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Hedgerow Appraisal Report

PRESENTED TO

Marshall Yards Development Company Ltd.
Proposed Large Scale Residential Development at Ballybin Road, Ratoath, Co. Meath

DATE

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1 INTRODUCTION

1.1 Background

Enviroguide Consulting was commissioned by Marshall Yards Development Company Ltd. to undertake a Hedgerow Appraisal (hereafter the 'Report') to inform the Ecological Impact Assessment (EcIA) for a Proposed Large Scale Residential Development at Ballybin Road, Ratoath, Co. Meath (hereafter the 'Proposed Development' or 'Site').

The purpose of this Report is to summarise the results of a Hedgerow Assessment Survey conducted by Enviroguide Consulting ecologists on the 13th of June 2024. The results of this survey will accompany and inform the results of the EcIA which will mitigate for potential impacts of the Proposed Development upon the hedgerow ecology of the Site.

1.2 Quality Assurance and Competence

All surveying and reporting have been conducted by qualified and experienced ecologists and environmental consultants. YM and NB, Enviroguide Ecologists, undertook the hedgerow appraisal at the Site.

YM is a Botanist with Enviroguide Consulting, with a B.Sc. and M.Sc. in botany from Japanese universities. YM has a wide range of practical field experience totalling 7 years that includes flora surveys, rare and protected plant species surveys, tree census, phytosociological vegetation surveys and analysis, habitat mapping and invasive species surveys. YM has been specialised in vegetational classification and as relevant achievements, she was one of lead botanists for the National Habitat Mapping Project in Japan and the deliverables have been published on the website of the government. In Ireland, YM has completed several hedgerow appraisal reports. YM is also a Qualifying member of the Chartered Institute of Ecology and Environmental Management (CIEEM) and an active member of the Botanical Society of Britain and Ireland (BSBI).

NB is an Ecologist with Enviroguide Consulting, with a B. Sc. (Hons) in Microbiology, an M. Sc. (Hons) in Environmental Microbiology from NUI, Galway, and an M. Sc. (Hons) in Biodiversity and Conservation from Trinity College, Dublin. Her 7 years of experience includes coordinating phytoplankton and zooplankton surveys in the Aquaculture Industry and coordinating research in Teagasc Food Research Centre. She has experience in laboratory management and university teaching, having coordinated and delivered material to a master's Microbiology course in University College Dublin. NB has extensive experience completing mammal, habitat, and invasive species surveys, as well as in desktop research, including the production of peer reviewed publications, grant proposals, literature reviews and ecological/environmental reports.

1.3 Relevant Legislation

1.3.1 Wildlife (Amended) Act 2000

The Wildlife Act 1976 was enacted to provide protection to birds, animals, and plants in Ireland and to control activities which may have an adverse impact on the conservation of wildlife. Regarding the listed species, it is an offence to disturb, injure or damage their breeding or resting place wherever these occur without an appropriate licence from the National Parks and Wildlife Service (NPWS). This list includes all wild birds along with their nests and eggs. Intentional destruction of an active nest from the building stage up until the chicks have fledged is an offence.

This includes the cutting of hedgerows from the 1st of March to the 31st of August. The act also provides a mechanism to give statutory protection to Natural Heritage Areas (NHAs). The Wildlife Amendment Act 2000 widened the scope of the Act to include most species, including the majority of fish and aquatic invertebrate species which were excluded from the 1976 Act.

1.3.2 Invasive Species

Certain plant species and their hybrids are listed as Invasive Alien Plant Species in Part 1 of the Third Schedule of the European Communities (Birds and Natural Habitats) Regulations 2011 (SI 477 of 2011, as amended). In addition, soils and other material containing such invasive plant material, are classified in Part 3 of the Third Schedule as vector materials and are subject to the same strict legal controls.

Failure to comply with the legal requirements set down in this legislation can result in either civil or criminal prosecution, or both, with very severe penalties accruing. Convicted parties under the Act can be fined up to €500,000.00, jailed for up to three years, or both.

Extracts from the relevant sections of the regulations are reproduced below.

"49(2) Save in accordance with a licence granted [by the Department of Arts, Heritage and the Gaeltacht], any person who plants, disperses, allows or causes to disperse, spreads or otherwise causes to grow in anyplace [a restricted non-native plant], shall be guilty of an offence.

49(3) … it shall be a defence to a charge of committing an offence under paragraph (1) or (2) to prove that the accused took all reasonable steps and exercised all due diligence to avoid committing the offence.

50(1) Save in accordance with a licence, a person shall be guilty of an offence if he or she […] offers or exposes for sale, transportation, distribution, introduction, or release—

(a) an animal or plant listed in Part 1 or Part 2 of the Third Schedule,

(b) anything from which an animal or plant referred to in subparagraph (a) can be reproduced or propagated, or

(c) a vector material listed in the Third Schedule, in any place in the State specified in the third column of the Third Schedule in relation to such an animal, plant or vector material."

1.4 Relevant Policies and Objectives

Policies and objectives of the Meath County Development Plan 2021-2027, that are of relevance to local hedgerows, are detailed below:

1.4.1 Chapter 08. Cultural and Natural Heritage Strategy

- **HER POL 37**: To encourage the retention of hedgerows and other distinctive boundary treatments in rural areas and prevent loss and fragmentation, where possible. Where removal of a hedgerow, stone wall or other distinctive boundary treatment is unavoidable, mitigation by provision of the same type of boundary will be required.
- **HER POL 38**: To promote and encourage planting of native hedgerow species in new developments and as part of the Council's own landscaping works.
- **HER POL 39**: To recognise the archaeological importance of townland boundaries including hedgerows and promote their protection and retention.

- **HER POL 40**: To protect and encourage the effective management of native and semi-natural woodlands, groups of trees and individual trees and to encourage the retention of mature trees and the use of tree surgery rather than felling, where possible, when undertaking, approving, or authorising development.
- **HER POL 41**: To protect trees the subject of Tree Preservation Orders (TPOs), Champion and Heritage Trees identified on the Tree Register of Ireland and Heritage Tree Database when undertaking, approving, or authorising development.
- **HER POL 42**: To promote the preservation of individual trees or groups of trees as identified on the Heritage Maps in Volume 2 and to manage these trees in line with arboricultural best practice. It is an objective of the Council:
- **HER OBJ 36**: To promote awareness, understanding and best practice in the management of the County's woodland, tree, and hedgerow resource.

Additionally, the Chapter states:

"*Roadside boundaries, whether hedgerows, sod and stone bank, stone wall, or other boundaries, provide important features that are elements of both the landscape and ecology of rural areas. The retention of such boundary treatments assists in absorbing new rural housing into its surroundings and should generally be encouraged. Occasionally, the removal of substantial lengths of roadside boundaries is proposed as part of an element of improving visibility at the junction of a new entrance onto a road. Where an alternative site is available and otherwise suitable, applicants and Planning Authorities should consider a location that avoids the necessity for widespread boundary removal*."

1.4.2 Chapter 09. Rural Development Strategy

- **RD OBJ 9**: To promote the retention of field boundaries and mature trees and hedgerows to protect the rural character of the area.
- **RD OBJ 10**: To ensure that proposals for infill development take account of the character of the area and where possible retain existing features such as building line, height, railings, hedgerows, trees, gateways etc.
- **RD OBJ 18**: To review and update the current list of TPOs and explore the option of making additions having regard to the recommendations set down in the County Meath Tree, Woodland, and Hedgerow Survey (2011) and having due regard to the Council's policies and objectives elsewhere in this County Development Plan.
- **RD POL 41**: To avoid the removal of existing roadside boundaries where they are more than 3 m from the road edge (edge of carriageway), except to the extent that this is needed for a new entrance, and where required for traffic safety reasons. (Please refer to policies contained in Section 8.9.7 Woodlands, Hedgerows and Trees in this regard).

1.4.3 Chapter 11. Development Management Standards and Land Use Zoning Objectives

- **DM OBJ 11**: Existing trees and hedgerows of biodiversity and/or amenity value shall be retained, where possible.
- **DM POL 9**: To support the retention of field boundaries for their ecological/habitat significance, as demonstrated by a suitably qualified professional. Where removal of a hedgerow, stone wall or other distinctive boundary treatment is unavoidable, mitigation by provision of the same boundary type will be required.

1.5 Hedgerow Definition

According to Foulkes *et al*. (2013), hedgerows are defined as linear strips of woody plants with a shrubby growth form that cover more than 25% of the length of a field or property boundary that have been deliberately established or managed. They often have associated banks, walls, ditches (drains), or trees. Hedges that have developed into lines of trees which no longer display a shrubby growth-form (remnant hedgerows) are also included. A remnant hedgerow is generally indicated by a (broken) line of mature or senescent plants in tree, rather than shrub form. These almost invariably have a high percentage of gaps, although may have bits of shrubby growth (including brambles) along their length.

Foulkes' definition of a hedgerow correlates with Fossitt (2000), which defines hedgerows as: "*linear strips of shrubs, often with occasional trees, that typically form field or property boundaries. Dimensions of hedgerows are taken here as being mainly less than 5m high and 4m wide. When wider or taller than this, or dominated by trees, the habitat should be considered as a narrow strip of scrub or woodland, or as a treeline - WL2. Some hedgerows may be overgrown or fragmented if management has been neglected, but they should still be considered in this category unless they have changed beyond recognition. Linear strips of low scrub are included in this category if they occur as field boundaries.*"

It should be noted that gaps that are filled with brambles (*Rubus* spp.) and/or non woody vegetation were still recorded as gaps in this report following Foulkes *et. al* (2013). All hedgerows and treelines that were surveyed at the Site were assessed as being 'hedgerows' according to the above definitions.

1.5.1 Irish Hedgerows

Networks of dense hedgerows are a distinct characteristic of the Irish landscape, and reflect many centuries of planting, border establishment, and cultural practice. Hedgerows are most widespread semi-natural habitats in the country and are multi-functional and represent a potentially vital source of biodiversity that has yet to be comprehensively quantified and fully understood.

Hedgerows are used as/for:

- Agricultural barriers and boundaries,
- Historic townland boundary markers,
- Livestock control,
- Shade and shelter provision,
- Archives of cultural and archaeological history,
- Aesthetic, sense of place,
- Habitat provision for wildlife species,
- Biodiversity refugia and corridors.

In addition, the network of hedgerows provides several recognised Ecosystem Services in Ireland:

- Provisioning Services (i.e., food and fuel).
- Regulation Services (i.e., air quality, climate moderation, water quality, soil erosion control, disease management, pest control and pollination).

- Cultural Services (i.e., aesthetic value, educational and recreational).
- and Support Services (i.e., soil formation, photosynthesis, and nutrient cycling).

2 METHODOLOGY

2.1 Desk Study

A desktop study was conducted to collate and review available information, datasets, and documentation sources relevant for the completion of the Hedgerow Assessment Survey. The desktop study, completed in June 2024 relied on the following sources:

- National Parks and Wildlife Service (NPWS) datasets.
- Geological Survey Ireland (GSI) online datasets and mapping.
- Environmental Protection Agency (EPA) mapping and datasets.
- OSI aerial imagery and Discovery Series mapping.
- Satellite imagery from various sources and dates (Google, Digital Globe, Bing).
- The Status of EU Protected Habitats in Ireland (NPWS).
- Office of Public Works (OPW) Flood Plans (*https://www.floodinfo.ie/map/floodplans/*).
- Department of Agriculture, Food, and the Marine Forestry Licence Viewer (*https://forestry-maps.apps.rhos.agriculture.gov.ie/*).

2.2 Field Survey

The Hedgerow Assessment Survey conducted was an adaptation of the Hedgerow Appraisal System (HAS) by Foulkes *et al*., (2013). In addition, the Hedgerow Evaluation and Grading System (HEGS) by Clements and Toft (1992) was supplementally implemented in the assessment. The survey was conducted on 13th of June 2024.

The hedgerows on the Site were divided into eight distinct hedgerows (H1 to H8 (Figure 1)), with nodes or connections to adjacent hedgerows demarcating the extent of any single hedgerow.

The route of each length of hedgerow was then walked and surveyed. Hedgerows can be said to be of three floristic layers, each of which was visually inspected, and species/condition recorded:

i. The tree layer, in which trees within the hedge are distinct from the shrub layer.

ii. The shrub layer, which includes thorns, woody climbers/lianas, shrubby trees (a result of cutting or laying).

iii. The ground flora are herbaceous, broadleaved plants, rushes, grasses, and ferns found at the base of the hedge. Some of these species are indicators of hedgerow antiquity.

2.2.1 Hedgerow Appraisal System (Foulkes *et al*. 2013)

It was necessary to modify the HAS approach as the objective of Foulkes *et al*. (2013) was originally to devise a national database of hedgerows, whereby samples from 1 km² areas are surveyed, rather than hedgerows associated with a particular site. Hence, the following criteria (as per Foulkes) were included:

- Adjacent land use.
- History.
- Links to semi-natural habitat and/or designated sites.
- Construction of the hedgerow (ditches, banks, walls).
- Structure/condition.

- Species present.

The field data collected was also used to assess the condition and significance of each hedgerow based on the following categories (after Foulkes *et al*. 2013):

Condition:

- Structural variables.
- Continuity.
- Negative indicators/degradation/issues affecting long term viability etc.

The condition of the hedgerow is ranked on a scale of 0 to 3, where 0 is Unfavourable, 1 is Adequate, 2 is Favourable and 3 is Highly Favourable. The four categories are divided into several criteria for each which are assessed with a similar rank 0 to 3 individually.

Significance (Ecology):

- Floral Species Diversity Significance.
- Ground Flora Significance.
- Structure, Construction & Associated Features
- Habitat Connectivity Significance etc.

The significance of the hedgerow is ranked on a scale of 0 to 4, where 0 is Low Significance, 1 is Slightly Significance, 2 is Moderately Significance, 3 is Significance and 4 is Highly Significance. The aforementioned five categories are divided into several criteria, each of which are assessed with a rank of 0 to 4 individually.

In both assessments, the higher the score, the more favourable the condition of the hedgerow. A score of 0 in any category is indicative of a hedgerow that is in an unfavourable condition overall.

Overall score for each category is calculated as the average of the rank values for each criterion. If the average value is a fraction, it is rounded up.

2.2.2 Floristic Recording

For the assessment in both methodologies, floristic data was recorded from the entire length of each hedgerow and from two non-concurrent 30m strips randomly selected along the length of each hedgerow following the HAS System.

Data was collected on:

- Records of all species on tree, shrub and ground flora layers, following Stace (2010).
- Relative abundance for each species.
    - Abundance was measured by eye using percentage cover scales (dominant to rare or absent, with a percentage estimate to reduce subjectivity) - a modified version of the method used for detecting charcoal in archaeobotanical light fraction samples.
    - The DAFOR scale was employed to measure abundance when developing species lists for each site, along with the growth form (e.g., shrub or field layer, single, clumps, tussock). In this method, the surveyor assigns one of the following categories to the abundance of the species; Dominant, Abundant, Frequent, Occasional or Rare.

- Number of woody species as present and the dominant species within each 30m strip and along the entire length of each hedgerow.

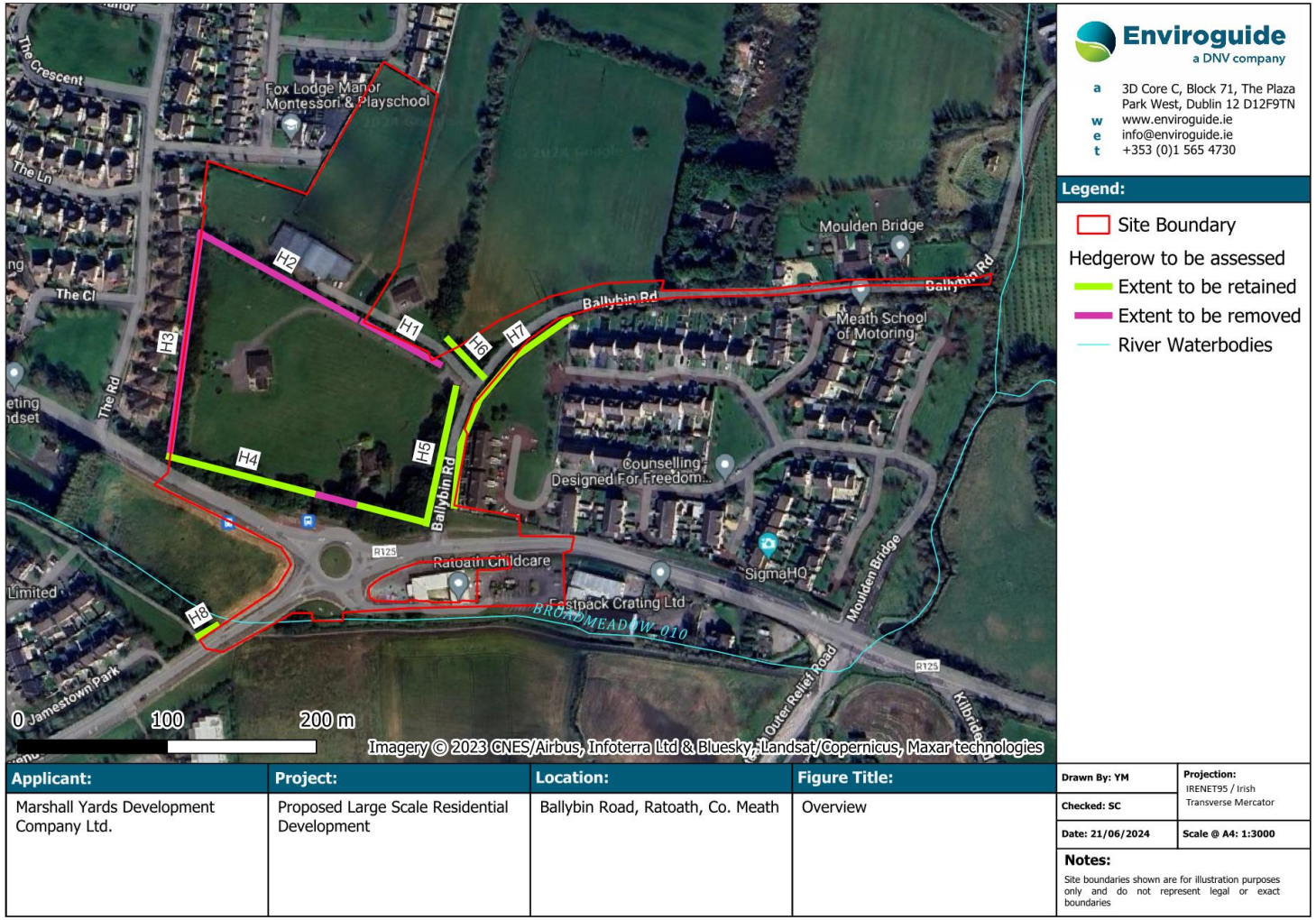

FIGURE 1: HEDGEROW H1 TO H8 AND SITE BOUNDARY FOR THE PROPOSED DEVELOPMENT.

2.3 Limitations

- Although efforts were made to identify all flowering species along the survey routes, there is always the possibility that due to limitations of time, season and resources, some species may have been missed. However, this limitation is not deemed to be a significant one in terms of the Hedgerow Appraisal. As such, as a precaution, the results of the hedgerow appraisals should be considered as indicative rather than comprehensive.
- H7 (Figure 1) is located along a roadway without verges and was too dangerous to survey from the roadside. The opposite side of this hedgerow contained a series of private lands and so survey effort along this hedgerow was limited in parts. It is noted this hedgerow is being retained and so this is not a limitation that would prevent any appropriate mitigation, or compensatory measures being applied and is not deemed significant.

3 RESULTS

All raw data is presented in Appendix I – Assessment Further Details and Hedgerow Data Sheets for the Hedgerow Appraisal System, with a detailed description provided below.

3.1 H1

H1 is proposed to be removed partially. The southern aspect will be removed while the northern aspect will be retained.

H1 (Figure 2 and Figure 3) forms a boundary between private roads within the Site. H1 is 58m in length with one aspect facing south. In summary, H1 consists of two rows of tree species on half banks with a grassy margin on the south side. In addition, there is a dry internal drainage ditch (0.5m depth) within the hedgerow connected to H2.

H1 is a treeline with the north side consisting mostly of Leyland cypress (*Cupressus* x *leylandii)* and the south side dominated by sycamore (*Acer pseudoplatanus)* and woodland species such as hawthorn (*Crataegus monogyna)* and wych elm (*Ulmus glabra)*. The south side was trimmed with a straight edge. The base and margins were deemed to be managed frequently, and so there is no overgrowth basal structure. The density was semi-opaque. The internal drainage was shaded entirely by tree species and covered by common ivy (*Hedera helix)* in the understory.

As negative indicators, it was identified that most of the tree composition were non-native, unfavourable species defined in the guideline of the HAS (Foulkes *et al*. 2013). This includes sycamore which is Medium impact invasive species (NBDC, 2024). No vegetated margin existed on the northern side.

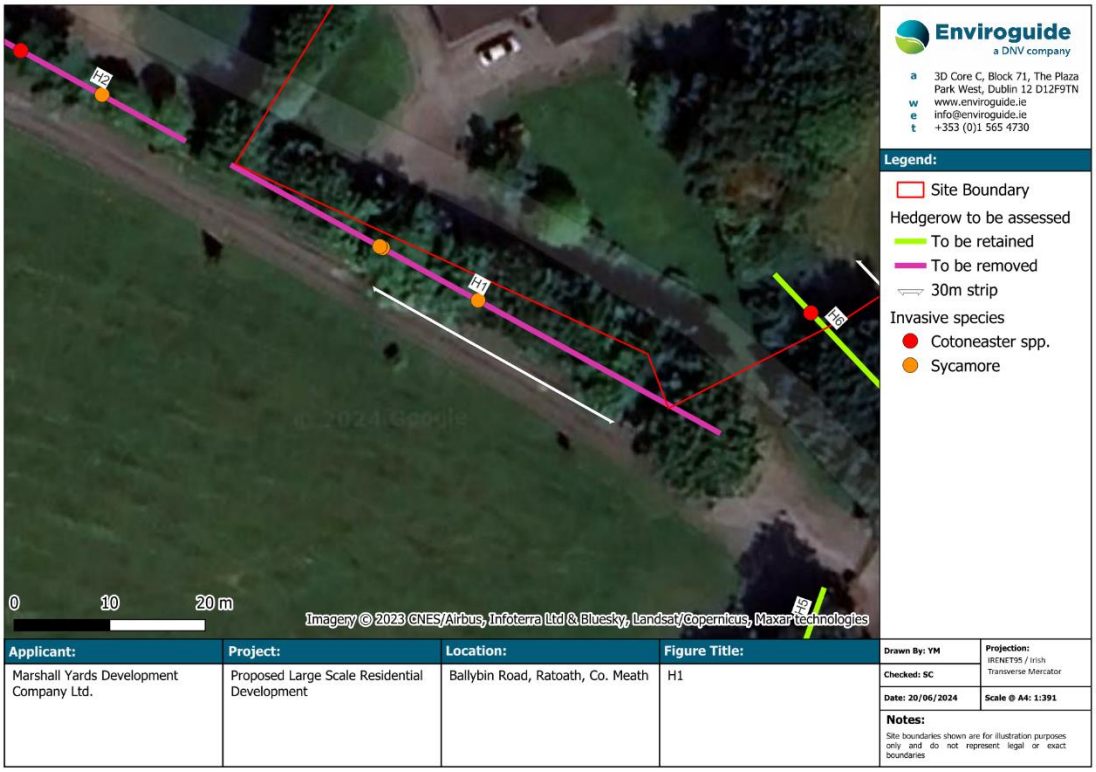

FIGURE 2: H1 EXTENT.

SOUTH SIDE

NORTH SIDE

INTERNAL DRAINAGE

FIGURE 3: H1 OVERVEIW.

As a result of hedgerow appraisals for H1, the hedgerow condition was assessed as 3 - Highly favourable and Hedgerow Significance (Ecology) was assessed as 1 - Slightly Significant in the HAS (Table 1).

The following are the overall results of Hedgerow Assessment for H1:

TABLE 1: H1 OVERALL ASSESSMENT SCORE USING THE MEAN OF CONDITION/SIGNIFICANT SCORES (THE HAS AND THE HEGS).

Assessment Criteria to Determine Hedgerow Condition	H1
Structural	3- Highly favourable
Continuity	3- Highly favourable
Negative indicators/Degradation	2- Favourable
HAS Score Overall for Condition (the mean of the above scores)	3- Highly favourable

Assessment Criteria to Determine Hedgerow Significance in Ecology	H1
Species Diversity Significance	1- Slightly Significant
Ground Flora Significance	1- Slightly Significant
Structure, Construction & Associated Features	1- Slightly Significant
Habitat Connectivity Significance	1- Slightly Significant
HAS Score Overall for Significance (the mean of the above scores)	1- Slightly Significant

Further details for the assessments, flora and photo data are provided in Appendices I to II.

3.2 H2

H2 is proposed to be removed entirely.

H2 (Figure 4 and Figure 5) is an internal farm boundary between pasture lands within the Site and adjoins H1. H2 is 124m in length with one side aspect being south. In summary, H2 consists of two rows of trees and shrubs with a makeshift bridge over the dry drainage ditch separating it from H1.

H2 was dominated by hawthorn in the east section (31m length) and a treeline dominated by ash (*Fraxinus excelsior)* in the west (91m length). There was no margin between H2 and the pasture lands. The basal structure was not developed, and the density was semi-opaque. There were several thickets of bramble (*Rubus fruticosus* agg.). The understory excluding the drainage ditch was covered by grass species such as Yorkshire-fog (*Holcus lanatus),* false oatgrass (*Arrhenatherum elatius)* and rough meadow-grass (*Poa trivialis)*. The internal drain was shaded entirely by tree species and covered by common ivy with a small stands of hart's-tongue (*Asplenium scolopendrium)* and woodland species such as honeysuckle (*Lonicera periclymenum)* and herb-Robert (*Geranium robertianum)*.

As negative indicators, there were some semi-mature sycamores in the tree layer, which is a Medium-impact invasive species in the NBDC database. In addition, it is worth noting for precaution that 3 individuals of Cotoneaster (*Cotoneaster* spp.) (0.8m height) were identified in the understory. *Cotoneaster horizontalis* is categorised as a Medium Impact Invasive Species in the NBDC database while all other cotoneasters are low impact. Cotoneaster is not a Third Schedule invasive species. Some of the identified stands are potentially Cotoneaster species listed in Schedule 9 in the UK as invasive species.

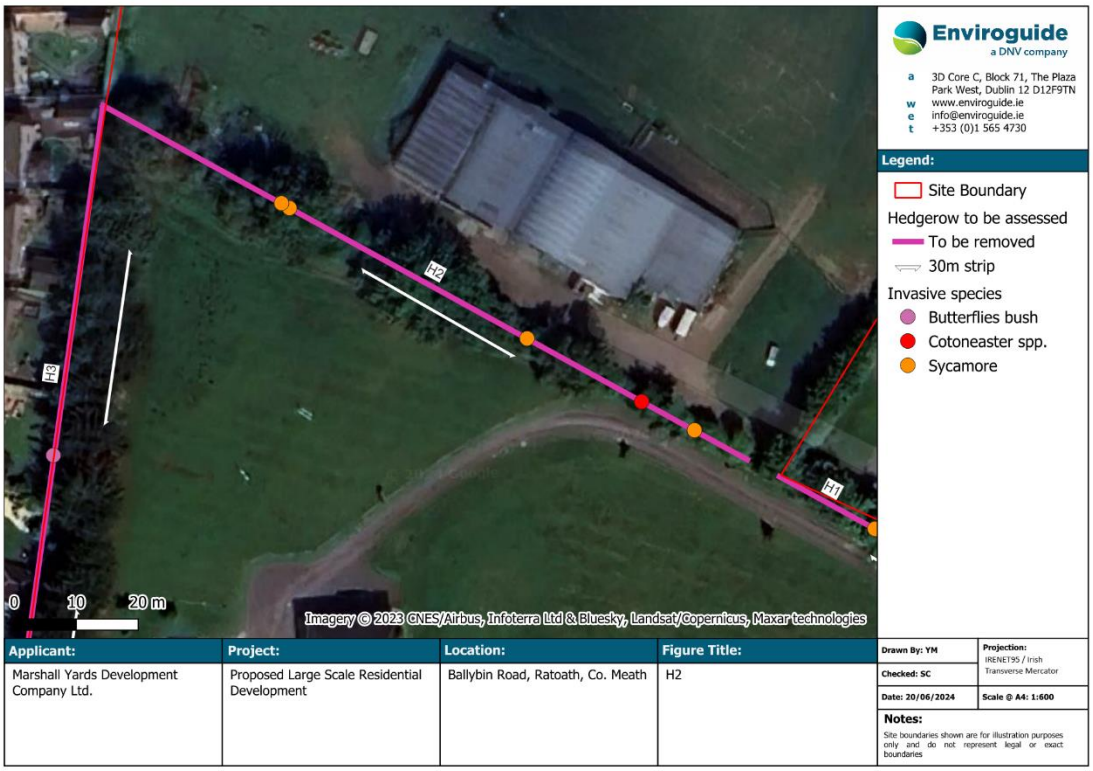

FIGURE 4: H2 EXTENT.

SOUTH SIDE

INTERNAL DRAINAGE

2M GAP

COTONEASTER SPP.

FIGURE 5: H2 OVERVEIW.

As a result of hedgerow appraisals for H2, the Hedgerow Condition was assessed as 2- Favourable and Hedgerow Significance (Ecology) was assessed as 2- Moderately Significant in the HAS (Table 2).

The following are the overall results of Hedgerow Assessment for H2:

TABLE 2: H2 OVERALL ASSESSMENT SCORE USING THE MEAN OF CONDITION/SIGNIFICANT SCORES (THE HAS AND THE HEGS).

Assessment Criteria to Determine Hedgerow Condition	H2
Structural	3- Highly favourable
Continuity	2- Favourable
Negative indicators/Degradation	2- Favourable
HAS Score Overall for Condition (the mean of the above scores)	2- Favourable

Assessment Criteria to Determine Hedgerow Significance in Ecology	H2
Species Diversity Significance	3- Significant
Ground Flora Significance	1- Slightly Significant
Structure, Construction & Associated Features	1- Slightly Significant
Habitat Connectivity Significance	1- Slightly Significant
HAS Score Overall for Significance (the mean of the above scores)	2- Moderately Significant

Further details for the assessments, flora and photo data are provided in Appendices I to II.

3.3 H3

H3 is proposed to be removed entirely.

H3 (Figure 6 and Figure 7) is a boundary between the pastureland within the Site and the neighbouring residential area. H3 is 151m in length with one side aspect being east. In summary, H3 consists of one row of trees and shrubs without drainage.

H3 was mainly a treeline dominated by planted Monterey cypress (*Cupressus macrocarpa)*, and there was a wall in the west side as a boundary of the adjacent residential area. Some non-native cultivated tree species were identified between the treeline and the wall, e.g. purple beech (*Fagus sylvatica* f. *purpurea)* and garden holly (*Ilex* sp.). Most of the understory was covered by common ivy, the base in the east side and gaps of canopies were dense with bramble and blackthorn (*Prunus spinosa)*.

As negative indicators, there were some stands of butterfly-bush (*Buddleja davidii)*, which is a Medium-impact invasive species in the NBDC database, and it was identified that most of the tree composition were non-native species listed in unfavourable species defined in the guideline of the HAS.

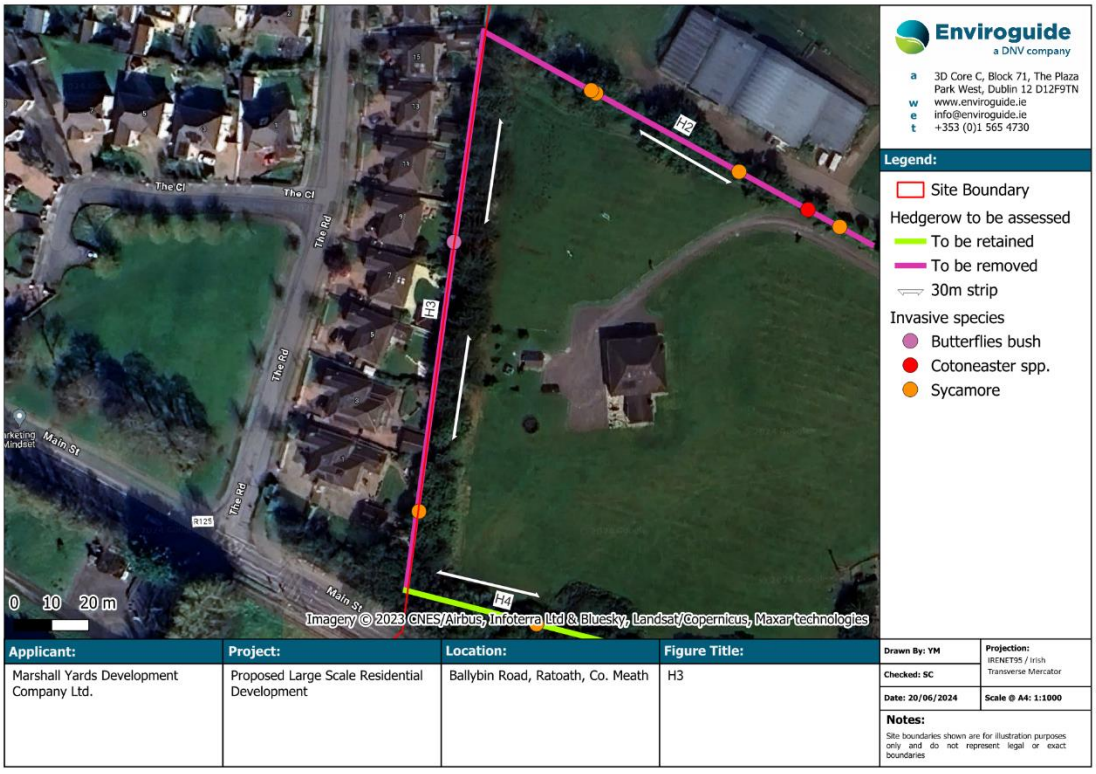

FIGURE 6: H3 EXTENT.

EAST SIDE

UNDERSTORY

BASAL STRUCTURE

BUTTERFLY-BUSH

FIGURE 7: H3 OVERVEIW.

As a result of hedgerow appraisals for H3, Hedgerow Condition was assessed as 2- Favourable and Hedgerow Significance (Ecology) was assessed as 1- Slightly Significant in the HAS (Table 3).

The following are the overall results of Hedgerow Assessment for H3:

TABLE 3: H3 OVERALL ASSESSMENT SCORE USING THE MEAN OF CONDITION/SIGNIFICANT SCORES (THE HAS AND THE HEGS).

Assessment Criteria to Determine Hedgerow Condition	H3
Structural	2- Favourable
Continuity	3- Highly favourable
Negative indicators/Degradation	2- Favourable
HAS Score Overall for Condition (the mean of the above scores)	2- Favourable

Assessment Criteria to Determine Hedgerow Significance in Ecology	H3
Species Diversity Significance	1- Slightly Significant
Ground Flora Significance	1- Slightly Significant
Structure, Construction & Associated Features	1- Slightly Significant
Habitat Connectivity Significance	2- Moderately Significant
HAS Score Overall for Significance (the mean of the above scores)	1- Slightly Significant

Further details for the assessments, flora and photo data are provided in Appendices I to II.

3.4 H4

H4 is proposed to be removed partially.

H4 (Figure 8 and Figure 9) is a boundary between the pastureland within the Site and the public road R125 in the north boundary of the Site. H4 is 178m in length with one side aspect being north. In summary, H4 consists of one row of mature trees with no drain.

H4 was a treeline mainly dominated by horse chestnut (*Aesculus hippocastanum),* sycamore and beech (*Fagus sylvatica)*. These component trees were entirely mature, including some late mature beech and sycamore trees in the east part. The understory took on an appearance of woodland covered by common ivy with species listed in "The current hedgerow survey list of ground flora species" (Foulkes *et al*. 2013) or listed in "Schedule 2 Woodland Species List" for the Hedgerows Regulations 1997 of England and Wales, e.g. cow parsley (*Anthriscus sylvestris)* and false brome (*Brachypodium sylvaticum).*

As negative indicators, the margin and understory covered 40% by nutrient rich species defined in the guideline of the HAS (Foulkes *et al*. 2013) such as common nettle (*Urtica dioica)*.

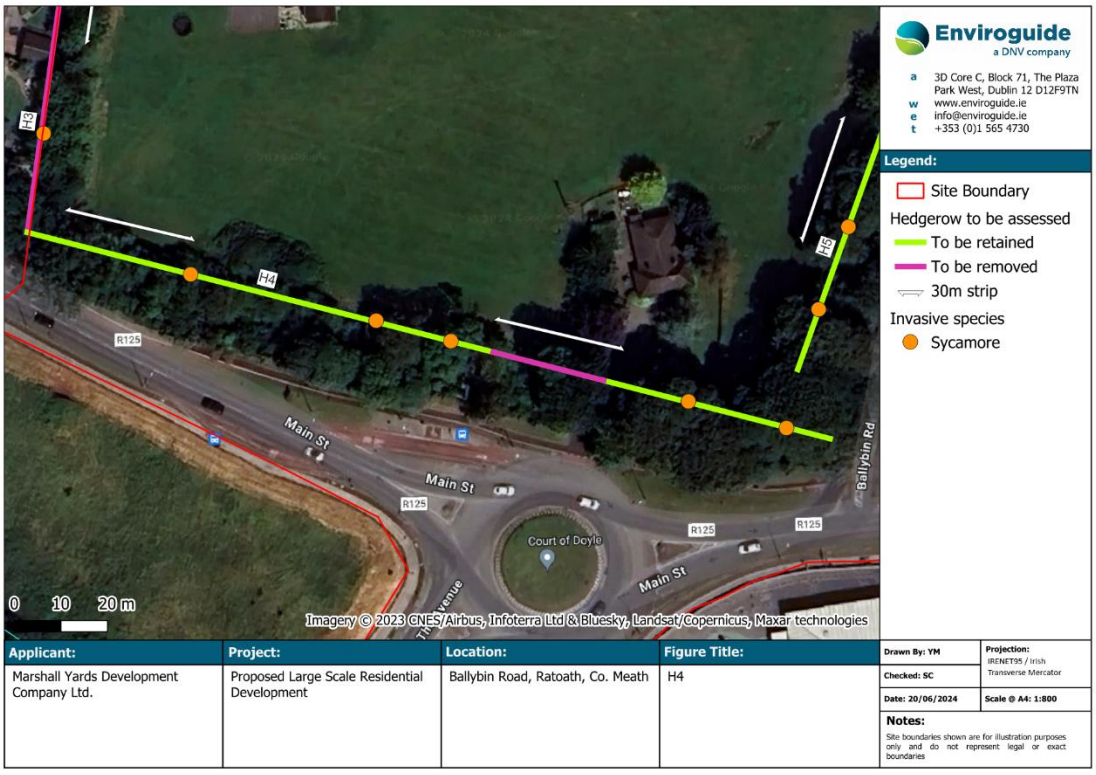

FIGURE 8: H4 EXTENT.

NORTH SIDE

PROPOSED EXTENT TO BE REMOVED

UNDERSTORY

FIGURE 9: H4 OVERVEIW.

As a result of hedgerow appraisals for H4, Hedgerow Condition was assessed as 2- Favourable and the Hedgerow Significance (Ecology) was assessed as 1- Slightly Significant in the HAS (Table 1).

The following are the overall results of Hedgerow Assessment for H4:

TABLE 4: H4 OVERALL ASSESSMENT SCORE USING THE MEAN OF CONDITION/SIGNIFICANT SCORES (THE HAS AND THE HEGS).

Assessment Criteria to Determine Hedgerow Condition	H4
Structural	3- Highly favourable
Continuity	2- Favourable
Negative indicators/Degradation	2- Favourable
HAS Score Overall for Condition (the mean of the above scores)	2- Favourable

Assessment Criteria to Determine Hedgerow Significance in Ecology	H4
Species Diversity Significance	1- Slightly Significant
Ground Flora Significance	1- Slightly Significant
Structure, Construction & Associated Features	0- Low Significance
Habitat Connectivity Significance	0- Low Significance
HAS Score Overall for Significance (the mean of the above scores)	1- Slightly Significant

Further details for the assessments, flora and photo data are provided in Appendices I to II.

3.5 H5

H5 is proposed to be retained entirely.

H5 (Figure 10 and Figure 11) is a boundary between the pastureland within the Site and the public road, Ballybin road, in the eastern boundary of the Site. H5 is 92m in length with one side aspect being west. In summary, H5 consists of one row of mature trees without a drainage ditch.

H5 was a treeline mainly dominated by sycamore and beech with a scrappy shrub layer of hawthorn. The component trees were entirely early mature. The understory took on an appearance of woodland covered by common ivy and cow parsley, partially filled with thickets of bramble and blackthorn.

As negative indicators, the more than half of the canopy was dominated by sycamore listed as unfavourable/invasive species.

FIGURE 10: H5 EXTENT.

NORTH SIDE

PROPOSED EXTENT TO BE REMOVED

UNDERSTORY

FIGURE 11: H5 OVERVEIW.

As a result of hedgerow appraisals for H5, Hedgerow Condition was assessed as 2- Favourable and Hedgerow Significance (Ecology) was assessed as 1- Slightly Significance in the HAS (Table 1).

The following are the overall results of Hedgerow Assessment for H5:

TABLE 5: H5 OVERALL ASSESSMENT SCORE USING THE MEAN OF CONDITION/SIGNIFICANT SCORES (THE HAS AND THE HEGS).

Assessment Criteria to Determine Hedgerow Condition	H5
Structural	2- Favourable
Continuity	3- Highly favourable
Negative indicators/Degradation	1- Adequate
HAS Score Overall for Condition (the mean of the above scores)	2- Favourable

Assessment Criteria to Determine Hedgerow Significance in Ecology	H5
Species Diversity Significance	1- Slightly Significance
Ground Flora Significance	0- Low Significance
Structure, Construction & Associated Features	0- Low Significance
Habitat Connectivity Significance	1- Slightly Significant
HAS Score Overall for Significance (the mean of the above scores)	1- Slightly Significance

Further details for the assessments, flora and photo data are provided in Appendices I to II.

3.6 H6

H6 is proposed to be retained entirely.

H6 (Figure 12 and Figure 13) is a boundary between a private road within the Site and a neighbouring pastureland. H6 is 34m in length with one side's aspect facing southwest. In summary, H6 consists of one row of trees and shrubs and no drainage ditch.

H6 is a mixture of treeline and shrubby hedgerow. The treeline is dominated by semi-mature Layland cypress, sycamore and a hedgerow composed by elder (*Sambucus nigra)*. The base was managed; therefore, the structure was lost and semi-translucent. The understory was covered by common ivy and it was identified that some cultivated young trees were planted such as lilac sp. (*Syringa* sp.) and star anise sp. (*Illicium* sp.).

As negative indicators, it was identified that there are three stands of Cotoneaster species (*Cotoneaster spp.)* in the margin on the southwest side. Although these species are not Wall Cotoneaster which is a medium impact invasive species in NBDC, some stands are deemed to be potentially Cotoneaster species listed in Schedule 9 in the UK as invasive species. In addition, the cultivated trees are listed as unfavourable tree species in the guidelines of the HAS.

FIGURE 12: H6 EXTENT.

SOUTH WEST SIDE

SOUTH WEST SIDE

UNDERSTORY AND BASAL STRUCTURE

COTONEASTER SPP.

FIGURE 13: H6 OVERVEIW.

As a result of hedgerow appraisals for H6, the hedgerow condition was assessed as 3- Highly favourable and Hedgerow Significance (Ecology) was assessed as 1- Slightly Significant in the HAS (Table 6).

The following are the overall results of Hedgerow Assessment for H6:

TABLE 6: H6 OVERALL ASSESSMENT SCORE USING THE MEAN OF CONDITION/SIGNIFICANT SCORES (THE HAS AND THE HEGS).

Assessment Criteria to Determine Hedgerow Condition	H6
Structural	3- Highly favourable
Continuity	3- Highly favourable
Negative indicators/Degradation	2- Favourable
HAS Score Overall for Condition (the mean of the above scores)	3- Highly favourable

Assessment Criteria to Determine Hedgerow Significance in Ecology	H6
Species Diversity Significance	1- Slightly Significant
Ground Flora Significance	1- Slightly Significant
Structure, Construction & Associated Features	0- Low Significance
Habitat Connectivity Significance	0- Low Significance
HAS Score Overall for Significance (the mean of the above scores)	1- Slightly Significant

Further details for the assessments, flora and photo data are provided in Appendices I to II.

3.7 H7

H7 is proposed to be retained entirely.

H7 (Figure 14 and Figure 15) is a boundary between the public Ballybin road and a residential area. H7 is 151m in length with one side aspect being northwest. In summary, H7 consists of random row of trees and shrubs without a drainage.

H7 was a hedgerow managed by trimming on rotation and laying along the residential area side with a gappy treeline along the roadside. The hedgerow was dominated completely by beech/purple beech. Beech trees formed a dense structure from canopy to base. Therefore, the understory was shaded well and covered *c.* 70% by common ivy without diverse species component.

As negative indicators, the hedgerow was dominated by beech and sycamore listed as unfavourable tree species in the guideline of the HAS.

FIGURE 14: H7 EXTENT.

SOUTH EAST SIDE

UNDERSTORY AND BASAL STRUCTURE

SOUTH EAST SIDE

FIGURE 15: H7 OVERVEIW.

As a result of hedgerow appraisals for H6, the Hedgerow Condition was assessed as 2- Favourable and Hedgerow Significance (Ecology) was assessed as 1- Slightly Significant in the HAS (Table 6).

The following are the overall results of Hedgerow Assessment for H1:

TABLE 7: H7 OVERALL ASSESSMENT SCORE USING THE MEAN OF CONDITION/SIGNIFICANT SCORES (THE HAS AND THE HEGS).

Assessment Criteria to Determine Hedgerow Condition	H6
Structural	2- Favourable
Continuity	3- Highly favourable
Negative indicators/Degradation	2- Favourable
HAS Score Overall for Condition (the mean of the above scores)	2- Favourable

Assessment Criteria to Determine Hedgerow Significance in Ecology	H6
Species Diversity Significance	0- Low Significance
Ground Flora Significance	1- Slightly Significant
Structure, Construction & Associated Features	1- Slightly Significant
Habitat Connectivity Significance	1- Slightly Significant
HAS Score Overall for Significance (the mean of the above scores)	1- Slightly Significant

Further details for the assessments, flora and photo data are provided in Appendices I to II.

3.8 H8

H8 is proposed to be retained entirely.

H8 (Figure 16 and Figure 17) is planted on the far side of a boundary wall along the redline boundary. It is located between the public road, The Avenue, a riparian woodland along Broadmeadow river/Ratoath Stream (IE_EA_08B020400) and a pastureland. H8 is 14m in length with one side aspect being southeast. In summary, H8 consists of one row of shrubs without a drain.

H8 was a topped and well-managed hedgerow with a stone wall consisting of planted cherry laurel (*Prunus laurocerasus)*.

As negative indicators, the entire component species was cherry laurel categorised into High Impact Invasive Species in NBDC[1].

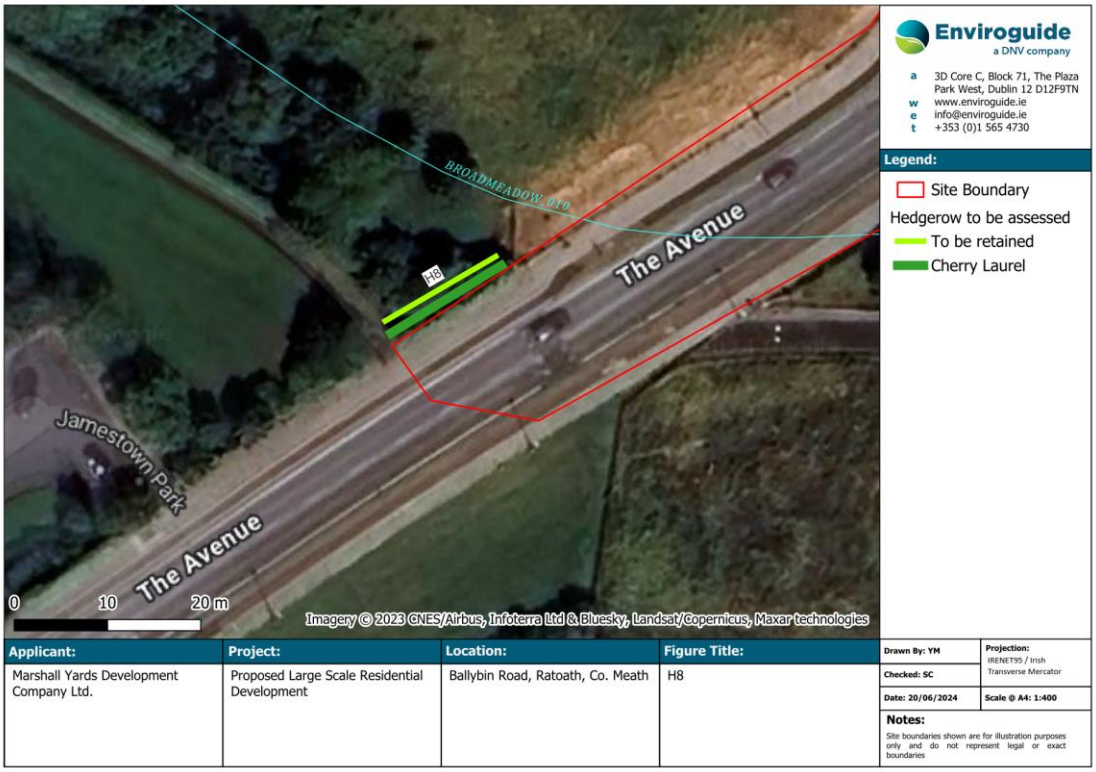

FIGURE 16: H8 EXTENT.

[1] NBDC Species Profile, https://species.biodiversityireland.ie/profile.php?taxonId=43895

SOUTHEAST SIDE

CROSS SECTION

STONE WALL

RIPARIAN WOODLAND BEHIND THE HEDGE

FIGURE 17: H8 OVERVEIW.

As a result of hedgerow appraisals for H8, Hedgerow Condition was assessed as 2- Favourable and Hedgerow Significance (Ecology) was assessed as 1- Slightly Significant in the HAS (Table 6).

The following are the overall results of Hedgerow Assessment for H8:

TABLE 8: H8 OVERALL ASSESSMENT SCORE USING THE MEAN OF CONDITION/SIGNIFICANT SCORES (THE HAS AND THE HEGS).

Assessment Criteria to Determine Hedgerow Condition	H8
Structural	1- Adequate
Continuity	3- Highly favourable
Negative indicators/Degradation	2- Favourable
HAS Score Overall for Condition (the mean of the above scores)	2- Favourable

Assessment Criteria to Determine Hedgerow Significance in Ecology	H8
Species Diversity Significance	0- Low Significance
Ground Flora Significance	1- Slightly Significant
Structure, Construction & Associated Features	1- Slightly Significant
Habitat Connectivity Significance	1- Slightly Significant
HAS Score Overall for Significance (the mean of the above scores)	1- Slightly Significant

Further details for the assessments, flora and photo data are provided in Appendices I to II.

4 SUMMARY OF HEDGEROW VALUE EVALUATIONS

4.1 Scoring Hedgerow Condition

The condition of the hedgerows at the Site are ranked on a scale of 0 to 3, where 0 is Unfavourable, 1 is Adequate, 2 is Favourable and 3 is Highly Favourable. The significance in ecology of the hedgerows at the Site are ranked on a scale of 0 to 4, where 0 is Low Significance, 1 is Slightly Significance, 2 is Moderately Significance, 3 is Significance and 4 is Highly Significance. The higher the score, the more favourable the condition of the hedgerow in question. A score of 0 in any category is indicative of a hedgerow that is in an unfavourable condition and low significance in ecology overall at present (Foulkes *et al*., 2013).

Table 9 outlines the collated condition scores of hedgerows at the Site.

TABLE 9: COLLATED HEDGEROW SCORES

Hedgerow	Condition Score			Mean	Significance in Ecology Score				Mean
	Structural	Continuity	Negative Indicator		Species Diversity	Ground Flora	Structure	Connectivity	
H1	3	3	2	**Highly Favourable**	1	1	1	1	**Slightly Significant**
H2	3	2	2	**Favourable**	3	1	1	2	**Moderately Significant**
H3	2	3	2	**Favourable**	1	1	1	2	**Slightly Significant**
H4	3	2	2	**Favourable**	1	1	0	0	**Slightly Significant**
H5	2	3	1	**Favourable**	1	0	0	1	**Slightly Significant**
H6	3	3	2	**Highly Favourable**	1	1	0	0	**Slightly Significant**
H7	2	3	2	**Favourable**	0	1	1	1	**Slightly Significant**
H8	1	3	2	**Favourable**	0	1	1	2	**Slightly Significant**

As can be seen, median scores of the eight hedgerows have been allocated to Favourable condition assessment and Slightly Significance in ecology in the HAS.

The structure and condition of hedgerows were scored well as regards to over-grown profiles with adequate height and width, continuity, and small coverage of common ivy in the canopies. On the other hand, the significance was scored as being mostly slight reflecting the dominant of unfavourable tree species and absence of wall/bank/drainage.

5 IMPACT ASSESSMENT OF THE PROPOSED DEVELOPMENT

5.1 Removal/Pruning Hedgerows

According to the Arboricultural Report (Charles McCorkell, 2024a) and the Tree Removals/Protection Plan (Charles McCorkell, 2024b, c, d, e) the removal of 83 trees and 5 tree/hedge groups and the partial removal of 5 tree/hedge groups have been proposed. Hedgerows/treelines assessed in this report to be either removed completely or partially, or retained are shown in Table 10.

TABLE 10: HEDGEROW SCORES AND REMOVALS PLAN FOR EACH HEDGEROW

Hedgerow	Condition Score	Significance Score	Extent required to be removed in the Tree Removals Plan	Approximate length to be removed
H1	3- Highly Favourable	1- Slightly Significant	Partial extent will be **removed**	58m
H2	2- Favourable	2- Moderately Significant	All extent will be **removed**	124m
H3	2- Favourable	1- Slightly Significant	All extent will be **removed**	151m
H4	2- Favourable	1- Slightly Significant	Partial extent will be **removed**	15m
H5	2- Favourable	1- Slightly Significant	All extent will be retained	0m
H6	3- Highly Favourable	1- Slightly Significant	All extent will be retained	0m
H7	2- Favourable	1- Slightly Significant	All extent will be retained	0m
H8	2- Favourable	1- Slightly Significant	All extent will be retained	0m

Most of the hedgerows/treelines to be removed are semi-mature and composed of unfavourable tree species such as conifers, sycamore, and beech with ecological significance scores largely of 1- Slightly Significant, and with structure/condition scores between 2- Favourable and 3- Highly Favourable. Hence, the removals will lead some loss of habitats for foraging and nesting for local mammals, birds, and invertebrates.

Therefore, in the worst-case scenario without any mitigation and compensation measures, the removals plan for the Proposed Development are deemed to represent a **permanent, negative, and moderate** impact at the Local scale due to the loss of some hedgerows/tree layers.

5.2 Effects on retained trees

The National Roads Authority (NRA) (2006) states in *Guidelines for the Protection and Preservation of Trees, Hedgerows and Scrub Prior to, During and Post Construction of National Road Schemes* that examples of expected disturbances to trees during construction are:

- Mechanical damage to bark, limbs, or roots.
- Compaction of the Root Protection Area (RPA)[2] as the result of vehicular and pedestrian activity and/or the storage of materials within this area; and
- Altered ground levels affecting the hydrological regime.

These types of disturbances could lead to the potential for additional impacts on any retained hedges at the Site. In particular, H4 and H5 are treelines consisting of mature/veteran trees which have potential to support wildlife. Therefore, the damage to these trees could impact at the Local scale.

The Proposed Development has been designed to set Root Protection Areas (RPAs) around the retained trees/hedgerows in accordance with the Arboriculture Report (Charles McCorkell, 2024a) and the Tree Protection Plan (Charles McCorkell, 2024d, e). The Arboriculture Report mentions that the Proposed Development will require the construction of footpaths within RPAs both via no-dig and above ground works and excavation. The Tree Protection Plans show the methods required for each situation to avoid damage on root areas within the Site, namely: a cellular confinement system or similar method with permeable finishing materials for where no-dig footpath will be installed, arboricultural supervision where excavation works will be carried out and protective fence to be installed. In addition, it suggests underground services should avoid the RPAs, otherwise, they should take follow industry best practice guidance.

Since the Proposed Development shall implement the construction of footpaths following the avoidance methods designed by the Tree Protection Plans, the Proposed Development is considered to have **no significant** impact to the retained trees.

5.3 Effects to the existing drainage/watercourse

There is no wet drains or watercourses around the hedgerows/treelines to be removed, although the potential for the drain to hold some water in wetter months is possible. No evidence of this occurred on a Site visit on the 6th of March 2024. Furthermore, all potential pathways were screened out in the AA screening accompanying this application under separate cover (Enviroguide, 2024). Therefore, there will be **no significant** impact via hydrological pathways to any designated sites.

5.4 Invasive species

Some species listed as invasive were recorded on Site, but none of which are Third Schedule. One high impact species (Cherry Laurel) was recorded, albeit outside the redline boundary. Furthermore, this species is planted as a hedge on neighbouring lands and forms a boundary with the Proposed Development. No intrusive works are planned for this area and so this species will not be affected or disturbed. Some stands of sycamore were identified within H1, H2, H3, H4, H5 and H6. Sycamore is considered an invasive species due to its ability to outcompete native tree species, and its low

[2] RPA is a calculated area of ground that lies immediately under a tree and just beyond the extent of its crown. It is intended to help avoid damage to the tree's rooting system (Woodland Trust 2021).

contribution to local biodiversity by supporting fewer insect species than native tree species. However, sycamore's invasiveness is considered more of an issue in sensitive native woodland settings as opposed to urban areas such as the Site location (Leslie, 2005). In addition, the drainages within H1 and H2 were identified to be dry, therefore, it is deemed that the hydrological pathway to spread seeds to the local area due to the relevant works is weak. Hence, sycamore is not required to be removed as the part of any invasive species management.

While the removals of the existing sycamore as invasive species, it is desirable not to spread the species at the local area. The main dispersion method of sycamore is anemochory, therefore, where required as per the Arborist Tree Impact Plans, the Proposed Development without any mitigation measurements is considered to spread sycamore to neighbouring lands, then to be **permanent, negative, and slight** impact at the Local scale.

The three stands of *Cotoneaster* spp. were identified within H2 and H6. It was determined they are not wall cotoneaster (a medium impact species), but some of these stands are deemed to be potentially Cotoneaster species listed in Schedule 9 in the UK as invasive species due to highly competitive advantage over native species especially on grassland habitats. These species are classified as low impact in Ireland. Although the main pathway to spread is seeds transported by birds, they can occasionally spread via cutting and re-sprout (Fennell *et al*., 2018). Therefore, the Proposed Development without any mitigation measurements is considered to spread *Cotoneaster* spp. to neighbour habitats, then to be **permanent, negative, and slight** at the Local scale.

The several stands of butterfly-bush, which is categorized into Medium-impact species, were identified within H3 which is to be removed entirely. Butterfly-bush usually spreads via seeds and produces abundant seed (Talent-Hassel & Watt, 2009). Although it is suggested that the seeds can are relatively short lived in the seedbank (Tallent-Halsell and Watt, 2009), there is a risk to spread this species via contaminated soils and materials during the construction phase of the Proposed Development. Therefore, the Proposed Development without any mitigation has the potential to spread butterfly-bush to neighbouring habitats, which would be a **permanent, negative and moderate** impact at the Local scale.

5.5 Overall impact assessment

Although the hedgerows/trees to be removed are scored as Slightly significant due to the dominance of unfavourable non-native species, there will be the loss of Favourable structure such as tree layers and foraging/nesting materials of hedgerows, and the risk of invasive species spread. In the context of the aforementioned impacts, in the worst-case scenario without any mitigation and compensation measures, this impact is considered to be **permanent, negative, and slight** at the Local scale.

Therefore, it is recommended to replace the tree removals with native trees and create grassy margins or understories with 2m width into the retained hedgerows, and to ensure proper treatment of invasive species at the Site as mitigation and compensation measurements. By means of these measurements, the removals/reductions of hedgerows to facilitate the Proposed Development and the disturbance caused by the accompanying works, will represent a **short to medium-term, negative, slight** impact at the Local scale until the replacement hedgerows have been planted and become established. The recreated mature hedgerows will result in **a positive, long-term, slight** effect, provided mostly native species are planted and establish successfully.

6 MITIGATION AND COMPENSATION RECOMMENDATIONS

To minimize the potential impacts, as assessed in Section 5 the following mitigation measures are recommended.

6.1 Construction Phase

6.1.1 Protection of retained trees

To avoid impacts on any retained trees and hedgerows, the Proposed Development shall adhere to the design and recommendations shown in the Arboricultural Report (Charles McCorkell, 2024a) and the Tree Removals/Protection Plan (Charles McCorkell, 2024b, c, d, e).

6.1.2 Timing of Hedgerow Removal/Pruning

To ensure compliance with the Wildlife Act 1976 as amended, the removal of areas of vegetation will not take place within the nesting bird season (March 1st to August 31st inclusive) to ensure that no significant impacts (i.e., nest/egg destruction, harm to juvenile birds) occur as a result of the Proposed Development. Should nesting birds be found, then the area of habitat in question will be noted and suitably protected until the ecologist confirms the young have fledged.

Table 11 provides guidance for when vegetation clearance is permissible. Information sources include British Hedgehog Preservation Society's *Hedgehogs and Development* and *The Wildlife (Amendment) Act, 2000*.

The preferred period for vegetation clearance is **within the months of September and October**. Vegetation will be removed in sections working in a consistent direction to prevent entrapment of protected fauna potentially present (e.g., hedgehog). Where this seasonal restriction cannot be observed, a check will be carried out immediately prior to any Site clearance by an appropriately qualified ecologist and repeated as required to ensure compliance with legislative requirements.

TABLE 11. SEASONAL RESTRICTIONS ON HABITAT/VEGETATION REMOVAL FOR RELEVANT KER SPECIES. RED BOXES INDICATE PERIODS WHEN CLEARANCE/WORKS ARE NOT PERMISSIBLE

Ecological Feature	January	February	March	April	May	June	July	August	September	October	November	December
Breeding Birds	Vegetation clearance permissible **(Sept - Feb)**		Nesting bird season. No clearance of vegetation unless confirmed to be devoid of nesting birds by an ecologist. **(Mar - Aug)**						Vegetation clearance permissible **(Sept - Feb)**			
Hibernating mammals (e.g., Hedgehog)	Mammal hibernation season. No clearance of vegetation unless confirmed to be devoid of hibernating mammals by an ecologist. **(Jan - Mar)**			Vegetation clearance permissible **(Apr - Oct)**							Mammal hibernation season. No clearance of vegetation unless confirmed to be devoid of	

Ecological Feature	January	February	March	April	May	June	July	August	September	October	November	December
											hibernating mammals by an ecologist. **(Nov - Dec)**	
Bats	Tree felling permissible but sub-optimal. If hibernating bats are found, felling must wait until after hibernation season.	Tree felling optimal **(Feb-March)**		Tree felling permissible, provided a check is also done for breeding birds prior to felling. Should nests be found, felling must wait until young are fledged.					Tree felling optimal **(Sept - Oct)**		Tree felling permissible but sub-optimal. If hibernating bats are found, felling must wait until after hibernation season.	

6.2 Construction/Post-construction Phase Hedgerow Recreation

Given the local policies on hedgerow retention and protection (see Section 1.4), it is recommended to replant hedgerows within the wider Site area to mitigate and compensate for the impact of hedgerow removal at the Proposed Development. The proposed plan for hedgerow recreation is outlined below.

6.2.1 Targets

To mitigate against the impact of the Proposed Development on hedgerows at the Site, it is recommended to manage replanted/retained hedgerows such that they grow to at least the same structural conditions and ecological significance as they have been assessed in this report.

6.2.1.1 Condition Score

To achieve these score's the new hedgerows should pass criteria corresponding to the scoring of the hedgerow it is intended to replace (Table 9). The hedgerows on Site after the Proposed Development should aim to beat least 2.5m height and 2m width with a >2m margin on one side and <5% gaps, unless the original hedgerow contained conditions less favourable than these, in which case those are the new minimums for that specific hedgerow.

Regarding negative indicators in ground flora, hedgerows should avoid getting 0- Unfavourable to control noxious/non-native species.

6.2.1.2 Significance Score

Replanted hedgerows should aim to achieve in the long term, an ecological significance score of at least equal to that of the hedgerow it is intended to replace (Foulkes et al., 2013). See Table 9. This will

be achieved by planting species of at least the same or better biodiversity and structure as those being lost. For example, a hedgerow comprised of beech and sycamore should be replaced with a hedgerow of at least similar species and structure. Ideally, this hedgerow will not replant invasive species like beech and sycamore, but would be replaced by species such as oak, birch, or horse chestnut.

Where an internal drainage ditch is to be lost, the Proposed Development should seek to replace it. Alternatively, if this cannot be achieved, sufficient drainage should be included in the design so as to avoid flooding in areas where trees and hedgerows are to be replanted. Similarly, the Proposed Development should seek to compensate for the loss of a drain or ditch by planting additional trees or hedgerow on Site.

6.2.1.3 Quantity

To compensate for the loss of trees and hedgerows, the replacement numbers of trees and length of hedgerow should aim to be the same or greater in the long term, in terms of canopy layers, species richness and width than those to be lost by the Proposed Development.

This should be achieved by planting trees properly, recreating margins and through a proper management plan as recommended below.

6.2.1.4 Location

Hedgerows should seek to provide connectivity throughout the Site, particularly between retained hedgerows and treelines. Hedgerows should be continuous, as long as possible, and provide connectivity through the Site. It is desirable that the new hedgerows are planted along similar features as their original habitats such as an associated ditch within the Site to consider drainage and to support wildlife movement throughout the Site. Where replanting along a drain is not possible, adequate drainage should be provided within the Proposed Development to avoid potential waterlogging of new root systems.

6.2.1.5 Species

Barr *et. al* (2005) in *Hedgerow Management and Costs*, states recommendations for planting mixed species within hedgerows as *"The idea that mixed species hedges are of more benefit to wildlife than single species lines is long established".*

Therefore, to maximise the ecological value of the new hedgerows, they should comprise multiple (at least five) species to enhance overall species richness of the hedgerow and retain a composition similar to hedgerows in the area. The original hedgerows/treelines did not have dominant native trees, therefore, the replacements should be suitable native species that would enhance the quality and significance of replacement hedgerows at the Site.

The hedgerows/treelines should seek to include where possible, wych elm, pedunculate oak, rowan (*Sorbus aucuparia)*, hawthorn, blackthorn and silver birch, which are component species of the climax woodland communities. These are more likely to thrive in the local climate and soils and to be in keeping with the character of the landscape. **At the very least trees should be purchased from a company sourcing their seed stock within Ireland. Ask suppliers for provenance stock**. It is understood wych elm and pedunculate oak are very difficult to source in Ireland. Therefore, to reduce the risk of buying imported stock, alternatives such as horse chestnut or Scott's pine (*Pinus sylvestris*) are recommended.

Imported tree stock has been responsible for the introduction of invasive species such as New Zealand flatworm and likely expedited the spread of ash dieback in the country. The same rules apply to sourcing seed for wildflowers etc. All seed should be native to Ireland wherever possible.

Where soil is required for replanting purposes, topsoil that is cleared from the Site to facilitate development should be reused, provided it has not been sourced from within 5 meters of any identified invasive plant species, in order to preserve the local seedbank.

6.2.1.6 Period, Frequency, and Intensity of the Management

The period, frequency and intensity of management will depend on the choice of whether escaped hedges, managed with coppicing and laying, or topped hedges are being proposed. In any case, it is desirable that partial cutting/laying is carried out every year, e.g., a third of the entire length of the hedge annually and done in multi-year (three years at the minimum) rotation, and that the management and maintenance is continued in perpetuity, with monitoring conducted until the new hedges achieve the targeted overall scores. Details are shown in each section.

6.2.2 Methods

To achieve the required conditions, methods on how to create the new hedges and margins, reinforce the retained hedges, and manage them are recommended below.

6.2.2.1 Create the new hedgerows

General recommendations for methods to plant new hedgerows are as follows.

- Clear any grass and vegetation where the new hedges will be planted. Where they will be planted on the existing ditches or hedges with gaps, any works including clearing litter should be implemented September and October (see section 0).
- If there is no available existing ditches, dig out ditches/drains where possible.
- Bare-root stock can be planted between the end of October and the end of March. Generally, it's best to plant early in the season, before January, to allow the plants more time to establish a network of feeder roots before the onset of spring.
- Never plant during freezing weather or if the ground is waterlogged. Ideally plant on a still, moist day, to minimise root drying and stress to the plants.
- Do not bury the stem or expose the roots when planting.
- Plant in species of local provenance. It is recommended that the hedgerows include native woodland components such as those mentioned in section 6.2.1.5. Trees should be purchased from a company growing their stock within Ireland.
- To create multi-layers structure as well-developed woodlands, it is desirable to plant tree species, mixing a pioneer species with rapid growth rate such as silver birch, hawthorn and blackthorn, subcanopy trees such as and rowan and wych elm and canopy trees such as pedunculate oak for the climax community to facilitate the same succession with woodlands, which consequently allows to create a suitable shading habitat for woodland understory species. It will get the high scores for **Species Diversity** in Significance in ecology.
- Young plants should be closely spaced (50 cm maximum). As a guide, it is suggested that at least 40cm is left between each row and that four to six plants are planted per metre.

- Hedgerows should be planted in a double staggered row which tends to be better for wildlife than single rows as they are wider and provide more shelter and habitat. Or they should be planted on a herringbone/zigzag line, not a straight line (Heritage Council, 2016).

6.2.2.2 Restoration of retained hedgerows

To maintain and restore the retained hedgerows, several recommendations are provided here.

- Noxious weeds, such as Spear Thistle, Creeping Thistle and Common Nettle listed in the HAS guidance as nutrient rich species, existing in/around the retained hedges should be controlled properly following the guideline "*The Management of Noxious Weeds and Non-Native Invasive Plant Species on National Roads*" (NRA 2010). It should be noted that they are native species supporting the local wildlife, so the target should not be their eradication but their population control to aim the coverage under 20% at the least. It will contribute to acquire the high scores for **Negative Indicators/Degradation** in Condition and **Ground Flora** in Significance in ecology.
- Where a tree removal is required to restore the retained hedges, a ECoW will be present to identify the usage potential for bats/birds prior to felling.
- Where <5m gaps will be produced within the retained hedgerows due to tree removals, close the gap up with mixture of native shrubs/trees such as Hawthorn or Blackthorn. Where >5m gaps, close the gap with mixture of shrubs and tall trees such as aforementioned species in 6.2.2.1. This is to retain connectivity, aim to have no gaps and improve into woodland-like structures, which allow to acquire the high scores for **Continuity** and **Structural Variables** in Condition and **Species Diversity** in Significance in ecology.
- In any case, it should be noted to avoid shading existing young trees of native species via new planting. In addition, young, planted woody species should be protected, using an appropriate tree guard or fencing as mentioned in 6.2.2.1.

6.2.2.3 Margins

Hedgerow margins should be recreated to at least a similar standard as those recorded at hedgerows prior to their removal. See Appendix I – Assessment Further Details and Hedgerow Data Sheets for the Hedgerow Appraisal System for specific margin assessments for each hedgerow.

General best practice measures for creating margins are as follows:

- A strip containing grassland or understory species, of similar lengths to those being lost should be maintained on either side of any newly planted hedgerow. Alternatively, where space restrictions exist, supplementary understory planting should be provided in retained hedgerows, or through additional wildflower planting throughout the Site.
- It is preferable if herbaceous margins contain a good range of broad-leaved herbs and grasses. However, All-Ireland Pollinator Plan does not recommend the use commercial wildflower seed mixes as they have a risk containing non-native species (NBDC 2023).
- Instead, natural regeneration is desirable to collect seeds from native species in the local woodlands or woodland edges and sow them into the margins in autumn, where possible, which allows to acquire the high scores for Ground Flora in Significance in ecology. Alternatively, species should be purchased from a reputable supplier of native Irish seed such as Wildflowers.ie.

- Mow the margins infrequently (no more than once per year, after mid-July) to encourage a natural succession of native species.

6.2.2.4 Hedgerow Management

A **Hedgerow and Woodland Management Plan (HWMP)** has been prepared as part of the arboricultural report (Charles McCorkell Arboricultural Consultancy, 2024b). This will be reviewed by a suitably qualified Ecologist once all replanting has been finalised, and signed off by Meath CoCo's Biodiversity Department.

In addition to the arborist's recommendations, the following measures will be adopted by the Management Company tasked with maintaining the Site's landscaping into the future in order to fulfil the recommendations of the Hedgerow Appraisal (Enviroguide, 2024b):

- The hedgerow and woodland areas located along the outer boundaries of the Site will, as much as is practicable, be allowed to link up with each other. The provision of an almost continuous vegetative margin around the Site; through planted native hedgerows and trees, will maintain habitat connectivity with the surrounding environment.
- The understorey areas within the woodland belt that runs along the southern and eastern sides of the Site will be maintained in as wild a state as possible, with minimal intervention, and with areas of dense, scrub habitat allowed to form where landscaping is not proposed. This will recreate the natural habitat conditions present within the existing woodland.
- Hedgerows will be maintained with a minimum **natural meadow strip of 1-2m** at their base wherever possible. Hedges with plenty of naturally occurring flowers and grasses at the base support will provide higher quality habitat for local wildlife using the hedges.
- The 1-2m strip at the base of the hedgerow will be cut on a reduced mowing regime to encourage wildflower growth and maximise the value of the hedgerow for pollinators. A **two-cut management approach** is ideal for suppressing coarse grasses and encouraging wildflowers. Cut the hedgerow basal strip **once during February** (this is before most verge plants flower and it will not disturb ground-nesting birds). Cut the verge **once again during September and October** (this slightly later cutting date allows plants that were cut earlier in the year time to grow and set seed).

  N.B. Raising the cutter bar on the back cut will lower the risk to small mammals.
- Where hedgerow, scrub or woodland understorey trimming needs to occur, delay trimming as late as possible – until **January and February** as the surviving berry crop will provide valuable food for wildlife. The earlier this is cut; the less food will be available to help birds and other wildlife survive through the winter. Any hedgerow/scrub/woodland trimming will be done outside of the nesting season and due consideration of the Wildlife Act 1976 (as amended) must be taken.
- Where possible, cut these outer boundary hedgerows on a minimum **3-year cycle** (cutting annually stops the hedgerow flowering and fruiting), and cut in rotation rather than all at once - this will ensure some areas of hedgerow will always flower (Blackthorn in March, Hawthorn in May etc.).
- Where they occur naturally, Bramble and Ivy should be allowed grow in hedgerows and along woodland areas, as they provide key nectar and pollen sources in summer and autumn.

Methods to Avoid

Hedgerows and woodland understorey will not be over-managed. Tightly cut hedges and vegetation mean there are fewer flowers and berries, thus reducing available habitats, feeding sources and suitable nesting sites.

Hedgerows and woodland understorey will not be cut between March 1st and August 31st inclusive. It is both prohibited (except under certain exemptions) and very damaging for birds as this is the period they will have vulnerable nests containing eggs and young birds.

6.2.3 Pesticide/ herbicide sprays or fertilisers will not be used near hedgerows or woodland understorey as they can have an extremely negative effect on the variety of plants and animals they support.**Monitoring**

In the post-construction phase, two years of annual monitoring to assess the ecological value of the new hedgerows should be carried out by a suitably qualified Ecologist/Botanist until the hedgerows have become established. Management of the new hedgerows should be carried out as part of the Proposed Development landscape maintenance program and should be based on the same methods as used in this Report, namely, the HAS, depending on the outcomes and recommendations made by the surveying Ecologist/Botanist over the first two years. The results of monitoring can be shared with Meath CoCo, and corrective measures shall be agreed and implemented on the recommendations of ecologists if required.

7 CONCLUSION

In total eight hedgerows were recorded and assessed within the Site, of which the major hedgerows were found to be with the same or higher than 2- Favourable condition and with the same or lower than 1- Slightly Significance in accordance with the HAS.

As a result of the Proposed Development, 83 trees and 5 tree/hedge groups and the partial removal of 5 tree/hedge groups will be lost. The total loss of hedgerow accounts to approximately 348m. Without any mitigation and/or compensation measures, this impact is considered to be **permanent, negative and moderate at the Local scale**.

To compensate for the loss, it is recommended to replant at least a similar length of hedgerow and trees as will be lost. Many species that are being removed are classed as invasive and so a focus should be put on replanting native species. Should the replanting not equate to at least 348m of hedgerow and 83 trees, this can be compensated for by ensuring what is replanted is comprised of a large selection of native species, while complementing understories and groundcover with native wildflower/grass species sourced from a reputable seller of native Irish plants/seeds.

It is further recommended to maintain and manage the replaced/retained hedgerows to a high standard to minimise and mitigate the impact and ensure dense connectivity. Hedgerows will need to be managed in order to ensure the meet the same criteria or better as those being lost in relation to their structure. This will ensure that after a period of establishment, the effect will be a **slight negative impact in the short term,** becoming at least **neutral** in the long term.

Provided all mitigation and compensation measures are implemented and recommendations are adhered to, it is anticipated that the loss and eventual replanting on the assessed hedgerows in new locations will result in an overall **permanent, neutral impact**. **Slightly positive, permanent impacts** can be expected if the resulting hedgerows are managed and maintained in a way that promotes higher quality hedgerows than what is currently present.

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APPENDIX I – ASSESSMENT FURTHER DETAILS AND HEDGEROW DATA SHEETS FOR THE HEDGEROW APPRAISAL SYSTEM

H1

TABLE 11: H1 CONDITIONAL ASSESSMENT FURTHER DETAIL.

Assessment Criteria to Determine Hedgerow Condition	H1	Assessment Score
Structural		
Height	5-10m	3- Highly favourable
Width	2-3m	3- Highly favourable
Profile	Top heavy / undercut (S) Straight sided (N)	3- Highly favourable
Basal density Porosity to light of woody shrubs? (N)	Semi-opaque with vegetation	3- Highly favourable
Continuity		
% Gaps	Continuous	3- Highly favourable
Specific Gaps	N	3- Highly favourable
Negative Indicators		
Degradation of bank/wall	None	3- Highly favourable
% Canopy dominated by ivy	0%	3- Highly favourable
Unfavourable species composition	75% (Layland cypress and sycamore)	0- Unfavourable
>20% evidence herbicide use	Y	0- Unfavourable
>20% nutrient rich species	N 2%	3- Highly favourable
Alien invasives?	N	3- Highly favourable
Degraded margin	Minor (S) No margin (N)	1- Adequate

TABLE 12: H1 SIGNIFICANCE ASSESSMENT FURTHER DETAIL.

Assessment Criteria to Determine Hedgerow Significance (Ecology)	H1	Assessment Score
Species Diversity Significance		
Tree / Shrub / Climber Species Count (Floristic) (All species)	4 species[3] / 30m strip at the average	1- Slightly Significant
Ground Flora Significance		
Species type (Y) Dominated by noxious species	N 2%	3- Significant
Species Count (from list) (Floristic)	3 species* / 30m strip at the average	1- Slightly Significant
Pteridophytes (Ferns) (from list) (Floristic)	1 species (Hart's-tongue)	1- Slightly Significant
Structure, Construction & Associated Features		
Wall / Bank	Half-bank (0.5m)	2- Moderately Significant
Drain / Ditch	Internal drain, dry	2- Moderately Significant
Other	None	0- Low Significance

[3] Counted species listed in the current hedgerow survey list of native trees, shrubs and climbers (Foulkes *et al*. 2013) or species listed in "The current hedgerow survey list of ground flora species" (Foulkes *et al*. 2013) / listed in "Schedule 2 Woodland Species List" for the Hedgerows Regulations 1997 of England and Wales.

Assessment Criteria to Determine Hedgerow Significance (Ecology)	H1	Assessment Score
Habitat Connectivity Significance		
Habitat Connectivity	Single link with semi-natural habitat including hedgerow	1- Slightly Significant

H2

TABLE 13: H2 CONDITIONAL ASSESSMENT FURTHER DETAIL.

Assessment Criteria to Determine Hedgerow Condition	H2	Assessment Score
Structural		
Height	5-10m	3- Highly favourable
Width	2-3m	2- Favourable
Profile	Overgrown/irregular	3- Highly favourable
Basal density Porosity to light of woody shrubs? (N)	Opaque/dense	3- Highly favourable
Continuity		
% Gaps	<5%	2- Favourable
Specific Gaps	1 path to the opposite field (0.5m width) 1 gap at the east end point (2m)	1- Adequate
Negative Indicators		
Degradation of bank/wall	None degradation of bank	3- Highly favourable
% Canopy dominated by ivy	10%	1- Adequate
Unfavourable species composition	Y (15%) Sycamore and cotoneaster spp.	0- Unfavourable
>20% evidence herbicide use	N	3- Highly favourable
>20% nutrient rich species	N 10%	1- Adequate
Alien invasives?	N	3- Highly favourable
Degraded margin	No >2m margin	1- Adequate

TABLE 14: H2 SIGNIFICANCE ASSESSMENT FURTHER DETAIL.

Assessment Criteria to Determine Hedgerow Significance (Ecology)	H2	Assessment Score
Species Diversity Significance		
Tree / Shrub / Climber Species Count (Floristic) (All species)	6 species / 30m strip at the average	3- Significant
Ground Flora Significance		
Species type (Y) Dominated by noxious species	N 10%	2- Moderately Significance
Species Count (from list) (Floristic)	1 species / 30m strip at the average	0- Low Significance
Pteridophytes (Ferns) (from list) (Floristic)	1 species (Hart's-tongue)	0- Low Significance
Structure, Construction & Associated Features		
Wall / Bank	Half-bank (0.5m)	2- Moderately Significance
Drain / Ditch	Dry internal drainage	2- Moderately Significance
Other	-	0- Low Significance
Habitat Connectivity Significance		
Habitat Connectivity	Single link with semi-natural habitat including hedgerow	1- Slightly Significance

H3

TABLE 15: H3 CONDITIONAL ASSESSMENT FURTHER DETAIL.

Assessment Criteria to Determine Hedgerow Condition	H3	Assessment Score
Structural		
Height	5-10m	3- Highly favourable
Width	>3m	3- Highly favourable
Profile	Losing Base Structure	1- Adequate
Basal density Porosity to light of woody shrubs? (N)	Semi-opaque	2- Favourable
Continuity		
% Gaps	Continuous	3- Highly favourable
Specific Gaps	N	3- Highly favourable
Negative Indicators		
Degradation of bank/wall	None degradation of wall	3- Highly favourable
% Canopy dominated by ivy	<1%	3- Highly favourable
Unfavourable species composition	Y 90% Monterey cypress and sycamore, beech, butterfly-bush	0- Unfavourable
>20% evidence herbicide use	N	3- Highly favourable
>20% nutrient rich species	N 1%	3- Highly favourable
Alien invasives?	Y Butterfly-bush	0- Unfavourable
Degraded margin	No >2m margin	1- Adequate

TABLE 16: H3 SIGNIFICANCE ASSESSMENT FURTHER DETAIL.

Assessment Criteria to Determine Hedgerow Significance (Ecology)	H3	Assessment Score
Species Diversity Significance		
Tree / Shrub / Climber Species Count (Floristic) (All species)	4 species / 30m strip at the average	1- Slightly Significant
Ground Flora Significance		
Species type (Y) Dominated by noxious species	N <1%	4- Highly Significant
Species Count (from list) (Floristic)	0 species / 30m strip at the average	0- Low Significance
Pteridophytes (Ferns) (from list) (Floristic)	0 species	0- Low Significance
Structure, Construction & Associated Features		
Wall / Bank	Wall >1m	3- Significance
Drain / Ditch	No drain/ditch	0- Low Significance
Other	None	0- Low Significance
Habitat Connectivity Significance		
Habitat Connectivity	Multiple links with semi-natural habitats, including other hedgerows	2- Moderately Significance

H4

TABLE 17: H4 CONDITIONAL ASSESSMENT FURTHER DETAIL.

Assessment Criteria to Determine Hedgerow Condition	H4	Assessment Score
Structural		
Height	10m	3- Highly favourable
Width	3m+	3- Highly favourable
Profile	Overgrown/irregular	3- Highly favourable
Basal density Porosity to light of woody shrubs? (N)	Opaque/dense	3- Highly favourable
Continuity		
% Gaps	<5%	2- Favourable
Specific Gaps	1 gap (3m) between H4 and H3	1- Adequate
Negative Indicators		
Degradation of bank/wall	No bank/wall	-
% Canopy dominated by ivy	5%	2- Favourable
Unfavourable species composition	65% horse-chestnut, beech and sycamore	0- Unfavourable
>20% evidence herbicide use	N	3- Highly favourable
>20% nutrient rich species	Y 43%	0- Unfavourable
Alien invasives?	N	3- Highly favourable
Degraded margin	Dominated by noxious weeds No >2m margin	1- Adequate

TABLE 18: H4 SIGNIFICANCE ASSESSMENT FURTHER DETAIL.

Assessment Criteria to Determine Hedgerow Significance (Ecology)	H4	Assessment Score
Species Diversity Significance		
Tree / Shrub / Climber Species Count (Floristic) (All species)	4 species / 30m strip at the average	1- Slightly Significant
Ground Flora Significance		
Species type (Y) Dominated by noxious species	Y 30%	0- Low Significance
Species Count (from list) (Floristic)	3 species / 30m strip at the average	1- Slightly Significant
Pteridophytes (Ferns) (from list) (Floristic)	1 species (Hart's-tongue)	1- Slightly Significant
Structure, Construction & Associated Features		
Wall / Bank	None	0- Low Significance
Drain / Ditch	No drain/ditch	0- Low Significance
Other	None	0- Low Significance
Habitat Connectivity Significance		
Habitat Connectivity	Multiple links with semi-natural habitats, including other hedgerows	0- Low Significance

H5

TABLE 19: H5 CONDITIONAL ASSESSMENT FURTHER DETAIL.

Assessment Criteria to Determine Hedgerow Condition	H5	Assessment Score
Structural		
Height	>10m	3- Highly favourable
Width	3m+	1- Adequate
Profile	Top heavy/undercut	2- Favourable
Basal density Porosity to light of woody shrubs? (N)	Semi-opaque with vegetation	3- Highly favourable
Continuity		
% Gaps	Continuous	3- Highly favourable
Specific Gaps	N	3- Highly favourable
Negative Indicators		
Degradation of bank/wall	No bank/wall	-
% Canopy dominated by ivy	N <1%	0- Unfavourable
Unfavourable species composition	80% Beech and sycamore	0- Unfavourable
>20% evidence herbicide use	N	3- Highly favourable
>20% nutrient rich species	Y 55%	0- Unfavourable
Alien invasives?	N	3- Highly favourable
Degraded margin	Dominated by noxious weeds No >2m margin	0- Unfavourable

TABLE 20: H5 SIGNIFICANCE ASSESSMENT FURTHER DETAIL.

Assessment Criteria to Determine Hedgerow Significance (Ecology)	H5	Assessment Score
Species Diversity Significance		
Tree / Shrub / Climber Species Count (Floristic) (All species)	4 species / 30m strip at the average	1- Slightly Significance
Ground Flora Significance		
Species type (Y) Dominated by noxious species	Y 55%	0- Low Significance
Species Count (from list) (Floristic)	2 species / 30m strip at the average	0- Low Significance
Pteridophytes (Ferns) (from list) (Floristic)	0 species	0- Low Significance
Structure, Construction & Associated Features		
Wall / Bank	Internal earth bank (<0.5m height)	1- Slightly Significant
Drain / Ditch	None	0- Low Significance
Other	-	0- Low Significance
Habitat Connectivity Significance		
Habitat Connectivity	Single link with semi-natural habitat including hedgerow	1- Slightly Significant

H6

TABLE 21: H6 CONDITIONAL ASSESSMENT FURTHER DETAIL.

Assessment Criteria to Determine Hedgerow Condition	H6	Assessment Score
Structural		
Height	5m	3- Highly favourable
Width	2-3m	2- Favourable
Profile	Top heavy / undercut	3- Highly favourable
Basal density Porosity to light of woody shrubs? (N)	Semi-opaque with vegetation	2- Favourable
Continuity		
% Gaps	Continuous	3- Highly favourable
Specific Gaps	None	3- Highly favourable
Negative Indicators		
Degradation of bank/wall	No bank/wall	-
% Canopy dominated by ivy	<1%	3- Highly favourable
Unfavourable species composition (from list)	38% Leyland cypress, cotoneaster spp., beech, horse-chestnut, sycamore, holly sp. and star anis sp.	0- Unfavourable
>20% evidence herbicide use	N	3- Highly favourable
>20% nutrient rich species	N 5%	2- Favourable
Alien invasives?	N	3- Highly favourable
Degraded margin	No >2m margin	1- Adequate

TABLE 22: H6 SIGNIFICANCE ASSESSMENT FURTHER DETAIL.

Assessment Criteria to Determine Hedgerow Significance (Ecology)	H6	Assessment Score
Species Diversity Significance		
Tree / Shrub / Climber Species Count (Floristic) (All species)	4 species / 30m strip at the average	1- Slightly Significant
Ground Flora Significance		
Species type (Y) Dominated by noxious species	N 5%	3- Significant
Species Count (from list) (Floristic)	3 species / 30m strip at the average	1- Slightly Significant
Pteridophytes (Ferns) (from list) (Floristic)	0 species	0- Low Significance
Structure, Construction & Associated Features		
Wall / Bank	No wall/bank	0- Low Significance
Drain / Ditch	No drain/ditch	0- Low Significance
Other	None	0- Low Significance
Habitat Connectivity Significance		
Habitat Connectivity	No connection with other semi-natural habitat	0- Low Significance

H7

TABLE 23: H7 CONDITIONAL ASSESSMENT FURTHER DETAIL.

Assessment Criteria to Determine Hedgerow Condition	H7	Assessment Score
Structural		
Height	2.5-4m	2- Favourable
Width	2-3m	2- Favourable
Profile	Straight sided Top heavy/undercut	3- Highly favourable
Basal density Porosity to light of woody shrubs? (N)	Semi-opaque with vegetation	2- Favourable
Continuity		
% Gaps	Continuous	3- Highly favourable
Specific Gaps	None	3- Highly favourable
Negative Indicators		
Degradation of bank/wall	No bank/wall	-
% Canopy dominated by ivy	<1%	3- Highly favourable
Unfavourable species composition (from list)	100% Beech and sycamore	0- Unfavourable
>20% evidence herbicide use	N	3- Highly favourable
>20% nutrient rich species	N <1%	3- Highly favourable
Alien invasives?	N	3- Highly favourable
Degraded margin	No >2m margin	1- Adequate

TABLE 24: H7 SIGNIFICANCE ASSESSMENT FURTHER DETAIL.

Assessment Criteria to Determine Hedgerow Significance (Ecology)	H7	Assessment Score
Species Diversity Significance		
Tree / Shrub / Climber Species Count (Floristic) (All species)	0 species / 30m strip at the average	0- Low Significance
Ground Flora Significance		
Species type (Y) Dominated by noxious species	N <1%	4- Highly Significant
Species Count (from list) (Floristic)	1 species / 30m strip at the average	0- Low Significance
Pteridophytes (Ferns) (from list) (Floristic)	0 species	0- Low Significance
Structure, Construction & Associated Features		
Wall / Bank	Fence (>1m)	3- Significance
Drain / Ditch	No drain/ditch	0- Low Significance
Other	None	0- Low Significance
Habitat Connectivity Significance		
Habitat Connectivity	Single link with semi-natural habitat including hedgerow	1- Slightly Significant

H8

TABLE 25: H8 CONDITIONAL ASSESSMENT FURTHER DETAIL.

Assessment Criteria to Determine Hedgerow Condition	H8	Assessment Score
Structural		
Height	2.5m	1- Adequate
Width	<1.5m	0- Unfavourable
Profile	Boxed (starting to lose the shape) Losing Base Structure	2- Favourable
Basal density Porosity to light of woody shrubs? (N)	Semi-opaque with vegetation	2- Favourable
Continuity		
% Gaps	Continuous	3- Highly favourable
Specific Gaps	None	3- Highly favourable
Negative Indicators		
Degradation of bank/wall	No degradation of stone wall	3- Highly favourable
% Canopy dominated by ivy	0%	3- Highly favourable
Unfavourable species composition (from list)	100% Cherry laurel	0- Unfavourable
>20% evidence herbicide use	N	3- Highly favourable
>20% nutrient rich species	N 0%	3- Highly favourable
Alien invasives?	Y Cherry laurel	0- Unfavourable
Degraded margin	No >2m margin	0- Unfavourable

TABLE 26: H8 SIGNIFICANCE ASSESSMENT FURTHER DETAIL.

Assessment Criteria to Determine Hedgerow Significance (Ecology)	H8	Assessment Score
Species Diversity Significance		
Tree / Shrub / Climber Species Count (Floristic) (All species)	0 species / 30m strip at the average	0- Low Significance
Ground Flora Significance		
Species type (Y) Dominated by noxious species	N 0%	4- Highly Significant
Species Count (from list) (Floristic)	0 species / 30m strip at the average	0- Low Significance
Pteridophytes (Ferns) (from list) (Floristic)	0 species	0- Low Significance
Structure, Construction & Associated Features		
Wall / Bank	Wall 0.5 - 1m	3- Significance
Drain / Ditch	No drain/ditch	0- Low Significance
Other	None	0- Low Significance
Habitat Connectivity Significance		
Habitat Connectivity	Single link with semi-natural habitat including hedgerow	1- Slightly Significance

Hedgerow Data Sheets for H1-H8

TABLE 27: H1-H8 HEDGEROW DATA SHEETS.

Hedgerow code	H1	H2	H3	H4	H5	H6	H7	H8
Surveyor	NB/YM	NB/YM	NB/YM	NB/YM	NB/YM	NB/YM	NB/YM	NB/YM
Date	13/06/2024	13/06/2024	13/06/2024	13/06/2024	13/06/2024	13/06/2024	13/06/2024	13/06/2024
Start node (first of 30m strip- explained below)	10m	46m	20m	7m	33m	-	83m	-
End of 1st 30m strip and start second	18m	48	30m	63m	29m	4m	38m	-
End of 2nd 30m strip and start second	-	-	41m	48m	-	-	-	-
End of 3rd 30m strip	-	-	-	-	-	-	-	-
Context	**H1**	**H2**	**H3**	**H4**	**H5**	**H6**	**H7**	**H8**
Land Cover Classification (CORINE Land Cover)	231 Pasture	231 Pasture	112 Discontinuous urban fabric 231 Pasture	112 Discontinuous urban fabric 231 Pasture	231 Pasture	231 Pasture	112 Discontinuous urban fabric 231 Pasture	112 Discontinuous urban fabric
Soil Type (Deep? Well drained? Brown soil?)	Ls, Limestone till- Carboniferous	Ls, Limestone till- Carboniferous	Ls, Limestone till- Carboniferous	Ls, Limestone till- Carboniferous	Ls, Limestone till- Carboniferous	Ls, Limestone till- Carboniferous	Ls, Limestone till- Carboniferous	Ls, Limestone till- Carboniferous
Elevation max (m)								
Elevation min (m)								
Aspect side of the Site (N/S/E/W etc.)	S	S	E	N	W	SW	NW	SE
Aspect side of the adjacent area								
1. Adjacent Land Use (Tick where relevant)	**H1**	**H2**	**H3**	**H4**	**H5**	**H6**	**H7**	**H8**
Tillage								

Dairy								
Cattle								
Sheep						X		
Mixed stock								
Equine		X						
Other	X (Private road and Farm road)	X (Pasture)	X (Pasture)	X (Pasture and Public road)	X (Pasture and Public road)	X (Pasture and Farm road)	X (Public road)	X (Riparian woodland, Pasture and Pedestrian walkway))
Fodder								
Curtilage		X (Within pastureland)	X				X	
Amenity/golf course/pitch								
Parkland								
2. History (Tick where relevant)	**H1**	**H2**	**H3**	**H4**	**H5**	**H6**	**H7**	**H8**
Internal farm boundary	X	X				X		
Townland/parish boundary								
Canal side boundary								
Railway line boundary								
Farm boundary			X	X	X			
Road				X	X		X	X
Stream								
Recently established								
First OS edition on which boundary is present (Insert Year)								

Connects to site or monument? (Y/N and provide details)	N	N	N	N	N	N	N	N
Connects to historical woodland? OS map (Y/N and provide details)	N	N	N	N	N	N	N	
3. Road class (Tick where relevant)	**H1**	**H2**	**H3**	**H4**	**H5**	**H6**	**H7**	**H8**
NP National Primary								
NS National Secondary								
R Regional				X				
L Local					X		X	X
U Unclassified								
F Farm Road/Track	X					X		
C Coillte Road								
4. Habitat Link Classification (Tick where relevant)	**H1**	**H2**	**H3**	**H4**	**H5**	**H6**	**H7**	**H8**
Arable								
Improved grassland		X				X		X
Neglected pasture	X	X	X	X	X			
Semi-natural grassland								
Non-native woodland								
Semi-natural woodland / scrub								X
Transitional woodland								
Curtilage/ built land			X	X			X	X
Peatlands								
Lake/pond								
Watercourse								

Hedgerow	X	X	X	X	X	X	X	X
Earth bank					X			
Re-colonising bare ground								
Other	X (Private and Farm road)			X (Public road)	X (Public road)	X (Farm road)	X (Public road)	X (Pedestrian walkway)
5. Designated site (Tick where relevant)	**H1**	**H2**	**H3**	**H4**	**H5**	**H6**	**H7**	**H8**
Annex I habitat	N	N	N	N	N	N	N	N
Designated site	N	N	N	N	N	N	N	N
Designated woodland	N	N	N	N	N	N	N	N
6. Hedgerow/Boundary Function	**H1**	**H2**	**H3**	**H4**	**H5**	**H6**	**H7**	**H8**
Hedgerow redundant								
Active and functional boundary	Active and functional boundary	Active and functional boundary	Active and functional boundary	Active and functional boundary	Active and functional boundary	Active and functional boundary	Active and functional boundary	Active and functional boundary
Construction	**H1**	**H2**	**H3**	**H4**	**H5**	**H6**	**H7**	**H8**
1. Outline (Tick where relevant)	**H1**	**H2**	**H3**	**H4**	**H5**	**H6**	**H7**	**H8**
Linear	X	X	X	X	X	X	X	X
Non-linear								
2. Linearity of shrub	**H1**	**H2**	**H3**	**H4**	**H5**	**H6**	**H7**	**H8**
Single line hedge			X	X	X	X	X	X
Double line hedge	X							
Random line		X						
3. Bank, wall, shelf (include rough size: <0.5m, 0.5 – 1m, >1m)	**H1**	**H2**	**H3**	**H4**	**H5**	**H6**	**H7**	**H8**

Bank	X (0.5m height half-bank)	X (0.5m height half-bank)						
Wall			X (2m height wall of the adjacent residential area)					X (0.5m height stone wall of the adjacent residential area)
Shelf								
Other								
4. Drain (include rough size: 0.5m, 0.5 – 1m, >1m & whether wet or dry)	**H1**	**H2**	**H3**	**H4**	**H5**	**H6**	**H7**	**H8**
External drain								
Internal drain (flowing into where/stagnant)	X 0.5m depth, dry	X 0.5m depth, dry						
Internal path/track		X						
Other								
5. Boundary classification	**H1**	**H2**	**H3**	**H4**	**H5**	**H6**	**H7**	**H8**
WL1 Hedgerow	X					X	X	X
WL2 Treeline		X	X	X	X		X	
Structure/Condition	**H1**	**H2**	**H3**	**H4**	**H5**	**H6**	**H7**	**H8**
1. Profile	**H1**	**H2**	**H3**	**H4**	**H5**	**H6**	**H7**	**H8**
Remnant								
Derelict / relict								
Boxed / A-shaped							X	X
Overgrown/irregular		X	X					
Top heavy / undercut	X			X	X	X	X	
Straight sided							X	X
Wind-shaped								

2. Base	H1	H2	H3	H4	H5	H6	H7	H8
Losing basal structure	X		X	X	X	X	X	X
Outgrowths at base		X						
3. Base structure	H1	H2	H3	H4	H5	H6	H7	H8
Open								
Semi-open								
Semi-opaque with vegetation	X				X	X		
Opaque/dense		X	X	X			X	X
4. Height	H1	H2	H3	H4	H5	H6	H7	H8
<1.5m								
1.5-2.5m								
2.5-4m							X	X
4-5m								
5m+	X	X	X	X	X	X		
5. Width	H1	H2	H3	H4	H5	H6	H7	H8
<1m								
1-2m								
2-3m	X	X				X	X	X
3m+			X	X	X			
6. % Gaps	H1	H2	H3	H4	H5	H6	H7	H8
Complete	X		X		X	X	X	X
< 5% gaps		X		X				
5 – 10%								
10 – 25%								
25– 50%								
>50%								
Specific or general?	2m gap	1 path to the opposite field (0.5m width)		2.5m gap				

7. Bank degradation degree and extent	H1	H2	H3	H4	H5	H6	H7	H8
None			X	X	X	X	X	X
Minor								
Severe								
Drain blocked/waterlogged	X dry drainage	X dry drainage						
Degradation >10%?								
Degradation isolated?								
Trees	**H1**	**H2**	**H3**	**H4**	**H5**	**H6**	**H7**	**H8**
1. Tree Quantity	**H1**	**H2**	**H3**	**H4**	**H5**	**H6**	**H7**	**H8**
None								
Up to 15%								
15 – 30%								
31 – 75%								
>75%	X	X	X	X	X	X	X	X
2. Tree Age	**H1**	**H2**	**H3**	**H4**	**H5**	**H6**	**H7**	**H8**
All mature				X	X			
Predominantly mature	X	X	X			X		
Predominantly immature							X	X
Mixed age range								
3. Tree height (max)	**H1**	**H2**	**H3**	**H4**	**H5**	**H6**	**H7**	**H8**
<3m								
3-5								X
5-10	X	X	X			X	X	
10-20				X	X	X		
>20m								
Hedge Margin	**H1**	**H2**	**H3**	**H4**	**H5**	**H6**	**H7**	**H8**

1. Margin/verge width (both sides)	**H1**	**H2**	**H3**	**H4**	**H5**	**H6**	**H7**	**H8**
<1m								X (SE)
1-2	X (S)	X	X	X	X	X	X	
2-4								
4m+								
none	X (N)							
2. Margin/verge degradation (both sides)	**H1**	**H2**	**H3**	**H4**	**H5**	**H6**	**H7**	**H8**
None	X	X	X	X	X	X	X	X
Poached within 2m								
Ploughed within 2m								
Herbicide use >2m								
3. Condition	**H1**	**H2**	**H3**	**H4**	**H5**	**H6**	**H7**	**H8**
Poor			X (Shaded by coniferous trees)					
Average	X	X		X	X	X	X	X
Good								
Evidence of disease								
Species list if possible								
Management	**H1**	**H2**	**H3**	**H4**	**H5**	**H6**	**H7**	**H8**
1. Management	**H1**	**H2**	**H3**	**H4**	**H5**	**H6**	**H7**	**H8**
Cut box profile								
Cut A shape								
Cut on one side	X (S)							
Cut on both sides								
Topped							X	
Laid							X	
Coppiced								

Short term unmanaged							X	X
Long term unmanaged	X (N)	X	X	X	X	X		
Infill planting								
Pruned								X
Cropped								
Other								
Out of season? (cut between 1st March and 31st August)								
2. Management Stage	**H1**	**H2**	**H3**	**H4**	**H5**	**H6**	**H7**	**H8**
Over trimmed, gaps, stems sparse								
Over trimmed, infrequent stems far apart								
Recently laid, coppiced, or planted hedgerow								
Dense, healthy, frequent stems >2m							X (SE)	X
>3m height, trimmed on rotation	X (S)							
Non-intervention hedge (intentionally untrimmed)	X (N)	X					X (NW)	
Mature, tall hedgerow with spreading tops			X			X		
Over mature with tops dying back								

Hedge developed into line of trees				X	X			
3. Management method	**H1**	**H2**	**H3**	**H4**	**H5**	**H6**	**H7**	**H8**
Flail								
Circular saw								
Bar cutter								
Hand tools								
Excavator								
other	X						X	X
4. Evidence of rejuvenation?	**H1**	**H2**	**H3**	**H4**	**H5**	**H6**	**H7**	**H8**
	N	Y (juvenile ash and elder in understory)	N	Y (juvenile horse-chestnut in understory)	N	N	N	N
5. Fencing	**H1**	**H2**	**H3**	**H4**	**H5**	**H6**	**H7**	**H8**
none	X			X	X	X		
Electric								
Post and wire								
Sheep wire	X	X						
Timber fence				X				
Concrete post and rail								
Wall			X					X
Other							X (fence)	

APPENDIX II – FLORA DATA

TABLE 28: H1-H8 PLANT SPECIES LIST.

Layer	Common name	*Scientific name*	H1	H2	H3	H4	H5	H6	H7	H8
Tree	Sycamore[4]	*Acer pseudoplatanus*	O	O	O	F	A	F		
	Beech	*Fagus sylvatica*				O	F	R		D
	Ash[5]	*Fraxinus excelsior*	R	D	R			O		
	Hawthorn	*Crataegus monogyna*	R	D		O				
	Horse-chestnut	*Aesculus hippocastanum*				D		R		
	Leyland Cypress	*Cupressus x leylandii*	D[6]					O		
	Monterey cypress	*Cupressus macrocarpa*			D					
	Silver Birch	*Betula pendula*			R	O		R		
	Common Ivy	*Hedera helix*		O		R				
	Whitebeam	*Sorbus aria*			O					
	Wych Elm	*Ulmus glabra*	R							
	Pedunculate Oak	*Quercus robur*			R					
Shrub	Common Ivy	*Hedera helix*	O	R	R		R			
	Sycamore	*Acer pseudoplatanus*			+	O	R			R
	Elder	*Sambucus nigra*		R				F		
	Hawthorn	*Crataegus monogyna*		R		R	O			
	Dog roses	*Rosa canina* agg.		R		R				
	Grey Williow	*Salix cinera*	O							
	Cherry laurel	*Prunus laurocerasus*							D	
	Bramble	*Rubus fruticosus* agg.			R					

[4] **A**: Nutrient rich species or unfavourable species defined in the guideline of the HAS (Foulkes *et al*. 2013).

[5] : Species listed in the current hedgerow survey list of native trees, shrubs and climbers (Foulkes *et al*. 2013) or Species listed in "The current hedgerow survey list of ground flora species" (Foulkes *et al*. 2013) / listed in "Schedule 2 Woodland Species List" for the Hedgerows Regulations 1997 of England and Wales.

[6] **A**: Dominant species in each layer.

Layer	Common name	*Scientific name*	H1	H2	H3	H4	H5	H6	H7	H8
	Beech	*Fagus sylvatica*			R					
	Holly sp. (cultivated)	*Ilex sp.*			R					
Ground Flora	Common Ivy	*Hedera helix*	D	D	D	D	A	D		D
	Bramble	*Rubus fruticosus* agg.	+	O	F	O	O		+	
	Cow Parsley	*Anthriscus sylvestris*		R		A	F	+		+
	Cleavers	*Galium aparine*	+	+		R	R	+		
	Common Nettle	*Urtica dioica*	R	O		F		+		
	Herb-Robert	*Geranium robertianum*	R	+		R		R		
	Wood Avens	*Geum urbanum*	+			+	R	+		
	Dock sp	*Rumex*		+	+	+		+		
	Creeping Buttercup	*Ranunculus repens*	+	R	+				+	
	Rough Meadow-grass	*Poa trivialis*	O	F	R					
	Yorkshire-fog	*Holcus lanatus*	O	O	O					
	False Oat-grass	*Arrhenatherum elatius*		F						
	Sycamore	*Acer pseudoplatanus*		R			R	+		
	Cock's-foot	*Dactylis glomerata*	R	R			R			
	Blackthorn	*Prunus spinosa*		R		+	R			
	Hart's-tongue	*Asplenium scolopendrium*	R	R		+				
	Annual Meadow-grass	*Poa annua*	R						D	
	Dog roses	*Rosa canina* agg.				R	R			
	Perennial Rye-grass	*Lolium perenne*		+					R	
	Bush Vetch	*Vicia sepium*	R	+						
	Dandelion	*Taraxacum* agg.		+					R	
	Elder	*Sambucus nigra*		R	+					
	Cotoneaster spp.	*Cotoneaster* spp.		R				+		
	Ash	*Fraxinus excelsior*		+				+		
	Smooth Sow-thistle	*Sonchus oleraceus*		+	+					
	False Brome	*Brachypodium sylvaticum*				R				
	Hawthorn	*Crataegus monogyna*		R						

Layer	Common name	*Scientific name*	H1	H2	H3	H4	H5	H6	H7	H8
	Star anis sp. (cultivated)	*Illicium* sp.						R		
	Great Willowherb	*Epilobium hirsutum*	R							
	Cherry sp.	*Prunus* sp.	+							
	Rosebay Willowherb	*Chamaenerion angustifolium*	+							
	Grey Williow	*Salix cinera*	+							
	Tutsan	*Hypericum androsaemum*	+							
	Wall Speedwell	*Veronica arvensis*	+							
	Ribwort Plantain	*Plantago lanceolata*		+						
	Spear Thistle	*Cirsium vulgare*		+						
	Honeysuckle	*Lonicera periclymenum*		+						
	Creeping thistle	*Cirsium arvense*		+						
	Timothy	*Phleum pratense*		+						
	Butterfly-bush	*Buddleja davidii*			+					
	Common ragwort	*Jacobaea vulgaris*			+					
	Horse-chestnut	*Aesculus hippocastanum*				+				
	Primrose	*Primula vulgaris*				+				
	Holly sp. (cultivated)	*Ilex* sp.						+		
	Bittersweet	*Solanum dulcamara*							+	

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