



CHERRYWOOD

PLANNING SCHEME

B i o d i v e r s i t y P l a n

Cherrywood Strategic Development Zone: Biodiversity Plan

Contents

1	INTRODUCTION.....	1
2.	SUMMARY OF ECOLOGICAL FEATURES IN THE SDZ AREA AND ENVIRONS.....	2
2.1	Desktop Review and Field Surveys	2
2.2	Habitats List.....	2
2.3	Eutrophic lake	3
2.4	Other artificial lakes and ponds.....	3
2.5	Eroding upland rivers	4
2.6	Depositing lowland rivers	4
2.7	Drainage ditches.....	4
2.8	Calcareous Springs.....	5
2.9	Reed and Large Sedge Swamps	6
2.10	Tall-herb swamp	6
2.11	Improved agricultural grassland.....	7
2.12	Amenity Grassland	8
2.13	Dry calcareous and neutral grassland	8
2.14	Dry meadows and Grassy verges	9
2.15	Wet grassland	9
2.16	Dense bracken.....	10
2.17	(Mixed) Broadleaved Woodland.....	10
2.18	Mixed Broadleaved-Conifer Woodland	11
2.19	Wet Pedunculate Oak-Ash Woodland	11
2.20	(Mixed) Conifer Plantation	11
2.21	Scattered Trees and Parkland.	12
2.22	Scrub	12
2.23	Immature Woodland.....	12
2.24	Hedgerows.....	13
2.25	Treelines.....	15
2.26	Exposed Siliceous Rock.....	15
2.27	Spoil and Bare Ground.....	15
2.28	Recolonising Bare Ground	15
2.29	Arable Crops	15
2.30	Stonewalls and Other Stonework	16
2.31	House-garden Habitat Complex	16
2.32	Other Built Land	17
2.33	Overwintering Birds.....	17
2.34	Breeding Birds.....	18
2.35	Badgers.....	20
2.36	Otters.....	22
2.37	Deer.....	22
2.38	Bats	23
2.39	Other Mammals	27
2.40	Invasive Flora Species	27
2.40.1	Giant Hogweed	27
2.40.2	Japanese Knotweed.....	28

2.40.3	Cherry Laurel & Rhododendron	29
2.41	Identification of ecological corridors	30
2.41.1	What are ecological corridors?	30
2.41.2	Fragmentation effects.....	31
2.41.3	Areas of habitat continuity	31
2.41.4	Existing Corridors	31
3	KEY BIODIVERSITY DESIGN CRITERIA AND OBJECTIVES	33
3.1	Biodiversity Strategy for Cherrywood SDZ.....	33
3.2	Consistency with the National Biodiversity Plan.....	33
3.3	Design and Management of Green Infrastructure	34
3.4	Retention of Habitats and Species	34
3.4.1	General criteria.....	34
3.4.2	Derogation Licences and Protected Species	35
3.5	Retention and Protection of Calcareous Springs	35
3.6	Retention and protection of retained hedgerows and treelines	35
3.7	Retention and protection of retained calcareous grassland	37
3.8	Retention and protection of Bat Roosts (including in trees).....	39
3.9	Retention and protection of Bat feeding corridors.....	40
3.10	Retention and protection of Badger Setts	40
3.11	Protection of Breeding Birds and removal of vegetation	43
3.12	Protection of Amphibians	43
3.13	Retention and protection of crossings over/under the M50 motorway ..	43
3.14	Retention and Protection of Watercourses	44
3.15	Recommendations for Habitat Creation	44
3.15.1	Hedgerows.....	44
3.15.2	Grassland	45
3.15.3	Wetlands	46
3.16	Protection and Management of Druid's Glen and Bride's Glen.....	46
3.16.1	Druid's Glen	46
3.16.2	Bride's Glen	48
3.17	Control of invasive species	49
3.18	Monitoring the impacts on the SDZ on Ecology	49
4	SOURCES OF INFORMATION: REFERENCE LIST ON BIODIVERSITY PROTECTION AND MANAGEMENT.	51

APPENDIX 1: ECOLOGICAL MAPS

APPENDIX 2: COMPLIANCE WITH WILDLIFE LAW: NATURE PROTECTION LEGISLATION

APPENDIX 3: ECOLOGICAL VALUATION CRITERIA (NRA 2009)

APPENDIX 4 BRITISH TRUST FOR ORNITHOLOGY: BREEDING BEHAVIOUR CODES

APPENDIX 5: BIRDS OF CONSERVATION CONCERN IN IRELAND (2009)

APPENDIX 6: NON-NATIVE PLANTS SUBJECT TO RESTRICTIONS WITHIN THE REPUBLIC OF
IRELAND ACCORDING TO THE EUROPEAN COMMUNITIES (BIRDS AND HABITATS
REGULATIONS 2011

1 INTRODUCTION

This Plan forms part of the draft Planning Scheme Documentation and should be read alongside maps and sections of the Scheme where appropriate. The function of this Plan is to provide a summary of the strategy behind the design of the Planning Scheme in terms of the retention, protection and management of ecological resources.

Its objectives are to achieve the following during the implementation of the draft Planning Scheme:

- a) Avoid or minimise the disturbance to or loss of semi-natural habitats;
- b) Avoid or minimise the disturbance to or loss of protected flora and fauna;
- c) To encourage retention of existing habitats of ecological importance as part of green infrastructure and hence create ecological corridors;
- d) To promote management of retained and newly created habitats in order to maximise their biodiversity potential and minimise the net loss of biodiversity in the area.

The structure of this Plan is as follows:

Section 2: Summary of Ecological Features in the SDZ area and environs:

describing the habitats and species of note in the SDZ lands and where they are found. Their ecological value is presented with reasons for their retention where appropriate.

Section 3: Key Biodiversity Design Criteria and Objectives: describes the requirements for development applications to allow them to meet important biodiversity objectives.

Section 4: Sources of Information: Reference list on biodiversity protection and management.

2. SUMMARY OF ECOLOGICAL FEATURES IN THE SDZ AREA AND ENVIRONS

2.1 Desktop Review and Field Surveys

In 2010, a series of ecological surveys were undertaken to record the key environmental features within the SDZ lands and up to 500m around the boundary. These included surveys of habitats, mammals, birds (winter and breeding), molluscs and invasive species.

The outputs of these surveys included a range of maps showing the records and locations of specific features. Summary reports provided supporting text explaining the ecological value of these features.

A review of desktop information was also carried out to compile information that has been collected on the SDZ lands and their environs. This review helped to identify potential sensitive ecological receptors, areas of high biodiversity value and scope the surveys of habitats and species that took place in 2010.

These data helped to inform the design of the Planning Scheme which took place in 2011-2012. Scott Cawley Ltd acted as independent ecological advisors to DLRCC during the drafting of the plan and have prepared this Biodiversity Plan to assist in the sustainable phasing of development.

This Section presents a summary of the surveys that were undertaken in 2010. Some follow-up work was undertaken in 2011 in the Lower Carrickmines Valley and Druid's Glen.

The lands within and surrounding the SDZ boundary are in a unique location in the Dún Laoghaire-Rathdown area. Not only do they contain nearly 30 different habitat types, they possess rare species and features not often found elsewhere in the County. The lands are juxtaposed between the M50 and the N11 and face effects of fragmentation and development pressures yet support a range of grassland, woodland and wetland habitats that require specific management to maintain their biodiversity. Habitat value ranges from locally-important to County-important scales.

2.2 Habitats List

- Eutrophic lake;
- Other artificial lakes and ponds;
- Eroding upland rivers;
- Depositing lowland rivers;
- Drainage ditches;
- Calcareous springs;
- Reed and large sedge swamps;
- Tall-herb swamp;
- Improved agricultural grassland;
- Amenity grassland;
- Dry calcareous and neutral grassland;
- Dry meadows and grassy verges;
- Wet grassland;
- Dense bracken;
- (Mixed) broadleaved woodland;
- Mixed broadleaved/conifer woodland;

- Wet pedunculate oak-ash woodland;
- (Mixed) conifer plantation;
- Scattered trees and parkland;
- Scrub;
- Immature woodland;
- Hedgerows;
- Treelines;
- Exposed siliceous rock;
- Spoil and bare ground;
- Recolonising bare ground;
- Arable crops;
- WS3 ornamental/non-native shrubs + BC4 flower beds and borders + BL3 building and artificial surfaces;
- Stonewalls and other stonework and
- Other built land.

These are described, with reference to their locations where they were recorded in the paragraphs below and the locations where they were recorded are presented in Figures 1 and 2 in Appendix 1.

2.3 Eutrophic lake

A shallow natural depression was recorded in the centre of the undulating large field to the northeast of Lehaunstown Park. This appears to be fed by surface water although the occurrence of calcareous springs less than 300m to the southeast could suggest that the lake may have a groundwater influence. There was no botanical or physical evidence that this is a turlough – a seasonal lake that rises and falls due to the influence of changes in groundwater.



Plate 1: Shallow Lake NE of Lehaunstown Park

2.4 Other artificial lakes and ponds

Other standing water bodies were recorded during the site surveys. This included a garden pond at a property on Lehaunstown Lane, a landscaped pond at Cherrywood Business Park surrounded by a fringe of wet grassland, flooded excavations at Cherrywood Business Park and attenuation ponds to the south-east of Cherrywood Business Park.

2.5 Eroding upland rivers

These habitats were characterised by their steeper gradients, turbulent flow and typical rocky substrates that result from high energy discharges over a long period of time. Whilst they were not regarded to be upland in the sense of altitude, the upper stretches of the Carrickmines and Loughlinstown Rivers both displayed typical attributes of these streams. Plants are limited to bryophytes such as *Thamnobryum alopecurum*, *Sciuro-hypnum plumosum*, *Platyhypnidium riparioides* and *Conocephalum salebrosum*. Bankside vegetation was influenced by the terrestrial environment and therefore was described under separate habitat types.



Plate 2: Cascades in Druid's Glen

2.6 Depositing lowland rivers

Where both rivers reached more shallow gradients at the eastern end of the site, the slower flows allowed vegetation to develop especially at the river edge. Shading of both the rivers appears to prevent much floating vegetation to develop and freshwater algae was the only plant recorded.

The invasive plant Giant Hogweed *Heracleum mantegazzianum* was found abundantly along the floor of the Lower Carrickmines River from Loughlinstown to the Lehaunstown Lane Bridge. Growing up to 4m high in places it is not only an ecological threat to ground flora by outshading other species but is also hazardous to humans as its sap can damage skin when exposed to sunlight. It was also present though in lower abundance in Druid's Glen.

2.7 Drainage ditches

Drainage ditches, as opposed to streams, have been created by man for the purposes of draining land. These were found across the SDZ lands but only one ditch was seen to support any ecological community of interest. This ditch flows northwards from the arable fields toward Druid's Glen in the north-east of the SDZ lands. It was deep and steep-sided and supports Water mint *Mentha aquatica*, Brooklime *Veronica beccabunga*, Water Speedwell *Veronica anagallis-aquatica*, Remote sedge *Carex remota* and Soft rush. Fish fry were also seen in this drainage ditch despite its shallow standing water. Other ditches include those constructed across bare ground north of the Wyattville Link Road. These supported little vegetation apart from Soft rush.

2.8 Calcareous Springs

This habitat type was found in four locations within the SDZ lands. Due to its level of ecological importance at a County-level this habitat was subject to a specialist survey. A summary of the location and habitats including extracts from botanical report is provided below:

Upper Druid's Glen Spring: This spring within Druid's Glen was highly calcareous and marl producing. Plant cover was low in the spring, but there were scattered plants of Opposite-leaved Golden-saxifrage *Chrysosplenium oppositifolium* and the bryophytes *Palustriella commutata*, *Cratoneuron filicinum* *Plagiomnium ellipticum* and *Pellia endiviifolia*. This flowed down the bank in several channels and fed into an area of wet woodland by the river. The calcareous spring was also of high, local conservation value but was not considered to be an example of the Annex I habitat '*Petrifying springs with tufa formation*' due to the low cover of bryophytes and vascular plants (Denyer, 2010).

Lower Carrickmines River Springs: One spring/ flush was located on the top of the slope not far from the Tullyvale residential development. This was small and dominated by marsh vegetation with species such as Hard Rush *Juncus inflexus*, Jointed Rush *J. articulatus*, Common Spotted Orchid *Dactylorhiza fuchsii*, Marsh Thistle *Cirsium palustre*, Square-stalked St John's-wort *Hypericum tetrapterum*, Angelica *Angelica sylvestris*, Common Fleabane *Pulicaria dysenterica*, Silverweed *Potentilla anserina*, Great Willowherb *Epilobium hirsutum* and the moss *Calliergonella cuspidata*.

Below this marsh areas down the wooded slope were several Calcareous springs and associated wetlands that were becoming overgrown with tall grasses and scrub. These supported a diverse range of species, in addition to those listed above, such as sedges: Long-stalked Yellow-sedge *Carex viridula* subsp. *brachyrrhyncha*, Hairy Sedge *Carex hirta*, Brown Sedge *Carex disticha*, Star Sedge *Carex echinata*; grasses: Tall Fescue *Festuca arundinacea*, Sweet Vernal-grass *Anthoxanthum odoratum*, Red Fescue *F. rubra* and Creeping Bent *Agrostis stolonifera*; fern: Marsh Horsetail *Equisetum palustre*; and vascular plants: Marsh Hawk's-beard *Crepis paludosa*, Hemp-agrimony *Eupatorium cannabinum*, Meadowsweet *Filipendula ulmaria*, Bog Pimpernel *Anagallis tenella*, Cowslip *Primula veris* and Devil's-bit Scabious *Succisa pratensis*. Bryophytes typical of calcareous springs were present such as *Palustriella commutata*. Another spring originated within the area of woodland within which there was a large area of tufa formation (Denyer, 2010). These springs are considered to be an example of the Annex I habitat '*Petrifying springs with tufa formation*' and the site was regarded to be of County-level importance. However the site requires management to maintain and improve its ecological interest.

Tully Church Springs: These were located to 200m to the south of the Church on south-facing slopes in the area of cleared land north of the Wyattville Link Road. There were likely to be recent in age and have only developed since the clearance of the land. All were tufa-forming and support characteristic bryophytes. *Pleuridium subulatum* which was uncommon in Ireland was present in one spring. Common Stonewort *Chara vulgaris* was present in one spring.

Bride's Glen Springs: Two springs were located in a patch of scrub, grassland and marsh on the north bank of the Loughlinstown River 1km west of the M50. These were tufa-forming but generally not supporting typical tufa fen

communities. The bryophyte *Cratoneuron filicinum* was present in small amounts but the typical tufa forming moss *Palustriella commutata* was not recorded.



Plate 3: Lower Carrickmines River Spring (summer)



Plate 4: Bride's Glen Spring

2.9 Reed and Large Sedge Swamps

Wetland areas were not frequently found around the site and were usually located in association with rivers. This habitat type was only recorded along the bottom of Druid's Glen in low areas. Species recorded included Reed Sweet-grass *Glyceria maxima*, Reed Canary-grass *Phalaris arundinacea*, and Water Horsetail *Equisetum fluviatile*.

2.10 Tall-herb swamp

Several areas of tall-herb swamp were found in three key locations. A large area (3500m²) was found on the north side of the Carrickmines River directly downhill of Glen Druid. This contained Meadowsweet *Filipendula ulmaria*, Yellow iris *Iris pseudacorus* in the taller areas of the swamp and Lesser Water parsnip *Berula erecta* and occasional Water horsetail. There was a sharp delineation between the wet area and the drier meadow to the north at the break of slope. It was likely that this swamp received base-rich groundwater from the calcareous grasslands to the north.

Swamp was also found at the bottom of the slope below the Lower Carrickmines River springs. These were dominated by Fools watercress *Apium nodiflorum* with Water-cress *Rorippa nasturtium-aquaticum*, Water Figwort *Scrophularia auriculata*, Bog Stitchwort *Stellaria alsine*, Marsh-bedstraw *Galium palustre*, Floating Sweet-grass *Glyceria fluitans*, Yellow Iris *Iris pseudacorus*, Lesser Spearwort *Ranunculus flammula*, Marsh Arrowgrass *Triglochin palustre* and a small area of Grey Club-rush *Schoenoplectus tabernaemontani*. An area of Branched Bur-reed *Sparganium erectum* was associated with a larger area of open water to the south. This area should be deemed to be in direct association with the calcareous springs and hence of County-level importance. Similar swamps, though lacking open water and dominated by Yellow iris, were also recorded in association with the calcareous springs at Bride's Glen.

A swamp was recorded at the edge of the archaeological feature on the northern edge of Wyattville Link Road. This was similarly found to be dominated by Yellow Iris and Bulrush with frequent Water horsetail around the margins. Open water was also a feature of this swamp.



Plate 5: Swamp at Carrickmines River valley

2.11 Improved agricultural grassland

This type of grassland was represented in several fields outside the M50 at the far western edge of the SDZ lands. An isolated field of this type was also found to the east of Lehaunstown Lane. It was likely that development around Cherrywood has meant that traditional pasture used for cattle has moved away from urban areas. These were generally of low ecological value as they were dominated by Perennial Rye Grass *Lolium perenne* with occasional Nettle *Urtica dioica*, Common Mouse ear *Cerastium fontanum* and Creeping buttercup *Ranunculus repens*.



Plate 6: View of agricultural grassland toward Ticknick.

2.12 Amenity Grassland

Amenity grassland is used for recreation and landscaping/aesthetic purposes such as lawns. It is inevitably low in floral diversity and usually seeded with *Agrostis* and *Festuca sp.* These were found around Cabinteely and the N11 and around residences and the Cherrywood Business Park.

2.13 Dry calcareous and neutral grassland

This type of grassland accounts for the largest proportion of the habitat types recorded in the SDZ lands. It was predominantly found in the centre of the lands between the M50 and the N11 and stretches across to the Cherrywood Business Park and the Lower Carrickmines valley. It was not encountered west of the M50 where more acidic character grassland is found. Geological maps and statements made in previous ecological reports for this area of the SDZ lands state that the calcareous influence results from drift deposits lying across part of this area.

Typical species characterising this type grassland were diverse and include False-oat grass *Arrhenatherum elatius*, Red clover *Trifolium pratense*, Kidney vetch, Black Medick *Medicago lupulina*, Common Vetch *Vicia sativa*, Ribwort Plantain *Plantago lanceolata* and Cowslip *Primula veris*. Species richness varied across the site and this was principally related to grazing regime and the age of the habitats. For example some fields in the centre of the site were ungrazed or lightly grazed and were subsequently dominated by grass species whilst more frequently grazed fields had a more open sward and greater proportion of forbs in the flora community. These fields were mostly formerly arable crops according to previous reports carried out and the soil was generally well drained. Where grazing pressure or active management of the site was absent there were areas of willow and gorse scrub invasion that threatens the floral diversity of this habitat type. Former arable fields in the centre of the site near Tully Church were notable for supporting Yellow rattle *Centranthus minor*, a parasitic plant that suppresses competitive grass growth and is an important element of species-rich lowland hay meadows. However, most of these fields were not regarded to be particularly species rich, supporting Common Bent, Red Clover, Selfheal *Prunella vulgaris*, Ribwort Plantain, Meadow Vetchling *Lathyrus pratensis*, Meadow Buttercup *Ranunculus acris* as well as less common species such as Common Centaury *Centaureum erythraea* and Red Bartsia *Odontites vernus*.

Areas of calcareous grassland on the floor of the Carrickmines River valley were species-rich and may be influenced by the springs to the south-west. Gorse scrub was found in small patches and surround open areas containing Glaucous sedge, Common Spotted Orchid, Red Clover, Crested Dog's-tail *Cynosurus cristatus*, Yorkshire Fog *Holcus lanatus*, Cowslip, Yarrow *Achillea millefolium* and Black Knapweed *Centaurea nigra*.

Close to the new Luas line there were swathes of Kidney Vetch covering newly laid spoil which shows the extent of these deposits. Similarly, calcicole species were found in the area of recolonising bare ground north of the Wyattville Link Road.



Plate 7: Calcareous grassland on the floor of Carrickmines River valley.

2.14 Dry meadows and Grassy verges

In many places this habitat type was calcareous or neutral grassland that has become overgrown and dominated by grassy species. Species such as False Oat Grass, Red Clover, Selfheal *Prunella vulgaris*, Meadow Vetchling *Lathyrus pratensis*, Hogweed *Heracleum sphondylium* and Meadow Buttercup *Ranunculus acris* were found in tall tussocky meadows throughout the area. The context of these habitats varies from large open fields such as those to the south and east of Tully Church to narrow roadside verges and central reservations along motorways. It was often fringed by scrub and in some areas of calcareous grassland it formed a thin belt alongside hedgerows where animals had not grazed it.

2.15 Wet grassland

Wet grassland was relatively infrequent in the SDZ lands. It was recorded within the flood plain near the Carrickmines River and Bride's Glen and also in patches near the landscape ponds in the Cherrywood Business Park and near Lehaunstown Park. It was characterised by domination by Creeping buttercup *Ranunculus repens*, Silverweed *Potentilla anserine* and Yorkshire Fog *Holcus lanatus*. It was primarily managed for grazing purposes.

2.16 Dense bracken

Bracken was found in small pockets at the edges of some fields but has only formed dense areas to the west of the M50. A patch was found near the Carrickmines Golf Course at the edge of the conifer plantation.

2.17 (Mixed) Broadleaved Woodland

This type of woodland was found in the eastern part of the SDZ lands. The largest area was found in Druid's Glen. Trees here were very mature and had an established understorey and in a few places a ground-layer was established.

Tree species included Beech *Fagus sylvatica*, Ash *Fraxinus excelsior*, Scots Pine *Pinus sylvestris*, Oak *Quercus* species, Sycamore *Acer pseudoplatanus* and Wych Elm *Ulmus glabra*. The understorey on the slopes of the valley was dominated by Holly *Ilex aquifolium* with occasional Hazel *Corylus avellana* and Elder *Sambucus nigra*. The ground layer on these slopes was heavily shaded and only Ivy was found. On the valley floor there was a path sloping along the southern side and there were areas of Cherry Laurel *Prunus laurocerasus* that have become established. This invasive shrub out-shaded much of the central portion of Druid's Glen. Further upstream and downstream the valley floor contained a diverse ground flora with Bramble *Rubus fruticosus*, Honeysuckle *Lonicera periclymenum*, Male-fern *Dryopteris filix-mas*, Great Wood-rush *Luzula sylvatica*, Soft Shield-fern *Polystichum setiferum*, Hard-fern *Blechnum spicant*, Hart's-tongue *Phyllitis scolopendrium*. In Spring the woodland flora supported Sanicle *Sanicula europaea*, Lords-and-Ladies *Arum maculatum*, Herb-Robert *Geranium robertianum*, Wood Speedwell *Veronica montana* and Enchanter's-nightshade *Circaea lutetiana*. Wood anemone was found in both its white form *Anemone nemorosa* and the non-native Blue Anemone like *Anemone apennina*. Bryophytes included *Mnium hornum*, *Fissidens taxifolius* and *Pseudotaxiphyllum elegans*, (Denyer, 2010). The lower middle section of the valley floor hosted a community of Yellow Skunk-Cabbage *Lysichiton americanus*, a non-native curious-looking bright yellow plant that has probably reached the site through refuse dumping.

Three invasive species were found in this woodland in Druid's Glen: Giant Hogweed, Cherry laurel and occasional *Rhododendron ponticum*. The latter two were woody species that had out-shaded the native ground flora and limit its ecological value.

Other areas of this woodland type were found along slopes leading to the Carrickmines River further downstream near the Tullyvale development and along the northern side of Bride's Glen. Another area of woodland is present near Cherrywood House north of Bride's Glen Road surrounding an old ruined building.



Plate 8: Wood anemone on banksides.

2.18 Mixed Broadleaved-Conifer Woodland

A small area of this woodland type was found at the northern end of Druid's Glen to the south of the Luas line. It was composed of Ash, Sycamore, Hazel with Norway Spruce and other conifers planted amongst them. Dense planting has resulted in a poor ground flora.

2.19 Wet Pedunculate Oak-Ash Woodland

This woodland type was found in narrow sections along the Bride's Glen and the Lower Carrickmines River. It was characterised by damp-loving bryophytes, woodland ferns (such as those listed above) and other plants such as Honeysuckle *Lonicera periclymenum*, Herb-Robert *Geranium robertianum*, Remote Sedge *Carex remota*, False-brome *Brachypodium sylvaticum*, Cow Parsley *Anthriscus sylvestris* and Primrose *Primula vulgaris*. Ash *Fraxinus excelsior*, Hazel *Corylus avellana*, Holly *Ilex aquifolium*, Blackthorn *Prunus spinosa* and Hawthorn *Crataegus monogyna* were dominant in this habitat type.



Plate 9: Wet woodland in Bride's Glen (Spring)

2.20 (Mixed) Conifer Plantation

There were four areas of fragmented conifer plantation that were reputedly part of one area prior to burning in the last decade (Richard Lynn and Associates, Muir

and Associates, 1998). All were located on the elevated lands to the west of the M50 motorway. They all contain Spruce *Picea sp.* with Larch *Larix decidua* and Fir also present. Ground flora was generally absent due to the smothering effect of pine needles. The fringes of the plantations were covered in Bracken, Gorse and occasional Silver Birch *Betula pendula* scrub. They do not appear to be managed for timber production.

2.21 Scattered Trees and Parkland.

Whilst there was no typical parkland habitats recorded in the SDZ lands, there were small pockets of landscaped ground that include mature and immature planted trees in association with managed grasslands. The largest area was found in the Cherrywood Business Park. Here the trees include Ornamental Cherry *Prunus sp.*, Elder, Sally *Salix viminalis*, Hazel, Ash and Holly. The grassland has varying influences including wet areas and possible calcareous flushes. Species in the mown areas of grassland include Glaucous sedge, Common bent, Daisy *Bellis perennis* and Black Medick. A few plants of Pale Flax *Linum bienne* were also recorded; this was rare in the County (Doogue *et. al.*, 1998).

2.22 Scrub

Scrub habitats accounted for a significant proportion of the SDZ lands and were found distributed evenly across the area. Areas and nature of the scrub varied considerably from the large area of gorse scrub covering the hillside to the west of the M50 motorway at Ticknick, to small discontinuous patches of bramble, Gorse and Willow along the motorway verges and in fields in the centre of the SDZ lands. Species were dominated by Gorse, Bramble, Hawthorn, Blackthorn and Elder with typical hedgerow species represented in the ground flora component. This habitat type was often surrounded by grassland, hedgerows or by other woodland types and was an important component of ecological corridors.



Plate 10: Gorse Scrub

2.23 Immature Woodland

Immature woodland was recorded in some small areas to the west of the M50 but the largest area was a willow (*Salix sp.*) plantation that was recorded in a field south of the Luas line near Druid's Glen. This may have been planted as the trees were at a high density and all were generally the same age. It was surrounded by calcareous grassland and scrub.

2.24 Hedgerows

Whilst hedgerows accounted for only 2.8% of the area of the SDZ, they were one of the area's most important habitats. Previous surveys of selected hedgerows in the Dún Laoghaire-Rathdown area in 2007 included some of the hedgerows in the SDZ lands. These were assessed using a methodology that assesses a length of hedgerow and its physical and ecological attributes. Not all hedgerows were assessed in 2007 as many were too short or were deemed to be treelines.

For the purposes of assessment of the habitats within the SDZ lands, there were many hedgerows to consider and therefore a strategic-level assessment tool was used to assess hedgerows quickly and informatively.

Specific criteria were used to classify the hedgerow as High, Moderate or Low Ecological Importance. These criteria were published in an early version of the Guidelines for Assessment of Ecological Impacts of National Road Schemes (2004). These criteria have been adapted for use below:

Hedgerow Evaluation Criteria:

High Value, Local Importance

- Average shrub canopy height over 5m
- (note: a continuous line of mature trees over 5m was normally referred to as a treeline)
- Average width at ground level over 4m
- Dense ground cover
- Mature standard trees more than 5 per 50m length
- Gaps less than 10% per 50m length
- End connections to greater than 4 other hedges
- Dominant tree and shrub species mainly native
- Diversity of greater than 8 tree and shrub species
- Typical diverse woodland ground flora present
- Associated stream or drain with permanent water

Moderate Value, Local Importance

- Average canopy height 2 to 5m
- Average width at ground 2 to 4m
- Patchy ground cover
- Mature standard trees 1 to 5 per 50m length
- Gaps between 10-30% per 50m length
- End connections to 2 to 4 other hedges
- Dominant tree and shrub species mixed native and non-native
- Diversity of 5 to 8 tree and shrub species
- Some woodland ground flora species present
- Parallel stream or drain with seasonal water only

Low Value, Local Importance

- Average canopy height less than 2m
- Average width at ground less than 2m
- Little or no ground cover
- No mature standard trees
- Gaps more than 30% per 50m length
- End connections to less than 2 other hedges

- Dominant tree and shrub species mainly non-native
- Diversity of less than 5 tree and shrub species
- No woodland ground flora species present
- No parallel stream or drain

The hedgerow was assessed by walking along its length and making a qualitative assessment of the attributes described above.

The best examples of high value hedgerows were those that run along the Lehaunstown Lane and also within the centre of the site. These contained a range of mature trees including Ash, Sycamore, Elm *Ulmus glabra*, Holly, Elder and Hawthorn. They were dense and in excess of 4m thick with a raised earth bank covered in Ivy, Primrose, Lady's bedstraw *Galium verum*, Common dog violet *Viola riviniana*, Herb Robert *Geranium robertianum*, Wood avens *Geum urbanum* and Lords-and-ladies *Arum maculatum*. This hedgerow has probably benefitted from annual cutting by the Council which has allowed a ground flora to develop.

Poorer hedgerows were usually lower in height and had fewer mature trees along their length. They were also not connected into a hedgerow network and little ground cover. The hedgerows of least value were usually heavily pruned to low levels or were gappy and overgrazed. Several of these poorer hedgerows were found dividing the fields containing improved agricultural grassland at the far western side of the SDZ lands.

148 hedgerow sections were mapped across the SDZ lands, although these do not equate to lengths of each hedgerow as some were divided for ease of mapping or classification. 26 (18%) were high value, 56 (37%) were moderate value and 66 (45%) were low value.



Plate 11: Network of hedgerows across the SDZ lands (green = high value, orange = moderate, yellow = low)

2.25 Treelines

Treelines are often hedgerows that have had their ground and sub-canopy removed by overgrazing, poor management and wind erosion. The main treelines were found at Tully Church, Lehaunstown Park and near Priorsland. The 2007 County habitat survey notes this as a hedgerow but it was regarded that this hedge was too gappy and lacking an understory to be called a hedgerow.

Treelines have an important role to play as refuges for birds and linkages across the landscape. In the SDZ lands they are relatively rare. Where they occur they are short and either reflect lack of hedgerow management, damage to hedgerows to their origins as planted perimeter treelines such as that at Lehaunstown Park.

2.26 Exposed Siliceous Rock

For safety reasons the areas of exposed rock could not be accessed at the edge of the M50 motorway cutting. This habitat was relatively recently created since the road was developed in the last 10 years. Sparse vegetation growing on the cutting was part-introduced, part-recolonisation. It includes Gorse *Ulex sp* with some sparse grasses such as *Agrostis* and *Poa species*. These were the only areas of exposed rock found anywhere in the SDZ lands.

2.27 Spoil and Bare Ground

Spoil and bare ground was found across the SDZ lands. It covers a variety of scales from rough dirt tracks to construction sites around the Luas line and the Cherrywood Business Park. There were areas where they were showing transition to recolonising bare ground habitat. Occasional early colonisers included Petty Spurge *Euphorbia peplus*, Kidney vetch, Scarlet Pimpernel *Anagallis arvensis* and occasional Soft rush in wet places. It should be noted that this is a transient habitat and will become colonised over the next 5 year to develop a grassland-scrub complex of habitats. Depending upon the underlying geology and the nature of any fill that have been deposited on it, the area could develop into calcareous grassland or dry meadow-scrub complex.

2.28 Recolonising Bare Ground

Construction projects in the SDZ lands and environs have produced a large area of this habitat type. Some 41ha of lands was recorded falling under this category. It included the embankments along the M50 and its median strip that had been recently cleared, the lateral strips along the Luas construction works and the large area of cleared land to the north of the Wyattville Link road.

An interesting area of recolonising ground was recorded on the western side of the M50 motorway near Heronford Lane. This area comprised spoil heaps that were now becoming colonised by calcicole species such as Kidney Vetch, Coltsfoot *Tussilago farfara*, Cock's-foot, Black Medick, Western Gorse *Ulex gallii*, Bird's-foot Trefoil and occasional Glaucous sedge. It also contained some pools that could be of use for some fauna.

2.29 Arable Crops

On land each side of the M50 there were areas of land still worked for arable crops. Tilled land was recorded in February 2010 and was relatively devoid of vegetation. In June 2010 there were seven fields containing Wheat *Triticum aestivum* in the same locations. There were few other species in the field and

most floral diversity was seen around the margins including Common poppy, Hop Trefoil *Trifolium campestre*, American Willowherb *Epilobium ciliatum*, Rough Hawkbit *Leontodon hispidus* and Hoary Mustard *Hirschfeldia incana*.

2.30 Stonewalls and Other Stonework

Stonewall habitat was found throughout the site. It ranged from old buried stone walls within field boundaries, to tall stone structures surrounding Lehaunstown Park and even retaining wall structures in the far west of the SDZ lands near the extensive area of gorse scrub at Ticknick. Species supported by the Ticknick stonewall habitats were diverse and included typical upland stonewall species such as Wood Sage *Teucrium scorodonia*, Heath bedstraw *Galium saxatile*, Bracken, Navelwort *Umbilicus rupestris*, Foxglove *Digitalis purpurea* and occasional Slender St John's Wort *Hypericum pulchrum*.

Taller stonewalls such as those around properties supported Ivy, Honeysuckle *Lonicera periclymenum* and Traveller's Joy *Clematis alba*. The largest stone structure in the SDZ lands was the Bride's Glen railway bridge (disused since 1958).



Plate 12: Stonewall Habitats at Ticknick.

2.31 House-garden Habitat Complex

This habitat complex accommodates several individual habitat types listed in Fossitt (2000). To allow easier mapping at a suitable scale as this study permits and ease its description, WS3 ornamental/non-native shrubs + BC4 flower beds and borders + BL3 building and artificial surfaces were included in this habitat complex. Species were invariably non-native and include tall *Cordyline* trees, Cherry and Spotted Laurel *Prunus laurocerasus*, *Aucuba japonica* as well as many different small shrubs and garden plants, some of which have high ecological value in their supporting role for insects and birds. Buildings themselves support Ivy and Honeysuckle and also support a range of fauna. This complex of habitats occupies 31ha in the SDZ lands and forms an important ecological corridor down the eastern edge and south-eastern corner of the area.

2.32 Other Built Land

Built land was found throughout the SDZ lands in the form of buildings, roads, footpaths, car parks, Luas line and other areas of hardstanding. These generally offered no support for flora apart from climbing plants such as Ivy and Honeysuckle but do have an ecological role for many fauna including bats and birds.

2.33 Overwintering Birds

Surveys of overwintering birds were undertaken on 12th – 13th February 2010. These surveys comprised surveyors covering the entire SDZ lands and recording any sightings of birds. Surveys generally commenced at dawn until dusk. Surveyors scanned areas of open grassland before moving through each open area to avoid disturbance of birds. The location and activity of birds were recorded using standard British Trust for Ornithology (BTO) codes and the position of each bird was mapped at the point it was first detected.

Surveys recorded 28 species in total over the two days. A species list is provided below and the locations where they were recorded are shown in Figure 3 in Appendix 1:

Table 1: Overwintering birds recorded in the SDZ lands and environs.

Species Common Name	Species Latin name	Location
Blackbird	<i>Turdus merula</i>	Hedgerows and suburban gardens.
Black-headed Gull	<i>Chroicocephalus ridibundus</i>	Cherrywood Business Park.
Blue tit	<i>Cyanistes caeruleus</i>	Most hedgerows and scrub.
Bullfinch	<i>Pyrrhula pyrrhula</i>	Hedgerows and scrub in Lower Carrickmines Valley
Chaffinch	<i>Fringilla coelebs</i>	Hedgerows.
Coal tit	<i>Periparus ater</i>	Most hedgerows and scrub.
Collared Dove	<i>Streptopelia decaocto</i>	Suburban gardens.
Curlew	<i>Numenius arquata</i>	Heronford Lane.
Goldfinch	<i>Carduelis carduelis</i>	Hedgerow and gorse scrub.
Great tit	<i>Parus major</i>	Most hedgerows and scrub.
Greenfinch	<i>Carduelis chloris</i>	Hedgerows.
Grey Heron	<i>Ardea cinerea</i>	Druid's Glen and Carrickmines River Valley Lower.
Herring Gull	<i>Larus argentus</i>	Cherrywood Business Park.
Hooded Crow	<i>Corvus cornix</i>	Druid's Glen, suburban gardens.

Jackdaw	<i>Corvus monedula</i>	All areas.
Kestrel	<i>Falco tinnunculus</i>	Tully Church.
Lapwing	<i>Vanellus vanellus</i>	Lands North of Wyattville Link Road.
Long tailed tit	<i>Aegithalos caudatus</i>	Bride's Glen. Lower Carrickmines River.
Linnet	<i>Carduelis cannabina</i>	Scrub in Lower Carrickmines Valley.
Magpie	<i>Pica pica</i>	All areas.
Mistle thrush	<i>Turdus viscivorus</i>	Treelines near Carrickmines and Tully church.
Pheasant	<i>Phasianus colchicus</i>	Hedgerows and Scrub.
Redwing	<i>Turdus iliacus</i>	Fields in centre of SDZ lands.
Robin	<i>Erithacus rubecula</i>	Suburban Gardens, Hedgerows.
Rook	<i>Corvus frugilegus</i>	All areas.
Siskin	<i>Carduelis spinus</i>	Conifer plantations at Ticknick.
Snipe	<i>Gallinago gallinago</i>	Ticknick.
Song Thrush	<i>Turdus philomena</i>	Suburban gardens.
Sparrowhawk	<i>Accipiter nisus</i>	Bride's Glen
Stonechat	<i>Saxicola torquata</i>	Ticknick and hedgerows at Carrickmines.
Tree Sparrow	<i>Passer montanus</i>	Carrickmines west of M50.
Wood pigeon	<i>Columba palumbus</i>	Suburban Gardens, Hedgerows.

Winter migrants such as Curlew, Lapwing and Redwing were recorded in the SDZ lands in small numbers (2 no. Curlew, 40 no. Lapwing and 12-20 no. Redwing). The area is likely to be a transitory area for these species as no significant areas of the typical habitats used by these species for refuge or feeding were found in the SDZ lands. Figure 3 shows the locations of the various sightings.

2.34 Breeding Birds

Surveys were undertaken on 10th April, 14th May, 15th June 2010. These surveys involved carrying out surveys to detect breeding activity in the SDZ lands. Due to the large size of the SDZ lands and in accordance with the BTO/RSPB/JNCC Breeding Bird Survey (BBS) methodology, the surveys were carried out along six transects which were surveyed on three occasions through the breeding season. To allow for variation in detection of early and late breeding species three surveys were conducted in April, May and June. Surveys recorded 31 species in total over the three days in a survey of 6 transects. The locations where they were recorded are shown in Figure 4 in Appendix 1. A species list is provided below with an indication of their predicted breeding status. Confirmed Breeding birds are in **bold**.

Table 2: Breeding birds recorded in the SDZ lands and environs.

Species Common Name	Species Latin Name	Breeding Location
Blackcap	<i>Sylvia atricapilla</i>	Druid's Glen, Bride's Glen.
Blackbird	<i>Turdus merula</i>	Hedgerows and suburban gardens.
Blue tit	<i>Cyanistes caeruleus</i>	Most hedgerows and scrub.
Buzzard	<i>Buteo buteo</i>	Druid's Glen.
Chaffinch	<i>Fringilla coelebs</i>	Hedgerows.
Coal tit	<i>Periparus ater</i>	Most hedgerows and scrub.

Collared Dove	<i>Streptopelia decaocto</i>	Suburban gardens.
Feral Pigeon	<i>Columba livia</i>	Suburban gardens.
Goldcrest	<i>Regulus regulus</i>	Druid's Glen, Ticknick.
Goldfinch	<i>Carduelis carduelis</i>	Large flocks in hedgerow and gorse scrub.
Greenfinch	<i>Carduelis chloris</i>	Hedgerows.
Great tit	<i>Parus major</i>	Most hedgerows and scrub.
Hooded Crow	<i>Corvus cornix</i>	Druid's Glen, suburban gardens.
House Martin	<i>Delichon urbicum</i>	Farm buildings especially around Bride's Glen.
Jackdaw	<i>Corvus monedula</i>	Farm buildings.
Kestrel	<i>Falco tinnunculus</i>	Conifer plantation at Heronford Lane.
Long tailed tit	<i>Aegithalos caudatus</i>	Bride's Glen. Lower Carrickmines River.
Magpie	<i>Pica pica</i>	Suburban gardens.
Meadow Pipit	<i>Anthus pratensis</i>	West of Tully Church.
Mistle thrush	<i>Turdus viscivorus</i>	Hedgerows, treelines.
Moorhen	<i>Gallinula chloropus</i>	Pond near Lehaunstown Lane.
Raven	<i>Corvus corax</i>	Isolated conifers near Glen Druid.
Robin	<i>Erithacus rubecula</i>	All hedgerows and scrub.
Rook	<i>Corvus frugilegus</i>	Druid's Glen.
Skylark	<i>Alauda arvensis</i>	West of Tully Church.
Song Thrush	<i>Turdus philomena</i>	Suburban gardens.
Starling	<i>Sternus vulgaris</i>	Farm and suburban buildings.
Stonechat	<i>Saxicola torquatus</i>	Gorse scrub.
Swallow	<i>Hirundo rustica</i>	Most farm buildings especially Lehaunstown Park.
Treecreeper	<i>Certhia familiaris</i>	Druid's Glen.
Wren	<i>Troglodytes troglodytes</i>	Suburban gardens, hedgerows and scrub.

The surveys included recording breeding behaviour to determine the presence of breeding territories.

Anecdotal records for other breeding birds include several records for Long-Eared Owl *Asio otus*. A possible winter roost for this species was located in conifer trees at Ticknick although no signs of any recent occupation or breeding success were noted in 2010. This is Ireland's commonest owl although its distribution is limited to rural areas and conifer plantations.

The author recorded Barn Owl *Tyto alba* at fields at Priorsland in the northwest of the SDZ lands in 2006. This rare owl is now threatened by loss of habitat and roost sites. Initial examination of buildings at Lehaunstown Park concluded that these open buildings being regarded to be potentially excellent breeding sites. However neither the owners nor an examination of the buildings suggested that Barn Owls were using them.

The List of Birds of Conservation Concern in Ireland (BoCCI) (Birdwatch Ireland, 2009) is often used to describe their importance in a national context. Where species are of international value they are listed in the EC Birds Directive. Birds listed on the Red List of BoCCI are deemed to be under greatest threat. Those on the Amber List are of moderate concern. Appendix 5 lists the BoCCI List.

None of the wintering or breeding bird species listed as Red list species have been recorded during the surveys in 2010. However, there are reliable anecdotal records of Yellowhammer as well as Barn Owl as stated above.

Of the Amber list species, the SDZ lands were recorded to support House Martin, Kestrel, Linnet, Skylark, Snipe, Starling, Swallow and Tree Sparrow. Consultation with local ornithologists has suggested that the area around Tully Cross was formerly used by Yellowhammers *Emberiza citrinella* but none were recorded there in 2010 (personal comm. H. Delaney, 2010). This is most likely due to the change in land use from arable land to grazing.

There were no bird species listed under Annex 1 of the EC Birds Directive that were recorded in the SDZ lands. Lapwing is listed under Annex 2(II) which allows them to be hunted in some Member States. All bird species occurring in Ireland are protected under EC Birds Directive and the Wildlife Act, 1976 (including amendments made in SI 283/1980 and SI 397/1985).

2.35 Badgers

Badgers and their setts (occupied or unoccupied) are protected by the Wildlife Acts (1976 as amended in 2000). Badgers live in social groups of up to 20 individuals or more containing several males and females. They live in setts within their territories. Each territory may have several setts including usually one large main sett with many entrances and subterranean chambers. An annex sett is often close-by and may also have several entrances. Other setts are termed subsidiary or outlier setts and are usually smaller and less frequently used. It is impossible to determine if a sett is occupied or not without sustained monitoring. Nevertheless all setts are protected whether occupied or not. The last national badger survey concluded that overall densities of badger groups average at 0.57 groups per km². Based upon the area of the SDZ lands alone it is possible that 2.5 social groups could be supported. The evidence collected by field surveys suggests that up to four groups may be present. The density of groups is primarily limited by the feeding resources available.

Table 3 below described the setts that were recorded. The locations of paths, latrines and feeding signs are shown in Figure 5 in Appendix 1. The types of setts are described in more detail below:

- **Main Setts:** These usually have a large number of holes with large spoil heaps, and the sett generally looks well used. They usually have well used paths to and from the sett and between sett entrances. Although normally the breeding sett is in continual use all year round, it is possible to find a main sett that has become disused because of excessive disturbance or for some other reason.
- **Annex Setts:** These are always close to a main sett and are usually connected to the main sett by one or more obvious, well-worn paths. They consist of several holes, but are not necessarily in use all the time, even if the main sett is very active.
- **Subsidiary Setts:** Often these have only a few holes, are usually at least 50 m from a main sett, and do not have an obvious path

connecting them with another sett. They are not continuously active.

- Outlying Setts: These usually only have one or two holes, often have little spoil outside the hole, have no obvious path connecting them with another sett, and are only used sporadically. (Natural England, 2009).

Table 3: Badger Setts within the SDZ lands and environs.

Sett Reference	Sett Type	Description
1	Annex Sett	2 entrances, active
2	Main Sett	6 + Entrances on South facing slope in scrub.
3	Main Sett	10+ Entrances with large spoil heaps, massive amounts of bedding, latrines nearby. Highly active.
4	Annex Sett	2 entrances, active.
5	Main Sett	6 entrances in area of bramble scrub. Small spoil heaps, some bedding.
6	Annex/Outlier	3 entrances, active, spoil.
7	Outlier sett	1 entrance, spoil.
8	Outlier	3 entrances, inactive
9	Outlier	1 entrance, inactive
10	Outlier	1 entrance, active
11	Annex	10 entrances, poss rabbit.
12	Annex	9 entrances, spoil, bedding. Low levels of activity at most entrances.
13	Outlier	2 entrances
14	Outlier	Possibly rabbit
15	Annex/outlier	2 entrances in rocks at edge of field/scrub. Other entrances nearby may be use but require monitoring.
16	Former main sett	5 entrances of which 3 appear active. No fresh spoil or bedding or signs of badgers. Signs of otters nearby so use as a holt cannot be ruled out.

Setts 2,3 and 5 were all very active main setts with evidence for recent occupancy. Photos below show bedding and sett entrances recorded during the surveys.



Plate 13: Sett entrances and bedding.

2.36 Otters

Otters and their holts (occupied or unoccupied) are protected by the Wildlife Acts and the EC Habitats Directive where they are listed under Annex II and IV. Clear evidence for otters was recorded in - both the Carrickmines River valley and along Bride's Glen. Spraints were recorded on rocks in both streams as shown below, at intervals of one sprainting site every c.150 metres. No evidence for holts were recorded in the SDZ lands although these can be very difficult to locate as they can be within dense scrub, tree roots and bankside vegetation. Suitable areas for holts locations were noted upstream within the Druid's Glen woodland and in the old badger setts (ref No 16) in lower (western) Bride's Glen. The locations of evidence for otters are presented in Figure 6 in Appendix 1.

2.37 Deer

Areas around Heronford Lane and Ticknick were identified as being used by herds of Sika deer *Cervus nippon*. Sika Deer are not listed as a protected species in the same way as badgers in the Wildlife Acts as they are not native species but there are restrictions on shooting deer within the Acts. Evidence for deer was found in the form of flattened areas of grassland within gorse scrub, rubbing marks against trees, tree grazing, footprints or 'slots', droppings and hair snags on wire fences. The locations of evidence for Deer are presented in Figure 7 in Appendix 1.



Plate 14: Remains of Sika Deer at Ticknick.

Deer are regularly sighted on the hillside on the western side of the M50 motorway at dusk. Several individuals were flushed from gorse and birch scrub in the Ticknick area during field surveys.

Sika Deer are not protected under the Wildlife Acts and are non-native species. They are deemed to be a threat to native herbivores in terms of competition and cause significant damage to young forestry. Their presence needs to be taken into account if any proposals for landscaping and woodland planting would be intended for areas frequented by deer. They do not appear to have moved very far east of the M50 within the SDZ lands. This may be due to lack of scrub in which they may take refuge. It is possible that they may graze at night within the grassland east of the M50 and return to the gorse scrub at Ticknick at dawn.

2.38 Bats

All bats are protected by the Wildlife Acts and the EC Habitats Directive where they are listed under Annex II. The surveys of the SDZ lands and environs has revealed a small number of roosts (likely to be an underestimate) and a diverse and abundant bat population using discrete areas for feeding. The following bat species were recorded in the Bat surveys:

- Common pipistrelle *Pipistrellus pipistrellus*
- Soprano pipistrelle *Pipistrellus pygmaeus*
- Leisler's Bat *Nyctalus leisleri*
- Brown Long-Eared bat *Plecotus auritus*
- Daubenton's bat *Myotis daubentonii*
- Natterer's bat *Myotis nattereri*¹
- Whiskered Bat *Myotis mystacinus*

The only species not recorded during the surveys but known to occur in the County was Nathusius's Pipistrelle *Pipistrellus nathusii*. There are records for this bat in Dublin city centre and it is likely to have been under-recorded across the region as it is often mistaken for the other Pipistrelle species. Lesser horseshoe bats *Rhinolopus hipposideros* have not been recorded in the County and would not be expected to occur.

Roosts were recorded at several locations in the SDZ lands but it is thought that bats may make occasional use of many more trees and structures than were recorded in the surveys in 2010. All bat surveys represent snapshots of bat activity and small roosts used by low numbers of individual bats may remain undetected despite repeated attempts to look for them. The results of the roost surveys of structures within the SDZ boundary are provided below in Table 4 and locations of bat roosts and activity are presented in Figure 8 in Appendix 1.

¹ Both Natterer's and Whiskered bats are hard to identify by echolocation call alone, therefore these identifications are based upon professional judgment and on sound analysis of their calls.

Table 4: Confirmed Bat roosts² recorded within or near the SDZ lands

Location	Results of Daytime internal/external surveys	Results of Dusk/Dawn Surveys
1. Druid House	Brown long-eared bat droppings at northern end of upper floor in new stable block. Roost (no bats visible) between rafter and wall.	Not undertaken.
2. Glen Druid Mews	Occasional Brown long-eared bat droppings in barn upper floor. Other outbuildings highly suitable for bats but no other evidence found.	Not undertaken.
3. Glen Druid Main House	Suspected Pipistrelle bat droppings (old) located under ridge beam in main house roof. No obvious signs of entry point. Building also suitable for rarer Whiskered Bats.	No bats recorded emerging at dusk or re-entering at dawn. Common and Soprano pipistrelle, Daubenton's bat, Leisler's bat and an unknown bat of the <i>Myotis</i> genus recorded flying around courtyard and main house.
4. Glen Druid outbuildings	Stable block upper hay loft contains several unidentified droppings, possibly Natterer's bat.	
5. Priorsland	Surveyed in 2006 by Paul Scott (Scott Cawley Ltd). No exterior or interior evidence for bats in main house or outbuildings. Evidence for pipistrelle and Brown long-eared bats using stable block.	Unknown number of Common pipistrelle bats recorded entering roosts under eaves on NE corner and SE corner of main house.
6. Lehaunstown Park and buildings	Upper storey examination limited due to access difficulties (floor unsafe). Feeding remains of Brown long-eared bats found below access hatch suggests possible feeding perch. No other signs of bats.	Brown long-eared bat recorded feeding on western edge. Leisler's bats possible roosting in trees to the west as they emerged at low level and early in the evening. No bats recorded emerging at dusk or re-entering at dawn.
7. Empty residences along Lehaunstown	All residences offered roosting opportunities for bats, especially for Pipistrellus species. No evidence for use by bats was found however.	No bats recorded emerging at dusk or re-entering at dawn. Leisler's bats and Common pipistrelle bats recorded in low numbers. Nearby Lehaunstown Lane

² Or structures that are deemed to have high potential for bats but roosts were not confirmed by surveys.

Lane		is an area of high activity.
8. Derelict Building, Bride's Glen	Offered good roosting potential and hibernation potential for some bat species under ivy and in cracks around timber lintels and old door frames. In danger of collapse or deterioration. No signs of bats but structure prone to weathering and therefore an inherent low chance of finding evidence of bats.	No bats recorded emerging at dusk or re-entering at dawn. Soprano pipistrelle, Common Pipistrelle, Daubenton's and Natterer's bats recorded flying in woodland.

Potential roosts within trees were not directly surveyed but groups of trees or isolated mature trees were surveyed if they appeared to offer high roosting potential for bats. Roosting potential for trees was based on the following characteristics:

- Natural holes
 - Cracks/splits in major limbs
 - Loose bark
 - Behind dense, thick-stemmed ivy
 - Hollows/cavities
 - Within dense epicormic growth
 - Bird and bat boxes
- (from BCT, 2008)

The best examples were the line of trees (including Turkey Oaks *Quercus cerris*) near Priorsland, trees in Druid's Glen and those surrounding Lehaunstown Park. Due to the difficulties in detecting tree roosts using standard techniques, it will be important to adopt a precautionary approach with regard to future development affecting these trees.

Bat activity was recorded across the SDZ lands and the immediate environs but there were distinct 'hotspots' for feeding and diversity of bat species. The Pipistrelle species were found throughout the area and were most common along hedgerows and small roads such as Lehaunstown Lane. The Common Pipistrelle bat was recorded most frequently. Leisler's bats were also recorded across the area and are known to fly over open ground more than other bat species. Other bats species were recorded on a more localised basis and the following areas were noted as being key areas of importance for bats with high abundance and diversity:

- **Druid's Glen** recorded the rarer Myotis species of bats including Natterer's and Whiskered Bats as well as Daubenton's bat and Pipistrellus species. Bats were particularly abundant around the bottom of the valley around the river and were recorded commuting up and down through dense vegetation.
- **Lehaunstown Lane:** Pipistrelle bats used this road for feeding and commuting at all levels from low alongside the hedgerows to the tree tops. It offered shelter from wind and high quality hedgerows that support many insects. Myotis species also were recorded along the road in the vicinity of Druid's Glen.
- **Carrickmines River valley (lower):** Bat activity was abundant around the area of the calcareous springs and along the upper treeline. Species included Pipistrelle bats, Leisler's bat and Daubenton's bats.
- **Bride's Glen (mid section):** Bats here mainly comprised Pipistrelle bats but several Brown Long-eared bats and Leisler's bats were also recorded. Most bats were recorded close to the M50 where the river is more open and woodland comes down to the road on the north side.
- **Bride's Glen (upper) and Ticknick:** Bat activity was more dispersed in these areas but nevertheless was abundant and included both Pipistrelle species and other bats including Leisler's bats and occasional Myotis species. The more open landscape in the Ticknick area is not conducive to bats as they become exposed to buffeting winds. Nevertheless bats were recorded in almost all areas in small numbers. This area to the west of the M50 motorway contains more potential roost sites than elsewhere in the SDZ lands and environs. There are several large old properties or properties with stables and outbuildings that offer suitable roosting sites. Roads such as Ballycorus Road and Mine Hill Road had tall hedgerows

down both sides of the road that provided feeding corridors for most bat species.

In the early autumn of 2011, Scott Cawley Ltd and Dr Emma Boston (Centre for Irish Bat Research) undertook a trapping survey (using a Harp Trap) within Druid's Glen to determine the identity of *Myotis* species that had been recorded by bat detector there in 2010. Unfortunately no bats were captured. Bat activity was significantly reduced compared to 2010. This was attributed to light spill from the Brennanstown Luas stop which illuminated the western end of Druid's Glen.

2.39 Other Mammals

Sightings and evidence of other mammals included Fox *Vulpes vulpes*, Rabbit *Oryctolagus cuniculus*, Grey squirrel *Sciurus carolinensis*, Brown Rat *Rattus norvegicus* and Pygmy Shrew *Sorex minutus*. Questionnaires sent out to some residents to determine the presence of bat roosts also flagged up the presence of these other species. There are no records of Pine Marten *Martes martes* but the range of this species is increasing and populations in the Dublin and Wicklow mountains could feasibly use the western edges of the SDZ lands.

2.40 Invasive Flora Species

A number of invasive (non-native) species were found within the Cherrywood area. Species included:

- Giant Hogweed *Heracleum mantegazzianum* – several large infestations along the banks of the Loughlinstown River on the western side of the N11.
- Japanese Knotweed *Fallopia japonica* - eastern end of Bride's Glen close to residences, and on the banks of the Loughlinstown River near to the Silver Tassie pub.
- Cherry Laurel *Prunus laurocerasus* – spread through Druid's Glen.
- Rhododendron *Rhododendron ponticum* – some patches in the western side of Druid's Glen.

These locations are shown in Figure 9 in Appendix 1.

Invasive species are discussed under **Objective 2 of the DLRCC Biodiversity Plan**, and specifically under Action 4.7: "*Identify those species posing a threat to biodiversity as a result of their invasive nature, and agree policies and actions to control their spread.*" Appendix V provides a list of alien species of conservation concern "*which adversely impact on native flora and fauna, or have the potential to do so in the future*". The list includes both Giant Hogweed and Rhododendron *ponticum*. Cherry Laurel is not included, but as it has been found to be invasive in Druid's Glen, it is strongly recommended that it should be treated in a similar manner. In the 'Threats to Biodiversity Section (p15), The Giant Hogweed infestation along the Loughlinstown Stream is specifically mentioned. It is noted that Dún Laoghaire- Rathdown County Council is currently working to control this species.

2.40.1 Giant Hogweed

Giant Hogweed is a tall (usually 3 - 5m), biennial or perennial herbaceous plant with white flowers, which looks like very large cow parsley, with pale, swollen

rootstock. Giant Hogweed originates from the Caucasus, and was introduced to gardens as a curiosity in the 19th century, from where it later spread into the wild via seed dispersal. It is invasive in habitats such as river and stream banks, railway lines, disused waste land and damp places. It has spread rapidly throughout Ireland, despite being the subject of on-going widespread control measures (ISI 2008).

Giant Hogweed spreads primarily by seed, which can disperse over short distances by wind but considerably longer distances by rivers or by anthropogenic activities (e.g. soil adhering to shoes, machinery and other contaminated objects). It produces 20-50,000 viable seeds a year, which are penny sized and paper-thin (ISI 2008).

Giant Hogweed sap contains a chemical which reacts with sunlight and causes a nasty and potentially dangerous skin reaction in almost everyone who comes into contact with it, resulting in burning, itching and blistering. The lesions are slow to heal and any consequent scarring may persist for at least 6 years. The reaction can occur by individuals accidentally brushing past leaves and can be especially acute in children. For this reason it is considered to be a serious and significant danger to public health (ISI 2008).

The plant's very large leaves mean that it shades out less vigorous plants in its immediate vicinity, which will lead to negative impacts upon amenity planting and areas of wild vegetation.

It was located within the SDZ lands along the banks of the Carrickmines River from the mid-section of Druid's Glen to the N11. It was particularly dense in the flat flood plain near the N11.



Plate 15: Giant Hogweed near the N11.

2.40.2 Japanese Knotweed

Japanese knotweed *Fallopia japonica* is an herbaceous plant of up to 3-4m height which produces distinctive bamboo-like canes. In summer it produces dense bushes of large, triangular leaves and strings of white flowers, and in the winter it dies back to leave stands of purplish canes. It is a perennial with thick, woody rhizomes (roots) that can creep underground up to 7m from the main plant. The

underground rhizomes are thick and woody with a knotty appearance and when broken reveal a bright orange-coloured centre (Kelly *et al* 2008). The UK Environment Agency document *The Knotweed Code of Practice: Managing Japanese knotweed on development sites* (2006) provides detailed descriptions and pictures of the plant, which can be used to aid the identification of plants and their roots.

Since it was introduced as an ornamental plant in the 19th Century from east Asia it has spread across the UK and Ireland, particularly along watercourses, transport routes and infested waste areas (Kelly *et al.*, 2008).



Plate 16: Japanese Knotweed

Within the Cherrywood SDZ area, it is present at a small number of locations along the banks of the Loughlinstown River, and its spread appears to be associated with water flow in the stream.

Japanese Knotweed flowers are effectively infertile in Ireland, as only female Japanese Knotweed plants have been recorded in the country to date. Although seeds are produced, they are hybrids and rarely survive. The principal means of spread is through the deliberate or accidental movement of rhizome fragments or cut stems, either through transport in waterbodies or through anthropogenic activities. In this species fragmentation can be highly virulent, and new plants can grow from fragments of stem of 1cm² or less. After establishment it grows very vigorously, and seedlings can push through tarmac and other built surfaces. If buried, it can regrow from depths of up to 5m below the surface (Kelly *et al* 2008).

Japanese knotweed can vigorously invade new areas, and can be a problem on riverbanks, lawns, flowerbeds and natural habitats. Few species can compete with its vigorous growth and the shading it produces. Once established underneath or around a built environment, it can be particularly hard to control, growing through concrete, tarmac and other hardstanding (Kelly *et al.*, 2008).

2.40.3 Cherry Laurel & Rhododendron

Cherry Laurel is a dense, thicket-forming invasive evergreen shrub of gardens, parks and woodlands. It has thick, green, laurel-like leaves, white flowers on upright spikes and blackish cherry-like fruits. It was originally introduced to Ireland from southwest Asia and southeast Europe, where it was used for ornamental or screening purposes (Maguire *et al* 2008), or to provide cover for

game. In the SDZ lands, Cherry Laurel was recorded along the bottom of Druid's Glen and in some areas formed impenetrable thickets.

It is tolerant of drought and shade, and is known to be invasive in woodlands in Ireland. As an evergreen plant it has a competitive advantage over Ireland's deciduous woodland trees, and when it becomes dense it can also cast shade over the ground inhibiting the regrowth of seedlings.

Rhododendron is a large evergreen shrub (growing up to 8m tall) that was introduced to Ireland as an ornamental plant in the 18th Century from Asia and north-west China. There are more than 900 species of Rhododendron, but only one type, *Rhododendron ponticum* is invasive in Ireland. It has dark green waxy, oblong leaves and conspicuous pinkish purple or lilac flowers on 2-4cm stalks although hybrids and cultivated varieties can vary in colour. Flowering occurs in spring and summer with plants capable of producing large quantities of viable seed, which can persist to create a seed-bank in the soil. Rhododendron can also propagate itself by vegetative means, both by suckering from roots and by layering wherever branches touch the ground (Maguire *et al.*, 2008). In the SDZ lands it was recorded at the north western end of Druid's Glen.

Rhododendron thrives on peaty, sandy and acidic soils and is extremely hardy. It is a very popular garden ornamental plant and has been extensively planted as game cover along the edges of fields and within woodlands. Its popularity, adaptability to Irish climate and soils along with its highly successful and multiple methods of reproduction and dispersal means that it has become naturalised and widespread. As Rhododendron is very shade tolerant, it has become widely established in several habitats, notably heathlands and woodlands, from adjacent gardens (Maguire *et al* 2008).

Rhododendron and Cherry Laurel are extremely invasive plant species, and often form dense thickets. Both are unpalatable to Irish wildlife, and may also be harmful if eaten (Rhododendron contains large amounts of 'free' phenols and diterpenes, while Cherry Laurel is high in cyanide). The deep shadow cast by the plants and toxic leaf litter accumulating underneath Rhododendron produces a dark sterile environment, which suppresses regeneration of native species and supports little wildlife. It has been reported that Rhododendron can cause localised changes in soil chemistry. Rhododendron hosts the fungus *Phytophthora ramorum* which is a serious plant health pathogen. This has the potential to attack a wide variety of native woody plants and is the causative agent of 'Sudden Oak Death'.

2.41 Identification of ecological corridors

2.41.1 What are ecological corridors?

Ecological Corridors are complexes of habitats or landscape features that allow the safe and effective dispersal of fauna and flora across geographic areas. They generally include undeveloped areas as built land offers little protection or support to most species. Woodland, rivers, scrub, hedgerows and treelines provide the best linkages for most fauna whilst open grassland and cleared land provide fewer opportunities for feeding and refuge. However it is important to realise that ecological corridors for one species is not the same as for another, For example, the Pale-bellied Brent Goose *Branta bernicla hrota* relies upon open amenity grassland and intertidal areas for feeding and open spaces for roosting whereas Otter *Lutra lutra* rely upon watercourses, wetlands and lakes for feeding and rough ground (scrub, woodland, rocky shores) for their resting sites.

It is important to regard the Cherrywood SDZ lands not as an isolated 'island', but as a parcel of land with permeable boundaries where species will move in and out. The discussion of ecological corridors therefore requires the acknowledgement of habitats of value within the 500m buffer zone.

2.41.2 Fragmentation effects

The M50 and the N11 dual carriageways are significant barriers to specific species groups in some parts of the SDZ lands. For some mobile species such as birds and insects, the fragmentation effects are not strong especially as the M50 is in cut at the section where it passes through the SDZ. During field surveys, flocks of Linnet *Carduelis cannabina*, Hooded Crow *Corvus cornix* and even the resident pair of Buzzards *Buteo buteo* were seen passing over the M50.

There were two main crossing locations that allow terrestrial fauna to cross the M50 at specific points. The overbridge at the top of Heronford Lane passes over the M50 but was relatively open and would only be used in the dusk-dawn period. There was no evidence that fauna were using this bridge although it was close to concentrations of Sika deer activity outside of the M50. The second crossing point was in Bride's Glen where the road passes under the M50 bridge. Field evidence points to this being used as a crossing point for Badger, Deer and Bats and therefore is an important breach in this barrier. Additional crossing points include the farmer's underpass near Carrickmines and a possible badger underpass underneath the M50. These crossing points are shown in Figure 10 in Appendix 1.

The N11 has no similar crossing points apart from the long culvert under the road that carried the Carrickmines and Loughlinstown Rivers after which they meet to form the Shanganagh River. Evidence for otters has been recorded both upstream and downstream of the bridge and it is possible that they would swim the 60m-long culvert unless it was under high flow.

Data entered into a national Road-kill database on www.biology.ie showed that there were a small number of badger mortalities to the south of the Bray roundabout on the N11 since 2008. Only one fox mortality was recorded on the N11 within the SDZ lands. Fox are ubiquitous throughout south County Dublin.

2.41.3 Areas of habitat continuity

Druid's Glen, a key area of broadleaved woodland, was severed at its western end by the M50 and does not show continuity apart from connecting with low-density housing with extensive leafy gardens to the north in Brennanstown and Carrickmines. There were good linkages to the north generally with few barriers to species moving from the SDZ lands in a north-south direction.

Habitat continuity was best shown in Bride's Glen where the wet pedunculate woodland on the banks of the river extends westwards from the site. This thin strip of woodland extends parallel to the Ballycorus Road and then heads southwest to meet the Enniskerry Road. It represents a corridor from the uplands around the Scalp, Puck's Castle, Ticknick and Kiltiernan to the lower coastal strip at Loughlinstown and Shanganagh.

2.41.4 Existing Corridors

It was apparent that linkages under the M50 at Bride's Glen and northwards to Brennanstown and Carrickmines were important ecological corridors to lands

further afield. Within the SDZ lands, key corridors were classified into primary (large corridors allowing movement through the SDZ lands) and secondary (small networks that allow access to specific areas).

Primary Corridors include:

- P1. Carrickmines - Druid's Glen woodland – Carrickmines River Valley. This extends to Loughlinstown Woods on the eastern side of the N11 for some mobile species.
- P2. Ballycorus/Ticknick- Bride's Glen – Cherrywood. This also extends to Loughlinstown Woods on the eastern side of the N11 for some mobile species.

Secondary Corridors within the SDZ lands include:

- S1: Ticknick – Carrickmines Golf Course – Glenamuck Road. Includes extensive gorse heath area and Golf course features.
- S2: Carrickmines – Lehaunstown-Tully Church. Primarily made up of scrub and hedgerows which allow species to also use the grassland areas.

It is one of the aims of this Biodiversity Plan and development that takes place within the SDZ that these corridors are protected and their functionality is maintained. The locations of these existing corridors are shown in Figure 11 in Appendix 1.

3 KEY BIODIVERSITY DESIGN CRITERIA AND OBJECTIVES

3.1 Biodiversity Strategy for Cherrywood SDZ

This Section presents guidance, design and management criteria to be used by DLRCC and prospective developers when planning developments within the draft Planning Scheme area. These recommendations are not exhaustive and will require review in accordance with changes in legislation and knowledge of how our natural environment responds to change.

Compliance with these recommendations will be a factor that the Council will take into account when determining planning applications in the SDZ. Non-compliance with proposed design criteria will not normally be accepted.

The overall Biodiversity Strategy for the SDZ includes four underlying principles:

- 1. To retain and manage existing semi-natural habitats wherever possible and to integrate them into the layout, design and development of the SDZ so that ecosystem, habitat and species diversity, richness and abundance are maintained and that ecological corridors are permitted to function through and beyond the area.**
- 2. To protect species that are protected by law or deemed to be endangered, rare or threatened.**
- 3. Promote the restoration of disturbed areas following construction to replace lost biodiversity.**
- 4. Promote the creation of new features in the landscape that allow for biodiversity gain.**

The following Objectives build upon those that are already established by the Council in the draft Planning Scheme and other Council documents including *Parklife: A Policy for enhancing Biodiversity in Parks and Green Spaces* (2010) and *Treasuring our Wildlife - Dún Laoghaire-Rathdown Biodiversity Plan 2009-2013* (2009). This Biodiversity Plan for Cherrywood should be read in conjunction with the Objectives contained within these other strategic documents.

3.2 Consistency with the National Biodiversity Plan

Ireland's Vision for Biodiversity is stated in the National Biodiversity Plan *Actions For Biodiversity 2011-2016*. It states:

"That biodiversity and ecosystems in Ireland are conserved and restored, delivering benefits essential for all sectors of society and that Ireland contributes to efforts to halt the loss of biodiversity and the degradation of ecosystems in the EU and globally."

The Irish Plan aims to comply with the Government's commitment to the European Union's Biodiversity Strategy which aims to halt the loss of biodiversity by 2020. This Strategy identified 6 Target Areas for action:

- Full implementation of the nature directives;
- Maintain and restore ecosystems and their services;
- Increase the contribution of agriculture and forestry to maintaining and enhancing biodiversity;
- Ensure the sustainable use of fisheries resources;

- Combat invasive alien species;
- Help avert global biodiversity loss.

This Biodiversity Plan for the Cherrywood SDZ draft Planning Scheme addresses several policy recommendations in the National Biodiversity Plan relating to:

- sharing responsibility for the conservation of biodiversity;
- increasing awareness and appreciation of biodiversity and ecosystems services;
- conserving and restoring biodiversity;
- addressing pollutant pressures on terrestrial and freshwater biodiversity;
- Controlling invasive alien species; and
- Conservation and management of hedgerows.

3.3 Design and Management of Green Infrastructure

The draft Planning Scheme has been carefully designed to provide natural linkages across the SDZ lands to allow a degree of permeation of mobile species across the area. The scheme has been informed by the collection of baseline ecological data from its outset allowing the identification of ecological features of importance so that they can be retained within the design of the draft Planning Scheme and provisions made in this Biodiversity Plan for their management. Wherever possible, habitats have been retained within the draft Planning Scheme in the form of Natural Green Space (including semi-natural woodland, grassland and calcareous springs), Public Open Space or retained hedgerows and treelines along Greenways. These are shown in Figure 12 in Appendix 1.

Objectives relating to the establishment and management of Green Infrastructure can be found in the relevant Chapter in the draft Planning Scheme. The relevant Objectives in the draft Planning Scheme are referred to in this Biodiversity Plan ('**GI**') and where necessary additional biodiversity-specific Objectives have been proposed with the prefix '**BP**'. In order for an application to be deemed to be in compliance with the draft Planning Scheme it should meet the requirements of all relevant Objectives.

3.4 Retention of Habitats and Species

3.4.1 General criteria

It is, of course, not possible to retain *all* habitats that occur within the SDZ lands as the 'hard' aspects of developments – roads, parking and buildings and other hardstanding areas- will overlie the existing semi-natural habitats. Where possible, all designs for proposed developments should attempt to retain all semi-natural habitats that can be accommodated within their ownership boundaries.

Overall objectives that underlie the Biodiversity Plan's requirements with regard to the retention of existing habitats and species are listed below:

BP01 Require the preservation, *as indicated* in Figure 12 in Appendix 1 of existing hedgerows, treelines, woodland, scrub and other semi-natural habitats.

BP02 Require that all developments acknowledge the ecological value of other semi-natural habitats and species within and adjacent to development plots in the design of the development and retain them where reasonably practicable.

BP03 The applicant must provide a Habitat Management Plan detailing how retained habitats will be retained, protected and managed.

These supplement the Objectives in the draft Planning Scheme that relate to maintaining physical ecological connectivity within the Green Infrastructure, particularly **GI 50 to GI 52 and GI 58 to GI 63**.

3.4.2 Derogation Licences and Protected Species

The disturbance of certain protected species, their breeding and resting places is an offence under domestic and international law. Therefore where derogation from the law is required in the event of there being no alternative then this should be sought from the relevant authorities **prior to** applying for planning permission³. This timing is required to allow the authorities the opportunity to comment on the potential offence prior to a formal planning decision being made. A minimum of 6 weeks should be provided for this application stage.

In some cases there will be a need to carry out additional ecological surveys (see **Objective GI 45** and **BP04** and **BP06**) to provide baseline data for the derogation licence applications.

3.5 Retention and Protection of Calcareous Springs

The protection of the Calcareous Springs, one of which has been determined to be on Annex 1-quality (under the EC Habitats Directive) is one of the most important features of the elements of the strategy to retain and protect habitats. Their protection relies upon an informed approach to the protection of the shallow groundwater aquifer that feed the springs.

It is likely that works requiring excavations in some areas will require additional hydrogeological investigations to be able to design the development in a way that avoids any impact on the springs. Meeting the requirements of **Objective GI30, GI 60** and **GI 63** in the draft Planning Scheme is central to the protection of the springs and principally affects developments in Development Areas 1 and 4.

3.6 Retention and protection of retained hedgerows and treelines

³ Department of the Environment, Heritage and Local Government Circular 2/07 states that “7. An application for such a derogation licence should be made in advance of seeking approval under Part 8 or Part 10 of the Planning and Development Regulations 2001, as amended, or seeking planning permission for works. This will ensure that full consideration can be given to the impacts of the proposed project on the species and to avoid the possibility of delay to the proposed project or of a refusal of a derogation licence which would prevent the works being carried out as planned”. This recommendation only applies to bats and otters in as far as the SDZ is concerned but it is prudent to extend this to badgers and amphibian breeding and resting places to avoid unnecessary delays after planning permission has been granted.

Figure 12 in Appendix 1 shows the extent of the existing hedgerows/treelines that will be retained and new hedgerows to be planted within the draft Planning Scheme. The design of the SDZ draft Planning Scheme has aimed to retain as many hedgerows/treelines of high conservation value as possible and to connect up fragmented sections with new planting.

The combination of the retained hedgerows/treelines and the newly-planted hedgerows/treelines will create a network of greenways that link between the areas of public open space and primary ecological corridors including Bride's Glen and Druid's Glen.

The applicant will be required to describe how the retained hedgerows/treelines will be protected during the entire construction phase (by submitting a Plan in accordance with **Objective BP03**) and how – retained and new hedgerows will be managed during the lifetime of the development. In addition **Objective GI42** relating to hedgerow and treeline protection should be met.

Depending on the overall aim and use of hedgerows and treelines, management prescriptions and styles can vary widely. Within the SDZ area, hedgerows to be retained must be enhanced and protected for wildlife and biodiversity primarily. It is however important to note that they are multifunctional systems and provide important ancillary functions including aesthetic value, are important for human health and are of local heritage value.

Over-management can be as detrimental to hedgerows as under management therefore the management regime must be sympathetic and flexible. Depending on the current state of the hedgerow this may include a range of active management practices such as planting, pruning, coppicing (if applicable to the situation), laying, pollarding and the creation of a protective buffer strip. Priority hedgerows include those with earth banks, ditches (dry or wet) and those which form important corridors through the landscape.

Management should aim to create thick hedges with wide bases in a variety of shapes and sizes from shaped hedgerows to lines of trees or woodland strips. Hedgerows with large numbers of woody species provide important resources for birds. Such woody species should ideally be native with inclusion of high value species such as oak as these species host a wide range of invertebrates, an important food resource for birds. The greater the variety of shrubs, trees and ground flora increases the diversity of the hedgerows and resources for wildlife throughout the seasons.

The Royal Society for the Protection of Birds notes that hedgerows support up to 80% of woodland birds, 50% of mammals and 30% of our butterflies (www.rspb.co.uk). Whereas ditches and earth banks associated with hedgerows provide habitat for frogs, toads, newts and reptiles. The requirements of differing bird species varies with some species such as bullfinches preferring hedgerows over 4 m tall, with lots of trees, whereas Linnets and Yellowhammers favour shorter hedgerows (2-3 m) with fewer trees. Dunnock and willow warblers prefer medium or tall hedgerows with few trees.

The variety within a hedgerow is important as some bird species such as wrens and robins usually nest low down, with song thrushes and blackbirds nesting well above ground level. It is therefore important to manage for a range of hedge heights and tree densities and to maintain a grassy verge at the base of the hedge, at least 2m wide, as per DLRCC's *Parklife* document (2010). Uncut grassy hedge bottoms are important as these provide nesting material and insect larvae

for bird chicks whilst also creating cover for wildlife using the hedgerow to commute such as foxes and badgers.

Prior to commencing any active management, the current condition of each hedgerow should be assessed. Depending on the results of this some hedgerows may require trimming, inter-planting, laying or even coppicing to ensure the long term survival of each hedgerow. Note excessive trimming must be avoided to ensure the long term survival of hedgerows.

Considerations for hedgerow management include species mix, height, shape, tree species, time of year for cutting, cutting rotation e.g. 3 year cycle, with 1/3 to 1/2 trimmed per year, partial cuts e.g. trimming one side of the hedge only or only trimming some hedgerows one year leaving others untouched till the next management cycle.-

Good practice dictates that the timing of hedgerow management should ideally be undertaken in late winter January/February but avoid cutting in frosty conditions, autumn and early winter when berries and shelter, important for birds and mammals would be removed. Under the Irish Wildlife Act (1976 and 2000), it is *"an offence for a person to cut, grub, burn or otherwise destroy, during the period beginning on the 1st day of March and ending on the 31st day of August in any year, any vegetation growing on any land not then cultivated"*. **Objective BP 08** should be met in this respect.

If trimming hedgerows, an alternative to the flail which can be quite destructive is the circular saw blade which can cut cleanly through much larger material than the flail. It is useful to re-shape overgrown hedgerows which have not been cut for many years, or to manage hedgerows on a much longer cutting rotation than is possible with flail mowers, perhaps just once every 10 years.

3.7 Retention and protection of retained calcareous grassland

Lowland calcareous grassland can support a large number of highly local invertebrate species which support a range of bird and mammal species. The principal threat to most specialist invertebrate species is likely to be from encroachment of scrub and the development of rank vegetation that may result from a lack of grazing. Maintenance of grazing regimes, by rabbits or by livestock, and holding back or setting back succession by other means are probably the main management tools to be used to benefit invertebrates.

However, whilst botanists have tended to put priority on short turf in the past, important invertebrate faunas also occur in intermediate or long swards and calcareous scrub. Many invertebrates therefore require a mosaic of vegetation structure and composition so are very vulnerable to a management strategy that results in uniformity, as can happen with single objective grazing or mowing (Buglife, 2012).

In the existing Cherrywood SDZ lands, there is a range of calcareous grassland heights found, ranging from the rabbit-grazed floor of the Lower Carrickmines Valley to the rank grasslands in the fields near Lehaunstown Lane. The proposed development allows retention of large swathes of this grassland type within the following areas:

1. Carrickmines River Valley
2. Tully Park
3. Druid's Park
4. M50 Green corridor
5. Druids Glen Buffer

Within these areas, calcareous grassland should be protected from unnecessary disturbance. Developers should recognise the value of the seed bank within the topsoil and treat it as an ecological resource during site clearance and restoration of cleared areas used for flood storage. Restoration and creation of calcareous grassland is discussed in Section 3.3. In accordance with **Objective BP03**, the Habitat Management Plan should clearly set out how grassland habitats will be retained, protected and managed during the lifetime of the development.

Grazing is a characteristic feature of semi-natural calcareous grasslands, and grasslands require management in order to inhibit succession and maintain the quality of the habitat. Where appropriate management occurs, a wide range of grasses and herbs exist to a species richness of up to 45 species per m² (Fossitt 2000, NIEA 2005, English Nature 1999). Any calcareous grassland management practice should aim to increase diversity to this level through the correct level of management, avoiding the loss of species diversity through over or under management.

This Biodiversity Plan considers mowing and cutting as a method of managing grasslands within the SDZ as the use of livestock is not believed to be a practical option. If however grazing is an option, advice can be sought from various sources including *The Lowland Grassland Handbook* (English Nature, 1999).

Management should aim to achieve a good mosaic of sub-habitats, including areas of short turf, bare ground, long grass (10-30cm) and a limited amount of scrub. The more open areas attain high temperatures in summer. Small patches of bare soil, with adjacent plants a few centimetres or longer provide an important mosaic, providing conditions for a range of species and life-cycles. The richest invertebrate faunas are in intermediate length turf with a reasonably open structure and floristic diversity. A few invertebrate communities are restricted to the longer turf. Over-wintering invertebrates will require the protection of tussocky vegetation in which to shelter at this stage. Many species require a specific part of the foodplant for larval development and so are unlikely to thrive in grassland which is too closely cropped by grazing. Plants should be allowed to flower in order to provide pollen and nectar for adult insects such as butterflies, bees and hoverflies.

If grazing is not a management option, an open and varied sward is likely to be best achieved through creation of a varied structure, with areas of short grassland (equivalent to grassland grazed by rabbits), medium height and rank grassland strips so that plants can flower, develop seeds and produce seedlings. This should be cut on rotation where possible in order to retain seeds of grasses and herbs. In the areas of Natural Green Space and Amenity Open Space, Class 1, it is suggested that areas can be left uncut during the bird breeding season to allow breeding birds to be undisturbed. An example of different vegetation heights is shown below:



Plate 17: Short sward for an informal path to the left and longer wildflower meadow in Shanganagh Park.

Mowing is normally undertaken mechanically by drum or disc mowers attached to a tractor. Very low cutting of sward heights should be avoided as there is a likelihood of excessive “scalping” resulting in the creation of bare patches in the sward. These provide favourable areas for the invasion of undesirable species, including creeping thistle. Conversely, some small-scale disturbance may be necessary for seed germination and may be beneficial for invertebrates.

Where grass has been cut, it should ideally be removed from the site as part of active management to ensure nutrients do not return to the system. Raking should be avoided as this can create open patches of soil which would provide opportunities for non-desirable species to enter the habitat. Machinery should be discouraged to access the grassland when ground conditions are damp, otherwise rutting will result and the sward may be damaged, creating areas which again could be invaded by weed species.

3.8 Retention and protection of Bat Roosts (including in trees)

All bats and their roosts are protected under domestic and international wildlife law from damage and disturbance. Damage can include temporary, permanent and direct/indirect interference with the roost structure. Disturbance can constitute a variety of activities that can lead to adverse effects on bat roosts and also on bats. This may include loss of habitat close to roosts or feeding areas or illumination of roosts and key commuting/feeding areas leading to displacement of bats. Loss of feeding areas is not necessarily an offence unless it could lead to abandonment of a roost.

There were several bat roosts confirmed as part of the ecological surveys carried out in 2010. These included:

- Druid House (outbuilding)
- Glendruoid Mews (outbuilding)
- Glendruoid Main House
- Glendruoid outbuildings
- Priorsland House
- Lehaunstown Park and buildings
- Empty residences along Lehaunstown Lane
- Derelict Buildings, Bride’s Glen

The draft Planning Scheme includes Objectives for the restoration and repair of some of these buildings, particularly **Objectives H16, H31 and H32**. Meeting these Objectives in the draft Planning Scheme must also take into account the requirements within this section of the Biodiversity Plan.

It is recommended that all of these structures are retained within the draft Planning Scheme. These will require re-survey at the appropriate time of year so that any proposed development of these structures can allow for the roost to be retained wherever possible – see **Objective BP04** below. The approach should follow that provided by Bat Conservation Ireland's *Bats and Buildings- Guidance Notes for Planners, engineers, architects and developers* (2010).

BP04 Require the re-survey of buildings identified as being bat roosts, or suitable for bats at an appropriate time of year (at least 2 surveys separated by a minimum of a week carried out between May and September) by a qualified bat worker, should these roosts be potentially affected by development proposals.

Should retention of any bat roost not be possible, then in order for a derogation licence to be granted there must have been no reasonable alternative, the loss of the roost must not affect the conservation status of the species and there must be overriding reasons of public interest for the loss of the roost. In all cases it is strongly recommended that loss of bat roosts is offset by providing replacement roost opportunities. All recommendations for mitigation should be adapted to the species and the function of the roost.

All proposals for development near bat roosts should address the potential adverse impacts of lighting on the bat roost. Lighting should be at a low level, directional and should follow guidance provided by Bat Conservation Ireland's *Bats and Lighting- Guidance Notes for Planners, engineers, architects and developers* (2010). **Objective BP05** summarises this requirement below.

BP05 Require an assessment of potential impacts of lighting on bats where development is proposed within 100m of known or suspected roosts. At these locations, potential adverse impacts on bats must be avoided. If adverse impacts are anticipated, a derogation licence must be obtained from the NPWS.

3.9 Retention and protection of Bat feeding corridors

Bats were found flying and feeding across almost all areas of the SDZ but were found in highest numbers around dense linear treelines and hedgerow and around the wooded river valleys.

In a similar manner to the protection of buildings, proposed public and private lighting schemes should ensure that bat feeding corridors are not illuminated which could adversely affect bat movements. If this cannot be achieved then a derogation may be required to permit disturbance to important feeding areas, especially near (within 200m) of roosts. This is addressed in **Objective GI 49** in the draft Planning Scheme.

3.10 Retention and protection of Badger Setts

The informed design of the draft Planning Scheme has allowed many of the known badger setts to be retained within the network of Natural Green Space and Amenity Space. However whilst many setts are capable of being retained, they may be subject to disturbance in the vicinity during construction works. Badgers are vulnerable to noise and vibration (especially ground-borne) and also to sudden changes to their environment. There are several examples of badger setts co-existing with public open space functions in the County. It is envisaged that assuming the open space can be designed and managed correctly, that these setts may be allowed to persist.

Developers will have to address the potential impacts on badgers within their applications for any development in the SDZ (given the high levels of use in the area), using the information collected in the 2010 surveys and any extra information collected during further surveys. Since the draft Planning Scheme will be delivered on a phased basis, it is possible that badgers may alter territorial boundaries and change sett locations over the lifetime of the Scheme. Therefore it will be necessary for applicants to carry out their own badger surveys in the area of the development and up to 150m around their application boundary to clarify the impacts on badgers. This is reflected in **Objective BP06**.

BP06 Require that a badger survey is carried out by developers prior to submitting applications for development to account for any changes to sett activity or establishment of new setts within the application site and up to 150m outside of the boundary of the site. Appropriate mitigation measures may be required in some cases.

As a general rule, impacts can occur when works take place within 50m of a breeding sett and 30m of a non-breeding sett. If impacts cannot be avoided and the sett must be removed or disturbed then liaison with the National Parks and Wildlife Service (NPWS) will be required. Construction of artificial sett(s) in a preferred location close to a main sett that require removal may be an option in some cases but this should be seen as a worst case scenario. This requirement is stated in **Objective BP07**:

BP07 Ensure the protection of badgers, their setts, paths and feeding areas are taken account of within the design and delivery of developments. Setts cannot be disturbed or removed without permission from the National Parks and Wildlife Service.

The proposed development will result in the loss of some of their feeding areas in the open fields. The preservation of open space within Natural Green Space and Amenity Open Space will allow many of the existing feeding resources to persist and it is predicted that areas of public open space will be used by badgers for feeding in the future.

Table 5 shows the predicted fate of the badger setts recorded in the SDZ lands.

Table 5: Impacts of draft Planning Scheme on existing badger setts

Sett Reference	Sett Type	Effect of SDZ
1	Annex Sett	Capable of being retained within public open space.
2	Main Sett	At edge of open space but development to the north (Development Area 5: Brennanstown – Cabinteely) could affect the underground elements of the sett. Require avoidance of the potential zone of conflict within the detailed design.
3	Main Sett	Sett can be retained at edge of woods and 50m buffer zone will protect the underground elements of the sett.
4	Annex Sett	At edge of open space but development to the south (Development Area 1 Laughanstown Village) could affect the underground elements of the sett. Require avoidance of the potential zone of conflict within the detailed design.
5	Main Sett	Sett likely to be entirely within area open space and capable of retention but development to the north west (Development Area 8: Druids Village) could indirectly affect the underground elements of the sett. Require avoidance of the potential zone of conflict within the detailed design.
6	Annex/Outlier	Sett can be retained within open space.
7	Outlier sett	Sett can be retained within open space.
8	Outlier	Sett within private land. Likely to be lost but not likely to be of significance due to small size and little evidence for use.
9	Outlier	Sett within private land. Likely to be lost but not likely to be of significance due to small size and little evidence for use.
10	Outlier	Sett can be retained within the conifer plantation.
11	Annex	Sett can be retained within the dense bracken habitat as it is just outside of the draft Planning Scheme boundary.
12	Annex	Sett can be retained within the conifer plantation.
13	Outlier	Sett can be retained within the hedgerow.
14	Outlier	Sett can be retained within the hedgerow.
15	Annex/outlier	Sett can potentially be retained at edge of scrub/hedgerow subject to detailed design of the Amenity Open Space. Require avoidance of the potential zone of conflict within the detailed design.
16	Former main sett	Outside of SDZ lands and hence will not be affected.

3.11 Protection of Breeding Birds and removal of vegetation

It is an offence under Section 22 of the Wildlife Act to intentionally injure or mutilate eggs or nests. Through this Biodiversity Plan all developers should be made aware of the abundant bird life in scrub, hedgerows and woodland in the SDZ lands. There is also the potential for ground-nesting birds such as Skylark and Meadow pipit to be breeding in longer grassland, particularly near Lehaunstown Park. **Objective BP08** therefore ensures that the presence of breeding birds must be taken into account when considering the removal of habitats.

BP 08 Where habitat that could be used by breeding birds must be removed or disturbed during the breeding season (generally February-August), a qualified ecologist must check the habitat concerned to ensure that no nests are present. The NPWS must be consulted if nests are found to determine the course of action.

3.12 Protection of Amphibians

All areas of standing water that occur - on site could be used by Common Frog *Rana temporaria* or Common Newt *Lissotriton vulgaris* for breeding between January and August and hence both the species and the pools would be protected under the Wildlife Act 1976 as amended in 2000. Developers will be required to ensure that **Objective BP09** is met when the proposed development areas include standing water.

BP09 Should any areas of permanent or semi-permanent standing water require infilling then they must be first checked by an ecologist for presence of Newts and/or frogs or evidence of their breeding. If required, a licence permitting their removal should be applied for from the NPWS. Developers must ensure that there is no net loss of breeding sites in the delivery of development projects in the SDZ.

3.13 Retention and protection of crossings over/under the M50 motorway

Badgers use several locations to cross the M50 (farmer's underpass, possible badger underpass, Lehaunstown Lane overbridge, Wyattville Link Road, Bride's Glen Road- see Figure 10 in Appendix 1) and these must remain unimpeded and link up to grassy verge habitats or other elements of green infrastructure so as to allow free passages to other areas. Meeting **Objective GI38** and **GI40** in the draft Planning Scheme and **Objective BP10** will preserve the integrity and use of these crossing points.

It is likely that foxes and deer also use these crossings.

BP10 Ensure that crossing points identified in the Biodiversity Plan are retained in the SDZ and that they connect to landscaped grassy verge or hedgerow habitats at each end. Developments near (within 50m) of the crossing points should be designed to take account of the sensitivity of some species to light and disturbance.

The location of the road parallel to the M50 within the draft Planning Scheme lands in Development Areas 7 and 8 will require the extension of the underpass pipe culvert to allow badgers to pass under the M50 and this road within the SDZ.

3.14 Retention and Protection of Watercourses

Wetland features that can be retained in the design of the SDZ include the Carrickmines and Loughlinstown rivers and the calcareous springs. There are proposals to locate flood storage basins in the Lower Carrickmines Valley and these must be constructed in a manner that minimises the risk of any contamination of the watercourses. As a general rule, there should be no development of any kind that 'breaks ground' within 10m of the edge of any watercourse. Where works are taking place in this zone then Inland Fisheries Ireland must be presented with a Fisheries Protection/Construction Method Statement. Reference to **Objectives GI 56 to GI 60** and **GI 59** in the draft Planning Scheme address these protective requirements. This is supplemented by **Objective BP11** for works close to watercourses:

BP11 Where works are taking place within 10m of the edge of a watercourse or tributary thereof, a Fisheries Protection/Construction Method Statement must be prepared demonstrating how pollution of watercourses during and after the construction period will be prevented and/or mitigated. This shall be developed in consultation with Inland Fisheries Ireland at application stage.

3.15 Recommendations for Habitat Creation

3.15.1 Hedgerows

The extent of new hedgerow creation is provided in Figure 12 in Appendix 1. The intention is for new hedgerows to link up established lines of vegetation and to avoid fragmented sections of retained habitats.

It is not possible to prescribe the form of all new planted hedgerows as the species mix and the structure should be determined by the nearest retained hedgerows to ensure that there is consistency in composition.

Examples of trees/shrubs species locally within the site include: Ash *Fraxinus excelsior*, Hazel *Corylus avellana*, Holly *Ilex aquifolium*, Blackthorn *Prunus spinosa* and Hawthorn *Crataegus monogyna*, Larch *Larix decidua*, Willow (*Salix sp.*), Elm *Ulmus glabra*, however other ecologically valuable native species such as Oak *Quercus sp.*, Elder *Sambucus nigra* and Alder *Alnus glutinosa* should also be included. It is recommended however that Sycamore *Acer pseudoplatanus* and Beech *Fagus sylvatica* (both non-natives) are not planted due to their invasive and suppressive properties.

When planting a hedgerow a double line of trees is recommended. This may be supplemented with shrub species along the sides of the hedgerows/treelines to ensure cover for wildlife is created at the base for movement, nesting, establishing resting places, breeding etc. Reference should be made the Heritage Council guidance on *Conserving Hedgerows* (2002).

Consideration should also be made to the translocation of hedgerows that have to be removed as this can be effective at also moving the seed bank in the soil around the hedgerows. Further details can be found at

http://www.roscommoncoco.ie/en/Services/Heritage/Publications/Hedgerow_Translocation_-_Documenting_the_Successful_Translocation_of_a_Mature_Hedgerow.pdf

In accordance with the Council's policy, all new hedgerows must have a 2m buffer on each side to protect the root zone from compaction and interference. Developers should therefore address **Objective GI 44** and **GI 64** in the draft Planning Scheme which is supplemented by **Objective BP12** below:

BP12 Require the planting of new hedgerows to take the form of a double line of native tree with shrub species. Translocation of existing hedgerows and their seed banks to new locations should be considered where feasible.

3.15.2 Grassland

Where a proposed development would result in the displacement of calcareous grassland, an applicant should aim to recreate the semi-natural grassland in areas retained within the proposed site boundary, even if it is in the form of grassy verges and roadside banks. Topsoil from the development area should be stripped and stored appropriately (vegetation upwards, short period of time, receive adequate watering and protection from sun, wind etc.) as it contains the seed bank for the calcareous species. Sub-soil should be stored separately from the top-soil in a suitable storage area, in the vicinity of the donor site, which can temporarily accommodate the material until it can be transferred to the intended recipient site. The top soil should not be stored more than 1m deep as this may cause the seed bank and substrate to deteriorate (Notice Nature, 2012).

Areas of bare ground within the SDZ may require reseeded to ensure weed species do not invade. Depending on the size of the area requiring reseeded, seed could be harvested from areas within the SDZ lands and used to reseed areas of bare ground. It is important not to introduce harmful invasive plant species, emphasis should be to try and plant species that occur naturally in the local region of the development. Different methods can be used to harvest seed however it depends on the amount required, typically 1.5 gram of wildflower seed is used to sow 1 metre. Species found within the site and therefore suitable for reintroduction elsewhere include Glaucous sedge *Carex flacca*, Common Spotted Orchid *Dactylorhiza fuchsii*, Red Clover *Trifolium pratense*, Crested Dog's-tail *Cynosurus cristatus*, Yellow Rattle *Centranthus minor*, Yorkshire Fog *Holcus lanatus*, Cowslip *Primula veris*, Yarrow *Achillea millefolium* and Black Knapweed *Centaurea nigra*. If gathering seed is not an option, seeds must be of local provenance. Based on this, an appropriate seed for calcareous grassland mix can also be sourced from www.wildflowers.ie or other Irish seed-suppliers that have a wild calcareous grassland mix.

Developers should therefore address **Objective GI 64** in the draft Planning Scheme which is supplemented by **Objective BP13** below. Measures should also be proposed to manage any new grassland areas in the Habitat Management Plan (**BP03**):

BP13 Require the planting of new grassland to include native species that are appropriate to the soil chemistry and the function of the grassland.

3.15.3 Wetlands

Creation of new wetlands is possible in the areas allocated for flood storage. In any location where there may be a permanent presence of standing water there are opportunities for creation of new biodiversity. Planting of emergent wetland species at the edges of ponds and lakes creates important habitats for invertebrates, fish and the species that prey on these fauna. Particular importance should be placed on those wetland features that link to the greenways, rivers and open space. The ponds proposed for Druid's park and Carrickmines Valley Natural Greenspace are ideal for biodiversity planting.

A variety of sedges can be used including Greater pond sedge *Carex riparia*, Bottle sedge *Carex rostrata* and Greater tussock sedge *Carex paniculata*. Other species include Bulrush *Typha* sp., Common reed *Phragmites australis*, Marsh-marigold *Caltha palustris*, Great fen-sedge *Cladium mariscus*, Duckweed *Lemna* sp., Water mint *Mentha aquatic*, Water-starwort *Callitriche* sp. and Yellow Flag Iris *Iris pseudacorus*. Other species may be planted round the edge including Cuckooflower *Cardamine pratensis*.

A swale is a shallow drainage channel lined with grass with gentle side slopes in the ground where water running off a site can collect and soak away. The design should include thick vegetation cover combined with native grasses in order to enhance biodiversity and wildlife. In this instance, it is recommended that sods of calcareous grassland be stored from areas lost to development and re-used to create swales. This would decrease the area of calcareous grassland lost to development whilst simultaneously increasing diversity through the site which would be beneficial for a range of fauna such as birds and invertebrates.

By reducing the frequency of cutting the taller plant growth provides essential food for invertebrates including butterflies; seeds of plants such as thistle, dock, teasel are eaten by birds particularly finches in winter and the dead plant material is used for overwintering invertebrates. It is recommended that swales be planted with sods of calcareous grassland with management following a similar extensive approach. Due to the natural management of calcareous grassland, it is recommended that cutting or mowing is undertaken infrequently, however small areas of swales can undergo more regular mowing to create a short sward. Details on management are described above under Calcareous grassland should be presented in the Habitat Management Plan at application stage. **Objectives GI 53 to GI 56** in the draft Planning Scheme provide the relevant objectives for delivering the design of new wetlands.

3.16 Protection and Management of Druid's Glen and Bride's Glen

3.16.1 Druid's Glen

The protection of Druid Glen's woodland and wetland habitats and its important mammal and bird populations must be taken into account when considering development in the vicinity of the Glen. Whilst there is no proposed development within the Glen itself (apart from a footpath and the road crossing- see later), there are *ex situ* developments that can have an adverse impact on the fauna and flora in this area.

The Glen contains both freshwater and woodland habitat types including eroding upland rivers, calcareous springs and (mixed) broadleaved woodland. These

habitats support a range of fauna that are found only in the Glen in the context of the whole SDZ area.

Druid's Glen recorded the highest diversity of bat species in the whole SDZ area. Bats were particularly abundant around the bottom of the valley around the river and were recorded commuting up and down through dense vegetation. Bats were also recorded along the southern and northern edges of the woodland and seen to dip in and out of openings at the woodland edge. Surveys carried out in 2010 and then in October 2011 indicated a drop in bat abundance in areas of light spill from the Luas stop at the western end of the Glen. This observation lends support to the need to manage the impacts of development in this sensitive location.

The presence of Wood White butterfly has been reported by a local resident. This has recently been re-classified as the Cryptic Wood White as the pure Wood White is only found in the Burren and its immediate surroundings. It is not listed on the Red Data List. Mollusc surveys at the calcareous spring revealed that this is a hotspot in Dublin for rare snails: two of the species found, the point snail *Acicula fusca* and the English chrysalis snail *Leiostyla anglica*, are nationally notable and were classed as Vulnerable in the Red Data List. A further species, the silky snail *Ashfordia granulata* is listed as Near Threatened. Both *Ashfordia granulata* and *Leiostyla anglica*, are species where Ireland is of global importance, having over 20% of the world resource in both cases. On this basis, Druid's Glen has a high local conservation value, and in the case of its populations of *Ashfordia granulata* and *Leiostyla anglica*, is contributing to world biodiversity.

In order to protect the Glen from development impacts at its edge, a 50m ecological buffer zone has been embodied within the draft Planning Scheme. The aim of the buffer is to form a graduation between the woodland and the urban area so that effects of development are attenuated. The buffer is to prevent visual disturbance, light disturbance, control of use of the woodland and physical protection including disturbance during the construction phase that the space provides. It also aims to prevent direct harm to the underground tunnels and chambers of the badger sett (Sett 3), which can stretch up to 50m from sett entrances.

The use of the buffer zone on the southern side will be limited to landscape planting, SUDs (swales) and pedestrian/cycleways. Where paths are proposed then they should preferably be unlit (with safe alternative nearby) or lit with bollard lighting but located on the outer perimeter at a maximum of 10m from the outer edge of the buffer and additional landscaping provided to screen any light spill (**Objective BP14**).

The aim of any design of development on the north side of the Glen must take into account the potential of the land (due to the local topography) to illuminate and provide indirect disturbance of the woodland habitats. A basic precautionary principle would be to be sure that lighting stays 50-70m away (depending on height of columns) from the river. Alternatively if applicants are able to prove that lighting at the river edge is 1 lux or below (by an applicant providing light modelling data) then this buffer zone could be reduced (**Objective BP15**).

BP14 Cycleways/footpaths within the southern buffer zone at Druid's Glen will be designed to be no more than 10m from the southern edge of the buffer zone. Supplementary planting will help to screen the path from the main body of woodland.

BP15 Any proposals for lighting within 70m of the river on the north side of Druid's Glen must be supported by data showing how background light levels can be maintained at the river.

The buffer zone can be 'overlooked' in as much as it can be used for pedestrian paths but inappropriate activities would include strongly-lit car parks. The buffer zone will also be used for flood attenuation or as a 'SUDS' swale.

Objective GI20, GI 61 and GI 62 should be met at the application stage and reference to the Report contained in Appendix D in the draft Planning Scheme provides additional detail on activities within the buffer zones.

Proposals for a footpath within the woodland habitat should meet the requirements of **Objective GI20**.

The crossing of Druid's Glen by a vehicle bridge at its eastern end is a potential source of impacts on the species using the Glen unless designed and constructed according to best practice. **Objective GI 68** aims to ensure that the crossing design provides detail on the extent of vegetation to be removed and that this should be minimised. The method of construction must be detailed so as to provide assurances that there will be no risk of significant impacts on the resident fauna and habitats and that there will be no spread of invasive species.

3.16.2 Bride's Glen

The proposals for development on the north side of Bride's Glen (the south side is outside of the SDZ lands) are covered by Development Area 6 – Bride's Glen. This includes preserving a belt of Natural Green Space that currently exists in front of the existing Cherrywood Business Park. Lands to the south west proposed for development are c70-80 m from the river itself and are shielded by a belt of trees that run along the sides of the river. Impacts of lighting, noise and disturbance are therefore potentially less significant than at Druid's Glen. Nevertheless, any proposals should comply with **Objective GI 22** and **GI 61** with regard to control of impacts of lighting and surface water run-off.

The lands to the west of the M50 motorway will be accessed by a crossing over the Loughlinstown River to the north of Ballycorus Road. The proposed access point will require the removal of a small area of immature woodland, wet grassland and will cross the area of scrub occupied by a marsh fed by two calcareous (petrifying) springs. It will be an important element of the detailed design of this access route that should allow the springs to be retained and protected. Consideration should be given to the elevation of the access road at this location which may allow retention of these ecological features but it may also be important to respect landscape and visual sensitivities. **Objective BP16** will meet these requirements.

BP16 Require that the detailed design of the crossing over the Loughlinstown River addresses the ecological features on the north side including the marsh and calcareous springs and that these features are retained as far as possible, taking into account other environmental factors such as visual impacts.

3.17 Control of invasive species

Non-native invasive species that are subject to restrictions within Ireland and have been found in the Cherrywood SDZ include; Giant Hogweed, Japanese Knotweed, Cherry Laurel and Rhododendron. These restrictions can be found under the *Birds and Habitats Regulations* 2011. These restrictions include the "*Prohibition on the Introduction and Dispersal of Certain Species*", where the species referred to can be found in Appendix C in these Regulations.

Guidance on how to manage these species can be found at <http://invasivespeciesireland.com/toolkit/invasive-plant-management/>.

The control of the invasive flora found in the SDZ lands cannot be achieved on a piecemeal basis. It requires a coordinated approach to ensure that the source of the spread of vegetation is removed and that there is no unnecessary eradication repeated due to re-infestation. Dún Laoghaire County Council will require that where relevant, developers include an Invasive Species Eradication Programme as part of their planning applications and that this is monitored as part of planning conditions. Objective GI 67 must be met at the application stage where relevant.

3.18 Monitoring the impacts on the SDZ on Ecology

As the natural environment changes over time, the manner in which impacts of development manifest themselves can also change. Some impacts can take years to become tangible whilst some predicted impacts may be far more significant than anticipated. The measures and objectives proposed in this Biodiversity Plan are deemed to be in line with current best practice and based upon baseline data collected in the previous 2 years. This advice may not be valid in 5 years' time and therefore a periodic review of this Plan in terms of ecological change is recommended. **Objective GI 69** in the draft Planning Scheme addresses this recommendation.

Specific parameters can also be measured to determine the 'health' of the natural environment. These ecological indicators are those most at risk from any inappropriate development within the SDZ. It is proposed to measure the richness and diversity of these species at 5-yearly intervals following commencement of development in the draft Planning Scheme lands. **Objective BP17** sets out the requirements for ecological monitoring:

Objective BP17 Require the monitoring of specific ecological parameters to measure the success of certain aspects of the Biodiversity Plan and the overall ecological 'health' of the SDZ lands:

- 1. Bats in Druid's Glen, Bride's Glen and a transect following the line of the original Lehaunstown Lane. Indicator parameters will include bat activity index (bat recordings per hour), species distribution density and species diversity.**
- 2. Floral richness at calcareous springs in Lower Carrickmines valley. Species numbers at the springs will be recorded including bryophytes to provide an indication of any changes in the groundwater conditions at this sensitive site.**

- 3. Breeding bird diversity: Measured in the March-May period along fixed transects through the SDZ lands. This will reflect any changes due to provision/loss of hedgerows and use of green infrastructure.**

- 4. Freshwater invertebrate sampling in Carrickmines and Loughlinstown River upstream and downstream of the SDZ lands to detect any changes in the water quality.**

- 5. Badger sett activity: indicators of activity (e.g. bedding, latrine use, feeding, excavation) will be recorded in the early spring when badgers are active.**

- 6. Invasive species: the distribution of invasive species in the SDZ land will be recorded to detect any spread in their ranges.**

Each of these monitoring programmes will be designed by a qualified ecologist and the results will be discussed with the Council's Biodiversity Officer with a view to amending any of the objectives or measures contained within this Plan if this is required.

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APPENDIX 1: ECOLOGICAL MAPS

APPENDIX 2: COMPLIANCE WITH WILDLIFE LAW: NATURE PROTECTION LEGISLATION.

Wildlife Act 1976 (As Amended 2000)

Licences (NPWS)

- Licences to Disturb or Interfere with Protected Plant and Animal Species
- Licence to Stop Damage to Flora and Fauna by Wild Animals
- Licence to Disturb Bats or Otters or their Breeding or Resting Places
- Licence to Take or Interfere with Protected Plant Species
- Licence to Photograph or Film a Protected Wild Animal or Bird
- No hedge cutting during the bird nesting season (1st March – 31st August)

Floral Protection Order 1999

- Protects certain wild plants, movement of which require licencing (NPWS)

European Communities (Birds and Natural Habitats) Regulations 2011

- Derogation Licences for the protection of certain fauna and plants (Part 6)
- Prohibition on the introduction and dispersal of certain plant species (Appendix C).
- Spread of Contaminated soil (Appendix C).

Forestry Act, 1946

- Requirements for Tree Felling Licence

European Communities (Environmental Liability) Regulations 2008

- Protection of Annex I habitats and Annex II/IV species listed under the EC Habitats Directive and Annex I birds listed under the Birds Directive. This relates to the SDZ in terms of the potential for unpermitted damage to calcareous spring habitats.

APPENDIX 3: ECOLOGICAL VALUATION CRITERIA (NRA 2009)

Ecological Valuation Criteria

International Importance:

- 'European Site' including Special Area of Conservation (SAC), Site of Community Importance (SCI), Special Protection Area (SPA) or proposed Special Area of Conservation.
- Proposed Special Protection Area (pSPA).
- Site that fulfils the criteria for designation as a 'European Site' (see Annex III of the Habitats Directive, as amended).
- Features essential to maintaining the coherence of the Natura 2000 Network.⁴
- Site containing 'best examples' of the habitat types listed in Annex I of the Habitats Directive.
- Resident or regularly occurring populations (assessed to be important at the national level)⁵ of the following:
 - Species of bird, listed in Annex I and/or referred to in Article 4(2) of the Birds Directive; and / or
 - Species of animal and plants listed in Annex II and/or IV of the Habitats Directive.
- Ramsar Site (Convention on Wetlands of International Importance Especially Waterfowl Habitat 1971).
- World Heritage Site (Convention for the Protection of World Cultural & Natural Heritage, 1972).
- Biosphere Reserve (UNESCO Man & The Biosphere Programme).
- Site hosting significant species populations under the Bonn Convention (Convention on the Conservation of Migratory Species of Wild Animals, 1979).
- Site hosting significant populations under the Berne Convention (Convention on the Conservation of European Wildlife and Natural Habitats, 1979).
- Biogenetic Reserve under the Council of Europe.
- European Diploma Site under the Council of Europe.
- Salmonid water designated pursuant to the European Communities (Quality of Salmonid Waters) Regulations, 1988, (S.I. No. 293 of 1988).⁶

⁴ See Articles 3 and 10 of the Habitats Directive.

⁵ It is suggested that, in general, 1% of the national population of such species qualifies as an internationally important population. However, a smaller population may qualify as internationally important where the population forms a critical part of a wider population or the species is at a critical phase of its life cycle.

⁶ Note that such waters are designated based on these waters' capabilities of supporting salmon (*Salmo salar*), trout (*Salmo trutta*), char (*Salvelinus*) and whitefish (*Coregonus*).

Ecological Valuation Criteria

National Importance:

- Site designated or proposed as a Natural Heritage Area (NHA).
- Statutory Nature Reserve.
- Refuge for Fauna and Flora protected under the Wildlife Acts.
- National Park.
- Undesignated site fulfilling the criteria for designation as a Natural Heritage Area (NHA); Statutory Nature Reserve; Refuge for Fauna and Flora protected under the Wildlife Act; and/or a National Park.
- Resident or regularly occurring populations (assessed to be important at the national level)⁷ of the following:
 - Species protected under the Wildlife Acts; and/or
 - Species listed on the relevant Red Data list.
- Site containing 'viable areas'⁸ of the habitat types listed in Annex I of the Habitats Directive.

County Importance:

- Area of Special Amenity.⁹
- Area subject to a Tree Preservation Order.
- Area of High Amenity, or equivalent, designated under the County Development Plan.
- Resident or regularly occurring populations (assessed to be important at the County level)¹⁰ of the following:
 - Species of bird, listed in Annex I and/or referred to in Article 4(2) of the Birds Directive;
 - Species of animal and plants listed in Annex II and/or IV of the Habitats Directive;
 - Species protected under the Wildlife Acts; and/or
 - Species listed on the relevant Red Data list.
- Site containing area or areas of the habitat types listed in Annex I of the Habitats Directive that do not fulfil the criteria for valuation as of International or National importance.
- County important populations of species, or viable areas of semi-natural habitats or natural heritage features identified in the National or Local Biodiversity Action Plan (BAP) if this has been prepared.
- Sites containing semi-natural habitat types with high biodiversity in a county context and a high degree of naturalness, or populations of species that are uncommon within the county.
- Sites containing habitats and species that are rare or are undergoing a decline in quality or extent at a national level.

⁷ It is suggested that, in general, 1% of the national population of such species qualifies as a nationally important population. However, a smaller population may qualify as nationally important where the population forms a critical part of a wider population or the species is at a critical phase of its life cycle.

⁸ A 'viable area' is defined as an area of a habitat that, given the particular characteristics of that habitat, was of a sufficient size and shape, such that its integrity (in terms of species composition, and ecological processes and function) would be maintained in the face of stochastic change (for example, as a result of climatic variation).

⁹ It should be noted that whilst areas such as Areas of Special Amenity, areas subject to a Tree Preservation Order and Areas of High Amenity are often designated on the basis of their ecological value, they may also be designated for other reasons, such as their amenity or recreational value. Therefore, it should not be automatically assumed that such sites are of County importance from an ecological perspective.

¹⁰ It is suggested that, in general, 1% of the County population of such species qualifies as a County important population. However, a smaller population may qualify as County importance where the population forms a critical part of a wider population or the species is at a critical phase of its life cycle.

Ecological Valuation Criteria**Local Importance (higher value):**

- Locally important populations of priority species or habitats or natural heritage features identified in the Local BAP, if this has been prepared;
- Resident or regularly occurring populations (assessed to be important at the Local level)¹¹ of the following:
- Species of bird, listed in Annex I and/or referred to in Article 4(2) of the Birds Directive;
- Species of animal and plants listed in Annex II and/or IV of the Habitats Directive;
- Species protected under the Wildlife Acts; and/or
- Species listed on the relevant Red Data list.
- Sites containing semi-natural habitat types with high biodiversity in a local context and a high degree of naturalness, or populations of species that are uncommon in the locality;
- Sites or features containing common or lower value habitats, including naturalised species that are nevertheless essential in maintaining links and ecological corridors between features of higher ecological value.

Local Importance (lower value):

- Sites containing small areas of semi-natural habitat that are of some local importance for wildlife;
- Sites or features containing non-native species that are of some importance in maintaining habitat links.

¹¹ It is suggested that, in general, 1% of the local population of such species qualifies as a locally important population. However, a smaller population may qualify as locally important where the population forms a critical part of a wider population or the species is at a critical phase of its life cycle.

APPENDIX 4 BRITISH TRUST FOR ORNITHOLOGY: BREEDING BEHAVIOUR CODES

Possible breeder

- H** Species observed in breeding season in suitable nesting **Habitat**
- S** **S**inging male present (or breeding calls heard) in breeding season in suitable breeding habitat

Probable breeding

- P** **P**air observed in suitable nesting habitat in breeding season
- T** Permanent **T**erritory presumed through registration of territorial behaviour (song etc) on at least two different days a week or more at the same place or many individuals on one day
- D** Courtship and **D**isplay (judged to be in or near potential breeding habitat; be cautious with wildfowl)
- N** Visiting probable **N**est site
- A** **A**gitated behaviour or anxiety calls from adults, suggesting probable presence of nest or young nearby
- I** Brood patch on adult examined in the hand, suggesting **I**ncubation
- B** Nest **B**uilding or excavating nest-hole

Confirmed breeding

- DD** **D**istractio**D**isplay or injury feigning
- UN** **U**sed **N**est or eggshells found (occupied or laid within period of survey)
- FL** Recently **F**ledged young (nidicolous species) or downy young (nidifugous species). Careful consideration should be given to the likely provenance of any fledged juvenile capable of significant geographical movement. Evidence of dependency on adults (e.g. feeding) is helpful. Be cautious, even if the record comes from suitable habitat.
- ON** Adults entering or leaving nest-site in circumstances indicating **O**ccupied **N**est (including high nests or nest holes, the contents of which cannot be seen) or adults seen incubating
- FF** Adult carrying **F**aecal sac or **F**ood for young
- NE** **N**est containing **E**ggs
- NY** **N**est with **Y**oung seen or heard

(taken from http://www.bto.org/birdatlas/taking_part/bevidence.htm)

APPENDIX 5: BIRDS OF CONSERVATION CONCERN IN IRELAND (2009)

BoCCI List
<p>Wintering:</p> <ul style="list-style-type: none">• Balearic Shearwater;• Bewick's Swan;• Knot ;• Shoveler;• Sooty Shearwater.
<p>Breeding:</p> <ul style="list-style-type: none">• Barn Owl• Black-headed Gull• Black-necked Grebe• Common Scoter• Corncrake• Curlew• Golden Eagle• Golden Plover• Grey Partridge• Herring Gull• Lapwing• Nightjar• Quail• Red Grouse• Red-necked Phalarope• Redshank• Ring Ouzel• Twite• Yellowhammer
<p>Arctic Tern Bar-tailed Godwit Barnacle Goose Black Guillemot Black-tailed Godwit Black-throated Diver Brent Goose Chough Common Gull Sandpiper Common Tern Coot Cormorant Cory's Shearwater Dunlin Eider Gadwall Gannet Garganey Goldeneye Goosander Golden Plover</p>

BoCCI List

Goshawk
Grasshopper Warbler
Great Black-backed Gull
Great Crested Grebe
Great Skua
Greenland White-fronted Goose
Greenshank
Greylag Goose
Grey Plover
Guillemot
Hen Harrier
House Martin
House Sparrow
Kestrel
Kingfisher
Kittiwake
Leach's Petrel
Lesser Black-backed Gull
Lesser Whitethroat
Linnet
Little Grebe
Little Tern
Manx Shearwater
Mediterranean Gull
Merlin
Mute Swan
Oystercatcher
Pied Flycatcher
Pochard
Puffin
Razorbill
Red Kite
Redstart
Red-throated Diver
Reed Warbler
Ringed Plover
Roseate Tern
Ruff
Sand Martin
Sandwich Tern
Scaup
Shag
Shelduck
Short-eared Owl
Skylark
Slavonian Grebe
Snipe
Snowy Owl
Spotted Crake
Spotter Flycatcher
Starling
Stock Dove
Storm Petrel
Swallow

BoCCI List

Swift

Teal

Tree Sparrow

Tufted Duck

Turtle Dove

Water Rail

Wheatear

Whinchat

Whooper Swan

Wigeon

Woodcock

Wood Sandpiper

Wood Warbler

Yellow Wagtail.

APPENDIX 6: NON-NATIVE PLANTS SUBJECT TO RESTRICTIONS WITHIN THE REPUBLIC OF IRELAND ACCORDING TO THE EUROPEAN COMMUNITIES (BIRDS AND HABITATS REGULATIONS 2011)

Common name	Scientific name
American skunk-cabbage	<i>Lysichiton americanus</i>
A red alga	<i>Grateloupia doryphora</i>
Brazilian giant-rhubarb	<i>Gunnera manicata</i>
Broad-leaved rush	<i>Juncus planifolius</i>
Cape pondweed	<i>Aponogeton distachyos</i>
Cord-grasses	<i>Spartina (all species and hybrids)</i>
Curly waterweed	<i>hydrocotyle</i>
Dwarf eel-grass	<i>Lagarosiphon major</i>
Fanwort	<i>Zostera japonica</i>
Floating pennywort	<i>Cabomba caroliniana</i>
Fringed water-lily	<i>Hydrocotyle ranunculoides</i>
Giant hogweed	<i>Nymphoides peltata</i>
Giant knotweed	<i>Heracleum mantegazzianu</i>
Giant-rhubarb	<i>Fallopia sachalinensis</i>
Giant salvinia	<i>Gunnera tinctoria</i>
Himalayan balsam	<i>Salvinia molesta</i>
Himalayan knotweed	<i>Impatiens glandulifera</i>
Hottentot-fig	<i>Persicaria wallichii</i>
Japanese knotweed	<i>Carpobrotus edulis</i>
Large-flowered waterweed	<i>Fallopia japonica</i>
Mile-a-minute weed	<i>Egeria densa</i>
New Zealand pigmyweed	<i>Persicaria perfoliata</i>
Parrot's feather	<i>Crassula helmsii</i>
Rhododendron	<i>Myriophyllum aquaticum</i>
Salmonberry	<i>Rhododendron ponticum</i>
Sea-buckthorn	<i>Rubus spectabilis</i>
Spanish bluebell	<i>Hippophae rhamnoides</i>
Three-cornered leek	<i>Hyacinthoides hispanica</i>
Wakame	<i>Allium triquetrum</i>
Water chestnut	<i>Undaria pinnatifida</i>
Water fern	<i>Trapa natans</i>
Water lettuce	<i>Azolla filiculoides</i>
Water-primrose	<i>Pistia stratiotes</i>
Waterweeds	<i>Ludwigia (all species)</i>
Wireweed	<i>Elodea (all species)</i>

Vector material	Species Referred to
Soil or spoil taken from places infested with Japanese knotweed (<i>Fallopia japonica</i>), giant knotweed (<i>Fallopia sachalinensis</i>) or their hybrid Bohemian knotweed (<i>Fallopia x bohemica</i>)	Japanese knotweed (<i>Fallopia japonica</i>) Giant knotweed (<i>Fallopia sachalinensis</i>) Bohemian knotweed (<i>Fallopia x bohemica</i>)