

TECHNICAL APPENDIX 7.1: ECOLOGY SURVEY RESULTS

7.1.1 Introduction

7.1.1.1 This Technical Appendix presents full details of the results from ecology field surveys undertaken in June 2018 and 2019 for the proposed development. Results were collected using methodologies detailed in Chapter 7: Ecology in Volume 2. Supporting detailed survey findings (Figures 7.1-7.4) are presented in Volume 4 - Ecology.

Results

7.1.2 Phase 1 Habitat Survey Results

7.1.2.1 The following habitat types were recorded within the study area and area shown on Figure 7.3 (see Volume 4):

A1.1.1 Semi-natural Broadleaved Woodland

7.1.2.2 This habitat occurs within the site boundary predominately along the embankments on the south side of the existing M9. Beech *Fagus sylvatica* and willow species *Salix sp.* are dominant. Wild cherry *Prunus avium* and bramble *Rubus fruticosus agg.* are abundant, with frequent hawthorn *Crataegus monogyna*, ash *Fraxinus excelsior* and dock species *Rumex spp.* Alder *Alnus glutinosa* is occasional with bittersweet *Solanum dulcamara* and rare gorse *Ulex europaeus* and Douglas fir *Pseudotsuga menziesii*.

7.1.2.3 Two larger stands of broadleaved woodland were recorded outside of the site boundary. The area of woodland to the north, surrounding Swine Burn is dominated by sycamore *Acer pseudoplatanus*, ash and hazel *Corylus avellane*. The stand of broadleaved woodland directly to the north of the site boundary, north of Duntarive Castle, is dominated by sycamore with abundant broad buckler fern *Dryopteris dilatata*, holly *Ilex aquifolium* and large leaved lime *Tilia platyphyllos*. There is also frequent hawthorn scrub, brambles and bracken *Pteridium aquilinum*.

A1.1.2 Broadleaved Plantation Woodland

7.1.2.4 An area of plantation woodland is present along the embankment on the north side of the M9, to the east of Beatlie Road (B8020). This woodland area is dominated by alder and ash with an understory of cock's foot *Dactylis glomerata*, Yorkshire fog *Holcus lanatus* and male fern *Dryopteris spp.* Rosebay willowherb *Chamerion angustifolium* and bramble is abundant with frequent silver birch *Betula pendula*, hawthorn bush, young sessile oak *Quercus petraea*. Occasional sycamore and Scots pine *Pinus sylvestris* are also present along with rare occurrences of Norway spruce *Picea abies*, goat willow *Salix caprea* and broadleaved marsh orchid *Dactylorhiza majalis*.

A1.3.1 Semi-natural Mixed Woodland

7.1.2.5 A small area of mixed woodland was recorded to the north of the M9, west of the B8020 at Duntarive Castle. The woodland is dominated by sycamore, hawthorn and Norway spruce. Scots pine *Pinus sylvestris* and grey willow *Salix cinerea* is abundant.

A3.1 Broadleaved Parkland / Scattered Trees

7.1.2.6 Stands of scattered broadleaved trees are present to the north of the site boundary near Duntarive Castle and south of the existing M9 underpass. These woodland areas are dominated by sycamore, ash and grey willow, with an understory of False oat grass

Arrhenatherum elatus, Yorkshire fog and common hogweed *Heracleum sphondylium*. A line of scattered lime *Tilia europaea* and ash runs perpendicular to M9 east of Beatlie Road. A line of sycamore, ash and goat willow runs to the north, south of Duntarive Castle. A line of wild cherry and grey willow is present along the M9 to the north west of the western extent of the site boundary.

B2.2 Semi Improved Neutral Grassland

7.1.2.7 Areas of semi-improved neutral grassland are present along the embankments of the M9, within the site boundary. There are also two areas to the north, just beyond the site boundary, near Duntarive Cottages and Duntarive Castle. False oat grass, Yorkshire fog and dock species dominate this habitat type, which is also abundant with bramble, cow parsley *Anthriscus sylvestris* and creeping thistle *Ranunculus repens*. Rosebay willowherb, common hogweed, cock's foot, white clover *Trifolium repens*, tufted hair grass *Deschampsia cespitosa* and wavy hair grass *Deschampsia flexuosa* is frequent with occasional hawthorn scrub and wild strawberry *Fragaria vesca*. Horse tail *Equisetum spp.* and ash is also present in low abundances.

B4 Improved Grassland

7.1.2.8 This habitat occurs within the south eastern section of the site boundary. Perennial rye grass *Lolium perenne* and white clover is dominant.

C3.1 Other Tall Herb and Fern – Ruderal

7.1.2.9 This habitat type was recorded within the site boundary, on the northern side of the M9, east of Winchburgh Road. This area is dominated by rosebay willowherb with false oat grass, hard fern *Blechnum spicant* and bramble. Common hogweed, hawthorn scrub and rose species *rosa spp.* is occasional.

G1.3 Standing Water – Oligotrophic

7.1.2.10 A small oligotrophic pond is present within the site boundary, the water body has formed within the ditch at the foot of the northern M9 embankment. A large oligotrophic pond is located to the north of the site boundary (not within site boundary), feeding into the Swine Burn at Grid Reference NT 097 759. This body of water is stocked and utilised as a fishing pond. Two other smaller oligotrophic ponds were recorded outside of the site boundary, one in woodland to the north of the site at Bailies Muir and another to the south east of the site at the foot of the northern M9 embankment. Pond locations are shown in Volume 4, Figure 7.4: Target Notes.

J1.1 Arable land- Cultivated/ Disturbed land

7.1.2.11 The most common habitat type within and outside the site boundary. Cropped fields were predominantly cereal crops including oat *Avena sativa*, barley *Hordeum vulgare* and wheat *Triticum spp.*

J2.1.2 Intact Hedge – Species poor

7.1.2.12 Two stretches of intact hawthorn hedgerow were recorded beyond the site boundary, along Winchburgh Road to the north and parallel to the M9 to the west. Elm *Ulmus spp* and ash species were recorded within the stretch of hedgerow to the north.

J2.6 Dry Ditch

7.1.2.13 Dry, vegetated ditches run directly parallel to both sides of the M9.

J2.8 Earth Bank

7.1.2.14 An earth bank runs perpendicular to the north of the site boundary, parallel to Winchburgh Road. The earth bank, measuring approximately 106 m, is covered in tall ruderal species including rosebay willow herb, common hogweed and bramble. False oat grass and Yorkshire fog is also abundant.

7.1.3 Target Notes

7.1.3.1 Table 7.1.1 details Target Notes recorded during the Extended Phase 1 survey. Target Notes are presented on Figure 7.4 in Volume 4.

Target Note	Grid Reference	Feature
1	NT 08974 76860	Pond 1: poor suitability (0.53) for great crested newts (GCN) <i>Triturus cristatus</i> , 330 m from site boundary, surrounded by broadleaved woodland, separated from the site boundary by Winchburgh Road and Beatlie Road.
2	NT 09104 76342	Mature horse chestnut <i>Aesculus hippocastanum</i> tree with low bat roost potential (BRP).
3	NT 09111 76259	Mature sycamore tree with low BRP.
4	NT 09855 75594	Pond 2: dried up, poor suitability (<0.01) for GCN.
5	NT 09248 76190	Mature sycamore tree with low BRP.
6	NT 09402 76256	Rabbit warren, multiple burrow entrances on mound.
7	NT 09305 76182	Line of mature ash and limetrees with low BRP, including one lime tree with dense branches around trunk.
8	NT 09702 76003	Pond 3: fishing pond, highly stocked, poor suitability (<0.39) for GCN or other amphibians.
9	NT 09832 75969	Planted woodland, area of young planted trees, field maple <i>Acer campestre</i> and sycamore <i>Acer pseudoplatanus</i> (still with protective plastic sheaths).
10	NT 09862 75970	Rhododendron <i>ponticum</i> , 3-4 bushes.
11	NT 09230 76189	Pond 4: poor suitability (<0.41) for GCN, near the foot of the embankment, bulrush <i>Typha latifolia</i> , soft rush <i>Juncus effuses</i> and duckweed <i>Lemna minor</i> present.

7.1.4 Protected Species

7.1.4.1 Protected species recorded during field surveys are shown on Figure 7.4 in Volume 4 and discussed in Chapter 7: Ecology and Nature Conservation in Volume 2.

Badger

7.1.4.2 The information on badger *Meles meles* recorded within the study area is provided in Technical Appendix 7.3, which is confidential and not available for the public.

Bats

7.1.4.3 The location of trees assessed for bat roost potential (BRP) are detailed in Table 7.1.1 and shown on Figure 7.4 in Volume 4.

7.1.4.4 Three mature trees located within the study area were assessed for BRP, which included one horse chestnut and two sycamores (Target Notes 2, 3 and 5). A line of mature lime and ash was also assessed (Target Note 7).

7.1.4.5 Although all trees were of adequate size and age to provide a potential roost location, each tree lacked sufficient BRP features and so were assessed to have low BRP. As stated in best practice guidelines¹, further survey is not required however soft felling will be required under the supervision of an ecologist if these trees are to be removed.

Otter

7.1.4.6 No signs of otter *Lutra lutra* activity were recorded during the Extended Phase 1 survey.

Water vole

7.1.4.7 No signs of water vole *Arvicola amphibius* activity were recorded during the Extended Phase 1 survey.

Great Crested Newt

7.1.4.8 The results of the Habitat Suitability Index (HSI) assessment for great crested newt (GCN) are detailed in Table 7.1.2.

7.1.4.9 Four ponds were located within the study area. The suitability of Ponds 1, 3 and 4 (Target Notes 1, 8 and 11) was assessed using the HSI. It was not possible to assess Pond 2 (Target Note 4) as it was no longer present due to seasonal drying. Pond 1 scored as below average suitability, Pond 2 is discounted from the assessment and Ponds 3 and 4 scored as poor suitability for GCN. Therefore, as per best practise guidance², none of these ponds require to be surveyed further for GCN.

Table 7.1.2: Great Crested Newt Pond Survey and HSI Assessment Results

Pond	1	2	3	4
Location	NT 08974 76860	NT 09855 75594	NT 09702 76003	NT 09230 76189
HSI Score	0.53	N/A	0.39	0.41
Suitability	Below Average	Poor	Poor	Poor
Description	Large pond 330 m north west of the site boundary within broadleaved woodland. Poor water quality, evidence of waterfowl.	Pond within site boundary no longer present – likely to have dried up, unable to conduct HSI assessment.	Pond is located just outside the site boundary to the north west at the Swine Burn. The pond is an active fishing pond, busy with human activity, highly stocked with fish. Water fowl present.	Pond it located just within the site boundary, at the very south east extent. Small pond located at foot of embankment, presence of bulrush and duckweed, poor water quality, likely to dry up seasonally.

¹ Collins, J. (ed.), 2016. Bat Surveys for Professional Ecologists: Good Practice Guidelines (3rd edition.). London: The Bat Conservation Trust.

² English Nature (2001). Great crested newt mitigation guidelines. English Nature August 2001.