

6 ECOLOGY

INTRODUCTION

- 6.1. This chapter provides an assessment of the potential impacts of the proposed development on wildlife and habitats. Impacts on birds are assessed separately in chapter 7.
- 6.2. In common with the other assessments in this document, the chapter is structured in the following way:
- A description of the methods used in the assessment, describing the approach taken to impact assessment and the specific survey methods used to describe the baseline conditions;
 - A baseline description, in this case directly from the results of desk study and field surveys;
 - Assessment of effects section then considers in what ways the proposed development may result in changes to the baseline, and whether such changes should be considered as significant effects in the sense used in the Environmental Impact Assessment Regulations. This section first describes the potential effects, then considers impact significance, taking into account any mitigation measures that will be implemented as a result of the development;
 - Any monitoring requirements are identified in a specific section; and
 - Finally, a statement of significance provides a summary of the chapter, highlighting any impacts which should be considered as significant effects. Where significant effects are identified in this section, they should be taken into account in the decision making process.
- 6.3. The key issues relating to this assessment are the direct and indirect loss of plant habitats and plant and animal species.

METHODOLOGY

Guidance

- 6.4. The following legislation and guidance documents have been taken into account in this assessment:
- Council Directive 92/43/EEC on the Conservation of Natural Habitats and Wild Flora and Fauna;
 - The Conservation (Natural Habitats &c) Regulation 1994;
 - Scottish Executive Interim Guidance on European Protected Species;
 - The Wildlife and Countryside Act 1981 (as amended);
 - The Protection of Badgers Act 1992;
 - Electricity Works Environmental Impact Assessment (Scotland) Regulations 2000 (EIA Regulations);
 - Guidelines for Baseline Ecological Assessment 1995¹;
 - National Planning Policy Guideline 14: Natural Heritage 1999;
 - Scottish Executive Advice Note EJ K1-3;

¹ Guidelines for Baseline Ecological Assessment, Institute of Environmental Assessment 1995, E & FN Spon London

- Environmental Assessment Handbook, Guidance on the Environmental Impact Assessment process²; and
- Guidelines for Environmental Impact Assessment³.

Consultation

- 6.5. A summary of ecological responses provided during the scoping phase are provided below:
- **Association of Salmon Fishery Boards** – concerned that construction work could lead to obstruction of upstream and downstream migration, disturbance of spawning beds, increases in silt and sediment loads, point source pollution and drainage issues. Requested that Caithness District Salmon Fishery Board be consulted;
 - **Scottish Natural Heritage** – Environmental Statement should assess any impacts of development on pipistrelle bat, otter, wildcat and Atlantic salmon. The ES should include an assessment of impacts of the proposed development on any habitats and species listed on the UK Biodiversity Action Plan and the Caithness Local Biodiversity Action Plan. Also recommend a survey for water voles is carried out; and
 - **Scottish Executive Ecological Adviser's Unit** – requested desk based study, baseline survey to National Vegetation Classification Phase 1 standards, mapping of rare/specially protected plants and animals.
- 6.6. In addition to formal scoping, local records have been checked where available, including a desk study and review of the Local Biodiversity Action Plan for the county.
- 6.7. Some members of the public have provided input to the assessment by highlighting the value placed on the wildlife locally. Much of this feedback was received during a public exhibition on 28 June 2006.

Baseline Studies

- 6.8. The methods for each of the baseline surveys carried out on site are described below. Initial surveys were carried out in May 2004 with the survey area being extended and survey work repeated over the periods 9-11 November 2005 and 27-29 June 2006.
- 6.9. **Phase 1 Habitat Survey:** A phase 1 habitat survey of the site has been carried out, mapping the habitats present using the method set out in JNCC guidance⁴. This took place over several visits, in order to take into account revisions to the study area boundary.
- 6.10. **NVC Survey:** The National Vegetation Classification is a system of categorising groups of plants that typically grow together in recognisable vegetation communities. Formal descriptions for the vegetation communities defined in this system are provided in Rodwell (1991 *et seq*)⁵. Rather than map the NVC communities present, this baseline simply describes the communities present within each phase 1 habitat type. Assigning vegetation to an NVC type involves listing the species found growing in representative quadrats (usually 2m x 2m) and estimating their relative percentage cover. In some cases vegetation has been assigned to an NVC type using field guide keys⁶.

² SNH 2005 "Environmental Assessment Handbook, Guidance on the Environmental Impact Assessment process" 4th Edition

³ IEMA 2004 "Guidelines for Environmental Impact Assessment" IEMA/RPS Group Plc, Lincoln

⁴ Joint Nature Conservation Committee 2004 "Phase 1 Habitat Survey: a technique for environmental audit" Joint Nature Conservation Committee, Peterborough

⁵ Rodwell, JS (ed) 1991f "British Plant Communities" (Vols 1-5) Cambridge University Press, Cambridge

⁶ Elkington T et al 2001 National Vegetation Classification: Field Guide to Mires and Heaths, also "Field Guide to Grasslands and Montane Communities", Joint Nature Conservation Committee, Peterborough

- 6.11. **Badger Survey:** The site was searched for badger in November 2005 and June 2006. Field signs of badger are described in the following references: Neal & Cheeseman 1996 and Bang & Dahlstrøm 2001, SNH 2001. Field evidence searched for included: holes (i.e. setts, single and groups of burrows), prints, latrines (and dung pits used as territorial markers), hairs, feeding signs (snuffle holes) and paths. A walkover survey for the above signs can determine current presence/absence of badger. The signs found may also indicate type and intensity of activity and consequently help in the assessment of the importance of a particular area for badger.
- 6.12. **Otter Survey:** The site was searched for field signs of otter in June 2006. The otter survey involved systematically searching for field signs along all accessible watercourses, and included a 100 m buffer in these habitats around proposed turbines and access tracks. Otter surveys were concentrated on all watercourses within close proximity of development activities. Otter field signs are described in Bang & Dahlstrøm 2001⁷ and Sargent & Morris 2003⁸. The most reliable field sign of otter presence is spraint, which is often left in prominent places as a territorial marker.
- 6.13. **Water Vole Survey:** A water vole survey was undertaken in June 2006 following the standard methodology described in Strachan 1998⁹. In addition to recording field signs of water voles, surveyors were instructed to record suitable habitat. One of the survey visits was outside of the correct time for surveys (November). Areas identified as being of suitable habitat during this survey were re-visited in June 2006 to conduct spot-checks.
- 6.14. **Bat Roost Assessment:** A sample of structures was inspected in June 2006 for suitability as bat roosts. For baseline purposes all structures marked on the 1:10,000 OS map are considered potentially suitable as bat roosts.

Assessment of Significance

- 6.15. Assessment of significance in this chapter is based on the most recent guidance from the Institute of Ecology and Environmental Management¹⁰. Assessment of significance involves several stages, which are described below.
- 6.16. The first stage is identifying and valuing the ecological receptors present at the site. This uses the concept of Valued Ecological Receptors (VERs) identified in previous drafts of the IEEM guidance¹¹. Using this approach allows the assessment to target potential impacts on the most important ecological receptors at a site. This assessment uses four categories of VER importance – **International, National, Regional, and Local**. Assigning value to designated sites is straightforward as these tend to be defined with reference to these geographic scales¹². For non-designated interests, guidelines such as the guidelines for the selection of biological SSSIs¹³ have been used to attribute value.
- 6.17. The guidance then recommends that the predicted impacts on these receptors be described and quantified, giving consideration to the following: **confidence in predictions, extent, magnitude, duration, reversibility, timing and frequency and cumulative/in combination effects**.

⁷ Bang, P & Dahlstrøm, P 2001 Animal Tracks and Signs Oxford University Press, Oxford

⁸ Sargent G & Morris, P 2003 How to find & Identify Mammals The Mammal Society, London

⁹ Strachan, R. 1998 "The Water Vole Conservation Handbook" Wildlife Conservation Research Unit, Department of Zoology, University of Oxford

¹⁰ Box *et al* 2005 "An Introduction to the new IEEM guidelines for Ecological Impact Assessment" *In Practice* **49**, IEEM, Winchester

¹¹ Institute of Ecology and Environmental Management 2002 "Guidelines for Ecological Impact Assessment: Amended Pilot November 2002, IEEM, Winchester, also available from www.ieem.org.uk

¹² For example, a site forming part of the European network of NATURA 2000 sites will be internationally important, a site designated as a Site of Special Scientific Interest will be nationally important, and a local wildlife site (for example one designated by the Scottish Wildlife Trust) will normally be regionally important.

¹³ Nature Conservancy Council 1989 (revised 1998) "Guidelines for Selection of Biological SSSIs" Nature Conservancy Council, Peterborough

- 6.18. Professional judgement is then used to determine whether an impact is **significant** or **not significant**. The guiding concept in determining significance is integrity. Integrity of a designated site or defined population has been defined for habitats as "*the coherence of [a site's] ecological structure and function, across its whole area, that enables it to sustain the habitat, complex of habitats and/or the levels of populations of the species for which it was classified*"¹⁴. Although this definition is in connection with designated sites, the principles are the same for any ecological receptor.

BASELINE DESCRIPTION

- 6.19. This section describes the existing flora and fauna at Spittal Hill.

Designated Sites

- 6.20. There are a number of sites designated for their peatland interest in the wider area around Spittal Hill. These are predominantly to the south west of the site, and are between 4 and 7 kilometres away from the site boundary, and include the Caithness and Sutherland Peatlands SAC and its component SSSIs. Given the distance between the proposed development and these sites, and the lack of any direct hydrological linkages, it is considered that impacts on these designated sites need not be considered further in this assessment.
- 6.21. The River Thurso SAC is approximately 500 m to the north of the site boundary.
- 6.22. Within the site itself there are two SSSIs, however these are designated for geological rather than ecological reasons and are therefore discussed further in Chapter 8.
- 6.23. Sites designated due to their ecological value are shown on Figure 6.1.

Habitats

- 6.24. The results of the phase 1 habitat survey are shown in Figure 6.2. Thirteen habitats were identified, and these are described below.
- 6.25. **Grasslands:** Five grassland phase 1 categories have been used to describe the range of variation in the grasslands recorded. The mapping of grassland habitats is, to a certain extent, subjective in that the categories are points on a continuum of increasing agricultural improvement, in this case from forms of heath through to typical improved grassland derived from sown agricultural seed mixes. Table 6.1 describes this range of variation and shows how the categories relate to each other, both in phase 1 and NVC terms.

¹⁴ Circular 06/2005 from the Office of the Deputy Prime Minister

Table 6.1: Variation in Grassland Habitats

Phase 1 categories	[Forms of heath]...	Unimproved acid grassland	Semi-improved acid grassland	Poor semi-improved grassland	Marshy Grassland	Improved grassland
NVC categories		U4e	U4	U4a	MG6b (MG10)	MG6a
Trends	More heathy, on peaty soils... ...more productive agriculturally, more mineral soils					
Typical or indicator species	<i>Vaccinium myrtillus</i> , <i>Calluna vulgaris</i> (Blaeberry, Heather)	<i>Agrostis capillaris</i> <i>Potentilla erecta</i>		<i>Juncus effusus</i> (Rushes)	<i>Lolium sp</i> (Ryegrasses) <i>Trifolium</i> (Clover)	

- 6.26. This table shows that the grasslands showing the greatest degree of agricultural improvement are forms of MG6 *Lolium – Cynosuretum cristati* grasslands, usually with a high proportion of ryegrasses and clover visible in the sward. The central form of acid grassland at this site is U4 *Festuca ovina – Agrostis capillaris – Gallium saxatile* grassland, which is a relatively broad NVC community ranging from more “heathy” forms at one end of the scale (U4e – *Vaccinium myrtillus – Deschampsia flexuosa* sub-community) to the more species-poor “typical” sub-community, U4a. Between these, types, classification as semi-improved was often a matter of judgement on the part of the surveyor, taking into account, for example, the abundance of rushes. Where *Juncus effusus* was dominant these areas have been mapped as marshy grassland. None of the grasslands recorded are rare or otherwise notable in a regional or national context.
- 6.27. **Coniferous Plantation Woodland:** There is a thin strip of relatively mature woodland with Sitka Spruce (*Picea stichensis*) and other conifers on the side of Spittal Hill. This is a common and widespread habitat, particularly in Caithness.
- 6.28. **Mixed Plantation Woodland:** All of the mixed plantation woodland on site is of recent origin, with a diverse mixture of young trees. Within these young plantations, tussocks of purple moor-grass (*Molinia caerulea*) and tufted hair-grass (*Deschampsia cespitosa*) were dominant in places. Being of recent origin, this woodland is of limited nature conservation importance.
- 6.29. **Wet Dwarf Shrub Heath:** Most of the heather dominated areas have been mapped as wet heath. In practice, the mapping of these habitats is indicative; these habitats were always found on close inspection to be mosaics, with wet heath, dry heath, acid grassland and even fragments of blanket bog vegetation present. There were two main wet heath NVC communities present in this type of vegetation - M15 *Trichophorum cespitosum – Erica tetralix* wet heath, and H21 *Calluna vulgaris – Vaccinium myrtillus – Sphagnum capillifolium* heath.
- 6.30. H21 only occurred patchily on the north facing slopes of Spittal Hill, with a characteristically tussocky mix of *Calluna*, *Vaccinium* and cushions of *Sphagnum capillifolium*.
- 6.31. M15 was the predominant form of wet heath, with high cover of *Calluna*, *Trichophorum cespitosum* and some *Empetrum nigrum*. This vegetation was very variable, from sedge rich forms, through to grassy forms (occasionally with abundant *Dactylorhiza* orchids) and species-poor stands with very high cover of *Calluna* and a dense carpet of hypnoid mosses. Sub communities M15a (*Carex panicea* sub community), M15b (typical sub community) and M15c (*Cladonia* sub community) were all recorded. This vegetation in places grades into small lenses of blanket bog type vegetation associated with deeper peat. Some of the larger areas have been mapped for illustrative purposes on Figure 6.2, but in practice these fragments occurred at a scale where mapping is impractical. Although these areas were small, they appear most likely to be a form of the NVC community M19 (*Calluna vulgaris – Eriophorum vaginatum* blanket mire). These areas had abundant *Sphagnum capillifolium* and other *Sphagnum sp.*

6.32. **Dry Dwarf Shrub Heath:** This habitat has not been mapped, however it does occur within the study area in mosaic amongst wet heath. Generally areas were small and graded into wetter forms. NVC communities H9 (*Calluna vulgaris – Deschampsia flexuosa* heath) and H12 (*Calluna vulgaris – Vaccinium myrtillus*) were recorded. Within this mosaic, dry heath may form up to 10% of the area mapped as wet heath.

6.33. **Wet Heath/Acid Grassland Mosaic:** As has been noted above, all forms of wet heath occurred in mosaics. This category has been used to map areas where there were relatively higher proportions of acid grassland to heath.

6.34. **Open Water:** The main body of open water at the site is Banniskirk Reservoir. In addition to this there are a number of small ponds present at the site. Most of these were almost dry at the time of survey and supported dense stands of *Carex rostrata* and *Menyanthes trifoliata*.

6.35. **Running Water:** Networks of drainage ditches are present within the site.

Protected Mammals

6.36. **Badger:** No field signs of badger were recorded during any of the site surveys.

6.37. **Otter:** Full details of the otter survey are presented as a confidential annex. The survey found a number of structures suspected to be otter shelters. In addition, otter spraints were found at the locations noted in the confidential annex. This evidence suggests that there is a strong otter population in this area.

6.38. **Water vole:** No field signs of this species were recorded, although suitable habitat was noted in a number of locations. The locations where suitable habitat was noted are shown in Figure 6.3.

6.39. **Bats:** A number of buildings were inspected during June 2006, and some were found to afford roosting opportunities, although no actual evidence of occupation by bats was recorded. None of the potentially suitable roost structures will be affected by the development.

6.40. In relation to potential bat collisions, it is helpful to have an understanding of how bats may use the airspace in the site. There is as yet no useable protocol for collecting data about how bats use airspace with reference to position and height that can be applied in the context of an environmental assessment. A useful proxy is to use habitat as an indicator. This approach has been developed by Walsh & Harris (1996a¹⁵). Habitats at Spittal are predominantly moorland; this is a habitat generally avoided by foraging bats, as it is less insect rich than woodland and more structurally diverse habitats (Walsh & Harris 1996b¹⁶).

6.41. **Other mammals** – evidence of fox and rabbit were found at a number of locations throughout the site. Although no specific surveys were undertaken, it is likely that a range of small mammals will be present, including field voles and shrews.

Identification of Valued Ecological Receptors

6.42. The above baseline data allows the assessment to identify four valued ecological receptors (VERs) present within the study area. These are described below, together with the reason why they are considered as valued ecological receptors in the context of this assessment, and a description of their nature conservation importance.

6.43. **Wet heath and related habitats:** The forms of wet heath recorded within the study boundary fall within the “Northern Atlantic wet heaths with *Erica tetralix*” category of Annex 1 of the habitats directive (92/43/EEC). They are a common and widespread habitat in the context of Caithness

¹⁵ Walsh, A.L., & Harris, S. 1996a “Foraging habitat preferences of vespertilionid bats in Britain” *Journal of Applied Ecology* **33** 508-518

¹⁶ Walsh, A.L., & Harris, S. 1996b “Factors determining the abundance of vespertilionid bats in Britain: geographical, land class and habitat relationships” *Journal of Applied Ecology* **33** 519-529

and upland Scotland generally. The extents of this habitat present in the study area are assessed as being of **local** nature conservation importance.

- 6.44. **Dry heath:** The forms of dry heath recorded within the study boundary fall within the “European dry heaths” category of the habitats directive (92/43/EEC). Although less extensive than (and in mosaic with) the wet heath, these habitats are also assessed as being of **local** nature conservation importance.
- 6.45. **Otter:** Otter is a European protected species under the habitats directive (92/43/EEC), and is afforded protection in UK law by the Conservation (Natural Habitats &c) Regulations 1994. The Scottish otter population is strong and probably still expanding¹⁷. The otter population within the study area is considered to be of **regional** importance.
- 6.46. **Bats:** Although the baseline population has not been established through emergence or flight activity survey, professional judgement suggests that here, as elsewhere, bats will be present. Bats are protected species under the habitats directive (92/43/EEC), and are afforded protection in UK law by the Conservation (Natural Habitats &c) Regulations 1994. On the basis of habitats present and through consultations, there is no evidence that an unusually strong or diverse bat population will be present. However, by adopting a precautionary approach, the population at Spittal is assessed as being of **regional** importance.

ASSESSMENT OF EFFECTS

Potential Effects

- 6.47. There are three main ways through which the development may affect habitat receptors:
- **Direct loss:** This is most likely through construction of access tracks and turbine bases. Such losses are generally considered permanent – any restoration of the habitat following decommissioning should be considered as habitat creation;
 - **Temporary disturbance:** This will occur as a result of movement of vehicles and temporary storage of construction materials and turbine components. The significance of this impact depends directly on the nature and frequency of the disturbance, and also the sensitivity of the habitat. Habitats under construction compounds and laydown areas are expected to take a long time to recover due to the ongoing nature of the disturbance during the construction period. Habitats at track edges may be disturbed by vehicle movements over a short period during localised track construction, some habitats will recover quickly from this type of disturbance; others may be only recover slowly; and
 - **Indirect effects:** construction of tracks over peat has the potential to disrupt lateral movement of water through peat. This is more of an issue in bog habitats. The predominant peatland habitats present are heaths, where the lateral movement of water is not so significant because the layer of peat present is thinner. In very remote situations, the creation of access tracks may increase stock access to grazing in previously ungrazed or only lightly grazed areas; this is not likely to influence the vegetation at Spittal.
- 6.48. For otters, the proposed development will result in increased disturbance both during the construction and operational phases of the development. Disturbance can take various forms, such as accidental entrapment in exposed excavations, and stress to the animals as a result of increased human presence around their places of shelter. The effects of such disturbance on populations are usually very difficult to detect, the effects can range from alterations in the distribution of the species, (with animals avoiding certain areas), to reduced breeding success and even death in situations of extreme stress, such as accidental entrapment.

- 6.49. For bats, the impact of primary concern would be disturbance to roosts, which is not considered likely in this case. The other way in which bats are potentially affected is through collisions with wind turbines, in a similar way to the way birds are affected. As yet there is no predictive model to quantify the risk of such events in the context of an impact assessment.
- 6.50. Loss of foraging habitat and blocking of migration routes have also been suggested as potential ways in which wind turbines may affect bats, these are not considered likely to be of relevance in this case.

Mitigation

- 6.51. Design: The most effective mitigation measure adopted in the design of this development has been the use of ecological constraints to inform the development layout. The main ways in which this has been effective are listed below:
- Losses of sensitive habitats have been minimised. A previous study area in earlier stages of the development included an area of wet modified bog. This area lies to the west of the current application area and will be unaffected by the development; and
 - There will be no disturbance to structures potentially containing bat roosts.
- 6.52. Ecological clerk of works during construction: An appropriately qualified ecologist will conduct repeat mammal surveys and advise during construction to minimise the risk of disturbance to sensitive habitats and species.
- 6.53. Micrositing: During construction, micrositing will be informed with input from an appropriately qualified ecologist to ensure disturbance to sensitive habitats and species is minimised.
- 6.54. Track construction methods – in-line working: Method statements for track construction will minimise the need for construction plant traffic outside the footprint of the track, thus minimising disturbance to habitats.
- 6.55. Excavations - storage and replacement of turves: In heathland and related habitats turves will be cut and appropriately stored for use in restoration of track edges, turbine bases etc. This process will be overseen by the ecological clerk of works.
- 6.56. Mammal escape ramps in uncovered excavations: Any uncovered or unfenced excavations/trenches over 0.5 m deep will have mammal escape ramps at regular intervals to ensure protected mammals such as otter are not inadvertently trapped. These will be inspected by the ecological clerk of works.
- 6.57. Changes to the layout have resulted in embedded mitigation measures within the wind farm design. Turbines have been removed from the reservoir, leaving a 500m buffer around the waterbody ensuring this area has been left free for otter foraging.

Residual Effects

- 6.58. This section considers in detail the significance of residual effects on valued ecological receptors. No impacts associated with the decommissioning phase of the development have been identified with the exception of general disturbance to otters.

Wet Heath and related habitats

- 6.59. Table 6.2 describes the impact on wet heath:

¹⁷ Green, J. & Green, R. 1997 “Otter Survey of Scotland 1991-1994” Vincent Wildlife Trust, London

Table 6.2 Wet Heath: Description of Impact

Impact Characteristic	Comments
Uncertainty in predictions	Direct losses can be predicted with some certainty, as they can be measured from a map. There will be an associated error in relation to the accuracy of habitat mapping, overall this is unlikely to influence the significance. Indirect losses are not predicted for this habitat.
Extent/magnitude	Direct losses are predicted to be 0.12 ha. There will be some indirect losses due to construction disturbance. This will be minimised through the mitigation measures described above.
Duration and reversibility	These losses are permanent.
Timing and Frequency	This will occur once, during construction.
Cumulative/in combination effects	The scale of the habitat loss predicted is not considered sufficient to warrant concern regarding in combination effects.

6.60. This receptor is of local value and the significance of potential impacts should therefore be assessed with regard to the integrity of the local habitat resource. Within the region there are over 400,000 hectares of peatland, including wet heath. The predicted losses from both direct and indirect impacts are clearly of trivial extent in a local or regional context. Primarily for this reason, the development is not predicted to lead to a significant impact on the integrity of the local habitat resource.

Dry Heath

6.61. Table 6.3 describes the impact on dry heath:

Table 6.3 Dry Heath: Description of Impact

Impact Characteristic	Comments
Uncertainty in predictions	Direct losses can usually be predicted with some certainty, as they can be measured from a map. In this case, however, the dry heath has been included within wet heath because it is present as a mosaic within this habitat type. Extents (and thus predicted losses) can only be estimated based on the estimated proportion of dry heath present in the vegetation. Primarily these uncertainties serve to highlight the limited extent of this habitat in the study area. Indirect losses are not predicted for this habitat.
Extent/magnitude	There will be some indirect losses due to construction disturbance. This will be minimised through the mitigation measures described above.
Duration and reversibility	These losses are permanent.
Timing and Frequency	This will occur once, during construction.
Cumulative/in combination effects	The scale of the habitat loss predicted is not considered sufficient to warrant concern regarding in combination effects.

6.62. As with the other habitat receptors, the significance of impacts on dry heath must be assessed with reference to the integrity of the local habitat resource. The scale of these losses in a local context is not considered to represent a significant impact on the integrity of the receptor.

Otter

6.63. Table 6.4 describes the impact on otter:

Table 6.4 Disturbance to otter during construction: Description of Impact

Impact Characteristic	Comments
Uncertainty in predictions	Disturbance to places of shelter has been addressed through survey and design and we can have confidence in these results. Residual uncertainty can be reduced through re-survey prior to construction. More general disturbance to otters is a chance event, when animals come in contact with certain forms of human activity. For this reason the assessment is not quantitative.
Extent/magnitude	Given the likely sizes of home ranges in this type of habitat, disturbance may affect a maximum of 2 females and one male's home range. Changes to the layout have ensured a 500 m buffer zone around the dam.
Duration and reversibility	This impact will last for the duration of the construction period – estimated to be 18 months. No irreversible effects are predicted.
Timing and Frequency	Occurs throughout the construction period.
Cumulative/in combination effects	No cumulative or in combination effects have been identified.

6.64. This impact, on an ecological receptor of regional importance, is not considered to be significant.

6.65. Operational disturbance: As noted above, disturbance is effectively a chance event, when otters come into contact with humans. Contact with humans as a direct result of operation of wind farm will be primarily associated with routine maintenance, which generally happens during the day. Most otter foraging in the habitats on site is likely to be nocturnal, or crepuscular (at dawn and dusk). On a site that is actively farmed, such as Spittal, it is considered that disturbance to otters from operation of the wind farm, (that is, over and above the baseline level of disturbance) will be so infrequent that it can be discounted as an impact and does not require further assessment.

6.66. Decommissioning of the proposed development would lead to similar disturbance levels to construction, with the exception that there would be no exposed excavations and hence no possibility of otters becoming trapped.

Bats

6.67. Table 6.5 describes the impact on bats:

Table 6.5 Bats: Description of Impact

Impact Characteristic	Comments
Uncertainty in predictions	There is uncertainty in predicting impacts on bats, especially with regard to collisions. Our understanding of the potential impacts is poor ¹⁸ .
Extent/magnitude	The number of collisions and the impact this will have on the local bat population is unknown.
Duration and reversibility	The risk of collision will be present whenever the turbines are turning at night for the 25-year lifespan of the development.
Timing and Frequency	The number of collisions and the impact this will have on the local bat population is unknown.
Cumulative/in combination effects	The scale of this impact is assumed to be low, and cumulative effects on the local bat population are not considered likely.

6.68. Based on an assessment of habitat quality, the site of the proposed development is considered to be of low value as a foraging resource for bats. On this basis, the potential for bat collisions is assessed as being low, and thus is considered unlikely to present a significant impact on the integrity of the local population. However it is acknowledged that the development of a more robust assessment method would give more confidence in coming to this conclusion.

SUMMARY OF EFFECTS

6.69. The table below provides a summary of the potential effects of the proposed development:

Potential Effect	Mitigation	Residual Effect
Direct loss of wet heath and disturbance to the habitat during construction	Layout design, track construction methods, restoration methods	No significant effect predicted on the integrity of the receptor
Direct loss of dry heath and disturbance to the habitat during construction	Layout design, track construction methods, restoration methods	No significant effect predicted on the integrity of the receptor
Disturbance to otters (construction)	Ecological Clerk of Works, Excavation techniques	No significant effect predicted on the integrity of the receptor
Collisions for bat species	None	No significant effect predicted on the integrity of the receptor

PROPOSED MONITORING

6.70. Monitoring of the effectiveness of mitigation measures during construction will be the responsibility of the ecological clerk of works. The clerk will monitor, in particular, the effectiveness of method statements to minimise disturbance to habitats during construction (in-line track construction), habitat restoration (the storage and replacement of turves), and the implementation of provision of mammal escape ramps. This monitoring will take the form of a weekly report produced by the ecological clerk of works.

6.71. In conjunction with bird monitoring for collisions, monitoring will include attempts to monitor for any bat collisions that may occur.

STATEMENT OF SIGNIFICANCE

6.72. The proposed development avoids sensitive habitats such as extensive tracts of peatland, and has been designed with the use of ecological constraints plans to avoid placing infrastructure close to protected mammals and other sensitive ecological receptors.

6.73. The assessment of the potential impacts of the proposed development presented in this chapter follows recent guidelines from the Institute of Ecology and Environmental Management. These guidelines focus attention in the assessment on the valued ecological receptors present at a site, and then consider the potential for impacts on the integrity of those receptors. Five valued ecological receptors have been identified at this site. There are three habitat receptors. In each of these three cases, habitat loss and disturbance are of very small scale in the context of the available habitat resource. The small scale of these predicted losses gives confidence that there will be no impact on the integrity of these receptors.

6.74. There are two protected mammal receptors. In the case of otter, the integrity of the receptor is not threatened because there is a low probability of disturbance given the mitigation measures being applied. In the case of bats, the integrity of the receptor is not considered to be threatened based on the value of the habitats present for foraging bats.

6.75. Thus none of the impacts identified are predicted to be significant in the sense used in the Environmental Impact Regulations.

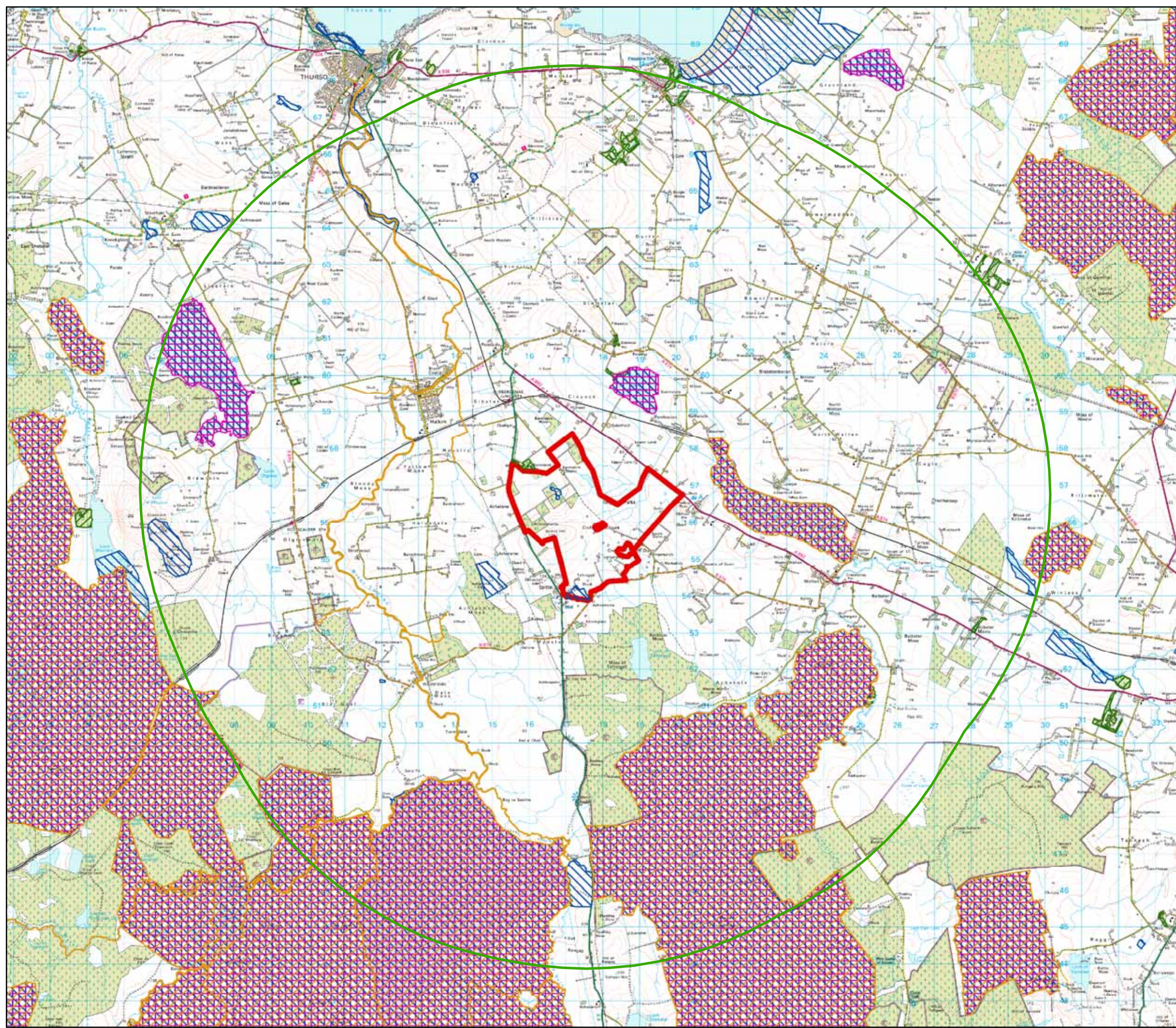
¹⁸ Betts, S. 2006 "Are British bats at risk from wind farms?" *British Wildlife* 17 No 5, 339-345

Spittal Hill Wind Farm Ltd

RPS

Key

- Application Boundary
- 10km Radius of Site Boundary
- Special Area for Conservation
- Special Protection Area
- Site of Special Scientific Interest
- Ramsar
- Inventory Ancient Woodland
- Inventory Semi Natural Ancient Woodland
- National Nature Reserve



Scale 1:100,000 @ A3
0 1,000 2,000 4,000 m



Environmental Designations

Figure 6.1

Spittal Hill Wind Farm Environmental Statement



Key

- Broad-leaved trees
- × Scattered scrub
- ▨ Coniferous plantation
- ▨ Mixed plantation
- ▨ Unimproved acid grassland
- ▨ SI Semi-improved acid grassland
- I Improved grassland
- ▨ Marshy grassland
- SI Poor semi-improved grassland
- ▨ Wet dwarf shrub heath
- ▨ Wet heath/acid grassland mosaic
- Blanket bog
- Standing water
- Q Quarry
- A Arable
- Running water
- Application Boundary
- ⊙ 110m Turbine Locations
- ⊙ 100m Turbine Locations
- Existing Tracks
- Proposed Access Tracks
- Temporary Laydown Area

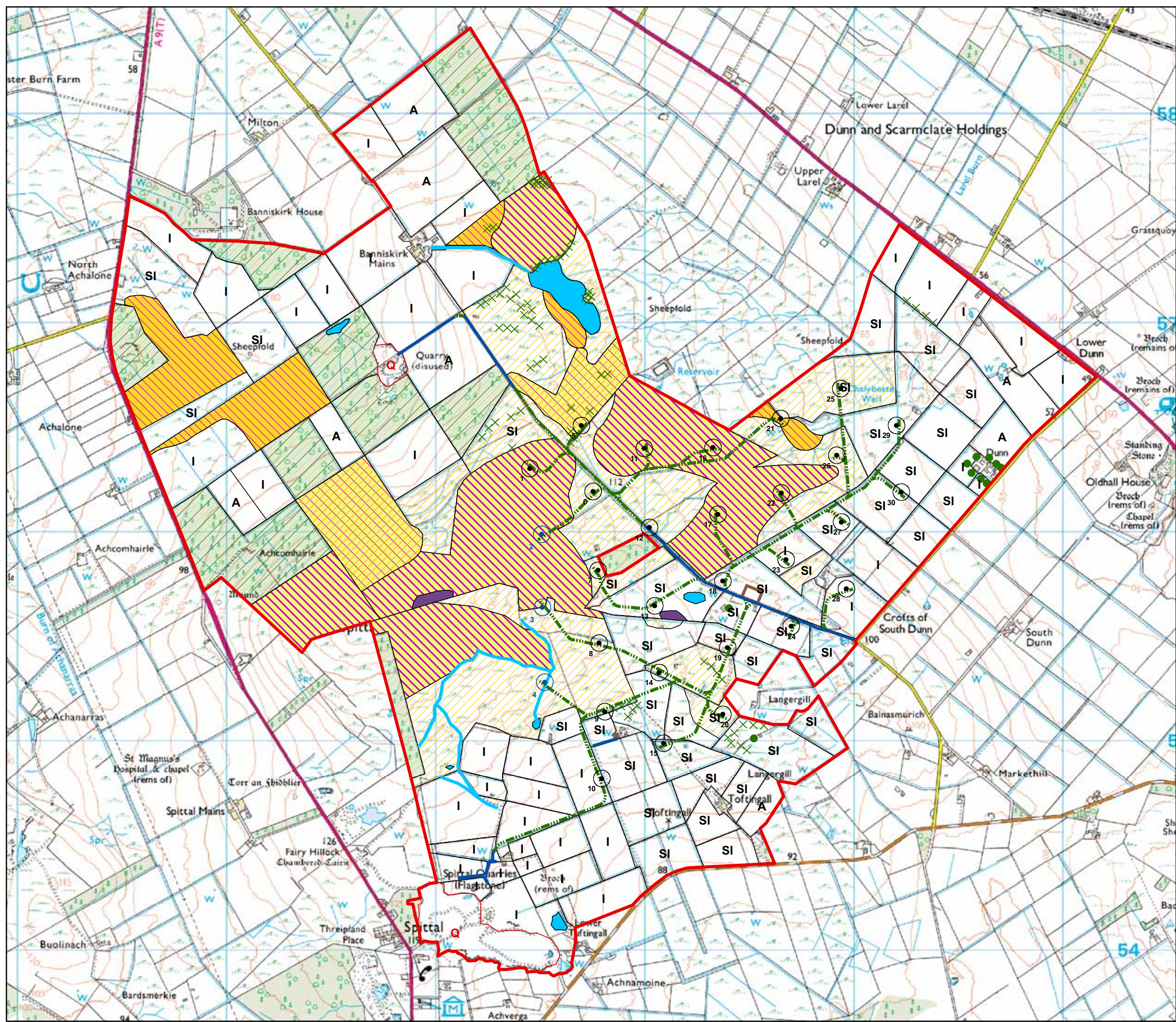
Scale 1:17,500 @ A3
 0 150 300 600 m



Phase 1 Habitat

Figure 6.2

**Spittal Hill Wind Farm
Environmental Statement**





Key

- Otter spraint
- Suitable water vole habitat
- 110m Turbine Locations
- 100m Turbine Locations
- Application Boundary
- Proposed Access Tracks
- Existing Tracks
- Temporary Laydown Area

Scale 1:20,000 @ A3



Otter and Water Vole Survey Results

Figure 6.3

Spittal Hill Wind Farm Environmental Statement

