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12 ECOLOGY

12.1 CONSULTATION

The Heritage Division, Dept. of Environment Heritage and Local Government, was consulted with respect to the proposed development (May, 2005). The area comprises largely of intensive agricultural land use and no ecological issues were raised with regard to the proposed development (Local Conservation Ranger (Dr. Maurice Eakin), pers. comm. and written communication, See Appendix 12.1).

The Eastern Regional Fisheries Board (ERFB) was consulted with respect to the Local Area Plan implementation (May, 2005). The River Nanny supports populations of brown trout. Any contamination of watercourses which feed into this area would have a negative impact on water quality and fish populations in this river (Environmental Officer (Mr. Noel McGlone), pers. comm.). It is therefore necessary that preventative measures are taken to ensure that there is no negative impact on the watercourses.

At the time of writing this report, written correspondence had not been received from the ERFB. The relevant individual was consulted by telephone and their comments were included. Letters of consultation will be offered as an addendum when written correspondence is received.

12.2 NATURE CONSERVATION DESIGNATIONS

A review of the Heritage Divisions datasets (www.heritagedata.ie) indicates that there are no parts of the site or the immediate surroundings covered by a scientific or conservation designation or proposed designation as recognized by the National Parks and Wildlife Service (NPWS). Four designated sites occur within approximately 5km of the site and are detailed below (see Figure 12.1). A Site Synopsis of each habitat is given in Appendix 12.2.

Table.12.1. Designated sites within approximately 5 km of the study area.

Site	Designation	Site Code	Description	Approx. distance to study area
01578	Duleek Commons	pNHA	Calcareous marsh and fen system	2 km
01593	Thomastown Bog	pNHA	Raised bog surrounded by wet woodland and wet grassland	5 km
01862	Boyne River Islands	cSAC	Alluvial wet woodland	5 km
01861	Dowth Wetland	pNHA	floodplain marsh with an associated area of deciduous woodland	4 km

12.3 FLORA

12.3.1 Desk Study and Field Survey Methodology

The desk study comprised the following elements:

- A review of the National Parks and Wildlife Service database of existing and proposed designated sites,
- A review of relevant Ordnance Survey maps,
- A review of relevant literature and reports,
- Consultation with National Parks and Wildlife Service
- Consultation with Eastern Regional Fisheries Board

Habitats were mapped and described according to *A Guide to Habitats in Ireland* (Fossitt, 2000) and in general accordance with *Draft Habitat Survey Guidelines: A Standard Methodology for Habitat Survey and Mapping in Ireland* (Heritage Council, 2002). Habitats were mapped with Target Notes used to describe features of interest. The conservation value of habitats is described in terms of international, national, regional and local importance as appropriate. An assessment of the potential impacts of the proposed development on the existing flora is made. Mitigation measures and recommendations are made in relation to ecologically important areas and features.

Botanical nomenclature followed Webb *et al.* (1996) for vascular plants excluding grasses and Hubbard (1984) for grasses.

The field survey was carried out on July 26th under good weather conditions. The survey was therefore carried out during the growing season and the optimal period for habitat surveys, which is generally regarded as being from April to September inclusive (JNCC, 2003).

12.3.2 Receiving Environment

12.3.2.1 Survey Results

An assessment of the habitats on the site was conducted. Six main habitats were identified within the site boundary. The location and approximate extent of the habitats are indicated on Figure 12.2. The dominant habitat was arable crops. The habitats recorded on the site are:

i. Arable crops BC1
ii. Improved agricultural grassland GA1
iii. Hedgerows WL1
iv. Drainage ditches FW4
v. Treelines WL2
vi. Spoil and bare ground ED2

i. Arable Crops BC1

The dominant habitat on site is arable corps, which occurs in all the fields except one (Figure 12.2; Appendix 12.3, Plate 1). This habitat as classified by Fossitt (2000) includes agricultural land used for the production of potatoes. The land was fallow at the time of visit but had been last sown with potatoes and several potato plants were growing in the fields. The vegetative cover was patchy and covered approximately 20% of the field area. The vegetative cover mostly comprised of potatoes. Other plant species recorded included ruderal species such as nettle (*Urtica dioica*), creeping thistle (*Cirsium arvense*), greater plantain (*Plantago major*), redshank (*Polygonum persicaria*), chickweed (*Stellaria media*) and meadow buttercup (*Ranunculus repens*). The arable crop area is of low ecological value.

ii. Improved Agricultural Grassland GA1

The improved agricultural grassland found on site was grazed by cattle at the time of the field survey and the sward height was c. 10 cm (Appendix 12.3, Plates 2). The species composition is dominated by typical agricultural grassland species including meadow fox-tail (*Alopecurus pratensis*), Yorkshire fog (*Holcus lanatus*), perennial ryegrass (*Lolium perenne*), cock's-foot (*Dactylis glomerata*), creeping bent (*Agrostis stolonifera*) and meadow-grasses (*Poa* spp.), which occur frequently. Broadleaved herbs include creeping buttercups (*Ranunculus repens*), meadow buttercup (*Ranunculus acris*), dandelion (*Taraxacum* spp.), white clover *(Trifolium* repens), cuckoo-flower (*Cardamine pratensis*) and thistles (*Cirsium* spp.), which occurred occasionally. The improved agricultural grassland is of low conservation value.

iii. Hedgerows WL1

Individual hedgerows were mapped for the purposes of this study. Hedgerow habitats are widespread within the area and define the boundary of field parcels. The dominant species is hawthorn (*Crataegus monogyna*). Most of the site boundary hedgerows are maintained as dense, stock-proof hedges and some support semi-mature and mature tree standards of ash (*Fraxinus excelsior*) along their length. A number have drainage ditches at their base. The internal hedgerows are poorly maintained and are gappy and overgrown in appearance. The ground flora is generally species-poor and dominated by grasses. A description of the individual hedgerows is given below.

H1: A well maintained hedgerow c.2m high forms the boundary between the site and the R152 road (Appendix 12.3, Plate 3). The hedgerow is dominated by dense hawthorn (*Crataegus monogyna*) and the ground flora is sparse and composed of grasses including bents (*Agrostis* spp.), Yorkshire fog

(*Holcus lanatus*) and forbs including cleavers (*Galium aparine*), germander speedwell (*Veronica chamaedrys*), herb-Robert (*Geranium robertianum*), hogweed (*Heracleum sphondylium*) and bush vetch (*Vicia sepium*), which occur occasionally. This hedgerow has a good structure but limited species-richness and is of low ecological value.

H2: This forms the site boundary to the north (Appendix 12.3, Plate 4) and west of the site. It is c. 2-3 m wide, varies in height between c. 4-5 m and is mostly stock-proof along its length. The dominant species is hawthorn (*Crataegus monogyna*). Bramble (*Rubus fruticosus*), ivy (*Hedera helix*) and rose (*Rosa* spp.) occur frequently. There is one sycamore standard (*Acer pseudoplatanus*) and elder (*Sambucus nigra*), occurs occasionally. A wide ditch is located at the base and hawthorn is planted on both sides. A number of shade tolerant species typical of hedgerows were found growing along the ditch including hart's-tongue fern (*Phyllitis scolopendrium*), dog violet (*Viola riviniana*), herb-Robert (*Geranium robertianum*) and ferns. Lords and ladies (*Arum maculatum*) was also found on a previous survey (Madden, 2000). Other ground flora species included cock's-foot (*Dactylis glomerata*), Yorkshire fog (*Holcus lanatus*), bush vetch (*Vicia sepium*) and ragwort (*Senecio jacobaea*). This hedgerow is of moderate ecological value.

H3: The hedgerow is largely intact, tall c. 5-7 m and stock-proof but becomes gappy towards the west where two ash standards occur (Appendix 12.3, Plate 5). The dominant species is hawthorn (*Crataegus monogyna*) and some old specimens occur here that are heavily clad in ivy (*Hedera helix*). Ground flora consists largely of bramble (*Rubus fruticosus*) and grasses including bents (*Agrostis* spp.), cock's-foot (*Dactylis glomerata*), Yorkshire fog (*Holcus lanatus*) and limited forbs including nettle (*Urtica dioica*), creeping thistle (*Cirsium arvense*) and docks (*Rumex* spp), which occur occasionally. This hedgerow is of low ecological value.

H4: Large gaps occur between the hawthorn (*Crataegus monogyna*) bushes along the length of this hedgerow (Appendix 12.3, Plate 6). The hedgerow is approximately 4-5 m in height and 2-3 m in width. Bramble (*Rubus fruticosus*) occurs abundantly within these gaps and along the ditch that occurs at the base of the hedgerow. Immature ash (*Fraxinus excelsior*), c.10 individuals, occur along the hedgerow. The ground flora is species poor comprising nettle (*Urtica dioica*), creeping thistle (*Cirsium arvense*), spear thistle (*Cirsium vulgare*), cock's foot (*Dactylis glomerata*) and ragwort (*Senecio jacobaea*). This hedgerow is of low ecological value.

H5: The hedgerow is poorly maintained and comprises largely of hawthorn (*Crataegus monogyna*), gorse (*Ulex europaeus*) and bramble (*Rubus fruticosus*). Wire fence runs the length of the hedgerow. The ground flora is species-poor comprising nettle (*Urtica dioica*), creeping thistle (*Cirsium arvense*), spear thistle (*Cirsium vulgare*), cock's foot (*Dactylis glomerata*) and ragwort (*Senecio jacobaea*). This hedgerow is of very low ecological value.

H6: Large gaps occur between the hawthorn (*Crataegus monogyna*) bushes along the length of this hedgerow. One standard of ash (*Fraxinus excelsior*) occurs and a ditch occurs at the base of the

hedgerow (Appendix 12.3, Plate 7). The ground flora comprises cock's foot (*Dactylis glomerata*), perennial rye-grass (*Lolium perenne*), nettle (*Urtica dioica*), creeping thistle (*Cirsium arvense*), spear thistle (*Cirsium vulgare*), sow-thistle (Sonchus asper) and ragwort (*Senecio jacobaea*). This hedgerow is of low ecological value.

H7: The hedgerow is stock-proof and dominated by hawthorn (*Crataegus monogyna*) with two standards of ash (*Fraxinus excelsior*), one of which has supported part of a rookery, indicated by the nests c. 15 and an abundance of bird excrement and feathers below (Appendix 12.3, Plate 8). The ground flora comprises cock's foot (*Dactylis glomerata*), nettle (*Urtica dioica*), creeping thistle (*Cirsium arvense*), spear thistle (*Cirsium vulgare*) and ragwort (*Senecio jacobaea*). This hedgerow is of moderate ecological value.

iv. Drainage Ditches FW4

A number of drainage ditches were noted at the base of the hedgerows and the species composition is described with the appropriate hedgerow. These were dry at the time of visit. The network links up and drains to the west where it eventually enters a tributary of the River Nanny.

v. Treelines WL2

The treeline to the south east of the site that bounds the R152 road (Figure 12.2) is dominated by c. 30 semi-mature and mature ash (*Fraxinus excelsior*) trees of c. 15-20 m in height (Appendix 12.3, Plate 9). Hawthorn (*Crataegus monogyna*) occurs intermittently along its length along with bramble (*Rubus fruticosus*), ivy (*Hedera helix*) and rose (*Rosa* spp.), which occur frequently. The ground flora is typical of the hedgerows on site and includes cleavers (*Galium aparine*), bush vetch (*Vicia sepium*), nettle (*Urtica dioica*), creeping thistle (*Cirsium arvense*), spear thistle (*Cirsium vulgare*), hogweed (*Heracleum sphondylium*) and ragwort (*Senecio jacobaea*).

The treeline to the west of the site (Figure 12.2) is also dominated by c. 10 ash (*Fraxinus excelsior*) trees of c. 15-20 m in height (Appendix 12.3, Plate 10). Hawthorn (*Crataegus monogyna*) occurs sparsely along its length and large gaps occur between the trees. The ground flora is similar in composition to the treeline described above. The treelines are of moderate ecological value.

vi. Spoil and Bare Ground ED2

A spoil and rubble heap was found in the northern corner of the site (Appendix 12.3, Plate 4). This comprised largely of soil and building rubble. The heap had become colonised with plant species common throughout the field.

12.3.2.2 Adjacent Habitats

The surrounding habitats consist largely of improved agricultural grassland bounded by hedgerows of similar composition and structure as those described on site. A tributary of the River Nanny flows to the south east c. 130 m to the east of the site at its nearest point.

The network of drainage ditches on site feeds into the tributary. The River Nanny is not a designated salmonid river but does support a population of brown trout (Fisheries Environmental Officer, pers comm.)

12.3.2.3 Evaluation

No designated habitats of international or national value were recorded on or adjacent to the site. All the habitats recorded on site are widespread within the landscape and of moderate to low species-richness. The dominant habitats on site are arable crops and improved agricultural grassland, which are highly modified habitats. They are of low scientific interest and represent a low contribution to local biodiversity.

The hedgerows on site are of moderate to low conservation value. The hedgerows H3, H4, H5 and H6 are particularly species-poor and support species typical of disturbed habitats. They are structurally poor largely due to lack of maintenance. Hedgerow 2 (H2) and both treelines are of moderate local conservation value. H2 supports some species typical of this habitat. The species-richness of these treelines is slightly greater than in the surrounding hedgerows and some trees, particularly H7, provide habitat for birds.

No rare, threatened or legally protected plant species, as listed in the Irish Red Data Book (Curtis & McGough, 1988), were found throughout the site nor have been known to occur in the general area in the past. The species are widespread within the landscape and are typical of the habitats in which they were found.

12.3.3 Impact Assessment

12.3.3.1 Potential and Predicted Impacts of the Proposal

In general, the impacts of a proposed development can be divided into three categories:

i. **Direct habitat change**: the removal/destruction of habitats or the creation of different habitat types.
ii. **Indirect habitat changes**. This occurs when a habitat not directly affected through development is altered as a consequence of the development through effects such as disturbance, drainage or pollution. The quality or character of a habitat may change as a result of these activities.
iii. **Habitat fragmentation**. This involves the break up of a habitat by a development, resulting in a number of smaller habitat areas. A reduction in the size of a habitat may cause a decline in species numbers where the habitat area becomes too small to support viable populations.

The proposed development is largely located in the western part of the site. It will result in the removal of arable crop land, improved agricultural grassland and a number of hedgerows in this area. The loss of theses habitats is of minimal consequence for the flora in the area as these are common, widespread habitats of moderate to low species diversity.

The hedgerows are the habitat of highest ecological importance on site but they do not represent good examples of hedgerow structure or species-richness. The loss of H2 and either of the treelines would be of moderate significance. These represent the most species-rich habitats on site. However, all species are common within the immediate and wider landscape. The loss of H7 to the west would impact negatively on the rookery located in that area.

Any contamination of the drainage ditches or any run-off from the site into the local drainage ditches has the potential to impact negatively on the River Nanny, to which these drains are connected.

12.3.4 Mitigation

12.3.4.1 Avoidance Remedial and Reductive Measures

Networks of hedgerows especially H2, and treelines should be maintained and incorporated into new developments where possible. Regular and appropriate maintenance of the retained hedgerows will help improve the ecological quality to these features. Hedgerows should be trimmed so that they are wider at the base and narrower at the top and established hedges should be trimmed every second or third year. Coppicing could also be used as a management practice to increase the light intensity reaching the ground and thereby improve the species-richness of the ground flora. This would be of particular benefit to H2. Cutting of hedgerows and site clearance should take place outside the bird-

nesting period which starts on March 1st and ends 31st of August. The use of herbicide should be avoided within 1.5m of hedgerows.

Best practices should be employed, such as the use of bunding, oil and grease interceptors and sediment traps, to prevent contaminated water from the site entering the watercourses in the area.

12.3.4.2 Monitoring

All measures employed to prevent water pollution should be regularly maintained and monitored to ensure that they are working efficiently.

12.3.4.3 Reinstatement

The proposed development provides an opportunity for sensitive landscaping that has the potential to improve the floral diversity of the site. Suggested species for planting are given in Appendix 12.4.

The soil appears to be of good quality and they are likely to support a mixture of native broadleaved trees including ash (*Fraxinus excelsior*), oak (*Quercus robur*) and hazel (Corylus avellana). Other species which could be used in planting schemes for new developments include hawthorn (Crataegus monogyna), blackthorn (Prunus spinosa), rowan (Sorbus aucuparia), birch (Betula spp.), willow (Salix spp.). Tree species planted should reflect the local native species composition.

New developments provide an opportunity to establish wildflower areas, which improves the amenity and biodiversity value of the site. Seed stocks should be sourced from locally or regionally grown seed where possible.

12.3.5 Conclusions and Recommendations

There are no habitats on site of high ecological importance that warrant conservation. Hedgerows and treelines should be incorporated where possible and enhanced to improve the biodiversity value of these features. The development provides good potential to increase the biodiversity value of the site if appropriate landscaping is implemented. Best practices methods should ensure that there is no impact on surrounding watercourses and subsequently the River Nanny. If these measures are undertaken, it is envisaged that there will be no negative impact on the ecology of the area and there may be a net gain in biodiversity value of the site.

A review of the Heritage Divisions datasets indicates that no part of the site or the immediate surroundings is covered by a scientific or conservation designation or proposed designation as recognized by the National Parks and Wildlife Service (NPWS). Four designated sites occur within the vicinity of the site; the nearest Duleeks Common proposed Natural Heritage Area c. 2km to the south-

west of the proposed development. The surrounding habitats consist largely of arable land and improved agricultural grassland bounded by hedgerows of similar composition and structure as those described on site. In addition, no rare, threatened or legally protected plant species, as listed in the Irish Red Data Book (Curtis & McGough, 1988), were found throughout the site nor have been known to occur in the general area in the past. The species are widespread within the landscape and are typical of the habitats in which they were found.

The air dispersion modeling analysis shows that the nearest conservation designation site is outside the range of air emission plume. The other designated sites; the Boyne River Islands candidate Special Areas of Conservation; Dowth Wetlands proposed Natural Heritage Area and Thomastown Bog are c. 4-5km away from the site and are also outside of the range of the air emission plume.

The studies carried out by AWN showed that the entire maximum predicted ground level concentrations of emissions were forum to be below limits specified in the Council Directive 2000/76/EC air quality standard limits and WHO guideline values. The cumulative emissions form the waste to energy plant and the other developments in the vicinity did not cause the maximum predicted ground level concentrations of emissions to reach air quality standard limit values and guidelines. As the projected emissions will be within European limits, it is considered that there would be no significant impacts by air emissions on the flora and fauna within the surrounding area or on designated sites for conservation in the region.

12.4 TERRESTRIAL FAUNA – MAMMALS, AMPHIBIANS AND REPTILES

12.4.1 Receiving Environment

The study area, c. 25 acres in size, falls within 1 km square O 0670 of the National Grid (Discovery Series Sheet no. 43).

12.4.1.1 Fauna Survey

This report presents the results of a fauna study undertaken on the 28th of June 2005. The fauna occurring on the site are described, and the likely impacts of the proposed development on the fauna discussed, with recommendations for mitigation or remedial measures.

The general format of this report is in accordance with guidelines recommended by the EPA (2002) *Guidelines on the Information to be contained in Environmental Impact Statements*. Recommendations and evaluation techniques utilised are in general accordance with *Guidelines for Baseline Ecological Assessment* (Institute of Environmental Assessment, UK, 1995), *Wildlife Impact: the treatment of nature conservation in environmental assessment* (RSPB, 1995) and *Guidelines for ecological evaluation and impact assessment* (Regini, M. 2000).

12.4.1.2 Survey Methodology

A field survey was conducted by Dr. Chris Smal on the 28th June 2005 in good weather conditions: dry, overcast, warm and breezy.

Survey of fauna was carried out by means of a thorough search within the site. Presence of mammals is indicated principally by their signs, such as dwellings, feeding signs or droppings - though direct observations are also occasionally made.

The nature and type of habitats present are also indicative of the species likely to be present; the habitats were assessed in general accordance with techniques adopted for the Badger & Habitat Survey of Ireland (Smal, 1995); habitats listed by Fossitt (2000) and by Nature Conservancy Council (1990) were referred to. The habitat survey is not intended to serve as a detailed botanical study.

The field survey was supplemented by evaluation of relevant literature and existing information. An earlier impact assessment report (flora and fauna, prepared by Biosphere Environmental Services in June 2000) was reviewed.

12.4.1.3 Survey Constraints

There were seasonal constraints in regard to badger survey due to high vegetational cover within hedgerows, treelines or areas of scrub. At this season, high grass growth limits findings of badger paths, and, also, badger activity is lower at this time than in late winter or autumn.

Both sides of internal boundaries were searched. Only one side of site boundary hedgerows and treelines was searched. It was not considered appropriate to enter adjoining lands. In practice, the nature of findings on site indicated that this constraint did not lead to any significant loss of information.

12.4.1.4 General Description of Area

The site is located in generally flat agricultural landscape between the towns of Drogheda and Duleek. Elevation drops gently from the east to the west, rising again at the extreme west. The elevation of the site is between 30 and 40m asl. The site is within an agricultural area of good soils.

A railway line is present a short distance from the site to the west. The site is immediately adjacent to the R152.

All but one of the several fields on site have been recently ploughed. All were under potatoes in the preceding year. At the west of the site is one field of permanent improved pasture grassland, currently grazed by cattle. The previous survey (Biosphere Environmental Services) noted that all of the fields on site were under pasture or meadow at that time (June 2000).

The principal habitats present in the area are mapped on Figure 12.3, and are approximate. The habitat map (Figure 12.3) serves to provide a framework for assessment of fauna and is not intended to serve as a botanical survey.

The composition of hedgerows and treelines is not diverse. There is some variation in structure and species composition. The habitat map illustrates whether hedgerows and treelines or present at various portions of the site.

In brief overview: all hedgerows and treelines are composed primarily of hawthorn *Crataegus monogyna* and ash *Fraxinus excelsior*, with other species scarce or occasional. The width of boundaries varies from thin (with little ground cover) to relatively wide corridor - perhaps up to c. 4m in width. These wider field boundaries have dense ground cover of low scrub, mainly of bramble *Rubus fruticosus* agg, or have weedy vegetation – mainly of nettle *Urtica dioica* or thistle *Cirsium* sp. Ploughing in arable areas approached very close to hedgerow and treeline boundaries, leaving little cover alongside, but there were occasional grassy areas. These also included a limited number common vetch *Vicia sativa*, and a restricted range of other flora. Other species frequent throughout include dog rose Rosa canina, ivy *Hedera helix* , and hogweed *Heraclium sphondylium*.
Uncommon, but present, are blackthorn *Prunus nigra* (at the eastern boundary), gorse *Ulex europaeus* (at a central field boundary) and elder *Sambucus nigra*. One central boundary, with double hedgerow and ditch between, has a somewhat more diverse flora, with ferns present in the shady areas.

Most of the boundaries on site are dominated by hawthorn. At the north-east, the entire boundary is of low-cut hawthorn, but most boundaries are of semi-mature or mature hawthorn, with occasional tall ash. Some of these boundaries are incomplete (but fenced) with scrubby gaps present. There are tall ash-dominated treelines along the R152 and at the extreme west of the site. The most westerly boundary of the site (towards the railway line) was observed to be the widest and is, again, composed of hawthorn and ash. It has a dense scrub cover at ground layer, and copious ivy cover also.

At the extreme north corner of the site is located a small area used for dumping of farming wastes, including soil, rubble, rocks, tyres, plastics and machinery parts. Much of this area is bare, but is being colonised by weedy ephemeral species.

Near this dumping area is located the only pool found on site: a very small pool (c. 1.5 m across) next to the eastern boundary ditch.

There are no structures on site. A small disused dwelling at the extreme south is off-site. The building has a slated roof, from which several slates are missing. The building offers potential for bat roosts.

The field boundaries include ditches, all of which were dry at time of survey. There are no streams or rivers present. The site is within the watershed of the River Nanny, a small tributary of which is present c. 100m to the south of the site. The River Nanny flows into the Irish Sea at Laytown.

12.4.1.5 Designated Conservation Areas in the Vicinity

There are no designated conservation areas in the immediate locality. Duleek Commons (pNHA no. 01578) is situated c. 2km to the south-west. Thomastown Bog (pNHA no. 01593) is situated c. 5 km to the south-west also. The Boyne River Islands cSAC is situated c. 5km to the north-west. The River Nanny reaches the Irish Sea at Laytown, where the estuary is a pNHA and an pSAC (site code: 000554, Laytown Dunes/Nanny Estuary).

12.4.1.6 Fauna

12.4.1.6.1 Mammals

A list of mammalian species observed on site or likely to occur in the locality is included in the Appendices (11.4 – 11.6).

The site has a very low representation of Irish fauna, due to the intensive agricultural practice (most of the site is composed of arable land) and limited range of habitats on site. The vegetated boundaries are of low species diversity and poor structure. There is an almost total lack of ponds, and there are no rivers or streams. There are very limited areas of scrub or other habitat types.

Common Species

The signs of common species were below expectation on site. For example, no signs of foxes *Vulpes vulpes* were seen, whilst this species is still expected to occur on site on occasion, perhaps more so at the west – in grassland areas. Fox signs had been observed in the 2000 study. Rabbit *Oryctolagus cuniculus* burrows were few on the main part of the site, but were present at the western portion, and several rabbits were observed there. Brown rats *Rattus norvegicus* are frequent in arable areas, and signs were seen of rats feeding on potatoes left from the last harvest.

One Irish hare *Lepus timidus hibernicus* was observed on site, but the habitats on site are not particularly good for this species.

Also noted were signs of long-tailed fieldmouse *Apodemus sylvaticus.* The bank vole *Clethrionomys glareolus* is absent from this part of Ireland. The house mouse *Mus musculus* is almost certainly present as it is present in agricultural areas and in association with residences.

Other species that will be present on occasion on site and in the vicinity include the hedgehog *Erinaceous europaeus* and pygmy shrew *Sorex minutus,* the latter expected to be frequent within hedgerows and at grasslands at the west of the site. No squirrels are expected on site.

The Irish stoat *Mustela erminea hibernica* is also certain to be present on occasion - but densities are expected to be very low. There are no suitable habitats for the pine marten *Martes martes* and this species is considered to be absent from this part of the country. Deer will also be absent in this area.

Other Species of Especial Interest

No signs of badgers *Meles meles* were found on site, whilst there were some seasonal constraints. Badgers tend to be less frequent in arable areas, due to limited suitable foraging habitat. It was considered that there are no badgers on site, whilst they may be expected in the general locality (where there are larger areas of improved pasture). Similarly, no setts or signs of badgers were found in the fauna study conducted in 2000.

There is an absence of watercourses on site, so no otters *Lutra lutra* were present and this species is unlikely ever to occur on site. There were also no significant ponds or pools that might harbour frogs, an important prey species for the otter. Feral American mink *Mustela vison* are not present on site, for similar reasons.

Bats

Opportunities for bat roosts on site and the quality of habitats as foraging areas for bats were assessed during daytime. A small disused dwelling house was indicated as off-site and this structure was, therefore, not checked for bat roosts. No bat detector study was undertaken, as such was not considered necessary given the nature of habitats on site.

The treelines and hedgerows do offer commuting and foraging areas for bats, but with regard to the relatively poor species composition and structure of these linear features, most of the boundaries on site do not provide particularly good foraging habitat.

It may be anticipated that only a few of Ireland's bat species would occur in the study area through the summer months (O'Sullivan, 1994; Richardson, 2000). These will include the common pipistrelle *Pipistrellus pipistrellus*, soprano pipistrelle *Pipistrellus pygmaeus,* and Leisler's bat *Nyctalus leisleri.* Brown long-eared bats *Plecotus auritus* might be present on occasion at the extreme west of the site, where mature treelines offer more foraging habitat than elsewhere on the site. No other bat species are expected to occur on site.

Many of the larger trees on site – of both ash and hawthorn – are ivy-covered and bats may make use of such cover on occasion in summer. Mature ash trees (some of which were substantial in size) may also have crevices, which bats may use as occasional roosts. No significant roosts can be expected on site, but recommendations are included to prevent injury to any bats that might be present in mature trees or ivy-covered trees on site.

The building (off-site) at the extreme south may harbour bat roosts in summer, and there is ready access to the roof-space through gaps left where there are missing slates. There are no structures on site.

12.4.1.6.2 Amphibian and Reptiles

There is only one pool on site and that was not suitable for frogs *Rana temporaria* or newts *Triturus vulgaris.* Pasture grasslands provide forage for frogs and this species may be expected on occasion.

The common lizard *Lacerta vivipara* is a common species and difficult to observe; its presence in the wider countryside is certainly underestimated. There is only limited potential for occurrence of this species on site due to the paucity of good habitats.

12.4.1.7 Overall Assessment of Scientific Interest of Site

The habitats on-site may be considered in terms of extent, diversity, naturalness, rarity, fragility, typicalness, recorded history, position, potential value and intrinsic appeal (Regini, 2000). The potential of these habitats for vertebrate fauna is considered in this framework also.

i the main portion of the site is comprised of arable farmland, with a portion of improved agricultural grassland at the west. These habitats may be considered as of Negligible ecological value.

ii the boundaries on site are of varied but of limited value. They do provide wildlife corridors and foraging areas for common species. Overall, they may be considered as of low ecological value for mammalian species as they are common and ubiquitous habitats in the Irish countryside.

iii the site does provide some potential for bat foraging habitat and occasional small roosts. The habitat quality on site is poor for other protected mammalian, reptilian and amphibian species.

12.4.1.7.1 Species of Conservation Interest

Common Species

Common protected [Wildlife Act (1976) and Wildlife [Amendment] Act (2000)] species observed or expected on site include the Irish hare, pygmy shrew, Irish stoat, and hedgehog. These species are common and generally ubiquitous in Irish agricultural landscapes.

Badger

No signs of current badger activity were found on site.

Legal Status and Conservation Issues - Badgers

A number of mammalian species are protected under the Wildlife Act (1976) and Wildlife [Amendment] Act (2000)[1]. These include the badger (which is also a Red Data Book species). However, the badger is a relatively common species and ubiquitous through much of the Irish countryside (Smal, 1995).

It is standard best practice to make special provisions for badgers affected by development; whilst the species is common in much of the Irish landscape, badgers are notable for their practice of constructing large underground tunnel and chamber systems (setts). Provisions are made for their humane removal or for their conservation on site where feasible or practicable. No active setts were noted on site; the Wildlife [Amendment] Act (2000) protects all setts (as resting places).

Otters

No otter signs were found on site and there is no likelihood that this species ever occurs on site. Otters are protected under the Irish Wildlife Acts and are also listed under Annex II and Annex IV of the EU Habitats Directive.

Bats

The site provides some foraging habitat for bats and three common species are expected to occur on site on occasion. Whilst no definite bat roosts were identified, they may occur within mature or ivy-covered trees on site.

Legal Status and Conservation Issues - Bats

All Irish bat species are protected under the Wildlife Act (1976) and Wildlife Amendment Act (2000). Across Europe, they are further protected under the Convention on the Conservation of European Wildlife and Natural Habitats (Bern Convention 1982), which, in relation to bats, exists to conserve all species and their habitats. The Convention on the Conservation of Migratory Species of Wild Animals (Bonn Convention 1979, enacted 1983) was instigated to protect migrant species across all European boundaries. The Irish government has ratified both these conventions. Also, the EC Directive on The Conservation of Natural habitats and of Wild Fauna and Flora (Habitats Directive 1992), seeks to protect rare species, including bats, and their habitats and requires that appropriate monitoring of populations be undertaken.

Birds

This report did not include a bird survey. Mention is made of legal status and conservation issues briefly. The habitats on site do offer refuge and foraging areas for a number of common avian species.

This item is included in relation to season of tree-felling that may affect both bats and birds.

[1] Note that the Wildlife Act (1976) and the Wildlife Amendment Act (2000) allow exemptions for certain types of development [page 32, 2000 Act: "it shall not be an offence for a person - …while constructing a road, or building operation or work of engineering construction, or while constructing or carrying on such other operation or work as may be prescribed, *unintentionally* to kill or injure such an animal or *unintentionally* to destroy or injure the breeding place or resting place of such an animal…"]

Legal Status and Conservation Issues – Birds

Most bird species are protected under the Wildlife Acts (1976, 2000), barring those regarded as pest species, and for those considered as game species (where they may be hunted under conditions). It is an offence to interfere with the breeding place of protected species, though there are certain exemptions for developments such as road construction and building works. For the generally common species, best practice provision is made to limit season of removal of vegetation and nesting habitat. Provisions of section 46 of the Wildlife [Amendment] Act (2000) require that disturbance to vegetation is excluded during the period 1st March to 31st August (with exemptions for certain developments).

12.4.2 Potential Impacts of Proposed Development on Fauna

The proposed scheme involves works and construction of facilities over most of the site, with access to the site from the R152.

There will be almost complete loss of habitats that are currently present on site (except portions at the extreme west). These include arable lands, a portion of improved pasture grassland, and most hedgerows and treelines present.

Principal impacts on mammalian fauna may be summarised as follows:

i loss of some foraging and commuting habitat for bats, and also loss of some boundary hedgerows and treelines that serve as wildlife corridors for common mammalian species. Impacts may be considered as Negligible.

ii loss of some potential bat roosts within trees on site (within the development area). Common species will be affected. If safely evacuated from potential roosts prior to development, the bats should find alternative roosting locations in the locality. Impacts may be considered as Negligible, if amelioration measures are taken.

iii loss of foraging habitat for species such as Irish hare and pygmy shrew etc. may be considered as of Negligible impact.

12.4.2.1 Potential Impacts on Adjoining Areas

There is not expected to be any significant impact on fauna present in adjoining areas arising from this proposal.

Impacts on non-designated areas in the locality are also considered to be Negligible.

12.4.2.2 Impacts on Designated Conservation Areas in the General Vicinity

No designated conservation areas are present in the immediate vicinity of the site. Several are present within c. 6km of the site. Drainage is towards the conservation area of the Nanny Estuary.

No impacts, arising from the proposal, are expected on any of these designated conservation areas.

12.4.3 Mitigation Measures

12.4.3.1 General Fauna

No species of especial ecological importance were observed on site, other than those detailed below.

No special mitigation measures are recommended for common species. General mitigation measures as would apply to any substantial development are recommended below.

12.4.3.2 Badgers

No signs of current active use of the site by badgers were found. Badgers do move and create new setts on occasion.

Measure 1:

If there is any significant period between this study, grant of permission, and initiation of construction works (e.g. 18 months), it is advised that a repeat badger survey be conducted on affected portions of the site only.

Measure 2:

Should any badger setts be found at time of such re-survey, these must be evacuated and destroyed by experts under licence from NPWS. Seasonal constraints will apply.

12.4.3.3 Bats

Bats certainly utilise the area for feeding, and summer (and perhaps winter roosts) may be present in mature trees or within ivy-covered trees on-site.

Measures 1: Felling of Large Trees

A bat expert should survey all trees due for removal prior to construction works commencing. With respect to bats, trees, which are to be removed, should be felled during the spring months of March, April, May or autumn months of September, October or November (felling during the spring or autumn

months avoids the periods when the bats are most active). However cognisance should be taken of the bird nesting season which excludes tree felling during the period March 1st to August 31st.

Any trees showing crevices, hollows etc., should be removed while a bat specialist is present to deal with any bats found. Large mature trees should be felled carefully, essentially by gradual dismantling by tree surgeons, under supervision of a bat specialist.

Care should be taken when removing branches as removal of loads may cause cracks or crevices to close, crushing any animals within. These cracks should be wedged open prior to load removal. The dead branches should be lowered to the ground using ropes to avoid impacts which may injure or kill bats within. Such animals should be retained in a box until dusk and released on-site.

Measure 2: Felling of Ivy-Covered Trees

Any ivy-covered trees (ash and hawthorn) – other than large trees (referred to above) which require felling should be left to lie for 24 hours after cutting to allow any bats beneath the cover to escape.

Measure 3: Landscaping

It would be of benefit to bats if treelines and shrubs of native species were planted on-site, with native species providing more insect life than foreign varieties.

Measure 4: Bat Box Scheme

A bat box scheme should be included in the area to offset the potential loss of roosts due to tree removal. It is recommended that c. 5 bat boxes would suffice; these should be placed upon existing mature tress to be retained at the extreme west of the site.

'Schwegler' woodcrete bat boxes are recommended but other designs are available – timber, concrete and concrete/sawdust). Consult the following publication: *Bat Boxes: A guide to the history, function, construction and use in the conservation of bats by R. E. Stebbings and S. T. Walsh (The Bat Conservation Trust, 1991).* Brown long-eared bats, Leisler's bats, common pipistrelles and soprano pipistrelle bats will frequently use bat boxes both as temporary and maternity roosts. Special hibernation bat boxes are also available. Suppliers of artificial bat roost units:

i) Schwegler Bat Boxes, Jacobi, Jayne & Co: www.jacobijayne.com
ii) Alana Ecology: www.alanaecology.com

12.4.3.4 Retention of Hedgerows, Treelines and Landscaping

Measure 1: Retention of Existing Hedgerows and Treelines

The proposed development will entail loss of many of the internal boundaries on site. Site boundary features - treelines and hedgerows - should be retained where possible to offer continuous corridors for bats and other wildlife. The most valuable treelines are at the west of the site and will not be affected by the proposal.

Measure 2: - Additional Planting of Trees

The proposal involves removal of mature trees. Additional planting is recommended. This should be of native species, such as oak, ash, hawthorn, and other deciduous species, according to local conditions and expert advice.

12.4.3.5 Protection of Birds

There are some treelines and hedgerows to be removed; these provide a feeding and nesting habitat for birds as well as other fauna.

Measure 1: Tree and Scrub Clearance

Clearance of trees, or areas of tall scrub, where required, should preferably take place outside of the bird nesting season, and should exclude the period March 1st to August 31st.

12.4.3.6 Works on Site: Construction and Operation Phase

There are no especial constraints on areas suitable for storage, machinery depots, site offices or other uses, but all areas identified as of interest or for protection within the development area should be avoided.

Measure 1: Protection of Trees to be Retained

Where mature trees and treelines are to be retained, these areas should be avoided and fenced off prior to construction traffic entering the site - in order to protect the trees and their root systems.

12.4.3.7 Pollution Hazards: Construction and Operational Phases

Contamination incidents and run-off of sediments into the nearby watercourses could affect the river habitats downstream of the site and affect sensitive species.

Measure 1: Control of Pollutants etc.

Construction works and operation of the plants on site should limit entry of sediments, and avoid entry of pollutants, into the drainage system and natural watercourses in the area.

12.4.3.8 Monitoring

Any wildlife mitigation measures incorporated into the proposed plan should preferably be monitored for effectiveness by means of occasional visits (at appropriate season) during the first two years of operation and additional mitigation measures taken as appropriate.

12.4.4 Predicted Impact of the Proposal

The proposed scheme will entail loss of arable lands, improved pasture and boundaries of low ecological interest. Bat foraging and roosting areas may be affected. No significant impacts are expected on other species known or expected on site.

The recommended mitigation measures, if implemented in full, will ensure that impacts on fauna in the locality are Negligible.

12.4.4.1 Worst Case Scenario

The construction and operation of the proposed Incinerator facility and associated works should not lead to exceptional impacts on fauna in a worst case scenario, except by virtue of severe pollution incidents (dissemination of pollutants into the local [and wider] atmosphere and into adjacent watercourses).

Pollution incidents could damage the freshwater ecology of the Nanny River and the river systems downstream. Impacts on invertebrates and vertebrates (fish) could lead to loss of feeding habitat for predators such as otter (Annex II & IV species, EU Habitats Directive). Recovery would be expected, but could be lengthy. The otter is susceptible to organochlorines and heavy metals.

Mitigation measures have been presented for potential impacts to soils, groundwater and surface water (Sections 10-12 respectively). With such mitigation measures in place the proposed development will have no significant impact on such receptors within the surrounding environs.

12.5 TERRESTRIAL FAUNA - BIRDS

12.5.1 Introduction

Biosphere Environmental Services was commissioned by White Young Green Environmental to assess the potential impacts on birds by the proposed Waste Management Facility at Carranstown. A previous survey had been carried out at the site by BES in May 2000.

12.5.2 Sites Designated for Conservation in Area

The nearest site designated for birds is the Boyne Estuary Special Protection Area (code 04080) located approximately 6 km north-east of Carranstown.

The other designated sites in the vicinity, namely Duleek Commons proposed Natural Heritage Area (code 01578) and the Boyne River Islands candidate Special Area of Conservation (code 01861), do not have any particular bird interests.

12.5.3 Methodology

A survey for breeding birds was carried out during the 2005 season. As required for breeding bird surveys, two field surveys of the site were conducted as follows: an early season visit on 18th May and a late-season visit on 29th June. All surveying was between 07.00-10.00 hrs, when birds are most active. Survey was carried out by Dr Brian Madden.

As the objective of the survey was to record all species breeding within the site, the entire site was systematically covered (as opposed to just transects across the site). Birds were recorded by sight (using 8.5 x 42 binoculars) and sound. Birds in the air over the site were also recorded but a judgment was made on whether these were birds associated with the site or merely 'passing over'. A cursory examination was made of adjacent areas from the public road.

During the survey, particular attention was given to the possible presence of bird species that are listed on Annex I of the EU Birds Directive (Council Directive 79/409/EEC) or Birds of Conservation Concern in Ireland (BoCCI) as listed in Newton et al. (1999).

The standard ornithological literature was reviewed, and listings and maps of sites of bird conservation importance in Co. Meath held by Department of the Environment, Heritage & Local Government were accessed. Contact was made with Mr David Norriss of the DoEHLG re. the presence of rare or sensitive breeding birds in the vicinity.

12.5.4 Survey Limitations

The principal survey limitation is that a survey for winter birds at the site was not carried out. However, this is not considered significant as the habitats present (i.e. intensive agriculture) would not be expected to support any species of conservation importance. Further, the literature does not identify any wintering species of note for the area.

12.5.5 Results

12.5.5.1 Overview of Habitats

The site, which comprises three fields and parts of a further two, is entirely used for agriculture which is of an intensive nature. In 2005, the dominant landuse was arable, with potatoes in some fields. The north-western field is used for cattle pasture. Hedgerows form the field boundaries though most of these have not been well maintained and are of only low to moderate quality. The hedgerows are predominantly of hawthorn *Crataegus monogyna,* with ash *Fraxinus excelsior* the principal tall tree species. There are no streams within the site.

The surrounding lands are also farmed intensively, with a mix of arable and grassland. A railway line runs a little north-west of the site and has scrub covered banks. The Platin Cement factory lies a few fields to the north. Associated with the factory is a large quarry.

12.5.5.2 Breeding Birds Within Site

A total of 22 species were recorded during the survey. Of these, 14 species are considered to breed (confirmed or probable) within the site, with a further four possibly breeding. A further 4 species were recorded but are not considered to be breeding within the site. A list of the species recorded is given in Table 12.2. Scientific names of species recorded are given in Table 12.2.

The breeding habitat in this site is provided by the hedgerows. The commonest species recorded were wren, blackbird, chaffinch and blue tit. Other species, such as song thrush, coal tit, dunnock, robin and chiffchaff, had several pairs each. The rooks nest's were all in ash trees and were distributed as follows: along mid eastern boundary (4 nests), along south-easternmost boundary (7 nests), along north-western boundary (c.20 nests).

12.5.5.3 Breeding Birds Outside Site

A cursory examination of surrounding areas indicated that a similar array of species occur as the habitats are largely similar. Additional species recorded were meadow pipit *Anthus pratensis*, house sparrow *Passer domesticus*, greenfinch *Carduelis chloris* and bullfinch *Pyrrhula pyrrhula.*

A pair of peregrines *Falco peregrinus* is known to breed in a quarry within 1 kilometre of Carranstown (exact site location withheld for confidentiality reasons – D. Norriss NPWS pers. comm.). It is not known if breeding occurred in 2005 though the site has been occupied in most years since the 1990s.

12.5.5.4 Likely birds in Winter

The habitats suggest that most of the species recorded within the site are probably resident and hence would be present in winter. These are likely to be joined by winter species such as redwing *Turdus iliacus* and fieldfare *Turdus pilaris*, as well as larger numbers of crows, finches and woodpigeons. Generally, utilization of the site in winter would depend on the type of agriculture practiced the previous season.

12.5.5.5 Evaluation of Birds at Site

The bird species recorded breeding in the survey area are typical of agricultural habitats in eastern Ireland. The total of 14 (and possibly 18) breeding species is average for the habitats present. In an analysis of the first three years of the Countryside Bird Survey Coombes *et al*. (2002) note that numbers of birds recorded in survey squares ranged from 1 to 48, and when averaged over the three years almost 40% of squares held between 21 and 30 species. All of the species recorded during the present survey are listed by Coombes (op. cit.) as occurring in 30 or more of the CBS survey squares in at least two of the three years from 1998-2000. The diversity of breeding birds at Carranstown reflects the type of habitats present and the small size of the site. No additional species had been recorded within the site during the breeding bird survey in 2002.

None of the species which were recorded within the site, or which are likely to occur in winter, are listed on Annex I of the EU Birds Directive or are 'Red species' (i.e. of high conservation concern) as listed by Newton et al. (1999).

The presence of a nesting pair of peregrines in the locality is of note as this species is listed in Annex I of the EU Birds Directive. However, the peregrine is not a species of high conservation concern in Ireland (see Newton et al. 1999), and a national survey in 2002 indicated a stable population with significant increases in the use of artificial sites, such as quarries and buildings (Madden et al. in preparation).

12.5.6 Potential Impacts

12.5.6.1 Characteristics of the Development

The proposed Waste Management Facility will be located in the north-western sector of the site. However, the majority of the site area will be used, with access roads and extensive landscape areas.

The existing perimeter hedgerow boundaries will be left intact, other than at the main site access from the R152. Internal hedgerows will be removed.
The principal impact by this development will be loss and alteration of habitats.

Further impacts which require consideration are possible impacts on birds outside of the site, especially peregrine, and possible impacts on birds in designated sites in the vicinity.

12.5.6.2 Impacts During Construction Phase

12.5.6.2.1 Impacts on Birds by Habitat Loss and Alteration

The main impact by the loss of the internal hedgerow and arable habitats will be the loss of both nesting and feeding habitat for a range of passerine species. However, the habitats that will be lost are frequent in the area and are not of notable quality. Also, the birds which presently use them are all common birds of the countryside. Further, practically all species would be expected to retain a presence on site due to the extensive landscaping programme that will take place. Therefore, the impact by loss of habitats is rated as Negligible and no adverse impacts would be expected on local bird populations. With time, a net positive impact may accrue due to the maturing of the trees and shrubs.

12.5.6.2.2 Potential Impacts on Birds Outside of Site

The proposed development would not be expected to have any impacts on the bird species which inhabit the fields that surround the site. While the construction will involve increased visual and noise activities, this would hardly be expected to have any adverse impacts on any of the countryside bird species as there is already substantial existing disturbance in the area due to road traffic, agricultural activities and industrial activities.

12.5.6.2.3 Potential Impacts on Peregrine

Loss of habitat

The potential loss of 25 acres of agricultural land by this development, which may be of use as hunting habitat to the peregrines that breed in the vicinity, could not be considered as significant as the pair would have a hunting territory in the region of several tens of square kilometres. Peregrines require large territories, with size varying according to the ability of the habitats to support prey. In upland areas of Britain, Ratcliffe (1980) gives an average density in the order of one pair to 325 +/- 50 km^2. Elsewhere in Britain, the smallest quoted territory was 42.3 km^2 for an inland area in north-west England. Further, the site will still support prey items (mainly woodpigeons) for the peregrines and, as peregrines normally take prey in mid air, often at substantial heights, hunting activities could continue at heights well above the complex (as they do over cities and suburban areas).

Disturbance

It is considered that the construction phase would not impact on the peregrines which breed in a local quarry as the birds already contend satisfactorily with a high degree of visual and noise levels associated with routine quarry activities. It is also noted that peregrines have successfully adapted to nesting on buildings in urban areas and on industrial structures such as power stations where there are high degrees of background disturbance. It is concluded that so long as there is no direct interference by construction activities with the nest site, there can be no impact on the nesting peregrines.

12.5.6.3 Impacts During Operation Phase

12.5.6.3.1 Countryside Bird Species

Once constructed, the waste management facility would not be expected to have any adverse impacts on any of the countryside birds which are found in the area.

As already noted, the maturing trees and shrubs within the site will support all of those species which already occur and it is likely that a higher diversity of species will occur than at present due to the diversity of trees and shrubs that will be planted.

12.5.6.3.2 Potential Impacts on Peregrine

Once in operation, the proposed development is likely to have little if any impacts on the peregrines which nest nearby.

As with any industrial complex, vermin will be controlled following professional standards. It is considered that there is little, if any, chance of peregrines picking up a rat after it had ingested poisoned bait as peregrines feed almost exclusively on pigeons (both woodpigeon and feral/racing pigeons).

Consideration also needs to be given to the possibility of collision with tall structures and wires. While the facility will have a tall stack (65 metres), it is considered that there is little or no chance that a peregrine would collide with this as it will be easily visible. As already noted, peregrines cope well in man-made environments where tall structures exist, for instance it is well known that birds have nested successfully in Dublin city and port area. Power lines can cause a problem for peregrines should they be positioned in a regular flight path. In the proposed development, the existing 110kV lines will not be altered and the only new lines from the site are likely to be 38kV lines leading to Rathmullan – as these will be lower than the existing 110kV set up, and probably on timber poles, it is considered that these would not pose any additional risk to the peregrines than which already exists.

12.5.6.3.3 Potential Impacts on Designated Sites

The proposed development could not have any impact on the Boyne Estuary SPA as there are no direct or indirect linkages between the two areas which are separated by a distance of c.6 km. The Boyne Estuary is the only designated bird site in this region.

12.5.7 Mitigation Measures

12.5.7.1 Removal of hedgerows

Section 40 of the Wildlife Act 1976, as amended by Section 46 of the Wildlife (Amendment) Act 2000, restricts the cutting, grubbing, burning or destruction by other means of vegetation growing on uncultivated land or in hedges or ditches during the nesting and breeding season for birds and wildlife, from 1st of March to the 31st of August. Unless otherwise agreed with the National Parks & Wildlife Service, removal of hedgerows and trees should be done outside of the restricted period to prevent the destruction of active bird's nests.

12.5.7.2 Landscaping

The extensive landscaping associated with the development will be beneficial for a range of passerine species including most of those species which presently occur within the hedgerows. Whilst birds will readily utilise non-native trees and shrubs (which are often prolific in setting fruit), it would be preferable to include a range of native species that occur in eastern Ireland. Useful native trees and shrubs include oak (*Quercus robur* or *Q. petraea*), hawthorn (*Crataegus monogyna*), blackthorn (*Prunus spinosa*), alder (*Alnus glutinosa*), willow (*Salix* spp.), birch (*Betula pubescens*), mountain ash (*Sorbus aucuparia*), holly (*Ilex aquifolium*), geulder rose (*Virburnum opulus*) and spindle (*Euonymous europaeus).*

Table 12.2. Birds recorded within survey site at Carranstown, Co. Meath, May/June 2005.

An indication of the breeding status is given and, where appropriate, the estimated number of pairs ('several' indicates up to 5 pairs recorded, 'common' more than 5 pairs).

Species	Status
Sparrowhawk *Accipiter nisus*	Not breeding – seen along railway
Pheasant *Phasianus colchicus*	Heard – may breed
Woodpigeon *Columba palumbus*	Breeds – several pairs but 20+ feeding in site
Swallow *Hirundo rustica*	Present feeding over site
Wren *Troglodytes troglodytes*	Breeds – common
Dunnock *Prunella modularis*	Breeds – several pairs
Robin *Erithacus rubecula*	Breeds – several pairs
Blackbird *Turdus merula*	Breeds – several pairs
Song thrush *Turdus philomelos*	Breeds – several pairs
Mistle thrush *Turdus viscivorus*	May breed – 1 pair
Chiffchaff *Phylloscopus collybita*	Breeds – 2 pairs
Goldcrest *Regulus regulus*	May breed
Blue tit *Parus caeruleus*	Breeds – several pairs
Coal tit *Parus ater*	Breeds – several pairs
Great tit *Parus major*	Breeds – 1 pair
Magpie *Pica pica*	Present
Jackdaw *Corvus monedula*	Breeds – several pairs
Rook *Corvus frugilegus*	Breeds – 30+ pairs (3 locations)
Hooded crow *Corvus corone*	Present
Starling *Sturnus vulgaris*	Breeds – several pairs
Chaffinch *Fringilla coelebs*	Breeds – several pairs
Goldfinch *Carduelis carduelis*	Present – could breed

12.6 REFERENCES

Flora

Fossitt, J.A. (2000). *A Guide to Habitats in Ireland*. The Heritage Council. Kilkenny.

Heritage Council (2002). *Draft Habitat Survey Guidelines: A Standard Methodology for Habitats Survey and Mapping in Ireland*. Heritage Council, Kilkenny.

Hubbard, C.E. (1984). *Grasses*. Penguin Books, London.

Joint Nature Conservation Committee (JNCC). 2003. *Handbook for Phase 1 Habitat Survey. A Technique for Environmental Audit*. Revised re-print. JNCC, Peterborough.

Madden, B. (2000). *Assessment of Impact of Flora and Faun by Proposed Development at Carranstown, Co. Meath*. Project Management Ltd.

National Parks and Wildlife, the Heritage Service. *Heritage Data Website* (http://www.heritagedata.ie)

Webb, D.A., Parnell, J. and Doogue, D. 1996. *An Irish Flora* (6th Ed.). Dundalgan Press, Dundalk.

Terrestrial Fauna – Mammals, Amphibians and Reptiles

Barratt, E. M., Deauville, R., Burland, T. M., Bruford, M. W., Jones, G., Racey, P. A., & Wayne, R. K. 1997 DNA answers the call of pipistrelle bat species. *Nature* **387**: 138 - 139.

Crichton, M. 1974 *Provisional distribution maps of amphibians, reptiles and mammals in Ireland.* An Foras Forbartha, Dublin.

Corbett, G. B. and Harris, S. 1991 Handbook of British Mammals. 3rd Edition, Blackwell Scientific, Publications.

Cox, P.R. 1993 *Badgers on site: a guide for developers and planners.* Berkshire County Council.

English Nature. 2002 *Badgers and development.* English Nature, Peterborough, UK.

Environmental Protection Agency 1995 *Advice notes on current practice in the preparation of Environmental Impact Statements.* EPA, Wexford, Ireland.

Environmental Protection Agency 2002 G*uidelines on the information to be contained in Environmental Impact Statements.* EPA, Wexford, Ireland.

Fossitt, J. 2000. *A Guide to Habitats in Ireland*. The Heritage Council, Kilkenny.

Harris, S., Jeffries, D., Cheeseman, C. & Booty, C. 1994 *Problems with badgers?* 3rd edition. RSPCA, UK.

Hayden, T. & Harrington, R. 2000 *Exploring Irish mammals*. Duchas. Town House Dublin.

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

Nature Conservancy Council. 1990 *Handbook for Phase I habitat survey - a technique for environmental audit.* Nature Conservancy Council, UK.

Ní Lamnha, E. 1979 *Provisional distribution atlas of amphibians, reptiles and mammals in Ireland.* 2nd edition. An Foras Forbartha.

O'Sullivan, P. 1994. *Bats in Ireland.* Special supplement to the Irish Naturalists' Journal.

Regini, K. 2000 Guidelines for ecological evaluation and impact assessment. *In Practice*, Bulletin of the Institute of Ecology and Environmental Management no. 29: 1-7.

Richardson, P 2000 *Distribution atlas of bats in Britain and Ireland 1980 - 1999*. The Bat Conservation Trust, London, UK.

RSPB. 1995 *Wildlife impact: the treatment of nature conservation in environmental assessment.* The RSPB, Sandy, UK.

Smal, C.M. 1995 *The Badger & Habitat Survey of Ireland.* The Stationery Office, Dawson St. Dublin 2.

Stebbings, R. E. and Walsh, S. T. 1991 *Bat Boxes: A guide to the history, function, construction and use in the conservation of bats*. The Bat Conservation Trust

Whilde, A. 1993 *Threatened mammals, birds, amphibians and fish in Ireland. Irish Red Data Book 2: Vertebrates.* Belfast: HMSO.

Terrestrial Fauna - Birds

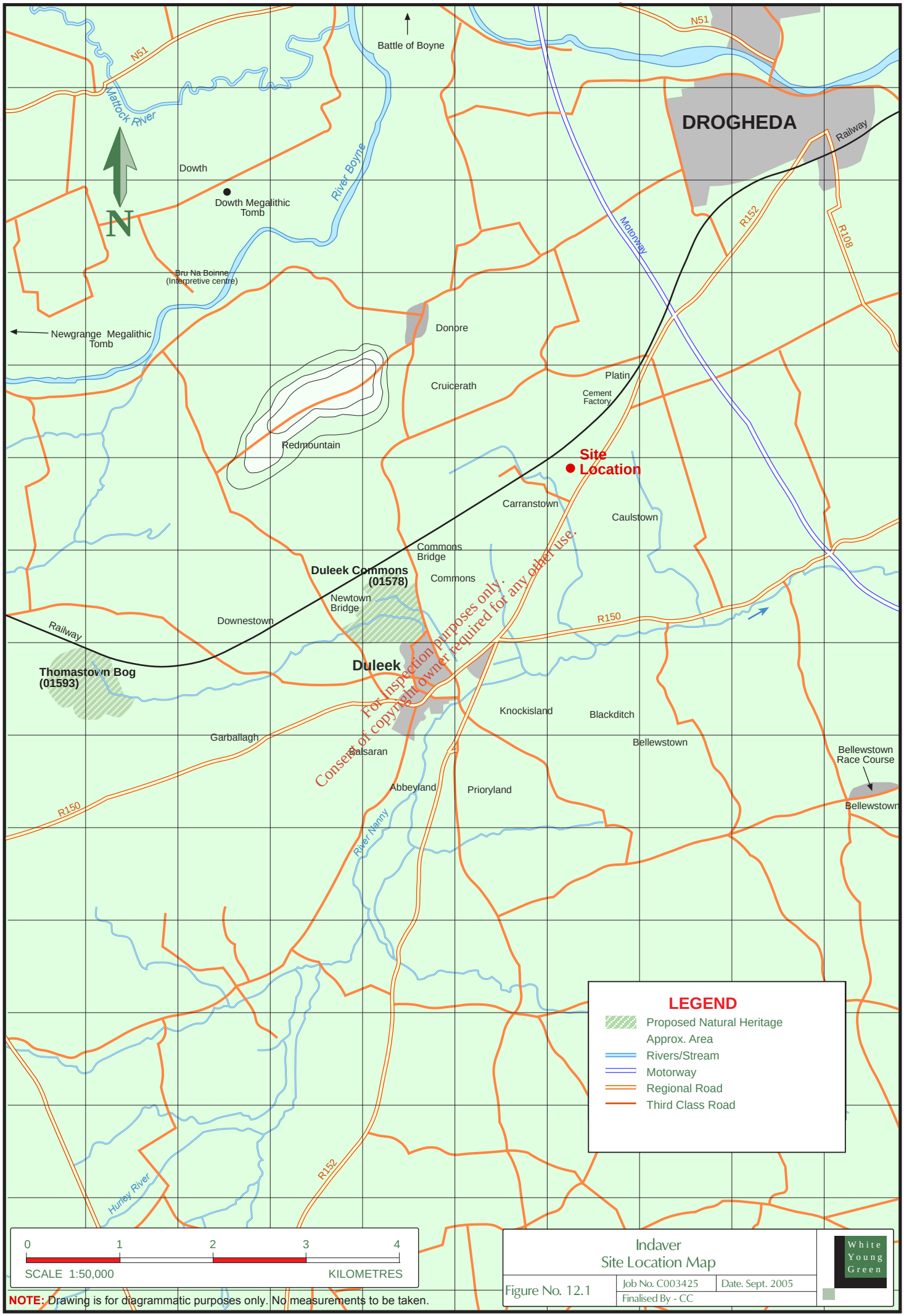
Anonymous (2004) *Proposed Natural Heritage Areas, Special Areas of Conservation, and Special Protection Areas in County Meath - listings and maps*. Department of the Environment, Heritage & Local Government.

Coombes, R.H., Crowe, O., Lysaght, L., Noble, D., O'Halloran, J., O'Sullivan, O. and Wilson, H.J. (2002) *Countryside Bird Survey Report. 1998-2000*. BirdWatch Ireland, Dublin.

Madden, B., Hunt, J. & Norriss, D.N. (in preparation) – Results of the 2002 National Peregrine Survey.

Newton, S., Donaghy, A., Allen, D. & Gibbons, D. (1999) Birds of conservation concern in Ireland. *Irish Birds* 6: 333-344.

Ratcliffe, D. (1980) *The Peregrine*. Poyser, Calton.



LEGEND

- Site Boundary
- Improved agricultural grassland
- Arable crops
- Spoil & bare ground
- Hedgerow (intact)
- Hedgerow (gappy)
- Treeline
- Drainage ditch

N

0 50 100 150
METRES

NOTE: Drawing is for diagrammatic purposes only. No measurements to be taken.

Indaver
Habitat Map

Figure No. 12.2 | Job No. C003425 | Date. July 2005 | Finalised By - CB

White Young Green

JF(10)

Appendix 12.1
Correspondence from the Department of the Environment, Heritage and Local Government

AN ROINN COMHSHAOIL, OIDHREACHTA AGUS RIALTAIS ÁITIÚIL
DEPARTMENT OF THE ENVIRONMENT, HERITAGE AND LOCAL GOVERNMENT

16 January 2005

Our Ref: G2005/279

Ms. Carmel Brennan,
Ecological Consultant,
White Young Green,
Apex Business Centre,
Blackthorn Road,
Sandyford,
Dublin 18.

Re: Proposed Waste Management Facility at Carranstown, Co. Meath.

Dear Ms. Brennan,

We refer to your notification in relation to the above-proposed development.

The Department of the Environment, Heritage and Local Government has no requirements from a nature conservation perspective.

Finally, this recommendation is based on the papers submitted to this Department on a pre-planning basis and is made without prejudice to any decision the Minister may take upon sight of a formal planning application or the submission of an Environmental Impact Statement.

Yours sincerely,

Teresa Halloran

Teresa Halloran,
Development Applications Unit.

AN ROINN COMHSHAOIL,
OIDHREACHTA AGUS
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APPENDIX 12.2

SITE SYNOPSES

SITE NAME: DULEEK COMMONS

SITE CODE: 001578

About 1km northwest of Duleek, Duleek Commons Natural Heritage Area (NHA) occupies a level, drained marsh area that was associated with the floodplain of a tributary running from Thomastown Marsh, through the undulating drift landscape to the River Nanny.

The area has suffered a certain amount of drainage activity and is now fairly dry around the periphery, where is found rushy pasture with both Soft and Hard Rush (Juncus effusus and J. inflexus) grazed by cattle. The centre is somewhat wetter, with wetland herbs such as Water Mint (Mentha aquatica), Water Forget-me-not (Myosotis sp.) large stands of Yellow Flag (Iris pseudacorus), Jointed Rush (Juncus acutiflorus) and bulky sedges (Carex sp.). The rare spike-rush (Eleocharis uniglumis) has been recorded here in one of its very few inland stations. This may be supported here by the high calcium content that is also indicated by the presence of Hard Rush.

Many wetlands in the area have completely disappeared due to drainage. Duleek commons is in relatively good condition, probably due to being in multiple ownerships. Thus this rather degraded wetland is of importance. Further drainage work here would be inappropriate.

SITE NAME: THOMASTOWN BOG

SITE CODE: 001593

This site is situated 3 km west of Duleek, Co. Meath. The site consists of a raised bog surrounded by wet woodland and wet grassland. The site is in a hollow surrounded by farmland on higher ground and is bordered by an embanked railway track on the northern side. The site is dissected by broad deep drainage channels throughout.

The raised bog was described during an earlier survey as having no bog pools and was considered to be drying out. The species recorded from the bog include Haether (Calluna vulgaris), Cross-leaved Heath (Erica tetralix), Cranberry (Vaccinium oxycoccus), Common Cottongrass (Eriophorum angustifolium), Hare's-Tail Cottongrass (Eriophorum vaginatum), Purple Moor-grass (Molinia caerulea) and Bog Asphodel (Narthecium ossifragum).

Wet woodland is the commonest habitat occurring at the site. It is considered to be spontaneous in origin. Large areas of this woodland are flooded during periods of high rainfall as the surrounding farmland drains into this site. The main species are Willow species (Salix spp.), Birch (Betula pubescens), Pedunculate Oak (Quercus robor), and Hawthorn (Crataegus monogyna). The south-east section of the woodland has Willow and large Alder (Alnus glutinosa) as the dominant tree species. There is some regenerating Wych Elm (Ulmus glabra) and a number of large dead Elms were seen.

These wet woodlands have a rich ground flora with Yellow Iris (Iris pseudacorus) dominant and associated species include Wild Angelica (Angelica sylvestris), Marsh-marigold (Caltha palustris), Ragged-robin (Lychnis flos-cuculi), Meadowsweet (Filipendula ulmaria), Meadow Vetchling (Lathyrus pratensis), Marsh Bedstraw (Galium paluste), Bog Stitchwort (Stellaria alsine) and Marsh Foxtail (Alopecurus geniculatus). Also recorded were (Marsh Cinquefoil (Potentilla palustris), Cuckooflower (Cardamine pratensis) and Lesser Spearwort (Ranunculus flammula).

A number of fields containing wet grassland vegetation occur along the southern boundary of the site. These fields contain vegetation dominated by Yellow Iris (Iris pseudacorus) with Marsh Speedwell (Veronica scutellata), Brooklime (Veronica beccabunga), Marsh Ragwort (Senecio aquaticus), Meadow Vetchling (Lathyrus pratensis), Tufted Forget-me-not (Myosotis laxa), Creeping Buttercup (Ranunculus repens) and Lesser Spearwort (Ranunculus flammula) as associated species.
Other habitats recorded at the site include reedbeds dominated by Common Reed (Phragmites australis) on the south-western border of the site, water channels with Yellow Iris and Bur-reed (Sparganium spp.) and streams.

Tree-felling has occurred on the eastern border of the site in recent times and there is evidence of an unsuccessful attempt to plant Sitka Spruce. Some areas of the site are grazed by cattle and sheep.

The site is notable for an excellent diversity of habitats and rich flora. The site has remained largely undisturbed due to difficulty of access.

SITE NAME: BOYNE RIVER ISLANDS

SITE CODE: 001862

The Boyne River Islands are a small chain of three islands situated 2.5 km west of Drogheda. The islands were formed by the build up of alluvial sediment in this part of the river where water movement is sluggish.

All of the islands are covered by dense thickets of wet, Willow (*Salix* spp.) woodland, with the following species occurring: Osier (*S. viminalis*), Crack Willow (*S. fragilis*), White Willow (*S. alba*), Purple Willow (*Salix purpurea*) and Grey Willow (*S. cinerea*). A small area of Alder (*Alnus glutinosa*) woodland is found on soft ground at the edge of the canal in the north-western section of the site. In the past, the islands were used as a source of cane for the construction of coracles and for the basket making industry.

The site includes an area of wet grassland found along the river bank to the north of the islands. This grassland is dominated by Soft Rush (*Juncus effusus*) and Hard Rush (*J. inflexus*), with Creeping Buttercup (*Ranunculus repens*), Red Fescue (*Festuca rubra*), Creeping Bent (*Agrostis stolonifera*) and Marsh Thistle (*Cirsium palustre*) occurring commonly. In places this wet grassland grades into freshwater marsh, which supports a diverse assemblage of sedge (*Carex*) species, including Greater Pond-sedge (*C. riparia*), a locally-occurring species, and Brown Sedge (*C. disticha*). The site also includes areas of reedswamp and part of a canal.

Although the site is small there are few similar examples of this type of alluvial wet woodland remaining in the country. The woodland is notable for its natural, unmodified condition, its diversity of Willow species and in particular for the fact that it conforms well to a type listed, with priority status, on Annex I of the EU Habitats Directive.

SITE NAME: DOWTH WETLAND

SITE CODE: 001861

Dowth wetland is located 4 km east of Slane along the northern bank of the River Boyne. The site is very similar in appearance to Crewbane Marsh (553) which is situated nearby. Both sites consist of an area of floodplain marsh with an associated area of deciduous woodland on steep slopes. The marsh occurs on wet alluvial soils, regularly flooded by the river.

The main area of freshwater marsh is dominated by Canary Reed-Grass (Phalaris arundinacea) with Marsh Bedstraw (Galium palustre), Reed-Grass (Glyceria maxima) and Meadowsweet (Filipendula ulmaria). The sedges Carex disticha and Carex elata are also common here. Fen Bedstraw (Galium uliginosum), a scarce species mainly confined to marshy areas in the midlands, is common in this vegetation. Between the marsh and the river there is a narrow strip of bank where dredge material was dumped in the past. This area is now colonised by a dense growth of Nettle (Urtica dioica) with some Bittersweet (Solanum dulcamara). As one moves further north the marsh grades into tall reedswamp vegetation dominated by Common Reed (Phragmites australis).

Above the marsh there is a relatively small area of mixed deciduous woodland on steep slopes. The main canopy species in the woodland are Ash (Fraxinus excelsior), Sycamore (Acer pseudoplatanus), Hazel (Corylus avellana) and Lime (Tilia cordata). There is also some Beech (Fagus sylvatica), Cherry Laurel (Prunus laurocerasus) and Bird Cherry (Prunus avium). The woodland floor is quite dry and as a result the ground flora is poor in species. The ferns Polystichum setiferum and Phyllitis scolopendrium are important components, as are Ivy (Hedera helix), Wood Avens (Geum urbanum) and Nettle (Urtica dioica).

The whole site is not heavily grazed by domestic stock and thus is in very good condition. A small herd of Red Deer graze within the site.

This site is the best remaining example of a floodplain marsh on the River Boyne. Such areas are now very rare, mainly due to agricultural reclaimation and drainage schemes along the Boyne in the past.

Appendix 12.3

Photographs

Plate 1. Arable crop BC1 is the dominant habitat on site. Potato plants and ruderal species cover approximately 20% of the field area.

Plate 2. Improved agricultural grassland grazed to c. 10 cm.

Plate 3. H1: A well maintained boundary hedgerow dominated by hawthorn (*Crataegus monogyna*).

Plate 4. H2: A section of the boundary hedgerow of varying height and moderate species richness. The adjacent cement factory is in the background and a rubble heap is visible to the left of the picture.

Plate 5. H3: An internal hedgerow of Hawthorn (*Crataegus monogyna*), which becomes increasingly gappy towards the west (left of the picture).

Plate 6. H4: A gappy internal hedgerow dominated by hawthorn (*Crataegus monogyna*) and bramble (*Rubus fruticosus*) with a ditch at the base.

Plate 7. H6: A species-poor and gappy internal hedgerow dominated by hawthorn (*Crataegus monogyna*).

Plate 8. H7: A boundary hedgerow supporting two ash (Fraxinus excelsior) trees. The one on the right supported a rookery.

Plate 9. Treeline to the west dominated by ash (*Fraxinus excelsior*). Hawthorn occurs between the trees.

Plate 10. Treeline to the west dominated by ash (*Fraxinus excelsior*). Large gaps occur between the trees and hawthorn is sparse.

Appendix 12.4

Suggested species for planting

Tree, Shrub and Climbers Species of Wildlife Value

Natives

Common Name	Latin Name	Comments
Rowan	*Sorbus aucuparia*	Native, good wildlife value, suitable for artificial environments, streets and public open spaces
Crab apple	*Malus sylvestris*	Native, good wildlife value,
Silver birch	*Betula pendula*	Native, suitable for public open spaces, streets and artificial environments
Wild cherry	*Prunus avium*	Native, suitable for public open spaces, streets and artificial environments
Blackthorn	*Prunus spinosa*	Native, good wildlife value
Spindle tree	*Euonymus europaeus*	Native, good for birds
Ash	*Fraxinus excelsior*	Native, good wildlife value
Oak	*Quercus robur*	Native, good wildlife value
Aspen	*Populus tremula*	Native, good wildlife value
Hazel	*Corylus avellana*	Native, good wildlife value
Strawberry tree	*Arbutus unedo*	Native, good wildlife value

Broom	*Cytisus scoparius*	Native, good for insects
Dog Rose	*Rose canina*	Native, good wildlife value,
Guelder rose	*Viburnum opulus*	Native, good wildlife value
Hawthorn	*Crataegus monogyna*	Native, good wildlife value, suitable for public open spaces, streets and artificial environments
Holly	*Ilex aquifolium*	Native, good wildlife value, suitable for artificial environments and public open spaces
Honeysuckle	*Lonicera periclymenum*	Native, good for insects, good clothing plant* in sun or partial shade
Ivy	*Hedera helix*	Native, good for wildlife, good clothing plant*, suitable for north facing sites in partial or full shade.

Non-natives

Field maple	*Acer campestre*	High conservation value, suitable for artificial environments and public open spaces
Sycamore	*Acer pseudoplatanus*	Good for wildlife, suitable for public open spaces
Butterfly Bush	*Buddleja davidii*	Good for butterflies, suitable for artificial environments
Cotoneaster	*Cotoneaster* spp.	Provides berries for birds and small mammals. Shrub and climbing species suitable for public open spaces
Escallonia	*Escallonia macrantha*	Provides nectar for bees and butterflies. Suitable for gardens and public open spaces
Lavander	*Lavandula* spp.	Attracts butterflies. Suitable for gardens and public open spaces

Lilac	*Syringa* spp.	Good food source for birds, butterflies and bees. Suitable for gardens and public open spaces
Fuchsia	*Fuchsia* spp.	Good food source for bees. Suitable for gardens and public open spaces
Hebe	*Hebe* spp.	Good food source for many butterfly species. Suitable for gardens and public open spaces
Firethorn	*Pyracantha* spp.	Good food source for birds and bees. Suitable for gardens and public open spaces
Viburnum	Viburnum bodnantense	Flower in winter and provide a good food source during this time
Viburnum	Viburnum tinus	Evergreen that flowers through winter and provides a useful nectar source
Japanese quince	Chaenomeles japonica	Good food source for birds
	Amelanchier canadensis	Good source of nectar and pollen in early spring
Mahonia	Mahonia spp	Flower early in the spring and provide a useful source of pollen

**Clothing plant refers to plants which can be successfully grown against a wall or open framework and which is primarily designed to provide a decorative or camophlage effect*

Suggested native herbaceous species for grassland areas

Common grass species suitable for neutral grassland	Common forb species suitable for neutral grassland	
Festuca rubra	*Achellia millifolium*	*Rumex acetosa*
Festuca pratensis	*Lucanthum vulgaris*	*Centaurea nigra*
Agrostis stolonifera	*Prunella vulgaris*	*Lotus corniculatus*
Poa annua	*Veronica chamaedrys*	*Cirsium vulgaris*
Poa pratensis	*Stellaria graminea*	
Poa trivialis	*Bellis perennis*	
Lolium perenne	*Cardamine pratensis*	
Cynosuros cristatus	*Taraxicum officinale*	
Arrhenatherum elatius	*Ranunculus repens*	
Anthoxanthum odoratum	*Ranunculus acris*	
Holcus lanatus	*Lathyrus pratensis*	
Phleum pretense	*Primula veris*	
Alopecurus pratensis	*Plantago lancelota*	
	Plantago major	

References

Anon. 1999. *Landfill Restoration and Aftercare*. Environmental Protection Agency. Wexford.

Baines, C. 1985. *How to Make a Wildlife Garden*. Elm Tree Books, London.

Hessayon, D.G. 2003. *The Tree and Shrub Expert*. Expert Books, London.

Mc Cullen, J. and Webb, R. 1982. *A Manual on Urban Trees*. An Foras Forbartha. Dublin.

Webb *et al*. 1996. *An Irish Flora*. Dundalgan Press. Dundalk.

Appendix 12.5

List of vertebrates and adjudged status

		Status in study area
Mammals		
Insectivora		
Hedgehog	*Erinaceous europaeus*	Certain/occasional
Pygmy Shrew	*Sorex minutus*	Certain
Chiroptera[1]		
Common Pipistrelle[2]	*Pipistrellus pipistrellus*	Certain[1]
Soprano Pipistrelle[2]	*Pipistrellus pygmaeus*	Likely[1]
Nathusius's Pipistrelle	*Pipistrellus nathusii*	Absent
Brown Long-eared	*Plecotus auritus*	Occasional
Leisler's	*Nyctalus leisleri*	Occasional
Lesser Horseshoe	*Rhinolophus hipposideros*	Absent
Whiskered	*Myotis mystacinus*	Absent
Natterer's	*Myotis nattereri*	Absent
Daubenton's	*Myotis daubentoni*	Absent
Brandt's [3]	*Myotis brandtii*	Absent
Lagomorpha		
Rabbit	*Oryctolagus cuniculus*	Present
Irish Hare	*Lepus timidus hibernicus*	Present
Rodentia		
Red Squirrel	*Sciurus vulgaris*	Absent
Grey Squirrel	*Sciurus carolinensis*	Absent/occasional
Bank Vole	*Clethrionomys glareolus*	Absent
Wood Mouse/Long-tailed Field Mouse	*Apodemus sylvaticus*	Present
House Mouse	*Mus musculus*	Certain
Brown Rat	*Rattus norvegicus*	Present
Black Rat	*Rattus rattus*	Absent

[1] Bat distribution records from Ni Lamnha (1979), O'Sullivan (1994), Hayden & Harrington (2000) and also Richardson (2000).

[2] Two species of Pipistrelle bat are present in Ireland, recent taxonomic revision. The species are identified by the frequency they use for echolocation (45Hz [Common] and 55Hz [Soprano]), and both are common and occur in similar habitats. Roosts occur in buildings and trees.

[3] This species is the latest addition to the Irish bat fauna – only discovered in 2003.

Appendix 12.5 continued: list of Irish mammals, vertebrates and amphibians

		Status in study area
Carnivora		
Fox	*Vulpes vulpes*	Certain, occasional
Badger	*Meles meles*	Absent, occasional
Pine Marten	*Martes martes*	Absent
Irish Stoat	*Mustela erminea hibernica*	Occasional, infrequent
Otter	*Lutra lutra*	Absent
American Mink	*Mustela vison*	Absent
Artiodactyla		
Red Deer	*Cervus elaphus*	Absent
Sika Deer	*Cervus nippon*	Absent
Red/Sika Hybrids	*Cervus elaphus/nippon*	Absent
Fallow Deer	*Dama dama*	Absent
Feral Goat	*Capra*	Absent
Amphibians		
Smooth Newt	*Triturus vulgaris*	Absent
Frog	*Rana temporaria*	Infrequent
Natterjack Toad	*Bufo calamita*	Absent
Reptiles		
Common Lizard	*Lacerta vivipara*	Unlikely

Appendix 12.6

Description of bat species known or expected on site

Common pipistrelle Pipistrellus pipistrellus

This species was only recently separated from its sibling, the soprano or brown pipistrelle *Pipistrellus pygmaeus*, which is detailed below (Barratt, E. M., Deauville, R. Burland, T. M., Bruford, M. W., Jones, G., Racey, P. A. & Wayne, R. K., 1997). The common pipistrelle's echolocation calls peak at 45 kHz. The species forages along linear landscape features such as hedgerows and treelines as well as within woodland.

Soprano pipistrelle Pipistrellus pygmaeus

The soprano pipistrelle's echolocation calls peak at 55 kHz, which distinguishes it readily from the common pipistrelle. The pipistrelles are the smallest and most often seen of our bats, flying at head height and taking small prey such as midges and small moths. Summer roost sites are usually in buildings but tree holes and heavy ivy are also used. Roost numbers can exceed 1500 animals in mid-summer.

Both the above species are considered as *Internationally Important*.

Brown long-eared bat Plecotus auritus

This species of bat is a 'gleaner', hunting amongst the foliage of trees and shrubs, and hovering briefly to pick a moth or spider off a leaf, which it then takes to a sheltered perch to consume. They often land on the ground to capture their prey. Using its nose to emit its echolocation, the long-eared bat 'whispers' its calls so that the insects, upon which it preys, cannot hear its approach (and hence, it needs oversize ears to hear the returning echoes). As this is a whispering species, it is extremely difficult to monitor in the field as it is seldom heard on a bat detector. Furthermore, keeping within the foliage, as it does, it is easily overlooked.

The species is considered as *Internationally Important*.

Leisler's bat Nyctalus leisleri

This species is Ireland's largest bat, with a wingspan of up to 320mm; it is also the third most common bat, preferring to roost in buildings, although it is sometimes found in trees and bat boxes. It is the earliest bat to emerge in the evening, flying fast and high with occasional steep dives to ground level, feeding on moths, caddis-flies and beetles. The echolocation calls are sometimes audible to the human ear being around 15kHz at their

lowest. The audible chatter from their roost on hot summer days is sometimes an aid to location. This species is uncommon in Europe and Ireland holds the largest national population.

The species is considered as *Internationally Important*.

Appendix 12.7

Photographic Record

Plate 1. Dwelling house just off site at extreme south, and tall treeline next to R152.

Plate 2. Treeline next to Regional Road R152. Note that ploughed area approaches close to the boundary, reducing its quality for wildlife.

Plate 3. Ploughed field and managed hawthorn hedge at north-east of site, next to R152.

Plate 4. View of northern portion of site, with cement factory in background.

Plate 5. Central portion of site; ploughed fields (last crop was potatoes). Hedgerow boundaries are thin and almost entirely of hawthorn.

Plate 6. Mature boundary at extreme west of site. The field is of improved pasture grassland, grazed by cattle.