

9 Effects on Fauna and Flora

Objectives and Scope of Assessment

- 9.1 The objective of this Ecological Impact Assessment (EclA) was, initially, to establish the extent and ecological status of the area likely to be impacted by the development of the proposed A8/M8 junction at Bishopton in a scoping exercise. Details of the survey area are shown in Figure 1 of Starling Learning's *A8/M8 Ecological Survey Update* (Appendix 9.2). The area so defined was the subject of desktop and walk-over surveys. Following discussion with Scottish Natural Heritage (SNH) the precise scope and programme of season-specific ecological surveys was formulated and subsequently carried out using qualified and experienced ecological surveyors. The information gathered and conclusions drawn were used to inform the design, to minimise potential impacts upon the ecological receptors identified. None of the information retrieved suggested that the survey needed to be extended beyond the initial survey area. The site assessment was simplified by the nature of the habitat to be lost and disturbed, which is largely farmed fields and managed roadside planting adjacent to the A8 and M8. There would, however, also be disturbance and loss of a small section of the eastern boundary of established reedbeds and the northern tip of a Site of Interest for Nature Conservation (SINC, a non-statutory designation) (see Figure 9.1 and Appendix 9.4).
- 9.2 The scale of the potential impacts and the sensitivity of these receptors were examined more closely in the refinement of the proposed design and formulation of appropriate mitigation and compensation measures.

Methodology

- 9.3 The EclA process broadly follows the Institute for Ecology and Environmental Management's (IEEM) *Guidelines for Ecological Impact Assessment in the United Kingdom* (2006). Following desk-top survey of the site and wider area, the land surrounding the proposed A8/M8 motorway junction was examined for the presence of wildlife, of protected species in particular, to establish the ecological resources likely to be impacted by the proposed development. The scope, extent (zone of influence) and timing of the surveys were determined following discussion with Scottish Natural Heritage (SNH). SNH also provided more formal feedback at the Scoping Stage (Chapter 4). The main issues for SNH were pre-construction checks for protected species and an examination of impacts on the SINC (raised peat bog). Ecological survey of habitats was conducted following best practice methodology (JNCC, 1993, and as amended in 2010 for survey post this date) and included visual inspection of the site and adjacent habitat; survey for other ecological receptors was carried out according to then current best practice, described in the relevant sections below; where there is departure from best practice by the surveyors, the reasons are explained. Habitat compartments around the site were noted and the potential for movement of fauna between habitats was also examined. The presence (or potential to support) protected species was recorded as was the presence of any invasive species present. The value (sensitivity) of the ecological resource was also assessed in order to assess the potential short- medium- and long-term impacts. The first site surveys were undertaken in late June and August 2006. Subsequent site surveys were carried out in 2010 (Appendix 9.1), 2011 (Appendix 9.2), 2012 (Appendix 9.3) and 2015 (Appendix 9.6).

Setting

- 9.4 The proposed junctions and slip roads are located on the intersection of the A8 and M8, approximately one kilometre south of Bishopton, Renfrewshire. The proposed motorway junction is shown in Figure 2.1. To help identify the areas of survey they are distinguished in the following description as Site A, Site B and Site C (Figure 9.2). Site A is located adjacent to and west of the M8 and to the east of a closed landfill site. The burn flowing through the site has been enlarged into four ponds with surrounding marsh; the watercourse currently receives runoff from the adjacent landfill site.

- 9.5 The burn flows under the M8 and joins the Lin Burn. The start of the slip road off the M8 extends into a small, wet woodland at the south end of site A. The proposed M8 east-bound slip road runs across Site B, and is located to the east of the M8. The road crosses the Lin Burn to join the M8. Site B largely comprises rolling agricultural land and hedgerows.
- 9.6 Site C comprises hedgerow and trees and a small portion of the field (improved grassland) adjacent to Craigmuir Farm, to the east of the motorway junction.

Qualifications of Surveyors

- 9.7 The following is a summary of the qualification of the surveying team: Liz Parsons BSc (Hons) Geography/Geology: Head of Company, co-ordinated survey, produced survey reports: CIEEM member, has held survey licenses for great crested newts, Hen Harriers, Barn Owls, and badger exclusion license; Joe Greenlees HND Countryside Management: ecological surveyor with Starling Learning since 1996. CIEEM member, has held survey licenses for great crested newts, Hen Harriers, Barn Owls, badger exclusion license; Jamie Manners BSc (Hons) Zoology: ecological surveyor with Starling learning since April 2000, has held licenses for great crested newts, Hen Harriers, Barn Owls; Diane Lyons BSc (Hons) Countryside Management: ecological surveyor with Starling Learning since April 2004.

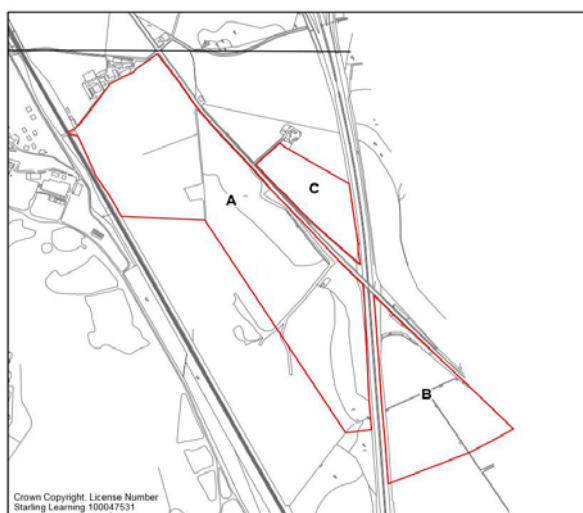


Figure 9.2 Survey areas, A, B and C.

Surveys

- 9.8 Protected species surveys have been carried out, focusing initially on water voles, bats and otters, the former because Site A represents potential habitat and the latter because otters and bats have been recorded in the area. Otters and all bats carry European protection²⁸, and are protected under the Wildlife and Countryside Act (1981), amended for Scotland (in the Nature Conservation Scotland Act 2004); other relevant legislation includes the Wildlife and Natural Environment Act (2011), which brought in new provisions governing the introduction of non-native species in Scotland, and the Nature Conservation (Scotland) Act 2004, which imposed a wide-ranging duty on Scotland's public sector to conserve biodiversity and protection of Scotland's natural heritage. The scope of the survey work was subsequently extended (detailed below) following an initial site inspection to ensure that potential species were investigated. For the initial survey, two visits were made to the site to carry out the survey work detailed below. The principal surveyors were Liz Parsons and Joseph Greenlees of Starling Learning, both of whom have extensive experience of wildlife survey and are very familiar with the survey area. These surveyors also undertook follow up survey work in 2010, 2011 and 2012, which

²⁸ The [Habitats Regulations 1994](#) as amended in Scotland) provide the protection afforded to European protected species (EPS) of animals and plants (those species listed on Annex IV of the Habitats Directive whose natural range includes Great Britain).

helped provide a clearer picture of the status of these animals at this location. Liz Parsons co-ordinated the survey update in March 2015 and was assisted by ecologists Davy Galbraith and Alan Wood.

9.9 The initial assessment included a desktop survey. Renfrewshire Council was approached and asked for information regarding the site. The Scottish Ornithologists Club, Clyde Branch (SOC) was approached for information on local bird populations. Keith Watson, a local botanist who carried out the Phase 1 Habitat Survey of Renfrewshire, was approached to investigate any significant known plant species in the area. The landfill operator, W.H. Malcolm was questioned regarding the construction of the existing ponds adjacent to the motorway. All of this work was informed by detailed knowledge of wildlife on the adjacent BAE Systems' Bishopton site, which was the subject of extensive and intensive survey to support the planning application for the remediation of the site and subsequent on-going survey to support this work.

Habitat Assessment

9.10 The whole site was walked and the habitats mapped. A brief description of the various habitats is given below. The Phase 1 Habitat Survey Map is shown below in an amended version of Starling Learning's Figure 2 (at Appendix 9.2).



Figure 9.3 Phase I Habitat Survey Map

SITE A

Pond, Marsh and their Margins

9.11 The burn runs in a ditch with fairly steep sides to the north end of the site (Photo. 9.1). The vegetation varies along its length, with areas of tufted hair grass (*Deschampsia caespitosa*), teasels (*Dipsacus fullonum*), greater willowherb (*Epilobium hirsutum*) and rosebay willowherb (*Chamerion angustifolium*) common throughout this stretch. The small burn has been extended as it flows south through the site into a series of four ponds and associated marsh. Each pond supports a large area of greater reedmace (*Typha latifolia*) (Photo. 9.2). Other

aquatic plants present include remote sedge (*Carex remota*), celery-leaved buttercup (*Ranunculus sceleratus*), tufted hair grass, reed canary-grass (*Phalaris arundinacea*), floating sweet grass (*Glyceria fluitans*) and marsh fox-tail (*Alopecurus geniculatus*). The ponds are shallow with a muddy silty substrate. East Fulwood Moss is an area of wet woodland (largely birch and willow) and raised bog with a large pond immediately to the south of the four ponds. This area has the status of SINC, referenced as S6, East Fulwood Moss (Appendix 9.4). A large part of this area is overgrown with greater reedmace. The 2010 and 2011 surveys show that the Greater reedmace has now grown extensively leaving few open areas in the ponds. These surveys also highlight the presence of celery-leaved buttercup – at the time of survey, only one of three recorded locations in Renfrewshire.



Photo. 9.1 The burn as it flows in a ditch through Site A (2014)



Photo. 9.2 Extensive margins to the ponds within Site A.

Grassland and Scrub

- 9.12 There are areas of grassland, largely comprising common species, including Yorkshire fog (*Holcus lanatus*), crested dog's-tail (*Cynosurus cristatus*), meadow foxtail (*Alopecurus pratensis*), meadow buttercup (*Ranunculus acris*), common spotted orchid (*Dactylorhiza fuchsia*) and northern marsh orchid (*Dactylorhiza purpurella*) to the edges of and separating the ponds. The fields adjacent to the ponds, over the former landfill site, are now used for agriculture.
- 9.13 There is an old section of road to the north of the site where rolls of silage are stored (Photo. 9.3). The embankment leading up to the A8 in this area is grassy with ruderal weeds such as rosebay willowherb and cow parsley (*Anthriscus sylvestris*) and scattered hawthorn (*Crataegus monogyna*) and willow (*Salix* spp.) scrub.
- 9.14 The field to the north of the A8 is currently under agricultural use. The hedgerow along the A8 is largely closely-cut hawthorn with occasional, solitary tree (mainly sycamore and a single young apple).
- 9.15 The area of SINC woodland surveyed has mainly birch and willow growing around the pond in this area. The ground to the northern end of the SINC is covered in reedmace (*Typha latifolia*).



Photo 9.3 Road across Site A, showing area of silage storage

SITE B

- 9.16 Site B comprises agricultural fields and hedgerow and a small area of young woodland/scrub to the existing road embankment. A small, triangular field immediately below the embankment supports a relatively species-rich grassland, including meadow buttercup (*Ranunculus acris*) and field scabious (*Knautia arvensis*) (Photo 9.4).



Photo 9.4. Species-rich grassland to the north of site B.

Agricultural Land

9.17 The agricultural fields are surrounded by hedgerows with occasional mature trees throughout.

Hedgerows

9.18 There are several mature hedgerows to the edge of Site B, mainly comprising hawthorn and dog rose (*Rosa canina*). There is hedgerow with a dense growth of brambles (*Rubus fruticosus* agg.) and nettles (*Urtica dioica*) growing on either side of the burn as it runs through Site B. There are also several standard trees along the length of the hedgerows, mainly ash (*Fraxinus excelsior*) and alder (*Alnus glutinosa*).

Burn

9.19 The Lin Burn is culverted to the east side of the A8. After meeting the small burn flowing from under the M8 it flows in a southeast direction in an open channel. The burn is small with a stony substrate and has steep, heavily-vegetated banks.



Photo 9.5 Lin burn, in steep, heavily-vegetated banks

Woodland

9.20 There is a small area of hazel (*Corylus avellana*) coppice, young woodland (15 – 20 yrs) and scrub, which runs alongside the A8. The woodland comprises a mixture of wild cherry (*Prunus avium*), ash (*Fraxinus excelsior*), silver birch (*Betula pendula*), Scots pine (*Pinus sylvestris*) and sessile oak (*Quercus petraea*); scrub species include blackthorn (*Prunus spinosa*) and hawthorn (*Crataegus monogyna*). The ground flora is generally species poor but includes figwort (*Scrophularia nodosa*) and broad-leaved helleborine (*Epipactus helleborine*). There are a number of garden escapes in this area, including snowberry, ground elder (now naturalised) and garden loosestrife.

SITE C

9.21 The proposed new road alignment will cross a mature hawthorn and blackthorn hedgerow at site C. Some of the hedgerow has been left uncut, some of was severely cut in 2006 management works.



Photo 9.6 Unmanaged hedgerow at Site C



Photo. 9.7 Severely cut hedgerow at Site C (2006)

Surveys and Method of Approach

Breeding Bird Survey

9.22 The standard mapping census technique (IBCC 1969, Bibby *et al* 199m²) as adopted by the British Trust for Ornithology (BTO) for the Common Bird Census was used to record birds across the survey area. Whilst it was quite late in the season, it was possible, during the two 2006 visits, to gain an indication of the breeding bird populations present.

Table 9.1: All bird species recorded (in *Voous* sequence *)

Mallard (<i>Anas penelop</i>)	Three females with broods of young recorded on ponds. The farmer at Craigmuir reported occasional sighting in the ditch at Site C.
---------------------------------	--

Moorhen (<i>Gallinula chloropus</i>)	Birds with juveniles recorded on all four of the ponds.
Woodpigeon (<i>Columba palumbus</i>)	Birds singing in woodland adjacent to A8.
Skylark (<i>Alauda arvensis</i>)	Three breeding pairs in fields of old landfill site
Swallow (<i>Hirundo rustica</i>)	Several birds recorded feeding over ponds
House Martin (<i>Delichon urbica</i>)	Three birds feeding over ponds
Wren <i>Troglodytes troglodytes</i>)	One breeding territory in vegetation next to ponds and one in area of woodland at Site B.
Robin (<i>Erithacus rubecula</i>)	One breeding territory in woodland and one in hedge at Site B.
Sedge Warbler (<i>Acrocephalus schoenobaenus</i>)	A family recorded in vegetation next to burn at Site A and two territories next to Lin Burn at Site B.
Whitethroat (<i>Sylvia communis</i>)	One breeding territory in scrub near burn at Site A and one in hedgerow at site B.
Willow Warbler (<i>Phylloscopus trochilus</i>)	Several territories in Barangarry woods (Fulwood Moss) and one territory in hedgerow at Site B.
Blue Tit (<i>Parus caeruleus</i>)	One bird recorded feeding in hedgerow at Site B.
Rook (<i>Corvus frugilegus</i>)	Several birds feeding in fields of old landfill site.
Carrion Crow (<i>Corvus corone</i>)	Two birds feeding in fields of old landfill site.
Starling (<i>Sturnus vulgaris</i>)	Twenty birds recorded in fields at landfill site.
House Sparrow (<i>Passer domesticus</i>)	A flock of 20 birds were seen feeding in the hedgerow at Site C.
Chaffinch (<i>Fringilla coelebs</i>)	One breeding territory on hedgerow at Site B.
Bullfinch (<i>Pyrrhula pyrrhula</i>)	One bird calling in Barangarry Woods (Fulwood Moss) SINC.
Greenfinch (<i>Carduelis chloris</i>)	One bird calling in field at old landfill site.
Yellowhammer (<i>Emberiza citrinella</i>)	The agricultural land around Site B is a good site for breeding yellowhammers. A total of five singing males were recorded. The area around Bishopton is known to the SOC for this population. It is attractive to this rapidly declining species as there are good mature hedges for nesting and a winter food source due to the cultivation of cereals.
Reed Bunting (<i>Emberiza schoeniclus</i>)	One territory in vegetation beside the Lin burn and two in the pond within the SINC.

* Voous order is a widely used scientific sequence devised by Dr K.H.Voous that places closely related species next to each other.

9.23 There are three red-listed species nesting within the survey area: skylark, yellowhammer and reed bunting. Skylarks should be relatively undisturbed as they nest in the fields of the old landfill site far enough away from the road and roundabout developments. There may be some loss of habitat for yellowhammer and reed bunting with the disturbance to the hedgerow and its surrounding vegetation at Site B. Further information was gathered on birds in the 2010, 2011 and 2015 surveys. These show that the land holds some significance for farmland passerines, including Yellowhammer, Skylark and Tree Sparrow.

Mammal Survey

9.24 The surveys concentrated on European Protected Species, *Pipistrelle* bat and otter (*Lutra lutra*), which are known to be present in the wider area (both have been recorded on the BAE Systems site at Bishopton). However, all mammals observed using the site were noted.

Methodologies

- 9.25 The site was surveyed following best practice methodology given in the Water Vole Conservation Handbook (English Nature et al 2006 2nd Ed.) Survey was carried out from the banks or within the water where safe to do so and aimed to examine a two-metre width of bank from the water's edge. Access was available to all of the waterbodies and burns up till the point at which they emerged or disappeared into culvert beneath the M8.
- 9.26 Survey for otters followed the methodology set out in the Chanin, P. (2003). *Monitoring the Otter: Conserving Natura 2000 Rivers*. Monitoring Series No. 10. All water bodies within and adjacent to the site were examined and the Lin burn to the east of the motorway followed for a minimum distance of 250 m. In the otter survey, particular attention was paid to small islands and large boulders in mid-stream, as these are the usual sites to find otter spraints and feeding remains. The area was intensively surveyed for suitable holt locations, such as under large tree roots near to the water edge, and for evidence of use by otters. The muddy edges of the ponds were examined for footprints. Signs of water voles (such as lawns, tracks, gnawings, faeces etc) were searched for at the same sites at the same time, and no evidence was found.
- 9.27 Bat survey followed BCT *Bat Survey – Good Practice Guidelines* (2007) in respect of timing of surveys for a low potential, medium-sized site. The site was surveyed with transect survey in each of the seasons, in spring 2006, 2009, autumn 2010, summer 2011 and autumn 2012, thus building up a picture of the use by bats of this site over the years and seasons. Assessments was made of the suitability of the habitat for roosting and feeding bats. Following day time walk-over survey, survey transects, begun up to an hour before sunset and two hours after sunset in optimal survey conditions; survey concentrated on identifying potential roost sites, key foraging areas and commuting routes. *Bat detectors of the type BATBOX III were used throughout.*
- 9.28 Each of the survey areas was examined for reptiles (and amphibians) by examination beneath stones and logs, with careful replacement of the cover after examination. Such survey was conducted on several occasions during optimal season and weather conditions. There are no reptiles recorded within 1km of the site and the M8/A8 would represent major barriers to movement; it was judged that no reptiles were likely to be present and no further survey would be required.

Policy Framework

- 9.29 The site is subject to National and Local Biodiversity Action Plans. At a national level the Scottish Biodiversity Strategy (Scottish Executive 2004) places a duty of care on public bodies to further the conservation of biodiversity in Scotland, the execution of which is implemented through Local Biodiversity Action Plans. This is being revised through '2020 Challenge for Scotland's Biodiversity' (2013). In addition there is the Scottish Biodiversity List which identifies animals, plants and habitats of principal importance at the local level.
- 9.30 Renfrewshire, East Renfrewshire and Inverclyde Local Biodiversity Action Plan (LBAP) is a partnership forum which aims to protect and enhance biodiversity. It has prepared 18 action plans for seven habitats and 11 species including the following which are of particular relevance to this site. Habitats: dwarf shrub heath; mires; unimproved grassland; rivers and streams; standing open water; broadleaved and mixed woodland; urban and scrub. Species: otter; aspen; green hairstreak; Atlantic salmon; brown hare; Lesser whitethroat; house sparrow and water vole. The relevant planning policy background is addressed in Chapter 5. This includes a review of Scottish Planning Policy which gives guidance on the maintenance and enhancement of biodiversity and local planning policies on nature conservation. The most significant local policy is embedded in the Renfrewshire Local Plan where Policy ENV3 relates to SINC; the objective is to enhance and protect designated sites.

- 9.31 Taking the policy framework in the round and accounting for the species and habitats present, the relationship to East Fulwood SINC and the package of mitigation, the scheme is in positive compliance with key aims and objectives of local and national policy.

Findings

Mammals

- 9.32 No bat roost was recorded on site, but pipistrelle bats (*Pipistrellus pipistrellus/pygmaeus*) were recorded feeding at Site A beside the ponds and in the edge of the woodland of the SINC. Two pipistrelle bats were also recorded feeding beside the woodland strip at Site B. The hedgerows running parallel with the A8 generally appeared to be being used for feeding/commuting, with activity suggesting the possibility of a bat roost at the neighbouring farm.
- 9.33 Only old otter spraints were found in the 2015 update survey. One was at the edge of the mitigation ponds and the other at a drainage ditch alongside East Fulwood Moss SINC. However, no protected structures have been encountered. There is no need for mitigation for otters. The Lin burn is a deep culvert for a distance of about 150 metres on the east side of the M8 and in approximately 50 m of 300 mm diameter pipe beneath the M8. The burn is small and shallow and the only fish species noted was stickleback. It seems too small and lacking in suitable food to be of interest to otter. The fact that the burn is culverted beneath the motorway would make it even less interesting to otters as they are unlikely to pass through a culverted section of this length.
- 9.34 No signs of water vole (*Arvicola amphibius*), including tracks, faeces, gnawings, burrows, lawns etc., were observed. Incidentally, fox (*Vulpes vulpes*) tracks were noted in the mud around the ponds. Roe deer (*Capreolus capreolus*) tracks and paths were also noted at Site B where they crossed the burn.
- 9.35 Badger tracks (*Meles meles*) were recorded in the woodland at Site B. Potentially suitable areas such as the bank adjacent to the A8 were thoroughly checked and no setts were found. There are paths into the woodland leading out on to the pasture and leading to the other side of the road. It is therefore assumed that the badgers use this wood for feeding only. In the 2015 update survey there were no signs that badgers were using any of the site area.

Amphibians & Reptiles

- 9.36 The ponds and the burn were sampled using a net and were walked-through to look for amphibians. Suitable refuge sites were also examined. There are no records of great crested newts (*Triturus cristatus*) in this area, which is generally beyond the northern limit of its range, and, the nearest record is north of the River Clyde.
- 9.37 The ponds and the burn were sampled using a net and were walked-through to look for amphibians. Suitable refuge sites were also examined. A HSI assessment was carried out for great crested newts (GCNs), *Triturus cristatus*, following the best-practice methodology as set out by Oldham et al (2000)²⁹. In terms of the key features of the analysis: the location is marginal, with a total pond area near optimal for GCNs with a series of connected bodies totalling a surface area of approximately 500 m²; the pond rarely dries out; the water bodies on site were constructed to provide surface water storage and treatment for nutrient leakage from the adjacent landfill and, as a result, the water quality is generally poor as a result of eutrophication, obvious in localised algal blooms; there is no shade at the pond; there is minor use of the pond by fowl; large numbers of stickleback were observed during the original survey; there is only one pond, immediately to the south of this area, which is very dark brown in colour as a result of the high levels of tannins released into the water from the adjacent bog, which is not separated from the site by a major barrier; the surrounding sheep-grazed fields and proximity of the

²⁹Oldham, R. S., Keeble, J., Swan, M. S. S. & Jeffcote, M. (2000), Evaluating the Suitability of Habitat for the Great Crested Newt (*Triturus cristatus*). Herpetological Journal 10 (4), 143 – 155.

motorway represent poor habitat for GCNs; the macrophyte cover of the pond is between 90 and 95%. The same analysis was conducted for the pond within the SINC. The results set out below indicated that the water bodies represent poor and below average habitat for GCNs, respectively. Torch survey was used over two nights during optimal breeding season and weather conditions in 2009 and only frogs were observed. It was concluded that given the poor HSI results and further, confirmatory evidence from the torch searches and absence of record of GCNs within 1 km of the site, no further GCN survey was deemed necessary or applied.

9.38 **Table 9.2 : HSI for GCNs**

Index	Water body on site	Water body in adjacent SINC
S1 Location	0.5	0.5
S2 Pond area	0.9	0.1
S3 Pond drying	1	1
S4 Water quality	0.33	0.67
S5 Shade	1	1
S6 Fowl	0.67	0.67
S7 Fish	0.01	0.33
S8 Ponds	0.66	0.66
S9 Terrestrial habitat	0.33	0.67
S10 Macrophytes	0.82	0.9
Total SI (S1xS2xS3xS4xS5xS6xS7xS8xS9xS10)	0.0001777	0.00294
Score	0.42	0.55

9.39 No reptiles were recorded at this site during any of the surveys; given that there were no record of reptiles within 1 km of the site, it was concluded that no reptiles were present and no further survey carried out.

Butterflies and Other Invertebrates

9.40 The whole site was walked and all butterflies observed recorded. Food plants were searched for caterpillars. The ponds were sampled for aquatic invertebrates. Records were noted of terrestrial invertebrates of interest around the site.

9.41 A large clump of nettles (*Urtica dioica*) covered in caterpillars of peacock butterflies was recorded adjacent to the A8 at Site B. Meadow Brown butterflies (*Maniola jurtina*) are numerous around the grassland adjacent to site A and in the grassy field at Site B.

9.42 Invertebrates at the ponds are detailed in Table 9.3 (2006).

Table 9.3: Aquatic invertebrates recorded in ponds and Lin burn

Name	Details
Damselfly (<i>Coenagrion puella</i>)	Adult damselflies very common feeding and mating around the ponds.
Four-spotted Chaser (<i>Libellula quadrimaculata</i>)	Three adults recorded feeding around the ponds

Pond skater (<i>Gerris lacustris</i>)	Very common in ponds
Water boatman (<i>Corixa</i> spp.)	Very common in ponds shallow water
Water cricket (<i>Velia caprai</i>)	Water cricket adults fairly frequent on burn at Site B.

- 9.43 Sticklebacks (*Gasterosteus aculeatus*) were very common in the ponds at Site A.
- 9.44 Information on the SINC available from Renfrewshire Council is shown in Appendix 9.4. The SOC-held records indicate breeding moorhen on the ponds in previous years. The record of celery-leaved buttercup (*Ranunculus scleratus*) is one of only three recorded locations within Renfrewshire. The purpose of the ponds (which are outwith the SINC), which were constructed by W.H. Malcolm, was to collect possible leachate from the landfill site before releasing it into the watercourse and, so, the ponds will possibly receive additional nitrogen and phosphorus in any leachate collected.

Impacts on Protected Habitats Beyond the Site Survey Boundary

- 9.45 A number of habitats found at or close to this site are also protected under Scottish and European legislation. There are a number of Special Protection Areas (SPAs) within proximity of the Bishopton site, including the Inner Clyde Estuary to the north of the site, downstream from Newshot Island; Black Cart, located to the east of the site, an important foraging area for wintering Icelandic whooper swans. More details on these SPAs can be found on the SNH website (www.snh.gov.uk).
- 9.46 A number of SSSIs also lie close to this site, including Black Cart (also a SPA), Dargavel Burn north of Kilmacolm (an active area of valley mire), Formakin to the west of Bishopton (a dry, herb-rich grassland) and Inner Clyde (also a SPA), all of which can be viewed on the Renfrewshire website <http://gis.renfrewshire.gov.uk/lvinternet> and the SNH website (www.snh.gov.uk).
- 9.47 The most significant of these in terms of the proposed junction works is Black Cart which lies approximately 1km to the east of the proposed junction. Black Cart is significant as habitat for whooper swans. There is no record of whooper swans feeding in the fields at this M8/A8 location.
- 9.48 A number of sites of importance for nature conservation (SINCs) lie adjacent to the location of the proposed junction, with two SINCs lying within 200m of the site, as illustrated in Figure 9.4 below.

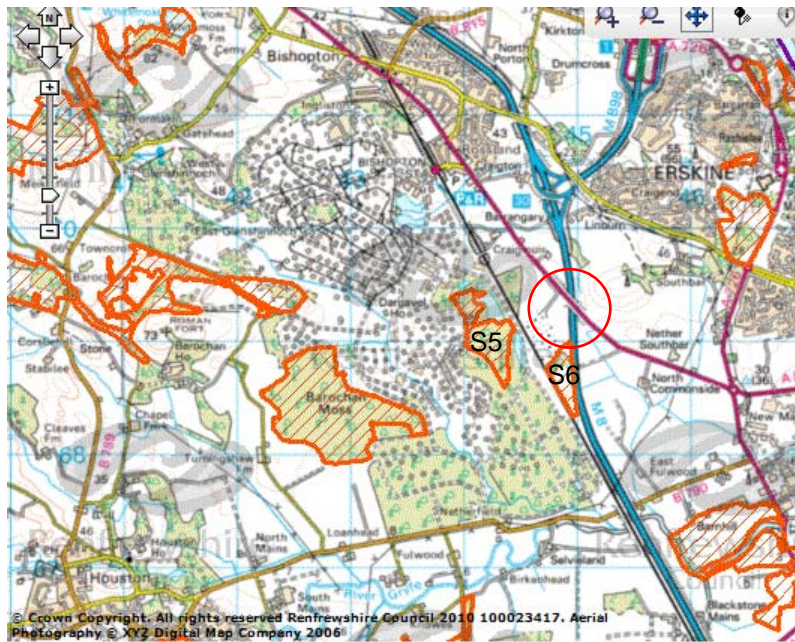


Figure 9.4 SINCs around A8/M8 junction (red circle)

9.49 These SINCs and habitats are:

- S5: an area of lichen heath/birch scrub lying to the west of the site, beyond the railway line - within the BAE Systems's site.
- S6: East Fulwood Moss, lowland raised bog. Full details of the SINC and its listing are given in Appendix 10.4.

Potential Impacts and Mitigation Measures

9.50 As discussed in the IEEM EclA Guidelines, assigning ecological value by means of pre-defined scoring cannot accommodate all of the factors that should influence the definition of value, for example in relation to the size or conservation status of species populations or, for habitats, their quality. The Guidelines therefore proposed an approach to valuing features that involves professional judgement, based on available guidance and information, together with advice from experts who know the locality of the project and/or the distribution and status of the species or features that are being considered. The judgements provided are therefore based on such factors as the habitat and species being disturbed and the length and nature of the impacts, and includes such features as legal protection, local rarity (BAPs and HAPs), supporting and amenity value etc., and arrived at by consensus between the ecological surveyors, who have in depth knowledge of the ecology of the area and the Ecological Project Manager for the adjacent BAE Systems Bishopton site – the known breeding location of otters and badgers and several other protected species in this area.

9.51 The following scale was used to assign probability to the judgement of the likelihood of events:

- Certain/near-Certain: probability estimated at 95% chance or higher.
- Probable: probability estimated above 50% but below 95%.
- Unlikely: probability estimated above 5% but less than 50%.
- Extremely Unlikely: probability estimated at less than 5%.

9.52 Reference is also made, where appropriate, to the following features:

- positive or negative;
- magnitude;
- extent;
- duration;
- reversibility; and
- timing and frequency

9.53 The following lists the potential key receptors, species and habitats, and the potential impacts upon them. The Significance of Impacts was arrived at following the method set out in SNH's *Environmental Assessment Handbook*, D.8 and took into account the sensitivity, magnitude, likelihood, comparison with a base-line 'do-nothing' situation and expression of the significance in relative terms.

Receptor	Potential Impact	Significance without Mitigation and Confidence Level	Duration of Impact	Mitigation/ Compensation
SINC	Loss of grassland/scrub and possibly some solitary trees in small area of scrub in north-west corner of Fulwood Moss. Disturbance of wildlife, including, potentially, nesting birds. Fulwood moss is separated from the main area of development by a drainage channel and burn, so unlikely to be any impact on hydrology.	Small area of limited extent of scrub habitat lost to development. Negative disturbance to wildlife (which has already adjusted to motorway) would be <i>minor at regional level and certain</i>	Development construction and beyond. Permanent loss of area. Duration of tree establishment.	Creation of biodiversity elsewhere within the development in advance of disturbance. Replacement planting of trees. Avoid scrub, tree, hedge removal or wetland habitat, such as tall reed capable of providing nesting sites during bird-breeding season (approx. March to September depending upon weather conditions)
Reed beds	Disturbance of eastern edge. Creation of three new SUDS reedbeds.	Approximately 1/3 rd of existing pond margins disturbed. Existing ponds currently filling-in, and will give way to scrub without management. <i>Significant negative disturbance at the site level and certain</i> Significant, (positive) addition to biodiversity at the local level: <i>probable in the medium term</i>	Temporary disturbance during construction. Re-establishment within a year of development. Permanent enhancement of biodiversity.	Avoid breeding period of amphibians (approximately March – June) and water fowl. Remove and reintroduce vegetation to pond edge, and enhance with native species of local provenance. Use material from existing ponds to ‘inoculate’ new ponds. Ensure no invasive species present.
Hedgerow	Loss of hedgerow.	Loss of approximately 300 m mature but species-poor hedgerow. Significant negative impact at the local level: <i>certain</i>	Loss through construction. Approximately 5 years to significant establishment of new hedgerow.	Creation of new hedgerows and application of sympathetic management. Avoid bird-breeding season for removal. Possible excavation and re-establishment of existing hedgerow. Enhance hedgerow with additional native species and solitary trees.

Woodland	Loss of number of young trees; severance of small area of woodland.	Approximately half of small area of woodland lost. Significant, negative impact at the local level: <i>certain</i>	15-20 year regeneration.	Replacement woodland planting. Consider excavation and replanting of excavated trees and shrubs. Avoid bird breeding season. Enhance planting with additional native species of local provenance.
Bats	Loss of feeding habitat for pipistrelles. Disturbance due to lighting *. Creation of new feeding habitat that may attract additional species	Relatively minor, negative disturbance at the local level, relatively minor change to the status quo: <i>probable</i> New lighting largely associated with existing motorway lighting, Impacts ² on recorded species (<i>Pipistrelle</i>) less significant than woodland-dwelling species. Severance of commuting/ foraging routes near motorway junction with relatively minor loss of habitat. Significance, minor negative at the local level: <i>probable</i>	Loss throughout construction Effects of lighting from construction onward. Valuable new ponds creating habitat value. Recovery within a season of construction.	Creation of feeding corridors. Retention of dead/dying trees as potential roost site and creation of open water bodies with extensive marginal vegetation. Creation of new travelling routes through extensive planting. Provision of bat boxes as enhancement of breeding opportunities in advance of development. This represents an appropriate level of pre-construction mitigation.
Farmed fields	Loss to construction; severance of small area of grassland.	Some loss of relatively species-rich grassland. Sheep currently accessing area and grazing off sward – likely to continue to do so in the absence of re-instated fencing. Minor at the local level: <i>certain</i>	Permanent loss of agricultural production, from construction onward. Enhancement of relict area for biodiversity.	Creation of and sympathetic management of species-rich neutral grassland, typically including red fescue (<i>Festuca rubra</i>), smooth meadow-grass (<i>Poa pratensis</i> agg.), crested dog's-tail (<i>Cynosurus cristatus</i>), Yorkshire fog (<i>Holcus lanatus</i>), knapweed (<i>Centaurea nigra</i>), lady's bedstraw (<i>Galium verum</i>), ox-eye daisy (<i>Leucanthemum vulgare</i>), red clover (<i>Trifolium pratense</i>), yarrow (<i>Achillea millefolium</i>) and yellow rattle (<i>Rhinanthus minor</i>).
Birds	Loss of feeding/nesting habitat	Loss of small area of woodland and approximately 300m hedgerow. <i>Minor, negative impact at the local level: certain</i>	Medium term (5 yr +) loss of hedgerow and woodland (10 yr +). Commencing with construction.	Creation of new feeding habitat. Provision of appropriate nest boxes to provide interim nesting locations in advance of development. Avoidance of bird breeding season.

Badgers	Loss of feeding habitat Avoidance of road-kill	Relatively minor loss of habitat and negative impact at the local level: <i>probable</i> . Introduction of underpass, significant positive at the local level: <i>probable</i>	Short-term disturbance during construction. Long-term disturbance from increased lighting and traffic flows. Introduction of badger underpass likely to provide significant benefits for the safe access to grazing in the short to longer term.	Maintenance of species-rich grassland. Provision of pass beneath new section of road to accommodate outward migration of badgers from Bishopton site (a known breeding location).The location and landscaping associated with the underpass is illustrated in Appendix 9.5. Follow best practice procedures (Highways Agency (1998) <i>Design Manual for Roads and Bridges</i> Volume 10) in the location of underpass (e.g., avoid street lighting, provide vegetative cover for access and egress to and from underpass etc.).
---------	---	---	--	---

* The Bat Conservation Trust has produced an information leaflet entitled *The Impact of Lighting on Bats* (which is based on a document produced by Dr J. Jones, May 2000). This leaflet details how artificial lighting can affect the feeding behaviour of bats. Studies have shown that certain species of bats, such as Leislars, Serotine and Pipistrelle, will swarm around White-Mercury-type lighting, feeding on insects. This behavior, however, is not true for all bat species.

9.54 Figure 10.13 shows the proposed road layout and landscape.

9.55 The existing leachate ponds have become fairly-well established and provide a rich habitat for a variety of wildlife as well as serving their purpose of collecting and treating leachate. There will need to be re-engineering of the eastern boundary of the ponds, but this should not create a major disturbance. Vegetative material from these ponds could be selectively removed to inoculate the three new SUDS ponds. The new SUDS ponds are located adjacent to existing hedgerow to maximise habitat potential/feeding corridors.

9.56 The disturbance to the SINC should be minimal as the off-slip road is proposed to start at the edge of the woodland and involves the removal of only a very narrow strip. There is no disturbance to the pond within the SINC and removal of the woodland will be kept to a minimum in the possible removal of a small area of scrub on the edge of the SINC, with replacement planting on completion of the engineering works.

9.57 It will be necessary to remove trees at the side of the M8 at Site B. This should be kept to the minimum, with tree protection measures applied to ensure minimal disturbance and replacement planting for any trees lost.

9.58 The impact on the species-rich grassland will be relatively limited as only a small area is to be disturbed for the road construction. However, as part of the mitigation, it may be possible to translocate turves to establish grassland in the isolated area of field adjacent to the motorway.

9.59 The hedgerow will be protected where possible, as this is a mature hedge. While species poor, it provides habitat for wildlife. New hedgerow and trees will be planted to provide alternative habitat. Additionally, an extensive area of gorse (*Ulex europaeus*) and birch shrub is to be provided, as this is particularly attractive to nesting yellow hammers (*Emberiza citronella*) that frequent the area. The excavation and re-planting of hedgerows can be successful especially where the existing hedgerow is well maintained and the space in which the roots extend are restricted (i.e., by physical barriers such as footpaths or roads, or where trimmed by ploughing etc) and should be considered in this instance.

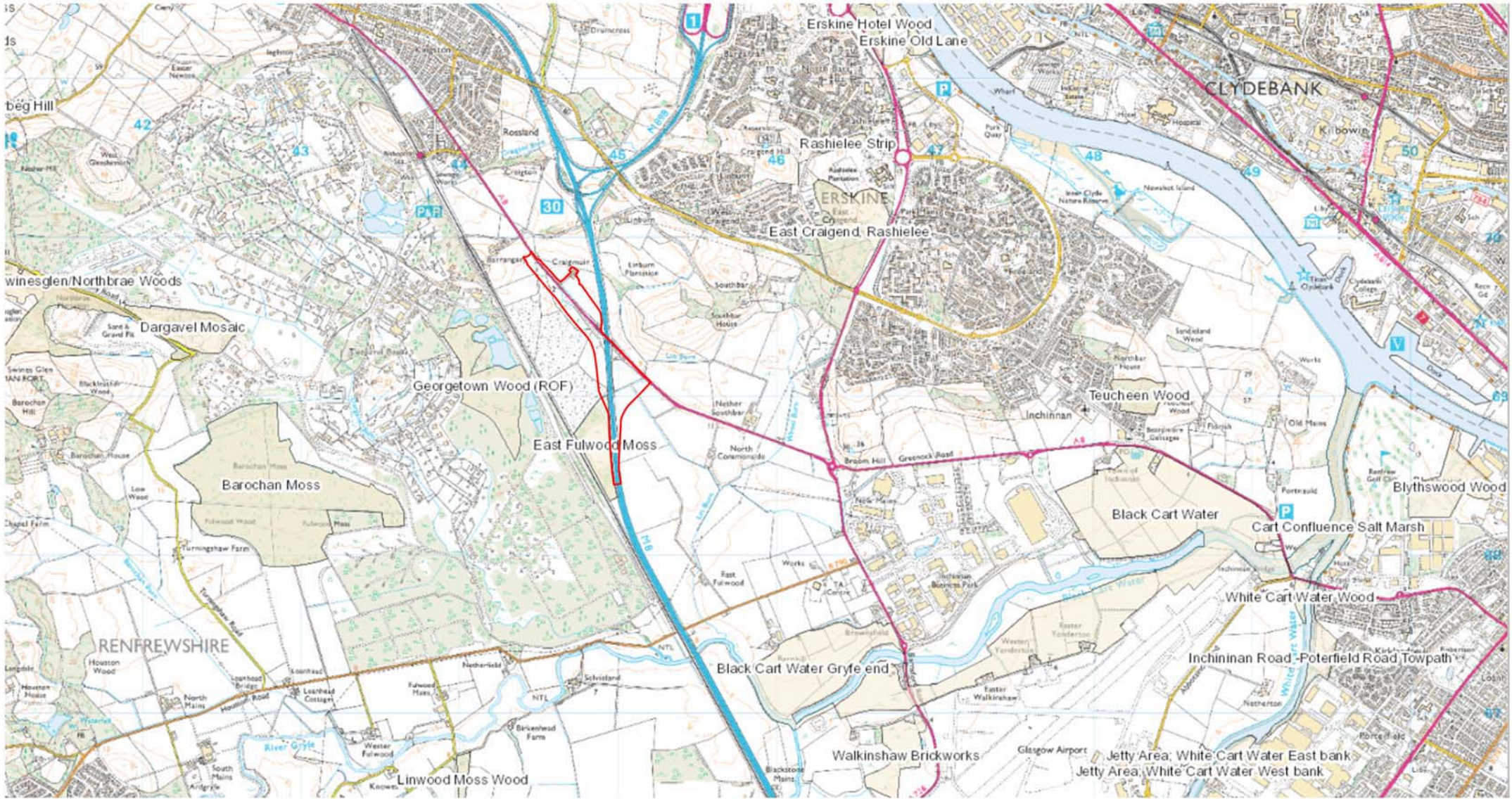
9.60 Although no evidence was found in any of the bat surveys for the use of the large standard ash in the hedgerow within Site B as a bat roost, this tree is to be retained as potential roosting habitat. Several old limbs have fallen off creating hollows, which appear highly suitable for birds to nest in and there is potential for future use by bats. This potential should be further enhanced by the provision of bat boxes or the installation of roosting features (e.g., cutting suitable hollows in the tree). Disturbance of the tree can be avoided entirely during the construction works; a suitable barrier (such as Heras fencing) should be erected at a distance from the tree, to be agreed with a qualified ecologist, in advance of the works and working methodology agreed to avoid physical disturbance of the tree during the construction of the slip road.

Assessment of Impacts Post Mitigation and Residual Impacts

9.61 The busy A8 and M8 represent significant barriers to the movement of wildlife; the construction of the slip roads and related infrastructure will not add significantly to this existing situation. The provision of a badger underpass on the A8 at a location known to be used by badgers (a badger fatality was recorded at this location in 2012), however, should help reduce the risk of injury/mortality of badger crossing the A8 and would be a positive benefit of the proposals. The impacts of the probable increase of traffic on to and off the A8 at this location in terms of noise and disturbance and risk to collision with wildlife should be largely balanced by the decrease in speed of vehicles at this point with the introduction of roundabouts on to the A8 at the ends of the slip roads. There is likely to be an increase in night-time illumination at this point, but its impacts on the wildlife, bats in particular, are unlikely to be significant over and above the given situation, given that only pipistrelles, which are less sensitive to light pollution, are recorded at this location. The provision of new habitat as outlined in detail within the proposals should see positive impacts in terms of enhancement of biodiversity in the longer term. As the proposed slip road works will only clip the small area of scrub in the north-western corner of the SINC and given that the slip road will be separated from the SINC by a drainage ditch and burn, there is unlikely to be any residual impact on the SINC post development.

9.62 A programme of pre, during and post construction work, in addition to provision of an Ecological Clerk of Works and programme of monitoring and methodology to agree changes to the construction or mitigation works, depending upon the finding of the monitoring work should be agreed within an Ecological Design and Management Plan (EDMP) (as implemented for the BAE Systems' Bishopton remediation work). The EDMP is a condition of the planning permission for the new junction. It has been drafted, submitted to Renfrewshire Council and the condition has been purified. The EDMP is in place to guide pre-construction, construction and post-construction stages of the works. It has been agreed by Renfrewshire Council in consultation with SNH.

Figures



— Land at Intersection of M8



Scale - NTS

**LAND AT THE INTERSECTION OF THE M8 MOTORWAY AND GREENOCK ROAD, INCHINNAN, ERSKINE
LOCATION OF SITES OF IMPORTANCE FOR NATURE CONSERVATION (SINCS)**