Aberdeen Western Peripheral Route

Environmental Statement 2007 Additional Survey Report: Breeding Birds

October 2007

JACOBS

Aberdeen Western Peripheral Route

Working in partnership

ABERDEEN CITY COUNCIL

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TRANSPORT SCOTLAND

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SOUTHERN LEG

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1 Introduction

1.1 General Background

1.1.1 This report is an additional survey report for the AWPR Environmental Statement 2007 (Jacobs UK Ltd, 2007). Its purpose is to update and complete Appendices A25.4 and A40.4 of the Environmental Statement based on findings of breeding bird surveys undertaken during summer 2007.

1.1.2 Part 1 provides baseline data for the Southern Leg study area, including that obtained from surveys undertaken in April, May and June 2007, and presents a full assessment of impacts on all breeding bird assemblages. Part 2 addresses the Fastlink study area findings.

1.1.3 The six component route sections in this report for the Southern Leg of the proposed scheme are as follows:

- Section SL1: Charleston to Bishopston (ch207200-203150);
- Section SL2: Bishopston to Burnhead (ch203150-200600);
- Section SL3: Burnhead to the A93 (ch200600-102870);
- Section SL4: A93 to Beanshill (ch102870-105900);
- Section SL5: Beanshill to the South Kingswells Junction (ch105900-108500); and
- Section SL6: South Kingswells Junction to Derbeth Overhills (ch108500-111200).

1.1.4 All tables and figures are structured in this manner.

1.1.5 The Ecological Impact Assessment (EcIA) was undertaken in accordance with the Design Manual for Roads and Bridges (DMRB) Volumes 10 and 11 (Highways Agency, 2001) and the Environmental Impact Assessment (Scotland) Regulations 1999, along with cognisance of draft Institute of Ecology and Environmental Management (IEEM) guidelines.

1.1.6 These studies included desk-based consultation to collate existing information about breeding bird populations in the area affected by the scheme and field surveys to provide current data about the status of breeding bird populations and the habitats that support them within the study area.

Aims

1.1.7 This report provides an assessment of the current status of breeding birds in the vicinity of the proposed scheme, an assessment of the potential impacts associated with the construction and operation of the scheme, provides appropriate mitigation measures and determines any residual impacts.

Study Area

1.1.8 For the purposes of this assessment, the study area is defined as comprising all areas within 500m either side of the centreline of the proposed scheme.

1.2 Legislation and Conservation Status of Birds

National Legislative Protection

Wildlife and Countryside Act (1981) (as amended) & Conservation (Natural Habitats & c.) Regulations (1994)

1.2.1 The Wildlife and Countryside Act (1981) (as amended) (WCA) is the principal mechanism for the legislative protection of wildlife in Great Britain and is the means by which the Convention on the Conservation of European Wildlife and Natural Habitats (the 'Bern Convention') is implemented.

1.2.2 The Conservation (Natural Habitats & c.) Regulations 1994 is the means by which the European Union Directives on the Conservation of Wild Birds (79/409/EEC, the 'Birds Directive') and Natural Habitats and Wild Fauna and Flora (92/43/FFC, the 'Habitat Directive') are implemented in Great Britain.

Nature Conservation (Scotland) Act 2004

1.2.3 The Nature Conservation (Scotland) Act 2004 (NCSA) implements a series of measures designed to improve the legal protection and enhance the conservation of the natural features of Scotland (natural features, in this context, refer to flora or fauna or geological or geomorphological features).

1.2.4 The NCSA comprises three parts: Part 1 introduces a general duty on public bodies to further the conservation of biodiversity in exercising any of their functions; Part 2 introduces significant changes to the existing arrangements for the establishment and protection of Sites of Special Scientific Interest (SSSIs); and Part 3 strengthens and extends the protection of birds, animals and plants by updating Part I of the WCA (1981).

1.2.5 Taken together, the WCA (1981) and NCSA (2004) ensure that all wild birds, their nests and eggs are protected, and make it an offence to;

- intentionally or recklessly kill, injure or take any wild bird;
- intentionally or recklessly take, damage or destroy the nest of any wild bird while it is in use or being built;
- intentionally or recklessly take or destroy the egg of any wild bird; or
- intentionally or recklessly disturb any wild bird listed on Schedule 1 while it is nest building or is at (or near) a nest with eggs or young; or disturb the dependent young of such a bird.

1.2.6 Wildlife and Countryside Act (1981) (as amended) Schedule 1 (WCA1i) bird species are protected by legal penalties at all times.

1.2.7 The acts additionally provide protection for Sites of Special Scientific Interest (SSSI) in particular those that are designated for the presence of wild bird populations.

UK Conservation Status of Birds

Biodiversity Action Plans

1.2.8 The UK Biodiversity Action Plan (UK BAP) was the UK's response to the commitments of the Rio Convention on Biological Diversity. The plan outlines action for 26 species of bird of conservation importance/concern and can be viewed at www.ukbap.org.uk.

1.2.9 In addition to having national priorities and targets, action for biodiversity was also taken at a local level. The local North East Scotland Biodiversity Partnership (LBAP) outlines action for 12 national and 22 local bird species and can be viewed at http://www.nesbiodiversity.org.uk/.

1.2.10 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 the local biodiversity action plans (LBAPs).

1.2.11 National Planning Policy Guidance 14 (NPPG 14) outlines planning guidance in relation to the conservation and enhancement of Scotland's natural heritage. NPPG 14 makes the presence of a protected species or habitats in addition to biodiversity habitats/species a material consideration in the assessment of development proposals and requires planning authorities to take particular care to avoid harm to species or habitats protected under the Wildlife and Countryside Act (1981) (as amended), European Directives and/or identified as priorities in the UK Biodiversity Action Plan.

Scottish Biodiversity List

1.2.12 The Scottish Biodiversity List was developed to meet the requirements of Section 2 (4) of the Nature Conservation (Scotland) Act 2004 and includes a list of species and habitats considered to be of principal importance for the purposes of biodiversity in Scotland. The list provides a guide to empower decision-makers such as public bodies, including local authorities, in implementing their duty to further the conservation of biodiversity in Scotland. At present, the Scottish Biodiversity List includes 93 species of bird and can be viewed at http://www.biodiversityscotland.gov.uk.

UK Birds of Conservation Concern 2002 - 2007

1.2.13 The leading government and non-government conservation organisations in the UK have jointly reviewed the population status of 247 bird species that are regularly found within the United Kingdom using data from national monitoring schemes.

1.2.14 On the basis of seven quantitative criteria, each species was placed on one of three lists, these being:

- Red (red list species are those that are globally threatened, have had an historical population decline in the UK from 1800-1995, a rapid (≥50%) decline in UK breeding population over the past 25 years or a rapid (≥50%) contraction of UK breeding range over the past 25 years);
- Amber (amber listed species have had an historical population decline from 1800-1995, but are recovering; population size has more than doubled over the past 25 years, a moderate (25-49%) decline in UK breeding population over the past 25 years, a moderate (25-49%) contraction of UK breeding range over the past 25 years, a moderate (25-49%) decline in UK non-breeding population over the past 25 years, or species with unfavourable conservation status in Europe also known as Species of European Conservation Concern (SPEC); and
- Green (green listed species have no identified threat to their population status).

1.2.15 Of the 247 species assessed, 40 species were red-listed, 121 were amber-listed and the remaining 86 were green-listed. With respect to this report, key species of conservation concern include CWA (1981) Schedule 1i, JNCC Red List, JNCC Amber List, UK BAP, LBAP and local status species.

2 Approach and Methods

2.1 Previous Survey Information

2.1.1 Consultation was undertaken with a variety of statutory and non-governmental organisations including Scottish Natural Heritage (SNH), North East Scotland Biological Records Centre (NESBReC), The Scottish Ornithologists' Club (SOC) and The Royal Society for the Protection of Birds (RSPB). These organisations were consulted regarding previous survey information/data and other bird records for the route corridor and wider study area.

2.2 Survey of Breeding Bird Assemblages

2.2.1 Survey methods were developed in consultation with SNH from 2004 to 2006. The following survey method section has been divided into two parts. The first part details the methods used to select and survey sites within the study area for breeding bird assemblages. The second part details the methods used to assess and evaluate habitats within the study area for breeding bird assemblages.

2.2.2 Field surveys were directed and undertaken by experienced ornithological surveyors with extensive background in identifying birds from observations and from bird song. The northern most part of the Southern Leg (ch207200 – 203150) was previously surveyed in 2004, the results of which were used to inform this assessment.

Development of Survey Strategy

2.2.3 A requirement to survey the route corridor of the proposed scheme for breeding bird assemblages to inform the EIA was identified as part of the initial scoping with SNH in late 2004.

2.2.4 A preliminary walkover survey of the study area corridor was undertaken in early 2006 (following consultation with SNH) to assist in the development of an appropriate survey strategy to sample the proposed route corridor for breeding birds.

2.2.5 When developing the survey strategy, it was determined through professional judgment together with consultation with SNH that a full survey of the entire route corridor of the proposed scheme for breeding bird assemblages would be impractical due to its large size and the excessive resourcing demands such a survey would require. Therefore, it was agreed to survey the route corridor by targeting potentially 'high value' habitats and sub-sampling remaining areas using Line Transects and Quadrats. These methods provided a pragmatic approach to producing a level of baseline information which could be practically achieved, and enabled the impacts on bird assemblages to be appropriately assessed.

2.2.6 The two-stage breeding bird survey strategy outlined below was developed using survey standards outlined in Bird Census Techniques (Bibby et al., 1992) and Bird Monitoring Methods (Gilbert et al., 1998). All methods were agreed through consultation with SNH in the form of an Ecology Scoping Report (Jacobs, 2006), prior to survey.

<u>Selection of Survey Areas - High Value Habitats</u>

2.2.7 The first stage in the selection of survey areas involved the identification and selection of high value habitats throughout the study area, referred to as Sites of Ornithological Value (SOV). Potential SOVs located within and/or adjacent to the study area were identified based on the initial walkover survey (as outlined in paragraph 2.2.4) together with an assessment of data supplied by NESBReC and analysis of aerial photographs and Ordnance Survey maps. Selected SOVs were then subject to a breeding bird survey (BBS).

<u>Selection of Survey Areas – Remaining Habitats</u>

2.2.8 The second stage in the selection of survey areas involved the use of a Line Transect and Quadrat sampling system to sample habitats (outside of the SOVs) throughout the remainder of the study area for breeding bird species. The Quadrat data were used to infer the importance of all remaining non-surveyed areas throughout the route corridor for breeding birds.

2.2.9 A single transect was centered over the Stage 1 Options (based on route option plans dated 23 January 2006), along which 500m square Quadrats were established on either side for the length of the transect. A sampling ratio of 1:3 was used resulting in 12 Quadrats being selected along the length of the transect (five of the Quadrats were previously surveyed in 2004). This level of sampling was considered to provide field survey data of sufficient representation to allow an

effective evaluation of the ecological importance of the breeding bird assemblages found in these areas and the remainder of the study area.

2.2.10 Approximately 32% (300ha) of the study area was surveyed for breeding birds using the Line Transect and Quadrat sampling system. The selected 12 Quadrats were subject to a breeding bird survey (BBS). The following habitats within each selected Quadrat were not surveyed:

- if the Quadrat overlapped the whole or part of any SOV (since these areas would be surveyed in any case); and
- urbanised zones including areas of existing road and/or hard standing.

2.2.11 Limitations to the surveys and the assessment are described in Section 2.6.

Breeding Bird Survey

2.2.12 An adapted breeding bird survey (based on the Common Bird Census (CBC) standard mapping technique, as developed by the British Trust for Ornithology (Bibby et al., 2000) was used to survey SOVs and Quadrats. It differed from a full CBC in the following ways:

- three rather than ten visits were made to each respective SOV/Quadrat; and
- each survey repetition was separated by more than ten days.

2.2.13 Definitions of the criteria used to classify observed birds (as either confirmed breeding, potentially breeding and non-breeding) are presented in Table 1.

Table 1 – Definitions of Breeding, Possible Breeding and Non-Breeding (Adapted from Buckland et al., 1990 and Gilbert et al., 1998)

Term	Definition
Breeding	A combination of registrations recorded on two or more survey visits including the following criteria: male in song (on the ground or in flight); male and/or female calling (on the ground or in flight); male and/or female repeatedly calling (on the ground or in flight); aggressive encounters between species (including the same species) perceived to be in the defence of territory, nest or young (on the ground or in flight); a nest (with or without an adult in attendance) or man made structure (e.g. nest box) containing either eggs or young; adult bird/s carrying nesting material or entering/leaving nesting-site with nesting material; adult bird/s carrying food or faecal sack or entering/leaving nesting-site with food or faecal sack; and calling and/or silent juveniles with or without parents in attendance.
Possible Breeding	A combination of registrations recorded on a single survey visit including the above criteria and the following: pair observed in suitable habitat in breeding season; and building or excavating a nest site.
Non Breeding	One or more registration (not including the criteria listed above) recorded on one or more survey visit including the following criteria: adult bird/s carrying or foraging for food not presumed to be for young/juveniles; and species observed during the breeding season but not in habitat deemed to suitable for nesting.

Incidental Observations

2.2.14 Observations of WCA1i, JNCC Red/Amber List and UK BAP / LBAP bird species present within or adjacent to each of the SOV and Quadrat, in addition to the wider study area, were noted during the other ecological surveys that were undertaken for the AWPR Environmental Statement 2007.

Dates of Survey

2.2.15 Reconnaissance surveys were undertaken from 23 to 26 January 2006. Breeding bird surveys were undertaken from 10 to 14 April 2006, 8 May to 3 June 2006, 12 to 28 June 2006, with further survey work carried out 23 to 25 April 2007, 23 to 25 May 2007 and 19 to 21 June 2007.

2.3 Habitat Assessment

Habitat Value

2.3.1 Information obtained from the Phase 1 Habitat Survey was used to inform a description of the habitats represented within each SOV and Quadrat and to assess their value for breeding birds. A habitat value (expressed as high, medium or low) was assigned to each SOV, Quadrat and Habitat Area (HA) (as described in Appendix A25.1 of the AWPR Environmental Statement 2007 (Terrestrial Habitats)) following the selection criteria in Table 2.

Table 2 – Habitat Assessment Criteria

Habitat Value	Criteria
High	Habitats considered offering abundant good quality foraging and nesting opportunities for birds.
Medium	Habitats considered offering scattered and/or localised nesting or foraging opportunities for birds.
Low	Habitats considered offering occasional or limited nesting and foraging opportunities for birds.

2.4 Evaluation of Ecology and Nature Conservation Value

2.4.1 The method for assessing the value of an ecological receptor uses all information collated in determining the baseline status of the resource. The ecological evaluation of a receptor is determined by reference to statutory and non-statutory site designations, the results of consultation, literature review (including reference to the North-East Scotland Bird Report (North-East Scotland Bird Club, 2004) and The Birds of North-East Scotland (Buckland et al., 1990)) and field surveys. The evaluation method incorporates a geographical framework where ecological receptors are assessed according to a series of criteria that are presented in Table 3, which are based on the Ratcliffe Criteria (Ratcliffe, 1977) used in the selection of biological SSSI and include size (extent), naturalness, rarity, typicality, vulnerability and position in an ecological/geographical unit.

2.4.2 The evaluation method additionally includes reference to the legal protection conferred on species or habitats as well as the conservation status of the receptor, such as presence of UK BAPs or LBAPs. These factors give rise to a level of conservation importance being assigned to species/habitats that reflects the geographical framework used in the evaluation process. Thus, for example, Birds Directive Annex 1 species such as little ringed plover that are protected by international legislation are referred to as internationally important in terms of their conservation status. Other species such as barn owl, which are identified as priority species in the North-East Scotland Biodiversity Action Plan (NES BAP) are referred to as regionally important species.

Table 3 – Evaluation of Ecological Receptor

Ecological Importance	Attributes of Ecological Receptor
International (European)	**Habitats** An internationally designated site or candidate site (SPA, pSPA, SAC, cSAC, Ramsar site, Biogenetic/Biosphere Reserve, World Heritage Site) or an area which meets the published selection criteria for such designation, whether or not it has yet been notified A viable area of a habitat type listed in Annex I of the Habitats Directive, or smaller areas of such habitat which are essential to maintain the viability of a larger whole Any river classified as excellent A1 and likely to support a substantial salmonid population. Any river with a Habitat Modification Score indicating that it is Pristine or Semi-Natural or Obviously Modified **Species** Any regularly occurring population of an internationally important species, which is threatened or rare in the UK. i.e. a UK Red Data Book species or listed as occurring in 15 or fewer 10km squares in the UK (categories 1 and 2 in the UK BAP) or of uncertain conservation status or of global conservation concern in the UK BAP A regularly occurring, nationally significant population/number of any internationally important species.
National (Scottish)	**Habitats** A nationally designated site (SSSI, ASSI, NNR, Marine Nature Reserve) or a discrete area, which meets the published selection criteria for national designation (e.g. SSSI selection guidelines) irrespective of whether or not it has yet been notified A viable area of a priority habitat identified in the UK BAP, or of smaller areas of such habitat which are essential to maintain the viability of a larger whole Any river classified as excellent A1 and likely to support a substantial salmonid population. Any river with a Habitat Modification Score indicating that it is Pristine or Semi-Natural or Obviously Modified. **Species** A regularly occurring, regionally or county significant population/number of an internationally/ nationally important species Any regularly occurring population of a nationally important species which is threatened or rare in the region or county (see local BAP) A feature identified as of critical importance in the UK BAP.
Regional (North East Scotland)	**Habitats** Sites which exceed the county-level designations but fall short of SSSI selection guidelines, where these occur Viable areas of key habitat identified in the Regional BAP or smaller areas of such habitat which are essential to maintain the viability of a larger whole Viable areas of key habitat identified as being of regional value in the appropriate SNH Natural Heritage Future area profile Any river classified as excellent A1 or good A2 and capable of supporting salmonid population. Any river with a Habitat Modification Score indicating that it is significantly modified or above. **Species** Any regularly occurring, locally significant population of a species listed as being nationally scarce which occurs in 16-100 10km squares in the UK or in a Regional BAP or relevant SNH Natural Heritage Future area on account of its regional rarity or localisation A regularly occurring, locally significant population/number of a regionally important species. Sites maintaining populations of internationally/nationally important species that are not threatened or rare in the region or county.

Ecological Importance	Attributes of Ecological Receptor
Authority Area (e.g. County or District) **(Aberdeenshire / City of Aberdeen)**	**Habitats** Sites that are recognised by local authorities (e.g. Sites of Interest for Nature Conservation (SINS) and District Wildlife Sites (DWS)) County/District sites that the designating authority has determined meet the published ecological selection criteria for designation, including Local Nature Reserves (LNR) selected on county/district ecological criteria (county/district sites where they exist, will often have been identified in local plans) A viable area of habitat identified in County/District BAP or in the relevant SNH Natural Heritage Future Area profile A diverse and/or ecologically valuable hedgerow network Semi-natural ancient woodland greater than 0.25 ha. Any river classified as good A2 or fair B and likely to support coarse fishery. Any river with a Habitat Modification Score indicating that it is significantly modified or above. **Species** Any regularly occurring, locally significant population of a species which is listed in a County/District BAP on account of its regional rarity or localisation A regularly occurring, locally significant population of a county/district important species (particularly during a critical phase of its life cycle) Sites supporting populations of internationally/nationally/regionally important species that are not threatened or rare in the region or county, and are not integral to maintaining those populations. Sites/features that are scarce within the county/district or which appreciably enrich the county/ district habitat resource
Local **(Immediate local area or village importance)**	**Habitats** Areas of habitat considered to appreciably enrich the habitat resource within the local context (survey area, parish or neighbourhood, e.g. species-rich hedgerows, ponds etc). Sites that retain other elements of semi-natural vegetation that due to their size, quality or the wide distribution of such habitats within the local area are not considered for the above classifications. Semi-natural ancient woodland smaller than 0.25 ha. Any river classified as fair B or poor C and unlikely to support coarse fishery. Any river with a Habitat Modification Score indicating that it is severely modified or above **Species** Populations/assemblages of species that appreciable enrich the biodiversity resource within the local context Sites supporting populations of county/district important species that are not threatened or rare in the region or county, and are not integral to maintaining those populations
Less than Local **(Limited ecological value)**	Sites that retain habitats and/or species that are of limited ecological importance due to their size, species composition or other factors. Any river classified as impoverished D and/or and with a Habitat Modification Score indicating that it is severely modified

Evaluation of SOVs, Quadrats and Habitat Areas

2.4.3 The ecological value of each SOV and Quadrat for breeding birds was determined by considering the evaluation of its habitat potential for breeding birds combined with the value of the breeding bird assemblage present.

2.4.4 An assessment of how representative the habitats found in each Quadrat or SOV in relation to the non surveyed areas adjacent was then made. The ecological value of the remaining Habitat Areas in each route section was then determined by evaluating their habitat potential for breeding birds combined with the knowledge of the breeding bird assemblages found in adjacent representative Quadrats or SOVs.

2.5 Impact Assessment

2.5.1 In the assessment of significance of impact, consideration has been given both to the magnitude of impact and to the sensitivity of the receiving environment or species. The sensitivity of a feature

was determined with reference to its level of importance although other elements have been taken into account where appropriate.

Impact Magnitude

2.5.2 Methods of impact prediction used included direct measurements, correlations, expert opinion and information from previous developments. Impacts include those that are predicted to be direct, indirect, temporary, permanent, cumulative, reversible or irreversible. The magnitude of each impact was assessed independently of its value or statutory status. Magnitude criteria are presented in Table 4 and include positive impact criteria in accordance with IEEM guidance (2002).

Table 4 – Impact magnitude

Impact Magnitude	Criteria
High negative	The change is likely to permanently, adversely affect the integrity of an ecological receptor, in terms of the coherence of its ecological structure and function, across its whole area that enables it to sustain the habitat, complex of habitats and/or the population levels of species of interest (at a regional or higher level).
Medium negative	The change is not likely to permanently adversely affect the ecological receptor's integrity but the effect on the receptor is likely to be substantial in terms of its ecological structure and function and may change its evaluation. Likely to result in changes in the localised distribution of a species but not affect its population status at a regional level.
Low negative	The change may adversely affect the ecological receptor, but there will probably be no permanent effect on its integrity and/or key attributes and is unlikely to change its evaluation.
Negligible	The change may slightly adversely affect the receptor but will have no permanent effect on the integrity of the receptor or its key attributes. There are no predicted measurable changes to the species assemblage or population and the effect is unlikely to result in an increased vulnerability of the receptor to future impacts.
Positive	The change is likely to benefit the ecological receptor, but may not improve its evaluation
High positive	The change is likely to restore an ecological receptor to favourable conservation status, or to create a feature of recognisable value (at a regional or higher level).

Impact Significance

2.5.3 The significance of an impact has been determined according to the matrix system illustrated in Table 5. Impacts can be beneficial or adverse, either improving or decreasing the ecological status health or viability of a species, population or habitat.

2.5.4 Typically, negative impact significance greater than or equal to moderate would require mitigation to be undertaken to ameliorate the impact significance to acceptable levels. However, in order to comply with Part 1 of the Nature Conservation (Scotland) Act (2004) mitigation is proposed for negative impacts of minor or above.

Table 5 – Impact Significance

Magnitude / Importance	High Negative	Medium Negative	Low Negative	Negligible	Positive	High Positive
International	Major	Major	Moderate	Negligible	Moderate	Major
National	Major	Major	Moderate	Negligible	Moderate	Major
Regional	Major	Moderate	Minor	Negligible	Minor	Moderate
County	Moderate	Moderate	Minor	Negligible	Minor	Moderate
Local	Minor	Minor	Minor	Negligible	Minor	Minor
Less than Local	Minor	Negligible	Negligible	Negligible	Negligible	Negligible

2.5.5 The level of significance of impacts predicted on ecological receptors is an important factor in influencing the decision-making process and determining the necessity and/or extent of mitigation

measures. Impacts can be beneficial or adverse, either improving or decreasing the ecological status health or viability of a species, population or habitat.

2.6 Limitations to Assessment

Weather

2.6.1 It has been shown that wind and rain are the two main factors that can limit the number of bird registrations recorded during a breeding bird survey (Gilbert et al., 1998).

2.6.2 Weather conditions during surveys were generally good with a limited numbers of days affected by rain and heavy cloud. Surveys were suspended if weather conditions were poor (e.g. high winds and persistent rain). Wind speed was occasionally high (approximately 12% of survey days), which is likely to have reduced records of singing birds. However, carrying out several survey visits to a site helps to reduce the significance of such effects. All surveys were carried out in suitable weather, although it was not practically possible to limit surveys to only to optimal weather conditions.

Survey Methodology

2.6.3 A full Common Bird Census (CBC) comprises ten survey visits made between March and June, with a minimum of ten days between each of the survey repetition, which enables the calculation of bird territories across an entire season within a given site. However, the adopted methodology included only three survey visits to each SOV and Quadrat with more than ten days between each repetition. There were two reasons for reducing the number of survey repetitions and increasing the number of days between visits. Firstly, it was considered that three survey repetitions (made between April and June) would enable a sufficient representative data set to be collected in order to gain an accurate reflection of the breeding bird assemblage present within each SOV and Quadrat and secondly, it was considered more important to gather an accurate baseline of the bird assemblage within each SOV and Quadrat rather than a full picture of the spatial distribution of all bird territories.

2.6.4 The above survey methodology is supported by SNH guidance (SNH, 2005; section 6.9), and was included in the Ecology Scoping Report (Jacobs, 2006), which was approved prior to the start of the surveys by SNH.

Changes to the Route Alignment

2.6.5 One Quadrat (SL-Bb04) currently lies outside the route corridor as a result of changes to the preferred route following the DMRB Stage 1 Assessment. Using the Quadrat and Line Transect method, it is possible to infer the potential value of remaining non-sampled areas within the route corridor for breeding bird assemblages.

3 Baseline

3.1 Consultation

3.1.1 SNH were unable to provide any records of key breeding bird species for the proposed scheme in their consultation correspondence.

3.1.2 Consultation with the RSPB did not identify the presence of any RSPB nature reserves or provide any previous records of breeding bird species within or adjacent to the proposed scheme study area.

3.1.3 The Scottish Ornithologists' Club (SOC) and the RSPB are jointly involved in a 5-year project to produce a Breeding Bird Atlas for Aberdeenshire (which was due for completion in 2006, but as yet as not been published). Records of confirmed, possible and probable breeding bird species are available for a selection of areas within the route corridor (not all areas within the route corridor have been surveyed to date) based on a 2km by 2km (tetrad) grid sampling system.

3.1.4 Existing survey data were not obtained from SOC and the RSPB for the following reasons:

- the data were not of sufficient detail in terms of the specific location of bird species for an EIA (i.e. the tetrads were too large); and
- data derived from SOC/RSPB's and Jacobs methodologies are incompatible due to differences employed to gather the data. SOC/RSPB used the Brown and Shepherd (1993) method for surveying upland breeding wader populations while the CBC methodology was used for this assessment.

3.2 Incidental Observations

3.2.1 Records of key bird species that were made incidentally by other surveyors during spring and summer 2006 are shown in Table 6.

Table 6 – Incidental Records of Important Bird Species

Month / Year	Species Name	Status	Location (NGR)	Comment
July 2006 August 2006	barn owl	WCA1i JNCC Amber list, LBAP	NO 892 992 NJ 852 054	Recorded in flight at Greenloaning, approximately 500m north of Clochandighter Wood and flying from Kingshill Wood to Moss of Auchlea across the proposed route corridor.
April 2006	kingfisher	WCA1i, JNCC Amber list	NO 853 005	Recorded feeding on the River Dee south of Camphill west of the current road bridge (note that surveys confirmed breeding east of the Bridge).
May 2006	osprey	WCA1i, JNCC Amber list	NO 938 011	Recorded over Loriston Loch.
April 2006	linnet	JNCC Red list, N.BAP	NO 845 047	Recorded singing on Beanshill.
April 2006	reed bunting	JNCC Red list, N.BAP	NO 845 047	Recorded singing on Beanshill.
April 2006	skylark	JNCC Red list, N.BAP	-	Recorded in most sections of the survey corridor on a number of occasions.
May 2004 June 2004	song thrush	JNCC Red list, N.BAP	NJ 922 004) NJ 857 002	Recorded singing on Blue Hill and singing at the Old Mill Inn at the Dee bridge.
June 2006	bullfinch	JNCC Red list, N.BAP	NJ 857 002	Recorded near the Old Mill Inn at the Dee bridge.
April2006, May 2006, June 2006	yellowhammer	JNCC Red list, LBAP	NJ 848 039 NJ 845 022 NO 897 990	Recorded north of Beanshill, at Nether Beanshill and east of Heatherknowe.
May 2005, June 2006	starling	JNCC Red list	NO 853 009 NO 868 981	Flocks recorded foraging north of Camphill and at Burnhead.
May 2006	curlew	status JNCC amber list, LBAP	NO 897 990 NJ 852 048	Recorded east of Heatherknowe and west of Gairnhill/Kingshill Wood.
May 2006	lapwing	JNCC amber list, LBAP	NO 872 982 NJ 849 052	were recorded near Burnhead and south of Craiglug
April 2006	stock dove	JNCC amber list	NO 867 985	Recorded at Blaikiewell.
June 2006	goldcrest	JNCC amber list	NO 869 992 NO 855 988	Recorded in Cleanhill Wood and Millbank.

Month / Year	Species Name	Status	Location (NGR)	Comment
June 2006	dunnock	JNCC amber list	NO 869 992 NJ 857 002	Recorded in Cleanhill Wood and near the Old Mill Inn at the Dee bridge.
April 2006	meadow pipit	JNCC amber list	NO 889 989 NJ 845 035	Recorded at Greenloaning and on Beanshill.
-	herring gull	JNCC amber list	NJ 856 010	Recorded foraging across much of the survey corridor, recorded north of the River Dee.
June 2004	oystercatcher	JNCC amber list	NJ 856 010 NJ 857 002 NJ 924 004	Recorded north of the River Dee, near the Old Mill Inn at the Dee bridge and on Blue Hill.
April 2006	woodcock	JNCC amber list	NO 885 987	Recorded near Greenloaning.
-	swallow	JNCC amber list	NO 882 987	recorded at Merchant's Croft and observed frequently throughout the survey corridor
June 2006	grey wagtail (pair)	JNCC amber list	NJ 857 002	Recorded near the Old Mill Inn at the Dee bridge.
June 2006, May 2004	willow warbler	JNCC amber list	NJ 857 002 NJ 924 004	Recorded near the Old Mill Inn at the Dee bridge and on Blue Hill.
June 2006	mistle thrush	JNCC amber list	NO 881 990	Recorded on Hill of Blairs.

3.3 Survey of Breeding Bird Assemblages

Sites of Ornithological Value (SOV)

3.3.1 A total of 16 SOVs were identified in the Southern Leg study area (AWPR Environmental Statement 2007, Figures 25.6a-h), within or adjacent to the proposed route corridor and account for an equivalent of approximately 22% of the survey corridor area. A description of each of the SOV is shown in Table 7. Three SOVs (Blue Hill, Hare Moss and West Hatton Wood, highlighted in bold) were also previously surveyed in 2004. Eight SOVs (Heatherknowe, Burnhead, Cleanhill Wood, Crynoch Burn, River Dee, Beanshill, East Silverburn and West Hatton Wood) highlighted in italics, were all re-surveyed in 2007 as a result of re-alignment and previous land access constraints.

Table 7 – Description of Sites of Ornithological Value (SOVs)

SOV Name	Section	Grid Reference	Size (ha)
Blue Hill	SL1	NJ 926 002	6
Hare Moss	SL1	NO 908 994	21.3
Heatherknowe	SL2	NO 895 989	2.5
South Greenloaning	SL2	NO 886 986	6
Hill of Blairs	SL2	NO 882 989	15.9
Burnhead	SL2	NO 875 982	6.5
Blaikiewell Burn	SL3	NO 867 987	9.6
Cleanhill Wood	SL3	NO 868 990	44.8
Crynoch Burn	SL3	NO 860 996	16.4
River Dee	SL3	NJ 858 003	16.3
Deeside Old Railway	SL3	NJ 854 010	1.8
Beanshill	SL4	NJ 847 037	18.3
East Silverburn	SL5	NJ 848 045	3.8
Gairnhill & Kingshill Wood	SL5	NJ 853 048	24.1
Moss of Auchlea	SL5	NJ 848 053	8.9
West Hatton Wood	SL6	NJ 858 067	5.6

3.3.2 Table 8 presents the results of the breeding bird surveys undertaken on each SOV in terms of species recorded, their status and whether they were recorded as breeding (B), possible breeding (P) and non-breeding (N). The scientific names of bird species are presented in Annex 1.

Table 8 – Bird Species Recorded Breeding (B), Possible Breeding (P) and Non-breeding (N) Birds within each Site of Ornithological Value (SOV)

Species	Status	SOV															
		Blue Hill	Hare Moss	Heatherknowe	South Greenloaning	Hill of Blairs	Burnhead	Blakiewell Burn	Cleanhill Wood	Crynnoch Burn	River Dee	Deeside Old Railway	Beanshill	East Silverburn	Gairnhill & Kingshill Woods	Auchlea Moss	West Hatton Wood
blackbird		P	B	P		B		B	P		B	B	B		B	B	P
blackcap						P			B	P		P				P	
bullfinch	x & Ψ	P								P						P	P
black-headed gull	+										N						
blue tit		B	P	P		P		P	P	P	P	B	P	P	B	B	B
buzzard		B						N	P	P		P	B		P	N	
carrion crow		P	P	P	N	N			N	N	N		P		B	P	P
chiffchaff		P	B						P								
chaffinch		B	B	B	B	B		B	B		B	B	B	P	B	B	B
common gull	+										N						
common tern											N						
crossbill	%					N											
common sandpiper											P						
coal tit		B		P	P	B		B	P	B		P	B	P	B	B	P
curlew	+ Ψ		P				N								P	B	
dunnock	+	P	P	B	B	P		N	P	P	N	B	B	P	P	P	
dipper										P	P						
goldcrest	+	P		P		P		B	B	P			P	P	B	P	B
goosander											P						
grasshopper warbler	x															P	
grey wagtail	+										P						
goldfinch							N				P	P				P	
greenfinch		P						P	P		P	B			P	P	P
greater spotted woodpecker		P				B			P	P					P		
great tit		P		P		P		P	P	P	P	B	P	P	B	B	B
garden warbler				P					P							P	
grey heron			P								N						
herring gull	+										N	P					
house martin	+						N										
jay									B	P					B		
jackdaw				P	N	N				P	N	P	P				
kingfisher	% + Ψ										B						
lapwing	+ Ψ						P								B	B	

Species	Status	SOV															
		Blue Hill	Hare Moss	Heatherknowe	South Greenloaning	Hill of Blairs	Burnhead	Blakiewell Burn	Cleanhill Wood	Crynnoch Burn	River Dee	Deeside Old Railway	Beanshill	East Silverburn	Gairnhill & Kingshill Woods	Auchlea Moss	West Hatton Wood
linnet	x & Ψ		B		B	P	N						B		P		
lesser redpoll	+ Ψ							P							B	P	
long-tailed tit		P						P		P		P				B	
mallard			P					N			P				P	P	
magpie					N			N	N	P					P	P	
meadow pipit	+		B		B	P	P						B				
mistle thrush	+	P								P			P				
oystercatcher	+		B							N	N	P	N	N			
pheasant		P	P	P		P							P		P	P	
pied wagtail					N											P	B
robin		B		P	P	B			P	B	P	B		P	B	P	P
reed bunting	x & Ψ		B				P				P					B	
red-legged partridge					N												
rook											P		B				P
skylark	x & Ψ		B			P	P						B			P	
stonechat	+								P								
starling	x		B	P	N	N	N				N	P	P		B		
sparrowhawk									P						N		
swift											N				P		
siskin															P	P	
swallow	+		B		N	N	N			N		P		N		N	P
sand martin	+										N						
snipe	+ Ψ		P											P			
song thrush	x & Ψ	P			B	P			N	P	P	P	P		B	P	P
sedge warbler			P								P	P					
treecreeper		P		P		P		P	P	P					P	P	
tawny owl															P		
tufted duck											N						
wheatear													P		P		
whinchat													P				
whitethroat			P		N					P	P	B					
woodcock	+				N												
woodpigeon			P	P		P	N	N	P	P	P	P			B	P	B
wren		B	B	B	B	B	N	P	P	B	B	B	P	P	B	B	B
willow warbler	+	P	B	P	B	B		B	P	P	P	P	P	P	B	B	B
yellowhammer	x & Ψ	P			P	P				P			P	P		P	

Key: % = WCA1i; x = JNCC Red List; + = JNCC Amber List; & = UKBAP; Ψ = LBAP.

Quadrats

3.3.3 A total of 12 Quadrats were established within the Southern Leg study area (AWPR Environmental Statement 2007, Figures 25.6a-h). A description of each of the Quadrat is shown in Table 9. Five of the Quadrats (SL-Bb01 – SL-Bb04 and SL-Bb12, highlighted in bold) were previously surveyed in 2004. Three of the Quadrats (SL-Bb04, SL-Bb08 and SL-Bb10, highlighted in italics) were all re-surveyed in 2007 as a result of re-alignment and previous land access constraints.

Table 9 – Description of Quadrats

Quadrat	Section	Grid Reference
SL-Bb01	**SL1**	**NJ 933 005**
SL-Bb02	**SL1**	**NO 929 997**
SL-Bb03	**SL1**	**NO 919 997**
SL-Bb04	**SL1**	**NO 906 991**
SL-Bb05	SL2	NO 886 988
SL-Bb06	SL2	NO 871 985
SL-Bb07	SL3	NO 863 996
SL-Bb08	SL4	NJ 854 010
SL-Bb09	SL4	NJ 848 025
SL-Bb10	SL5	NJ 849 039
SL-Bb11	SL5	NJ 851 055
SL-Bb12	**SL6**	**NJ 857 071**

3.3.4 Table 10 presents the results of the breeding bird surveys undertaken on each Quadrat in terms of species recorded, their status and whether they were recorded as breeding (B), possible breeding (P) or non-breeding (N). Scientific names of bird species are presented in Annex 1.

Table 10 – Bird Species Recorded Breeding (B), Possible Breeding (P) and Non-breeding (N) Birds within each Quadrat

Common Name	Status	Quadrat											
		1	2	3	4	5	6	7	8	9	10	11	12
blackbird			B	P	B		P	B	B	B		B	B
blackcap								P	P	N			
black-headed gull	+		N	N							N		
blue tit		P	B	B	B	P	P	B	P	B		P	B
bullfinch	x & Ψ		B										
buzzard		P				N			P		N	N	P
carrion crow		P	B	B	B					B			B
chaffinch		P	B	B	B	P	B	B	B	B	P	B	B
chiffchaff			B		P			P					
coal tit		P		P	P	P	B	P	P	B		P	P
collared dove								P					
common gull	+				N								
snipe	+ Ψ		P		P								

Common Name	Status	Quadrat											
		1	2	3	4	5	6	7	8	9	10	11	12
curlew	+ Ψ		P		P							P	P
dunnock	+		B	P	B	P	P	P		B		B	B
feral pigeon						P							
garden warbler							P					P	
goldcrest	+			B				P			P		B
goldfinch					P	P	P			P		P	
grasshopper warbler	x Ψ												
greater spotted woodpecker								P					
great tit			B				B	P	N	B		P	B
greenfinch			P	P	B		P	B	P	B		P	P
greenshank	%											N	
grey heron													
grey partridge	x & Ψ												P
grey wagtail	+							B					
herring gull	+	N		N								N	
house martin	+	P											B
house sparrow	x	P			P		P	P					
jackdaw				P		P		P	P	B			
kestrel	+												B
kingfisher	% +												
lapwing	+ Ψ			P	B							P	
lesser redpoll	+						P						
linnet	x & Ψ			P	P	N	B		P		P	P	P
long-tailed tit								B					
magpie				B	B	N			P	N	P		P
mallard								P			P	N	P
meadow pipit	+	B	B	P	B		B	P			P	B	P
mistle thrush	+	P	P									P	
moorhen								B					
oystercatcher	+	B	B	P	P		P	B	N	P		P	
pheasant		P		P			B					P	
pied wagtail			B		B	P		B		P		P	B

Common Name	Status	Quadrat											
		1	2	3	4	5	6	7	8	9	10	11	12
reed bunting	x & Ψ		B		P						P	P	
robin		P		P	B	P	P	P	B	B		P	B
rook					P		B		N	N		B	
sand martin	+	P											
sedge warbler		B	B				P	P					
skylark	x & Ψ	B	B		B	P	B	B				B	P
song thrush	x & Ψ		P	P	P	B		P	P	P		P	
starling	x	B	P		P	B	P	N		B		N	
stock dove	+								P	P			
swallow	+	B	B	P	B	B	P	N	N	N		N	B
swift		P		P									
tawny owl												P	
teal	+										P		
wheatear						P					P		P
whitethroat			B			P			P	P		P	
willow warbler	+	P	B		B			B	P	P	P	P	B
wood warbler	+			P									
woodpigeon			B	B	P		P	P	N	B		B	B
wren		B	B	P	B	B	B	B	B	B		P	B
yellowhammer	x & Ψ		P	P	B	B				B		P	

Key: % = WCA1i; x = JNCC Red List; + = JNCC Amber List; & = UKBAP; Ψ = LBAP.

3.4 Habitat Descriptions: SOVs and Quadrats

3.4.1 The following section presents a description of the habitats represented within each SOV and Quadrat together with their associated Habitat Areas.

Section SL1

3.4.2 Section SL1 is characterised by improved grassland fields with some less intensively managed semi-improved fields together with pockets of marshy grassland and scrub. An extensive contiguous area of conifer plantation woodland, comprising Duff's Hill and Blue Hill, is present at the eastern end of the section together with a small remnant area of wet modified bog just west of Quadrat SL-Bb02 and south of the Blue Hill. A number of discrete stands of mature Scots pine are additionally present throughout the section.

3.4.3 Table 11 presents a detailed description of habitats present within each SOV and Quadrat.

Table 11 - Habitat Descriptions for Section SL1

SOV / Quadrat	Representative Habitat Areas	Value	Habitat Description
Blue Hill	S3	Medium	A mosaic of habitats comprising coniferous plantation woodland, mature deciduous and mixed parkland / scattered trees, dense scrub, semi-improved neutral grassland and continuous bracken.
Hare Moss	S10	High	A mosaic of woodland and remnant heathland/bog habitats, comprising wet modified bog and semi-natural broad-leaved woodland with areas of deciduous parkland/scattered trees and scattered and dense scrub. Two small areas of marsh/marshy grassland are located in the west of the SOV with an area of standing water (bog pool).
SL-Bb01	S2 S5	Low	Habitats within the Quadrat comprise large fields of improved, semi-improved (acid) grassland with areas of scattered scrub and marsh / marsh grassland around a pond at Gallowhill. An area of bare ground with a boundary of parkland / scattered trees is present in the north-west of the Quadrat.
SL-Bb02	S2	Low	Habitats within the Quadrat comprise fields of improved and poor semi-improved grassland boarded by stone walls with occasional patches of scattered scrub. Areas of semi-improved grassland with lines of parkland / scattered trees are present adjacent to the A90 and A956. Two small fields of marsh / marshy grassland and semi-improved acid grassland are located immediately south of the A956. Isolated stands of mixed plantation woodland are present in fragments of land at the A90/A956 junction.
SL-Bb03	S6 S7 S9	Medium	Habitats within the Quadrat comprise conifer plantation woodland with some neutral semi-improved grassland along rides and pockets of broad-leaved plantation woodland. Others habitats within the Quadrat comprise improved fields and small areas of marshy grassland.
SL-Bb04	S10 S13	High	A mosaic of woodland and remnant heathland/bog habitats, comprising wet modified bog and semi-natural broad-leaved woodland with areas of and dense scrub, marshy grassland, an area of standing water (bog pool) and a series of improved and horse-grazed semi-improved fields to the south.

Section SL2

3.4.4 Section SL2 is characterised by improved agricultural grassland fields separated by stonewalls with patches of dense and scattered scrub (that become extensive in places) and occasional species rich hedgerow. Extensive areas of conifer plantation woodland, comprising Clochandighter Wood and Hill of Blairs, are present in the southeast and northwest of the section together with areas of semi-natural / plantation broad-leaved woodland at Greenloaning and Heatherknowe in the north-east. Table 12 presents a detailed description of habitats present within each SOV and Quadrat.

Table 12 – Habitat Descriptions for Section SL2

SOV / Quadrat	Representative Habitat Areas	Value	Habitat Description
Heatherknowe SOV	S11	Medium	SOV comprise a small block of scrubby broad-leaved plantation woodland. Occasional conifers are present but mostly confined to the western end of the SOV. The ground layer is dominated by ericaceous species and bracken.
South Greenloaning SOV	S15	Medium	Both halves of the SOV comprise areas of dense gorse scrub and bracken. The eastern half however is dominated by two improved grassland fields.
Hill of Blairs SOV	S15	High	SOV comprises a large mosaic of conifer plantation woodland with pockets of semi-improved grassland, dense and scattered scrub and dry/wet dwarf scrub heath. Large areas of bracken are present in the east of the SOV together with an area of fen occupying a shallow hollow in the centre of the SOV.
Burnhead SOV	S19 S20	Low	SOV comprises an area of rush dominated improved grassland fields with a seasonal flooded area.
SL-Bb05	S15	Low	Quadrat SL-Bb05 partially occurs within Hill of Blairs and South Greenloaning SOVs and with the exception of these areas is comprised predominantly of improved grassland with small pockets of dense / scattered scrub and bracken.
SL-Bb06	S19 S20	Medium	Quadrat SL-Bb06 partially occurs within Blaikiewell Burn and Cleanhill SOVs. South of the Blaikiewell Burn, the Quadrat is comprised predominantly of poor semi-improved/semi-improved grassland and arable fields bounded by species rich hedgerows with trees. A shelterbelt of mixed plantation woodland is located in the south-east. North of the burn, the Quadrat comprises a large area of conifer plantation woodland.

Section SL3

3.4.5 Section SL3 is characterised by extensive areas of conifer/mixed plantation and semi-natural broad-leaved woodland with large areas of parkland and scattered trees and amenity grassland (represented by Cleanhill Wood and Kingcausie). This section also comprises improved, and to a lesser degree poor semi-improved/semi-improved agricultural grassland fields, many of which are separated by dry stone walls with occasional areas of dense and scattered scrub confined to the south and west of the section. The north of the section is dominated by the River Dee and its tributaries (Crynoch Burn/Blaikiewell Burn) with extensive areas of semi-natural broad-leaved woodland (to the south of the river) and semi-improved grassland (to the north of the river).

3.4.6 Table 13 presents a detailed description of habitats present within each SOV and Quadrat.

Table 13 – Habitat Descriptions for Section SL3

SOV / Quadrat	Representative Habitat Areas	Value	Habitat Description
Blaikiewell Burn SOV	S22	Medium	SOV comprises a riparian habitat mosaic with areas of dense scrub, marsh / marshy grassland, introduced scrub and parkland / scattered trees.
Cleanhill Wood SOV	S20	High	SOV comprises mature conifer plantation woodland that contains significant amounts of semi-natural broadleaved woodland. The ground flora is very variable, ranging from heath, acid grassland to bare soil. Rhododendron *spp*. can also be extensive as a shrub layer.
Crynoch Burn SOV	S22 S24 S27	High	SOV comprises riparian woodland dominated by semi-natural broadleaved woodland that lines much of the burn. Areas of amenity grassland are present within the west of the SOV (Storybook Glen). Towards the River Dee the SOV also includes an area of conifer plantation woodland with parkland and scattered broad-leaved and conifer trees associated with Kingcausie.
River Dee SOV	S27 S28	High	SOV comprises a corridor of riparian broad-leaved semi-natural woodland (to the south of the river) and semi-improved grassland (to the north of the river). Also present are areas of scrub, arable farmland, conifer plantation and open water.
Deeside Old Railway SOV	S31	Medium	SOV comprises a corridor of semi-natural broad-leaved woodland, scrub, tall ruderal and ephemeral / short perennial vegetation.
SL-Bb07	S22 S23 S24	High	Comprises part of Crynoch Burn SOV and Cleanhill Wood SOV. Habitats include riparian woodland dominated by semi-natural broadleaved woodland lining much of the burn. Mature conifer plantation woodland also contains significant amounts of semi-natural broadleaved woodland, as well as a series of predominantly improved grassland bordered by woodland.

Section SL4

3.4.7 Section SL4 is characterised by residential housing (some with mature established gardens), large sports complexes, schools, nursing homes and hotels in the south of the Section. Remaining habitats north of Milltimber comprise improved grassland and occasional arable fields separated by dry stone walls. Tree-lines and scattered scrub along field margins, and areas of broad-leaved and coniferous plantation woodland with pockets of semi-natural broad-leaved woodland are also present. A large area of wet heath/acid grassland and coniferous plantation woodland (Beanshill) is present in the north of the section.

3.4.8 Table 14 presents a detailed description of habitats present within each SOV and Quadrat.

Table 14 – Habitat Descriptions for Section SL4

SOV / Quadrat	Represented Habitat Areas	Value	Habitat Description
Beanshill SOV	S39	Medium	Acid grassland, part of which is semi-improved and part forming a mosaic with wet heath vegetation. There is also some scrub, marshy grassland and coniferous plantation woodland.
SL-Bb08	S29 S30 S31 S32 S33	Medium	Quadrat SL-Bb08 partly occurs within the Deeside Old Railway SOV. Habitats comprise improved and poor semi-improved grassland fields and built up areas. The Quadrat additionally includes some broad-leaved woodland and part of a golf course comprising amenity grassland and parkland/scattered trees.
SL-Bb09	S36 S37	Medium	Quadrat SL-Bb09 consists mainly of improved grassland with some arable land. There is a significant amount of scrub along field and road edges and a small block of broad-leaved woodland.

Section SL5

3.4.9 Section SL5 is characterised by improved grassland with occasional arable fields, scattered clumps and boundary lines of scrub and conifer plantation. There are numerous small burns and drains through this area. Table 15 presents a detailed description of habitats within each SOV and Quadrat.

Table 15 - Habitat Descriptions for Section SL5

SOV / Quadrat	Represented Habitat Areas	Value	Habitat Description
East Silverburn SOV	S42	Medium	An area of rough poor semi-improved grassland, dense scrub and parkland / scattered trees together with an area of broad-leaved plantation woodland along Silver Burn.
Gairnhill/Kingshill Wood SOV	S43	Medium	An expansive area of coniferous plantation woodland, with occasional areas of broad-leaved plantation woodland and scrub.
Moss of Auchlea SOV	S45	High	High scrub of willow on wet grassland. Areas of birch are also present. Where trees have been removed, marsh dominates, although areas of swamp are also present.
Quadrat SL-Bb10	S39 S40 S43	Medium	Quadrat SL-Bb10 comprises primarily coniferous plantation woodland, improved grassland which is bisected by a number of small burns, with patches of rushes and scrub present in the west and a wet heath / acid grassland mosaic of Beanshill SOV to the south.
Quadrat SL-Bb11	S43 S44 S45	High	Quadrat SL-Bb11 partly occurs within Moss of Auchlea SOV. The remaining habitats outside the SOV are comprised of mature coniferous plantation woodland, with pockets of mixed woodland, improved grassland with a few patches of scrub and a strip of mixed plantation.

Section SL6

3.4.10 Section SL6 is characterised by fields of improved and poor semi-improved grassland with tree / scrub lined stonewall boundaries and areas of dense and scattered scrub. A mixed shelterbelt plantation with an area of unimproved grassland and scattered trees occur on Cloghill. Table 16 presents a detailed description of habitats within each SOV and Quadrat.

Table 16 - Habitat Descriptions for Section SL6

SOV / Quadrat	Represented Habitat Areas	Value	Habitat Description
West Hatton Wood SOV	S47	Medium	A mosaic of semi-natural broad-leaved woodland, deciduous parkland/scattered trees and dense scrub.
Quadrat SL-Bb12	S46 S47 S48	Low	Quadrat SQL partly occurs within West Hatton Wood SOV. The remaining habitats within the Quadrat comprise predominantly improved and poor semi-improved grassland fields with a shelterbelt of mixed plantation on the slopes of Cloghill. Semi-improved grassland with scattered trees and scrub and a small area of broadleaf woodland are located immediately adjacent to Kingswells.

3.5 Summary of Survey Results

Incidental Observations

3.5.1 24 key bird species were recorded throughout the route section during other ecological surveys that were conducted for the purpose of the ES, of which:

- two were WCA1i (barn owl and osprey);
- seven were JNCC Red List Species (bullfinch, linnet, reed bunting, skylark, starling, song thrush and yellowhammer); and
- 17 were JNCC Amber List Species (barn owl, curlew, dunnock, goldcrest, greylag goose, grey wagtail, herring gull, kingfisher, lapwing, mistle thrush, meadow pipit, oyster catcher, osprey, stock dove, swallow, woodcock and willow warbler).

Breeding Bird Surveys

3.5.2 Breeding bird surveys were conducted on 16 SOVs (excluding Camphill SOV, which was not surveyed due to access restrictions) within or adjacent to the study corridor and 12 Quadrats established along the original consultation route.

3.5.3 A total of 69 bird species (59 were recorded as breeding or possibly breeding) were recorded throughout the 16 SOVs, of which:

- one was a WCA1i species (kingfisher);
- eight were JNCC Red List species (bullfinch, grasshopper warbler, linnet, reed bunting, skylark, starling, song thrush, and yellowhammer); and
- 19 were JNCC Amber List species (common gull, common snipe, cuckoo, curlew, dunnock, goldcrest, grey wagtail, herring gull, house martin, kingfisher, lapwing, meadow pipit, mistle thrush, oystercatcher, sand martin, stonechat, swallow, willow warbler and woodcock).

3.5.4 A total of 62 bird species (58 were recorded as breeding or possibly breeding) were recorded throughout the 12 Quadrats, of which:

- one WCA1i species (greenshank) was recorded (non-breeding);
- nine were JNCC Red List species (bullfinch, house sparrow, linnet, grey partridge, reed bunting, skylark, starling, yellowhammer and song thrush); and
- 16 were JNCC Amber List species (common snipe, curlew, dunnock, goldcrest, grey wagtail, lapwing, house martin, meadow pipit, mistle thrush, oystercatcher, sand martin, stock dove, swallow, teal, willow warbler and wood warbler).

Habitat Description

3.5.5 The majority of the study area comprises farmland of improved/poor semi-improved grassland and arable (although to a lesser degree with the exception of north of Kingswells) which support areas of dense and scattered frequently located along field boundaries together with parkland/scattered trees. Hedgerows are uncommon, in particular species rich hedgerows. Identified SOVs represent the majority of semi-natural habitats within the route corridor which include the following broad habitats: woodland, scrub, heathland, marsh, bog and riparian habitats.

3.5.6 A number of watercourses are present within the route corridor, including the River Dee and Crynoch Burn which are part of the River Dee SAC.

4 Evaluation

4.1 Introduction

4.1.1 The ecological value of SOVs, Quadrats and Habitat Areas for breeding birds was determined by considering the habitat evaluation of each area combined with the value of the breeding bird assemblage present. The ecological value of remaining Habitat Areas in each route section was determined by an initial evaluation of habitat potential for breeding birds combined with the knowledge of the breeding bird assemblages found in adjacent representative Quadrats or SOVs (refer to sections 2.4.3 and 2.4.4).

4.2 Evaluation of SOVs/Quadrats

4.2.1 Species recorded in each of the sections (SOV and Quadrats) are presented in Table 8 and Table 10.

4.2.2 Table 17 provides a list of key bird species that were recorded within each Quadrat or SOV. Where a key bird species was recorded as an incidental sighting only (marked with an asterisk in the text), it has been assigned to the appropriate Quadrat or SOV. Incidental sightings without grid references have not been included in the evaluation below as the information could not be identified with a particular SOV or Quadrat.

4.2.3 All SOVs/Quadrats were subject to three breeding bird surveys and therefore the evaluations below are considered to provide an accurate assessment of their ecological value for breeding birds.

Section SL1

4.2.4 Two SOVs (Blue Hill and Hare Moss) and four Quadrats (SL-Bb01 - SLBb04) are located within Section SL1 and are evaluated below.

<u>Blue Hill SOV (including all or parts of Habitat Areas S2 and S3)</u>

4.2.5 The breeding bird assemblage recorded in this SOV is considered to be of medium diversity, with 23 breeding bird species, of which none were WCA1i species, four were JNCC Red List species (bullfinch, song thrush, starling, yellowhammer), five were JNCC Amber List species (dunnock, goldcrest, mistle thrush, willow warbler and oystercatcher*, two were UK BAP species (bullfinch, song thrush), three were LBAP species (bullfinch, song thrush, yellowhammer) and none were local status species. The habitats that comprise the Habitat Areas within the Quadrat are assessed as being of medium value for birds, comprising a mosaic of habitats dominated by coniferous plantation woodland, mature deciduous and mixed parkland/scattered trees, dense scrub, semi-improved neutral grassland and continuous bracken (Table 11). The breeding assemblage found in this SOV is considered to enrich the biodiversity resource within the local context and therefore is assessed to be of local ecological value.

Hare Moss SOV (including all or parts of Habitat Area S10)

4.2.6 The breeding bird assemblage recorded in this SOV is considered to be of medium diversity, with 23 breeding bird species of which none were WCA1i species, four were JNCC Red List species (linnet, reed bunting, skylark, starling), seven were JNCC Amber List species (curlew, dunnock, meadow pipit, oystercatcher, snipe, swallow, willow warbler), three were UK BAP species (linnet, reed bunting, skylark), five were LBAP species (curlew, linnet, reed bunting, skylark, snipe) and none were local status species. The habitats that comprise the Habitat Areas within the Quadrat are assessed as being of high value for birds, comprising a mosaic of wet modified bog and semi-natural broad-leaved woodland with areas of deciduous parkland/scattered trees, scattered and dense scrub, marsh/marshy grassland and standing water (bog pool) (Table 11). The breeding assemblage found in this SOV is considered to enrich the biodiversity resource within the county context and therefore is assessed to be of county ecological value.

Quadrat SL-Bb01 (including all or parts of Habitat Areas S2 and S5)

4.2.7 The breeding bird assemblage recorded in this Quadrat is considered to be of medium diversity, with 20 breeding bird species of which none were CWA1i species, three were JNCC Red List species (house sparrow, skylark, starling), nine were JNCC Amber List species (dunnock, house martin, mistle thrush, meadow pipit, oystercatcher, sand martin, swallow, willow warbler, herring gull), one was a UK BAP species (skylark), one was a LBAP species (skylark) and none were local status species. The habitats that comprise the Habitat Areas within the Quadrat are assessed as being of low value for birds, comprising large fields of improved, semi-improved acid grassland with areas of scattered scrub and marsh / marsh grassland around a pond at Gallowhill together with an area of bare ground and parkland / scattered trees (Table 11). The breeding assemblage found in Quadrat SL-Bb01 is considered to enrich the biodiversity resource within the less than local context and therefore is considered to be of less than local ecological value.

Quadrat SL-Bb02 (including all or parts of Habitat Area S2)

4.2.8 The breeding bird assemblage recorded in this Quadrat is considered to be of medium diversity, with 27 breeding bird species of which one was a CWA1i species (osprey*, recorded over Loirston Loch), six were JNCC Red List species (bullfinch, reed bunting, skylark, song thrush, starling, yellowhammer), ten were JNCC Amber List species (curlew, mistle thrush, meadow pipit, oystercatcher, swallow, snipe, willow warbler, dunnock, blackheaded gull, and osprey*), four were UK BAP species (bullfinch, reed bunting, skylark, song thrush), seven were LBAP species (bullfinch, reed bunting, skylark, song thrush, yellowhammer, snipe, curlew) and one was a local status species (osprey*). The habitats that comprise the Habitat Areas within the Quadrat are assessed as being of low value for birds, comprising fields of improved, poor semi-improved and semi-improved acid grassland boarded by stone walls with occasional patches of scattered scrub and marsh / marshy grassland, areas of semi-improved grassland with lines of parkland / scattered trees and islands of mixed plantation woodland in isolated junction fragments (Table 11). The breeding assemblage found in Quadrat SL-Bb02 is considered to enrich the biodiversity resource within the local context and therefore is considered to be of local ecological value.

Quadrat SL-Bb03 (including all or parts of Habitat Areas S6, S7 and S9)

4.2.9 The breeding bird assemblage recorded in this Quadrat is considered to be of medium diversity, with 23 breeding bird species of which none were CWA1i species, three were JNCC Red List species (linnet, song thrush, yellowhammer), nine were JNCC Amber List species (dunnock, goldcrest, lapwing, meadow pipit, oystercatcher, swallow, wood warbler, blackheaded gull, herring gull), two were UK BAP species (linnet, song thrush), four were LBAP species (linnet, song thrush, yellowhammer, lapwing) and none were local status species. The habitats that comprise the Habitat Areas within the Quadrat are assessed as being of medium value for birds, comprising conifer plantation woodland with some neutral semi-improved grassland and pockets of broad-leaved plantation woodland with improved fields and small areas of marshy grassland (Table 11). The breeding assemblage found in Quadrat SL-Bb03 is considered to enrich the biodiversity resource within the local context and therefore is considered to be of local ecological value.

Quadrat SL-Bb04 (including all or parts of Habitat Areas S10 and S13)

4.2.10 The breeding bird assemblage recorded in this Quadrat is considered to be of medium diversity, with 29 breeding bird species of which none were WCA1i species, seven were JNCC Red List species (house sparrow, linnet, reed bunting, skylark, song thrush, starling, yellowhammer), nine were JNCC Amber List species (curlew, dunnock, lapwing, meadow pipit, oystercatcher, swallow, snipe, willow warbler, common gull), four were UK BAP species (linnet, reed bunting, skylark, song thrush), eight were LBAP species (linnet, reed bunting, skylark, song thrush, curlew, lapwing, snipe, yellowhammer) and none were local status species. The habitats that comprise the Habitat Areas within the Quadrat are assessed as being of high value for birds. They comprise a mosaic of woodland and remnant heathland/bog habitats, with wet modified bog and semi-natural broad-leaved woodland and areas of dense scrub, marshy grassland and an area of standing water (bog pool). A series of improved and horse-grazed semi-improved fields are present to the south (Table 11). The breeding assemblage found in Quadrat SL-Bb04 is considered to enrich the biodiversity resource within the county context and therefore is considered to be of county ecological value.

Section SL2

4.2.11 Four SOVs (Heatherknowe, South Greenloaning, Hill of Blairs and Burnhead) and two Quadrats (SL-Bb05 and SL-Bb06) are located within Section SL2 and are evaluated below.

Heatherknowe SOV (including all or parts of Habitat Area S11)

4.2.12 The breeding bird assemblage recorded in this SOV is considered to be of medium diversity, with 19 breeding bird species of which none were WCA1i species, two were JNCC Red List species (starling, yellowhammer*), four were JNCC Amber List species (dunnock, goldcrest, willow warbler, curlew*), none were UK BAP species, two were LBAP species (yellowhammer*, curlew*) and none were local status species. Two of the species (yellowhammer*, curlew*) were recorded as an incidental and thus the total number of species presented here differs from the total given in the baseline. The habitats that comprise the Habitat Areas within the Quadrat are assessed as being of medium value for birds, comprising a small block of scrubby broad-leaved plantation woodland with occasional conifers and a ground layer dominated by ericaceous species and bracken (Table 12). The breeding assemblage found in this SOV is considered to enrich the biodiversity resource within the local context and therefore is assessed to be of local ecological value.

South Greenloaning SOV (including all or parts of Habitat Area S15)

4.2.13 The breeding bird assemblage recorded in this SOV is considered to be of low diversity, with 11 breeding bird species of which one was a WCA1i species (barn owl*), four were JNCC Red List species (linnet, song thrush, yellowhammer, starling), six were JNCC Amber List species (dunnock, willow warbler, meadow pipit, swallow, woodcock, barn owl*), two were UK BAP species (linnet, song thrush), four were LBAP species (linnet, song thrush, yellowhammer, barn owl*) and none were local status species. One of the species (barn owl*) was recorded as an incidental and thus the total number of species presented here differs from the total given in the baseline. The habitats that comprise the Habitat Areas within the Quadrat are assessed as being of medium value for birds, comprising areas of dense gorse scrub and bracken and improved grassland fields (Table 12). The breeding assemblage found in this SOV is considered to enrich the biodiversity resource within the less than local context and therefore is assessed to be of less than local ecological value.

Hill of Blairs SOV (including all or parts of Habitat Area S15)

4.2.14 The breeding bird assemblage recorded in this SOV is considered to be of medium diversity, with 21 breeding bird species of which one was WCA1i species (crossbill), five were JNCC Red List species (linnet, skylark, song thrush, yellowhammer, starling), six were JNCC Amber List species (dunnock, goldcrest, meadow pipit, willow warbler, swallow, mistle thrush*), three were UK BAP species (linnet, skylark, song thrush), four were LBAP species (linnet, skylark, song thrush, yellowhammer) and none were local status species. One of the species (mistle thrush*) was recorded as an incidental and thus the total number of species presented here differs from the total given in the baseline. The habitats that comprise the Habitat Areas within the Quadrat are

assessed as being of high value for birds, comprising a large mosaic of conifer plantation woodland with pockets of semi-improved grassland, dense and scattered scrub and dry/wet dwarf scrub heath together with a large areas of bracken and a fen occupying a shallow hollow in the centre of the SOV (Table 12). The breeding assemblage combined with the habitat value considers the SOV to be of county ecological value.

Burnhead SOV (including all or parts of Habitat Areas S19 and S20)

4.2.15 The breeding bird assemblage recorded in this SOV is considered to be of low diversity, with four breeding bird species of which none were WCA1i species, three were JNCC Red List species (reed bunting, skylark, starling), three were JNCC Amber List species (lapwing, meadow pipit, house martin), two were UK BAP species (reed bunting, skylark), two were LBAP species (reed bunting, skylark, lapwing) and none were local status species. The habitats that comprise the Habitat Areas within the Quadrat are assessed as being of low value for birds, comprising an area of rush dominated improved grassland field with a seasonal flooded area (Table 12). The breeding assemblage found in this SOV is considered to enrich the biodiversity resource within the less than local context and therefore is assessed to be of less than less than local ecological value.

Quadrat SL-Bb05 (including all or parts of Habitat Area S15)

4.2.16 The breeding bird assemblage recorded in this Quadrat is considered to be of medium diversity, with 17 breeding bird species of which none were WCA1i species, four were JNCC Red List species (skylark, song thrush, starling, yellowhammer), two were JNCC Amber List species (dunnock, swallow), three were UK BAP species (linnet, skylark, song thrush), four were LBAP species (linnet, skylark, song thrush, yellowhammer) and none were local status species. The habitats that comprise the Habitat Areas within the Quadrat are assessed as being of low value for birds, comprising improved grassland with small pockets of dense/scattered scrub and bracken (Table 12). The breeding assemblage found in Quadrat SL-Bb05 is considered to enrich the biodiversity resource within the less than local context and therefore is considered to be of less than local ecological value.

Quadrat SL-Bb06 (including all or parts of Habitat Areas S19 and S20)

4.2.17 The breeding bird assemblage recorded in this Quadrat is considered to be of medium diversity, with 23 breeding bird species of which none were WCA1i species, four were JNCC Red List species (house sparrow, linnet, skylark, starling), four were JNCC Amber List species (dunnock, lesser redpoll, meadow pipit, oystercatcher, swallow), two were UK BAP species (linnet, skylark), two were LBAP species (linnet, skylark) and none were local status species. The habitats that comprise the Habitat Areas within the Quadrat are assessed as being of medium value for birds. They comprise poor semi-improved/semi-improved grassland/arable fields bordered by species-rich hedgerows with trees, mixed plantation woodland and conifer plantation woodland (Table 12). The breeding assemblage found in Quadrat SL-Bb06 is considered to enrich the biodiversity resource within the local context and therefore is considered to be of local ecological value.

Section SL3

4.2.18 Six SOVs (Blaikiewell Burn, Cleanhill Wood, Crynnoch Burn, River Dee, Camphill and Deeside Old Railway) and one Quadrat (SL-Bb07) are located within Section SL3 and are evaluated below.

Blaikiewell Burn SOV (including all or parts of Habitat Area S22)

4.2.19 The breeding bird assemblage recorded in this SOV is considered to be of low diversity, with 13 breeding bird species of which none were WCA1i species, none were JNCC Red List species, five were JNCC Amber List species (dunnock, goldcrest, lesser redpoll, willow warbler, stock dove*) and none were UK BAP, LBAP or local status species. The habitats that comprise the Habitat Areas within the Quadrat are assessed as being of medium value for birds, comprising a riparian habitat mosaic with areas of dense scrub, fen vegetation, marsh/marshy grassland, introduced scrub and parkland/scattered trees (Table 13). One of the species, stock dove* was recorded as an incidental and thus the total number of species presented here differs from the total given in the

baseline. The breeding assemblage found in this SOV is considered to enrich the biodiversity resource within the local context and therefore is assessed to be of local ecological value.

Cleanhill Wood SOV (including all or parts of Habitat Area S20)

4.2.20 The breeding bird assemblage recorded in this SOV is considered to be of medium diversity, with 18 breeding bird species of which none were WCA1i species, one was a JNCC Red List species (song thrush), four were JNCC Amber List species (dunnock, goldcrest, stonechat, willow warbler), one was a UK BAP species (song thrush), one was an LBAP species (song thrush) and none were local status species. The habitats that comprise the Habitat Areas within the Quadrat are assessed as being of high value for birds, comprising a riparian habitat mosaic with areas of dense scrub, marsh / marshy grassland, introduced scrub and parkland / scattered trees (Table 13). The breeding assemblage found in this SOV is considered to enrich the biodiversity resource within the local context and therefore is assessed to be of local ecological value.

Crynoch Burn SOV (including all or parts of Habitat Areas S22, S24 and S27)

4.2.21 The breeding bird assemblage recorded in this SOV is considered to be of medium diversity, with 23 breeding bird species of which none were WCA1i species, three were JNCC Red List species (bullfinch, song thrush, yellowhammer), six were JNCC Amber List species (dunnock, goldcrest, mistle thrush, oystercatcher, swallow, willow warbler), two were UK BAP species (bullfinch, song thrush), three were LBAP species (bullfinch, song thrush, yellowhammer) and none were local status species. The habitats that comprise the Habitat Areas within the Quadrat are assessed as being of high value for birds, comprising riparian woodland dominated by semi-natural broadleaved woodland with areas of amenity grassland, conifer plantation woodland with parkland and scattered broad-leaved woodland associated with Kingcausie (Table 13). The breeding assemblage found in this SOV is considered to enrich the biodiversity resource within the county context and therefore is assessed to be of county ecological value.

River Dee SOV (including all or parts of Habitat Area S27 and S28)

4.2.22 The breeding bird assemblage recorded in this SOV is considered to be of medium diversity, with 23 breeding bird species of which one was a WCA1i species (kingfisher), four were JNCC Red List species (reed bunting, song thrush, starling, bullfinch*), ten were JNCC Amber List species (black-headed gull, common gull, dunnock, grey wagtail, herring gull, kingfisher, oystercatcher, sand martin, willow warbler, goldcrest*), three were UK BAP species (reed bunting, song thrush, bullfinch*), four were LBAP species (kingfisher, reed bunting, song thrush, bullfinch*) and one was local status species (kingfisher). The habitats that comprise the Habitat Areas within the Quadrat are assessed as being of high value for birds. They comprise a corridor of riparian broad-leaved semi-natural woodland (to the south of the river) and semi-improved grassland (to the north of the river) with areas of scrub, arable farmland, conifer plantation and open water (Table 13). The breeding assemblage found in this SOV is considered to enrich the biodiversity resource within the county context and therefore is assessed to be of county ecological value.

4.2.23 There is a high diversity of species recorded as non-breeding along the Dee including reports of osprey (JNCC Amber list, WCA1i) hunting. The River Dee is also a designated SAC (Special Area of Conservation), although birds are not a cited interest.

Deeside Old Railway SOV (including all or parts of Habitat Area S31)

4.2.24 The breeding bird assemblage recorded in this SOV is considered to be of medium diversity, with 23 breeding bird species of which none were WCA1i species, two were JNCC Red List species (song thrush, starling), five were JNCC Amber List species (dunnock, herring gull, oystercatcher, swallow, willow warbler), one was a UK BAP species (song thrush), one was a LBAP species (song thrush) and none were local status species. The habitats that comprise the Habitat Areas within the Quadrat are assessed as being of medium value for birds, comprising a corridor of semi-natural broad-leaved woodland, scrub, tall ruderal and ephemeral / short perennial vegetation (Table 13). The breeding assemblage found in this SOV is considered to enrich the biodiversity resource within the local context and therefore is assessed to be of local ecological value.

Quadrat SL-Bb07 (including all or parts of Habitat Areas S22, S23 and S24)

4.2.25 The breeding bird assemblage recorded in this Quadrat is considered to be of medium diversity, with 28 breeding bird species of which none were WCA1i species, four were JNCC Red List species (house sparrow, skylark, song thrush, starling), seven were JNCC Amber List species (dunnock, goldcrest, grey wagtail, meadow pipit, oystercatcher, swallow, willow warbler), two were UK BAP species (skylark, song thrush), two were LBAP species (skylark, song thrush) and none were local status species. The habitats that comprise the Habitat Areas within the Quadrat are assessed as being of high value for birds, comprising part of Crynoch Burn SOV and Cleanhill Wood SOV. Habitats include riparian woodland dominated by semi-natural broadleaved woodland lining much of the burn. Mature conifer plantation woodland also contains significant amounts of semi-natural broadleaved woodland, as well as a series of predominantly improved grassland bordered by woodland (Table 13). The breeding assemblage found in Quadrat SL-Bb07 is considered to enrich the biodiversity resource within the county context and therefore is considered to be of county ecological value.

4.2.26 The remaining Habitat Areas within Section SL3 are dominated by arable, improved and semi-improved grassland fields with occasional area of marsh/marshy grassland. Additionally, avenues of parkland/scattered trees, residential gardens with pockets of woodland and ancient hedgerows, broad-leaved and coniferous plantation woodland are considered to be of high value to birds.

Section SL4

4.2.27 One SOV (Beanshill) and two Quadrats (SL-Bb08 and SL-Bb09) are located within Section SL4 and are evaluated below.

Beanshill SOV (including all or parts of S39)

4.2.28 The breeding bird assemblage recorded in this SOV is considered to be of medium diversity, with 23 breeding bird species of which none were WCA1i species, six were JNCC Red List species (linnet, skylark, song thrush, starling, yellowhammer, reed bunting*), six were JNCC Amber List species (goldcrest, meadow pipit, oystercatcher, willow warbler, mistle thrush, dunnock), four were UK BAP species (linnet, skylark, song thrush, reed bunting*), five were LBAP species (linnet, skylark, song thrush, yellowhammer, reed bunting*) and none were local status species. The habitats that comprise the Habitat Areas within the Quadrat are assessed as being of medium value for birds, comprising acid grassland, part of which is semi-improved and part forming a mosaic with wet heath vegetation with scrub, marshy grassland and coniferous plantation woodland (Table 14). The breeding assemblage found in this SOV is considered to enrich the biodiversity resource within the local context and therefore is assessed to be of local ecological value.

Quadrat SL-Bb08 (including all or parts of Habitat Areas S29, S30, S31, S32 and S33)

4.2.29 The breeding bird assemblage recorded in this Quadrat is considered to be of low diversity, with 17 breeding bird species of which none were WCA1i species, three were JNCC Red List species (linnet, song thrush, starling*), four were JNCC Amber List species (willow warbler, oystercatcher, stock dove, swallow), two were UK BAP species (linnet, song thrush), two were LBAP species (song thrush) and none were local status species. The habitats that comprise the Habitat Areas within the Quadrat are assessed as being of medium value for birds, comprising part of the Deeside Old Railway SOV. Habitats comprise improved and poor semi-improved grassland fields and built up areas, with some broad-leaved woodland and part of a golf course comprising amenity grassland and parkland/scattered trees (Table 14). The breeding assemblage found in Quadrat SL-Bb08 is considered to enrich the biodiversity resource within the local context and therefore is considered to be of local ecological value.

Quadrat SL-Bb09 (including all or parts of Habitat Areas S36 and S37)

4.2.30 The breeding bird assemblage recorded in this Quadrat is considered to be of medium diversity, with 21 breeding bird species of which none were WCA1i species, three were JNCC Red List species (song thrush, starling, yellowhammer), five were JNCC Amber List species (dunnock,

oystercatcher, stock dove, swallow, willow warbler), one was a UK BAP species (song thrush), two were LBAP species (song thrush, yellowhammer) and none were local status species. The habitats that comprise the Habitat Areas within the Quadrat are assessed as being of medium value for birds, comprising arable farmland and improved grassland fields with scrub along field and road edges together with small blocks of broad-leaved woodland (Table 14). The breeding assemblage found in Quadrat SL-Bb09 is considered to enrich the biodiversity resource within the local context and therefore is considered to be of local ecological value.

Section SL5

4.2.31 Three SOVs (East Silverburn, Gairnhill/Kingshill Wood and Moss of Auchlea) and two Quadrats (SL-Bb10 and SL-Bb011) are located within Section SL5 and are evaluated below.

East Silverburn SOV (including all or parts of Habitat Area S42)

4.2.32 The breeding bird assemblage recorded in this SOV is considered to be of low diversity, with ten breeding bird species of which none were WCA1i species, one was a JNCC Red List species (yellowhammer), three were JNCC Amber List species (goldcrest, dunnock, snipe), none were UK BAP species, two were LBAP species (snipe, yellowhammer) and none were local status species. The habitats that comprise the Habitat Areas within the Quadrat are assessed as being of medium value for birds, comprising an area of rough poor semi-improved grassland, dense scrub and parkland/scattered trees, together with an area of broad-leaved plantation woodland along Silver Burn (refer to Table 15). The breeding assemblage found in this SOV is considered to enrich the biodiversity resource within the local context and therefore is assessed to be of local ecological value.

Gairnhill/Kingshill Wood SOV (including all or parts of Habitat Area S43)

4.2.33 The breeding bird assemblage recorded in this SOV is considered to be of high diversity, with 30 breeding bird species of which none were WCA1i species, three were JNCC Red List species (linnet, starling, song thrush), six were JNCC Amber List species (curlew, dunnock, goldcrest, lapwing, willow warbler, lesser redpoll), two were UK BAP species (linnet, song thrush), four were LBAP species (linnet, song thrush, lapwing, curlew) and none were local status species. The habitats that comprise the Habitat Areas within the Quadrat are assessed as being of medium value for birds, comprising an expansive area of coniferous plantation woodland, with occasional areas of broad-leaved plantation woodland and scrub. The breeding assemblage found in this SOV is considered to enrich the biodiversity resource within the county context and therefore is assessed to be of county ecological value.

Moss of Auchlea SOV (including all or parts of Habitat Area S45)

4.2.34 The breeding bird assemblage recorded in this SOV is considered to be of high diversity, with 33 breeding bird species of which one was a WCA1i species (barn owl), seven were JNCC Red List species (reed bunting, skylark, song thrush, yellowhammer, bullfinch, grasshopper warbler), eight were JNCC Amber List species (curlew, dunnock, goldcrest, lapwing, willow warbler, swallow, lesser redpoll, barn owl), four were UK BAP species (reed bunting, skylark, song thrush, bullfinch), eight were LBAP species (reed bunting, skylark, song thrush, yellowhammer, curlew, lapwing, bullfinch, barn owl*) and one was a local status species (grasshopper warbler). The habitats within the Quadrat are assessed as being of high value for birds, comprising broad-leaved woodland/scrub with wet grassland, marsh and areas of swamp (refer to Table 15). The breeding assemblage found in this SOV is considered to enrich the biodiversity resource within the county context and therefore is assessed to be of county ecological value.

Quadrat SL-Bb10 (including all or parts of Habitat Area S39, S40 and S43)

4.2.35 The breeding bird assemblage recorded in this Quadrat is considered to be of low diversity, with seven breeding bird species of which none were WCA1i species, three were JNCC Red List species (reed bunting, linnet, starling), five were JNCC Amber List species (goldcrest, willow warbler, meadow pipit, teal, black-headed gull), two were UK BAP species (reed bunting, linnet), two were LBAP species (reed bunting, linnet) and none were of locally rare/uncommon species

status. The habitats that comprise the Habitat Areas within the Quadrat are assessed as being of medium value for birds. They comprise primarily coniferous plantation woodland, a wet heath/acid grassland mosaic of Beanshill SOV to the south and improved grassland which is bisected by a number of small burns with patches of rushes and scrub present in the west (refer to Table 15). The breeding assemblage found in Quadrat SL-Bb09 is considered to enrich the biodiversity resource within the local context and therefore is considered to be of local ecological value.

Quadrat SL-Bb11 (including all or parts of Habitat Area S43, S44 and S45)

4.2.36 The breeding bird assemblage recorded in this Quadrat is considered to be of medium diversity, with 28 breeding bird species of which one was a WCA1i species (greenshank), six were JNCC Red List species (linnet, reed bunting, skylark, song thrush, starling, yellowhammer), nine were JNCC Amber List species (curlew, dunnock, herring gull, lapwing, meadow pipit, mistle thrush, oystercatcher, swallow, willow warbler), four were UK BAP species (linnet, reed bunting, skylark, song thrush), seven were LBAP species (curlew, lapwing, linnet, reed bunting, skylark, song thrush, yellowhammer) and none were local status species. The habitats that comprise the Habitat Areas within the Quadrat are assessed as being of high value for birds, comprising part of the Moss of Auchlea SOV. The remaining habitats outside the SOV are comprised of mature coniferous plantation woodland, with pockets of mixed woodland, improved grassland with a few patches of scrub and a strip of mixed plantation (Table 15). The breeding assemblage found in Quadrat SL-Bb11 is considered to enrich the biodiversity resource within the county context and therefore is considered to be of county ecological value.

Section SL6

4.2.37 One SOV (West Hatton Wood) and one Quadrat (SL-Bb12) are located within Section SL6 and are evaluated below.

West Hatton Wood SOV (including all or parts of Habitat Area S47)

4.2.38 The breeding bird assemblage recorded in this SOV is considered to be of medium diversity, with 17 breeding bird species of which none were WCA1i species, three were JNCC Red List species (bullfinch, song thrush, starling) three were JNCC Amber List species (goldcrest, swallow, willow warbler), two were UK BAP species (bullfinch, song thrush), two were LBAP species (bullfinch, song thrush) and none were local status species. The habitats that comprise the Habitat Areas within the Quadrat are assessed as being of medium value for birds, comprising a mosaic of woodland and scrub habitats dominated by semi-natural broad-leaved woodland, deciduous parkland/scattered trees and dense scrub (Table 16). The breeding assemblage found in this SOV is considered to enrich the biodiversity resource within the local context and therefore is assessed to be of local ecological value.

Quadrat SL-Bb12 (including all or parts of Habitat Areas S46, S47 and S48)

4.2.39 The breeding bird assemblage recorded in this Quadrat is considered to be of low diversity, with 26 breeding bird species of which none were WCA1i species, three were JNCC Red List species (grey partridge, linnet, skylark), ten were JNCC Amber List species (curlew, dunnock, goldcrest, house martin, kestrel, lapwing, meadow pipit, swallow, willow warbler), three were UK BAP species (grey partridge, linnet, skylark), four were LBAP species (curlew, grey partridge, linnet, skylark) and none were local status species. The habitats that comprise the Habitat Areas within the Quadrat are assessed as being of low value for birds, comprising part of the West Hatton SOV. Habitats include improved and poor semi-improved grassland fields, mixed plantation and semi-improved grassland with scattered trees and areas of poor-quality broad-leaved woodland (Table 16). The breeding assemblage found in Quadrat SL-Bb12 is considered to enrich the biodiversity resource within the local context and therefore is considered to be of local ecological value.

Table 17 - Summary Evaluation of Breeding Bird Assemblages and Habitats (SOV, Quadrats)

SOV / Quadrat	Habitat Areas Contributing to the Value of the SOV / Quadrat	Value of Habitats	Designated Sites Within or Adjacent to SOV / Quadrat	Total Number of Breeding Bird Species	Legal / Conservation Status of key bird species (Breeding, Possibly Breeding, Non Breeding and Incidentals)							Value Of Breeding Bird Population
					Ec Birds Directive Annex I	Wca1i	Jncc Red List	Jncc Amber List	Uk Bap	L Bap	Local Status (Uncommon / Rare)	
Section SL1												
Blue Hill SOV	S2 S3	Medium	-	23	-	-	bullfinch starling song thrush yellowhammer	dunnock goldcrest mistle thrush willow warbler oystercatcher*	bullfinch song thrush	bullfinch song thrush yellowhammer	-	**Local**
Hare Moss SOV	S10	High	-	23	-	-	linnet reed bunting skylark starling	curlew dunnock meadow pipit oystercatcher swallow snipe willow warbler	linnet reed bunting skylark	linnet reed bunting skylark curlew snipe	-	**County**
Quadrat SL-Bb01	S2 S5	Low	-	20	-	-	house sparrow skylark starling	dunnock house martin mistle thrush meadow pipit oystercatcher sand martin swallow willow warbler herring gull	skylark	skylark	-	**Less than local**

SOV / Quadrat	Habitat Areas Contributing to the Value of the SOV / Quadrat	Value of Habitats	Designated Sites Within or Adjacent to SOV / Quadrat	Total Number of Breeding Bird Species	Legal / Conservation Status of key bird species (Breeding, Possibly Breeding, Non Breeding and Incidentals)							Value Of Breeding Bird Population
					Ec Birds Directive Annex I	Wca1i	Jncc Red List	Jncc Amber List	Uk Bap	L Bap	Local Status (Uncommon / Rare)	
Quadrat SL-Bb02	S2	Low	-	27	osprey*	osprey*	bullfinch reed bunting skylark song thrush starling yellowhammer	curlew mistle thrush meadow pipit oystercatcher swallow snipe willow warbler osprey* dunnock blackheaded gull	bullfinch reed bunting skylark song thrush	bullfinch reed bunting skylark song thrush yellowhammer snipe curlew	osprey*	**Local**
Quadrat SL-Bb03	S6 S7 S9	Medium	-	23	-	-	linnet song thrush yellowhammer	dunnock goldcrest lapwing meadow pipit oystercatcher swallow wood warbler black-headed gull herring gull	linnet song thrush	linnet song thrush yellowhammer lapwing	-	**Local**

SOV / Quadrat	Habitat Areas Contributing to the Value of the SOV / Quadrat	Value of Habitats	Designated Sites Within or Adjacent to SOV / Quadrat	Total Number of Breeding Bird Species	Legal / Conservation Status of key bird species (Breeding, Possibly Breeding, Non Breeding and Incidentals)							Value Of Breeding Bird Population
					Ec Birds Directive Annex I	Wca1i	Jncc Red List	Jncc Amber List	Uk Bap	L Bap	Local Status (Uncommon / Rare)	
Quadrat SL-Bb04	S10 S13	High	-	29	-	-	house sparrow linnet reed bunting skylark song thrush starling yellowhammer	curlew dunnock lapwing meadow pipit oystercatcher swallow snipe willow warbler common gull	linnet reed bunting skylark song thrush	linnet reed bunting skylark song thrush curlew lapwing snipe yellowhammer	-	**County**
Section SL2												
Heatherknowe SOV	S11	Medium	-	19	-	-	starling yellowhammer*	dunnock goldcrest willow warbler curlew*	-	yellowhammer* curlew*	-	**Local**
South Greenloaning SOV	S15	Medium	-	11	-	barn owl*	linnet song thrush yellowhammer starling	dunnock willow warbler meadow pipit swallow woodcock barn owl*	linnet song thrush	linnet song thrush yellowhammer barn owl*	-	**Local**
Hill of Blairs SOV	S15	High	-	21	-	crossbill	linnet skylark song thrush yellowhammer starling	donnock goldcrest meadow pipit willow warbler swallow mistle thrush*	linnet skylark song thrush	linnet skylark song thrush yellowhammer	-	**County**

SOV / Quadrat	Habitat Areas Contributing to the Value of the SOV / Quadrat	Value of Habitats	Designated Sites Within or Adjacent to SOV / Quadrat	Total Number of Breeding Bird Species	Legal / Conservation Status of key bird species (Breeding, Possibly Breeding, Non Breeding and Incidentals)							Value Of Breeding Bird Population
					Ec Birds Directive Annex I	Wca1i	Jncc Red List	Jncc Amber List	Uk Bap	L Bap	Local Status (Uncommon / Rare)	
Burnhead SOV	S19 S20	Medium	-	4	-	-	reed bunting skylark starling	lapwing meadow pipit housemartin	reed bunting skylark	reed bunting skylark lapwing	-	**Less than local**
Quadrat SL-Bb05	S15	Low	-	17	-	-	skylark song thrush starling yellowhammer linnet	dunnock swallow	linnet skylark song thrush	linnet skylark song thrush yellowhammer	-	**Less than local**
Quadrat SL-Bb06	S19 S20	Medium	Cleanhill Wood SINS[1]	23	-	-	house sparrow linnet skylark starling	dunnock meadow pipit oystercatcher swallow lesser redpoll	linnet skylark	linnet skylark	-	**Local**

[1] Designated area within quadrat surveyed as part of SOV, not included on Quadrat survey.

SOV / Quadrat	Habitat Areas Contributing to the Value of the SOV / Quadrat	Value of Habitats	Designated Sites Within or Adjacent to SOV / Quadrat	Total Number of Breeding Bird Species	Legal / Conservation Status of key bird species (Breeding, Possibly Breeding, Non Breeding and Incidentals)							Value Of Breeding Bird Population
					Ec Birds Directive Annex I	Wca1i	Jncc Red List	Jncc Amber List	Uk Bap	L Bap	Local Status (Uncommon / Rare)	
Section SL3												
Blaikiewell Burn SOV	S22	Medium		13	-	-	0	goldcrest willow warbler dunnock stock dove* lesser redpoll	-	-	-	**Local**
Cleanhill Wood SOV	S20	High	SESA	21	-	-	song thrush	dunnock goldcrest stonechat willow warbler	song thrush	song thrush	-	**Local**
Crynnoch Burn SOV	S22 S24 S27	High	River Dee SAC, SSSI, DWS, SESA	23	-	-	song thrush bullfinch yellowhammer	dunncok goldcrest mistle thrush willow warbler swallow oystercatcher	song thrush bullfinch	song thrush bullfinch yellowhammer	-	**County**
River Dee SOV	S27 S28	High	River Dee SAC, SSSI, DWS, SESA	25	kingfisher	kingfisher	reed bunting song thrush starling bullfinch*	grey wagtail kingfisher willow warbler dunnock common gull black-headed gull herring gull oystercatcher sand martin goldcrest*	reed bunting song thrush bullfinch*	reed bunting song thrush kingfisher bullfinch*	kingfisher	**County**

SOV / Quadrat	Habitat Areas Contributing to the Value of the SOV / Quadrat	Value of Habitats	Designated Sites Within or Adjacent to SOV / Quadrat	Total Number of Breeding Bird Species	Legal / Conservation Status of key bird species (Breeding, Possibly Breeding, Non Breeding and Incidentals)							Value Of Breeding Bird Population
					Ec Birds Directive Annex I	Wca1i	Jncc Red List	Jncc Amber List	Uk Bap	L Bap	Local Status (Uncommon / Rare)	
Deeside Old Railway SOV	S31	Medium	Deeside Old Railway DWS	22	-	-	starling song thrush	dunnock oystercatcher swallow willow warbler herring gull	song thrush	song thrush	-	**Local**
Quadrat SL-Bb07	S22 S23 S24	High	River Dee SAC, SSSI, DWS, SESA[1]	28	-	-	house sparrow skylark song thrush starling	dunnock goldcrest grey wagtail meadow pipit oystercatcher willow warbler swallow	skylark song thrush	skylark song thrush	-	**County**
Section SL4												
Beanshill SOV	S39	Medium	-	23	-	-	linnet skylark song thrush yellowhammer starling reed bunting*	goldcrest meadow pipit oystercatcher willow warbler mistle thrush dunnock	linnet skylark song thrush reed bunting*	linnet skylark song thrush yellowhammer reed bunting*	-	**Local**
Quadrat SL-Bb08	S29 S30 S31 S32 S33	Medium	Deeside Old Railway DWS[1]	17	-	-	song thrush starling linnet	stock dove oystercatcher swallow willow warbler	song thrush linnet	song thrush linnet	-	**Local**

SOV / Quadrat	Habitat Areas Contributing to the Value of the SOV / Quadrat	Value of Habitats	Designated Sites Within or Adjacent to SOV / Quadrat	Total Number of Breeding Bird Species	Legal / Conservation Status of key bird species (Breeding, Possibly Breeding, Non Breeding and Incidentals)							Value Of Breeding Bird Population
					Ec Birds Directive Annex I	Wca1i	Jncc Red List	Jncc Amber List	Uk Bap	L Bap	Local Status (Uncommon / Rare)	
Quadrat SL-Bb09	S36 S37	Medium		21	-	-	song thrush starling yellowhammer	dunnock oystercatcher stock dove willow warbler swallow	song thrush	song thrush yellowhammer	-	**Local**
Section SL5												
East Silverburn SOV	S42	Medium	Rotten o' Gairn DWS	10	-	-	yellowhammer	dunnock snipe goldcrest	-	Snipe yellowhammer	-	**Local**
Gairnhill/Kingshill Wood SOV	S43	Medium		30	-	-	linnet starling song thrush	curlew dunnock goldcrest lapwing willow warbler lesser redpoll	linnet song thrush	linnet song thrush lapwing curlew	-	**County**
Moss of Auchlea SOV	S45	High	Moss of Auchlea DWS	33	-	barn owl	reed bunting skylark song thrush bullfinch grasshopper warbler yellowhammer	curlew dunnock goldcrest lapwing willow warbler swallow barn owl lesser redpoll	reed bunting skylark song thrush bullfinch	reed bunting skylark song thrush yellowhammer curlew lapwing bullfinch barn owl	grasshopper warbler	**County**

SOV / Quadrat	Habitat Areas Contributing to the Value of the SOV / Quadrat	Value of Habitats	Designated Sites Within or Adjacent to SOV / Quadrat	Total Number of Breeding Bird Species	Legal / Conservation Status of key bird species (Breeding, Possibly Breeding, Non Breeding and Incidentals)							Value Of Breeding Bird Population
					Ec Birds Directive Annex I	Wca1i	Jncc Red List	Jncc Amber List	Uk Bap	L Bap	Local Status (Uncommon / Rare)	
Quadrat SL-Bb10	S39 S40 S43	Medium	-	10	-	-	linnet starling reed bunting	meadow pipit teal black-headed gull goldcrest willow warbler	linnet reed bunting	linnet reed bunting	-	**Local**
Quadrat SL-Bb11	S43 S44 S45	High	Moss of Auchlea DWS[1]	28	-	greenshank	reed bunting song thrush yellowhammer skylark linnet starling	curlew dunnock mistle thrush meadow pipit oystercatcher willow warbler lapwing herring gull swallow	reed bunting song thrush skylark linnet	reed bunting song thrush yellowhammer skylark linnet curlew lapwing	-	**County**
Section SL6												
West Hatton Wood SOV	S42	Medium	West Hatton Woods DWS	17	-	-	starling song thrush bullfinch	goldcrest swallow willow warbler	song thrush bullfinch	song thrush bullfinch	-	**Local**

SOV / Quadrat	Habitat Areas Contributing to the Value of the SOV / Quadrat	Value of Habitats	Designated Sites Within or Adjacent to SOV / Quadrat	Total Number of Breeding Bird Species	Legal / Conservation Status of key bird species (Breeding, Possibly Breeding, Non Breeding and Incidentals)							Value Of Breeding Bird Population
					Ec Birds Directive Annex I	Wca1i	Jncc Red List	Jncc Amber List	Uk Bap	L Bap	Local Status (Uncommon / Rare)	
Quadrat SL-Bb12	S46 S47 S48	Low		26	-	-	grey partridge linnet skylark	curlew dunnock goldfinch house martin lapwing meadow pipit swallow willow warbler goldcrest kestrel	grey partridge linnet skylark	grey partridge linnet curlew skylark	-	**Local**

4.3 Evaluation of Habitat Areas

Section SL1

4.3.1 An evaluation of Habitat Areas within Section SL1 is presented in Table 18.

Table 18 – Evaluation of Habitat Areas for Section SL1

Habitat Area	Habitat Value	Habitat Description	Value of Breeding Bird Assemblage
S1	Low	Birch wood, which, although derived from plantation, is beginning to develop a semi-natural ground flora.	Composed of similar habitats to Blue Hill SOV but is small in size and less diverse. Therefore is likely to support a similar, but less diverse breeding assemblage. **Less than local**
S2	Low	A series of largely improved fields, many of which are separated by dry stone walls.	Habitats within the Habitat Area were partially sampled by Blue Hill SOV, Quadrat SL-Bb1 and S2 which are considered to be representative of Habitat Area S2. Therefore the Habitat Area is likely to support a similar breeding bird assemblage. **Local**
S3	Medium	A mosaic of habitats comprising coniferous plantation woodland, mature deciduous and mixed parkland / scattered trees, dense scrub, semi-improved neutral grassland and continuous bracken.	The majority of habitats within the Habitat Area are composed of Blue Hill SOV and therefore the area is likely to support a similar breeding bird assemblage. **Local**
S4	Medium	Small area of modified degraded bog habitats. The west is slightly drier than the east due to a slope, thereby resulting in different bog communities, for example, ericoids are more extensive in the west.	Habitats within S4 were not sampled by either a SOV or Quadrat. The area is composed of similar habitats to Hare Moss SOV. However, this area is smaller in size and degraded in nature and is therefore less likely to support a diverse breeding assemblage as the SOV. **Local**
S5	Low	Dominated by large arable and improved fields, this area also contains a drain-associated marshy grassland with influence of bog species. A woody element is provided by conifers to the south of un-named farm buildings.	Habitats within the Habitat Area were partially sampled by Quadrat SL-Bb01 which is considered to be representative of S5. Therefore, the area is likely to support a similar breeding bird assemblage. **Less than local**
S6	Medium	Young coniferous plantation with broadleaved edges and occasional blocks. A species poor semi-improved ground flora is limited to these broadleaved sections. A patch of marsh is present to the west, whilst a pond with surrounding wet grassland is located in the northwest.	Habitats within the area were partially sampled by Quadrat SL-Bb03 which is considered to be representative of S6. Therefore, the Habitat Area is likely to support a similar breeding bird assemblage. **Local**
S7	Low	Dense pine plantation with broadleaved edge and a strip of scrub, however, virtually no ground flora is associated with this forest.	Habitats within the Habitat Area were partially sampled by Quadrat SL-Bb01 which is considered to be representative of S7. Therefore, the area is likely to support a similar breeding bird assemblage. **Local**
S8	Low	Series of improved, poor semi-improved and arable fields.	Habitats within the area were partially sampled by Quadrat SL-Bb02 and are

Habitat Area	Habitat Value	Habitat Description	Value of Breeding Bird Assemblage
		Walls are present though limited, whilst shrubs are extremely sparse.	similar to those represented by Quadrat SL-Bb03, which are considered to be representative of the Habitat Area. Therefore, the area is likely to support a similar breeding assemblage. **Local**
S9	Medium	The majority of this area is composed of young spruce plantation with little ground flora. Other habitats present include amenity grassland with scattered trees and more mature conifer plantation with poor to good semi-improved field flora. To the south, semi-improved acid grassland with scrub gives way to a small semi-natural broadleaved woodland.	Habitats within the area were not sampled by either a SOV or Quadrat. However, the habitats within the Habitat Area are similar to habitats represented by part of Quadrat SL-Bb03 (which is considered to be representative) and Blue Hill SOV. Therefore, this area is likely to support a similar breeding assemblage. **Local**
S10	High	A mosaic of woodland and remnant heathland/bog habitats, comprising wet modified bog and semi-natural broad-leaved woodland with areas of deciduous parkland / scattered trees and scattered and dense scrub. Two small areas of marsh / marshy grassland are located in the west of the SOV with an area of standing water (bog pool).	Composed entirely of Hare Moss SOV. **County**

Section SL2

4.3.2 An evaluation of Habitat Areas within Section SL2 is presented in Table 19.

Table 19 – Evaluation of Habitat Areas for Section SL2

Habitat Areas	Habitat Value	Description	Value of Breeding Bird Assemblage
S11	Medium	SOV comprise a small block of scrubby broad-leaved plantation woodland. Occasional conifers are present but mostly confined to the western end of the SOV. The ground layer is dominated by ericaceous species and bracken.	The Habitat Area is comprised entirely of Heatherknowe SOV. **Local**
S12	Medium	Two distinct areas of woodland. To the east is a dense birch woodland plantation with other occasional broadleaved shrubs. The east is dominated by a semi-natural mix of broadleaves though birch is dominant. Pools, burns and channels are present in both woods.	Habitats within the area were not sampled by either a SOV or Quadrat. However, the habitats within the area are similar to habitats occurring within part of Heatherknowe and Hill of Blairs SOVs. Therefore, this area is likely to support a similar breeding assemblage, although possibly less diverse. **Local**
S13	Low	A series of improved and horse-grazed semi-improved fields. Small copses of broadleaves surrounded by walls are present though the ground flora is species poor.	Habitats within the area were partially surveyed by Quadrat SL-Bb04. However, the habitats within the Habitat Area are less diverse than the habitats represented by Quadrat SL-Bb04. Therefore, the area is likely to support a less diverse breeding assemblage. **Local**

Habitat Areas	Habitat Value	Description	Value of Breeding Bird Assemblage
S14	Low	Mature conifer plantation woodland. A sizeable portion of this area has been felled, with the remaining portion being dominated by lodgepole pine and spruce. Dry heath dominates the rides and is also present under much of the plantation. A concrete water storage system is at the centre of this area.	Habitats within the area were not surveyed by either SOV or Quadrat. However, the habitats within the area are similar to habitats represented by Hill of Blairs SOV but the habitat mosaic within the area is less diverse. Therefore, is less likely to support as diverse breeding assemblage. **Local**
S15	High	A large mosaic of conifer plantation woodland with pockets of semi-improved grassland, dense and scattered scrub and dry/wet dwarf scrub heath together with a large areas of bracken and a shallow fen that occupies the centre of the wood providing high value habitat to breeding birds.	The majority of the habitats within the Habitat Area are composed of Hill of Blairs SOV. Therefore, the area is likely to support a similar breeding bird assemblage. **County**
S16	Low	Improved grassland dominates this area. Soft rush dominated marshy grassland is present within the field. Trees and hedgerows are present within some of the fields and surrounding the area, as are dry stone walls.	Habitats within the area were partially sampled by Quadrat SL-Bb05 which although not considered to be representative of the Habitat Area are similar in composition. Therefore, the area is likely to support a similar breeding assemblage. **Local**

Section SL3

4.3.3 An evaluation of Habitat Areas within Section SL3 is presented in Table 20.

Table 20 – Evaluation of Habitat Areas for Section SL3

Habitat Area	Habitat Value	Habitat Description	Value of Breeding Bird Assemblage
S17	Low	Dominated by improved fields with a small area of species poor marshy grassland. Separating these fields is an avenue of long established broad-leaved trees with ancient woodland indicator species.	Habitats within the area were not sampled by either SOV or Quadrat. However, the habitats within Habitat Area are similar habitats represented by Quadrat SL-Bb05 and SL-Bb06. Therefore, the area is likely to support a similar breeding assemblage. **Local**
S18	Low	Large expanse of plantation woodland, both of broad-leaved and conifer habitat. The conifers are mature and have little ground flora associated with them, whilst the broadleaved birch dominated wood is relatively young and planted upon marshy and acid grassland. Dry heath is often associated with the paths through the wood.	Habitats within the area were not sampled by either SOV or Quadrat. However the habitats within the area are similar in composition to the habitat mosaic represented by Cleanhill Wood SOV although is less diverse. Therefore the Habitat Area is likely to support a similar or less diverse breeding assemblage. **Local**
S19	Medium	Sequence of horse-grazed semi-improved fields with occasional buildings. The fields rise sharply from Blaikiewell Burn (i.e. not part of the flood plain) but are gently sloping thereafter towards the south. The rides are lined with shrubs approaching hedgerows. An arable field is also present.	Habitats within the area were partially sampled by Quadrat SL-Bb06, which is considered to be representative of the Habitat Area. Therefore, it is likely to support a similar breeding assemblage. **Local**
S20	High	Comprises mature conifer plantation woodland that contains significant amounts of semi-natural broadleaved woodland. The ground flora is very variable, ranging from heath, acid grassland to bare soil. Rhododendron can also be extensive as a shrub layer.	Habitats within the area were partially sampled by Cleanhill Wood SOV, which is similar in composition. Therefore, the Habitat Area is likely to support a similar species assemblage. **Local**
S21	Medium	Series of arable and improved fields with shrubs and trees provided by the border with the riparian woodland.	Habitats within the Habitat Area were partially sampled by Quadrat SL-Bb07. Therefore, it is likely it supports a similar breeding assemblage. **Local**
S22	High	Linear habitat area comprising Blaikiewell Burn, Crynoch Burn and a mosiaic of habitats through Kingcausie. Blaikiewell Burn is lined by dense scrub and fen vegetation, grading into riparian woodland dominated by semi-natural broadleaved woodland around Crynoch Burn. Areas of amenity grassland are present within the west of the SOV (Storybook Glen). Towards the River Dee SOV also includes an area of conifer plantation woodland with parkland and scattered broad-leaved and conifer trees associated with Kingcausie.	Habitats within the area were partially sampled by Quadrat SL-Bb07, by Crynoch Burn SOV and Blaikiewell Burn SOV, which are considered to be similar in composition. Therefore, is likely to support a similar or more diverse breeding assemblage. **County**

Habitat Area	Habitat Value	Habitat Description	Value of Breeding Bird Assemblage
S23	High	Series of predominantly improved grassland bordered by woodland and with occasional trees and shrubs located on field boundaries. The area also contains a number of dwelling areas with gardens and amenity grasslands. Ancient hedgerows are present within the vicinity of the dwelling houses. Also present is a small broadleaved plantation which is located close to swamp/wet woodland.	Habitats within the area were partially sampled by Quadrat SL-Bb07, which is similar in composition. Therefore, is likely to support a similar breeding assemblage. **County**
S24	Medium	Series of predominantly improved grassland bordered by woodland and with occasional trees and shrubs located on field boundaries. The area also contains a number of dwelling areas with gardens and amenity grasslands. Ancient hedgerows are present within the vicinity of the dwelling houses. Also present is a small broadleaved plantation which is located close to swamp/wet woodland.	Habitats within the area were partially sampled by Crynoch Burn SOV and are similar to habitats represented by Quadrat SL-Bb07, although more diverse. Therefore, the Habitat Area is likely to support a similar or more diverse breeding assemblage. **County**
S25	Low	Caravan park with amenity grassland and scattered trees and shrubs.	Habitats within S25 were not sampled by either SOV or Quadrat. However, the habitats present were similar to those represented by Quadrat SL-Bb07, although are less diverse. Therefore, it is likely that this Habitat Area supports a less diverse breeding assemblage. **Local**
S26	Low	Agricultural fields of improved or semi-improved grassland with scattered broadleaves and conifers and a well-vegetated field drain.	Habitats within S26 were not sampled by either SOV or Quadrat but are similar in composition to habitats represented by Quadrat SL-Bb07. Therefore, the habitats within this Habitat Area are likely to support a similar breeding assemblage. **Local**
S27	Medium	This area consists of improved fields with trees and scrub frequent along the margins and two wooded pockets of plantation and scrub in the north of the area.	Habitats were partially sampled by the River Dee SOV and are similar in composition to Quadrat SL-Bb07. Therefore, the Habitat Area is likely to support as similar breeding assemblage. **County**
S28	High	The western section of this area is dominated by wet willow/alder woodland, with tall ruderals also present. The northeastern banks contain species rich mesotrophic grassland with scattered and dense scrub, plus occasional trees. The southeastern section, however, is primarily composed of woodland.	Habitats within the area were entirely sampled by the River Dee SOV and therefore it is likely to support an identical species assemblage. **County**

Habitat Area	Habitat Value	Habitat Description	Value of Breeding Bird Assemblage
S29	Low	This area comprises of modern buildings with amenity grassland and sculptured gardens on one hand and woodland, much of it broadleaved semi-natural derived from plantation on the other. Trees line most of the area.	Composed of a similar habitat to part of Quadrat SL-Bb08 which is considered to be representative of the surrounding area. However the habitats within this Habitat Area are less diverse therefore, the habitats and breeding assemblage within this area are likely to be less diverse. **Local**
S30	Medium	This area comprises of modern buildings with amenity grassland and sculptured gardens. Woodland (AWI), much of it broad-leaved semi-natural derived from plantation, is also present. Trees line most of the area.	Habitats within S30 were partially sampled by Quadrat SL-Bb08 (which spans Sections SL3 and SL4) and are similar in composition. Therefore, the Habitat Area is likely to support a similar breeding assemblage. **Local**
S31	Medium	A corridor of riparian broad-leaved semi-natural woodland (to the south of the river) and semi-improved grassland (to the north of the river). Also present are areas of scrub, arable farmland, conifer plantation and open water.	Habitats within the area were partially sampled by the Deeside Old Railway SOV. Therefore, the area is likely to support a similar breeding assemblage. **Local**

Section SL4

4.3.4 An evaluation of Habitat Areas within Section SL4 is presented in Table 21.

Table 21 – Evaluation of Habitat Areas for Section SL4

Habitat Areas	Habitat Value	Habitat Description	Value of Breeding Bird Assemblage
S32	Medium	Large sports complexes, schools, nursing homes and hotels dominate the built environment. Amenity grassland dominates the habitat, though areas of woodland and ancient hedgerows are also present. Wooded areas are primarily plantation with occasional patches of semi-natural broadleaves and frequent scattered trees.	Habitats within the area were partially sampled by Quadrat SL-Bb08 which is composed of a similar habitat, although the Habitat Area is more diverse, in particular well established parkland habitats in Milltimber. Therefore, the area is likely to support a similar or more diverse breeding assemblage. **Local**
S33	Medium	This area consists of relatively large dwelling houses with gardens, many with mature scattered trees as a border.	Habitats within the area were partially sampled by Quadrat SL-Bb08 which is partially composed of similar habitats, although the area is less diverse. Therefore, it is likely to support a less diverse breeding assemblage. **Less than local**
S34	Medium	This area consists of relatively large dwelling houses with gardens, many with mature scattered trees as a border.	Habitats within the area are composed of similar habitats to part of Quadrat SL-Bb08. Therefore, the habitats and breeding assemblage within this area are likely to be of similar diversity. **Local**

Habitat Areas	Habitat Value	Habitat Description	Value of Breeding Bird Assemblage
S35	Low	Scots pine plantation with birch surround. Much of the woodland has now been felled, with abundant dead wood now littering the site.	The habitats within the area were not sampled by SOV or Quadrat. However, the habitats present are likely to be of value to a range of woodland breeding species, e.g. species recorded in Hill of Blairs SOV in Section SL2. However, the habitat composition within this area is less diverse. Therefore, the breeding assemblage is likely to be similarly less diverse. **Local**
S36	Medium	A mixture of arable and improved fields with shrubs lining many of the fields. Small pockets of woodland are occasional. A large shelter belt (the western stretch of Stone Circle) containing matures Scots pine, plus a variety of other conifers and broadleaves is present. Walls divide fields across the majority of the area. Species poor marshy grassland is rare.	Habitats within the area were partially sampled by Quadrat SL-Bb09, which is considered to be representative of the habitats within the Habitat Area, although less diverse in terms of habitats. Therefore, likely to support a similar or more diverse breeding assemblage. **Local**
S37	Medium	Although all connected and, therefore, providing a wooded wildlife corridor, the structure is varied. The west contains a wood with ancient woodland indicators, however, this has been cut back, so the wood is now little more than a large garden. This connects to an area of dense scrub with a new plantation on amenity grassland to the north, before eventually connecting with areas of predominantly conifer plantation to the north and south.	Habitats within S37 were partially sampled by Quadrat Sl-HA09, which is considered to be representative of habitats within the Habitat Area. Therefore, likely to support a similar species assemblage. **Local**
S38	Low	Series of improved fields with frequent pockets and field borders of gorse scrub. Walls line many of the fields.	Habitats within S38 were not sampled by either SOV or Quadrat but are similar in composition to Quadrat Sl-HA09 which is considered to be representative of habitats within the Habitat Area. Therefore, the area is likely to support a similar species assemblage. **Local**
S39	Medium	Upland habitats dominate this area. Acid grassland is particularly dominant, though dry heath increases in abundance in the south west. Gorse is scattered occasionally around the area. Wall enclosed sheep grazed improved grassland is dominant to the east with occasional trees.	Habitats within S39 were partially sampled by Beanshill SOV and therefore the area is likely to support a similar breeding assemblage. **Local**

Section SL5

4.3.5 An evaluation of Habitat Areas within Section SL5 is presented in Table 22.

Table 22 – Evaluation of Habitat Areas for Section SL5

Habitat Areas	Habitat Value	Habitat Description	Value of Breeding Bird Assemblage
S40	Medium	Improved fields with abundant marshy grassland and rocky outcrops dominate. The small channel of Silver Burn runs through the area.	Habitats within S40 were partially sampled by Quadrat SL-Bb10 which is considered to be representative of habitats within the Habitat Area. Therefore, likely to support a similar breeding assemblage. **Local**
S41	Medium	Coniferous plantation woodland with open clearings.	Habitats within S41 were not sampled by either SOV or Quadrat but are similar in composition to habitats represented by Gairnhill / Kingshill SOV. However, the area is smaller in size and botanically less diverse and therefore it is likely to support a similar or less diverse breeding assemblage. **Local**
S42	Medium	Improved/semi-improved grasslands with frequent areas of species poor marshy grassland.	Habitats within S42 were sampled by East Silverburn SOV which is considered to be representative of the Habitat Area. Therefore, the Habitat Area is likely to support a similar breeding assemblage. **Local**
S43	Medium	Plantation conifer woods dominate. Beech can be frequent and sometimes dominant in the canopy. Scots pine probably dominates overall but there is a mix of plantings. Under the Scots pine and larch woodlands, a dry heath community is present.	Habitats within S43 were partially sampled by Gairnhill / Kingshill SOV which is considered to be representative of the Habitat Area. Therefore, likely to support a similar breeding assemblage. **County**
S44	Low	This area is dominated by improved and arable fields. Walls are dominant feature of the borders between fields with gorse occasional.	Habitats within S44 were partially sampled by Quadrat SL-Bb11. Some habitats within S44 are considered representative however, overall the habitat area is considered less diverse and therefore it is likely that it supports a less diverse breeding assemblage. **Local**
S45	High	High scrub of willow on wet grassland. Areas of birch are also present. Where trees have been removed, marsh dominates, although areas of swamp are also present.	Habitats within the area were entirely sampled by Moss of Auchlea SOV. Therefore, the Habitat Area will support an identical breeding assemblage. **County**

Section SL6

4.3.6 An evaluation of Habitat Areas within Section SL6 is presented in Table 23.

Table 23 – Evaluation of Habitat Areas for Section SL6

Habitat Areas	Habitat Value	Habitat Description	Value of Breeding Bird Assemblage
S46	Low	This area is comprised of many relatively small improved and poor semi-improved fields. Dry stone walls surround many of the fields with gorse and broom shrubs frequently lining many of the fields.	Habitats within S46 were partially sampled by Quadrat SL-Bb12 which is considered to be representative of habitats within the Habitat Area Therefore, it is likely that it supports a similar breeding assemblage. **Local**
S47	Medium	A mosaic of semi-natural broad-leaved woodland, deciduous parkland/scattered trees and dense scrub.	Habitats within S46 were partially sampled by West Hatton Wood SOV, which is considered to be representative of habitats within the Habitat Area. Therefore, it is likely that it supports a similar breeding assemblage. **Local**
S48	Medium	This mosaic of communities is dominated by improved grassland bordered by stone walls, the majority of which are tree and shrub lined. Pockets of coniferous woodland, with some dense scrub are frequent in the northern half. The south of the site is dominated by mesotrophic semi-improved grassland with acid characteristics, plus pockets of more typical acid grassland. Scattered trees and scrub are present throughout.	Habitats within the area were partially sampled by Quadrat SL-Bb12. Some habitats within S48 are thought to be representative of Quadrat SL-Bb12 although it contains less habitat diversity. As such, the area is likely to support a similar or less diverse breeding assemblage. **Local**

5 Potential Impacts

5.1 Introduction

5.1.1 The following issues associated with road construction and operation of the proposed scheme are set out following the Design Manual for Roads and Bridges (DMRB) guidelines and recommendations (Highways Agency, 2001).

5.1.2 The following assessment addresses the potential impacts (in the absence of mitigation) on breeding birds. Potential impacts associated with construction and operation of the proposed scheme on breeding bird assemblages may include: direct mortality, habitat loss, habitat fragmentation/isolation, disturbance (in particular during the bird breeding season) and pollution/other indirect impacts.

5.1.3 It should be noted that the potential impacts outlined above frequently interact (i.e. habitat loss during construction can potentially result in disturbance and habitat fragmentation) and the resulting combination of impacts may through synergistic effects significantly increase the adverse impact of the proposed scheme (Luell et al., 2003). Impacts associated with the operational phase of the scheme are considered to be permanent, whereas temporary impacts, which are only apparent while the road is being built, are discussed in association with the construction phase.

5.2 General

5.2.1 The following comprises a description of the types of potential impacts that may occur during construction and operation of the proposed scheme.

Direct Mortality

Construction

5.2.2 Direct mortality of adult birds, their eggs and un-fledged/fledged young during road construction is directly linked to pre-construction habitat loss and disturbance.

5.2.3 Habitat loss resulting from clearance of vegetation prior to construction would be unlikely to result in direct mortality of adults and/or sufficiently fledged young since they are able to escape by moving into unaffected adjacent habitats. Birds' eggs and un-fledged young however are vulnerable to direct mortality impacts associated with habitat loss with species located in denser habitats, such as dense scrub, grassland or woodland being the most effected as the nests cannot be easily detected by contractors.

5.2.4 Disturbance to birds could occur as a result of construction activities and the presence of workers near breeding sites. This could lead to lack of breeding success if adult bird behaviour is disrupted and they are not able to spend sufficient time incubating eggs to tending dependant young.

5.2.5 Direct mortality of bird eggs and young (from habitat loss and disturbance) would be most likely to occur during the breeding season, typically March to July, and would constitute a prosecutable offence under the Wildlife and Countryside Act (1981) (as amended), in particular for those species listed within Schedule 1 of the act.

Operation

5.2.6 Many bird species will attempt to cross active roads to move between habitat fragments that arise as a direct result of operational habitat fragmentation and isolation (refer to paragraph 5.2.21) and the barrier effects that road development imposes on species movement (Salter, 1994).

5.2.7 High mortality rates associated with operational roads reduce the exchange of bird populations between habitats and thus increases isolation effects, demonstrating the link between mortality and barrier effects caused by fragmentation (Van Apeldoorn, 1995). While there are no data available for the numbers of birds killed on roads in Scotland, a review undertaken by Slater (1994) estimated that a total of 653,000 and 7,000,000 birds per annum were killed on Dutch and Bulgarian roads.

5.2.8 An increase in direct mortality resulting from habitat fragmentation associated with an increase in number of roads and road traffic within the UK has been highlighted as a major component in the decline of some bird species such as the barn owl (a WCA Schedule 1 species). It has been observed that twice as many barn owls are now killed by road traffic (an estimated 5,000 individuals per annum) on UK roads as compared with the 1950s and in some areas suitable habitat no longer supports barn owl populations (English Nature, 1996).

5.2.9 Roads can also create unexpected sources of mortality, for example, there have been several documented cases of bird mortality from road salt. Finches, in particular, are attracted to salt, probably to satisfy a dietary need. This can cause mortality through vehicle collision and also through the toxic effects of the ingested salt (Mineau and Brownlee, 2005).

5.2.10 In contrast, some bird species actively benefit from living near roads such as certain members of the corvid family, for example magpie and carrion crow, which regularly scavenge on road kills (Slater, 1994) and common kestrel, which hunts for small rodents along suitable roadside verges. However, none of these species are considered to be species of conservation concern.

5.2.11 The proposed scheme would constitute a new off-line road through a range of habitats where no comparable road exists, and would be likely to result in an increase in mortality (in addition to fragmentation and isolation) of both adult and juvenile birds (with the greatest hazard presented to juvenile birds) through road traffic accidents (RTAs). RTAs would be most likely to occur where birds do not have time to avoid road traffic travelling at speed. RTAs typically occur where woodland or scrub habitats are located immediately adjacent to busy roads and it is likely that low

flying bird species (e.g. members of the thrush family, owls and game birds) would be the greatest affected.

Habitat Loss

Construction and Operation

5.2.12 The direct impact of road construction is the physical loss of breeding and foraging habitats along a route corridor, as they are replaced or altered by transport infrastructure. The impacts associated with direct habitat loss are additionally increased by the interaction of disturbance and fragmentation/isolation impacts which, if combined, can lead to a change in the distribution of species within a route corridor or wider study area (Luell et al., 2003).

5.2.13 Pre-construction habitat clearance would result in the destruction of potential breeding habitat for bird species. Cumulative impacts would also be likely to arise as a consequence of the destruction of birds' eggs and direct mortality of un-fledged young and the displacement of adults and fledglings by means of disturbance into adjacent un-affected habitat.

5.2.14 Habitat clearance would additionally result in the direct loss of foraging habitat through the loss of plant food groups such as buds or berries and the indirect loss of invertebrate communities as these form a major dietary constituent for the majority of small to medium sized bird species (e.g. blue tit or song thrush).

5.2.15 Removal/clearance of surrounding vegetation and/or buildings (which may or may not provide nesting sites) could alter the available shelter for breeding birds, increasing vulnerability to a range of external factors such as adverse environmental conditions and/or predators.

5.2.16 The estimated areas of Phase 1 Habitats that would be lost to the proposed scheme are provided in Table 24. According to the current design release (version 8.0), the amount of landtake required for the Southern Leg section of the proposed scheme is currently 2.766km^2, i.e. 276.6060ha. Note that permanent habitat loss is habitat loss within the footprint of the scheme, including detention basins while temporary habitat loss includes all areas outside the footprint of the scheme that would be lost during construction, but will subsequently be restored once construction of the proposed scheme is complete.

Table 24 – Phase 1 Habitat Areas: Breakdown of Estimated Landtake

Phase 1 Habitat Description	Phase 1 Habitat Categories within scheme land-take	
	Permanent Habitat Loss	**Temporary Habitat Loss/Gain (Ha) – (gain)/+(loss)**
Woodland broadleaved semi-natural	1.229	2.885
Woodland broadleaved plantation	0.744	-2.444
Woodland coniferous plantation	4.010	13.453
Woodland mixed plantation	1.223	-26.726
Recently felled woodland coniferous	0.108	0.342
Cultivated disturbed land amenity	0.061	0.079
Dense continuous Scrub	0.000	-9.276
Scattered scrub	0.000	3.533
Acid grassland unimproved	0.401	-32.694
Improved grassland	35.425	115.805
Acid grassland semi-improved	0.951	4.821
Neutral grassland unimproved	0.742	1.572
Neutral grassland semi-improved	1.283	3.571
Marshy grassland	0.651	4.638
Poor semi-improved grassland	8.135	25.416
Parkland mixed	0.822	3.202
Herb and fern tall ruderal	0.000	0.176
Heathland acid grassland dry mosaic	0.026	0.080
Wet bog	0.248	0.516
Fen	0.076	0.385
Open water	0.146	0.359
Arable	15.271	43.747
Built up areas (buildings)	0.486	0.990
Amenity grassland	0.000	-0.545
Bare ground	0.687	-4.263
Actual road	0.000	-85.782
Total	**72.725**	**149.624**

5.2.17 Habitat loss associated with the construction and use of site compounds and other temporary structures, for example, access tracks, bridges or storage areas, would result in the temporary loss of potential breeding bird habitat, the effects of which are described above. It should be noted however that the level of permanence (in terms of loss) would vary and is dependant on location/s, which are currently unknown at this stage.

5.2.18 Aside from permanent habitat loss described above, no significant additional habitat loss within the route corridor associated with operation of the proposed scheme is envisaged, with the possible exception of occasional routine operational management of roadside habitats (comprising mowing of verges or trimming of scrub/trees).

5.2.19 Operation of the proposed scheme could result in a reduction in the abundance of invertebrate communities within the immediate vicinity of the proposed scheme, in particular as a result of pollution. Pollution can include road salting, oil and fuel spillage resulting in an indirect impact to bird populations through a reduction in food availability.

5.2.20 In addition, indirect habitat loss (i.e. habitat degradation) could occur in areas adjacent to the proposed scheme, where an increase in noise and pollution from the traffic using the road could lead to birds moving out of the area and thus rendering potentially suitable habitat unsuitable for breeding bird populations. Studies undertaken in the Netherlands demonstrated that approximately 60% of species exhibited reduced breeding densities close to roads; with the distance over which the effect was measurable varying depending on how busy the roads were (Reijnen and Foppen, 1994; and 1995b). The research observed that very busy roads (up 60,000 vehicles per day) affected breeding birds up to 2.9km away, with less busy roads (up to 10,000 vehicles per day) affecting birds up to 1.5km from the road. It is likely that the proposed scheme would result in significant disturbance to breeding birds in adjacent unaffected habitats during periods of peak traffic flow. Breeding bird species affected could potentially include; buzzard, woodcock, cuckoo, woodpeckers, tree pipit, goldcrest, chaffinch and warblers (wood and willow warbler) with significantly lower breeding success (or complete absence) near the road.

Habitat Fragmentation and Isolation

Construction and Operation

5.2.21 Habitat fragmentation occurs when a road development imposes a barrier to the natural dispersal of animals resulting in disrupted movement across a site (English Nature, 2001).

5.2.22 The loss of contiguous habitat due to fragmentation is now considered to be one of the most important factors in accelerating the reduction in worldwide biodiversity (Wilson, 1992, In: English Nature, 2001).

5.2.23 Previous studies of breeding birds in highly fragmented woodland have shown that greater numbers of species were recorded in larger areas of woodland, but that factors such as available hedgerows within 0.5km of the woodland and species composition of the woodland were significant contributors to the variation in the number of breeding birds. The research also found that local species extinctions were more pronounced in smaller woods than in larger areas of woodland (Hinsley et al., 1992; in: English Nature, 2001).

5.2.24 English Nature (1994) reports that the habitats most likely to be affected by fragmentation are woodland, heathland and species-rich grassland, and that bird species which move between habitats in order to maintain genetic diversity and avoid inter-breeding are the most affected. The ability to use fragmented habitats varies according to species, with greater impacts on those species less able to cross gaps. Some bird species such as the great spotted woodpecker are not significantly affected by fragmentation and easily cross gaps between pockets of woodland. However, other species (e.g. cuckoo) will not live within several hundred metres of a road. While the barrier effect imposed by the proposed scheme to birds is difficult to assess due to it being variable between species, as a general rule, the busier and wider the road the more effective barrier it is to dispersion (English Nature, 2001).

5.2.25 With respect to the above research, in the absence of appropriate mitigation the proposed scheme is likely to constitute a significant dispersion barrier between habitats which could have the ability to adversely impact a range breeding bird species, some of which may not normally be significantly impacted by habitats gaps.

5.2.26 Construction of the proposed scheme would be likely to have significant fragmentation and isolation impacts on bird populations within the survey corridor through the severing and subsequent isolation of bird populations within pre-existing habitats[1]. This fragmentation and

[1] Dispersal of species between habitats is one of the key factors that enables species to maintain their population viability.

isolation would have an adverse impact on local bird populations through a reduction in dispersal and subsequent isolation of species, which could potentially result in a reduction in population sizes. The extent of these impacts would likely be dependent on the size of the isolated area of habitat and the species affected, as the ability to avoid genetic isolation and localised extinctions by moving between fragmented habitats varies between bird species.

5.2.27 Operation of the proposed scheme is also likely to have significant fragmentation and isolation impacts on bird populations through a restriction in dispersal and movement of species between habitats (fragmented by construction) resulting from direct mortality, habitat loss associated with minimal operational maintenance and noise and vibration disturbance (caused by road traffic). The continued fragmentation and isolation of bird species within severed habitats could have a detrimental effect on species population dynamics and ultimately on population viability.

Disturbance

Construction

5.2.28 Disturbance resulting from noise and vibration associated with construction of the proposed scheme would occur in two stages. The first stage would comprise disturbance resulting from pre-construction habitat clearance. The second stage would comprise both direct disturbance (for example, from rock chipping or possible blasting) and indirect disturbance (for example, human activity associated with construction of the proposed scheme). Both direct and indirect disturbance would be likely to contribute to an increase in the effects of fragmentation and isolation (refer to paragraph 5.2.21). Should either form of disturbance reach a level considered to be significant, it might lead to some species of bird failing to nest[1] during the breeding season.

5.2.29 The location of temporary site compounds/offices (which may be operational 24 hours a day and therefore may require some night work) near sensitive habitats, for example areas of woodland or wetlands, could result in significant disturbance to breeding birds. This could result from noise, vibration and light pollution in addition to physical disturbance from the presence of construction workers and heavy plant.

5.2.30 Disturbance resulting from light pollution associated with construction during low light levels in winter/autumn and/or 24-hour construction could result in disturbance to both breeding and non-breeding bird species located within habitats adjacent to the proposed scheme. This could potentially lead to some species of bird failing to breed or completely abandoning their habitats at a local level if the disturbance reaches a significant level. The severity of the impact would vary according to the frequency and magnitude of the disturbance and the species involved.

5.2.31 It should be noted that it is illegal to disturb breeding birds under the Wildlife and Countryside Act (1981) (as amended), in particular, for those species listed within Schedule 1 of the Act.

Operation

5.2.32 Research undertaken by Reijnen et al (1997) and Reijnen and Foppen (1994) has shown that operational noise is a primary factor in altering the density of bird populations adjacent to roads and highways.

5.2.33 A detailed study on the effects of road traffic noise on breeding bird populations in the Netherlands by Reijnen et al (1995a) observed that roads used for high speed travel reduced the density of breeding birds within adjacent woodland and grassland habitats. Their research additionally noted

[1] The number of failed nesting attempts will depend on the frequency and magnitude of the disturbance and the species involved.

that the distances at which species were affected varied between species. For example, the greatest sensitivity to disturbance was observed in black-tailed godwits and cuckoo, located 1.13km and 0.9km respectively from the study highway.

5.2.34 Further research undertaken by Reijnen et al (1995b) has shown that road traffic noise accounted for lower densities of 43 songbird species in habitats adjacent to operational roads and that the distance from a motorway at which breeding bird densities were affected was influenced by the intensity and speed of traffic (Reijnen et al., 1995a).

5.2.35 Other studies have shown that road traffic noise exceeding 50dBA can reduced bird density (40dBA for some woodland species) in adjacent habitats, while in comparison, some bird species appeared unaffected by disturbance but had lower breeding success (Luell et al., 2003).

5.2.36 Light pollution can have adverse impacts on bird species and can affect both breeding and foraging behaviour in a number of species of bird. This impact was first observed by Rawson (1932) who demonstrated the correlation between critical light levels at dawn and singing in thrushes and suggested that artificial lighting could modify the timing of natural behavioural patterns.

5.2.37 Farner (1964) demonstrated photoperiodic control of reproduction in birds and observed that increasing artificial day length induced hormonal, physiological and behavioural changes initialling breeding. Lofts and Merton (1968) demonstrated photoperiodic control of reproduction in birds, showing that 50 species of wild bird could be brought into breeding condition prematurely by exposure to artificially long days in winter.

5.2.38 Hill (1992) observed that seabirds were disorientated by street lights on cloudy nights and observed that redshank and oystercatchers were observed feeding within 50m of artificial lighting at night, while flocks of dunlin were observed roosting near to a large roundabout lit by flood lighting.

5.2.39 Outen (undated) and Hill (1992) found that nocturnal bird species such as barn owl are sensitive to the presence of bright illumination and that artificial lighting has the potential to provide more feeding time for birds but could have an adverse impact on prey abundance leading to food shortages.

5.2.40 Disturbance resulting from noise and vibration associated with operation of the proposed scheme would be mainly influenced by traffic type, traffic intensity, road surface properties, topography and structure/type of adjacent vegetation, the magnitude and spread of which is in turn influenced by underlying geology and soil characteristics (Luell et al., 2003).

5.2.41 Disturbance during operation of the proposed scheme would result from noise and vibration associated with road traffic, artificial lighting (that would be installed at all major junctions along the proposed scheme) and occasional operational maintenance of the proposed scheme. As with disturbance associated with construction, an increase in traffic noise and lighting could result in sensitive bird species failing to breed or abandoning habitats adjacent to the scheme. This impact might be more pronounced, given that the majority of habitats within the route corridor are currently subject to either low or no artificial lighting.

Pollution and Other Indirect Impacts

Construction

5.2.42 Accidental spills of chemicals and other potentially toxic substances during construction of the proposed scheme might occur and would be of particular concern if they were to happen within proximity of ecological sensitive communities or rivers and/or streams (especially if they are designated or form a tributary to a site designated at a national or European level, for example, SSSI or cSAC (refer to AWPR Environmental Statement 2007, Chapter 24: Water Environment). The severity and magnitude of the pollution impact would depend on the constituents, their toxicity to biodiversity and the discharge/spill volume of the pollutant in question.

Operation

5.2.43 Pollutants and toxins are derived from road traffic and road surfaces. The exhaust produced by road vehicles contains a number of pollutants ranging from carbon monoxide, nitrogen oxide and sulphur dioxide to hydrocarbons and dioxins, while cars themselves produce a number of heavy metals ranging from lead to cadmium. These chemicals and gases could potentially pollute surface and groundwater, soil and vegetation (Luell et al., 2003).

5.2.44 Research conducted by Ballard and Hacker (1996) has shown that de-icing salt used in the winter to keep roads ice-free can potentially result in the death of seed eating birds such as finches, which consume seeds contaminated by salt. The application of de-icing salt to the proposed scheme during the winter and the indirect pollution of adjacent habitats via vehicle spray could therefore potentially result in the death of seed eating bird species foraging in habitats located adjacent to the proposed scheme. It is not possible to estimate the average amount of salt spread, and hence potential impact to bird populations since this is dependant on the rate of salt spread and speed of the spreader. However, wide verges with varied nut or berry bearing planting are likely to be most impacted.

5.2.45 Accidental spills of chemicals and other potentially toxic substances during operation of the proposed scheme could occur as a consequence of inadvertent discharge or indirectly as a result of road traffic accidents. As with the construction phase, these pollution incidents would be of particular concern if they were to happen within proximity of ecological sensitive communities or rivers and/or streams identified above (refer to AWPR Environmental Statement 2007, Chapter 24: Water Environment).

5.2.46 Impacts on bird populations from vehicle-derived atmospheric pollution are not envisaged, as an air quality assessment has been undertaken for the route corridor, and also for the wider area – including the city of Aberdeen (please refer to AWPR Environmental Statement 2007, Chapters 44: Air Quality and 55: Air Quality Cumulative Impact Assessment). Findings indicate that air quality within the vicinity of the proposed scheme would remain very good.

5.2.47 Insufficient research has been undertaken to date regarding the direct impacts that operational roads have on the abundance of invertebrate communities and the indirect impacts on bird species through a reduction in food availability. The only survey conducted to date in the UK was undertaken by the RSPB in 2004 (www.rspb.org.uk/bugcount). The study observed that in total one invertebrate was killed for every five miles travelled.

5.2.48 Spills and/or accidental discharge associated with construction and operation within or in close proximity to the following watercourses, waterbodies and/or wetland areas could constitute a key impact: Loirston Burn, Greengate Ditch, Burn of Ardoe, Bishopston Ditch, Heathfield Burn, Jameston Ditch, Hare Moss, Whitestone Burn, Burnhead Burn, Crynoch Burn, Blaikiewell Burn, Kingcausie Burn, River Dee, Milltimber Burn, Culter House Ditch, Beans Burn, Upper Beanshill Burn, Gairn Burn, Moss of Auchlea, Moss of Auchlea drainage system and Westholme Burn.

Impacts on Key Bird Species

5.2.49 A summary description of generic impacts on key bird species (WCA1i, JNCC Red List, JNCC Amber List, UK BAP, LBAP and local status species) is shown in Table 25.

Table 25 – Summary Description of Impacts on Bird Species of Conservation Concern

Bird Species	Habitats of Value	Impacts
barn owl	Resident species. Open farmland and rough grassland habitats with suitable old buildings or trees for roosting/ nesting.	Loss and fragmentation of breeding habitat (buildings, in particular, farm out buildings and open fields) during operation. Disturbance during construction and operation. Possible risk of RTAs due to low flight patterns.
bullfinch	Resident species. Breeds and winters in orchards, parks, woodlands and scrub.	Loss of breeding habitat (woodland and scrub) during operation of the scheme. Disturbance during construction and operation.
common gull	Resident species. Breeds on bare ground, or rocky grassy slope less often on coastal edges and more recently, buildings.	Unlikely to be impacted by loss of breeding habitat or disturbance. .
curlew	Resident species. Breeds on areas of damp moorland and pasture. Winters on estuaries and damp grassland.	Loss of breeding habitat (heathland, pasture and marshy grassland) during operation. Disturbance during construction. Species in the long term is unlikely to be disturbed during operation due to habituation to road traffic.
dunnock	Breeds and winters in gardens, parks, woodland, waste ground and hedges.	Loss of breeding habitat (woodland, hedgerow and scrub) during operation. Disturbance during construction. Disturbance during operation is unlikely to constitute a significant impact.
goldcrest	Breeds and winters in coniferous woodlands, occurring in deciduous woodland, scrub and even gardens in winter.	Loss of breeding habitat (conifer woodlands) during operation. Disturbance during construction. Disturbance during operation would be unlikely to constitute a significant impact.
grasshopper warbler	Summer visitor. Breeds in habitats with low thick vegetation, marshland, beside lakes or watercourses, in young conifer plantations or clear felled areas, among tall grass and herbage with scattered bushes.	Loss and fragmentation of breeding riparian habitats (marsh/marshy grassland and areas of wet woodland/scrub) during operation. Disturbance and pollution to wet areas during construction and operation.
greenshank	Breeds in bog and moorland habitats, wintering on the coast and using fresh and salt-water bodies during passage.	Unlikely to be significantly impacted through loss, fragmentation and disturbance of breeding habitat during operation. Disturbance during construction may occur.
grey partridge	Breeds and winters on farmland, grassland and arable fields.	Loss and fragmentation of breeding habitat (arable farmland and fields) during operation. Disturbance during both construction and operation. Possible risk of RTAs due to low flight pattern.
grey wagtail	Resident species. Breeds in sheltering trees, shrubs, or dense herbage, holes, ledges, or hollows for nesting. Usually but not exclusively associated with water, such as river or streams.	Loss and fragmentation of breeding habitat during operation. Disturbance during construction. Disturbance during operation would be unlikely to constitute a significant impact. Possible direct mortality from ingestion of pollutants.
herring gull	Resident species. Breeds on rocky coastal edges and more recently, buildings.	Unlikely to be impacted by loss of breeding habitat or disturbance. .
house martin	Migrant species. Breeds on the sides or buildings or other structure with vertical sides. Feeds on insects over fields and other areas.	Loss and fragmentation of breeding habitat (buildings and open fields) during operation. Unlikely to be subject to disturbance due to the fact that very few buildings, which provide nesting habitat for house martins, will be destroyed or impacted upon. Possible risk of RTAs due to low flight patterns.
house sparrow	Resident species. Breeds in urban environment, in rood tiles, air ducks, recesses and occasionally trees.	Loss of breeding habitat (buildings and hedgerows). Unlikely to be impacted by disturbance.
kingfisher	Resident species. Breeds in step or vertical bank of stream, river or gravel pit, usually over water.	Loss and fragmentation of breeding habitat (riverine banks) during operation. Disturbance, in particular during construction, as species is sensitive to human presence. Direct mortality from pollution of watercourses could occur.
lapwing	Resident species. Breeds from the coast to the uplands on marshy areas and farmland. Winters on estuaries and farmland.	Loss and fragmentation of breeding habitat (farmland) during operation. Disturbance, in particular during construction, as species is sensitive to human presence.

Bird Species	Habitats of Value	Impacts
linnet	Resident species. Breeds in scrub on moorland, heaths and farmland. Winters in stubble and weedy fields.	Loss of breeding and wintering habitat (farmland and grassland) during operation. Disturbance during construction. Disturbance during operation would be unlikely to constitute a significant impact.
meadow pipit	Resident species. Breeds in open country, moors and heaths, coastal meadows, pastures and bogs.	Loss and fragmentation of breeding habitat (grassland, heathland and bog). Disturbance during construction. Disturbance during operation would be unlikely to constitute a significant impact.
mistle thrush	Resident species. Breeds in woods, parks, gardens and orchards. Also found in winter in fields and moorland edges.	Loss and fragmentation of breeding habitat (woodland, scrub, gardens, agricultural fields). Disturbance during construction. Disturbance during operation would be unlikely to constitute a significant impact. Possible risk of RTAs due to low flight patterns.
osprey	Migrant species. Breeds in trees favouring Scots pine woodland but dependent on large freshwater bodies (rivers or lochs) for feeding.	Unlikely to be impacted by the loss of habitat and fragmentation of the River Dee during operation due to large feeding range. Disturbance during both construction and operation at the River Dee and Loirston Loch. Direct mortality from ingestion of pollutants.
oystercatcher	Resident species. Breeds on grass fields and shingle beside lakes, rivers and seashores. Winters on estuaries, sandy beaches and open fields.	Loss of breeding habitat (farmland and grassland) during operation. Disturbance during construction. Disturbance during operation would be unlikely to constitute a significant impact.
reed bunting	Resident species. Breeds and winters in reedbeds, upland and lowland marshes and farmland. Visits gardens in winter.	Loss, fragmentation and possible pollution of breeding habitat (riparian corridors, marshland and scrub/hedgerows operation) during operation. Disturbance during construction. Disturbance during operation would be unlikely to constitute a significant impact.
sand martin	Migrant species. Breeds in riverbanks, lakesides and sandpits. Usually seen over water.	Unlikely to be subject to disturbance other than in proximity of breeding areas. Possible risk of RTAs due to low flight patterns.
skylark	Resident species. Breeds on moorland, farmland, dunes and grassland. Winters on rough grassland, stubble and saltmarsh.	Loss of breeding habitat (arable and grassland) during operation. Disturbance during construction. Disturbance during operation would be unlikely to constitute a significant impact.
snipe	Resident species. Breeds in marshes and boggy areas. Winters on salt marshes, coastal lagoons and other marshy areas.	Loss and fragmentation of breeding habitat (marshland and boggy areas) during operation. Disturbance during construction. Disturbance during operation would be unlikely to constitute a significant impact. Possible risk of RTAs due to low flight patterns.
song thrush	Resident species. Breeds and winters in gardens, farmland, woodland and hedges.	Loss and fragmentation of breeding habitat (woodland, scrub, gardens, agricultural fields). Disturbance during construction. Disturbance during operation would be unlikely to constitute a significant impact. Possible risk of RTAs due to low flight patterns.
starling	Resident species. Breeds in towns, woods, parks, and on farms. Winters in cities, gardens and farmland.	Loss of breeding habitat (woodland, agricultural land, parks and gardens). Disturbance during construction and operation would be unlikely to constitute a significant impact.
stock dove	Resident species. Breeds in wooded areas, forest edges and larger undisturbed parks.	Loss and fragmentation of breeding habitat (woodland and parkland). Disturbance during construction and operation. Possible risk of RTAs due to low flight patterns.
stonechat	Migrant species. Breeds in dense vegetation on or close to the ground. Winters in southern Europe.	Loss and fragmentation of breeding habitat (scrub, rank grassland) during operation. Disturbance during construction and operation.
swallow	Summer visitor. Breeds mostly in farm buildings. Feeds in the air usually over open country.	Loss and fragmentation of breeding habitat (buildings, in particular, farm out-buildings and open fields) during operation. Unlikely to be subject to disturbance. Possible risk of RTAs due to low flight patterns.
teal	Resident species. Breeds and wintering in areas of seasonal / permanent open water such as lochs.	Minimal loss and fragmentation of breeding habitat (rivers or small burns/channels) during operation. Disturbance during construction and operation. Possible risk of RTAs due to low flight patterns. .
willow warbler	Migrant species. Breeds in thick ground cover in woodland, farmland and scrub.	Loss and fragmentation of breeding habitat (woodland and areas dense scrub) during operation. Disturbance during construction. Disturbance during operation would be unlikely to constitute a significant impact.

Bird Species	Habitats of Value	Impacts
wood warbler	Migrant species. Breeds in woodland with little secondary growth and sparse ground cover.	Loss and fragmentation of breeding habitat (mature woodland) during operation. Disturbance during construction and operation
woodcock	Resident species. Breeds in extensive woodland, whether broad-leaved, mixed, or coniferous, for cool shade, humidity and soft humus apt to retain moisture.	Loss and fragmentation of breeding habitat (mature woodland) during operation. Disturbance during construction and operation
yellowhammer	Resident species. Breeds and winters in hedgerows and scrub, especially gorse and hawthorn thickets.	Loss and fragmentation of breeding habitat (farmland and grassland) during operation. Disturbance during construction and operation.

5.3 Specific Impacts

Potential Impacts on Habitat Areas

5.3.1 Potential impacts to breeding bird populations throughout Sections SL1 – SL6 during construction and operation of the proposed scheme are likely to include:

- direct mortality;
- direct and in-direct habitat loss;
- habitat severance, fragmentation and isolation;
- disturbance; and
- pollution.

5.3.2 Habitat Areas that would not be affected during construction or operation of the proposed scheme have not been considered as part of this assessment.

5.3.3 A description and assessment of specific impacts is provided in Table 26. With respect to construction and operation and unless otherwise stated in Table 26, the risk of direct mortality (including operational RTAs), fragmentation and disturbance resulting from clearance and loss of low value habitats (arable or improved/amenity grassland) is assessed as being a low negative impact. In comparison, the impacts resulting from clearance and loss of high value habitats (such as woodland, scrub, unimproved/semi-improved/marshy grassland, heath and bog) is assessed as being a medium negative impact. Pollution to aquatic habitats resulting from accidental spills or surface runoff is assessed as being a medium negative impact. Whereas, pollution to solely terrestrial habitats is assessed as being a low negative impact.

5.3.4 Impacts associated with the location of temporary work compounds cannot be assessed at this stage until the location of temporary work compounds is determined. However, the siting of such compounds will be in cognisance of ecological advice and will be such as to cause minimal impact.

5.3.5 Key bird species identified during surveys and outlined in Table 25 (JNCC Red List, JNCC Amber List, UK BAP and LBAP) and likely to be affected by the impacts described above (direct mortality, habitat loss, disturbance etc.) have been inferred through an assessment of the baseline information based on professional judgment.

Section SL1

5.3.6 Six Habitat Areas and the bird assemblages they support would be affected during construction and operation of the proposed scheme: S2, S3, S6, S7, S9 and S10.

5.3.7 Potential construction impacts would include fragmentation/isolation and disturbance, particularly at Hare Moss (S10). In addition, there is a risk of pollution to the same area due to accidental spills. Predicted construction impacts are generally of low negative magnitude and Minor significance. Potential key impacts occur at Hare Moss due to its being assessed as areas of county importance for breeding birds. Key impacts are assessed as being of medium negative magnitude and

Moderate significance. All other construction impacts within SL1 are predicted to be between negligible to low negative magnitude and between negligible and minor significance because although the impacts may negatively affect the breeding bird assemblage, there will probably be no permanent effect on its integrity and/or key attributes and is unlikely to change its evaluation

5.3.8 During the operation of the road, there is the potential risk of direct mortality, fragmentation/isolation, disturbance and habitat loss at Hare Moss (S10). The additional risk of pollution is not likely as detention (SUDS) ponds will be lined.. Predicted impacts are generally of low negative magnitude and Minor significance. Potential key impacts occur at Hare Moss, due to it being assessed as an area of county importance for breeding birds. Key impacts are all assessed as being of medium negative magnitude and moderate significance. All other impacts within SL1 are predicted to be between negligible to low negative magnitude and between negligible and minor significance because although the impacts may negatively affect the breeding bird assemblage, there will probably be no permanent effect on its integrity and/or key attributes and is unlikely to change its evaluation

Section SL2

5.3.9 Four Habitat Areas and the bird assemblages they support would be affected during construction and operation of the proposed scheme: S11, S13, S15 and S16.

5.3.10 Potential construction impacts would include fragmentation/isolation and disturbance, particularly as a result of the clearance of land around the Hill of Blairs. Although the area is assessed as being of county importance for breeding birds, the majority of impacts are of low negative magnitude and minor significance. All other impacts within SL2 are predicted to be between negligible to low negative magnitude and between negligible and minor significance

5.3.11 During the operation of the road, there is the potential risk of direct mortality, fragmentation/isolation, disturbance and habitat loss. The areas around the Hill of Blairs (S15) are assessed as having the highest value for breeding birds (county) within SL2. All operational impacts within these areas are predicted to be of medium negative magnitude and moderate significance. All other impacts within SL2 are predicted to be between negligible to low negative magnitude and between negligible and minor significance because although the impacts may negatively affect the breeding bird assemblage, there will probably be no permanent effect on its integrity and/or key attributes and is unlikely to change its evaluation.

Section SL3

5.3.12 Eleven Habitat Areas and the bird assemblages they support would be affected during construction and operation of the proposed scheme: S19, S20, S21, S22, S23, S24, S27, S28, S29, S30 and S31.

5.3.13 Potential construction impacts would include fragmentation/isolation and disturbance, particularly at Cleanhill (S20), Blaikiewell Burn (S22), Crynoch Burn (S24) and the River Dee (S27 and S28). In addition, there is a risk of pollution of Blaikiewell Burn and the River Dee due to accidental spills. Predicted construction impacts are generally of low negative magnitude and Minor significance. The River Dee is assessed as of county importance for breeding birds and pollution to this watercourse is assessed as being of medium negative magnitude and moderate significance within this context. All other construction impacts within SL3 are predicted to be between negligible to low negative magnitude and between negligible and minor significance.

5.3.14 During the operation of the road, there is the potential risk of direct mortality, fragmentation/isolation, disturbance and habitat loss, particularly at Cleanhill, Blaikiewell Burn, Crynoch Burn and the River Dee. The additional risk of pollution due to runoff exists at Blaikiewell Burn and the River Dee in the absence of appropriate mitigation. Impacts to these areas are generally assessed as low negative magnitude and Minor significance. The exception is pollution, which is assessed as medium negative magnitude and Minor significance for Blaikiewell Burn and Crynoch Burn; and medium negative magnitude and Moderate significance for the River Dee (county importance). All other impacts within SL3 are predicted to be between negligible to low negative magnitude and between negligible and minor significance.

Section SL4

5.3.15 Five Habitat Areas and the bird assemblages they support would be affected during construction and operation of the proposed scheme: S32, S33, S36, S37 and S39.

5.3.16 During the construction of the road, there is the potential risk of pollution to Gairn Burn, Upper Beanshill Burn and Silver Burn, which are assessed as medium negative magnitude and Minor significance. All other impacts within SL4 are predicted to be between negligible to low negative magnitude and between negligible and minor significance because although the impacts may negatively affect the breeding bird assemblage, there will probably be no permanent effect on its integrity and/or key attributes and is unlikely to change its evaluation.

5.3.17 During the operation of the road, there is the potential risk of pollution to Gairn Burn, Upper Beanshill Burn and Silver Burn, These impacts are assessed as medium negative magnitude and minor significance. All other impacts within SL4 are predicted to be between negligible to low negative magnitude and between negligible and minor significance because although the impacts may negatively affect the breeding bird assemblage, there will probably be no permanent effect on its integrity and/or key attributes and is unlikely to change its evaluation..

Section SL5

5.3.18 Five Habitat Areas and the bird assemblages they support would be affected during construction and operation of the proposed scheme: S40, S42, S43, S44 and S45.

5.3.19 Potential construction impacts would include disturbance at East Silverburn (S40), Kingshill/Gairnhill Wood (S43) and the Moss of Auchlea (S45). In addition, there is a risk of fragmentation/isolation and pollution of watercourses surrounding East Silverburn and the marshy grassland and swamp at the Moss of Auchlea due to accidental spills. Predicted construction impacts are generally of low negative magnitude and Minor significance. The Impacts of pollution would be a potential key impact at the watercourses within the East Silverburn and the inundated areas at the Moss of Auchlea area, due to its assessment as an area of county importance for breeding birds. Key impacts in SL5 in the absence of mitigation are all assessed as being of medium negative magnitude and minor significance. All other impacts within SL5 are predicted to be between negligible to low negative magnitude and between negligible and minor significance because although the impacts may negatively affect the breeding bird assemblage, there will probably be no permanent effect on its integrity and/or key attributes and is unlikely to change its evaluation.

5.3.20 During the operation of the road, there is the potential risk of direct mortality, disturbance and habitat loss at East Silverburn, Kingshill/Gairnhill Wood and the Moss of Auchlea. Additionally, there is a risk of fragmentation/isolation and pollution of watercourses at East Silverburn and the marshy grassland/low-lying area at the Moss of Auchlea due to run off. Predicted impacts to these areas are generally of low negative magnitude and Minor significance. However, in the absence of mitigation, pollution at East Silverburn and the Moss of Auchlea (county importance) are assessed as being of medium negative magnitude and Moderate significance; and direct mortality, fragmentation and isolation and disturbance and habitat loss are all assessed as being medium negative magnitude and minor significance. All other impacts within SL5 are predicted to be between negligible to low negative magnitude and between negligible and minor significance because although the impacts may negatively affect the breeding bird assemblage, there will probably be no permanent effect on its integrity and/or key attributes and is unlikely to change its evaluation.

Section SL6

5.3.21 Three Habitat Areas and the bird assemblages they support would be affected during construction and operation of the proposed scheme: S46, S47 and S48.

5.3.22 Potential construction impacts include fragmentation/isolation, disturbance and pollution at the agricultural fields north of the A944 (S46) and Cloghill (S48). All impacts are of low negative magnitude and Minor significance. All other impacts within SL6 are predicted to be between

negligible to low negative magnitude and between negligible and minor significance because although the impacts may negatively affect the breeding bird assemblage, there will probably be no permanent effect on its integrity and/or key attributes and is unlikely to change its evaluation.

5.3.23 During the operation of the road, there is the potential risk of direct mortality, fragmentation/isolation, disturbance, habitat loss and pollution due to runoff. The areas around the agricultural fields north of the A944 (S46) and Cloghill are assessed as having a local ecological value for breeding birds. As such operational impacts within these areas are predicted to be of low negative magnitude and minor significance. All other impacts within SL6 are predicted to be between negligible to low negative magnitude and between negligible and minor significance, because although the impacts may negatively affect the breeding bird assemblage, there will probably be no permanent effect on its integrity and/or key attributes and is unlikely to change its evaluation.

Table 26 - Assessment of Potential Impacts

Habitat Area	Evaluation	Phase	Description of Impacts	Impact Magnitude / Significance
Section S1				
S2/S3	Local	Construction	Fragmentation/isolation and disturbance due to clearance	Low negative/Minor
		Operation	Direct mortality through RTA, disturbance and habitat loss of improved fields and of coniferous plantation.	
S6	Local	Construction	Fragmentation/isolation and disturbance due to clearance.	Low negative/Minor
		Operation	Direct mortality through RTA, fragmentation and isolation, disturbance and habitat loss of coniferous plantation.	
S7	Local	Construction	Fragmentation/isolation and disturbance due to clearance	
		Operation	Direct mortality through RTA, disturbance and habitat loss of coniferous plantation woodland.	Low negative/Minor
S9	Local	Construction	Fragmentation/isolation and disturbance due to clearance	
		Operation	Direct mortality through RTA, disturbance and habitat loss of coniferous plantation woodland.	Low negative/Minor
S10	County	Construction	Fragmentation/isolation and disturbance due to clearance	Medium negative/Minor
			Potential pollution to area surrounding Hare Moss due to accidental spills.	Medium negative/Moderate
		Operation	Direct mortality through RTA, fragmentation and isolation, disturbance and habitat loss of marshy grassland and willow scrub.	
			Potential pollution area surrounding Hare Moss due to runoff	Negligible
Section S2				
S11	Local	Construction	Fragmentation/isolation and disturbance due to clearance	Low negative/Minor
		Operation	Direct mortality through RTA, disturbance and habitat loss of broad-leaf plantation woodland.	
S13	Local	Construction	Fragmentation/isolation, disturbance and pollution due to accidental spills around the agricultural fields from Sunnyside to Causeyport.	Low negative/Minor
		Operation	Direct mortality due to RTA, fragmentation/isolation, disturbance, habitat loss of improved grassland.	
S15	County	Construction	Fragmentation/isolation and disturbance due to clearance.	Low negative/Minor
		Operation	Direct mortality through RTA, disturbance and habitat loss of conifer plantation-dry/wet heath mosaic.	Medium negative/Moderate
S16	Local	Construction	Fragmentation/isolation, disturbance and pollution due to accidental spills around the agricultural fields of East of Burnhead to Greenloaning.	Low negative/Minor
		Operation	Direct mortality due to RTA, fragmentation/isolation, disturbance, habitat loss of improved grassland.	
Section SL3				
S19	Local	Construction	Fragmentation/isolation and disturbance due to clearance	Low negative/Minor
		Operation	Direct mortality through RTA, disturbance and habitat loss of grazed semi-improved grassland.	

Habitat Area	Evaluation	Phase	Description of Impacts	Impact Magnitude / Significance
S20	County	Construction	Fragmentation/isolation and disturbance due to clearance	Low negative/Minor
		Operation	Direct mortality through RTA, disturbance and habitat loss of mature coniferous plantation.	
S21	Local	Construction	Fragmentation/isolation and disturbance due to clearance	Low negative/Minor
		Operation	Direct mortality through RTA, disturbance and habitat loss of arable and improved grassland.	
S22	County	Construction	Fragmentation/isolation and disturbance due to clearance	Low negative/Minor
			Potential for pollution of the Blaikiewell Burn, Crynoch Burn and River Dee due to accidental spills.	Medium negative/Minor
		Operation	Direct mortality through RTA, fragmentation and isolation, disturbance and habitat loss of riparian woodland.	
			Potential for pollution of the Blakiewell Burn, Crynoch Burn and River Dee due to runoff.	
S23	County	Construction	Fragmentation/isolation and disturbance due to clearance	Low negative/Minor
			Potential pollution to surrounding area due to accidental spills.	
		Operation	Direct mortality through RTA, fragmentation and isolation, disturbance and habitat loss of improved grassland with woodland borders and ancient hedgerows.	Medium negative/Minor
			Potential pollution to surrounding area due to run-off	
S24	County	Construction	Fragmentation/isolation and disturbance due to clearance	Low negative/Minor
			Potential for pollution of the Kingcausie Burn, Crynoch Burn and River Dee due to accidental spills.	Medium negative/Minor
		Operation	Direct mortality through RTA, fragmentation and isolation, disturbance and habitat loss of improved grassland with woodland and shrub borders.	
			Potential for pollution of the Kingcausie Burn and the Crynoch Burn due to runoff.	
S27	County	Construction	Fragmentation/isolation and disturbance due to clearance.	Low negative/Minor
			Potential pollution into River Dee due to accidental spills.	Medium negative/Moderate
		Operation	Direct mortality through RTA, fragmentation and isolation, disturbance and habitat loss of improved fields with tree and shrub borders.	
			Potential pollution to River Dee due to run-off	
S28	County	Construction	Fragmentation/isolation and disturbance due to clearance.	Low negative/Minor
			Potential pollution into River Dee due to run-off.	Medium negative/Moderate
		Operation	Direct mortality through RTA, fragmentation and isolation, disturbance and habitat loss of riparian woodland.	
			Potential pollution to River Dee due to run-off	
S29	Local	Construction	Fragmentation/isolation and disturbance due to clearance	Low negative/Negligible
			Potential for pollution of the Milltimber Burn and the River Dee due to accidental spills.	Medium negative/Minor
		Operation	Direct mortality through RTA, disturbance and habitat loss of scattered riparian woodland and amenity grassland.	
			Potential for pollution of Milltimber Burn and the River Dee due to runoff.	
S30	Local	Construction	Fragmentation/isolation and disturbance due to clearance	Low negative/Minor
		Operation	Direct mortality through RTA, disturbance and habitat loss of scattered riparian woodland and amenity grassland.	

Habitat Area	Evaluation	Phase	Description of Impacts	Impact Magnitude / Significance
S31	Local	Construction	Fragmentation/isolation and disturbance due to clearance	Low negative/Minor
		Operation	Direct mortality through RTA, disturbance and habitat loss of riparian broad-leaf woodland.	
Section SL4				
S32	Local	Construction	Fragmentation/isolation and disturbance due to clearance	Low negative/Minor
		Operation	Direct mortality through RTA, disturbance and habitat loss of amenity grassland and wooded areas.	
S33	Less than local	Construction	Fragmentation/isolation and disturbance due to clearance	Low negative/Minor
		Operation	Direct mortality through RTA, disturbance and habitat loss of gardens and mature scattered trees.	
S36	Local	Construction	Fragmentation/isolation and disturbance due to clearance	Low negative/Minor
		Operation	Direct mortality through RTA, disturbance and habitat loss of improved and arable fields.	
S37	Local	Construction	Fragmentation/isolation and disturbance due to clearance	Low negative/Minor
		Operation	Direct mortality through RTA, disturbance and habitat loss of woodland corridor.	
S39	Local	Construction	Fragmentation/isolation and disturbance of Beans Hill area due to clearance	Low negative/Minor
			Potential pollution to Beans Burn due to accidental spills	Medium negative/Minor
		Operation	Direct mortality through RTA, disturbance and habitat loss of upland habitats on Beans Hill including acid grassland and dry heath.	Low negative/Minor
			Potential pollution to Beans Burn due to run-off.	Medium negative/Minor
Section SL5				
S40	Local	Construction	Fragmentation/isolation and disturbance due to clearance	Low negative/Minor
			Potential pollution to Gairn Burn, Upper Beanshill Burn and Silver Burn due to accidental spills	Medium negative/Minor
		Operation	Direct mortality through RTA, disturbance and habitat loss of improved grassland and marshy grassland.	Low negative/Minor
			Potential pollution to Gairn Burn, Upper Beanshill Burn and Silver Burn due to accidental spills.	Medium negative/Minor
S42	Local	Construction	Fragmentation/isolation and disturbance due to clearance	Low negative/negligible
		Operation	Direct mortality through RTA, disturbance and habitat loss of improved grassland.	
Section SL5				
S43	County	Construction	Fragmentation/isolation, disturbance and pollution due to accidental spills around Gairnhill/Kingshill Woods	Low negative/Minor
		Operation	Direct mortality through RTA, fragmentation and isolation, disturbance and habitat loss of plantation coniferous woodland and potential pollution to the surrounding area due to run-off.	Medium negative/Minor
S44	Local	Construction	Fragmentation/isolation and disturbance due to clearance	Low negative/Minor
		Operation	Direct mortality through RTA, disturbance and habitat loss of improved and arable fields.	

Habitat Area	Evaluation	Phase	Description of Impacts	Impact Magnitude / Significance
S45	County	Construction	Fragmentation/isolation, disturbance and pollution due to accidental spills around the Moss of Auchlea.	Low negative/Minor
			Potential pollution to Moss of Auchlea due to accidental spills.	Medium negative/Minor
		Operation	Direct mortality through RTA, fragmentation and isolation, disturbance and habitat loss of marshy grassland and dense willow scrub.	Medium negative/Minor
			Potential pollution to Moss of Auchlea due to run-off	Medium negative/Moderate
Section SL6				
S46	Local	Construction	Fragmentation/isolation and disturbance due to clearance	Low negative/Minor
		Operation	Direct mortality through RTA, disturbance and habitat loss of improved and semi-improved grassland.	
S47	Local	Construction	Fragmentation/isolation and disturbance due to clearance	Low negative/Minor
		Operation	Direct mortality through RTA, disturbance and habitat loss of semi-natural broad-leaf woodland.	
S48	Local	Construction	Fragmentation/isolation and disturbance due to clearance	Low negative/Minor
		Operation	Direct mortality through RTA, disturbance and habitat loss of improved grassland/scrub mosaic.	

6 Mitigation

6.1 Generic Mitigation

6.1.1 This section of the report outlines measures to prevent, reduce or offset the adverse effects of the proposed scheme on breeding birds and the habitat features of importance to them.

6.1.2 A detailed mitigation plan (including a habitat management plan that will detail all habitat creation/enhancement prescriptions) will be prepared prior to construction. It will specify where and when generic mitigation should be undertaken.

6.1.3 Table 27 presents a suite of generic mitigation measures that are applicable during both construction and operation of the proposed scheme. The mitigation measures outlined below comprise prevention/avoidance, reduction and offset/compensation measures, which form a hierarchy of measures that should be adopted, preferably in the order presented.

6.1.4 It should be noted that offset measures referred to at the bottom of the table are not strictly mitigation, but compensation measures that are designed to produce benefits to birds in order to offset adverse impacts that cannot be prevented or reduced.

Table 27 – Generic Mitigation Measures: Construction and Operation

Mitigation Type	Impact	Description of Generic Mitigation
Construction		
Prevent	Direct Mortality Disturbance	Habitat clearance and building demolition, where possible, will take place outside the main bird breeding season (March – July inclusive) and must be maintained in such a condition as to ensure that it is not used for breeding purposes. The potential presence of bird nests should be taken into consideration when planning the demolition of buildings or clear felling of trees.
Prevent	Direct Mortality Disturbance	All cleared material will be either be chipped or moved and stored off-site to ensure that birds do not use the cleared material for nesting during the breeding season.
Prevent	Direct Mortality Disturbance	Barn Owl (WCA1i species) All buildings (in particular farm buildings or other vacant structure with open access) that need to be demolished prior to construction must be checked one year in advance of construction to ensure that they are not in use by barn owl. All buildings will be destroyed immediately after survey provided evidence of barn owl is not recorded. Alternatively, if demolition is not feasible, all entrances into the structure will be secured and covered to prevent access by barn owl.
Prevent	Direct Mortality Disturbance	Kingfisher (WCA1i species) A pre-construction survey of all suitable watercourses should be undertaken at least one breeding season in advance of construction following methods outlined by Gilbert et al (1998) to confirm the potential presence of kingfisher. Should the presence of kingfisher be confirmed, any river or stream bank that would be likely to be directly impacted by the proposed scheme that exhibits potential nesting habitat for kingfisher must be destroyed (only if strictly necessary and under supervision of the Ecological Clerk of Works) or securely covered (which ever is applicable) outside the main breeding season (March – October) at least one year in advance of construction in order to prevent access by potentially breeding kingfishers. Once construction of the proposed scheme is completed all protective covering must be removed. Any river or stream bank that is not directly impacted (but is likely to be disturbed) by construction of the proposed scheme that exhibits potential nesting habitat for kingfisher should be securely covered under the supervision of the ecological clerk of works out with the main breeding season (March – October) at least one season in advance of construction in order to prevent access by potentially breeding kingfishers. Once construction of the proposed scheme is completed all protective covering must be removed. It should be noted that the above mitigation measure cannot be undertaken without taking into consideration indirect impacts (disturbance and pollution) to other ecology, for example, protected mammal species such as otter and freshwater ecology, for example, fish.

Mitigation Type	Impact	Description of Generic Mitigation
Prevent	Direct Mortality Habitat Loss Disturbance	Plant and personnel will be constrained to a prescribed working corridor through the use of temporary barriers, thereby minimising damage to habitats and potential direct mortality and disturbance to breeding/non-breeding birds located within and adjacent to the proposed scheme working corridor.
Prevent	Habitat Loss Disturbance	Where possible, works compounds, storage sites and access roads must not be located within 10m of areas of woodland, wetland and scrub to prevent damage of habitats and disturbance of breeding birds.
Prevent	Disturbance Pollution	Ensure that any lighting associated with construction during low light levels and/or night is minimised as far as practical by the adoption of best working practices associated with the use of artificial light.
Prevent	Pollution	Strict adherence to SEPA pollution prevention guidelines PPG1, PPG2 and PPG6.
Prevent	Pollution	Minimise the amount of dust and other airborne debris produced during construction by the adoption of best working practices.
Prevent	Pollution	The use of approved pollution prevention schemes (e.g. oil separators) should be installed to prevent potentially polluted surface water from flowing into wetlands and/or other waterbodies.
Reduce	Direct Mortality Disturbance	Construction activities such as blasting, piling, grouting or any other activity likely to result in significant disturbance to breeding birds must (as far as practical) be undertaken outside the main bird breeding season (March – July inclusive). Where it is not possible to time works outside the breeding season, consideration should be given to avoiding works near habitats identified (by the Ecological Clerk of Works) as being of high value / sensitivity for breeding birds.
Operation		
Prevent	Direct Morality	Where the alignment passes through existing areas of established woodland, potential RTAs should be prevented by removing or significantly thinning all trees within 5m of the road unless considered to be of significant ecological value (i.e. mature oak, wych elm or ash).
Prevent	Direct Mortality Disturbance	Habitat management of areas of woodland, scrub and/or grassland should occur out with the main bird breeding season (March – July inclusive) to ensure that breeding birds, their eggs and/or nestlings are not subject to direct mortality / disturbance impacts during operational habitat management.
Prevent	Disturbance Pollution	Roadside lighting throughout the proposed scheme will be strategically sited only where strictly necessary (e.g. major junctions) and will ensure that it complies with guidelines / guidance produced by the Environment Agency (http://www.environment-agency.gov.uk/yourenv/eff/pollution/) and Institute of Lighting Engineers (http://www.ile.org.uk/lighting_technical.htm) concerning the reduction of unnecessary light pollution within urban and rural areas (in particular the requirement for fitting all lights with shades and ensuring that lighting only illuminates chosen areas).
Prevent	Direct Mortality Habitat Loss Disturbance	Kingfisher (WCA1i species) Any sand and/or gravel bank/s within 500m of the proposed scheme should be surveyed for potential nesting kingfisher one breeding season in advance of any operational habitat management and/or maintenance following methods outlined by Gilbert et al (1998). Works cannot be undertaken if breeding is confirmed. If suitable nesting habitat is identified, the banks should be securely covered out with the main breeding season (March – October) in order to prevent access by potentially breeding kingfishers, one breeding season in advance of any works.
Prevent	Direct Mortality Habitat Loss Disturbance	Operational maintenance of areas of woodland, scrub and/or grassland is minimised as far as practical.
Prevent	Direct Mortality Pollution	The use of de-icing salt during winter periods should be kept to an absolute minimum.
Reduce	Direct Mortality	A grassland verge (approximately 5m in width) should be maintained between the edge of the hard shoulder and any areas of scrub or woodland thereby ensuring that bird species can easily see any on-coming vehicles before they attempt to cross the proposed scheme.
Reduce	Direct Mortality	Landscape planting (including berry / fruit bearing trees and shrubs) at all junctions (regardless of size), embankments or any point of the proposed scheme that is below vehicle height will be not be planted within 5m of the carriageway to ensure that potential RTAs are minimised as far as practical. Use of temporary fencing (prior to the development of the planting) will be considered where appropriate to reduce the risk of RTA for species of particular sensitivity (e.g. barn owl).

Mitigation Type	Impact	Description of Generic Mitigation
Offset	Fragmentation Disturbance	Planting of dense native tree and scrub species (>25m from the carriageway) to screen noise and vibration disturbance associated with operation of the proposed scheme from birds located within adjacent habitats (the screening must ensure that noise levels are maintained less than 40dBA on the side opposite to the carriageway).
Offset	Habitat Loss	Barn owl (WCA1i species) Replacement nest boxes should be provided in suitable adjacent buildings/habitat (subject to consultation and verification with SNH) in the event that they are identified in buildings that need to be demolished prior to construction of the proposed scheme.
Offset	Habitat Loss	Additional planting within and adjacent to existing areas of woodland/scrub using native scrub and tree species, thereby creating additional breeding and foraging bird habitat and compensating for habitat clearance, fragmentation and isolation and disturbance impacts. Habitat creation should include areas of core woodland (> 30m from woodland edge) and areas located at least 50m from route alignment.
Offset	Habitat Loss	Appropriate management of existing boundary habitats such as hedgerows or rough edges for the benefit of key farmland species of conservation concern such as yellowhammer, skylark, linnet, tree sparrow, meadow pipit and grey partridge.
Offset	Habitat Loss	Appropriate habitat management of existing woodland/scrub habitats by selective thinning to create open glades and additional planting of native broad-leaved species – to enhance existing woodland/scrub habitat and compensate for habitat lost to the scheme, thereby creating a habitat structure of greater value to breeding and non-breeding birds.
Offset	Habitat Loss	Bird boxes (suitable for a range of species) should be considered (at a density of 20 boxes for every 0.5ha of woodland lost) in severed areas of woodland in order to compensate for the loss of suitable breeding habitat.
Offset	Habitat Loss	Off-line compensatory habitat creation will be undertaken at a location still to be determined. The area of habitat creation will be managed to create a mosaic of habitats of value to a range of key priority breeding bird species.
Offset	Habitat Loss	Sympathetic planting of second (and subsequent) stage detention basins to allow use by breeding birds
Offset	Habitat Loss Fragmentation Disturbance	Kingfisher (WCA1i species) Where a pre-construction survey of all suitable watercourses (undertaken at least one breeding season in advance of construction following methods outlined by Gilbert et al (1998) confirms the presence of kingfisher, replacement breeding habitat in the form of sand and/or gravel banks should be created in order to compensate for any nesting habitat loss during construction and should be sited as close to the location where the original habitat was lost (taking into account disturbance impacts associated with operation of the proposed scheme). Habitat loss will be identified and quantified in the course of a pre-construction survey.
Offset	Habitat Loss Fragmentation	Vegetated strips, wildlife overbridges or similar should be created to offset the loss of wildlife corridors (e.g. woodland, scrub, rivers, streams or disused railways etc) severed by the proposed scheme and should be planted with native shrub and/or tree species to facilitate the movement of bird species along the these severed corridors either above or below the alignment.
Offset	-	An environmental management plan (EMP) will be prepared in consultation with SNH and should be followed throughout operation of the proposed scheme.

6.2 Specific Mitigation

6.2.1 The current mitigation proposals do not include any scope to mitigate for the large scale loss of ecologically valuable farmland (arable, improved, poor semi-improved and semi-improved grassland fields). These areas likely provide foraging opportunities (to a greater or lesser degree) for populations of the following key bird species: barn owl, curlew, grey partridge, lapwing, linnet, meadow pipit, oystercatcher, skylark and yellowhammer.

6.2.2 A description of specific mitigation measures is presented in AWPR Environmental Statement 2007, Chapter 25 (Ecology and Nature Conservation), Table 25.22. The approach to breeding bird mitigation includes the following elements:

- construction activities, including the felling of trees and clearing of scrub, will be timed to avoid periods when birds are nesting (i.e. March to July inclusive), where possible, preventing disturbance to breeding birds. Areas may be pre-felled or cleared in winter to make habitat undesirable for nesting;
- areas of habitat will be created to offset habitat loss although these areas will be situated away from the scheme to prevent RTAs. This will include the provision of a grassland buffer either side of the road before any scrub or woodland planting therefore allowing a clear sightline of the traffic;
- planting of dense native tree and scrub species (taking into account direct mortality impacts) to screen noise and vibration disturbance associated with operation of the proposed scheme from birds located within adjacent habitats; and
- sympathetic planting of second (and subsequent) stage detention basins to allow use by breeding birds.

6.2.3 Specific mitigation and residual impacts are presented in Table 28 below:

Table 28 - Specific Mitigation and Residual Impacts

Habitat Area	Evaluation	Phase	Description of Impacts	Impact Magnitude / Significance	Mitigation	Residual Impacts
Section SL1						
S2/S3	Local	Construction	Fragmentation/isolation and disturbance due to clearance	Low negative/ Minor	Generic mitigation (Table 27) except for habitat loss.	Negligible
		Operation	Direct mortality through RTA, disturbance and habitat loss of improved fields and coniferous plantation.			
S6	Local	Construction	Fragmentation/isolation and disturbance due to clearance	Low negative/Minor	Generic mitigation (Table 27) apart from habitat loss.	Negligible
		Operation	Direct mortality through RTA, fragmentation and isolation, disturbance and habitat loss of coniferous plantation.			
S7	Local	Construction	Fragmentation/isolation and disturbance due to clearance	Low negative/Minor	Generic mitigation (Table 27) Habitat creation: Conifer woodland to the south of the proposed scheme in HA S7 at ch205330 (AWPR Environmental Statement 2007, Figure 26.5c).	Negligible
		Operation	Direct mortality through RTA, disturbance and habitat loss of coniferous plantation woodland.			
S9	Local	Construction	Fragmentation/isolation and disturbance due to clearance	Low negative/Minor	Generic mitigation (Table 27).	Negligible
		Operation	Direct mortality through RTA, disturbance and habitat loss of coniferous plantation woodland.			
S10	County	Construction	Fragmentation/isolation and disturbance due to clearance	Medium negative/Moderate	Generic mitigation (Table 27).	Negligible
			Potential pollution to the Burn of Ardoe and Hare Moss due to accidental spills.	Medium negative/Moderate		
		Operation	Direct mortality through RTA, fragmentation and isolation, disturbance and habitat loss of marshy grassland and willow scrub land.	Medium negative/Moderate		Low negative/Minor adverse
			Potential pollution to Burn of Ardoe and Hare Moss due to run-off	Negligible		Negligible
Section SL2						
S11	Local	Construction	Fragmentation/isolation and disturbance due to clearance	Low negative/Minor	Generic mitigation (Table 27).	Negligible
		Operation	Direct mortality through RTA, disturbance and habitat loss of broad-leaf plantation woodland.			
S13	Local	Construction	Fragmentation/isolation, disturbance and pollution due to accidental spills around the agricultural fields from Sunnyside to Causeyport.	Low negative/Minor	Generic mitigation (Table 27). Habitat creation: Mixed woodland to the north of the proposed scheme in HA S14 and S16 at ch202570 (Figure 26.5d) and	Negligible
		Operation	Direct mortality due to RTA, fragmentation/isolation, disturbance, and habitat loss of improved grassland.			

Habitat Area	Evaluation	Phase	Description of Impacts	Impact Magnitude / Significance	Mitigation	Residual Impacts
					ch201130 (Figure 26.5e) (AWPR Environmental Statement 2007).	
S15	County	Construction	Fragmentation/isolation and disturbance due to clearance	Low negative/Minor	Generic mitigation (Table 27).	Negligible
		Operation	Direct mortality through RTA, disturbance and habitat loss of conifer plantation-dry/wet heath mosaic.	Medium negative/Minor		
S16	Local	Construction	Fragmentation/isolation, disturbance and pollution due to accidental spills around the agricultural fields of East of Burnhead to Greenloaning.	Low negative/Minor	Generic mitigation (Table 27).	Negligible
		Operation	Direct mortality due to RTA, fragmentation/isolation, disturbance, and habitat loss of improved grassland.			
Section SL3						
S19	Local	Construction	Fragmentation/isolation and disturbance due to clearance	Low negative/Minor	Generic mitigation (Table 27)	Negligible
		Operation	Direct mortality through RTA, disturbance and habitat loss of grazed semi-improved grassland.			
S20	County	Construction	Fragmentation/isolation and disturbance due to clearance	Medium negative/Minor	Generic mitigation (Table 27)	Negligible
					Generic mitigation (Table 27)	
		Operation	Direct mortality through RTA, disturbance and habitat loss of mature conifer plantation.			
S21	Local	Construction	Fragmentation/isolation and disturbance due to clearance	Low negative/Minor	Generic mitigation (Table 27)	Negligible
		Operation	Direct mortality through RTA, disturbance and habitat loss of arable and improved grassland.			
S22	County	Construction	Fragmentation/isolation and disturbance due to clearance	Low negative/Minor	Generic mitigation (Table 27) except for habitat loss. Habitat creation: Riparian woodland planting to the east of the proposed scheme in HA 22 at ch100150 (AWPR Environmental Statement 2007, Figure 26.5g)	Negligible
			Potential pollution to Blaikiewell Burn due to accidental spills.	Medium negative/Minor		
		Operation	Direct mortality through RTA, fragmentation and isolation, disturbance and habitat loss of riparian woodland.			
			Potential pollution to Blaikiewell Burn due to runoff	Low negative/Minor		
S23	County	Construction	Fragmentation/isolation and disturbance due to clearance	Low negative/Minor	Generic mitigation (Table 27)	Negligible
		Operation	Direct mortality through RTA, fragmentation and isolation, disturbance and habitat loss of improved grassland with woodland borders and ancient hedgerows.	Medium negative/Minor	Generic mitigation (Table 27) Habitat creation: New standard broad-leaved tree planting to the east and west of the proposed scheme in HA 23 at ch100960 (AWPR Environmental	

Habitat Area	Evaluation	Phase	Description of Impacts	Impact Magnitude / Significance	Mitigation	Residual Impacts
					Statement 2007, Figure 26.5g).	
S24	County	Construction	Fragmentation/isolation and disturbance due to clearance	Low negative/Minor	Generic mitigation (Table 27)	Negligible
			Potential pollution to Kingcausie Burn and Crynoch Burn due to accidental spills.			
		Operation	Direct mortality through RTA, fragmentation and isolation, disturbance and habitat loss of improved grassland with woodland and shrub borders.	Medium negative/Minor	Generic mitigation (Table 27) Habitat creation: Broad-leaved woodland to the east of the proposed scheme in HA S20 at ch100380 (AWPR Environmental Statement 2007, Figure 26.5g)	
			Potential pollution to Kingcausie Burn and Crynoch Burn due to run-off		Generic mitigation (Table 27)	
S27	County	Construction	Fragmentation/isolation and disturbance due to clearance.	Low negative/Minor	Generic mitigation (Table 27). Except for habitat loss	Negligible
			Potential pollution into River Dee due to accidental spills.	Medium negative/Moderate		
		Operation	Direct mortality through RTA, fragmentation and isolation, disturbance and habitat loss of improved fields with tree and shrub borders.			
			Potential pollution to River Dee due to runoff			
S28	County	Construction	Fragmentation/isolation and disturbance due to clearance.	Low negative/Minor	As detailed in the Mitigation Measures (Table 27). The River Dee is considered, based on professional judgement, to offer suitable nesting and foraging habitat for kingfisher (a WCA1i species). Despite not being recorded in this area by the surveys, all pertinent generic mitigation for kingfisher (as outlined in Table 27) must be implemented.	Negligible
			Potential pollution into River Dee due to runoff.	Medium negative/Moderate		Low negative/Minor
		Operation	Direct mortality through RTA, fragmentation and isolation, disturbance and habitat loss of riparian woodland.			
			Potential pollution to River Dee due to run-off			
S29	Local	Construction	Fragmentation/Isolation and disturbance due to clearance	Low negative/Negligible	Generic mitigation (Table 27) except for habitat loss.	Negligible
		Operation	Direct mortality through RTA, disturbance and habitat loss of scattered riparian woodland and amenity grassland.	Low negative/Minor		
S30	Local	Construction	Fragmentation/isolation and disturbance due to clearance	Low negative/Minor	Generic mitigation (Table 27).	Negligible
		Operation	Direct mortality through RTA, disturbance and habitat loss of scattered riparian woodland and amenity grassland.			
S31	Local	Construction	Fragmentation/isolation and disturbance due to clearance	Low negative/Minor	Generic mitigation (Table 27).	Negligible

Habitat Area	Evaluation	Phase	Description of Impacts	Impact Magnitude / Significance	Mitigation	Residual Impacts
		Operation	Direct mortality through RTA, disturbance and habitat loss of riparian broad-leaf woodland.		Habitat creation: Broad-leaved woodland to the east of the proposed scheme in HA S29 at ch102680 (AWPR Environmental Statement 2007, Figure 26.5i)	
Section SL4						
S32	Local	Construction	Fragmentation/isolation and disturbance due to clearance	Low negative/Minor	Generic mitigation (Table 27) except for habitat loss. Habitat creation: New standard broad-leaved tree planting to the east of the proposed layout in HA S32 at ch103800 (AWPR Environmental Statement 2007, Figure 26.5i).	Negligible
		Operation	Direct mortality through RTA, disturbance and habitat loss of amenity grassland and wooded areas.			
S33	Less than local	Construction	Fragmentation/isolation and disturbance due to clearance	Low negative/Minor	Generic mitigation (Table 27).	Negligible
		Operation	Direct mortality through RTA, disturbance and habitat loss of gardens and mature scattered trees.			
S36	Local	Construction	Fragmentation/isolation and disturbance due to clearance	Low negative/Minor	Generic mitigation (Table 27). Habitat creation: New standard tree planting to the east of the proposed scheme in HA S36 at ch105710 (AWPR Environmental Statement 2007, Figure 26.5j).	Negligible
		Operation	Direct mortality through RTA, disturbance and habitat loss of gardens and mature scattered trees.	Low negative/Minor		
S37	Local	Construction	Fragmentation/isolation and disturbance due to clearance	Low negative/Minor	Generic mitigation (Table 27). Habitat creation: Mixed woodland and standard tree planting to the east of the proposed scheme in HA S36 at ch105760 - 105890 (AWPR Environmental Statement 2007, Figure 26.5k).	Negligible
		Operation	Direct mortality through RTA, disturbance and habitat loss of upland habitats including acid grassland and dry heath.			
S39	Local	Construction	Fragmentation/isolation and disturbance due to clearance	Low negative/Minor	Generic mitigation (Table 27).	Negligible
			Potential pollution to Beans Burn due to accidental spills.	Medium negative/Minor	Generic mitigation (Table 27). Habitat creation: Scrub planting to the east of the proposed scheme in HA S39 at ch105625 (AWPR Environmental Statement 2007, Figure 26.5k).	
		Operation	Direct mortality through RTA, disturbance and habitat loss of upland habitats including acid grassland and dry heath.	Low negative/Minor		
			Potential pollution to Beans Burn due to runoff.	Medium negative/Minor		

Habitat Area	Evaluation	Phase	Description of Impacts	Impact Magnitude / Significance	Mitigation	Residual Impacts
Section SL5						
S40	Local	Construction	Fragmentation/isolation and disturbance due to clearance	Low negative/Minor	Generic mitigation (Table 27). Habitat creation: Riparian scrub and mixed woodland planting to the east and west of the proposed scheme in HA S40 at ch106010 (AWPR Environmental Statement 2007, Figure 26.5l).	Negligible
			Potential pollution to Silver Burn due to accidental spills	Medium negative/Minor		
		Operation	Direct mortality through RTA, disturbance and habitat loss of improved grassland and marshy grassland.	Low negative/Minor		
			Potential pollution to Silver Burn due to accidental spills.	Medium negative/Moderate		
S42	Local	Construction	Fragmentation/isolation and disturbance due to clearance	Low negative/Negligible	Generic mitigation (Table 27).	Negligible
		Operation	Direct mortality through RTA, disturbance and habitat loss of improved grassland.		Generic mitigation (Table 27). Habitat creation: Riparian scrub planting to the west of the proposed scheme in HA S42 at ch106520 (AWPR Environmental Statement 2007, Figure 26.5l).	
S43	County	Construction	Fragmentation/isolation, disturbance and pollution due to accidental spills around Gairnhill/Kingshill Woods	Low negative/Minor	Generic mitigation (Table 27) except for habitat loss.	Negligible
		Operation	Direct mortality through RTA, fragmentation and isolation, disturbance and habitat loss of plantation coniferous woodland and potential pollution to the surrounding area due to run-off.	Medium negative/Minor		
S44	Local	Construction	Fragmentation/isolation and disturbance due to clearance	Low negative/Minor	Generic mitigation (Table 27).	Negligible
		Operation	Direct mortality through RTA, disturbance and habitat loss of improved and arable fields.			
S45	County	Construction	Fragmentation/isolation, disturbance and pollution due to accidental spills around the Moss of Auchlea.	Low negative/Minor	Generic mitigation (Table 27).	Low negative/Minor adverse
			Potential pollution to Moss of Auchlea due to run-off.	Medium negative/Minor		
		Operation	Direct mortality through RTA, fragmentation and isolation, disturbance and habitat loss of marshy grassland and dense willow scrub.		Generic mitigation (Table 27) Habitat creation: Scrub and standard tree planting to the east and west of the proposed scheme in HA S42 and 44 at ch106520, 107450, 107540 and 108100 (AWPR Environmental Statement 2007, Figure 26.5l and Figure 26.5m).	
			Potential pollution to Moss of Auchlea due to run-off	Medium negative/Moderate		

Habitat Area	Evaluation	Phase	Description of Impacts	Impact Magnitude / Significance	Mitigation	Residual Impacts
Section SL6						
S46	Local	Construction	Fragmentation/isolation and disturbance due to clearance	Low negative/Minor	Generic mitigation (Table 27). Habitat creation: Mixed woodland and scrub planting to the east of the proposed scheme in HA S46 at ch109400 (AWPR Environmental Statement 2007, Figure 26.5o).	Negligible
		Operation	Direct mortality through RTA, disturbance and habitat loss of improved and semi-improved grassland.			
S47	Local	Construction	Fragmentation/isolation and disturbance due to clearance	Low negative/Minor	Generic mitigation (Table 27). Habitat creation: Mixed woodland and scrub planting to the east of the proposed scheme in HA S46 at ch109400 (AWPR Environmental Statement 2007, Figure 26.5o).	Negligible
		Operation	Direct mortality through RTA, disturbance and habitat loss of semi-natural broad-leaf woodland.			
S48	Local	Construction	Fragmentation/isolation and disturbance due to clearance	Low negative/Minor	Generic mitigation (Table 27). Habitat creation: Mixed woodland and scrub planting to the east and west of the proposed scheme in HA S48 at ch109770 and 109810 (AWPR Environmental Statement 2007, Figure 26.5o).	Negligible
		Operation	Direct mortality through RTA, disturbance and habitat loss of improved grassland/scrub mosaic.			

Further work

6.2.4 It will be the responsibility of the contractor to appoint an Ecological Clerk of Works, whose primary role will be to ensure the implementation of all mitigation measures during construction and operation of the proposed scheme.

7 Residual Impacts

7.1.1 This section of the report provides an assessment of residual impacts in accordance with the mitigation measures proposed in Section 6. Table 28 lists the significance of residual impacts for all of the study area. Those sections with adverse impacts of greater than negligible significance are discussed below.

7.1.2 Residual impacts on breeding birds throughout the study area would remain due to the risk of direct mortality from RTAs, fragmentation/isolation and habitat loss during operation despite application of appropriate mitigation. The residual impacts on breeding birds in the study area have been assessed as being of Negligible to minor residual significance:

Section SL1

7.1.3 Predicted impacts of low negative magnitude and Minor Adverse significance in this section on breeding birds would remain in and around Hare Moss (S10). Residual impacts are predicted due to the temporary fragmentation and disturbance during construction as well as from the risk of potential direct mortality from RTAs, fragmentation/isolation and habitat loss during operation.

Section SL3

7.1.4 Predicted impacts of low negative magnitude and Minor Adverse significance in this section on breeding birds remain in areas surrounding the River Dee (S28). These impacts would result from temporary fragmentation and disturbance during construction and from the risk of potential direct mortality due to RTAs, habitat loss, fragmentation and disturbance during operation.

Section SL5

7.1.5 Predicted residual impacts of low negative magnitude and Minor Adverse significance in this section on breeding birds remain in and around the Moss of Auchlea (S45). These impacts would result from temporary fragmentation and disturbance during construction and the risk of potential direct mortality due to RTAs, fragmentation/isolation, disturbance and habitat loss during operation.

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Annex 1

Species list for birds recorded in the Southern Leg

Common Name	Latin Name
barn owl	*Tyto alba*
blackbird	*Turdus merula*
blackcap	*Sylvia atricapilla*
black-headed gull	*Larus ridibundus*
blue tit	*Parus caeruleus*
bullfinch	*Pyrrhula pyrrhula*
buzzard	*Buteo buteo*
carrion crow	*Corvus corone*
chaffinch	*Fringilla coelebs*
chiffchaff	*Phylloscopus collybita*
coal tit	*Parus ater*
collared dove	*Streptopelia decaocto*
common gull	*Larus canus*
common sandpiper	*Actitis hypoleucos*
common tern	*Sterna hirundo*
coot	*Fulica atra*
crossbill	*Loxia curvirostra*
cuckoo	*Cuculus canorus*
curlew	*Numenius arquata*
dipper	*Cinclus cinclus*
dunnock	*Prunella modularis*
feral pigeon	*Columba livia x*
garden warbler	*Sylvia borin*
goldcrest	*Regulus regulus*
goldfinch	*Carduelis carduelis*
goosander	*Mergus merganser*
grasshopper warbler	*Locustella naevia*
great spotted woodpecker	*Dendrocopos major*
great tit	*Parus major*
greater spotted woodpecker	*Dendrocopos major*
greenfinch	*Carduelis chloris*
greenshank	*Tringa nebularia*
grey heron	*Ardea cinerea*
grey partridge	*Perdix perdix*
grey wagtail	*Moctacilla cinerea*
herring gull	*Larus argentatus*
house martin	*Delichon urbica*
house sparrow	*Passer domesticus*
jackdaw	*Corvus monedula*
jay	*Garrulus glandarius*
kestrel	*Falco tinnunculus*
kingfisher	*Alcedo atthis*

lapwing	*Vanellus vanellus*
lesser redpoll	*Carduelis flammea cabaret*
linnet	*Carduelis cannabina*
long-tailed tit	*Aegithalos caudatus*
magpie	*Pica pica*
mallard	*Anas platyrhynchos*
meadow pipit	*Anthus pratensis*
mistle thrush	*Turdus viscivorus*
moorhen	*Gallinula chloropus*
osprey	*Pandion haliaetus*
oystercatcher	*Haematopus ostralegus*
pheasant	*Phasianus colchicus*
pied wagtail	*Motacilla alba*
red-legged partridge	*Alectoris rufa*
reed bunting	*Emberiza schoeniclus*
robin	*Erithacus rubecula*
rook	*Corvus frugilegus*
sand martin	*Riparia riparia*
sedge warbler	*Acrocephalus schoenobaenus*
siskin	*Carduelis spinus*
sky lark	*Alauda arvensis*
snipe	*Gallinago gallinago*
song thrush	*Turdus philomelos*
sparrowhawk	*Acipiter nisus*
starling	*Sturnus vulgaris*
stock dove	*Columba oenas*
stonechat	*Saxicola torquata*
swallow	*Hirundo rustica*
swift	*Apus apus*
tawny owl	*Strix aluco*
teal	*Anas crecca*
treecreeper	*Certhia familiaris*
tufted duck	*Aythya fuligula*
wheatear	*Oenanthe oenanthe*
whinchat	*Saxicola rubetra*
whitethroat	*Sylvia communis*
willow warbler	*Phylloscopus trochilus*
wood warbler	*Phylloscopus sibilatrix*
woodcock	*Scolopax rusticola*
woodpigeon	*Columba palumbus*
wren	*Troglodytes troglodytes*
yellowhammer	*Emberiza citrinella*

PART 2

FASTLINK

Contents

Tables

1 Introduction

1.1 General Background

1.1.1 This report is an additional survey report for the AWPR Environmental Statement 2007 (Jacobs UK Ltd, 2007). Its purpose is to update and complete Appendices A25.4 and A40.4 of the Environmental Statement based on the findings of breeding bird surveys undertaken during summer 2007.

1.1.2 Part 2 provides baseline data for the Fastlink study area, including that obtained from surveys undertaken in April, May and June 2007 and presents a full assessment of impacts on all breeding bird assemblages.

1.1.3 To aid the interpretation of the assessment, the Fastlink has been sub-divided into three component route sections as follows:

- Section FL1: Stonehaven to Howieshill (ch0-3200);
- Section FL2: Howieshill to Cookney (ch3200-6300); and
- Section FL3: Cookney to Cleanhill Junction (ch6300-10200).

1.1.4 All tables and figures are structured in this manner.

1.1.5 The Ecological Impact Assessment (EcIA) was undertaken in accordance with the Design Manual for Roads and Bridges (DMRB) Volume 10 and 11 (Highways Agency, 2001) and the Environmental Impact Assessment (Scotland) Regulations 1999, along with cognisance of draft Institute of Ecology and Environmental Management (IEEM) guidelines.

1.1.6 These studies included desk-based consultation to collate existing information about breeding bird assemblages in the area affected by the scheme and field surveys to provide current data about the status of breeding bird assemblages and the habitats that support them within the study area.

Aims

1.1.7 This report provides an additional assessment of the current status of breeding birds in the vicinity of the proposed scheme, an assessment of the potential impacts associated with the construction and operation of the scheme, provides appropriate mitigation measures and determines any residual impacts.

Study Area

1.1.8 For the purposes of this assessment, the study area is defined as comprising all areas 500m either side of the centreline of the road alignment.

1.2 Legislation and Conservation Status of Birds

National Legislative Protection

Wildlife and Countryside Act 1981 (as amended) & Conservation (Natural Habitats & c.) Regulations 1994

1.2.1 The Wildlife and Countryside Act 1981 (as amended) (WCA) is the principal mechanism for the legislative protection of wildlife in Great Britain and is the means by which the Convention on the Conservation of European Wildlife and Natural Habitats (the 'Bern Convention') is implemented.

1.2.2 The Conservation (Natural Habitats & c.) Regulations 1994 is the means by which the European Union Directives on the Conservation of Wild Birds (79/409/EEC, the ‘Birds Directive’) and Natural

Habitats and Wild Fauna and Flora (92/43/FFC, the 'Habitat Directive') are implemented in Great Britain.

Nature Conservation (Scotland) Act 2004

1.2.3 The Nature Conservation (Scotland) Act 2004 (NCSA) implements a series of measures designed to improve the legal protection and enhance the conservation of the natural features of Scotland (natural features, in this context, refer to flora, fauna, geological or geomorphological features).

1.2.4 The NCSA comprises three parts: Part 1 introduces a general duty on public bodies to further the conservation of biodiversity in exercising any of their functions; Part 2 introduces significant changes to the existing arrangements for the establishment and protection of Sites of Special Scientific Interest (SSSIs); and Part 3 strengthens and extends the protection of birds, animals and plants by updating Part I of the WCA (1981).

1.2.5 Taken together, the WCA (1981) and NCSA (2004) ensure that all wild birds, their nests and eggs are protected, and make it an offence to:

- intentionally or recklessly kill, injure or take any wild bird;
- intentionally or recklessly take, damage or destroy the nest of any wild bird while it is in use or being built;
- intentionally or recklessly take or destroy the egg of any wild bird; and
- intentionally or recklessly disturb any wild bird listed on Schedule 1 while it is nest building or is at (or near) a nest with eggs or young; or disturb the dependent young of such a bird.

1.2.6 WCA Schedule 1 (WCA1i) bird species are protected by legal penalties at all times.

1.2.7 The acts additionally provide protection for Sites of Special Scientific Interest (SSSI) in particular those that are designated for the presence of wild bird populations.

UK Conservation Status of Birds

Biodiversity Action Plans

1.2.8 The UK Biodiversity Action Plan (UK BAP) is the UK's response to the commitments of the Rio Convention on Biological Diversity. The plan outlines action for 26 species of bird of conservation importance/concern and can be viewed at www.ukbap.org.uk.

1.2.9 In addition to having national priorities and targets, action for biodiversity is also taken at a local level. The local North East Scotland Biodiversity Partnership (LBAP) outlines action for 12 national and 22 local bird species and can be viewed at http://www.nesbiodiversity.org.uk/.

1.2.10 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 the local biodiversity action plans (LBAPs).

1.2.11 National Planning Policy Guidance 14 (NPPG 14) outlines planning guidance in relation to the conservation and enhancement of Scotland's natural heritage. NPPG 14 makes the presence of a protected species or habitats in addition to biodiversity habitats/species a material consideration in the assessment of development proposals and requires planning authorities to take particular care to avoid harm to species or habitats protected under the WCA (1981), European Directives and/or identified as priorities in the UK Biodiversity Action Plan.

Scottish Biodiversity List

1.2.12 The Scottish Biodiversity List was developed to meet the requirements of Section 2 (4) of the Nature Conservation (Scotland) Act 2004 and includes a list of species and habitats considered to be of principal importance for the purposes of biodiversity in Scotland. The list provides a guide to empower decision-makers such as public bodies, including local authorities, in implementing their duty to further the conservation of biodiversity in Scotland. At present, the Scottish Biodiversity List includes 93 species of bird and can be viewed at http://www.biodiversityscotland.gov.uk.

UK Birds of Conservation Concern 2002 - 2007

1.2.13 The leading government and non-government conservation organisations in the UK have jointly reviewed the population status of 247 bird species that are regularly found within the United Kingdom using data from national monitoring schemes.

1.2.14 On the basis of seven quantitative criteria, each species was placed on one of three lists, these being:

- Red - red list species are those that are globally threatened, have had an historical population decline in the UK from 1800 -1995, a rapid (> or = 50%) decline in UK breeding population over the past 25 years or a rapid (> or = 50%) contraction of UK breeding range over the past 25 years;
- Amber - amber listed species have had an historical population decline from 1800-1995, but are recovering; population size has more than doubled over the past 25 years, a moderate (25-49%) decline in UK breeding population over the past 25 years, a moderate (25-49%) contraction of UK breeding range over the past 25 years, a moderate (25-49%) decline in UK non-breeding population over the past 25 years, or species with unfavourable conservation status in Europe also known as Species of European Conservation Concern (SPEC); and
- Green - green listed species have no identified threat to their population status.

1.2.15 Of the 247 species assessed, 40 species were red-listed, 121 were amber-listed and the remaining 86 were green-listed. With respect to this report, key species of conservation concern include CWA (1981) Schedule 1i, JNCC Red List, JNCC Amber List, UK BAP, LBAP and local status species.

2 Approach and Methods

2.1 Previous Survey Information

2.1.1 Consultation was undertaken with a variety of statutory and non-governmental organisations including Scottish Natural Heritage (SNH), North East Scotland Biological Records Centre (NESBReC), The Scottish Ornithologists' Club (SOC) and The Royal Society for the Protection of Birds (RSPB). These organisations were consulted regarding previous survey information/data and other bird records for the route corridor and wider study area.

2.2 Survey of Breeding Bird Assemblages

2.2.1 Survey methods were developed in consultation with SNH from 2004 to 2006. The following survey method section has been divided into two parts. The first part details the methods used to select and survey sites within the study area for breeding bird assemblages. The second part details the methods used to assess and evaluate habitats within the study area for breeding bird assemblages.

2.2.2 Field surveys were directed and undertaken by experienced ornithological surveyors with extensive background in identifying birds from observations and from bird song.

Development of Survey Strategy

2.2.3 A requirement to survey the route corridor of the proposed scheme for breeding bird assemblages to inform the assessment was identified through an initial scoping exercise with SNH in late 2004.

2.2.4 A preliminary walkover survey of the study area corridor was undertaken in early 2006 (following consultation with SNH) to assist in the development of an appropriate survey strategy to sample the proposed route corridor for breeding birds.

2.2.5 When developing the survey strategy it was determined through professional judgment together with consultation with SNH that a full survey of the entire route corridor of the proposed scheme for breeding bird assemblages would be impractical due to its large size and the excessive resourcing demands such a survey would require. Therefore, it was agreed to survey the route corridor by targeting potentially 'high value' habitats and sub-sampling remaining areas using Line Transects and Quadrats. These methods provided a pragmatic approach to producing a level of baseline information which could be practically achieved, and enabled the impacts on bird assemblages to be appropriately assessed.

2.2.6 The two-stage breeding bird survey strategy outlined below was developed using survey standards outlined in Bird Census Techniques (Bibby et al., 1992) and Bird Monitoring Methods (Gilbert et al., 1998). All methods were agreed through consultation with SNH in the form of an Ecology Scoping Report (Jacobs, 2006), prior to survey.

Selection of Survey Areas - High Value Habitats

2.2.7 The first stage in the selection of survey areas involved the identification and selection of high value habitats throughout the study area, referred to as Sites of Ornithological Value (SOV). Potential SOVs located within and/or adjacent to the study area were identified based on the initial walkover survey (as outlined in Section 2.24) together with an assessment of data supplied by NESBReC and analysis of aerial photographs and Ordnance Survey maps. Selected SOVs were then subject to a breeding bird survey (BBS).

Selection of Survey Areas – Remaining Habitats

2.2.8 The second stage in the selection of survey areas involved the use of a Line Transect and Quadrat sampling system to sample habitats (outside of the SOVs) throughout the remainder of the study area for breeding bird species. The Quadrat data was used to infer the importance of all remaining non-surveyed areas throughout the route corridor for breeding birds.

2.2.9 A single transect was established centered over the Stage 1 Options route corridor (based on route option plans dated 23 January 2006) along which 500m square Quadrats were established. A sampling ratio of 1:3 was used resulting in eight Quadrats being selected along the length of the transect. This level of sampling was considered to provide field survey data of sufficient representation to allow an effective evaluation of the ecological importance of the breeding bird assemblages found in these areas, and the remainder of the study area.

2.2.10 Approximately 40% (200ha) of the study area was surveyed for breeding birds using the Line Transect and Quadrat sampling system. The selected eight Quadrats were subject to a breeding bird survey. The following habitats within each selected Quadrat were not surveyed:

- if the Quadrat overlapped the whole or part of any SOV (since these areas would be surveyed in any case); and
- urbanised zones including areas of existing road and/or hard standing.

2.2.11 Limitations to the surveys and the assessment are described in Section 2.5.

Breeding Bird Survey

2.2.12 An adapted breeding bird survey (based on the Common Bird Census (CBC) standard mapping technique as developed by the British Trust for Ornithology (Bibby et al., 2000) method was used to survey SOVs and Quadrats, but differed from a full CBC by the following:

- three rather than ten visits were made to each respective SOV/Quadrat; and
- each survey repetition was separated by more than 10 days.

2.2.13 Definitions of the criteria used to classify observed birds as either confirmed breeding, potentially breeding and non-breeding are presented in Table 1.

Table 1 – Definitions of Breeding, Possible Breeding and Non-Breeding (Adapted from Buckland et al., 1990 and Gilbert et al., 1998).

Term	Definition
Breeding	A combination of registrations recorded on two or more survey visits including the following criteria: male in song (on the ground or in flight); male and/or female calling (on the ground or in flight); male and/or female repeatedly calling (on the ground or in flight); aggressive encounters between species (including the same species) perceived to be in the defence of territory, nest or young (on the ground or in flight); a nest (with or without an adult in attendance) or man made structure (e.g. nest box) containing either eggs or young; adult bird/s carrying nesting material or entering/leaving nesting-site with nesting material; adult bird/s carrying food or faecal sack or entering/leaving nesting-site with food or faecal sack; and calling and/or silent juveniles with or without parents in attendance.
Possible Breeding	A combination of registrations recorded on a single survey visit including the above criteria and the following: pair observed in suitable habitat in breeding season; and building or excavating a nest site.
Non Breeding	One or more registration (not including the criteria listed above) recorded on one or more survey visit including the following criteria: adult bird/s carrying or foraging for food not presumed to be for young/juveniles; and species observed during the breeding season but not in habitat deemed to suitable for nesting.

Incidental Observations

2.2.14 Observations of WCA1i, JNCC Red/Amber List and UK BAP / LBAP bird species present within or adjacent to each of the SOV and Quadrat, in addition to the wider study area, were noted during other ecological surveys that were undertaken for the AWPR Environmental Statement 2007.

Dates of Survey

2.2.15 The reconnaissance surveys were undertaken from 23 to 26 January 2006. The surveys were undertaken from 10 to 14 April 2006, 8 May to 3 June 2006 and 12 to 28 June 2006 with further survey work carried out 23 to 25 April 2007, 23 to 25 May 2007 and 19 to 21 June 2007.

2.3 Habitat Assessment

Habitat value

2.3.1 Information obtained from the Phase 1 Habitat Survey was used to inform a description of the habitats represented within each SOV and Quadrat and assess their value for breeding birds. A habitat value (expressed as high, medium or low) was assigned to each SOV, Quadrat and Habitat Area (HA) (as described in the Terrestrial Habitat Report, Appendix A25.1) based on the habitat descriptions derived from the Phase 1 Habitat Survey, following the criteria shown in Table 2.

Table 2 – Habitat Assessment Criteria

Habitat Value	Criteria
High	Habitats considered to offer abundant good quality foraging and nesting opportunities for birds.
Medium	Habitats considered to offer scattered and/or localised nesting or foraging opportunities for birds.
Low	Habitats considered to offer occasional or limited nesting and foraging opportunities for birds.

2.4 Evaluation of Ecology and Nature Conservation Value

2.4.1 The method for assessing the value of an ecological receptor uses all information collated in determining the baseline status of the resource. The ecological evaluation of a receptor is determined by reference to statutory and non-statutory site designations, the results of consultation, literature review (including reference to the North-East Scotland Bird Report (North-East Scotland Bird Club, 2004) and The Birds of North-East Scotland (Buckland et al., 1990) and field surveys. The evaluation method incorporates a geographical framework where ecological receptors are assessed according to a series of criteria presented in Table 3, which are based on the Ratcliffe Criteria (Ratcliffe, 1977) used in the selection of biological SSSI and include size (extent), naturalness, rarity, typicality, vulnerability and position in an ecological / geographical unit.

2.4.2 The evaluation method additionally includes reference to the legal protection conferred on species or habitats as well as the conservation status of the receptor, such as presence of UK BAPs or LBAPs. These factors give rise to a level of conservation importance being assigned to species/habitats that reflects the geographical framework used in the evaluation process. Thus, for example, Birds Directive Annex 1 species such as little ringed plover that are protected by international legislation are referred to as internationally important in terms of their conservation status. Other species such as barn owl, which are identified as priority species in the North-East Scotland Biodiversity Action Plan (NES BAP) are referred to as regionally important species.

Table 3 – Evaluation of Ecological Receptor

Ecological Importance	Attributes of Ecological Receptor
International (European)	**Habitats** An internationally designated site or candidate site i.e. Special Protection Area (SPA), provisional SPA (pSPA), Special Areas of Conservation (SAC), candidate SAC (cSAC), Ramsar site, Biogenetic/Biosphere Reserve, World Heritage Site or an area which meets the published selection criteria for such designation. A viable area of a habitat type listed in Annex I of the Habitats Directive, or smaller areas of such habitat that are essential to maintain the viability of a larger whole. Any river classified as excellent A1 and likely to support a substantial salmonid population. Any river with a Habitat Modification Score indicating that it is Pristine or Semi-Natural or Obviously Modified. **Species** Any regularly occurring population of an internationally important species, which is threatened or rare in the UK, i.e. a UK Red Data Book species or listed as occurring in 15 or fewer 10km squares in the UK (categories 1 and 2 in the UK BAP) or of uncertain conservation status or of global conservation concern in the UK BAP. A regularly occurring, nationally significant population/number of any internationally important species.
National (Scottish)	**Habitats** A nationally designated site i.e. Site of Special Scientific Interest (SSSI), Areas of Special Scientific Interest (ASSI), National Nature Reserve (NNR), Marine Nature Reserve, or a discrete area, which meets the published selection criteria for national designation (e.g. SSSI selection guidelines) A viable area of a priority habitat identified in the UK Biodiversity Action Plan (UK BAP), or of smaller areas of such habitat that are essential to maintain the viability of a larger whole. Any river classified as excellent A1 and likely to support a substantial salmonid population. Any river with a Habitat Modification Score indicating that it is Pristine or Semi-Natural or Obviously Modified. **Species** A regularly occurring, regionally or county significant population/number of an internationally/nationally important species. Any regularly occurring population of a nationally important species which is threatened or rare in the region or county (see local BAP). A feature identified as of critical importance in the UK BAP.
Regional (North East Scotland)	**Habitats** Sites which exceed the county-level designations but fall short of SSSI selection criteria. Viable areas of key habitat identified in the Regional BAP or smaller areas of such habitat that are

Ecological Importance	Attributes of Ecological Receptor
	essential to maintain the viability of a larger whole. Viable areas of key habitat identified as being of regional value in the appropriate SNH Natural Heritage Future area profile. Any river classified as excellent A1 or good A2 and capable of supporting salmonid population. Any river with a Habitat Modification Score indicating that it is significantly modified or above. **Species** Any regularly occurring, locally significant population of a species listed as being nationally scarce which occurs in 16-100 10km squares in the UK or in a Regional BAP or relevant SNH Natural Heritage Future area on account of its regional rarity or localisation. A regularly occurring, locally significant population/number of a regionally important species. Sites maintaining populations of internationally/nationally important species that are not threatened or rare in the region or county.
Authority Area (e.g. County or District) **(Aberdeenshire / City of Aberdeen)**	**Habitats** Sites that are recognised by local authorities e.g. Sites of Interest for Nature Conservation (SINS) and District Wildlife Sites (DWS). County/District sites that the designating authority has determined meet the published ecological selection criteria for designation, including Local Nature Reserves (LNR). A viable area of habitat identified in County/District BAP or in the relevant SNH Natural Heritage Future area profile. A diverse and/or ecologically valuable hedgerow network. Semi-natural ancient woodland greater than 0.25 ha. Any river classified as good A2 or fair B and likely to support coarse fishery. Any river with a Habitat Modification Score indicating that it is significantly modified or above. **Species** Any regularly occurring, locally significant population of a species that is listed in a County/District BAP on account of its regional rarity or localisation. A regularly occurring, locally significant population of a county/district important species (particularly during a critical phase of its life cycle). Sites supporting populations of internationally/nationally/regionally important species that are not threatened or rare in the region or county, and are not integral to maintaining those populations. Sites/features that are scarce within the county/district or which appreciably enrich the county/ district habitat resource.
Local **(Immediate local area or village importance)**	**Habitats** Areas of habitat considered to appreciably enrich the habitat resource e.g. species-rich hedgerows, ponds etc. Sites that retain other elements of semi-natural vegetation that due to their size, quality or the wide distribution of such habitats within the local area are not considered for the above classifications. Semi-natural ancient woodland smaller than 0.25ha. Any river classified as fair B or poor C and unlikely to support coarse fishery. Rivers with a Habitat Modification Score indicating that it is severely modified or above. **Species** Populations/assemblages of species that appreciable enrich the biodiversity resource within the local context. Sites supporting populations of county/district important species that are not threatened or rare in the region or county, and are not integral to maintaining those populations.
Less than Local **(Limited ecological value)**	Sites that retain habitats and/or species that are of limited ecological importance due to their size, species composition or other factors. Any river classified as impoverished D and/or and with a Habitat Modification Score indicating that it is severely modified.

Evaluation of SOVs, Quadrats and Habitat Areas

2.4.3 The ecological value of each SOV and Quadrat for breeding birds was determined by considering the evaluation of its habitat potential for breeding birds (Table 2, derived from information in Appendix A40.1 of the AWPR Environmental Statement 2007 (Terrestrial Habitats)) combined with the value of the breeding bird assemblage present.

2.4.4 An assessment of how representative the habitats found in each Quadrat or SOV in relation to the non surveyed areas adjacent was then made. The ecological value of the remaining Habitat Areas in each route section was then determined by evaluating their habitat potential for breeding birds combined with the knowledge of the breeding bird assemblages found in adjacent representative Quadrats or SOVs.

2.5 Impact Assessment

2.5.1 In the assessment of significance of impact, consideration has been given both to the magnitude of impact and to the sensitivity of the receiving environment or species. The sensitivity of a feature was determined with reference to its level of importance although other elements have been taken into account where appropriate.

Impact Magnitude

2.5.2 Methods of impact prediction used included direct measurements, correlations, expert opinion and information from previous developments. Impacts include those that are predicted to be direct, indirect, temporary, permanent, cumulative, reversible or irreversible. The magnitude of each impact was assessed independently of its value or statutory status. Magnitude criteria are presented in Table 4 and include positive impact criteria in accordance with IEEM guidance (2002).

Table 4 – Impact Magnitude

Impact Magnitude	Criteria
High negative	The change is likely to permanently, adversely affect the integrity of an ecological receptor, in terms of the coherence of its ecological structure and function, across its whole area that enables it to sustain the habitat, complex of habitats and/or the population levels of species of interest (at a regional or higher level).
Medium negative	The change is not likely to permanently adversely affect the ecological receptor's integrity but the effect on the receptor is likely to be substantial in terms of its ecological structure and function and may change its evaluation. Likely to result in changes in the localised distribution of a species but not affect its population status at a regional level.
Low negative	The change may adversely affect the ecological receptor, but there will probably be no permanent effect on its integrity and/or key attributes and is unlikely to change its evaluation.
Negligible	The change may slightly adversely affect the receptor but will have no permanent effect on the integrity of the receptor or its key attributes. There are no predicted measurable changes to the species assemblage or population and the effect is unlikely to result in an increased vulnerability of the receptor to future impacts.
Positive	The change is likely to benefit the ecological receptor, but may not improve its evaluation
High positive	The change is likely to restore an ecological receptor to favourable conservation status, or to create a feature of recognisable value (at a regional or higher level).

Impact Significance

2.5.3 The significance of an impact has been determined according to the matrix system illustrated in Table 5. Impacts can be beneficial or adverse, either improving or decreasing the ecological status health or viability of a species, population or habitat.

2.5.4 Typically, negative impact significance greater than or equal to moderate would require mitigation to be undertaken to ameliorate the impact significance to acceptable levels. However, in order to comply with Part 1 of the Nature Conservation (Scotland) Act (2004) mitigation is proposed for negative impacts of minor or above.

Table 5 – Impact Significance

Magnitude / Importance	High Negative	Medium Negative	Low Negative	Negligible	Positive	High Positive
International	Major	Major	Moderate	Negligible	Moderate	Major
National	Major	Major	Moderate	Negligible	Moderate	Major
Regional	Major	Moderate	Minor	Negligible	Minor	Moderate
County	Moderate	Moderate	Minor	Negligible	Minor	Moderate
Local	Minor	Minor	Minor	Negligible	Minor	Minor
Less than Local	Minor	Negligible	Negligible	Negligible	Negligible	Negligible

2.5.5 The level of significance of impacts predicted on ecological receptors is an important factor in influencing the decision-making process and determining the necessity and/or extent of mitigation measures. Impacts can be beneficial or adverse, either improving or decreasing the ecological status health or viability of a species, population or habitat.

2.6 Limitations to Assessment

Weather

2.6.1 All surveys were carried out in suitable weather, although it was not practical to limit surveys to optimal weather conditions only. It has been shown that wind and rain are the two main factors that can limit the number of bird registrations recorded during a breeding bird survey (Gilbert et al.,1998).

2.6.2 Weather conditions during surveys were generally good with a limited number of days affected by rain and heavy cloud. Surveys were suspended if weather conditions were poor (e.g. high winds and persistent rain). Wind speed was relatively high on some days (approximately 12% of survey days), which is likely to have reduced records of singing birds. However, visiting the site several times during the optimal survey period helps to reduce the significance of such effects.

Survey Methodology

2.6.3 A full Common Bird Census (CBC) comprises ten survey visits made between March and June, with a minimum of 10 days between each of the survey repetition, which enables the calculation of bird territories across an entire season within a given site. However, the adopted methodology included only three survey visits to each SOV and Quadrat with more than 10 days between each repetition. There were two reasons for reducing the number of survey repetitions and increasing the number of days between visits. Firstly, it was considered that three survey repetitions (made between April and June) would enable a sufficient representative data set to be collected in order to gain an accurate reflection of the breeding bird assemblage present within each SOV and Quadrat; and secondly, it was considered more important to gather an accurate baseline of the bird assemblage within each SOV and Quadrat rather than a full picture of the spatial distribution of all bird territories.

2.6.4 The above survey methodology is supported by SNH guidance (SNH, 2005; Section 6.9) and was included in the ecology scoping report (Jacobs, 2006) which was approved prior to the start of the surveys by SNH.

Changes to the Route Alignment

2.6.5 Four Quadrats currently lie outside the route corridor as a result of changes to the preferred route following the DMRB Stage 1 Assessment. Using the Quadrat and Line Transect method, it was possible to infer the potential value of remaining non-sampled areas within the route corridor for breeding bird assemblages.

3 Baseline

3.1 Consultation Information

3.1.1 SNH did not provide any records of key breeding bird species for the proposed scheme in their consultation correspondence.

3.1.2 Consultation with the RSPB did not identify the presence of any RSPB nature reserves or provide any previous records of breeding bird species within or adjacent to the proposed scheme study area.

3.1.3 The Scottish Ornithologists' Club (SOC) and the RSPB are jointly involved in a 5-year project to produce a Breeding Bird Atlas for Aberdeenshire (which was due for completion in 2006 but has yet has not been published). Records of confirmed, possible and probable breeding bird species are available for a selection of areas within the route corridor (not all areas within the route corridor have been surveyed to date) based on a 2km by 2km (tetrad) grid sampling system.

3.1.4 Existing survey data was not obtained from SOC and the RSPB for the following reasons:

- the data was not of sufficient detail in terms of the specific location of bird species for an EIA (i.e. the tetrads were too large); and
- data derived from SOC/RSPB's and Jacobs methodologies are incompatible due to differences employed to gather the data. SOC/RSPB used the Brown and Shepherd (1993) method for censuring upland breeding wader populations while the CBC methodology was used for this assessment.

3.2 Incidental Observations

3.2.1 Records of key bird species that were made incidentally during other surveys that were carried out for this EIA during spring and summer 2006 are shown in Table 6.

Table 6 – Incidental Records of Key Bird Species

Month / Year	Species	Status	Location (NGR)	Comment
April 2006	tree sparrow (flock of six)	JNCC Red List and UK BAP	NO 865 938	Recorded on the edge of Red Moss (by Quadrat FL-Bb05).
May 2006	reed bunting	JNCC Red List and UK BAP	NO 868 907	Recorded singing near Fishermyre.
May 2006	song thrushes	JNCC Red List and UK BAP	NO 869 905	Recorded singing Near Howieshill.
May 2006	linnet	JNCC Red List and UK BAP	NO 869 900	Recorded near Fishermyre.
-	skylark	NBAP, JNCC Red List	-	Recorded throughout the route section.
May 2006	grasshopper warblers	LBAP, JNCC Red List	NO 868 894	Recorded singing near Coneyhatch.
April 2006 May 2006	yellowhammer	LBAP, JNCC Red List	NO 870 875 NO 869 900	Recorded at Mains of Ury and at Fishermyre.
May 2006	house sparrow	JNCC Red List	NO 869 900	Recorded at Fishermyre.
May 2006	curlew	LBAP, JNCC Amber	NO 867 902	Recorded in song near Fishermyre.
April 2006	lapwing	LBAP, JNCC Amber	NO 873 923	Recorded north of Elrick.
May 2006	cuckoo	JNCC Amber List	NO 870 906	Heard singing near Howieshill.
-	herring gulls	JNCC Amber List	-	Recorded foraging in much of the section throughout the season.
-	lesser black-backed gulls	JNCC Amber List	-	Recorded foraging in much of the section throughout the season.
-	meadow pipits	JNCC Amber List	-	Recorded throughout the section all season.
April 2006	oystercatchers	JNCC Amber List	NO 873 934	Pair recorded east of Cookney.
April 2006	stock dove	JNCC Amber List	-	Recorded about fields near Mains of Ury.
-	swallow	JNCC Amber List	-	Recorded along much of the route section throughout the season.

3.3 Survey of Breeding Bird Assemblages

Sites of Ornithological Value (SOVs)

3.3.1 A total of seven SOVs were identified in the Fastlink study area, within or adjacent to the proposed route corridor (AWPR Environmental Statement 2007, Figures 40.6a-f) and account for approximately 24% of the total survey corridor area. A description of each SOV in terms of location and size is presented in Table 7. Five SOVs (Limpet Burn, Kempstone Hill, South Fishermyre and North Fishermyre and Stranog Hill) highlighted in italics, were all re-surveyed in 2007 as a result of re-alignment and previous land access constraints.

Table 7 – Description of SOVs

SOV Name	Section	Grid Reference	Size (ha)
Limpet Burn	FL1	NO 874 888	16.6
Kempstone Hill	FL1	NO 876 894	14.5
South Fishermyre	FL1	NO 869 899	18.1
North Fishermyre	FL2	NO 866 907	28
Harecraig	FL3	NO 875 937	9
Cookney	FL3	NO 870 936	9.5
Stranog Hill	FL3	NO 866 966	26.2

3.3.2 Table 8 presents the results of the breeding bird surveys undertaken on each SOV in terms of species recorded, their status and whether they were recorded as breeding (B), possible breeding (P) and non-breeding (N). The scientific names of bird species are presented in Annex 1.

Table 8 – Bird Species Recorded Breeding (B), Possible Breeding (P) and Non-breeding (N) Birds within each Site of Ornithological Value (SOV)

Common Name	Status	SOV						
		Limpet Burn	Kempstone Hill	South Fishermyre	North Fishermyre	Harecraig	Cookney	Stranog Hill SOV
blackbird		P	B	P	P	B	B	
blackcap		P	P					
blue tit		P	P	P	P	B	P	
bullfinch	x & Ψ	P	N					
buzzard		P	N		N			N
carrion crow		N		N	N		N	N
chaffinch		B	B	B	B	B	B	B
chiffchaff		B						
coal tit		P				P	P	
corn bunting	x & Ψ			N				
cuckoo	+			P	P			
curlew	+ Ψ			N				N
dunnock	+	P	P	P		P	B	B
goldcrest	+	P				P		
goldfinch		P	P	N				
grasshopper warbler	x Ψ			P	P			
greater spotted woodpecker					P			
great tit		B			P	P	P	N
greenfinch		P		P	P	B	P	N
herring gull	+			N				
house sparrow	x			B				
jackdaw							N	
lapwing	+ Ψ							N
lesser redpoll	+	N			P	P	P	
linnet	x & Ψ	P	P		P	P	B	P

Common Name	Status	SOV						
		Limpet Burn	Kempstone Hill	South Fishermyre	North Fishermyre	Harecraig	Cookney	Stranog Hill SOV
magpie						P		
meadow pipit	+	P	B	B	B	P	B	P
mistle thrush	+		N					
oystercatcher	+				N			
pheasant		P		B	P			
reed bunting	x & Ψ			P	B	P	P	P
redstart	+	P						
robin		P	P	P	P	N	P	
sand martin	+	N						
sedge warbler			P	P		P		
siskin				P	P			
skylark	x & Ψ			P	P	P	P	B
song thrush	x & Ψ	P	P	B	P	B	B	
sparrowhawk		P			N			
starling	x		N	N		P	B	N
swallow	+		N	N	N	N		
tawny owl						N		
treecreeper		P						
whitethroat		P	P	P	P	P		N
woodpigeon		B		N	P	B	N	
wren		B	P	B	P	B	B	
willow warbler	+	B	P	B	P	B		B
yellowhammer	x Ψ	P	P	B	B	P	B	

Key: x = JNCC Red List; + = JNCC Amber List; & = UKBAP; Ψ = LBAP.

Quadrats

3.3.3 A total of eight Quadrats were established within the Fastlink study area (Figures 40.6a-f) and account for approximately 17% of the total survey corridor area. A description of each Quadrat, in terms of location, is shown in Table 9. Four of the Quadrats (FL-Bb01, FL-Bb02, FL-Bb03 and FL-Bb05) highlighted in italics were all re-surveyed in 2007 as a result of re-alignment and previous land access constraints.

Table 9 – Description of Quadrats

Quadrat	Section	Grid Reference
FL-Bb01	FL1	NO 873 875
FL-Bb02	FL1	NO 874 890
FL-Bb03	FL2	NO 870 907
FL-Bb04	FL2	NO 872 920
FL-Bb05	FL3	NO 873 933
FL-Bb06	FL3	NO 873 947
FL-Bb07	FL3	NO 871 965
FL-Bb08	FL3	NO 869 980

3.3.4 Table 10 presents the results of the surveys undertaken on each Quadrat in terms of species recorded, their status and whether they were recorded as breeding (B), possible breeding (P) and non-breeding (N). The scientific names of bird species are presented in Annex 1.

Table 10 – Bird Species Recorded Breeding (B), Possible Breeding (P) and Non-breeding (N) Within Each Quadrat

Common Name	Status	Quadrat ID							
		1	2	3	4	5	6	7	8
blackbird			P	P	B	P	P	P	B
blackcap					P			P	
blue tit		P	P		P	B	P	P	P
bullfinch	x & Ψ		P					N	
buzzard		N	P			N			N
carrion crow				N	N			B	P
chaffinch		B	B	P	B	B	B	B	B
chiffchaff			P						P
coal tit					P		P	B	B
curlew	+ Ψ			P		P		P	
dunnock	+				P		P		P
garden warbler					P			P	
goldcrest	+		P		P				P
goldfinch							P		P
greater spotted woodpecker						P			
great tit		P			P	B	B		B
greenfinch		P			P	P	P	P	
grey heron				N					N
grey partridge	x & Ψ			P					
herring gull	+				N				
house martin	+				N				
house sparrow	x	P			P	B			
jackdaw					P			N	
lapwing	+ Ψ				B				
lesser redpoll	+					P	P		B
linnet	x & Ψ					P	P	B	B
magpie					P	P		N	P

Common Name	Status	Quadrat ID							
		1	2	3	4	5	6	7	8
mallard					P				
meadow pipit	+			P		B	B	P	B
mistle thrush	+								P
moorhen					P				
mute swan	+				N				
oystercatcher	+	P	P		B		B		
pheasant			P						
pied wagtail				P	P	B	B		
reed bunting	x & Ψ		P			P		P	B
robin		P			B	B		B	B
rook						N	B		
sand martin	+				N				
sedge warbler					B			P	
siskin							P		
skylark	x &	B		P	B	B	P	B	B
snipe	↑ + Ψ							P	
snow bunting								N	
song thrush	x & Ψ	P			P	B	P	P	P
starling	x			N	N	P	B		
stock dove	+						P		N
swallow	+			P	P		B		
whitethroat		P			P	P	P		B
willow warbler	+		P	P	B		B	B	B
woodpigeon		P	P		P	P		B	B
wood warbler	+							N	
wren		P		P	B	B	B	B	B
yellowhammer	x Ψ		P	P	B	P	B	B	P

Key: x = JNCC Red List; + = JNCC Amber List; & = UKBAP; Ψ = LBAP.

3.4 Habitat Descriptions: SOVs and Quadrats

3.4.1 The following section presents a description of the habitats represented within each SOV and Quadrat together with their associated Habitat Areas.

Section FL1

3.4.2 The habitats within Section FL1 are comprised predominantly of arable farmland with some improved grassland fields and areas of scattered scrub and hedgerows (species rich) along the field margins.

3.4.3 Table 11 presents a detailed description of habitats present within each SOV and Quadrat, together with their associated Habitat Areas.

Table 11 – Habitat Descriptions for Section FL1

SOV / Quadrat	Represented Habitat Area	Value	Habitat Description
Limpet Burn SOV	F7	High	Mosaic of semi-natural communities lining the heavily vegetated Limpet Burn. Communities include a dense marsh with scattered willow, birch woodland, dense bracken and continuous gorse scrub.
Kempstone Hill SOV	F9	Medium	A large area if gorse scrub-acid grassland mosaic with some dry heath vegetation.
South Fishermyre SOV	F10	Medium	A large area of gorse scrub-acid grassland mosaic with some dry heath vegetation.
FL-Bb01	F1 F2 F3 F4	Low	Quadrat comprised of fields of arable (with areas of scattered scrub and parkland/scattered trees) and improved grassland (the later associated with the existing Stonehaven bypass and junction). Megray Burn bisects the Quadrat south of H Ram Wood. Areas of broad-leaved woodland (Ury Shelter Belt) constitute the remainder of the habitats.
FL-Bb02	F6 F7 F8	Low	Approximately half of the Quadrat is comprised by Limpet Burn SOV (see above for habitat description and habitat value). The remaining areas within the Quadrat comprise immature coniferous plantation woodland and arable fields boarded by native species-rich hedgerows with pockets of scattered and dense scrub.

Section FL2

3.4.4 Habitats within Section FL2 are entirely comprised of arable farmland with some improved and semi-improved grassland fields with occasional hedgerows. Table 12 presents a detailed description of habitats present within each SOV and Quadrat, together with their associated Habitat Areas.

Table 12 – Habitat Descriptions for Section FL2

SOV / Quadrat	Represented Habitat Area	Value	Habitat Description
North Fishermyre SOV	F12	High	The majority of this area is dominated by dry heath. The north and north west is lined with dense gorse scrub. Mixed semi-natural woodland is present towards the south west with scattered pockets of willow dominated wet woodland ranging across the south. Marsh is present in the environs of the wet woods. This habitat mosaic extends well beyond the survey corridor to form a large area of good quality habitat.
FL-Bb03	F8 F10 F12 F13	Medium	Habitats within the Quadrat are comprised predominantly of a mosaic of fen, dry heath and acid grassland with gorse scrub and scattered areas of wet woodland with an area of improved grassland to the east.
FL-Bb04	F13 F15 F16	Medium	Habitats within the Quadrat are comprised of arable fields bounded by native species-rich hedgerows and stonewalls. The Burn of Muchalls bisects the Quadrat from west to east and is dominated by semi-natural wet woodland in the east and young mixed plantation woodland in the west. The burn also contains fishing ponds and supports a broad strip of partially naturalised planted mixed woodland, species rich hedgerow and marshy grassland vegetation. An avenue of broadleaf trees runs along an access road.

Section FL3

3.4.5 The majority of Section FL3 is comprised of improved grassland with some arable fields, hedgerows and scattered stands of scrub and woodland. There are a number of minor burns and

stands of marshy grassland. Table 13 presents a detailed description of habitats present within each SOV and Quadrat, together with their associated Habitat Areas.

Table 13 – Habitat Descriptions for Section FL3

SOV / Quadrat	Represented Habitat Area	Value	Habitat Description
Cookney SOV	F17	Medium	A large area of marsh/marshy grassland with areas of patchy gorse scrub together with three large stands of willow carr woodland.
Harecraig SOV	F19	High	Patchy alder, willow and birch scrub/ woodland on an area of marsh/marshy grassland. There are patches of wet heath vegetation and gorse scrub.
Stranog Hill SOV	F22 F23	High	Small hill of grazed improved grassland and dense gorse, leading west to the wetter heathland further lined by dense gorse scrub.
FL-Bb05	F16 F17 F18 F19	High	Mosaic of wet and dry heath with bog pools to the west, with patchy alder, willow and birch scrub/wet woodland with areas of wet heath and gorse scrub to the east. Areas of improved grassland and arable farmland are found to the south and north of the quadrat.
FL-Bb06	FL18	Medium	Large area of predominantly improved grassland and arable farmland with areas of marshy grassland. Patches of scattered scrub are present around field boundaries with occasionally continuous stands.
FL-Bb07	F20 F21 F22 F23	High	Habitats comprise of a dry heath/acid grassland mosaic with frequent scrub grading to rush pasture and improved agricultural fields with pockets of scrub.
FL-Bb08	F26	Medium	Dominated by improved fields, with a large area of marshy grassland present to the west of Burnhead.

3.5 Summary of Results

Incidental Observations

3.5.1 17 key bird species were recorded throughout the route section during the other ecological surveys, of which:

- none were WCA1i;
- eight were JNCC Red List Species (grasshopper warbler, house sparrow, linnet, reed bunting, skylark, song thrush, tree sparrow and yellowhammer); and
- nine were JNCC Amber List Species (cuckoo, curlew, lapwing, herring gull, lesser black-backed gull, oystercatcher, meadow pipit, stock dove and swallow).

Breeding Bird Surveys

3.5.2 Breeding bird surveys were conducted on six SOVs within or adjacent to the study corridor and eight Quadrats established along the original consultation route.

3.5.3 A total of 48 bird species (37 recorded breeding or possibly breeding) were recorded throughout the six SOVs, of which:

- none were WCA1i species;
- ten were **JNCC Red List** species (bullfinch, corn bunting, grasshopper warbler, house sparrow, linnet, reed bunting, skylark, starling, song thrush, and yellowhammer); and
- 12 were **JNCC Amber List** species (cuckoo, curlew, dunnock, goldcrest, lesser redpoll, mistle thrush, meadow pipit, oystercatcher, redstart, swallow, sand martin and willow warbler).

3.5.4 A total of 54 bird species (39 recorded as breeding or possibly breeding) were recorded throughout the eight Quadrats, of which:

- one was **WCA1i species** (snow bunting) was recorded (non-breeding);
- eight were **JNCC Red List** Species (house sparrow, linnet, grey partridge, reed bunting, skylark, starling, yellowhammer and song thrush); and
- 11 were **JNCC Amber List** Species (curlew, dunnock, goldcrest, lapwing, mistle thrush, meadow pipit, oystercatcher, stock dove, swallow, common snipe and willow warbler).

Habitat Description

3.5.5 The majority of the study area consists of arable farmland and improved or semi-improved grassland. This farmland also supports species-rich hedgerows and stands of scrub. Identified SOVs represented the majority of semi-natural habitats within the route corridor, which were dominated by heath, scrub, woodland, marshy and riparian habitats.

3.5.6 A number of watercourses are present within the route corridor, including the Burn of Muchalls.

4 Evaluation

4.1 Introduction

4.1.1 The ecological value of SOVs, Quadrats and Habitat Areas for breeding birds was determined by considering the habitat evaluation of each area combined with the value of the breeding bird assemblage present. The ecological value of remaining Habitat Areas in each route section was determined by an initial evaluation of habitat potential for breeding birds combined with the knowledge of the breeding bird assemblages found in adjacent representative Quadrats or SOVs (refer to sections 2.4.3 and 2.4.4).

4.2 Evaluation of SOVs / Quadrats

4.2.1 Species recorded in the study area are presented in the baseline section of this report (Table 8 and Table 10).

4.2.2 Table 14 provides a list of key bird species recorded within each Quadrat or SOV. Where a key bird species were recorded as an incidental sighting only (noted in Table 14 and following text with an asterisk), it has been assigned to the appropriate Quadrat or SOV. Incidental sightings without grid references which have not been included in the evaluation below, as the information could not be identified with a particular SOV or Quadrat.

Section FL1

4.2.3 Three SOVs (Limpet Burn, Kempstone Hill and South Fishermyre) and two Quadrats (FL-Bb01 and FL-Bb02) are located within Section FL1 and are evaluated below.

Limpet Burn SOV (including all or parts of Habitat Area F7)

4.2.4 The breeding bird assemblage recorded in this SOV is considered to be of medium diversity, with 27 breeding bird species of which none were WCA1i species, four were JNCC Red List species (bullfinch, linnet, song thrush, yellowhammer), five were JNCC Amber List species (dunnock, goldcrest, meadow pipit, redstart, willow warbler), three were UK BAP species (bullfinch, linnet, song thrush), four were LBAP species (bullfinch, linnet, song thrush, yellowhammer) and none were local status species. The habitats that comprise the Habitat Areas within the Quadrat are assessed as being of high value for birds, comprising a mosaic of semi-natural habitats dominated by dense marsh with scattered willow, birch woodland, dense bracken and continuous gorse scrub (Table 11). The breeding assemblage found in this SOV is considered to enrich the biodiversity resource within the county context and therefore is assessed to be of county ecological value.

Kempstone Hill SOV (including all or parts of Habitat Area F9)

4.2.5 The breeding bird assemblage recorded in this SOV is considered to be of low diversity, with 14 breeding bird species of which none were WCA1i species, three were JNCC Red List species (linnet, song thrush, yellowhammer), three were JNCC Amber List species (dunnock, meadow pipit, willow warbler), two were UK BAP species (linnet, song thrush), four were LBAP species (linnet, song thrush, yellowhammer, bullfinch) and none were local status species. The habitats that comprise the Habitat Areas within the Quadrat are assessed as being of medium value for birds, comprising a large mosaic of gorse scrub-acid grassland with some dry heath vegetation (Table 11). The breeding assemblage found in this SOV is considered to enrich the biodiversity resource within the local context and therefore is assessed to be of local ecological value.

South Fishermyre SOV (including all or parts of Habitat Area F9)

4.2.6 The breeding bird assemblage recorded in this SOV is considered to be of medium diversity, with 21 breeding bird species of which none were WCA1i species, six were JNCC Red List species (grasshopper warbler, reed bunting, song thrush, yellowhammer, skylark, house sparrow), five were JNCC Amber List species (cuckoo, dunnock, mistle thrush, meadow pipit, willow warbler), three were UK BAP species (reed bunting, song thrush, skylark), six were LBAP species (reed bunting, song thrush, yellowhammer, grasshopper warbler, skylark, curlew) and one (grasshopper warbler) was a locally uncommon species. The habitats that comprise the Habitat Areas within the Quadrat are assessed as being of high value for birds, comprising a large mosaic of gorse scrub-acid grassland with some dry heath vegetation (Table 11). The breeding assemblage found in this SOV is considered to enrich the biodiversity resource within the county context and therefore is assessed to be of county ecological value.

Quadrat FL-Bb01 (including all or parts of Habitat Areas F1 – 3)

4.2.7 The breeding bird assemblage recorded in this Quadrat is considered to be of relatively low diversity, with 14 breeding bird species of which none were WCA1i species, four were JNCC Red List species (house sparrow, skylark, song thrush, yellowhammer*), two were JNCC Amber List species (oystercatcher, stock dove*), two were UK BAP species (skylark, song thrush), four were LBAP species (song thrush, yellowhammer*, curlew) and none were local status. The habitats that comprise the Habitat Areas within the Quadrat are assessed as being of low value for birds, comprising arable fields (with areas of scattered scrub and parkland/scattered trees), improved grassland (the latter associated with the existing Stonehaven bypass and junction) with Megray Burn bisecting the Quadrat south of H Ram Wood and areas of broad-leaved woodland (Ury Shelter Belt) constituting the remainder of the habitats (Table 11). The breeding assemblage found in Quadrat FL-Bb01 is considered to enrich the biodiversity resource within the less than local context and therefore is considered to be of less than local ecological value.

Quadrat FL-Bb02 (including all or parts of Habitat Areas F6 – 8)

4.2.8 The breeding bird assemblage recorded in this Quadrat is considered to be of relatively low diversity, with 12 breeding bird species of which none were WCA1i species, two were a JNCC Red List species (yellowhammer, bullfinch), three were JNCC Amber List species (willow warbler, goldcrest, oystercatcher). One was a UK BAP species (bullfinch), two were LBAP species (yellowhammer, bullfinch) and none were local status. The habitats that comprise the Habitat Areas within the Quadrat are assessed as being of low value for birds, comprising immature coniferous plantation woodland and arable fields boarded by native species-rich hedgerows with pockets of scattered and dense scrub (Table 11). The breeding assemblage found in Quadrat FL-Bb02 is considered to enrich the biodiversity resource within the less than local context and therefore is considered to be of less than local ecological value.

Section FL2

4.2.9 One SOV (North Fishermyre) and two Quadrats (FL-Bb03 and FL-Bb04) are located within Section FL2 and are evaluated below.

North Fishermyre SOV (including all or parts of Habitat Area F12)

4.2.10 The breeding bird assemblage recorded in this SOV is considered to be of medium diversity, with 27 breeding bird species of which none were WCA1i species, six were JNCC Red List species (grasshopper warbler, linnet, skylark, yellowhammer, reed bunting, song thrush), five were JNCC Amber List species (meadow pipit, willow warbler, lesser redpoll, curlew*, cuckoo), four were UK BAP species (linnet, skylark, reed bunting, song thrush), seven were LBAP species (grasshopper warbler, linnet, skylark, yellowhammer, reed bunting, song thrush, curlew*) and none were local status species. The habitats that comprise the Habitat Areas within the Quadrat are assessed as being of high value for birds, the majority comprising dry heath, with dense gorse scrub in the north and north west and mixed semi-natural woodland in the south west with scattered pockets of willow dominated wet woodland ranging across the south (Table 12). The breeding assemblage found in this SOV is considered to enrich the biodiversity resource within the county context and therefore is assessed to be of county ecological value.

Quadrat FL-Bb03 (including all or parts of Habitat Areas F8, F10, F12 and F13)

4.2.11 The breeding bird assemblage recorded in this Quadrat is considered to be of relatively low diversity, with 11 breeding bird species of which none were WCA1i species, three were JNCC Red List species (grey partridge, skylark, yellowhammer), four were JNCC Amber List species (curlew, meadow pipit, swallow, willow warbler), two were UK BAP species (grey partridge, skylark), four were LBAP species (grey partridge, skylark, yellowhammer, curlew) and none were local status species. The habitats that comprise the Habitat Areas within the Quadrat are assessed as being of high value for birds, comprising a mosaic of fen, acidic dwarf heath and scattered willow scrub (Table 12). The breeding assemblage found in Quadrat FL-Bb03 is considered to enrich the biodiversity resource within the less than local context and therefore is considered to be of county ecological value.

Quadrat FL-Bb04 (including all or parts of Habitat Areas F13, F15 and F16)

4.2.12 The breeding bird assemblage recorded in this Quadrat is considered to be of relatively high diversity, with 28 breeding bird species of which none were WCA1i species, four were JNCC Red List species (house sparrow, song thrush, skylark, yellowhammer), six were JNCC Amber List species (dunnock, goldcrest, lapwing, oystercatcher, swallow, willow warbler), two were UK BAP species (song thrush, skylark), three were LBAP species (song thrush, lapwing, yellowhammer) and none were local status species. The habitats that comprise the Habitat Areas within the Quadrat are assessed as being of medium value for birds, comprising arable fields boarded by native species-rich hedgerows and stonewalls with the Burn of Muchalls (dominated by semi-natural wet woodland in the east, young mixed plantation woodland in the west and naturalised planted mixed woodland, species rich hedgerow and marshy grassland vegetation) bisecting the Quadrat from west to east (Table 12). The breeding assemblage found in Quadrat FL-Bb04 is considered to enrich the biodiversity resource within the county context and therefore is considered to be of county ecological value.

Section FL3

4.2.13 Three SOVs (Cookney, Harecraig and Stranog Hill) and four Quadrats (FL-Bb05 - FL-Bb08) are located within Section FL3 and are evaluated below.

Cookney SOV (including all or parts of Habitat Area F17)

4.2.14 The breeding bird assemblage recorded in this SOV is considered to be of medium diversity, with 18 breeding bird species of which none were WCA1i species, six were JNCC Red List species (linnet, reed bunting, starling, skylark, song thrush, yellowhammer), four were JNCC Amber List species (dunnock, meadow pipit, lesser redpoll, oystercatcher*), four were UK BAP species (linnet, reed bunting, skylark, song thrush), five were LBAP species (linnet, reed bunting, skylark, song thrush, yellowhammer) and none were local status species. One of the species (oystercatcher*) was recorded as an incidental and thus the total number of species presented here differs from the total given in the baseline. The habitats that comprise the Habitat Areas within the Quadrat are assessed as being of medium value for birds, comprising a large mosaic of marsh / marshy

grassland with areas of patchy gorse scrub together with three large stands of willow carr woodland (Table 13). The breeding assemblage found in this SOV is considered to enrich the biodiversity resource within the county context and therefore is assessed to be of county ecological value.

Harecraig SOV (including all or parts of Habitat Area F19)

4.2.15 The breeding bird assemblage recorded in this SOV is considered to be of medium diversity, with 22 breeding bird species of which none were WCA1i species, six were JNCC Red List species (linnet, reed bunting, skylark, starling, yellowhammer, song thrush), five were JNCC Amber List species (dunnock, goldcrest, meadow pipit, willow warbler, lesser redpoll), four were UK BAP species (linnet, reed bunting, skylark, song thrush), five were LBAP species (linnet, reed bunting, skylark, yellowhammer, song thrush) and none were local status species. The habitats that comprise the Habitat Areas within the Quadrat are assessed as being of high value for birds, comprising patchy alder, willow and birch scrub / woodland on an area of marsh / marshy grassland with patches of wet heath vegetation and gorse scrub (Table 13). The breeding assemblage found in this SOV is considered to enrich the biodiversity resource within the county context and therefore is assessed to be of county ecological value.

Stranog Hill SOV (including all or parts of Habitat Areas F22 and F23)

4.2.16 The breeding bird assemblage recorded in this SOV is considered to be of low diversity, with 15 breeding bird species of which none were WCA1i species, three were JNCC Red List species (linnet, reed bunting and skylark), three were JNCC Amber List species (dunnock, meadow pipit and willow warbler), three were UK BAP species (linnet, reed bunting and skylark), three were LBAP species (linnet, reed bunting and skylark) and none were local status species. The habitats that comprise the Habitat Areas within the SOV are assessed as being of high value for birds, comprising of improved grassland, heathland and dense scrub (Table 13). The breeding assemblage found in this SOV is considered to enrich the biodiversity resource within the county context and therefore is assessed to be of county ecological value.

Quadrat FL-Bb05 (including all or parts of Habitat Areas FL16, FL17, FL18 and F19)

4.2.17 The breeding bird assemblage recorded in this Quadrat is considered to be of medium diversity, with 23 breeding bird species of which none were WCA1i species, eight were JNCC Red List species (house sparrow, linnet, reed bunting, starling, song thrush, yellowhammer, skylark, tree sparrow*), three were JNCC Amber List species (curlew, meadow pipit, lesser redpoll), five were UK BAP species (linnet, reed bunting, skylark, song thrush, tree sparrow*), five were LBAP species (linnet, reed bunting, curlew, yellowhammer, tree sparrow*) and none were local status species. One of the species (tree sparrow) was recorded as an incidental and thus the total number of species presented here differs from the total given in the baseline. The habitats that comprise the Habitat Areas within the Quadrat are assessed as being of high value for birds, comprising a mosaic of wet and dry heath with bog pools, scrub/wet woodland, gorse scrub and areas of improved grassland and arable farmland (Table 13). The breeding assemblage found in Quadrat FL-Bb05 is considered to enrich the biodiversity resource within the local context and therefore is considered to be of county ecological value.

Quadrat FL-Bb06 (including part of Habitat Area FL18)

4.2.18 The breeding bird assemblage recorded in this Quadrat is considered to be of medium diversity, with 24 breeding bird species of which one were WCA1i species, five were JNCC Red List species (linnet, starling, song thrush, yellowhammer, skylark), seven were JNCC Amber List species (dunnock, oystercatcher, stock dove, swallow, willow warbler, lesser redpoll, meadow pipit), three was a UK BAP species (linnet, skylark, song thrush), two were LBAP species (linnet, yellowhammer) and none were local status species. The habitats that comprise the Habitat Areas within the Quadrat are assessed as being of medium value for birds, comprising predominantly improved grassland and arable farmland with areas of marshy grassland and patches of scattered and occasionally continuous scrub (Table 13). The breeding assemblage found in Quadrat FL-Bb06 is considered to enrich the biodiversity resource within the county context and therefore is considered to be of local ecological value.

Quadrat FL-Bb07 (including all or parts of Habitat Areas F20, F21, F22 and F23)

4.2.19 The breeding bird assemblage recorded in this Quadrat is considered to be of medium diversity, with 21 breeding bird species of which none were WCA1i species, five were JNCC Red List species (linnet, reed bunting, song thrush, yellowhammer, skylark), four were JNCC Amber List species (curlew, snipe, meadow pipit, willow warbler), four were UK BAP species (linnet, reed bunting, skylark, song thrush), five were LBAP species (linnet, reed bunting, curlew, snipe, yellowhammer) and none were local status species. The habitats that comprise the Habitat Areas within the Quadrat are assessed as being of high value for birds, comprising a dry heath/acid grassland mosaic with frequent scrub, grading to rush pasture and improved agricultural fields with pockets of scrub (Table 13). The breeding assemblage found in Quadrat FL-Bb07 is considered to enrich the biodiversity resource within the county context and therefore is considered to be of county ecological value.

Quadrat FL-Bb08 (including all or parts of Habitat Area F26)

4.2.20 The breeding bird assemblage recorded in this Quadrat is considered to be of medium diversity, with 24 breeding bird species of which none were WCa1i species, five were JNCC Red List species (linnet, reed bunting, skylark, song thrush, yellowhammer), six were JNCC Amber List (dunnock, goldcrest, mistle thrush, meadow pipit, willow warbler, lesser redpoll), four were UK BAP species (linnet, reed bunting, skylark, song thrush), five were LBAP species (linnet, reed bunting, skylark, song thrush, yellowhammer) and none were local status species. The habitats that comprise the Habitat Areas within the Quadrat are assessed as being of medium value for birds, comprising improved fields and a large area of marshy grassland (Table 13). The breeding assemblage found in Quadrat FL-Bb08 is considered to enrich the biodiversity resource within a local context and therefore is considered to be of local ecological value.

Table 14 – Summary Evaluation of Breeding Bird Assemblages and Habitats: SOVs and Quadrats

SOV / Quadrat	Habitat Area Contributing to the Value of the Quadrat / SOV	Value of Habitats for Breeding Birds	Total Number of Breeding Bird Species Recorded in SOV / Quadrat	Legal / Conservation Status of key bird species (Breeding, Possibly Breeding, Non Breeding and Incidentals)							Value of Breeding Bird Assemblage
				EU Birds Directive Annex	WCA1i	JNCC Red List	JNCC Amber List	UK BAP	LBAP	Local Status (Uncommon / Rare)	
Section FL1											
Limpet Burn SOV	F7	High	27	-	-	bullfinch linnet song thrush yellowhammer	dunnock goldcrest meadow pipit redstart willow warbler lesser redpoll sand martin	bullfinch linnet song thrush	bullfinch linnet song thrush yellowhammer	-	**County**
Kempstone Hill SOV	F9	Medium	14	-	-	linnet song thrush yellowhammer bullfinch starling	dunnock meadow pipit willow warbler mistle thrush swallow	linnet song thrush bullfinch	linnet song thrush yellowhammer bullfinch	-	**Local**
South Fishermyre SOV	F7	High	21	-	-	grasshopper warbler reed bunting song thrush yellowhammer skylark house sparrow	cuckoo dunnock mistle thrush meadow pipit willow warbler curlew swallow	reed bunting song thrush skylark	reed bunting song thrush yellowhammer grasshopper warbler curlew skylark	grasshopper warbler	**County**
Quadrat FL-Bb01	F1 F2 F3	Low	14	-	-	house sparrow skylark song thrush yellowhammer*	oystercatcher stock dove*	skylark song thrush	skylark song thrush yellowhammer*	-	**Less than local**
Quadrat FL-Bb02	F6 F7 F8	Low	12	-	-	yellowhammer bullfinch	willow warbler goldcrest oystercatcher	bullfinch	yellowhammer bullfinch	-	**Less than local**

SOV / Quadrat	Habitat Area Contributing to the Value of the Quadrat / SOV	Value of Habitats for Breeding Birds	Total Number of Breeding Bird Species Recorded in SOV / Quadrat	Legal / Conservation Status of key bird species (Breeding, Possibly Breeding, Non Breeding and Incidentals)							Value of Breeding Bird Assemblage
				EU Birds Directive Annex	WCA1i	JNCC Red List	JNCC Amber List	UK BAP	LBAP	Local Status (Uncommon / Rare)	
Section FL2											
North Fishermyre SOV	F12	High	27	-	-	linnet skylark yellowhammer reed bunting song thrush grasshopper warbler	meadow pipit willow warbler lesser redpoll oystercatcher swallow curlew* cuckoo	linnet skylark reed bunting song thrush	linnet skylark yellowhammer reed bunting song thrush curlew* grasshopper warbler	-	**County**
Quadrat FL-Bb03	F8 F10 F12 F13	High	9	-	-	grey partridge skylark yellowhammer starling	curlew meadow pipit	grey partridge skylark	grey partridge skylark yellowhammer curlew	-	**County**
Quadrat FL-Bb04	F13 F15 F16	Medium	28	-	-	house sparrow song thrush skylark yellowhammer starling	dunnock goldcrest lapwing oystercatcher swallow willow warbler herring gull house martin mute swan sand martin	song thrush skylark	song thrush lapwing yellowhammer	-	**County**

SOV / Quadrat	Habitat Area Contributing to the Value of the Quadrat / SOV	Value of Habitats for Breeding Birds	Total Number of Breeding Bird Species Recorded in SOV / Quadrat	Legal / Conservation Status of key bird species (Breeding, Possibly Breeding, Non Breeding and Incidentals)							Value of Breeding Bird Assemblage
				EU Birds Directive Annex	WCA1i	JNCC Red List	JNCC Amber List	UK BAP	LBAP	Local Status (Uncommon / Rare)	
Section FL3											
Cookney SOV	F17	Medium	18	-	-	linnet reed bunting starling skylark song thrush yellowhammer	dunnock meadow pipit lesser redpoll oystercatcher	linnet reed bunting skylark song thrush	linnet reed bunting skylark song thrush yellowhammer	-	**County**
Harecraig SOV	F19	High	22	-	-	linnet reed bunting skylark starling yellowhammer song thrush	dunnock goldcrest meadow pipit willow warbler lesser redpoll	linnet reed bunting skylark song thrush	linnet reed bunting skylark yellowhammer song thrush	-	**County**
Stranog Hill SOV	F22 F23	High	15	-	-	skylark reed bunting linnet	willow warbler meadow pipit dunnock	skylark reed bunting linnet	skylark reed bunting linnet	-	**County**
Quadrat FL-Bb05	F16 F17 F18 F19	High	23	-	-	house sparrow linnet reed bunting starling song thrush yellowhammer skylark tree sparrow*	curlew meadow pipit lesser redpoll swallow	linnet reed bunting skylark song thrush tree sparrow*	linnet reed bunting curlew yellowhammer tree sparrow*	-	**County**

SOV / Quadrat	Habitat Area Contributing to the Value of the Quadrat / SOV	Value of Habitats for Breeding Birds	Total Number of Breeding Bird Species Recorded in SOV / Quadrat	Legal / Conservation Status of key bird species (Breeding, Possibly Breeding, Non Breeding and Incidentals)							Value of Breeding Bird Assemblage
				EU Birds Directive Annex	WCA1i	JNCC Red List	JNCC Amber List	UK BAP	LBAP	Local Status (Uncommon / Rare)	
Quadrat FL-Bb06	F18	Medium	24	-	-	linnet starling song thrush yellowhammer skylark	dunnock oystercatcher stove dove swallow willow warbler lesser redpoll meadow pipit	Linnet skylark Song thrush	Linnet yellowhammer	-	**Local**
Quadrat FL-Bb07	F20 F21 F22 F23	High	21	-	-	linnet reed bunting song thrush yellowhammer skylark bullfinch	curlew snipe meadow pipit willow warbler wood warbler	linnet reed bunting skylark song thrush bullfinch	linnet reed bunting curlew snipe yellowhammer	-	**County**
Quadrat FL-Bb08	F26	Medium	24	-	-	linnet reed bunting skylark song thrush yellowhammer	dunnock goldcrest mistle thrush meadow pipit willow warbler lesser redpoll stock dove	linnet reed bunting skylark song thrush	linnet reed bunting skylark song thrush yellowhammer	-	**Local**

4.3 Evaluation of Habitat Areas

Section FL1

4.3.1 An evaluation of Habitat Areas within Section FL1 is presented in Table 15.

Table 15 – Evaluation of Habitat Areas for Section FL1

Habitat Area	Habitat Value	Habitat Description	Value of Breeding Bird Assemblage
F1	Low	Series of agricultural fields with scattered scrub. A railway line runs through the area; however this is characterised by scattered scrub, rank grassland and tall ruderals.	Habitats within the area were partially sampled by Quadrat FQ1, which is considered to be representative of F1 and therefore likely to support a similar breeding bird assemblage. **Less than local**
F2	Low	Large expanse of south sloping agricultural fields. Broadleaved shelter belts between fields and the road can be relatively species rich and, in some cases, of semi-natural status (though derived from plantation).	Habitats within the area were partially sampled by Quadrat SQ1, which is considered to be representative of F2 and therefore likely to support a similar breeding bird assemblage. **Less than local**
F3	Medium	Very large arable fields with a small occasional scattered scrub. A species rich arable border is present around some of the fields. Dwelling houses with tree surrounds are present to the south.	Habitats within the area were partially sampled by Quadrat FL-Bb01, which is considered to be representative. The habitats within F3 are more diverse and therefore the breeding assemblage is likely to be correspondingly more diverse. **Local**
F4	Medium	Small pocket of reasonably mature plantation woodland.	Habitats within the area were not sampled by either quadrat or SOV, although F6 is considered to be representative. The habitat within F4 is more diverse and therefore the breeding assemblage is likely to be correspondingly more diverse. **Local**
F5	Medium	Semi-natural broad-leaved woodland co-dominated by rowan and birch. The woodland near to Coneyhatch Farm is comprised of similar species, but goat willow is co-dominant with birch in that area.	Composed of a similar habitat mosaic to Limpet Burn SOV but is less diverse in terms of habitats and therefore is likely to support less diverse breeding assemblage. **Local**
F6	Low	Mature conifer plantation dominated by Sitka spruce. A small burn runs through the upper portion, which connects to the richer HA F7.	Habitats within the area were sampled by Quadrat FL-Bb02, which is considered to be representative of the surrounding area and therefore it is likely to support a similar breeding bird assemblage. **Less than local**
F7	High	Mosaic of semi-natural communities lining the heavily vegetated Limpet Burn. Communities include a dense marsh with scattered willow, birch woodland, dense bracken and continuous gorse scrub.	The majority of habitats within the area are composed from Limpet Burn SOV and therefore it is likely to support a similar breeding bird assemblage. **County**
F8	Low	Series of arable and improved fields, with occasional marshy grassland and scattered and continuous scrub along field borders.	Habitats within the area were partially sampled by Quadrat FL-Bb02 and FL-Bb03, which are both considered to be representative. The habitats within F8 are less diverse and therefore the breeding assemblage is likely to be correspondingly less diverse. **Local**
F9	Medium	A large area if gorse scrub-acid grassland mosaic with some dry heath	The majority of habitats within the area are composed from Kempstone Hill SOV and therefore it is likely to support a

Habitat Area	Habitat Value	Habitat Description	Value of Breeding Bird Assemblage
		vegetation.	similar breeding bird assemblage. **Local**
F10	Medium	A large area of gorse scrub-acid grassland mosaic with some dry heath vegetation.	The majority of habitats within the area are composed from South Fishermyre SOV and therefore it is likely to support a similar breeding bird assemblage. **County**
F11	Medium	A mix of semi-natural broadleaved birch wood towards the edge with road, combined with dense continuous gorse scrub. Behind the birch wood is a Scots pine conifer plantation, with acid grassland underneath and beyond. The hill to the north is composed of semi-improved neutral grassland.	Composed of a similar habitat mosaic to South Fishermyre and Limpet Burn SOV and therefore is less likely to support a similar breeding assemblage. **County**

4.3.2 An evaluation of Habitat Areas within Section FL2 is provided in Table 16.

Table 16 – Evaluation of Habitat Areas for Section FL2

Habitat Area	Habitat Value	Habitat Description	Value of Breeding Bird Assemblage
F12	High	The majority of this area is dominated by dry heath. The north and north west is lined with dense gorse scrub. Mixed semi-natural woodland is present towards the south west with scattered pockets of willow dominated wet woodland ranging across the south. Marsh is present in the environs of the wet woods.	The majority of habitats within the area are composed of North Fishermyre SOV and also sampled by Quadrat FL-Bb03 and is therefore likely to support a similar breeding bird assemblage. **County**
F13	Low	This area is comprised of agricultural land that is predominantly improved grassland or grasses cropped for silage. There are small areas of mature mixed plantation woodland and shelter belts throughout that are co-dominated by beech and Scots pine and occasional patches of dense gorse scrub.	Habitats within the area were partially sampled by Quadrat FL-Bb03 and FL-Bb04, where some habitat was considered to be representative. The habitats within F13 are less diverse and therefore the breeding assemblage is likely to be correspondingly less diverse. **Local**
F14	Low	A small area comprised of bare ground and arable fields the east and acid grassland mosaic with patches of dense scrub and improved grassland to the west.	Habitats within F14 were not sampled by either a SOV or Quadrat. However, the habitats within F13 are similar to habitats occurring within part of Quadrat FL-Bb04, which is considered to be representative of the surrounding area. The habitats within F14 are less diverse and therefore the breeding assemblage is likely to be correspondingly less diverse. **Local**
F15	High	Riparian habitat surrounding the Burn of Muchalls. This varied riparian zone includes semi-natural wet woodland consisting of rowan, alder and willow in the eastern section with young mixed plantation woodland in the western section that consists of Scots pine, birch, rowan, hazel, whitebeam, a number of willow species, bird cherry and wild cherry.	Habitats within the area were partially sampled by Quadrat FL-Bb04, which is considered to be representative of F15. Therefore, it is likely to support a similar breeding bird assemblage. **County**
F16	Medium	This Habitat Area is predominantly agricultural land consisting of improved pasture and cropped silage. The management of the area has however been sympathetic and there are many newly planted hedgerows and rows and groups of standards trees. Mature Scots pine and beech line many of the lanes in the area and shelter belts comprised of	Habitats within the area were partially sampled by Quadrat FL-Bb04 and Quadrat FL-Bb05, where some habitats were considered to be representative. The habitats within F16 are less diverse and therefore the breeding assemblage is likely to be correspondingly less diverse.

Habitat Area	Habitat Value	Habitat Description	Value of Breeding Bird Assemblage
		these species are frequent throughout the landscape.	**Local**

Section FL3

4.3.3 An evaluation of Habitat Areas within Section FL3 is provided in Table 17.

Table 17 – Evaluation of Habitat Areas for Section FL3

Habitat Area	Habitat Value	Habitat Description	Value of Breeding Bird Assemblage
F17	Medium	This is an area with patches of bog and heath, characterised by hare's tail cotton grass humps with abundant heather and common cotton grass dominant in the bog pools. The moss species in this area are predominantly *Sphagnum*. There are also areas of wet and dry heath throughout this habitat consisting of heather, cross leaved heath, crowberry, bilberry and occasional purple moor grass. Here *Sphagnum* is not a major constituent.	Habitats within the area were partially sampled by Cookney SOV and therefore F17 is likely to support a similar or more diverse breeding bird assemblage. **County**
F18	Medium	Large area of predominantly improved grassland but also occasional arable farms. Marshy grassland is present though rare. Scrub is present throughout the habitat, usually scattered around field edges and boundaries, however dense pockets of continuous gorse scrub are also present.	Habitats within the area were partially sampled by Quadrat FL-Bb05 where some habitats were considered representative. The habitats within F18 are less diverse and therefore the breeding assemblage is likely to be correspondingly less diverse. **Local**
F19	High	Patchy alder, willow and birch scrub/ woodland on an area of marsh/marshy grassland. There are patches of wet heath vegetation and gorse scrub.	Habitats within the area were partially sampled by Harecraig SOV which is similar in composition in terms of habitats. Therefore, likely to support a similar breeding bird assemblage. **County**
F20	Medium	Series of improved agricultural fields with occasional pockets if scattered scrub, notably within the vicinity of both new and established dwelling houses.	Habitats within the area were partially sampled by Quadrat FL-Bb07 where some habitats were considered representative. The habitats within F20 are less diverse and therefore the breeding assemblage is likely to be correspondingly less diverse. **Local**
F21	Medium	The habitats grade from soft rush dominated improved fields in the north to a dry heath/acid grassland mosaic dominated by wavy-hair grass and ericoids, plus cotton grasses in the south. Scrub is frequent and is particularly invasive within the dry heath habitat.	Habitats within the area were partially sampled by Quadrat FL-Bb07 where some habitats were considered representative. The habitats within F21 are less diverse and therefore the breeding assemblage is likely to be correspondingly less diverse. **Local**
F22	Medium	A series of improved fields. Soft rush is prominent in the mid-section, whilst scattered and dense gorse scrub is the distinguishing feature in the north and an area of dry heath/acid grassland mosaic splitting the two areas of improved fields.	Habitats within the area were partially sampled by Quadrat FL-Bb07 and Stranog SOV where some habitats were considered representative. The habitats within F22 are less diverse and therefore the breeding assemblage is likely to be correspondingly less diverse. **Local**
F23	Medium	Dry heath/acid grassland mosaic on level area of ground. Grassland dominates overall with scattered shrub occasional. Patches of wet heath leading onto bog are also present.	Habitats within the area were partially sampled by Stranog SOV which is considered to be representative of F23. Therefore, it is likely to support a similar breeding bird assemblage. **County**

Habitat Area	Habitat Value	Habitat Description	Value of Breeding Bird Assemblage
F24	High	Wet modified bog is the dominant habitat, this being of a higher value in the western section. The eastern section of this area is more modified, containing areas of dry heath, wet birch woods and scattered broadleaves and conifers. A small vegetated burn is present with a pool of standing water. Synthetic tracks are present within this area.	Habitats within the area were not sampled by either a SOV or Quadrat but are similar in composition to habitats represented by Quadrat FL-Bb053, which is considered to be representative. Therefore F24 is likely to support a similar breeding bird assemblage. **County**
F25	Medium	An area of young mixed plantation woodland underlain by dry heath / acid grassland mosaic similar to that of F24.	Habitats within the area were not sampled by either a SOV or Quadrat. Similar in composition to habitats represented by F6 which is considered to be representative. The habitats within F25 are more diverse and therefore the breeding assemblage is likely to be correspondingly more diverse. **Local**
F26	Medium	Dominated by improved fields, scrub is rare but marshy grassland is present to the west of Burnhead.	Habitats within the area were sampled by Quadrat FL-Bb08, which is considered to be representative. Therefore it is likely to support a similar breeding bird assemblage. **Local**
F27	Medium	Mesotrophic semi-improved grassland is dominant to the south, giving way to improved fields with abundant gorse scrub.	Habitats within the area were not sampled by either a SOV or Quadrat. Similar in composition, although less diverse to habitats represented by Quadrat FL-Bb04, which are considered representative. The habitats within F27 are less diverse and therefore the breeding assemblage is likely to be correspondingly less diverse. **Local**

5 Potential Impacts

5.1 Introduction

5.1.1 The following issues associated with road construction and operation of the proposed scheme are set out following the Design Manual for Roads and Bridges (DMRB) guidelines and recommendations (Highways Agency, 2001).

5.1.2 The following assessment addresses the potential impacts (in the absence of mitigation) on breeding birds. Potential impacts associated with construction and operation of the proposed scheme on breeding bird assemblages are likely to include: direct mortality, habitat loss, habitat fragmentation/isolation, disturbance (in particular during the bird breeding season) and pollution/other indirect impacts.

5.1.3 It should be noted that the potential impacts outlined above frequently interact (i.e. habitat loss during construction can potentially result in disturbance and habitat fragmentation) and the resulting combination of impacts may through synergistic effects significantly increase the adverse impact of the proposed scheme (Luell et al., 2003). Furthermore, impacts associated with the operational phase of the scheme are considered to be permanent, whereas temporary impacts, which are only apparent while the road is being built, are discussed in association with the construction phase.

5.2 General

5.2.1 The following comprises a description of the types of potential impacts that would occur during construction and operation of the proposed scheme.

Direct Mortality

Construction

5.2.2 Direct mortality of adult birds, their eggs and un-fledged/fledged young during road construction is directly linked to pre-construction habitat loss and disturbance.

5.2.3 Habitat loss resulting from clearance of vegetation prior to construction is unlikely to result in direct mortality of adults and/or sufficiently fledged young since they are able to escape by moving into unaffected adjacent habitats. Birds' eggs and un-fledged young however are vulnerable to direct mortality impacts associated with habitat loss with species located in denser habitats, such as dense scrub, grassland or woodland being the most affected as the nests cannot be easily detected by contractors.

5.2.4 Disturbance could result in direct mortality due to the presence of workers / construction activities which may cause a lack of breeding success if adult birds are not able to spend sufficient time incubating eggs to tending dependant young.

5.2.5 Direct mortality of bird eggs and young (from habitat loss and disturbance) is most likely to occur during the breeding season, typically March to July, and would constitute a prosecutable offence under the WCA (in particular for those species listed within Schedule 1 of the Act).

Operation

5.2.6 Many bird species will attempt to cross active roads to move between habitat fragments that arise as a direct result of operational habitat fragmentation and isolation and the barrier effects that road development imposes on species movement (Salter, 1994).

5.2.7 High mortality rates associated with operational roads reduces the exchange of bird populations between habitats and thus increases isolation effects, demonstrating the link between mortality and barrier effects caused by fragmentation (Van Apeldoorn, 1995). While there is no data available for

the numbers of birds killed on roads in Scotland, a review undertaken by Slater (1994) estimated that a total of 653,000 and 7,000,000 birds per annum were killed on Dutch and Bulgarian roads.

5.2.8 An increase in direct mortality resulting from habitat fragmentation associated with an increase in number of roads and road traffic within the UK has been highlighted as a major component in the decline of some bird species such as the barn owl (a WCA Schedule 1 species). It has been observed that twice as many barn owls are now killed by road traffic (an estimated 5,000 individuals per annum) on UK roads as compared with the 1950's and in some areas suitable habitat no longer supports barn owl populations (English Nature, 1996).

5.2.9 Roads can also create unexpected sources of mortality, for example, there have been several documented cases of bird mortality from road salt. Finches, in particular, are attracted to salt, probably to satisfy a dietary need. This can cause mortality through vehicle collision and also through the toxic effects of the ingested salt (Mineau and Brownlee, 2005).

5.2.10 In contrast, some bird species actively benefit from living near roads such as certain members of the corvid family, for example magpie and carrion crow, which regularly scavenge on road kills (Slater, 1994) and common kestrel, which hunt for small rodents along suitable roadside verges. However, none of these species are considered to be species of conservation concern.

5.2.11 The proposed scheme would constitute a new off-line road through a range of habitats where no comparable road exists and is likely to result in an increase in mortality (in addition to fragmentation and isolation – refer to paragraph 5.2.21) of both adult and juvenile birds (with the greatest hazard presented to juvenile birds) through road traffic accidents (RTAs) and is most likely to occur where birds do not have time to avoid road traffic traveling at speed. RTAs typically occur where woodland or scrub habitats are located immediately adjacent to busy roads and it likely that low flying bird species (e.g. members of the thrush family, owls and game birds) would be the greatest affected.

Habitat Loss

Construction and Operation

5.2.12 The direct impact of road construction is the physical loss of breeding and foraging habitats along a route corridor, which are replaced or altered by transport infrastructure. The impacts associated with direct habitat loss are additionally increased by the interaction of disturbance and fragmentation/ isolation impacts (refer to paragraphs 5.2.21 and 5.2.26) which if combined, can lead to a change in the distribution of species within a route corridor or wider study area (Luell et al., 2003).

5.2.13 Pre-construction habitat clearance would result in the destruction of potential breeding habitat for bird species. Cumulative impacts are also likely to arise as a consequence of the destruction of birds' eggs and direct mortality of un-fledged young (refer to paragraph 5.2.2) and the displacement of adults and fledglings by means of disturbance (refer to paragraph 5.2.26) into adjacent un-affected habitat.

5.2.14 Habitat clearance would additionally result in the direct loss of foraging habitat through the loss of plant food groups such as buds or berries and the indirect loss of invertebrate communities, which form a major dietary constituent for the majority of small to medium sized bird species (e.g. blue tit or song thrush).

5.2.15 Removal / clearance of surrounding vegetation and/or buildings (which may or may not provide nesting sites) may possibly alter the available shelter for breeding birds increasing vulnerability to a range of external factors such as adverse conditions and/or predators.

5.2.16 The total amount of landtake required in order to construct the Fastlink of the proposed scheme is estimated at approximately 1.20km2 / 120ha. Table 18 shows the estimated total pre-construction and post-construction areas of Phase 1 Habitats present within the proposed land-take. The post-construction figures take account of both anticipated habitat loss to construction and habitat created or changed as a result of mitigation.

Table 18 – Phase 1 Habitat Areas Pre and Post Construction

Phase 1 Habitat Description	Phase 1 Habitat Categories within proposed scheme land-take	
	Pre-construction (ha)	Post-construction (ha)
Woodland mixed plantation	2.46	13.23
Woodland broadleaved plantation (including standard trees)	0.10	0.78
Woodland broadleaved semi-natural	2.11	0.55
Woodland coniferous plantation	1.28	0.31
Scattered scrub	0.59	1.20
Dense continuous scrub	3.58	7.17
Riparian woodland	0	3.37
Acid grassland semi-improved	0.15	0.13
Acid grassland unimproved	0.40	0.19
Improved grassland	46.29	26.39
Marshy grassland	5.21	2.87
Neutral grassland semi-improved	0.26	0.21
Poor semi-improved grassland	2.96	1.51
Disturbed amenity grassland	0.83	0.37
Arable	49.21	19.64*
Built up areas (buildings)	0.49	0.49
Fen	3.87	1.41
Heath - acid grassland dry mosaic	1.88	1.67
Total	**121.67**	**81.49**

**Figure assumes all potential return to agriculture is achieved.*

5.2.17 Habitat loss associated with the construction and use of site compounds and other temporary structures, for example, access tracks, bridges or storage areas would result in the temporary loss of potential breeding bird habitat, the effects of which are described above. It should be noted however that the level of permanence (in term of loss) would vary and is dependant on location(s), which are currently unknown at this stage.

5.2.18 Aside from the permanent habitat loss described above, no significant additional habitat loss within the route corridor associated with operation of the proposed scheme is envisaged, with the possible exception of occasional routine operational management of roadside habitats (comprising mowing of verges or trimming of scrub/trees).

5.2.19 Operation of the proposed scheme could result in a reduction in the abundance of invertebrate communities within the immediate vicinity of the proposed scheme, in particular as a result of pollution. Pollution may include road salting, oil and fuel spillage, resulting in an indirect impact to bird populations through a reduction in food availability.

5.2.20 In addition, indirect habitat loss (i.e. habitat degradation) can occur in areas adjacent to the proposed road, where an increase in noise and pollution from the traffic using the road can lead to birds moving out of the area and rendering potentially suitable habitat as unsuitable for breeding bird populations (refer to paragraph 5.2.28). Studies undertaken in the Netherlands demonstrated that around 60% of species exhibited reduced breeding densities close to roads with the distance over which the effect was measurable varying depending on how busy the roads were (Reijnen and Foppen, 1994; and 1995b). The research observed that very busy roads (up 60,000 vehicles per

day) affected breeding birds up to 2.9km away with less busy roads (up to 10,000 vehicles per day) affecting birds up to 1.5km from the road. It is likely that the proposed scheme would result in significant disturbance to breeding birds in adjacent unaffected habitats during periods of peak traffic flow. Breeding bird species affected could potentially include buzzard, woodcock, cuckoo, woodpeckers, tree pipit, goldcrest, chaffinch and warblers (wood and willow warbler) with significantly lower breeding success (or complete absence) near to the road.

Habitat Fragmentation and Isolation

Construction and Operation

5.2.21 Habitat fragmentation occurs when a road development imposes a barrier to the natural dispersal of animals resulting in disrupted movement across a site (English Nature, 2001).

5.2.22 The loss of contiguous habitat due to fragmentation is now considered to be one of the most important factors in accelerating the reduction in worldwide biodiversity (Wilson, 1992, In: English Nature, 2001).

5.2.23 Previous studies of breeding birds in highly fragmented woodland has shown that greater number of species were recorded in larger areas of woodland but that factors such as available hedgerows within 0.5km of the woodland and species composition of the woodland were significant contributors to the variation in the number of breeding birds. The research also found that local species extinctions were more pronounced in smaller woods than in larger areas of woodland (Hinsley et al., 1992 In: English Nature, 2001).

5.2.24 English Nature (1994) reports that the habitats most likely to be affected by fragmentation are woodland, heathland and species-rich grassland and bird species which move between habitats in order to maintain genetic diversity and avoid inter-breeding are the most affected. The ability to use fragmented habitats varies according to species with greater impacts on those species less able to cross gaps. Some bird species such as the great spotted woodpecker are not significantly affected by fragmentation and easily cross gaps between pockets of woodland. However, other species (e.g. cuckoo) will not live within several hundred meters of a road. While the barrier effect imposed by the proposed scheme to birds is difficult to assess due to it being variable between species, as a general rule, the busier and wider the road the more effective barrier it is to dispersion (English Nature, 2001).

5.2.25 With respect to the above research, in the absence of appropriate mitigation the proposed scheme is likely to constitute a significant dispersion barrier between habitats which could have the ability to adversely impact a range breeding bird species, some of which may not normally be significantly impacted by habitats gaps.

5.2.26 Construction of the proposed scheme is likely to have significant fragmentation and isolation impacts on bird populations within the survey corridor through the severing and subsequent isolation of bird populations within pre-existing habitats. This fragmentation and isolation would have an adverse impact on local bird populations through a reduction in dispersal and subsequent isolation of species, which could potentially result in a reduction in population sizes. The extent of these impacts is likely to be dependent on the size of the isolated area of habitat and the species affected, as the ability to avoid genetic isolation and localised extinctions by moving between fragmented habitats varies between bird species.

5.2.27 Operation of the proposed scheme is also likely to have significant fragmentation and isolation impacts on bird populations through a restriction in dispersal and movement of species between habitats (fragmented by construction) resulting from direct mortality, habitat loss associated with minimal operational maintenance and noise and vibration disturbance. The continued fragmentation and isolation of bird species within severed habitats could have a detrimental effect on species population dynamics and ultimately population viability.

Disturbance

Construction

5.2.28 Disturbance resulting from noise and vibration associated with construction of the proposed scheme would occur in two stages. The first stage would comprise disturbance resulting from pre-construction habitat clearance. The second stage would comprise both direct disturbance (for example, from rock chipping or possible blasting) and indirect disturbance (for example, human activity associated with construction of the proposed scheme). Both direct and indirect disturbance are likely to contribute to an increase in the effects of fragmentation and isolation. Should either form of disturbance reach a level considered to be significant, it may lead to some species of bird failing to nest1 during the breeding season.

5.2.29 The location of temporary site compounds/offices (which may be operational 24 hours a day and therefore may require some night work) near sensitive habitats, for example areas of woodland or wetlands, could result in significant disturbance to breeding birds resulting from noise, vibration and light pollution in addition to physical disturbance from the presence of construction workers and heavy plant.

5.2.30 Disturbance resulting from light pollution associated with construction during low light levels in winter/autumn and/or 24-hour construction could result in disturbance to both breeding and non-breeding bird species located within habitats adjacent to the proposed scheme. This could potentially lead to some species of bird failing to breed or completely abandoning their habitats at a local level if the disturbance reaches a significant level. The severity of the impact would vary according to the frequency and magnitude of the disturbance and the species involved.

5.2.31 It should be noted that it is illegal to disturb breeding birds under the WCA (1981), in particular for those species listed within Schedule 1 of the Act.

Operation

5.2.32 Research undertaken by Reijnen et al., (1997) and Reijnen and Foppen (1994) has shown that operational noise is a primary factor in altering the density of bird populations adjacent to roads and highways.

5.2.33 A detailed study on the effects of road traffic noise on breeding bird populations in the Netherlands by Reijnen et al (1995a) observed that roads used for high speed travel reduced the density of breeding birds within adjacent woodland and grassland habitats. Their research additionally noted that the distances at which species were affected varied between species. For example, the greatest sensitivity to disturbance was observed in black-tailed godwits and cuckoo, located 1.13km and 0.9km respectively from the study highway.

5.2.34 Further research undertaken by Reijnen et al (1995b) has shown that road traffic noise accounted for lower densities of 43 songbird species in habitats adjacent to operational roads and that the distance from a motorway at which breeding bird densities were affected was influenced by the intensity and speed of traffic (Reijnen et al., (1995a)).

5.2.35 Other studies have shown that road traffic noise exceeding 50dBA can reduced bird density (40dBA for some woodland species) in adjacent habitats, while in comparison, some bird species appeared unaffected by disturbance but had lower breeding success (Luell et al., 2003).

5.2.36 Light pollution can have adverse impacts on bird species and can affect both breeding and foraging behaviour in a number of species of bird. This impact was first observed by Rawson (1932) who

1 The number of failed nesting attempts will depend on the frequency and magnitude of the disturbance and the species involved.

demonstrated the correlation between critical light levels at dawn and singing in thrushes and suggested that artificial lighting could modify the timing of natural behaviour patterns.

5.2.37 Farner (1964) demonstrated photoperiodic control of reproduction in birds and observed that increasing artificial day length induced hormonal, physiological and behavioural changes initialising breeding. Lofts and Merton (1968) demonstrated photoperiodic control of reproduction in birds, showing that 50 species of wild bird could be brought into breeding condition prematurely by exposure to artificially long days in winter.

5.2.38 Hill (1992) observed that seabirds were disorientated by street lights on cloudy nights and observed that redshank and oystercatchers were observed feeding within 50m of artificial lighting at night, while flocks of dunlin were observed roosting near to a large roundabout lit by flood lighting.

5.2.39 Outen (undated) and Hill (1992) found that nocturnal bird species such as barn owl are sensitive to the presence of bright illumination and that artificial lighting has the potential to provide more feeding time for birds but could have an adverse impact on prey abundance leading to food shortages.

5.2.40 Disturbance resulting from noise and vibration associated with operation of the proposed scheme would be mainly influenced by traffic type, traffic intensity, road surface properties, topography and structure/type of adjacent vegetation, the magnitude and spread of which is in turn influenced by underlying geology and soil characteristics (Luell et al., 2003).

5.2.41 Disturbance during operation of the proposed scheme would result from noise and vibration associated with road traffic, artificial lighting (that will be installed at all major junctions along the proposed scheme) and occasional operational maintenance of the proposed scheme. As with disturbance associated with construction, an increase in traffic noise and lighting could result in sensitive bird species failing to breed or abandoning habitats adjacent to the scheme. This impact may be more pronounced given that the majority of habitats within the route corridor are currently subject to either low or no artificial lighting.

Pollution and Other Indirect Impacts

Construction

5.2.42 Accidental spills of chemicals and other potentially toxic substances during construction of the proposed scheme may occur and are of particular concern if they happen within proximity of ecological sensitive communities or rivers and/or streams (especially if they are designated or form a tributary to a site designated at a national or European level, for example, SSSI or SAC (refer to AWPR Environmental Statement 2007, Chapter 39: Water Environment). The severity and magnitude of the pollution impact would depend on the on the constituents, toxicity to biodiversity and discharge/spill volume of the pollutant in question.

Operation

5.2.43 Pollutants and toxins are derived from road traffic and road surfaces. The exhaust produced by road vehicles contains a number of pollutants ranging from carbon monoxide, nitrogen oxide and sulphur dioxide to hydrocarbons and dioxins, while cars themselves produce a number of heavy metals ranging from lead to cadmium. These chemicals and gases can potentially pollute surface and groundwater, soil and vegetation (Luell et al., 2003).

5.2.44 Research conducted by Ballard and Hacker (1996) has shown that de-icing salt used in the winter to keep roads ice-free can potentially result in the death of seed eating birds such as finches, which consume seeds contaminated by salt. The application of de-icing salt to the proposed scheme during the winter and the indirect pollution of adjacent habitats via vehicle spray could potential result in the death of seed eating bird species foraging in habitats located adjacent to the proposed scheme. It is not possible to estimate the average amount of salt spread and hence potential impact to bird populations as since this is dependant on the rate of salt spread and speed of the

spreader. However, wide verges with varied nut or berry bearing planting are likely to be most impacted.

5.2.45 Accidental spills of chemicals and other potentially toxic substances during operation of the proposed scheme may occur as a consequence of inadvertent discharge or indirectly as a result of road traffic accidents. As with the construction phase, these pollution incidents are of particular concern if they happen within proximity of ecological sensitive communities or rivers and/or streams identified above (refer to AWPR Environmental Statement 2007, Chapter 39: Water Environment).

5.2.46 Impacts on bird populations from vehicle-derived atmospheric pollution are not envisaged. An air quality assessment was undertaken for the route corridor and also for the wider area including the city of Aberdeen (refer to AWPR Environmental Statement 2007, Chapters 44 and 55); findings indicate air quality within the vicinity of the proposed scheme would remain good.

5.2.47 Insufficient research has been undertaken to date regarding the direct impacts that operational roads have on the abundance of invertebrate communities and the indirect impacts on bird species through a reduction in food availability. The only survey conducted to date in the UK was undertaken by the RSPB in 2004. The study observed that in total one invertebrate was killed for every five miles traveled.

Impacts on Key Bird Species

5.2.48 A summary description of impacts on key bird species (WCA1i, JNCC Red List, JNCC Amber List, UK BAP, LBAP and local status species) is shown in Table 19.

Table 18 – Summary Description of Impacts on Bird Species of Conservation Concern

Bird Species	Habitat/s of Value	Impacts
bullfinch	Resident species. Breeds and winters in orchards, parks, woodlands and scrub.	Loss of breeding habitat (woodland and scrub) during operation of the scheme. Disturbance during construction and operation.
corn bunting	Resident species. Breeds and winters in farmland, scrub and grassy areas.	Loss of breeding habitat (farmland; cereal fields and field margins) during the operation of the scheme. Disturbance during construction and operation.
cuckoo	Migrant species. Parasitic breeding species.	Loss of breeding habitat (woodland, hedgerow and scrub) during operation. Disturbance during construction. Disturbance during operation in unlikely to constitute a significant impact.
curlew	Resident species. Breeds on areas of damp moorland and pasture. Winters on estuaries and damp grassland.	Loss of breeding habitat (heathland, pasture and marshy grassland) during operation. Disturbance during construction. Species in the long term is unlikely to be disturbed during operation due to habituated of road traffic.
dunnock	Resident species. Breeds and winters in gardens, parks, woodland, waste ground and hedges.	Loss of breeding habitat (woodland, hedgerow and scrub) during operation. Disturbance during construction. Disturbance during operation is unlikely to constitute a significant impact.
goldcrest	Resident species. Breeds and winters in coniferous woodlands, occurring in deciduous woodland, scrub and even gardens in winter.	Loss of breeding habitat (conifer woodlands) during operation. Disturbance during construction. Disturbance during construction. Disturbance during operation is unlikely to constitute a significant impact.
grasshopper warbler	Migrant species. Breeds in habitats with low thick vegetation, marshland, beside lakes or watercourses, in young conifer plantations or clear felled areas, among tall grass and herbage with scattered bushes.	Loss and fragmentation of breeding riparian habitats (marsh / marshy grassland and areas of wet woodland / scrub) during operation. Disturbance and pollution to wet areas during construction and operation.
grey partridge	Resident species. Breeds and winters on farmland, grassland and arable fields.	Loss and fragmentation of breeding habitat (arable farmland and fields) during operation. Disturbance during both construction and operation. Possible risk of RTAs due to low flight pattern.

Bird Species	Habitat/s of Value	Impacts
herring gull	Resident species. Breeds on rocky coastal edges and more recently, building.	Unlikely to be impacted by loss of breeding habitat or disturbance.
house sparrow	Resident species. Breeds in urban environment, in rood tiles, air ducks, recesses and occasionally trees.	Loss of breeding habitat (buildings and hedgerows). Unlikely to be impacted by disturbance.
lapwing	Resident species. Breeds from the coast to the uplands on marshy areas and farmland. Winters on estuaries and farmland.	Loss and fragmentation of breeding habitat (farmland) during operation. Disturbance, in particular during construction, as species is sensitive to human presence.
lesser black-backed gull	Resident species. Breeds on rocky coastal edges and more recently, building.	Unlikely to be significantly impacted by loss of breeding habitat, fragmentation or disturbance.
linnet	Resident species. Breeds in scrub on moorland, heaths and farmland. Winters in stubble and weedy fields.	Loss of breeding and wintering habitat (farmland and grassland) during operation. Disturbance during construction. Disturbance during operation is unlikely to constitute a significant impact.
meadow pipit	Resident species. Breeds in open country, moors and heaths, coastal meadows, pastures and bogs.	Loss and fragmentation of breeding habitat (grassland, heathland and bog). Disturbance during construction. Disturbance during operation is unlikely to constitute a significant impact.
mistle thrush	Resident species. Breeds in woods, parks, gardens and orchards. Also found in winter in fields and moorland edges.	Loss and fragmentation of breeding habitat (woodland, scrub, gardens, agricultural fields). Disturbance during construction. Disturbance during operation is unlikely to constitute a significant impact. Possible risk of RTAs due to low flight patterns.
mute swan	Resident species. Breeds and winters on lakes, slow flowing rivers and nearby fields.	Disturbance during construction and operation phases. Risk of pollution to waterbodies during construction.
oystercatcher	Resident species. Breeds on grass fields and shingle beside lakes, rivers and seashores. Winters on estuaries, sandy beaches and open fields.	Loss of breeding habitat (farmland and grassland) during operation. Disturbance during construction. Disturbance during operation is unlikely to constitute a significant impact.
redstart	Migrant species. Breeds in woodland, gardens and parks.	Loss and fragmentation of breeding habitat (woodland, scrub, gardens, agricultural fields). Disturbance during construction. Disturbance during operation is unlikely to constitute a significant impact. Possible risk of RTAs due to low flight patterns.
reed bunting	Resident species. Breeds and winters in reedbeds, upland and lowland marshes and farmland. Visits gardens in winter.	Loss, fragmentation and possible pollution of breeding habitat (riparian corridors, marshland and scrub/hedgerows operation) during operation. Disturbance during construction. Disturbance during operation is unlikely to constitute a significant impact.
sand martin	Migrant species. Breeds in riverbanks, lakesides and sandpits. Usually seen over water.	Unlikely to be subject to disturbance other then in proximity of breeding areas. Possible risk of RTAs due to low flight patterns.
skylark	Resident species. Breeds on moorland, farmland, dunes and grassland. Winters on rough grassland, stubble and saltmarsh.	Loss of breeding habitat (arable and grassland) during operation. Disturbance during construction. Disturbance during operation is unlikely to constitute a significant impact.
snipe	Resident species. Breeds in marshes and boggy areas. Winters on salt marshes, coastal lagoons and other marshy areas.	Loss and fragmentation of breeding habitat (marshland and boggy areas) during operation. Disturbance during construction. Disturbance during operation is unlikely to constitute a significant impact. Possible risk of RTAs due to low flight patterns.
snow bunting	Resident species. Breeds in high alpine habitat, in boulder zone of bare mountains.	Unlikely to breed within the route corridor and therefore only subject to disturbance during both construction and operation.
song thrush	Resident species. Breeds and winters in gardens, farmland, woodland and hedges.	Loss and fragmentation of breeding habitat (woodland, scrub, gardens, agricultural fields). Disturbance during construction. Disturbance during operation is unlikely to constitute a significant impact. Possible risk of RTAs due to low flight patterns.

Bird Species	Habitat/s of Value	Impacts
starling	Resident species. Breeds in towns, woods, parks, and on farms. Winters in cities, gardens and farmland.	Loss of breeding habitat (woodland, agricultural land, parks and gardens). Disturbance during construction and operation is unlikely to constitute a significant impact.
stock dove	Resident species. Breeds in wooded areas, forest edges and larger undisturbed parks.	Loss and fragmentation of breeding habitat (woodland and parkland). Disturbance during construction and operation. Possible risk of RTAs due to low flight patterns.
swallow	Migrant species. Breeds mostly in farm buildings. Feeds in the air usually over open country.	Loss and fragmentation of breeding habitat (buildings, in particular, farm out buildings and open fields) during operation. Unlikely to be subject to disturbance. Possible risk of RTAs due to low flight patterns.
tree sparrow	Resident species. Breeds and winters in woodland, farmland and scrub, nesting in holes in trees or buildings.	Loss and fragmentation of breeding habitat (scrub / hedgerows) during operation. Disturbance during construction and operation.
willow warbler	Migrant species. Breeds in thick ground cover in woodland, farmland and scrub.	Loss of breeding habitat (woodland and areas dense scrub) during operation. Disturbance during construction. Disturbance during operation in unlikely to constitute a significant impact.
yellowhammer	Resident species. Breeds and winters in hedgerows and scrub, especially gorse and hawthorn thickets.	Loss and fragmentation of breeding habitat (farmland and grassland) during operation. Disturbance during construction and operation.

5.3 Specific Impacts

Potential Impacts on Habitat Areas

5.3.1 Potential impacts to breeding bird populations throughout Sections FL1 – FL3 during construction and operation of the proposed scheme are likely to include:

- direct mortality;
- direct and in-direct habitat loss;
- habitat severance, fragmentation and isolation;
- disturbance; and
- pollution.

5.3.2 Habitat Areas that would not be affected during construction or operation of the proposed scheme have not been considered as part of this assessment.

5.3.3 A description and assessment of specific impacts is provided in Table 20. With respect to construction and operation and unless otherwise stated in Table 20, the risk of direct mortality (including operational RTAs), fragmentation and disturbance resulting from clearance and loss of low value habitats (arable or improved/amenity grassland) is assessed as being a low negative impact. In comparison, the above impacts resulting from clearance and loss of high value habitats (such as woodland, scrub, unimproved/semi-improved/marshy grassland, heath and bog) is assessed as being a medium negative impact. Pollution to aquatic habitats resulting from accidental spills or surface runoff is assessed as being a medium negative impact. Whereas, pollution to solely terrestrial habitats is assessed as being a low negative impact.

5.3.4 Impacts associated with the location of temporary work compounds cannot be assessed at this stage until the location of temporary work compounds is determined. However, the siting of such compounds will be in cognisance of ecological advice and will be such as to cause minimal impact.

5.3.5 Key bird species identified during surveys and outlined in Table 8 and Table 10 (JNCC Red List, JNCC Amber List, UK BAP and LBAP) likely to be effected by the impacts described above have been inferred through an assessment of the baseline information based on professional judgment.

Section FL1

5.3.6 Nine Habitat Areas and the bird assemblages they support would be affected during construction and operation of the proposed scheme, including: F1, F3, F4, F6, F7, F8, F9, F10 and F12.

5.3.7 Potential construction impacts would include fragmentation/isolation, disturbance and pollution due to accidental spills at Limpet Burn (F7), South Fishermyre (F10) and North Fishermyre (F12). These areas are all assessed as being of county importance for breeding birds. Potential risks are anticipated to be greater at North and South Fishermyre and these impacts have been assessed as medium magnitude and Moderate significance. All other impacts within FL1 are predicted to be between negligible to low negative magnitude and between Negligible and Minor significance because although the impacts may negatively affect the breeding bird assemblage, there will probably be no permanent effect on its integrity and/or key attributes and is unlikely to change its evaluation.

5.3.8 During the operation of the road, there is the potential risk of direct mortality, fragmentation/isolation, disturbance, habitat loss and pollution due to runoff. Limpet Burn, South Fishermyre and North Fishermyre are assessed as having a county ecological value for breeding birds. Operational impacts within these areas have been assessed as medium negative magnitude and Moderate significance. The exception is the potential impacts that have been identified at Limpet Burn, which have been assessed at low negative magnitude (medium magnitude for pollution) and Minor significance. All other impacts within FL1 are predicted to be between negligible to low negative magnitude and between Negligible and Minor significance because although the impacts may negatively affect the breeding bird assemblage, there will probably be no permanent effect on its integrity and/or key attributes and is unlikely to change its evaluation.

Section FL2

5.3.9 Three Habitat Areas and the bird assemblages they support would be affected during construction and operation of the proposed scheme, including: F13, F15 and F16.

5.3.10 Potential construction impacts would include fragmentation/isolation, disturbance and pollution due to accidental spills at the Burn of Muchalls (F15). This area is assessed as being of county importance for breeding birds. Potential impacts from construction activities have been assessed as low negative magnitude and Minor significance. However, the impacts that would result from risk of pollution of watercourses within these areas have been assessed as being of medium negative magnitude and Moderate significance. All other impacts within FL2 are predicted to be between negligible to low negative magnitude and between Negligible and Minor significance because although the impacts may negatively affect the breeding bird assemblage, there will probably be no permanent effect on its integrity and/or key attributes and is unlikely to change its evaluation.

5.3.11 During the operation of the road, impacts from direct mortality, fragmentation/isolation, disturbance, habitat loss and pollution due to runoff have been identified. The Burn of Muchalls is assessed as county ecological value for breeding birds. The potential for operational pollution in both of these areas, as well as direct mortality, fragmentation/isolation, disturbance and habitat loss is predicted to be of medium negative magnitude and Moderate significance. All other impacts within FL2 are predicted to be between negligible to low negative magnitude and between Negligible and Minor significance because although the impacts may negatively affect the breeding bird assemblage, there will probably be no permanent effect on its integrity and/or key attributes and is unlikely to change its evaluation.

Section FL3

5.3.12 Eight Habitat Areas and the bird assemblages they support would be affected during construction and operation of the proposed scheme, including: F18, F19, F20, F21, F22, F23, F25 and F27.

5.3.13 Potential construction impacts would include fragmentation/isolation, disturbance and pollution due to accidental spills at Harecraig (F19) and Stranog Hill (F23). These areas are all assessed as being of county importance for breeding birds. The key potential impacts have been assessed as low magnitude and Minor significance. The exception is the risk from pollution which has been

assessed as being of medium negative magnitude and Minor significance. All other impacts within FL3 are predicted to be between negligible to low negative magnitude and between Negligible and Minor significance because although the impacts may negatively affect the breeding bird assemblage, there will probably be no permanent effect on its integrity and/or key attributes and is unlikely to change its evaluation.

5.3.14 During the operation of the road, impacts from direct mortality, fragmentation/ isolation, disturbance, habitat loss and pollution due to runoff have been identified, particularly at Harecraig and Stranog Hill (both of county importance). The key impacts have been assessed as medium negative magnitude and Minor significance. The exception is the risk of pollution which has been assessed as medium negative magnitude and Moderate significance. All other impacts within FL1 are predicted to be between negligible to low negative magnitude and between Negligible and Minor significance because although the impacts may negatively affect the breeding bird assemblage, there will probably be no permanent effect on its integrity and/or key attributes and is unlikely to change its evaluation.

5.3.15 A description and assessment of potential impacts is provided in Table 20.

Table 20 - Assessment of Potential Impacts

Habitat Area	Evaluation	Phase	Description of Impacts	Impact Magnitude / Significance
Section FL1				
F1	**Less than local**	Construction	Fragmentation/isolation and disturbance due to clearance.	Negligible/Negligible
			Potential for pollution of Megray Burn due to accidental spills.	Low negative/Minor
		Operation	Direct mortality through RTA, fragmentation and isolation, disturbance and habitat loss of riparian habitats	
			Potential for pollution of Megray Burn due to runoff.	
F3	**Local**	Construction	Fragmentation / isolation and disturbance due to clearance.	Low negative/Minor
			Potential for pollution of Megray Burn due to accidental spills.	Medium negative/Minor
		Operation	Direct mortality through RTA, fragmentation and isolation, disturbance and habitat loss of arable land.	Low negative/Minor
			Potential for pollution of Megray Burn due to runoff	Medium negative/Minor
F4	**Local**	Construction	Disturbance due to clearance.	Low negative/Negligible
			Potential for pollution of Megray Burn due to accidental spills.	Low negative/Minor
		Operation	Direct mortality through RTA, disturbance, habitat loss of broad-leaved and coniferous plantations.	
			Potential for pollution of Megray Burn due to runoff.	
F6	**Less than local**	Construction	Disturbance due to clearance.	Negligible/Negligible
		Operation	Direct mortality through RTA, disturbance and habitat loss of coniferous plantation.	Low negative/Negligible
F7	**County**	Construction	Fragmentation / isolation and disturbance due to clearance.	Medium negative/Moderate
			Potential pollution of the Limpet Burn due to accidental spills.	
		Operation	Direct mortality through RTA, fragmentation and isolation, disturbance and habitat loss of dense, continuous scrub, bracken, and a small area of semi-natural broad-leaved woodland.	
			Potential for pollution of Limpet Burn due to runoff.	
F8	**Local**	Construction	Fragmentation / isolation and disturbance due to clearance.	Low negative/Minor
		Operation	Direct mortality through RTA, fragmentation and isolation, disturbance and habitat loss of improved grassland and scattered scrub.	Medium negative/Minor
F9	**Local**	Construction	Disturbance due to clearance.	Negligible/Negligible
		Operation	Disturbance.	Low negative/Minor

Habitat Area	Evaluation	Phase	Description of Impacts	Impact Magnitude / Significance
F10/F12	**County**	Construction	Fragmentation and isolation disturbance and potential pollution of the Green burn due to accidental spills.	Medium negative/Moderate
		Operation	Direct mortality through RTA, fragmentation and isolation, disturbance, habitat loss of dry heath, acid grassland and marsh/marshy grassland and potential pollution of the Green Burn due to runoff.	
Section FL2				
F13	**Local**	Construction	Fragmentation / isolation and disturbance due to clearance.	Low negative/Minor
			Potential of pollution of field ditches which form the Allochie Burn due to accidental spills	Medium negative/minor
		Operation	Direct mortality through RTA, fragmentation and isolation, disturbance and habitat loss of improved and arable grassland and small areas of native species rich hedgerows.	
			Potential pollution of field ditches which form the Allochie Burn due to runoff.	
F15	**County**	Construction	Fragmentation / isolation and disturbance due to clearance.	Low negative/Minor
			Potential for pollution of the Burn of Muchalls due to accidental spills	Medium negative/Moderate
		Operation	Direct mortality through RTA, fragmentation and isolation, disturbance and habitat loss of semi-improved acid grassland and arable.	Medium negative/Moderate
			Potential for pollution of the Burn of Muchalls due to runoff,	
F16	**Local**	Construction	Fragmentation / isolation and disturbance due to clearance.	Low negative/Minor
			Potential for pollution of the Burn of Blackbutts due to accidental spills.	Medium negative/Minor
		Operation	Direct mortality through RTA, fragmentation and isolation, disturbance and habitat loss of arable and improved grassland.	
			Potential for pollution of the Burn of Blackbutts due to runoff.	
Section FL3				
F18	**Local**	Construction	Fragmentation / isolation and disturbance due to clearance.	Low negative/Minor
			Potential for pollution of Balnagubs Burn and a tributary of the Elsick Burn due to accidental spills.	Medium negative/minor
		Operation	Direct mortality through RTA, fragmentation and isolation, disturbance and habitat loss of arable, improved and marshy grassland and small areas of native species rich hedgerows.	
			Potential for pollution of Balnagubs Burn and a tributary of the Elsick Burn due to runoff.	
F19	**County**	Construction	Fragmentation and isolation, disturbance due to clearance.	Low negative/Minor

Habitat Area	Evaluation	Phase	Description of Impacts	Impact Magnitude / Significance
			Potential for pollution of Stoneyhill Ditch due to accidental spills.	Medium negative/Minor
		Operation	Direct mortality through RTA, fragmentation and isolation, disturbance and habitat loss of marshy grassland.	Low negative/Minor
			Potential for pollution of Stoneyhill Ditch due to runoff.	Medium negative/Minor
F20	**Local**	Construction	Disturbance due to clearance.	Low negative/Minor
		Operation	Direct mortality through RTA, disturbance and habitat loss of improved grassland.	
F21	**Local**	Construction	Fragmentation / isolation and disturbance due to clearance.	Low negative/Minor
			Potential for pollution of Whiteside burn due to accidental spills.	Medium negative/Minor
		Operation	Direct mortality through RTA, fragmentation and isolation, disturbance and habitat loss of acid grassland and scattered scrub.	
			Potential for pollution of Whiteside Burn due to runoff.	
F22	**Local**	Construction	Fragmentation / isolation and disturbance due to clearance.	Low negative/Minor
			Potential for pollution of Cairns Burn and Crossley Burn due to accidental spills	Medium negative/Minor
		Operation	Direct mortality through RTA, fragmentation and isolation, disturbance, habitat loss of improved fields and marshy grassland.	
			Potential for pollution of Cairns Burn and Crossley Burn due to runoff.	
F23	**County**	Construction	Fragmentation / isolation and disturbance due to clearance.	Low negative/Minor
			Potential for pollution of Circle Burn due to accidental spills	Medium negative/Minor
		Operation	Direct mortality through RTA, fragmentation and isolation, disturbance, habitat loss of acid grassland and scattered/dense scrub.	
			Potential for pollution of Circle Burn due to runoff.	Medium negative/Moderate
F25	**Local**	Construction	Fragmentation / isolation and disturbance due to clearance.	Low negative/Minor
			Potential for pollution of Square Burn due to accidental spills.	
		Operation	Direct mortality through RTA, fragmentation and isolation disturbance and habitat loss of mixed plantation woodland underlain by dry heath and acid grassland. It should be noted that the dry heath and acid grassland have degraded as a result of the plantation woodland, and as such, impacts have been assessed at a low negative magnitude.	
			Potential for pollution of Square Burn due to runoff.	
F26	**Local**	Construction	Fragmentation / isolation and disturbance due to clearance.	Low negative/Minor
			Potential for pollution of Craigentath Burn and Ditch, Wedderhill Burn and Burnhead Burn due to accidental spills.	Medium negative/Minor
		Operation	Direct mortality through RTA, fragmentation and isolation, disturbance, habitat loss of improved and arable grassland and small areas of semi-improved and marshy grassland.	
			Potential for pollution of Craigentath Burn and Ditch, Wedderhill Burn and Burnhead Burn due to runoff.	
F27	**Local**	Construction	Fragmentation / isolation and disturbance due to clearance.	Low negative/minor
			Potential for pollution of Craigentath Burn and Ditch, Wedderhill Burn and Burnhead Burn due to accidental spills.	

Habitat Area	Evaluation	Phase	Description of Impacts	Impact Magnitude / Significance
		Operation	Direct mortality through RTA, fragmentation and isolation, disturbance, habitat loss of semi-improved and improved grassland with areas of scattered scrub.	
			Potential for pollution of Craigentath Burn and Ditch, Wedderhill Burn and Burnhead Burn due to runoff.	

6 Mitigation

6.1 Generic Mitigation

6.1.1 This section of the report outlines measures to prevent, reduce or offset the adverse effects of the proposed scheme on breeding birds and the habitat features of importance to them.

6.1.2 A detailed mitigation plan (including a habitat management plan that will detail all habitat creation/enhancement prescriptions) will be prepared prior to construction. It will specify where and when generic mitigation should be undertaken.

6.1.3 Table 21 presents a suite of generic mitigation measures that are applicable during both construction and operation of the proposed scheme. The mitigation measures outlined below comprise prevention/avoidance, reduction and offset/compensation measures, which form a hierarchy of measures that should be adopted preferably in the order presented.

6.1.4 It should be noted that offset measures referred to at the bottom of Table 21 are not strictly mitigation, but compensation measures that are designed to produce benefits to birds in order to offset adverse impacts that cannot be prevented or reduced.

Table 21 – Generic Mitigation Measures: Construction and Operation

Mitigation Type	Impact	Description of Generic Mitigation
Construction		
Prevent	Direct Mortality Disturbance	All habitat clearance and building demolition, where possible, will take place outside the main bird breeding season (March – July inclusive) and must be maintained in such a condition as to ensure that it is not used for breeding purposes. The potential presence of bird nests should be taken into consideration when planning the demolition of buildings or clear felling of trees.
Prevent	Direct Mortality Disturbance	All cleared material will be either be chipped or moved and stored off-site to ensure that birds do not use the cleared material for nesting during the breeding season.
Prevent	Direct Mortality Disturbance	Barn Owl (WCA1i species) All buildings (in particular farm buildings or other vacant structure with open access) that need to be demolished prior to construction must be checked one year in advance of construction to ensure that they are not in use by barn owl. All buildings will be destroyed immediately after survey provided evidence of barn owl is not recorded. Alternatively, if demolition is not feasible, all entrances into the structure should be secured covered to prevent access by barn owl.
Prevent	Direct Mortality Disturbance	Kingfisher (WCA1i species) A pre-construction survey of all suitable watercourses should be undertaken at least one breeding season in advance of construction following methods outlined by Gilbert et al (1998) to confirm the potential presence of kingfisher. Should the presence of kingfisher be confirmed, any river or stream bank that is likely to be directly impacted by the proposed scheme that exhibits potential nesting habitat for kingfisher must be destroyed (only if strictly necessary and under supervision of the ecological clerk of works) or securely covered (whichever is applicable) outside the main breeding season (March – October) at least one year in advance of construction in order to prevent access by potentially breeding kingfishers. Once construction of the proposed scheme is completed all protective covering must be removed. Any river or stream bank that is not directly impacted (but is likely to be disturbed) by construction of the proposed scheme that exhibits potential nesting habitat for kingfisher should be securely covered under the supervision of the Ecological Clerk of Works out with the main breeding season (March – October) at least one season in advance of construction in order to prevent access by potentially breeding kingfishers. Once construction of the proposed scheme is completed all protective covering must be removed. It should be noted that the above mitigation measure cannot be undertaken without taking into consideration indirect impacts (disturbance and pollution) to other ecology, for example, protected mammal species such as otter and freshwater ecology, for example, fish.
Prevent	Direct Mortality Habitat Loss	Plant and personnel should be restricted to a prescribed working corridor through the use of temporary barriers thereby minimising damage to habitats and potential direct mortality and disturbance to breeding/non-breeding birds located within and adjacent to

Mitigation Type	Impact	Description of Generic Mitigation
	Disturbance	the proposed scheme working corridor.
Prevent	Habitat Loss Disturbance	Works compounds, storage sites and access roads must not be located within 10m of areas of woodland, wetland and scrub to prevent damage of habitats and disturbance of breeding birds.
Prevent	Disturbance Pollution	Ensure that any lighting associated with construction during low light levels and/or night is minimised as far as practical by the adoption of best working practices associated with the use of artificial light.
Prevent	Pollution	Strict adherence to SEPA pollution prevention guidelines PPG1, PPG2 and PPG6.
Prevent	Pollution	Minimise the amount of dust and other airborne debris produced during construction by the adoption of best working practices.
Prevent	Pollution	The use of approved pollution prevention schemes (e.g. oil separators) should be installed to prevent potentially polluted surface water from flowing into wetlands and/or other waterbodies.
Reduce	Direct Mortality Disturbance	Construction activities such as blasting, piling, grouting or any other activity likely to result in significant disturbance to breeding birds must (as far as practical) be undertaken outside the main bird breeding season (March – July inclusive). Where it is not possible to time works outside the breeding season, consideration should be given to avoiding works near habitats identified (by the Ecological Clerk of Works) as being of high value / sensitivity for breeding birds.
Operation		
Prevent	Direct Morality	Where the proposed alignment passes through existing areas of established woodland, potential RTAs should be prevented by removing or significantly thinning all trees to within 5m of the road unless considered to be of significant ecological value (i.e. mature oak, wych elm or ash).
Prevent	Direct Mortality Disturbance	Habitat management of areas of woodland, scrub and/or grassland should occur out with the main bird breeding season (March – July inclusive) to ensure that breeding birds, their eggs and/or nestlings not subject to direct mortality / disturbance impacts during operational habitat management.
Prevent	Disturbance Pollution	Roadside lighting throughout the proposed scheme will be strategically sited only where strictly necessary (e.g. major junctions) and will ensure that it complies with guidelines / guidance produced by the Environment Agency. (http://www.environment-agency.gov.uk/yourenv/eff/pollution/) and Institute of Lighting Engineers (http://www.ile.org.uk/lighting_technical.htm) concerning the reduction of unnecessary light pollution within urban and rural areas (in particular the requirement for fitting all lights with shades and ensuring that lighting only illuminates chosen areas).
Prevent	Direct Mortality Habitat Loss Disturbance	Kingfisher (WCA1i species) Any sand and/or gravel bank/s within 500m of the proposed scheme should be surveyed for potential nesting kingfisher one breeding season in advance of any operational habitat management and/or maintenance following methods outlined by Gilbert et al (1998). Works cannot be undertaken if breeding is confirmed. If suitable nesting habitat is identified, the banks should be securely covered out with the main breeding season (March – October) in order to prevent access by potentially breeding kingfishers one breeding season in advance of any works.
Prevent	Direct Mortality Habitat Loss Disturbance	Operational maintenance of areas of woodland, scrub and/or grassland is minimised as far as practical.
Prevent	Direct Mortality Pollution	The use of de-icing salt during winter periods should be kept to an absolute minimum.
Reduce	Direct Mortality	A grassland verge (approximately 5m in width) should be maintained between the edge of the hard shoulder and any areas of scrub or woodland thereby ensuring that bird species can easily see any on-coming vehicles before they attempt to cross the proposed scheme.
Reduce	Direct Mortality	Landscape planting (including berry / fruit bearing trees and shrubs) at all junctions (regardless of size), embankments or any point of the proposed scheme that is below vehicle height will be not be planted within 5m of the carriageway to ensure that potential RTAs are minimised as far as practical. Use of temporary fencing (prior to the development of the planting) will be considered where appropriate to reduce the risk of RTA for species of particular sensitivity (e.g. barn owl).
Offset	Fragmentation Disturbance	Planting of dense native tree and scrub species (>25m from the carriageway) to screen noise and vibration disturbance associated with operation of the proposed scheme from birds located within adjacent habitats (the screening must ensure that noise levels are maintained less than 40dBA on the side opposite to the carriageway).

Mitigation Type	Impact	Description of Generic Mitigation
Offset	Habitat Loss	Barn owl (WCA1i species) Replacement nest boxes should be provided in suitable adjacent buildings/habitat (subject to consultation and verification with SNH) in the event that they are identified in buildings that need to be demolished prior to construction of the proposed scheme.
Offset	Habitat Loss	Additional planting within and adjacent to existing areas of woodland/scrub using native scrub and tree species thereby creating additional breeding and foraging bird habitat and compensating for habitat clearance, fragmentation and isolation and disturbance impacts. Habitat creation should include areas of core woodland (> 30m from woodland edge) and areas located at least 50m from route alignment.
Offset	Habitat Loss	Appropriate management of existing boundary habitats such as hedgerows or rough edges for the benefit of key farmland species of conservation concern such as yellowhammer, skylark, linnet, tree sparrow, meadow pipit and grey partridge.
Offset	Habitat Loss	Appropriate habitat management of existing woodland/scrub habitats by selective thinning to create open glades and additional planting of native broad-leaved species to enhance existing woodland/scrub habitat and compensate for habitat lost to the scheme thereby creating a habitat structure of greater value to breeding and non-breeding birds.
Offset	Habitat Loss	Bird boxes (suitable for a range of species) should be considered (at a density of 20 boxes for every 0.5ha of woodland lost) in severed areas of woodland in order to compensate for the loss of suitable breeding habitat.
Offset	Habitat Loss	Off-line compensatory habitat creation will be undertaken at a location still to be determined. The area of habitat creation will be managed to create a mosaic of habitats of value to a range of key priority breeding bird species.
Offset	Habitat Loss	Sympathetic planting of second (and subsequent) stage detention basins to allow use by breeding birds
Offset	Habitat Loss Fragmentation Disturbance	Kingfisher (WCA1i species) Where a pre-construction survey of all suitable watercourses (undertaken at least one breeding season in advance of construction following methods outlined by Gilbert et al (1998) confirms the presence of kingfisher, replacement breeding habitat in the form of sand and/or gravel banks should be created in order to compensate for any nesting habitat loss during construction and should be sited as close to the location where the original habitat was lost (taking into account disturbance impacts associated with operation of the proposed scheme). Habitat loss will be identified and quantified in the course of a pre-construction survey.
Offset	Habitat Loss Fragmentation	Vegetated strips, wildlife overbridges or similar should be created to offset the loss of wildlife corridors (e.g. woodland, scrub, rivers, streams or disused railways) severed by the proposed scheme and should be planted with native shrub and/or tree species to facilitate the movement of bird species along the these severed corridors either above or below the alignment.
Offset	-	An environmental management plan (EMP) will be prepared in consultation with SNH and should be followed throughout operation of the proposed scheme.

6.2 Specific Mitigation

6.2.1 The current mitigation proposals do not include any scope to mitigate for the large scale loss of ecologically valuable farmland (arable, improved, poor semi-improved and semi-improved grassland fields). These areas are likely to provide foraging opportunities (to a greater or lesser degree) for populations of the following key bird species: barn owl, curlew, grey partridge, lapwing, linnet, meadow pipit, oystercatcher, skylark and yellowhammer.

6.2.2 The approach to breeding bird mitigation includes the following key elements:

- construction activities including the felling of trees and clearing of scrub will be timed to avoid periods when birds are nesting (i.e. March-July) where possible, preventing disturbance to breeding birds. Areas may be pre-felled or cleared in winter to make habitat undesirable for nesting;
- areas of habitat will be created to offset habitat loss, although these areas will be situated away from the scheme to prevent RTAs. This will include the provision of a grassland buffer either side of the road before any scrub or woodland planting therefore allowing a clear sightline of the traffic;
- planting of dense native tree and scrub species (taking into account direct mortality impacts) to screen noise and vibration disturbance associated with operation of the proposed scheme from birds located within adjacent habitats; and
- sympathetic planting of second (and subsequent) stage detention basins, where appropriate, to allow use by breeding birds.

6.2.3 Specific mitigation and residual impacts are presented in Table 22.

Table 22 – Specific Mitigation and Residual Impacts

Habitat Area	Evaluation	Phase	Description of Impacts	Impact Magnitude / Significance	Mitigation	Residual Impacts
Section FL1						
F1	**Less than local**	Construction	Fragmentation / isolation and disturbance due to clearance.	Negligible/Negligible	Generic mitigation (Table 21)	Negligible
			Potential for pollution of Megray Burn due to accidental spills.	Low negative/Minor		
		Operation	Direct mortality through RTA, fragmentation and isolation, disturbance and loss of riparian habitat.			
			Potential for pollution of Megray Burn due to runoff.			
F3	**Local**	Construction	Fragmentation and isolation, disturbance due to clearance.	Low negative/Minor	Generic mitigation (Table 21) apart from habitat loss.	Negligible
			Potential for pollution of Megray Burn due to accidental spills.	Medium negative/Minor		
		Operation	Direct mortality through RTA, fragmentation and isolation. Loss of arable land.	Low negative/Minor		
			Potential for pollution of Megray Burn due to runoff	Medium negative/Minor		
F4	**Local**	Construction	Disturbance due to clearance.	Low negative/Negligible	Generic mitigation (Table 21).	Negligible
			Potential for pollution of Megray Burn due to accidental spills.	Low negative/Minor		
		Operation	Direct mortality through RTA, disturbance, loss of broad-leaved and coniferous plantations.		Generic mitigation (Table 21). Habitat creation: Mixed woodland planting to the east of the proposed scheme in HA F4 at ch70 - 310 (AWPR Environmental Statement 2007, Figure 41.5a).	
			Potential for pollution of Megray Burn due to runoff.			
F6	**Less than local**	Construction	Disturbance due to clearance.	Negligible/Negligible	Generic mitigation (Table 21) apart from habitat loss.	Negligible
		Operation	Direct mortality through RTA, loss of coniferous plantation.	Low negative/Negligible		
F7	**County**	Construction	Fragmentation and isolation, disturbance due to clearance.	Medium negative/Moderate	Generic mitigation (Table 21). Habitat creation Mixed woodland planting to the east of the proposed scheme in HA F4 at ch70 - 310 (AWPR Environmental Statement 2007, Figure 41.5a) and riparian woodland planting to the east and west of the proposed scheme in HA F7 at ch1290 (AWPR Environmental Statement 2007, Figure 41.5b).	Low negative/minor adverse
			Potential for pollution of Limpet Burn due to accidental spills.			
		Operation	Direct mortality through RTA, fragmentation and isolation, loss of dense, continuous scrub, bracken and a small area of semi-natural broad-leaved woodland.			
			Potential for pollution of Limpet Burn due to runoff .		Generic mitigation (Table 21).	Negligible

Habitat Area	Evaluation	Phase	Description of Impacts	Impact Magnitude / Significance	Mitigation	Residual Impacts
F8	**Local**	Construction	Fragmentation and isolation, disturbance due to clearance.	Low negative/Minor	Generic mitigation (Table 21) apart from habitat loss.	Negligible
		Operation	Direct mortality through RTA, fragmentation and isolation, disturbance and loss of improved grassland and scattered scrub.	Low negative/Negligible		
F9	**Local**	Construction	Disturbance due to clearance.	Negligible/Negligible	Generic mitigation (Table 21).	Negligible
		Operation	Disturbance.	Low negative/Minor	Generic mitigation (Table 21).	Negligible
F10/F12	**County**	Construction	Fragmentation and isolation, disturbance and potential pollution of the Green Burn due to accidental spills.	Medium negative/Moderate	Generic mitigation (Table 21) apart from habitat loss. Offset mitigation Habitat loss will be mitigated for by offset mitigation.	Low Negative/Minor
		Operation	Direct mortality through RTA, fragmentation and isolation, disturbance, loss of dry heath, acid grassland and marsh/marshy grassland and potential pollution of the Green Burn due to runoff.			
Section FL2						
F13	**Local**	Construction	Fragmentation and isolation, disturbance due to clearance.	Low negative/Minor	Generic mitigation (Table 21) apart from habitat loss.	Negligible
			Potential for pollution of field ditches which form the Allochie Burn due to accidental spills.	Medium negative/Minor		
		Operation	Direct mortality through RTA, fragmentation and isolation, loss of improved and arable grassland; and small areas of native, species rich hedgerows.			
			Potential for pollution of field ditches which form the Allochie Burn due to runoff.			
F15	**County**	Construction	Fragmentation and isolation, disturbance due to clearance.	Low negative/Minor	Generic mitigation (Table 21).	Negligible
			Potential for pollution of Burn of Muchalls due to accidental spills	Medium negative/Moderate		
		Operation	Direct mortality through RTA, fragmentation and isolation. Loss of semi-improved acid grassland and arable.			
			Potential for pollution of the Burn of Muchalls due to runoff,			
F16	**Local**	Construction	Fragmentation and isolation, disturbance due to clearance.	Low negative/Minor	Generic mitigation (Table 21) apart from habitat loss.	Negligible
			Potential for pollution of the Burn of Blackbutts due to accidental spills.	Medium negative/Minor		
		Operation	Direct mortality through RTA, fragmentation and isolation, disturbance and loss of arable and improved grassland.			
			Potential for pollution of the Burn of Blackbutts due to runoff.			
Section FL3						

Habitat Area	Evaluation	Phase	Description of Impacts	Impact Magnitude / Significance	Mitigation	Residual Impacts
F18	**Local**	Construction	Fragmentation and isolation, disturbance due to clearance.	Low negative/Minor	Generic mitigation (Table 21) apart from habitat loss.	Negligible
			Potential for pollution of Balnagubs Burn and a tributary of the Elsick Burn due to accidental spills.	Medium negative/Minor		
		Operation	Direct mortality through RTA, fragmentation and isolation, disturbance and loss of arable, improved and marshy grassland; and small areas of native, species rich hedgerows.			
			Potential pollution of the Balnagubs Burn and a tributary of the Elsick Burn due to runoff.			
F19	**Local**	Construction	Fragmentation and isolation, disturbance due to clearance.	Low negative/Minor	Generic mitigation (Table 21) apart from habitat loss.	Negligible
			Potential for pollution of Stoneyhill Ditch due to accidental spills.	Medium negative/Minor		
		Operation	Direct mortality through RTA, fragmentation and isolation, disturbance and loss of marshy grassland.	Low negative/Minor		
			Potential for pollution of Stoneyhill Ditch due to runoff.	Medium negative/Minor		
F20	**Local**	Construction	Disturbance due to clearance.	Negligible/Negligible	Generic mitigation (Table 21).	Negligible
		Operation	Direct mortality through RTA, disturbance and loss of improved grassland.	Low negative/Minor		
F21	**Local**	Construction	Fragmentation and isolation, disturbance due to clearance.	Low negative/Minor	Generic mitigation (Table 21).	Negligible
			Potential for pollution of Whiteside burn due to accidental spills.	Medium negative/Minor	Generic mitigation (Table 21). Habitat creation Scrub planting to the east of the proposed scheme in HA F18 and F21 at ch8550 - 8630 (AWPR Environmental Statement 2007, Figure 41.5i) Acid grassland to be retained where possible.	
		Operation	Direct mortality through RTA, fragmentation and isolation, disturbance and loss of acid grassland and scattered scrub.			
			Potential for pollution of Whiteside Burn due to runoff.			
F22	**Local**	Construction	Fragmentation and isolation, disturbance due to clearance.	Low negative/Minor	Generic mitigation (Table 21) apart from habitat loss.	Negligible
			Potential for pollution of Cairns Burn and Crossley Burn due to accidental spills	Medium negative/Minor		
		Operation	Direct mortality through RTA, fragmentation and isolation. Disturbance and loss of improved fields and marshy grassland.			
			Potential for pollution of Cairns Burn and Crossley Burn due to runoff.			
F23	**County**	Construction	Fragmentation and isolation, disturbance due to clearance.	Low negative/Minor	Generic mitigation (Table 21).	Negligible
			Potential for pollution of Circle Burn due to accidental spills	Medium negative/Minor		
		Operation	Direct mortality through RTA, fragmentation and isolation, disturbance habitat loss of acid grassland and scattered/dense scrub.		Generic mitigation (Table 21). Habitat creation	

Habitat Area	Evaluation	Phase	Description of Impacts	Impact Magnitude / Significance	Mitigation	Residual Impacts
				Medium negative/Moderate	Scrub planting to the west of the proposed scheme in HA F21 at ch8640 - 8760 (AWPR Environmental Statement 2007, Figure 41.5i).	
F25	**Local**	Construction	Fragmentation / isolation and disturbance due to clearance.	Low negative/Minor	Generic mitigation (Table 21).	Negligible
			Potential for pollution of Square Burn due to accidental spills.			
		Operation	Direct mortality through RTA, fragmentation and isolation disturbance and loss of mixed plantation woodland underlain by dry heath and acid grassland. It should be noted that the dry heath and acid grassland have degraded as a result of the plantation woodland, and as such, impacts have been assessed at a low negative magnitude.		Generic mitigation (Table 21). Habitat creation Mixed woodland planting to the west of the proposed scheme in HA F25 at ch9950 - 10200 (AWPR Environmental Statement 2007, Figure 41.5j).	
			Potential for pollution of Square Burn due to runoff.	Medium negative/Moderate	Generic mitigation (Table 21).	
F26	**Local**	Construction	Fragmentation and isolation, disturbance due to clearance.	Low negative/Minor	Generic mitigation (Table 21) apart from habitat loss.	Negligible
			Potential for pollution of Craigentath Burn and Ditch, Wedderhill Burn and Burnhead Burn due to accidental spills.	Medium negative/Minor		
		Operation	Direct mortality through RTA, fragmentation and isolation, loss of improved and arable grassland; and small areas of semi-improved and marshy grassland.			
			Potential for pollution of Craigentath Burn and Ditch, Wedderhill Burn and Burnhead Burn due to runoff.			
P27	**Local**	Construction	Fragmentation / isolation and disturbance due to clearance.	Low negative/Minor	Generic mitigation (Table 21).	Negligible
			Potential for pollution of Craigentath Burn and Ditch, Wedderhill Burn and Burnhead Burn due to accidental spills.			
		Operation	Direct mortality through RTA, fragmentation and isolation, disturbance, habitat loss of semi-improved and improved grassland with areas of scattered scrub.			
			Potential for pollution of Craigentath Burn and Ditch, Wedderhill Burn and Burnhead Burn due to runoff.			

Further work

6.2.4 It will be the responsibility of the contractor to appoint an Ecological Clerk of Works, whose primary role will be to ensure the implementation of all mitigation measures during construction and operation of the proposed scheme.

7 Residual Impacts

7.1.1 This section of the report provides an assessment of residual impacts in accordance with the mitigation measures proposed in Section 5. Table 22 lists the significance of residual impacts for all of the study area. Those sections with adverse impacts of greater than negligible significance are discussed below.

7.1.2 The following residual impacts on breeding birds throughout the study area would remain due to the risk of direct mortality from RTAs, fragmentation/isolation and habitat loss during operation despite application of appropriate mitigation. The residual impacts on breeding birds in the study area have been assessed as being of Negligible to Minor residual significance.

Section FL1

7.1.3 Predicted impacts of low negative magnitude and Minor Adverse significance in this section on breeding birds remain in and around the Limpet Burn area (F7). Residual impacts are predicted due to the temporary fragmentation and disturbance as well as potential pollution to Limpet Burn due to accidental spills during construction; and from the risk of potential direct mortality from RTAs, fragmentation / isolation, habitat loss and potential pollution to Limpet Burn due to run-off during operation.

7.1.4 Predicted impacts of Low Negative magnitude and Minor Adverse significance in this section on breeding birds remain in and around Fishermyre (F10 and F12). Residual impacts are predicted due to the temporary fragmentation and disturbance as well as potential pollution to Green Burn due to accidental spills during construction; and from the risk of potential direct mortality from RTAs, fragmentation / isolation, habitat loss and potential pollution to Green Burn due to run-off during operation.

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Annex 1

Species list for birds recorded in the Fastlink

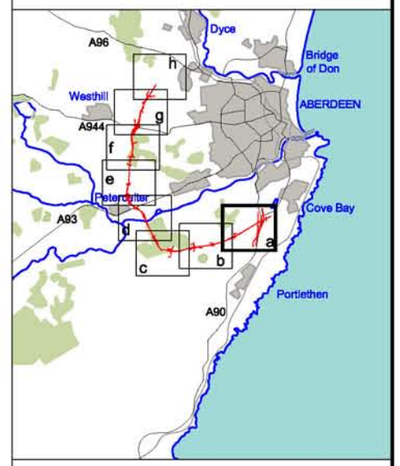
Common Name	Scientific Name
blackbird	*Turdus merula*
blackcap	*Sylvia atricapilla*
blue tit	*Parus caeruleus*
bullfinch	*Pyrrhula pyrrhula*
buzzard	*Buteo buteo*
carrion crow	*Corvus corone*
chaffinch	*Fringilla coelebs*
chiffchaff	*Phylloscopus collybita*
coal tit	*Parus ater*
collared dove	*Streptopelia decaocto*
cuckoo	*Cuculus canorus*
curlew	*Numenius arquata*
dunnock	*Prunella modularis*
garden warbler	*Sylvia borin*
goldcrest	*Regulus regulus*
goldfinch	*Carduelis carduelis*
grasshopper warbler	*Locustella naevia*
great spotted woodpecker	*Dendrocopos major*
great tit	*Parus major*
greenfinch	*Carduelis chloris*
grey heron	*Ardea cinerea*
grey partridge	*Perdix perdix*
herring gull	*Larus argentatus*
house martin	*Delichon urbica*
house sparrow	*Passer domesticus*
jackdaw	*Corvus monedula*
lapwing	*Vanellus vanellus*
lesser black-backed gull	*Larus fuscus*
lesser redpoll	*Carduelis flammea cabaret*
linnet	*Carduelis cannabina*
magpie	*Pica pica*
mallard	*Anas platyrhynchos*
meadow pipit	*Anthus pratensis*
mistle thrush	*Turdus viscivorus*
moorhen	*Gallinula chloropus*
mute swan	*Cygnus olor*
oystercatcher	*Haematopus ostralegus*
pheasant	*Phasianus colchicus*
pied wagtail	*Motacilla alba*
redstart	*Phoenicurus phoenicurus*
reed bunting	*Emberiza schoeniclus*
robin	*Erithacus rubecula*

Common Name	Scientific Name
rook	*Corvus frugilegus*
sand martin	*Riparia riparia*
sedge warbler	*Acrocephalus schoenobaenus*
siskin	*Carduelis spinus*
skylark	*Alauda arvensis*
snipe	*Gallinago gallinago*
snow bunting	*Plectrophenax nivalis*
song thrush	*Turdus philomelos*
starling	*Sturnus vulgaris*
stock dove	*Columba oenas*
swallow	*Hirundo rustica*
tawny owl	*Strix aluco*
tree sparrow	*Passer montanus*
whitethroat	*Sylvia communis*
willow warbler	*Phylloscopus trochilus*
woodpigeon	*Columba palumbus*
wood warbler	*Phylloscopus sibilatrix*
wren	*Troglodytes troglodytes*
yellowhammer	*Emberiza citrinella*

APPENDIX 1

FIGURES

FIGURE 25.6a



NORTH

Continued on Sheet 2 of 8 (Figure 25.6b)

Loirston Loch WOV

Blue Hill SOV

CHARLESTON JUNCTION

CHARLESTON

GREENHOWE WOODS

THE CROSSROADS

Quadrat SL-Wb02

Quadrat SL-Bb02

Quadrat SL-Wb03

Quadrat SL-Bb03

Quadrat SL-Bb01

Quadrat SL-Wb01

HARE MOSS

Moss SOV

Quadrat SL-Wb04

DUFF'S HILL

207000

206000

205000

204000

0 1km 2km

LEGEND

- Proposed Route (Engineering Profile 04/05/07)
- Indicative Study Area (500m from centre of Proposed Route)
- Watercourses
- Direction of Flow
- Waterbody
- Woodland

Breeding Bird Survey : Quadrats
- High Habitat Value
- Medium Habitat Value
- Low Habitat Value

Breeding Bird Survey : Sites of Ornithological Value
- High Habitat Value
- Medium Habitat Value
- Low Habitat Value

Wintering Bird Survey : Quadrats
- High Habitat Value
- Medium Habitat Value
- Low Habitat Value

Wintering Bird Survey : Waterbodies of Ornithological Value
- High Habitat Value

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Title	Breeding & Wintering Bird Surveys Sheet 1 of 8
Drawing Status	FINAL
JB No.	0010332
Figure No.	FIGURE 25.6a
Revisions	
Scale	1:10,000
Date	Oct 2007
Drawn	SHF
Checked	GR
Approved	SH

FIGURE 25.6b

NORTH

AUCHLUNIES

Ecological Section SL 2

Ecological Section SL 1

Continued on Sheet 1 of 8 (Figure 25.6a)

HARE MOSS

Hare Moss SOV

Quadrat SL-Bb04

Quadrat SL-Wb04

Hill of Blairs SOV

Heatherknowe SOV

South Greenloaning SOV

Quadrat SL-Bb05

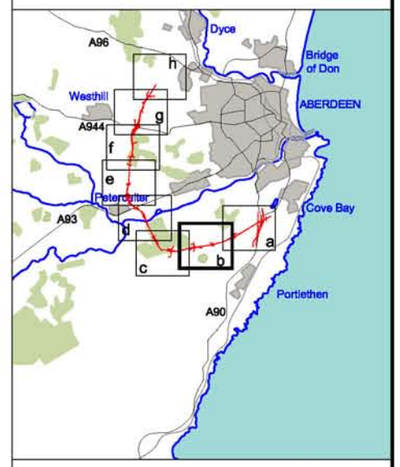
Quadrat SL-Wb05

BISHOPSTON

CLOCHANDIGHTER

Continued on Sheet 3 of 8 (Figure 25.6c)

Bodentoy Park Industrial Estate



LEGEND

- Proposed Route (Engineering Profile 04/05/07)
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- Woodland

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- Low Habitat Value

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- High Habitat Value
- Medium Habitat Value

Wintering Bird Survey : Quadrats
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- Medium Habitat Value
- Low Habitat Value

Wintering Bird Survey : Waterbodies of Ornithological Value
- High Habitat Value

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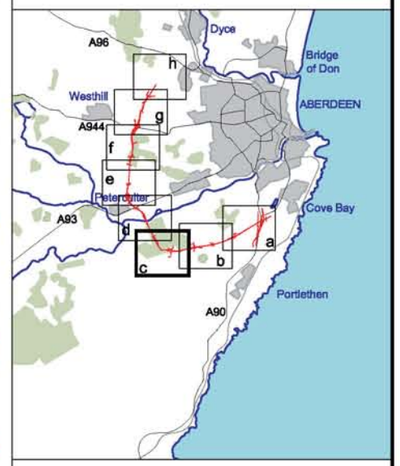
Drawing Status	FINAL
JB No.	0010332
Figure No.	FIGURE 25.6b
Revisions	
Scale	1:10,000
Date	Oct 2007
Drawn	SHF
Checked	GR
Approved	SH

0 1km 2km

FIGURE 25.6c



NORTH

Continued on Sheet 4 of 8 (Figure 25.6d)

Ecological Section SL 3

Ecological Section SL 2

Crynoch Burn SOV

Blaikiewell Burn SOV

Cleanhill Wood SOV

Hill of Blairs SOV

South Green

CLEANHILL JUNCTION

BURNHEAD

BLAIKIEWELL

Ecological Section SL 3

Ecological Section FL 3

Quadrat SL-Bb06

Quadrat SL-Wb06

Burnhead SOV

Quadrat FL-Wb08

Quadrat FL-Bb08

Continued on Sheet 2 of 8 (Figure 25.6b)

Start of Southern Leg (Part C)

Start of Fastlink (Part D)

0 1km 2km

LEGEND

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- Waterbody
- Woodland

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- Low Habitat Value

Breeding Bird Survey : Sites of Ornithological Value
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- Medium Habitat Value
- Low Habitat Value

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- Low Habitat Value

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Title	Breeding & Wintering Bird Surveys Sheet 3 of 8
Drawing Status	FINAL
JB No.	0010332
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Revisions	
Scale	1:10,000
Date	Oct 2007
Drawn	SHF
Checked	GR
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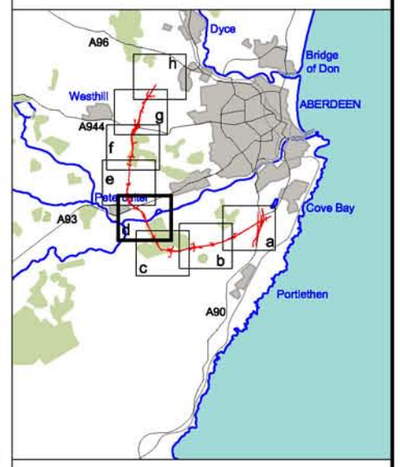
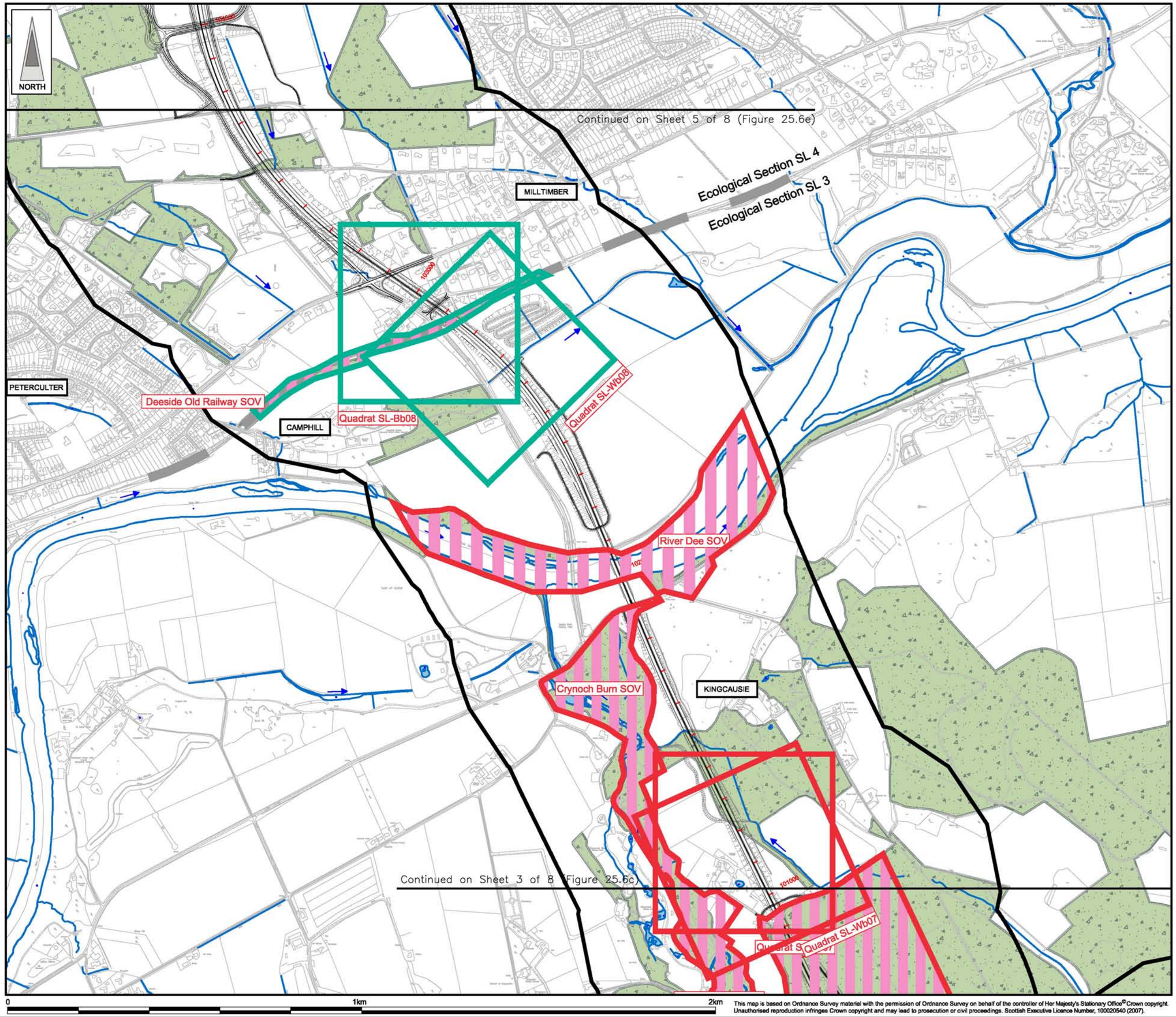
FIGURE 25.6d





LEGEND

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- Medium Habitat Value
- Low Habitat Value

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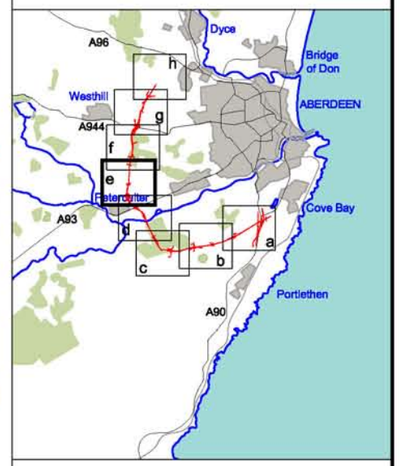
Title	Breeding & Wintering Bird Surveys Sheet 4 of 8
Drawing Status	FINAL
JB No.	0010332
Figure No.	FIGURE 25.6d
Revisions	
Scale	1:10,000
Date	Oct 2007
Drawn	SHF
Checked	GR
Approved	SH

FIGURE 25.6e



Continued on Sheet 6 of 8 (Figure 25.6f)

NORTH

Quadrat SL-Bb10

Quadrat SL-Wb10

Beanshill SOV

BEANS HILL

Ecological Section SL 5

Ecological Section SL 4

Quadrat SL-Bb09

Quadrat SL-Wb09

HILL OF MILLTIMBER

A93 MILLTIMBER JUNCTION

MILLTIMBER

Continued on Sheet 4 of 8 (Figure 25.6d)

0 1km 2km

LEGEND

- Proposed Route (Engineering Profile 04/05/07)
- Indicative Study Area (500m from centre of Proposed Route)
- Watercourses
- Direction of Flow
- Waterbody
- Woodland

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- Medium Habitat Value
- Low Habitat Value

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- Low Habitat Value

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- Low Habitat Value

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- High Habitat Value

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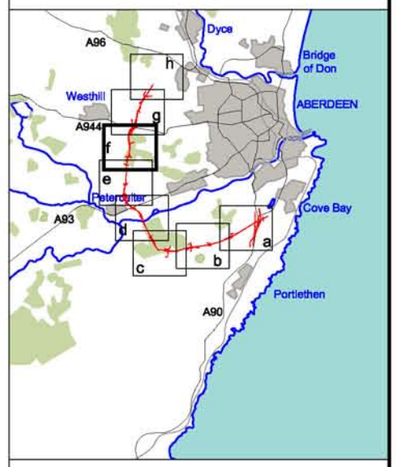
Title	Breeding & Wintering Bird Surveys Sheet 5 of 8
Drawing Status	FINAL
JB No.	0010332
Figure No.	FIGURE 25.6e
Revisions	
Scale	1:10,000
Date	Oct 2007
Drawn	SHF
Checked	GR
Approved	SH

FIGURE 25.6f



NORTH

Continued on Sheet 7 of 8 (Figure 25.6g)

Ecological Section SL 6

Ecological Section SL 5

AUCHLEA

SILVERBURN

Quadrat SL-Bb11

Quadrat SL-Wb11

Auchlea Moss SOV

East Silverburn SOV

Gairnhill & Kingshill Wood SOV

Quadrat SL-Bb10

Quadrat SL-Wb10

Beanshill SOV

108000

107000

106000

Ecological Section SL 5

Ecological Section SL 4

Continued on Sheet 5 of 8 (Figure 25.6e)

0 1km 2km

LEGEND

- Proposed Route (Engineering Profile 04/05/07)
- Indicative Study Area (500m from centre of Proposed Route)
- Watercourses
- Direction of Flow
- Waterbody
- Woodland

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- Medium Habitat Value
- Low Habitat Value

Breeding Bird Survey : Sites of Ornithological Value
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- Medium Habitat Value
- Low Habitat Value

Wintering Bird Survey : Quadrats
- High Habitat Value
- Medium Habitat Value
- Low Habitat Value

Wintering Bird Survey : Waterbodies of Ornithological Value
- High Habitat Value

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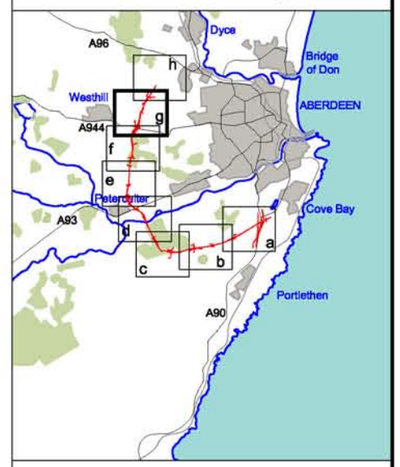
Title	Breeding & Wintering Bird Surveys Sheet 6 of 8
Drawing Status	FINAL
JB No.	0010332
Figure No.	FIGURE 25.6f
Revisions	
Scale	1:10,000
Date	Oct 2007
Drawn	SHF
Checked	GR
Approved	SH

FIGURE 25.6g



NORTH

Continued on Sheet 8 of 8 (Figure 25.6h)

Continued on Sheet 6 of 8 (Figure 25.6f)

WEST HATTON

KINGSWELLS

SOUTH KINGSWELLS JUNCTION

Quadrat SL-Bb12

Quadrat SL-Wb12

West Hatton Wood SOV

Quadrat SL-Bb11

Ecological Section SL 6

Ecological Section SL 5

111000

110000

109000

108000

0 1km 2km

LEGEND

- Proposed Route (Engineering Profile 04/05/07)
- Indicative Study Area (500m from centre of Proposed Route)
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- Direction of Flow
- Waterbody
- Woodland

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- Medium Habitat Value
- Low Habitat Value

Breeding Bird Survey : Sites of Ornithological Value
- High Habitat Value
- Medium Habitat Value
- Low Habitat Value

Wintering Bird Survey : Quadrats
- High Habitat Value
- Medium Habitat Value
- Low Habitat Value

Wintering Bird Survey : Waterbodies of Ornithological Value
- High Habitat Value

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Title	Breeding & Wintering Bird Surveys Sheet 7 of 8
Drawing Status	FINAL
JB No.	0010332
Figure No.	FIGURE 25.6g
Revisions	
Scale	1:10,000
Date	Oct 2007
Drawn	SHF
Checked	GR
Approved	SH

NORTH

BRIMMOND HILL

Brimmond Country Park

111000

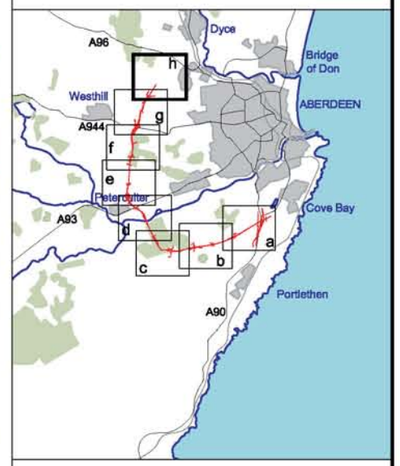
Continued on Sheet 7 of 8 (Figure 25.6g)

Start of Northern Leg (Part B)

Start of Southern Leg (Part C)

0 1km 2km

FIGURE 25.6h



LEGEND

- Proposed Route (Engineering Profile 04/05/07)
- Indicative Study Area (500m from centre of Proposed Route)
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- Direction of Flow
- Waterbody
- Woodland

Breeding Bird Survey : Quadrats
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Breeding Bird Survey : Sites of Ornithological Value
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- Low Habitat Value

Wintering Bird Survey : Quadrats
- High Habitat Value
- Medium Habitat Value
- Low Habitat Value

Wintering Bird Survey : Waterbodies of Ornithological Value
- High Habitat Value

Rev	Date	Purpose of Revision	Drwn	Chkd	Appd

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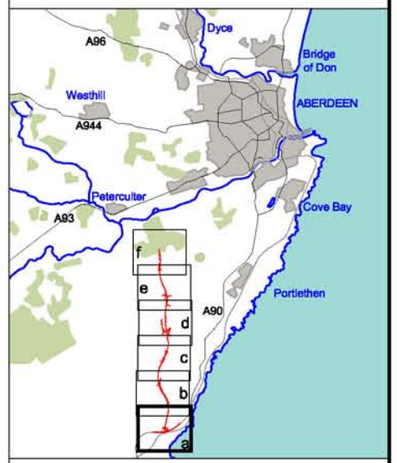
Title	Breeding & Wintering Bird Surveys Sheet 8 of 8
Drawing Status	FINAL
JB No.	0010332
Figure No.	FIGURE 25.6h
Revisions	
Scale	1:10,000
Date	Oct 2007
Drawn	SHF
Checked	GR
Approved	SH

FIGURE 40.6a



NORTH

Continued from Sheet 2 of 6 (Figure 40.6b)

FORESTER'S CROFT

HILL OF MEGRAY

STONEHAVEN JUNCTION

COWIE

STONEHAVEN

Quadrat FL-Bb02

Quadrat FL-Wb02

Quadrat FL-Bb01

Quadrat FL-Wb01

1000

50

0 1km 2km

LEGEND

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Title	Breeding & Wintering Bird Surveys Sheet 1 of 6
Drawing Status	FINAL
JB No.	0010332
Figure No.	FIGURE 40.6a
Revisions	
Scale	1:10,000
Date	Oct 2007
Drawn	SHF
Checked	GR
Approved	SH

NORTH

North Fishermyre SOV

Continued from Sheet 3 of 6 (Figure 40.6c)

CANTLAYHILLS

Ecological Section FL 2

Ecological Section FL 1

Quadrat FL-Bb03

Quadrat FL-Wb03

South Fishermyre SOV

KEMPSTONE HILL

Kempstone Hill SOV

2000

CONEYHATCH

Limpet Burn SOV

Quadrat FL-Bb02

Quadrat FL-Wb02

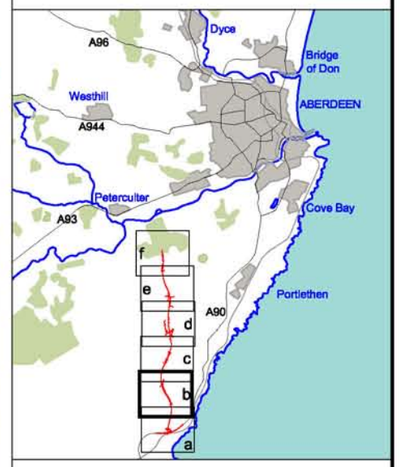
Continued from Sheet 1 of 6 (Figure 40.6a)

FORESTER'S CROFT

1000

0 1km 2km

FIGURE 40.6b



LEGEND

- Proposed Route (Engineering Profile 04/05/07)
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- Waterbody
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Title	Breeding & Wintering Bird Surveys Sheet 2 of 6
Drawing Status	FINAL
JB No.	0010332
Figure No.	FIGURE 40.6b
Revisions	
Scale	1:10,000
Date	Oct 2007
Drawn	SHF
Checked	GR
Approved	SH

FIGURE 40.6c

NORTH

Continued from Sheet 4 of 6 (Figure 40.6d)

Continued on Sheet 2 of 6 (Figure 40.6b)

Quadrat FL-Wb05

Quadrat FL-Bb04

Quadrat FL-Wb04

North Fishermyre SOV

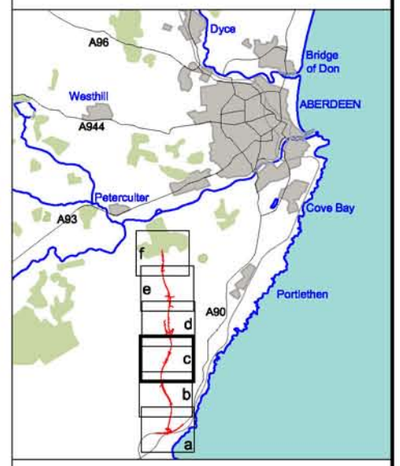
BURNSIDE

CANTLAYHILLS

Ecological Section FL 2

5000

4000



LEGEND

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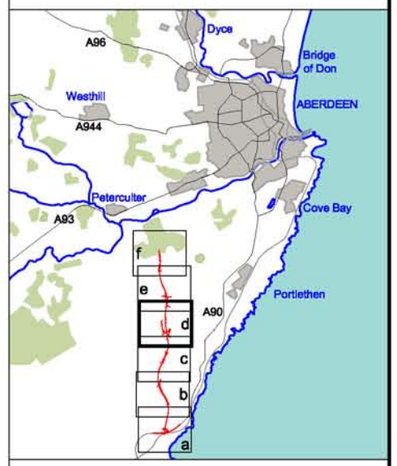
Drawing Status	FINAL
JB No.	0010332
Figure No.	FIGURE 40.6c
Revisions	
Scale	1:10,000
Date	Oct 2007
Drawn	SHF
Checked	GR
Approved	SH

0 1km 2km

FIGURE 40.6d



NORTH

Continued from Sheet 5 of 6 (Figure 40.6e)

8000

Quadrat FL-Bb06

Quadrat FL-Wb06

7000

RED MOSS

Harecraig SOV

Cookney SOV

COOKNEY

Quadrat FL-Bb05

Quadrat FL-Wb05

Ecological Section FL 3

Ecological Section FL 2

Continued from Sheet 3 of 6 (Figure 40.6c)

0 1km 2km

LEGEND

- Proposed Route (Engineering Profile 04/05/07)
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- Direction of Flow
- Waterbody
- Woodland

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- Low Habitat Value

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- Medium Habitat Value
- Low Habitat Value

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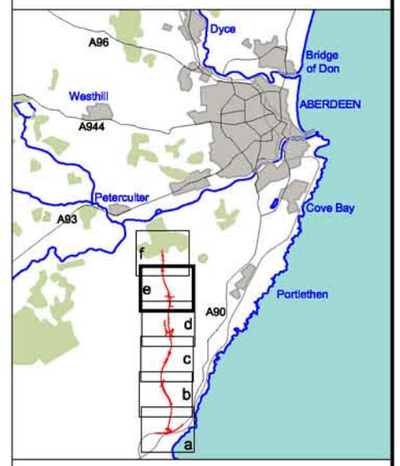
Title	Breeding & Wintering Bird Surveys Sheet 4 of 6
Drawing Status	FINAL
JB No.	0010332
Figure No.	FIGURE 40.6d
Revisions	
Scale	1:10,000
Date	Oct 2007
Drawn	SHF
Checked	GR
Approved	SH

FIGURE 40.6e



Continued on Sheet 6 of 6 (Figure 40.6f)

NORTH

STRANOG HILL

NORTH ROTHNICK

Stranog Hill SOV

Quadrat FL-Wb07

Quadrat FL-Bb07

10000

9000

8000

Continued on Sheet 4 of 6 (Figure 40.6d)

0 1km 2km

LEGEND

- Proposed Route (Engineering Profile 04/05/07)
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- Woodland

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- Low Habitat Value

Breeding Bird Survey : Sites of Ornithological Value
- High Habitat Value
- Medium Habitat Value
- Low Habitat Value

Wintering Bird Survey : Quadrats
- High Habitat Value
- Medium Habitat Value
- Low Habitat Value

Wintering Bird Survey : Waterbodies of Ornithological Value
- High Habitat Value

Rev	Date	Purpose of Revision	Drwn	Chkd	Appd

JACOBS
95 Bothwell Street, Glasgow, G2 7HX, UK
Tel: 0141 204 2511 Fax: 0141 226 3109
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Client	Aberdeen Western Peripheral Route
Project	Aberdeen Western Peripheral Route Environmental Statement 2007 Additional Survey Report : Breeding Birds
Title	Breeding & Wintering Bird Surveys Sheet 5 of 6
Drawing Status	FINAL
JB No.	0010332
Figure No.	FIGURE 40.6e
Revisions	
Scale	1:10,000
Date	Oct 2007
Drawn	SHF
Checked	GR
Approved	SH

FIGURE 40.6f

NORTH

Ecological Section SL 3

Ecological Section SL 2

Crynoch Burn SOV

Quadrat SL-Wb07

Blaikiewell Burn SOV

Cleanhill Wood SOV

Hill of Blairs SOV

South Green

CLEANHILL JUNCTION

BURNHEAD

Quadrat SL-Bb06

Quadrat SL-Wb06

Burnhead SOV

BLAIKIEWELL

Ecological Section SL 3

Ecological Section FL 3

Quadrat FL-Wb08

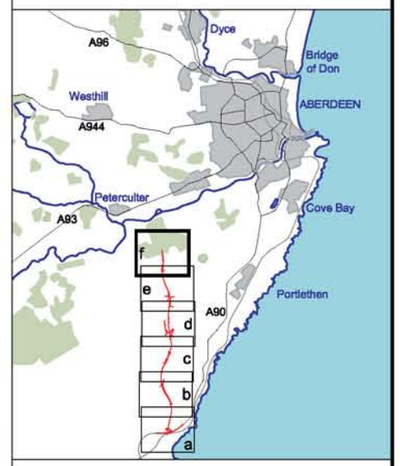
Quadrat FL-Bb08

Start of Southern Leg (Part C)

Start of Fastlink (Part D)

Continued on Sheet 5 of 6 (Figure 40.6e)

0 1km 2km



LEGEND

- Proposed Route (Engineering Profile 04/05/07)
- Indicative Study Area (500m from centre of Proposed Route)
- Watercourses
- Direction of Flow
- Waterbody
- Woodland

Breeding Bird Survey : Quadrats
- High Habitat Value
- Medium Habitat Value
- Low Habitat Value

Breeding Bird Survey : Sites of Ornithological Value
- High Habitat Value
- Medium Habitat Value
- Low Habitat Value

Wintering Bird Survey : Quadrats
- High Habitat Value
- Medium Habitat Value
- Low Habitat Value

Wintering Bird Survey : Waterbodies of Ornithological Value
- High Habitat Value

Rev	Date	Purpose of Revision	Drwn	Chkd	Appd

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Drawing Status	FINAL
JB No.	0010332
Figure No.	FIGURE 40.6f
Revisions	
Scale	1:10,000
Date	Oct 2007
Drawn	SHF
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Approved	SH