



# **Ecological Impact Assessment (EcIA) Report**

**Proposed Residential Development at Drumlark, Cavan, Co.  
Cavan**

**Report For:**

**Drumlark Investments Ltd.**

**Prepared By:**

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**Date:**

**20<sup>th</sup> February 2024**

**Project No. 15300**

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## **1.0 INTRODUCTION**

### **1.1 Project Background**

It is understood that Drumlark Investments Ltd. intend to apply to Cavan County Council for planning permission for a new residential development at a site at Drumlark, Cavan, Co. Cavan.

In addition to the preparation of an Appropriate Assessment (AA) Screening Report, Hydrec Environmental Consulting were engaged by Michael Fitzpatrick Architects on behalf of the applicant to complete an Ecological Impact Assessment (EcIA) for the proposal. This EcIA can be considered to have the following aims:

- Establish the ecological baseline prior to the works;
- Determine the ecological value of any identified features;
- Assess the impact of the proposed works on ecological features of value;
- Recommend mitigation measures to avoid, reduce and remedy any identified ecological impacts; and
- Identify any residual impacts of the works post mitigation.

### **1.2 Project Description**

As mentioned previously Drumlark Investments Ltd. intend to apply to Cavan County Council for planning permission for a new residential development at a site at Drumlark, Cavan, Co. Cavan. The development will consist of 2 – 4 bedroom houses, in addition to a number of apartment and terrace blocks. In total, 145 units will be constructed on a 5ha site at a housing density of 32 units/Ha. A public open space area of 0.7ha is also provided for. A new foul water network will be constructed across the site and will be connected to an existing combined sewer located to the east of the site. Stormwaters will be attenuated through a series of tree pits, bioretention areas, swales and Stormtech attenuation tanks with the outflow to the poles stream limited to the greenfield runoff rate. The site will be accessed via a new site entrance which opens out onto the L1532 – Local Road.

### **1.3 Legislative & Policy Context**

This report has been prepared in full accordance with the following legislation, policy and guidance documentation:

#### **Legislation**

- Wildlife Acts 1976 – 2012 (as amended);
- EU Habitats Directive 92/43/EEC, European Communities (Natural Habitats) Regulations 1997, European Communities (Birds & Natural Habitats) Regulations 2011;
- Flora (Protection) Order, 1999;
- EU Birds Directive 2009/147/EEC; and
- Environmental Impact Assessment Directive (2014/52/EU);

#### **Policies & Plans**

- Wetland Survey County Cavan (2008, 2021 & 2022);
- National Biodiversity Action Plan 2017 – 2021 (DoCHG, 2017);
- River Basin Management Plan for Ireland 2018 – 2021; and
- Cavan County Development Plan 2022 – 2028.

#### **Guidance**

- Appropriate Assessment of Plans and Projects in Ireland: Guidance for Planning Authorities. Department of Environment, Heritage and Local Government;
- Assessment of Plans and Projects Significantly Affecting Natura 2000 Sites: Methodological guidance on the provisions of Article 6(3) and (4) of the Habitats;
- Fossitt, J. (2000) A Guide to Habitats in Ireland;
- Guidelines for Assessment of Ecological Impacts of National Road Schemes (NRA, 2009);
- Smith et. al. (2011) Best practice guidance for habitat survey and mapping;
- CIEEM (2018) Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater, Coastal and Marine. September 2018;

- Irish Ramsar Wetlands Committee, 2018. Irish Wetland Types - an identification guide and field survey manual. EPA, Johnstown Castle, Ireland;
- CIEEM (2021), Good Practice Guidance for Habitats and Species.

## 2.0 METHODOLOGY

### 2.1 Field Surveys

The site was surveyed on the 07<sup>th</sup> of July 2023 under bright, dry conditions (see Plate 1). The primary aim of the visit was to establish a baseline of the ecological conditions onsite and to describe the habitats, dominant species, indicator species, invasive species and species of conservation where present. The timing of the survey was suitable to complete the floral aspect of the investigation. Given the presence of Badgers (*Meles meles*) within 1km of the proposed development site, a badger survey was also conducted. Similarly, given the previous recordings of Eurasian Red Squirrel (*Sciurus vulgaris*) within 1km of the site, a check for Red Squirrel dreys within the trees onsite was also completed.



**Plate 1. The yellow shaded area indicates the extent of the study area and broken red line indicates extent of otter holt survey**

On the 06<sup>th</sup> of July 2023, Patrick McCabe (Certified Small Stream Risk Score (SSRS) Assessor) completed an SSRS assessment on the Poles Stream (see Plate 1). The SSRS is a biological risk assessment system for identifying streams / rivers that are definitely 'At Risk' of failing to achieve the 'Good' water quality status goals of the Water Framework Directive (WFD). The SW1 monitoring location was located in the vicinity of where the new site entrance is proposed to be constructed. A pool - riffle – glide sequence did exist at the monitoring

location. The sample was collected using the 2-minute 'Travelling Kick Method' and accompanied with a 1-minute stone wash. To supplement the kick sampling exercise, a macrophyte survey was also completed. During the river survey work a search for evidence of otter activity / habitat was completed along both banks of the Poles Stream for a 300m stretch (see Plate 1).

On the 14<sup>th</sup> of October 2023 Hydrec Environmental Consulting carried out a bat survey at the site. This involved the following procedures:

1. Visual inspection

All areas of the site where hedgerow/treeline habitat is proposed for removal was examined for evidence of living bats, bat corpses, bat droppings and staining. This was done from ground level.

2. Bat detector survey

Additionally, a bat detector survey was carried out on all areas of the site where hedgerow/treeline habitat is proposed for removal. A Songmeter Mini Bat was placed at the eastern boundary of the site (i.e. adjacent to where mature sycamore trees are proposed for removal).

The active survey involved an examination of all elements visually with the support of an Echometer 2 bat detector (which converts the ultrasonic used by bats to navigate and communicate to a recordable digital signal as well as an audible sound and a screen displaying sonograms of the ultrasonic received).

The survey commenced prior to sunset and re-commenced the following morning prior to sunrise. Weather conditions recorded included temperatures of 8 degrees Celsius, low windspeed and no rainfall. Conditions were highly suited to bat activity.

## 2.2 Impact Assessment Methodology

The impact assessment methodology applied within this assessment follows the Chartered Institute of Ecology and Environmental Management (CIEEM) guidance (CIEEM 2018). As outlined in the guidance a 'Zone of Influence' must be established. The 'Zone of Influence' for a project is the area over which ecological features may be affected by biophysical changes as a result of the proposed project and associated activities. Those ecological features which occur within the Zone of Influence are evaluated in geographic hierarchy of importance (see guidelines included within Appendix 1). The following geographic frame of reference as outlined in the NRA Guidelines (2009) have been used to determine value of ecological resources:

- International importance;
- National importance;
- County importance;
- Local importance (higher value) and
- Local importance (lower value).

In accordance with the CIEEM (2018) guidelines, likely potential impacts were characterised by considering the parameters shown in Table 1. Potential impacts may occur during construction or operational of a development and may be indirect as well as direct.

After assessing the impacts of the project, mitigation to avoid ecological impacts may be warranted. Once measures to avoid and mitigate ecological impacts have been finalised, assessment of the residual impacts should be undertaken to determine the significance of their effects on ecological features. Cumulative effects can result from individually insignificant but collectively significant actions taking place over a period of time or concentrated in a location. Developments included in the cumulative impact assessment include projects located within the established Zone of Influence including:

- proposals for which consent has been applied which are awaiting determination in any regulatory process (not necessarily limited to planning permission)
- projects which have been granted consent (not limited to planning permissions) but which have not yet been started or which have been started but are not yet completed (i.e. under construction)

- proposals which have been refused permission, but which are subject to appeal and the appeal is undetermined
- to the extent that their details are in the public domain, proposed projects that will be implemented by a public body but for which no consent is needed from a competent authority.

**Table 1. Characteristics of potential impacts (adapted from CIEEM 2018).**

<b>Potential Impact Parameter</b>	<b>Description</b>
Quality of Effects	Potential impacts can have a positive or negative effect on the environment.
Magnitude	Magnitude can be measured in many ways such as the spatial or geographical area over which the impact may occur, or the size of a population impacted.
Duration	Effects may be described as temporary, short, medium, long-term or permanent. A temporary impact lasts <1 year; short-term impact lasts 1-7 years, medium-term impacts last 7-15 years, long-term impacts last 15-60 years; permanent impacts last >60 years.
Frequency & Timing	<p>The number of times an activity occurs will influence the resulting effect.</p> <p>The timing of an activity or change may result in an impact if it coincides with critical life-stages or seasons e.g. bird nesting season.</p>
Significance	Potential impacts are either significant or non-significant.



### **3.0 EXISTING ENVIRONMENT – DESKTOP STUDY**

#### **3.1 Hydrology**

With the publication of Ireland’s second River Basin Management Plan (RBMP), the RBMP 2018 – 2021 defines the entirety of the island of Ireland as a single River Basin District (RBD). This single RBD has been broken down into 46 catchment management units. These units are mainly based on the hydrometric areas in use by the local authorities. Each of the 46 catchment management units have been further broken down into 583 sub-catchments. The proposed development site is located within the Erne Hydrometric Area WFD Catchment. Additionally, the site is located within the Cavan\_SC\_010 WFD Sub-catchment.

The Poles Stream (1<sup>st</sup> Order) which flows adjacent to the site’s eastern boundary is the closest watercourse to the proposed development. This stream rises in Drumgola Lough (c. 320m to the north), flows in a general southern orientation where it merges with the Swellan Upper Stream (1<sup>st</sup> Order) c. 240m downstream to form the Swellan Upper Stream (2<sup>nd</sup> Order). Thereafter, the Swellan Upper Stream discharges into the Cavan River a further 580m downstream.

As part of the Catchment Flood Risk Assessment and Management (CFRAM) project, the Poles Stream was modelled as part of the Cavan hydraulic model. Flooding of the proposed development area and site entrance was not predicated to occur under either the 1 in 100-year or 1 in 1000-year flood events.

#### **3.2 Soils & Geology**

According to the Teagasc and EPA soils map, AminPD - Acid Deep Poorly Drained Mineral soils belonging to the Surface Water Gley / Groundwater Gley soil group are found within the entirety of the site.

In Ireland, the parent material underlying the majority of the country is comprised of quaternary sediments with the remainder composed of bedrock outcrop. These quaternary sediments have resulted from glacial movement, melting and deposition. The Teagasc and EPA subsoil maps identify that TLPSsS – Sandstone and shale till subsoil of predominately clayey texture are found to underly the poorly draining soils.

Based on the GSI’s 1:100k bedrock formation mapping, the entirety of the site is underlain by the Cooldaragh Formation which comprises of pale brown-grey siltstones and mudstones and



muddy siltstones. Bedrock outcrops are not found within the curtilage of the site, with the closest identified c. 600m to the north. Similarly, and according to the National Karst Database, no karst features are present within the site's boundary or locality.

### 3.3 Hydrogeology

The Geological Survey of Ireland (GSI) have reviewed the 1,200 geological Formations and Members defined within the Republic of Ireland and reduced them into 27 'Rock Unit Groups' (RUGs) based on their hydrogeological properties and significance. Based on the GSI's generalised bedrock RUG mapping, the *Dinantian (early) Sandstones, Shales and Limestones* RUG exists within the entirety of the site. A LI – Locally Important Aquifer - Bedrock which is Moderately Productive only in Local Zones is associated with this RUG and underlies the site.

Groundwater Vulnerability is a term used to represent the intrinsic geological and hydrogeological characteristics that determine the ease with which groundwater may be contaminated by human activities. Groundwater vulnerability maps are based on the type and thicknesses of subsoils (sands, gravels, glacial tills (or boulder clays), peat, lake and alluvial silts and clays), and the presence of certain karst features. Groundwater is most at risk where the subsoils are absent or thin and, in areas of karstic limestone, where surface streams sink underground at swallow holes. The northern / western portion of the development site is classified as '*L – Low*' vulnerability. The north-eastern, central and southern areas are classified as '*M – Moderate*' vulnerability, whilst the south-eastern corner has a '*H – High*' vulnerability assigned. The groundwater underneath the site is within the Killashandra Groundwater Body (GWB) and is classified as being of 'Good' status.

### 3.4 Terrestrial Ecology – Desktop Study

Figure 1. within the accompanying AA Screening Report, illustrates that there are four Natura 2000 sites situated within 15km of the proposed works (the closest being Lough Oughter & Associated Loughs SAC c. 1.3km to the west). The closest proposed National Heritage Area (pNHA) to the site relates to that of the Drumkeen House Woodland pNHA. Whilst, the Drumkeen House Woodland is not regarded as extensive woodland, and is not natural in character, the paucity of woodlands in the locality warrants that any deciduous woodland tract of a reasonable size and maturity is of local importance.

In addition to carrying out a search for species protected under a NATURA 2000 designation (i.e. within 1km of the proposed development), a search of the National Parks and Wildlife Services (NPWS) and National Biodiversity Data Centre's (NBDC) online data records was undertaken to determine if any rare or protected flora or fauna species have been recorded within the site footprint (see Appendix 2). This search was expanded to a 1km radius from the site to account for the estimated Zone of Influence. Based on these records (see Appendix 2), two species of note was identified, namely:

- Eurasian Badger (*Meles meles*); and
- Eurasian Red Squirrel (*Sciurus vulgaris*)

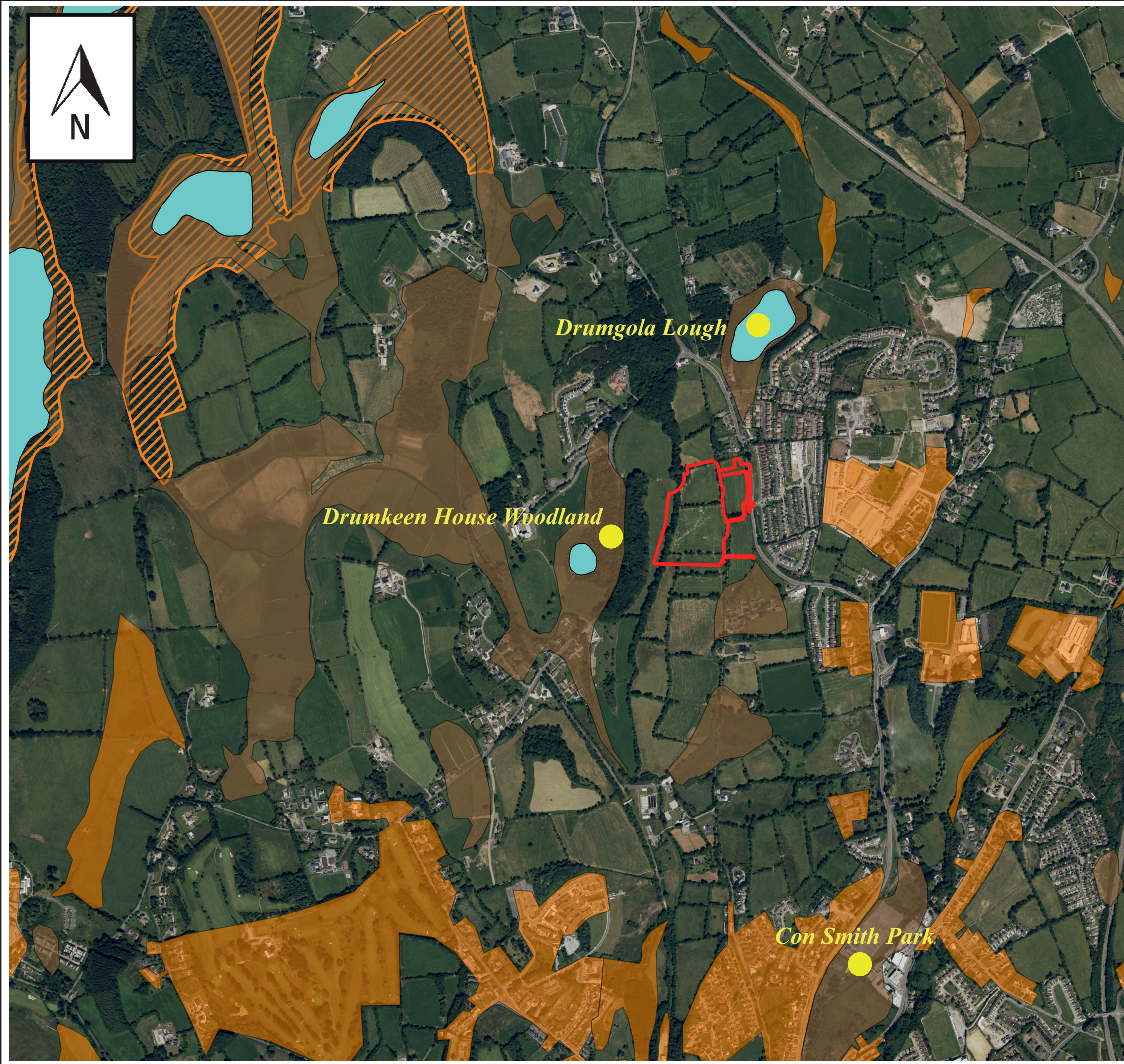
Additionally, three high impact invasive floral species were also recorded in this zone, namely, Black Currant (*Ribes nigrum*), Cherry Laurel (*Prunus laurocerasus*) and Japanese Knotweed (*Fallopia japonica*). Please see Section 5.2 which confirms that no high impact invasive plant species were recorded onsite during the study period).

The Map of Irish Wetlands was also reviewed. This mapping is a joint project between Wetland Surveys Ireland and Foss Environmental Consulting that aims to show the location and provide further information on all wetland sites in Ireland. In addition, to mapping the boundaries of surveyed wetlands, a 'Wetland Indicating Sediments' layer based on the Quaternary Geology Map of Ireland is also included on the mapping portal. This has been included as the sediments within this layer may suggest the presence of wetland conditions. Given the presence of AminPD - Acid Deep Poorly Drained Mineral soils underlain with Sandstone & Shale Till, the site is not included within the 'Wetland Indicating Sediments' layer (see Figure 1). Furthermore, no record of the study site is contained within the Wetland Survey of County Cavan (2008, 2021, 2022). The closest recognised wetlands to the site, are the Drumkeen House Woodland c. 65m to the west and Drumgola Lough c. 300m to the north (see Figure 1).


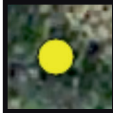

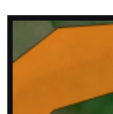


### 3.5 Aquatic Ecology

Macroinvertebrate sampling has not historically been conducted on the Poles Stream. However kick sample has been completed on the downstream Cavan River at different monitoring locations since the 1970's. The closest active WFD operational monitoring station to the site (i.e. Bridge South East of Drumkeen House – RS36C020300), is located c. 1.6km downstream. A Q-value rating of Q3 was recorded in 2019. This Q-value score represents a 'Poor' ecological status, which has been consistently recorded at this monitoring point since 1989 with the exception of 2010 and 2013, when a Q1-2 / Q2 'Bad' status was recorded.





## LEGEND

-  Lough
-  Wetland Location
-  Cutover Peat Soils
-  Alluvium Subsoils
-  SAC Boundary (Wetland Habitats Within)
-  Study Site



**PROJECT:**  
 Ecological Impact Assessment (EcIA).  
 - Drumlark Investments Ltd

**TITLE:**  
 Map of wetlands and sediments  
 identified within the proximity of the site

<b>SCALE:</b> 1:12,500@A3	<b>DRAWN BY:</b> PMcC
<b>DRAWING NO:</b> Figure 1.	<b>REV.</b> B



## 4.0 ECOLOGICAL ASSESSMENT

### 4.1 Onsite Terrestrial Ecology – Habitat Assessment

On the 07<sup>th</sup> of July 2023, Patrick McCabe of Hydrec Environmental Consulting conducted a walkover study of the site to assess its ecological condition and identify the habitats within.



**Plate 2. Photo overlooking proposed development site (facing in a south-eastern direction)**

‘GA1 – Improved Agricultural Grassland’ habitat was the dominant habitat type found throughout the site (see Plate 2 and Appendix 3). Within said habitat grasses including Perennial Ryegrass (*Lolium perenne*) dominated. Rush spp. (*Juncaceae spp.*), Docks (*Rumex spp.*), Meadow Buttercup (*Ranunculus acris*) and White Clover (*Trifolium repens*) were occasional to frequent.

On the northern periphery of the site, a FW4 – Drainage Ditch habitat is flanked by a WL1 – Hedgerow habitat containing Ash (*Fraxinus excelsior*), Hawthorn (*Crataegus monogyna*), Bramble (*Rubus fruticosus*), Cleavers (*Galium aparine*) and Herb Robert (*Geranium robertianum*). The western boundary of the site comprises of a WL2 – Treeline habitat consisting predominately of Beech (*Fagus spp*) and Oak (*Quercus spp*) whereas the southern boundary of the site is made up by a broken WL1 – Hedgerow habitat containing Ash (*Fraxinus excelsior*), Hawthorn (*Crataegus monogyna*) and occasional Sycamore trees (*Acer pseudoplatanus*). A number of further adult and juvenile Sycamore trees (*Acer pseudoplatanus*) are found along the eastern boundary of the site. Numerous Spoil Heaps (ED2) were recorded which are believed to be related to the cleaning / dredging of the drainage ditches bordering the site. Where areas of ED3 – Recolonising Bare Ground are found in close proximity to the drains, plant species such as Bull Thistle (*Cirsium vulgare*), Creeping Thistle (*Cirsium arvense*), Ragweed (*Jacobaea vulgaris*) and Nettle (*Urtica dioica*) were noted.

## **Fauna**

Given that there have been recordings of the Eurasian Badger (*Meles meles*) within 1km of the site, a survey for badger setts was undertaken with a particular focus placed on the bordering hedgerows and drains. There was no evidence of badger habitat or activity (e.g. badger latrines) recorded within the confines of the site during the time of the survey. Whilst there are no seasonal constraints for these surveys, dense vegetation can on occasion reduce the ease in which these features are identified. However, given that the grassland was recently cut and hedgerows appear to have been cut earlier in the year, no survey limitations apply. Each mature tree on site was assessed to determine if any Red Squirrel dreys were present. A particular focus was placed on the tree forks. No dreys were observed during the time of the survey.

No evidence of bat activity around the vegetation scheduled for removal was recorded during the survey period. Thus, it was concluded that maternity roosts are unlikely to be present at said locations.

## **4.2 Onsite Aquatic Ecology – Habitat Assessment**

A score of 4.0 which signifies a ‘Stream at risk’, was recorded at the SW1 monitoring location (see Appendix 4). Overall species diversity and abundance was very low. For instance, no mayfly or stonefly species were recorded in the sample whilst a single family of caddisfly (*Glossosomatidae*) was recorded. Furthermore, aquatic vegetation within the channel was limited. No threatened bryophyte species were recorded (i.e. no threatened moss or scaleworts recorded (see Appendix 3). No otter holts were recorded on the periphery of the stream. Given the width of the stream (c. <1.5m) it is not envisaged that watercourse would be considered a



suitable otter feeding site. Given that the water level within the stream was <20cm during the site investigation, optimal conditions for the identification of otter holts was present.



**Plate 3. Photo of Poles Stream facing in a southern direction (6<sup>th</sup> July 2023).**

## 5.0 IMPACT ASSESSMENT

This section provides an assessment of the habitats and species within the established Zone of Influence of the proposed development area, based on the field survey results and the geographic evaluation methodology. Table 2 summaries the key ecological receptors considered in the assessment.

**Table 2. Ecological Evaluation of Key Ecological Receptors in Relation to the Subject Site**

Habitat / Species Type	Identified Ecological Receptor	Ecological Valuation Level
Designated Sites		
SACs and SPAs	Screened out	International
Drumgola Lough (Wetland)	No Hydrological or Hydrogeological Connection	National
Drumkeen House Woodland (pNHA & Wetland)	No Hydrological or Hydrogeological Connection	National
Protected & Threatened Species		
Terrestrial Mammals including Eurasian Badger ( <i>Meles meles</i> )	Identified Within 1km of Site	National
Eurasian Red Squirrel ( <i>Sciurus vulgaris</i> )	Identified Within 1km of Site	National
Habitats & Flora		
WL2 – Treeline	Onsite	Local / Regional
WL2 – Hedgerow	Onsite	Local
FW4 – Drainage Ditch	Onsite	Local

### 5.1 Evaluation of Designated Sites within the Zone of Influence

A separate Natura Impact Statement has been produced to accompany this planning permission application. Said assessment concluded that:

*‘This statement identifies mitigation measures that will ensure avoidance of these effects; so that the structure and functions of the Natura 2000 Network and local ecology / biodiversity are not affected.*

*Following a comprehensive evaluation of the potential direct, indirect and residual impacts, it is considered that the proposed works either independently or in combination with other plans, does not have the potential to significantly affect the conservation objectives of and National or European Designated Site’.*

## **5.2 Evaluation of Important Flora and Fauna within the Zone of Influence**

As mentioned previously, no evidence of otter, badger or red squirrel habitat or activity was observed. Thus, it is not envisaged that the proposed works will have a negative effect on this species. Nonetheless, a further check for badger setts, otter holts and red squirrel dreys should be completed prior to any site clearance / hedgerow removal works commencing. Whilst it is proposed to remove some hedgerow / broken hedgerow onsite, which will result in a slight negative local impact on biodiversity, it is not proposed to remove any of the more substantial treeline habitat on the eastern boundary. Additionally, no rare or protected species were recorded and thus it was determined that the habitats and flora onsite were of a low local importance. Moreover, no high impact invasive plant species were recorded. A number of juvenile and mature Sycamore trees were observed, which are classified as a medium impact invasive and thus care must be taken during their removal (see Section 5.5).

## **5.3 Evaluation of Potential Wetland Habitat**

The Ramsar Convention is an international agreement for the conservation of wetlands. Subsequent to the Ramsar Convention, the ecological importance of wetland habitats has been recognised by the European Union, with several wetland types listed under Annex I of the EU Habitats Directive (CEC, 1992). Such Annex I habitats are protected through the designation of areas of land under the Natura 2000 network of sites across Europe. However, many other wetlands occur outside of designated sites and also provide a host of ecological and other services. The Irish Ramsar Wetlands Committee (IRWC) was set up by the Irish Government in 2010 and is co-hosted by the NPWS and the EPA. This committee have developed guidance around Irish wetland types.

Following the completion of the habitat survey, it was concluded that no wetland habitats (i.e. with the exception of the stream and drainage ditches flanking the site) were present. As neither rushes or sedges were found in any great abundance, wet grassland habitat was not recorded either. Given that the Drumgola Lough wetland is situated hydrologically upgradient from the applicant’s site, it is not envisaged that the proposed development can have a negative



impact on that receptor. Similarly, owing to the topography of the site, groundwater underlying the site is expected to flow in an eastern direction and partially discharge into the Poles Stream. Thus, there is no hydrogeological connection between the site and the Drumkeen House Woodland.

#### **5.4 Cumulative Impacts**

A number of other projects have been considered in order to determine if ‘In-Combination’ impacts exist. A search of all planning applications submitted to Cavan County Council within the last two years and within the townland of Drumlark was completed. It was determined that development density in the area was relatively low and that planning permission was granted to three projects in this timeframe. These included planning applications:

- 22261 – is sought to erect 15 no. dwellings (1 no. 3 bedroom detached dwelling, 6 no. 3 bedroom semi-detached dwellings and 8 no. 2 bedroom terraced dwellings), access via existing service road, connect to public foul and storm water sewers, public watermains and all ancillary site works;
- 21586 – to erect fully serviced part two story part single storey dwelling with detached garage, install sewerage treatment unit, percolation area, form access of existing laneway, carry out alterations to existing entrance and all associated works; and
- 21548 – Permission to erect 2 no. 4-bed detached two storey dwellings, one on existing foundations of previously approved planning reference 01/1850, revised site layouts, connection to existing services, landscaping and all associated & ancillary site works.

Given that there will be no loss of otter, badger or red squirrel habitat as a result of the development, cumulative impacts with other developments will not occur. Similarly given that there will be no foul water discharge or water abstraction from the Poles Stream, a change in the assimilation capacity of the watercourse will not occur. As the site is hydrologically and hydrogeologically independent from the recognised wetland sites (i.e. Cavan Wetland Survey) in the locality, the development is not considered to contribute to cumulative impacts.

It was therefore concluded that no cumulative impacts are predicated with any in-combination impacts associated with neighbouring developments deemed to be negligible and insignificant.

## 5.5 Mitigation and Residual Impacts

The following mitigation measures as set out in the Outline Construction Environmental Management Plan (OCEMP) should be adhered too, in order to ensure that any indirect effects are abated;

### Surface Water Management

- All existing surface water drainage elements (including adjacent watercourses) will be maintained free from waste materials generated during the construction of the proposed development, including the initial site clearance and excavation. Routine visual inspections by the contractor shall reduce any risk of excess construction materials causing obstructions to surface water drainage and any potential flooding occurring;
- A maintenance schedule and operational schedule must be established by the contractor for silt and pollution control measures during the construction period. This should be undertaken in consultation with the relevant statutory authorities;
- Run-off from the working site or any areas of exposed soil shall be channelled and intercepted at regular intervals for discharge to silt traps or lagoons. A temporary positive drainage system shall be installed prior to the commencement of the construction works, to collect surface water runoff from the site during construction;
- A series of geotextile-lined cascading, high level outfall settling basins will be installed upstream of an agreed discharge point, the location of which is to be determined by the contractor as part of their detailed Construction and Environmental Management Plan and approved by Cavan County Council. This temporary surface water management facility will throttle runoff and allow suspended solids to be settled out and removed before being discharged in a controlled manner to the agreed outfall;
- All inlets to the cascading settling basins will be riprapped to prevent scour and erosion in the vicinity of the inlet;
- Pouring of concrete shall be carried out in the dry and allowed to cure. Mixer washings and excess concrete shall not be discharged to surface water;
- Oil storage tank(s) and the associated filling area and distribution pipe work shall be separated by at least 10m from surface watercourses. Storage tanks shall have secondary containment provided by means of an above ground bund to capture any oil leakage, irrespective of whether it arises from leakage of the tank itself or from associated equipment (such as filling and off-take points, sighting gauges, etc.), all of which should be located within the bund. The bund specification should conform to the current best practice for oil storage (Enterprise Ireland BPGC5005);

- Weather conditions and seasonal weather variations shall also be taken account of when planning stripping of topsoil and excavations, with an objective of minimising soil erosion; and
- Hazardous construction materials shall be stored appropriately to prevent contamination of watercourses or groundwater. Spill kits shall be kept in designated areas for re-fuelling of construction machinery.

### Noise

- Avoid unnecessary revving of engines and switch off equipment when not required.
- Minimise drop height of materials;
- Start-up plant sequentially rather than all together;
- Loading and unloading will occur within designated loading areas as far from noise receptors as possible;
- Equipment will be fitted with appropriate silencers where possible;
- Regular and effective maintenance by trained personnel is carried out to reduce noise and / or vibration from plant and machinery;
- Hours are limited during which site activities likely to create high levels of noise and vibration are carried out – no noisy activities will be carried out outside of the permitted construction hours;
- A site representative responsible for matters relating to noise and vibration will be appointed prior to construction on site. This individual will be responsible for engagement with local residents, advance notice for noisy activities and the maintenance of a complaints register/record; and
- A noise and vibration monitoring specialist will be appointed to carry out independent monitoring of noise and vibration during critical periods at sensitive locations.

### Dust

- The contractor will continuously monitor dust over the variation of weather and material disposal to ensure the limits are not breached throughout the project. It should be noted that there are currently no national or European Union standards of air quality with which levels of dust deposition can be compared. Thus, the minimum criteria to be maintained will be in accordance with the German Standard Method for determination of dust deposition rate (VDI 2119), which is a maximum deposition of 350mg/m<sup>2</sup>/day as measured using Bergerhoff type dust deposit gauges;

- Ensuring construction vehicles have a clean surface to travel on within the site (i.e., haul road);
- Providing a “Full-Body Self Contained” wheel wash, constructed and located within the site confines; and
- Ensuring an appropriate wheel or road washing facility is provided as and when required throughout the various stages of construction on site. If conditions require it then a manned power washer will be put in place to assist the wheel wash system.

### Harmful Materials

- If any contaminated material is encountered, it will need to be segregated from clean/inert material, tested and classified as either non-hazardous or hazardous in accordance with the EPA publication entitled ‘Waste Classification: List of Waste & Determining if Waste is Hazardous or Non-Hazardous’ using the HazWasteOnline application (or similar approved classification method). The material will then need to be classified as clean, inert, nonhazardous or hazardous in accordance with the EC Council Decision 2003/33/EC, which establishes the criteria for the acceptance of waste at landfills; and
- Paints, glues, adhesives and other known hazardous substances will be stored in designated areas away from watercourses. They will generally be present in small volumes only and associated waste volumes generated will be kept to a minimum. Wastes will be stored in appropriate receptacles pending collection by an authorised waste contractor. In addition, WEEE (containing Construction and Demolition Waste Management Plan 11 hazardous components), printer toner/cartridges, batteries (Lead, Ni-Cd or Mercury) and/or fluorescent tubes and other mercury containing waste may be generated during construction activities. These wastes (if encountered) will be stored in appropriate receptacles in designated areas of the site pending collection by an authorised waste contractor.

### Adjacent Watercourse

- It will not be permitted to discharge into any newly constructed storm water systems or watercourse without adhering to the conditions of the discharge licence and agreeing the same with the Design Team, Site Manager and Local Authority Area Engineer;
- Only approved storage system for oil / diesel within the site will be permitted, (i.e., all oil / diesel storage to be located within a designated area placed furthest away from adjacent watercourses and contained within constructed bunded areas e.g., placed on 150mm concrete slab with the perimeter constructed with 225mm solid blockwork rendered internally). The bunded area will accommodate the relevant oil / diesel storage

- capacity in case of accidental spillage. Any accidental spillages will be dealt with immediately on site however minor by containment/removal from site. Re-fuelling will be contained within a designated area adjacent to the storage area;
- The washing out of concrete trucks on site will not be permitted as they are a potential source of high alkalinity in watercourses. Consequently, it is a requirement that all concrete truck washout takes place back in the ready-mix depot; and
- The Site Management Team will maintain a record of all receipts for the removal of toilet or interceptor waste off site to insure its disposal in a traceable manner.

#### Retention & Protection of Vegetation During Construction

- Any trees along the proposed development boundary that are to be retained, both within and adjacent to the proposed development boundary (where the root protection area of the tree extends into the proposed development boundary), shall be fenced off at the outset of works and for the duration of construction to avoid structural damage to the trunk, branches or root systems of the trees. Temporary fencing shall be erected at a sufficient distance from the tree so as to enclose the Root Protection Area (RPA) of the tree. The RPA shall be defined based upon the recommendation of a qualified arborist.
- Where fencing is not feasible due to insufficient space, protection for the tree/hedgerow shall be afforded by wrapping hessian sacking (or suitable equivalent) around the trunk of the tree and strapping stout buffer timbers around it.
- The area within the RPA shall not be used for vehicle parking or the storage of materials (including soils, oils and chemicals). The storage of hazardous materials (e.g. hydrocarbons) or concrete washout areas shall not be undertaken within 10m of any retained trees, hedgerows and treelines.
- A qualified arborist shall assess the condition of, and advise on any repair works necessary to, any trees which are to be retained or that lie outside of the proposed development boundary but whose RPA is impacted by the works. Any remedial works required shall be carried out by a qualified arborist.
- A buffer zone of at least 5m shall be maintained between construction works and retained hedgerows to ensure that the root protection areas are not damaged.

### Protection of Bird Nesting Sites

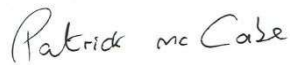
- No onsite vegetation (i.e. hedgerows, trees, or scrub) shall be removed or significantly disturbed between the 1<sup>st</sup> of March and the 31<sup>st</sup> of August, to avoid direct impacts on nesting birds. Should the construction programme not allow this seasonal restriction to be observed, then these areas shall be inspected by a suitably qualified ecologist for the presence of breeding birds prior to clearance. Areas found not to contain nests shall be cleared within 3 days of the nest survey, otherwise repeat surveys shall be required. Should nesting birds be encountered during surveys, the removal of vegetation shall be required to be delayed until after the nesting season (1<sup>st</sup> March to 31<sup>st</sup> August inclusive), unless permitted by a derogation licence from the National Parks and Wildlife Service (NPWS)

### Further Ecological Protection Measures

- The construction of the site entrance, scheduled to traverse the Poles Stream should be constructed in accordance with Inland Fisheries Ireland (IFI) and Office of Public Works (OPW) guidance. For instance, a silt curtain will be placed downstream of the works to mitigate against excessive siltation, as per “Environmental Guidance: Drainage Maintenance & Construction” handbook EP 15;
- No high impact invasive plant species have been recorded onsite. Therefore, there is a low risk of invasive species spread during the initial ground disturbance works. Any sightings of invasive species during the operation phase should be recorded. This may be supplemented by future ecological surveys. In the event that invasive species are recorded, an ecologist should be engaged to prepare an Invasive Species Management Plan;
- One medium impact species namely, Sycamore (*Acer pseudoplatanus*), were found onsite. It is understood that some of these trees require removal to allow for the development to proceed. It is imperative that any trees / hedgerows scheduled for removal are felled outside of the period from the 1<sup>st</sup> of March to the 31<sup>st</sup> of August. Whilst this regulation is stipulated to prevent impact on nesting birds, the removal of this deciduous species in the winter period will prevent seed dispersal when disturbed also;
- It is recommended that Ash (*Fraxinus excelsior*) trees are not included in the project’s landscaping plan given the prevalence of ash dieback in the area; and
- A further check for badger setts and red squirrel dreys is completed prior to the commencement of the site clearance works. Should any setts / dreys be found, suitable commensurate mitigation will be required. Similarly a further check for bats should be completed during the summer months of 2024.

A minor negative local impact will occur through the loss of hedgerow habitat. However, in light of adherence to the mitigation measures set out previously, residual impacts are anticipated to be negligible. Furthermore, no impact on otter, badger, squirrel or bat species are predicted. Given the absence of high impact floral invasives recorded during the habitat survey, the risk of spread offsite during the construction stage is low. Thus, residual impacts will not result in any significant effects on the important national ecological features / receptors within the Zone of Influence of the project.

Signed:

A handwritten signature in black ink that reads 'Patrick McCabe'.

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Patrick McCabe B.Sc., M.Sc.

(P.I available on request)





## **APPENDIX 1**

### **CRITERIA FOR ECOLOGICAL EVALUATION (NRA GUIDELINES, 2009)**



Guidelines for Assessment of Ecological Impacts  
of National Road Schemes

**Ecological valuation: Examples**

**International Importance:**

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

**National Importance:**

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

<sup>4</sup> See Articles 3 and 10 of the Habitats Directive.

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

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

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

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

**County Importance:**

- ❑ Area of Special Amenity.<sup>9</sup>
- ❑ Area subject to a Tree Preservation Order.
- ❑ Area of High Amenity, or equivalent, designated under the County Development Plan.
- ❑ Resident or regularly occurring populations (assessed to be important at the County level)<sup>10</sup> of the following:
  - ❑ Species of bird, listed in Annex I and/or referred to in Article 4(2) of the Birds Directive;
  - ❑ Species of animal and plants listed in Annex II and/or IV of the Habitats Directive;
  - ❑ Species protected under the Wildlife Acts; and/or
  - ❑ Species listed on the relevant Red Data list.
- ❑ Site containing area or areas of the habitat types listed in Annex I of the Habitats Directive that do not fulfil the criteria for valuation as of International or National importance.
- ❑ County important populations of species, or viable areas of semi-natural habitats or natural heritage features identified in the National or Local BAP,<sup>11</sup> if this has been prepared.
- ❑ Sites containing semi-natural habitat types with high biodiversity in a county context and a high degree of naturalness, or populations of species that are uncommon within the county.
- ❑ Sites containing habitats and species that are rare or are undergoing a decline in quality or extent at a national level.

**Local Importance (higher value):**

- ❑ Locally important populations of priority species or habitats or natural heritage features identified in the Local BAP, if this has been prepared;
- ❑ Resident or regularly occurring populations (assessed to be important at the Local level)<sup>12</sup> of the following:
  - ❑ Species of bird, listed in Annex I and/or referred to in Article 4(2) of the Birds Directive;
  - ❑ Species of animal and plants listed in Annex II and/or IV of the Habitats Directive;
  - ❑ Species protected under the Wildlife Acts; and/or
  - ❑ Species listed on the relevant Red Data list.
- ❑ Sites containing semi-natural habitat types with high biodiversity in a local context and a high degree of naturalness, or populations of species that are uncommon in the locality;
- ❑ Sites or features containing common or lower value habitats, including naturalised species that are nevertheless essential in maintaining links and ecological corridors between features of higher ecological value.

**Local Importance (lower value):**

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

**Table 1:** *Examples of valuation at different geographical scales*

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

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

<sup>11</sup> BAP: Biodiversity Action Plan

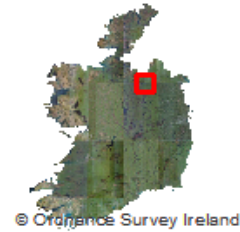
<sup>12</sup> It is suggested that, in general, 1% of the local population of such species qualifies as a locally important population. However, a smaller population may qualify as locally important where the population forms a critical part of a wider population or the species is at a critical phase of its life cycle.

## **APPENDIX 2**

### **BIODIVERSITY RECORDS**



## Species list for H4107



### Quality of information

The National Biodiversity Data Centre makes every effort to ensure the quality of the information available on this website and updates the information regularly. Before relying on the information on this site, however, users should carefully evaluate its accuracy, currency, completeness and relevance for their purposes. The National Biodiversity Data Centre cannot guarantee and assumes no legal liability or responsibility for the accuracy, currency or completeness of the information.

To assist the Centre in the provision of high quality information, should you identify an error in any of the information provided, please notify the Centre and every effort will be made to rectify the error.

Grid square	Species group	Species name	Record count	Date of last record	Title of dataset	Designation
Custom	fern	Broad Buckler-fern ( <i>Dryopteris dilatata</i> )	4	27/06/2015	Irish Vascular Plant Data - Robert Northridge	
Custom	fern	Hard Shield-fern ( <i>Polystichum aculeatum</i> )	1	12/06/1999	Flora of County Cavan	
Custom	fern	Hard-fern ( <i>Blechnum spicant</i> )	1	12/06/1999	Flora of County Cavan	
Custom	fern	Hart's-tongue ( <i>Phyllitis scolopendrium</i> )	2	12/06/1999	Flora of County Cavan	
Custom	fern	Lady-fern ( <i>Athyrium filix-femina</i> )	1	27/06/2015	Irish Vascular Plant Data - Robert Northridge	
Custom	fern	Maidenhair Spleenwort ( <i>Asplenium trichomanes</i> )	1	12/06/1999	Flora of County Cavan	
Custom	fern	Male-fern ( <i>Dryopteris filix-mas</i> )	3	27/06/2015	Irish Vascular Plant Data - Robert Northridge	
Custom	fern	Polypody ( <i>Polypodium vulgare</i> )	2	27/06/2015	Irish Vascular Plant Data - Robert Northridge	
Custom	fern	Rustyback ( <i>Ceterach officinarum</i> )	1	12/06/1999	Flora of County Cavan	
Custom	fern	Scaly Male-fern ( <i>Dryopteris affinis</i> )	2	27/06/2015	Irish Vascular Plant Data - Robert Northridge	
Custom	fern	Soft Shield-fern ( <i>Polystichum setiferum</i> )	2	12/06/1999	Flora of County Cavan	
Custom	fern	Wall-rue ( <i>Asplenium ruta-muraria</i> )	1	12/06/1999	Flora of County Cavan	
Custom	flowering plant	Alder ( <i>Alnus glutinosa</i> )	2	12/06/1999	Flora of County Cavan	
Custom	flowering plant	Amphibious Bistort ( <i>Persicaria amphibia</i> )	1	12/06/1999	Flora of County Cavan	
Custom	flowering plant	Annual Meadow-grass ( <i>Poa annua</i> )	2	12/06/1999	Flora of County Cavan	
Custom	flowering plant	Arctium minus agg.	1	12/06/1999	Flora of County Cavan	
Custom	flowering plant	Ash ( <i>Fraxinus excelsior</i> )	3	12/06/1999	Flora of County Cavan	
Custom	flowering plant	Black Currant ( <i>Ribes nigrum</i> )	1	12/06/1999	Flora of County Cavan	Invasive Species: Invasive Species    Invasive Species: Invasive Species >> Medium Impact Invasive Species
Custom	flowering plant	Blackthorn ( <i>Prunus spinosa</i> )	2	12/06/1999	Flora of County Cavan	
Custom	flowering plant	Blue Water-speedwell ( <i>Veronica anaqallis-aquatica</i> )	1	12/06/1999	Flora of County Cavan	
Custom	flowering plant	Bogbean ( <i>Menyanthes trifoliata</i> )	1	12/06/1999	Flora of County Cavan	
Custom	flowering plant	Bottle Sedge ( <i>Carex rostrata</i> )	1	12/06/1999	Flora of County Cavan	
Custom	flowering plant	Bramble ( <i>Rubus fruticosus</i> agg.)	3	12/06/1999	Flora of County Cavan	
Custom	flowering plant	Broad-leaved Dock ( <i>Rumex obtusifolius</i> )	2	12/06/1999	Flora of County Cavan	
Custom	flowering plant	Brooklime ( <i>Veronica beccabunga</i> )	1	12/06/1999	Flora of County Cavan	
Custom	flowering plant	Broom ( <i>Cytisus scoparius</i> )	1	12/06/1999	Flora of County Cavan	
Custom	flowering plant	Bugle ( <i>Ajuga reptans</i> )	1	12/06/1999	Flora of County Cavan	
Custom	flowering plant	Bulrush ( <i>Typha latifolia</i> )	3	12/06/1999	Flora of County Cavan	
Custom	flowering plant	Bush Vetch ( <i>Vicia sepium</i> )	2	12/06/1999	Flora of County Cavan	



Custom	flowering plant	Butterbur ( <i>Petasites hybridus</i> )	1	13/08/1998	Flora of County Cavan	
Custom	flowering plant	Callitriche aggregate	1	12/06/1999	Flora of County Cavan	
Custom	flowering plant	Cat's-ear ( <i>Hypochaeris radicata</i> )	2	12/06/1999	Flora of County Cavan	
Custom	flowering plant	Cherry Laurel ( <i>Prunus laurocerasus</i> )	1	27/06/2015	Irish Vascular Plant Data - Robert Northridge	Invasive Species: Invasive Species    Invasive Species: Invasive Species >> High Impact Invasive Species
Custom	flowering plant	Cleavers ( <i>Galium aparine</i> )	2	12/06/1999	Flora of County Cavan	
Custom	flowering plant	Cock's-foot ( <i>Dactylis glomerata</i> )	2	12/06/1999	Flora of County Cavan	
Custom	flowering plant	Coltsfoot ( <i>Tussilago farfara</i> )	1	12/06/1999	Flora of County Cavan	
Custom	flowering plant	Common Chickweed ( <i>Stellaria media</i> )	1	12/06/1999	Flora of County Cavan	
Custom	flowering plant	Common Club-rush ( <i>Schoenoplectus lacustris</i> )	1	12/06/1999	Flora of County Cavan	
Custom	flowering plant	Common Comfrey ( <i>Symphytum officinale</i> )	1	12/06/1999	Flora of County Cavan	
Custom	flowering plant	Common Dog-violet ( <i>Viola riviniana</i> )	1	12/06/1999	Flora of County Cavan	
Custom	flowering plant	Common Duckweed ( <i>Lemna minor</i> )	3	12/06/1999	Flora of County Cavan	
Custom	flowering plant	Common Figwort ( <i>Scrophularia nodosa</i> )	1	12/06/1999	Flora of County Cavan	
Custom	flowering plant	Common Knapweed ( <i>Centaurea nigra</i> )	1	12/06/1999	Flora of County Cavan	
Custom	flowering plant	Common Mouse-ear ( <i>Cerastium fontanum</i> )	2	12/06/1999	Flora of County Cavan	
Custom	flowering plant	Common Nettle ( <i>Urtica dioica</i> )	2	12/06/1999	Flora of County Cavan	
Custom	flowering plant	Common Ragwort ( <i>Senecio jacobaea</i> )	2	12/06/1999	Flora of County Cavan	
Custom	flowering plant	Common Reed ( <i>Phragmites australis</i> )	1	12/06/1999	Flora of County Cavan	
Custom	flowering plant	Common Sorrel ( <i>Rumex acetosa</i> )	2	12/06/1999	Flora of County Cavan	
Custom	flowering plant	Common Spike-rush ( <i>Eleocharis palustris</i> )	1	12/06/1999	Flora of County Cavan	
Custom	flowering plant	Common Valerian ( <i>Valeriana officinalis</i> )	1	31/05/1999	Species Data from the National Vegetation Database	
Custom	flowering plant	Compact Rush ( <i>Juncus conglomeratus</i> )	1	12/06/1999	Flora of County Cavan	
Custom	flowering plant	Cow Parsley ( <i>Anthriscus sylvestris</i> )	2	12/06/1999	Flora of County Cavan	
Custom	flowering plant	Cowbane ( <i>Cicuta virosa</i> )	1	31/05/1999	Species Data from the National Vegetation Database	
Custom	flowering plant	Creeping Bent ( <i>Agrostis stolonifera</i> )	1	31/05/1999	Species Data from the National Vegetation Database	
Custom	flowering plant	Creeping Buttercup ( <i>Ranunculus repens</i> )	2	12/06/1999	Flora of County Cavan	
Custom	flowering plant	Creeping Cinquefoil ( <i>Potentilla reptans</i> )	1	12/06/1999	Flora of County Cavan	
Custom	flowering plant	Creeping Thistle ( <i>Cirsium arvense</i> )	2	12/06/1999	Flora of County Cavan	
Custom	flowering plant	Creeping-Jenny ( <i>Lysimachia nummularia</i> )	1	12/06/1999	Flora of County Cavan	
Custom	flowering plant	Crested Dog's-tail ( <i>Cynosurus cristatus</i> )	1	12/06/1999	Flora of County Cavan	

Custom	flowering plant	Cuckooflower ( <i>Cardamine pratensis</i> )	2	12/06/1999	Flora of County Cavan	
Custom	flowering plant	Curled Dock ( <i>Rumex crispus</i> )	1	12/06/1999	Flora of County Cavan	
Custom	flowering plant	Cut-leaved Crane's-bill ( <i>Geranium dissectum</i> )	1	12/06/1999	Flora of County Cavan	
Custom	flowering plant	Daisy ( <i>Bellis perennis</i> )	2	12/06/1999	Flora of County Cavan	
Custom	flowering plant	Devil's-bit Scabious ( <i>Succisa pratensis</i> )	1	31/05/1999	Species Data from the National Vegetation Database	
Custom	flowering plant	Downy Birch ( <i>Betula pubescens</i> )	1	31/05/1999	Species Data from the National Vegetation Database	
Custom	flowering plant	Dwarf Cherry ( <i>Prunus cerasus</i> )	1	12/06/1999	Flora of County Cavan	
Custom	flowering plant	Elder ( <i>Sambucus nigra</i> )	2	12/06/1999	Flora of County Cavan	
Custom	flowering plant	Enchanter's-nightshade ( <i>Circaea lutetiana</i> )	2	27/06/2015	Irish Vascular Plant Data - Robert Northridge	
Custom	flowering plant	English Elm ( <i>Ulmus procera</i> )	1	27/06/2015	Irish Vascular Plant Data - Robert Northridge	
Custom	flowering plant	False Oat-grass ( <i>Arrhenatherum elatius</i> )	2	12/06/1999	Flora of County Cavan	
Custom	flowering plant	False-brome ( <i>Brachypodium sylvaticum</i> )	1	13/08/1998	Flora of County Cavan	
Custom	flowering plant	Fat-hen ( <i>Chenopodium album</i> )	1	12/06/1999	Flora of County Cavan	
Custom	flowering plant	Festuca rubra agg.	1	12/06/1999	Flora of County Cavan	
Custom	flowering plant	Field Forget-me-not ( <i>Myosotis arvensis</i> )	2	12/06/1999	Flora of County Cavan	
Custom	flowering plant	Foxglove ( <i>Digitalis purpurea</i> )	1	12/06/1999	Flora of County Cavan	
Custom	flowering plant	Garlic Mustard ( <i>Alliaria petiolata</i> )	1	13/08/1998	Flora of County Cavan	
Custom	flowering plant	Germander Speedwell ( <i>Veronica chamaedrys</i> )	2	27/06/2015	Irish Vascular Plant Data - Robert Northridge	
Custom	flowering plant	Glaucous Sedge ( <i>Carex flacca</i> )	1	12/06/1999	Flora of County Cavan	
Custom	flowering plant	Gorse ( <i>Ulex europaeus</i> )	1	12/06/1999	Flora of County Cavan	
Custom	flowering plant	Great Willowherb ( <i>Epilobium hirsutum</i> )	2	12/06/1999	Flora of County Cavan	
Custom	flowering plant	Great Yellow-cress ( <i>Rorippa amphibia</i> )	1	12/06/1999	Flora of County Cavan	
Custom	flowering plant	Greater Bird's-foot-trefoil ( <i>Lotus pedunculatus</i> )	1	12/06/1999	Flora of County Cavan	
Custom	flowering plant	Greater Plantain ( <i>Plantago major</i> )	2	12/06/1999	Flora of County Cavan	
Custom	flowering plant	Greater Stitchwort ( <i>Stellaria holostea</i> )	1	12/06/1999	Flora of County Cavan	
Custom	flowering plant	Ground-elder ( <i>Aegopodium podagraria</i> )	2	12/06/1999	Flora of County Cavan	
Custom	flowering plant	Guelder-rose ( <i>Viburnum opulus</i> )	2	12/06/1999	Flora of County Cavan	
Custom	flowering plant	Gypsywort ( <i>Lycopus europaeus</i> )	1	12/06/1999	Flora of County Cavan	
Custom	flowering plant	Hairy Sedge ( <i>Carex hirta</i> )	1	12/06/1999	Flora of County Cavan	
Custom	flowering plant	Hairy-brome ( <i>Bromopsis ramosa</i> )	1	12/06/1999	Flora of County Cavan	
Custom	flowering plant	Hard Rush ( <i>Juncus inflexus</i> )	1	12/06/1999	Flora of County Cavan	
Custom	flowering plant	Hawthorn ( <i>Crataegus monogyna</i> )	3	12/06/1999	Flora of County Cavan	

Custom	flowering plant	Hazel ( <i>Corylus avellana</i> )	4	27/06/2015	Irish Vascular Plant Data - Robert Northridge	
Custom	flowering plant	Heath Bedstraw ( <i>Galium saxatile</i> )	1	12/06/1999	Flora of County Cavan	
Custom	flowering plant	Heath Wood-rush ( <i>Luzula multiflora</i> )	1	12/06/1999	Flora of County Cavan	
Custom	flowering plant	Hedge Bindweed ( <i>Calystegia sepium</i> )	2	12/06/1999	Flora of County Cavan	
Custom	flowering plant	Hedge Mustard ( <i>Sisymbrium officinale</i> )	1	12/06/1999	Flora of County Cavan	
Custom	flowering plant	Hedge Woundwort ( <i>Stachys sylvatica</i> )	2	12/06/1999	Flora of County Cavan	
Custom	flowering plant	Herb-Robert ( <i>Geranium robertianum</i> )	2	12/06/1999	Flora of County Cavan	
Custom	flowering plant	Hogweed ( <i>Heracleum sphondylium</i> )	2	12/06/1999	Flora of County Cavan	
Custom	flowering plant	Holly ( <i>Ilex aquifolium</i> )	1	12/06/1999	Flora of County Cavan	
Custom	flowering plant	Honeysuckle ( <i>Lonicera periclymenum</i> )	3	27/06/2015	Irish Vascular Plant Data - Robert Northridge	
Custom	flowering plant	Horse-chestnut ( <i>Aesculus hippocastanum</i> )	2	27/06/2015	Irish Vascular Plant Data - Robert Northridge	
Custom	flowering plant	Ivy ( <i>Hedera helix</i> )	3	12/06/1999	Flora of County Cavan	
Custom	flowering plant	Ivy-leaved Toadflax ( <i>Cymbalaria muralis</i> )	1	12/06/1999	Flora of County Cavan	
Custom	flowering plant	Japanese Knotweed ( <i>Fallopia japonica</i> )	3	27/08/2015	National Invasive Species Database	Invasive Species: Invasive Species    Invasive Species: Invasive Species >> High Impact Invasive Species    Invasive Species: Invasive Species >> Regulation S.I. 177 (Ireland)
Custom	flowering plant	Knotgrass ( <i>Polygonum aviculare</i> )	1	12/06/1999	Flora of County Cavan	
Custom	flowering plant	Lesser Stitchwort ( <i>Stellaria graminea</i> )	2	12/06/1999	Flora of County Cavan	
Custom	flowering plant	Lesser Trefoil ( <i>Trifolium dubium</i> )	1	12/06/1999	Flora of County Cavan	
Custom	flowering plant	Lords-and-Ladies ( <i>Arum maculatum</i> )	2	27/06/2015	Irish Vascular Plant Data - Robert Northridge	
Custom	flowering plant	Marsh Ragwort ( <i>Senecio aquaticus</i> )	1	31/05/1999	Species Data from the National Vegetation Database	
Custom	flowering plant	Marsh Thistle ( <i>Cirsium palustre</i> )	1	12/06/1999	Flora of County Cavan	
Custom	flowering plant	Marsh-bedstraw ( <i>Galium palustre</i> )	1	31/05/1999	Species Data from the National Vegetation Database	
Custom	flowering plant	Marsh-marigold ( <i>Caltha palustris</i> )	1	12/06/1999	Flora of County Cavan	
Custom	flowering plant	Meadow Buttercup ( <i>Ranunculus acris</i> )	2	12/06/1999	Flora of County Cavan	
Custom	flowering plant	Meadow Foxtail ( <i>Alopecurus pratensis</i> )	2	12/06/1999	Flora of County Cavan	
Custom	flowering plant	Meadow Vetchling ( <i>Lathyrus pratensis</i> )	1	12/06/1999	Flora of County Cavan	
Custom	flowering plant	Meadowsweet ( <i>Filipendula ulmaria</i> )	3	12/06/1999	Flora of County Cavan	
Custom	flowering plant	Mouse-ear-hawkweed ( <i>Pilosella officinarum</i> )	1	12/06/1999	Flora of County Cavan	
Custom	flowering plant	Nipplewort ( <i>Lapsana communis</i> )	1	12/06/1999	Flora of County Cavan	
Custom	flowering plant	Opposite-leaved Golden-saxifrage ( <i>Chrysosplenium oppositifolium</i> )	4	27/06/2015	Irish Vascular Plant Data - Robert Northridge	

Custom	flowering plant	Osier ( <i>Salix viminalis</i> )	1	12/06/1999	Flora of County Cavan	
Custom	flowering plant	Oxeye Daisy ( <i>Leucanthemum vulgare</i> )	1	12/06/1999	Flora of County Cavan	
Custom	flowering plant	Pedunculate Oak ( <i>Quercus robur</i> )	1	12/06/1999	Flora of County Cavan	
Custom	flowering plant	Perennial Rye-grass ( <i>Lolium perenne</i> )	1	12/06/1999	Flora of County Cavan	
Custom	flowering plant	Pignut ( <i>Conopodium majus</i> )	2	27/06/2015	Irish Vascular Plant Data - Robert Northridge	
Custom	flowering plant	Pineappleweed ( <i>Matricaria discoidea</i> )	1	12/06/1999	Flora of County Cavan	
Custom	flowering plant	Plicate Sweet-grass ( <i>Glyceria notata</i> )	1	12/06/1999	Flora of County Cavan	
Custom	flowering plant	Prickly Sow-thistle ( <i>Sonchus asper</i> )	1	13/08/1998	Flora of County Cavan	
Custom	flowering plant	Primrose ( <i>Primula vulgaris</i> )	2	27/06/2015	Irish Vascular Plant Data - Robert Northridge	
Custom	flowering plant	Procumbent Pearlwort ( <i>Sagina procumbens</i> )	1	12/06/1999	Flora of County Cavan	
Custom	flowering plant	Ragged-Robin ( <i>Lychnis flos-cuculi</i> )	1	12/06/1999	Flora of County Cavan	
Custom	flowering plant	Ramsons ( <i>Allium ursinum</i> )	1	12/06/1999	Flora of County Cavan	
Custom	flowering plant	Raspberry ( <i>Rubus idaeus</i> )	1	12/06/1999	Flora of County Cavan	
Custom	flowering plant	Red Clover ( <i>Trifolium pratense</i> )	2	12/06/1999	Flora of County Cavan	
Custom	flowering plant	Red Dead-nettle ( <i>Lamium purpureum</i> )	1	12/06/1999	Flora of County Cavan	
Custom	flowering plant	Reed Canary-grass ( <i>Phalaris arundinacea</i> )	3	12/06/1999	Flora of County Cavan	
Custom	flowering plant	Remote Sedge ( <i>Carex remota</i> )	3	12/06/1999	Flora of County Cavan	
Custom	flowering plant	Ribwort Plantain ( <i>Plantago lanceolata</i> )	2	12/06/1999	Flora of County Cavan	
Custom	flowering plant	Rosebay Willowherb ( <i>Chamerion angustifolium</i> )	1	12/06/1999	Flora of County Cavan	
Custom	flowering plant	Rough Hawk's-beard ( <i>Crepis biennis</i> )	1	12/06/1999	Flora of County Cavan	
Custom	flowering plant	Rough Meadow-grass ( <i>Poa trivialis</i> )	2	12/06/1999	Flora of County Cavan	
Custom	flowering plant	Rumex sanguineus	2	12/06/1999	Flora of County Cavan	
Custom	flowering plant	Russian Comfrey ( <i>Symphytum officinale</i> x <i>asperum</i> = <i>S. x uplandicum</i> )	2	27/06/2015	Irish Vascular Plant Data - Robert Northridge	
Custom	flowering plant	Rusty Willow ( <i>Salix cinerea</i> subsp. <i>oleifolia</i> )	1	12/06/1999	Flora of County Cavan	
Custom	flowering plant	<i>Salix cinerea</i>	1	31/05/1999	Species Data from the National Vegetation Database	
Custom	flowering plant	Sanicle ( <i>Sanicula europaea</i> )	1	12/06/1999	Flora of County Cavan	
Custom	flowering plant	Sessile Oak ( <i>Quercus petraea</i> )	1	12/06/1999	Flora of County Cavan	
Custom	flowering plant	Shepherd's-purse ( <i>Capsella bursa-pastoris</i> )	1	12/06/1999	Flora of County Cavan	
Custom	flowering plant	Short-fruited Willowherb ( <i>Epilobium obscurum</i> )	1	12/06/1999	Flora of County Cavan	
Custom	flowering plant	Silverweed ( <i>Potentilla anserina</i> )	1	12/06/1999	Flora of County Cavan	
Custom	flowering plant	Smooth Sow-thistle ( <i>Sonchus oleraceus</i> )	1	12/06/1999	Flora of County Cavan	

Custom	flowering plant	Snowberry ( <i>Symphoricarpos albus</i> )	2	12/06/1999	Flora of County Cavan	
Custom	flowering plant	Soft-brome ( <i>Bromus hordeaceus</i> )	1	12/06/1999	Flora of County Cavan	
Custom	flowering plant	Soft-rush ( <i>Juncus effusus</i> )	2	12/06/1999	Flora of County Cavan	
Custom	flowering plant	Spear Thistle ( <i>Cirsium vulgare</i> )	2	12/06/1999	Flora of County Cavan	
Custom	flowering plant	Spindle ( <i>Euonymus europaeus</i> )	1	12/06/1999	Flora of County Cavan	
Custom	flowering plant	Sweet Vernal-grass ( <i>Anthoxanthum odoratum</i> )	1	12/06/1999	Flora of County Cavan	
Custom	flowering plant	Sycamore ( <i>Acer pseudoplatanus</i> )	3	12/06/1999	Flora of County Cavan	Invasive Species: Invasive Species    Invasive Species: Invasive Species >> Medium Impact Invasive Species
Custom	flowering plant	Taraxacum aggregate	2	12/06/1999	Flora of County Cavan	
Custom	flowering plant	Thin-spiked Wood-sedge ( <i>Carex striosa</i> )	1	27/06/2015	Irish Vascular Plant Data - Robert Northridge	
Custom	flowering plant	Thyme-leaved Speedwell ( <i>Veronica serpyllifolia</i> )	1	12/06/1999	Flora of County Cavan	
Custom	flowering plant	Tormentil ( <i>Potentilla erecta</i> )	1	12/06/1999	Flora of County Cavan	
Custom	flowering plant	Tufted Hair-grass ( <i>Deschampsia cespitosa</i> )	1	12/06/1999	Flora of County Cavan	
Custom	flowering plant	Turnip ( <i>Brassica rapa</i> )	1	12/06/1999	Flora of County Cavan	
Custom	flowering plant	Water Dock ( <i>Rumex hydrolapathum</i> )	1	12/06/1999	Flora of County Cavan	
Custom	flowering plant	Water Mint ( <i>Mentha aquatica</i> )	2	12/06/1999	Flora of County Cavan	
Custom	flowering plant	Water-plantain ( <i>Alisma plantago-aquatica</i> )	1	12/06/1999	Flora of County Cavan	
Custom	flowering plant	White Clover ( <i>Trifolium repens</i> )	2	12/06/1999	Flora of County Cavan	
Custom	flowering plant	White Dead-nettle ( <i>Lamium album</i> )	1	12/06/1999	Flora of County Cavan	
Custom	flowering plant	Wild Angelica ( <i>Angelica sylvestris</i> )	3	12/06/1999	Flora of County Cavan	
Custom	flowering plant	Wild Privet ( <i>Ligustrum vulgare</i> )	1	13/08/1998	Flora of County Cavan	
Custom	flowering plant	Wild Strawberry ( <i>Fragaria vesca</i> )	1	12/06/1999	Flora of County Cavan	
Custom	flowering plant	Winter Heliotrope ( <i>Petasites fragrans</i> )	1	12/06/1999	Flora of County Cavan	
Custom	flowering plant	Winter-cress ( <i>Barbarea vulgaris</i> )	1	12/06/1999	Flora of County Cavan	
Custom	flowering plant	Wood Avens ( <i>Geum urbanum</i> )	3	12/06/1999	Flora of County Cavan	
Custom	flowering plant	Wood Speedwell ( <i>Veronica montana</i> )	1	27/06/2015	Irish Vascular Plant Data - Robert Northridge	
Custom	flowering plant	Wood-sedge ( <i>Carex sylvatica</i> )	3	27/06/2015	Irish Vascular Plant Data - Robert Northridge	
Custom	flowering plant	Wood-sorrel ( <i>Oxalis acetosella</i> )	3	27/06/2015	Irish Vascular Plant Data - Robert Northridge	
Custom	flowering plant	Wych Elm ( <i>Ulmus glabra</i> )	1	12/06/1999	Flora of County Cavan	
Custom	flowering plant	Yarrow ( <i>Achillea millefolium</i> )	1	12/06/1999	Flora of County Cavan	
Custom	flowering plant	Yellow Iris ( <i>Iris pseudacorus</i> )	1	12/06/1999	Flora of County Cavan	
Custom	flowering plant	Yellow Water-lily ( <i>Nuphar lutea</i> )	1	12/06/1999	Flora of County Cavan	
Custom	flowering plant	Yorkshire-fog ( <i>Holcus lanatus</i> )	2	12/06/1999	Flora of County Cavan	

Custom	horsetail	Field Horsetail ( <i>Equisetum arvense</i> )	1	12/06/1999	Flora of County Cavan	
Custom	horsetail	Water Horsetail ( <i>Equisetum fluviatile</i> )	1	12/06/1999	Flora of County Cavan	
Custom	liverwort	Dilated Scalewort ( <i>Frullania dilatata</i> )	1	16/05/2012	Bryophytes of Ireland	Threatened Species: Least concern
Custom	liverwort	Even Scalewort ( <i>Radula complanata</i> )	1	16/05/2012	Bryophytes of Ireland	Threatened Species: Least concern
Custom	liverwort	<i>Marchantia polymorpha</i> subsp. <i>ruderalis</i>	1	09/10/2014	Bryophytes of Ireland : Data Compiled Post-Atlas	Threatened Species: Least concern
Custom	liverwort	Tamarisk Scalewort ( <i>Frullania tamarisci</i> )	1	16/05/2012	Bryophytes of Ireland	Threatened Species: Least concern
Custom	moss	Big Shaggy-moss ( <i>Rhytidiadelphus triquetrus</i> )	1	16/05/2012	Bryophytes of Ireland	Threatened Species: Least concern
Custom	moss	Broom Fork-moss ( <i>Dicranum scoparium</i> )	1	16/05/2012	Bryophytes of Ireland	Threatened Species: Least concern
Custom	moss	Bruch's Pincushion ( <i>Ulota bruchii</i> )	1	16/05/2012	Bryophytes of Ireland	Threatened Species: Least concern
Custom	moss	Capillary Thread-moss ( <i>Bryum capillare</i> )	1	16/05/2012	Bryophytes of Ireland	Threatened Species: Least concern
Custom	moss	Common Feather-moss ( <i>Eurhynchium praelongum</i> )	1	16/05/2012	Bryophytes of Ireland	Threatened Species: Least concern
Custom	moss	Common Pocket-moss ( <i>Fissidens taxifolius</i> )	1	16/05/2012	Bryophytes of Ireland	
Custom	moss	Common Striated Feather-moss ( <i>Eurhynchium striatum</i> )	1	16/05/2012	Bryophytes of Ireland	Threatened Species: Least concern
Custom	moss	Common Tamarisk-moss ( <i>Thuidium tamariscinum</i> )	1	16/05/2012	Bryophytes of Ireland	Threatened Species: Least concern
Custom	moss	Cypress-leaved Plait-moss ( <i>Hypnum cupressiforme</i> )	1	16/05/2012	Bryophytes of Ireland	
Custom	moss	Fern-leaved Hook-moss ( <i>Cratoneuron filicinum</i> )	1	16/05/2012	Bryophytes of Ireland	Threatened Species: Least concern
Custom	moss	Flat Neckera ( <i>Neckera complanata</i> )	1	16/05/2012	Bryophytes of Ireland	Threatened Species: Least concern
Custom	moss	Fountain Apple-moss ( <i>Philonotis fontana</i> )	1	16/05/2012	Bryophytes of Ireland	Threatened Species: Least concern
Custom	moss	Fox-tail Feather-moss ( <i>Thamnobryum alopecurum</i> )	1	16/05/2012	Bryophytes of Ireland	Threatened Species: Least concern
Custom	moss	Frizzled Crisp-moss ( <i>Tortella tortuosa</i> )	1	16/05/2012	Bryophytes of Ireland	Threatened Species: Least concern
Custom	moss	<i>Isoetecium myosuroides</i> var. <i>myosuroides</i>	1	16/05/2012	Bryophytes of Ireland	Threatened Species: Least concern
Custom	moss	Larger Mouse-tail Moss ( <i>Isoetecium alopecuroides</i> )	1	16/05/2012	Bryophytes of Ireland	Threatened Species: Least concern
Custom	moss	Lateral Cryphaea ( <i>Cryphaea heteromalla</i> )	1	16/05/2012	Bryophytes of Ireland	Threatened Species: Least concern
Custom	moss	Lyell's Bristle-moss ( <i>Orthotrichum lyellii</i> )	1	16/05/2012	Bryophytes of Ireland	Threatened Species: Least concern
Custom	moss	Pointed Spear-moss ( <i>Calliergonella cuspidata</i> )	1	16/05/2012	Bryophytes of Ireland	Threatened Species: Least concern

Custom	moss	Rigid Beard-moss ( <i>Didymodon rigidulus</i> )	1	16/05/2012	Bryophytes of Ireland	Threatened Species: Least concern
Custom	moss	Rough-stalked Feather-moss ( <i>Brachythecium rutabulum</i> )	1	16/05/2012	Bryophytes of Ireland	Threatened Species: Least concern
Custom	moss	Silky Wall Feather-moss ( <i>Homalothecium sericeum</i> )	1	16/05/2012	Bryophytes of Ireland	Threatened Species: Least concern
Custom	moss	Spiral Extinguisher-moss ( <i>Encalypta streptocarpa</i> )	1	16/05/2012	Bryophytes of Ireland	Threatened Species: Least concern
Custom	moss	Supine Plait-moss ( <i>Hypnum cupressiforme</i> var. <i>resupinatum</i> )	1	16/05/2012	Bryophytes of Ireland	Threatened Species: Least concern
Custom	moss	Tender Feather-moss ( <i>Rhynchostegiella tenella</i> )	1	16/05/2012	Bryophytes of Ireland	Threatened Species: Least concern
Custom	moss	Thickpoint Grimmiid ( <i>Schistidium crassipilum</i> )	1	16/05/2012	Bryophytes of Ireland	Threatened Species: Least concern
Custom	moss	Tree-moss ( <i>Climacium dendroides</i> )	1	16/05/2012	Bryophytes of Ireland	Threatened Species: Least concern
Custom	moss	Variable Forklet-moss ( <i>Dicranella varia</i> )	1	16/05/2012	Bryophytes of Ireland	Threatened Species: Least concern
Custom	moss	Wall Screw-moss ( <i>Tortula muralis</i> )	1	16/05/2012	Bryophytes of Ireland	Threatened Species: Least concern
Custom	moss	Wood Bristle-moss ( <i>Orthotrichum affine</i> )	1	16/05/2012	Bryophytes of Ireland	Threatened Species: Least concern
Custom	moss	<i>Zygodon viridissimus</i> sens.lat.	1	16/05/2012	Bryophytes of Ireland	
Custom	terrestrial mammal	Eurasian Badger ( <i>Meles meles</i> )	1	31/12/2005	Badger Setts of Ireland Database	Protected Species: Wildlife Acts
Custom	terrestrial mammal	Eurasian Red Squirrel ( <i>Sciurus vulgaris</i> )	2	31/12/2012	Irish Squirrel Survey 2012	Protected Species: Wildlife Acts





## **APPENDIX 3**

### **PHOTO LOGS**





**Plate A7.1 Photo of drainage channel and broken hedgerow habitat on northern boundary of the site.**



**Plate A7.2 Photo of treeline habitat on western boundary of the site.**





**Plate A7.3 Photo of broken hedgerow on southern boundary of the site.**



**Plate A7.4 Photo of hedgerow on eastern boundary of the site.**





**Plate A7.5 Photo of broken hedgerow within central portion of the site.**



**Plate A7.6 Photo of recolonising bare ground habitat onsite.**



## **APPENDIX 4**

### **SSRS ASSESSMENT SHEETS**





River: <b>POLES</b>	Code: <b>SW1</b>	Date: <b>6/7/23</b>	Time: <b>Spn</b>
Station no. <b>WA-SW1-01</b>	Location: <b>DRUMLARK</b>	Grid (6 figure): <b>64781, 807316</b>	
Field Chemistry		Stream Order: <b>1st</b>	Stream flow:
DO%	-	Modifications: <b>Y/N</b> Canalised-widened-bank erosion-arterial drainage	Riffle
DO mg/l	-	Dominant Types:	Riffle/Glide
Temp (°C)	-	Bedrock	Slow flow
Conductivity	-	Boulder (>128mm)	<b>RIFLE - 40%</b>
pH	-	Cobble (32-128mm)	<b>GLIDE - 50%</b>
Bank width (cm)	<b>2m</b>	Gravel (8-32mm)	<b>POOL - 10%</b>
Wet width (cm)	<b>1m</b>	Fine Gravel (2-8mm)	
Avg Depth (cm)	<b>15cm</b>	Sand (0.25-2mm)	
Staff gauge		Silt (<0.25mm)	
Velocity	Colour	Slope: Low - Medium - High - Very High	Shading: High - <b>Moderate</b> - Low - None
Torrential	None	Geology: Calcareous-Siliceous <b>Mixed</b>	Cattle access Y: upstream - downstream of <b>N</b>
Fast	<b>Slight</b>	Substratum Condition: Calcareous-Compacted-Loose - <b>Normal</b>	<b>Fenced off</b>
<b>Moderate</b>	Moderate	Substratum:	Photo: Y / N
Slow	High	<b>Stoney bottom</b> -Muddy bottom-Mud over stones	
Very slow		Degree of siltation: Clean-Slight-Moderate <b>Heavy</b>	
Clarity	Discharge	Depth of mud: None <b>&lt;1cm</b> 1-5cm: 5-10cm: >10cm	
Very clear	Flood	Litter: None - <b>Present</b> - Moderate - Abundant	
Clear	<b>Normal</b>	Filamentous Algae:	Sewage Fungus:
<b>Slightly turbid</b>	Low	<b>None</b> - Present - Moderate - Abundant	<b>None</b> - Present - Moderate - Abundant
Highly turbid	Very Low	Main land use u/s:	Sample retained: Y / N
	Dry	<b>Pasture</b>	Sampled in Minutes:
	Recent Flood	Bog	Pond net x <b>2</b>
		Urban	Stone wash x <b>1</b>
		Tillage	Weed sweep x <b>1</b>
		Other	

General Comments: **NO mayfly or stonefly species recorded.**  
**Cammarus** dominated the sample.

"OTHER GOLD" Taxa refers to the presence of leeches.

**Macroinvertebrate Composition**

The macroinvertebrates are divided into the following 5 specific groups:

Group 1 = Ephemeroptera (3-tails) - note that tails may be damaged during sampling	Relative Abundance
Group 2 = Plecoptera (2-tails) - note that tails may be damaged during sampling	1-5 1
Group 3 = Trichoptera	6-20 2
Group 4 = G.O.L.D (Gastropoda, Oligochaeta and Diptera)	21-50 3
Group 5 = Asellus	51-100 4
Calculate the total number of taxa and relative abundance of each macroinvertebrate group below: (Abundance - Ab)	101+ 5

**Ephemeroptera:**

<i>Ecayonurus</i> Ab	
<i>Rhithrogena</i> Ab	
<i>Heptagenia</i> Ab	
<i>Ephemerella</i> Ab	
<i>Caenis</i> Ab	
<i>Paraleptophlebia</i> Ab	
<i>Ephemera danica</i> Ab	
Other Ephem Ab	

**Plecoptera:**

<i>Leuctra</i> Ab	
<i>Isoperla</i> Ab	
<i>Protonemura</i> Ab	
<i>Amphinemura</i> Ab	
<i>Perla</i> Ab	
<i>Dinocras</i> Ab	
Other Plecop Ab	
Other Plecop Ab	

**Trichoptera:**

Total no. of taxa	<b>0</b>	Total Relative Abundance	<b>0</b>
Hydropsychidae Ab			
Polycentropodidae Ab			
<i>Rhyacophila</i> Ab			
Philopotamidae Ab			
Limnephilidae Ab			
Sericostomatidae Ab			
<b>Glossosomatidae</b> Ab	<b>1</b>		
Lepidostomatidae Ab			
Other Trichoptera Ab			

**G.O.L.D:**

Total no. of Taxa	<b>0</b>	Total Relative Abundance	<b>0</b>
<i>Lymnaea</i> (G) Ab			
<i>Potamopyrgus</i> (G) Ab			
<i>Planorbis</i> (G) Ab			
<i>Ancylus</i> (G) Ab			
<i>Physa</i> (G) Ab			
<i>Lumbriculus</i> (O) Ab			
<i>Eiseniella</i> (O) Ab			
Tubificidae (O) Ab			

**Chironomidae (D) Ab:**

<i>Chironomus</i> (D) Ab	
Simuliidae (D) Ab	<b>1</b>
<i>Dicranota</i> (D) Ab	
Tipulidae (D) Ab	
Ceratopogonidae (D) Ab	
Other GOLD Ab	<b>1</b>

**Asellus:**

Absent	<input checked="" type="checkbox"/>
Few/Low	
Common/Numerous	

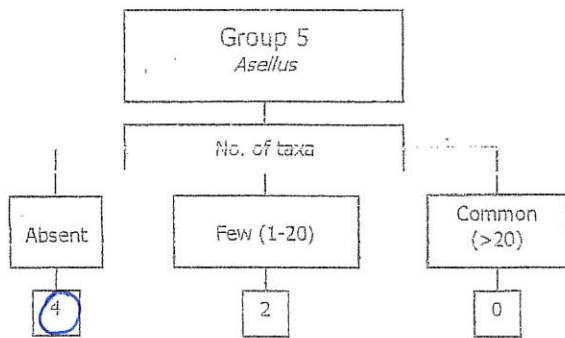
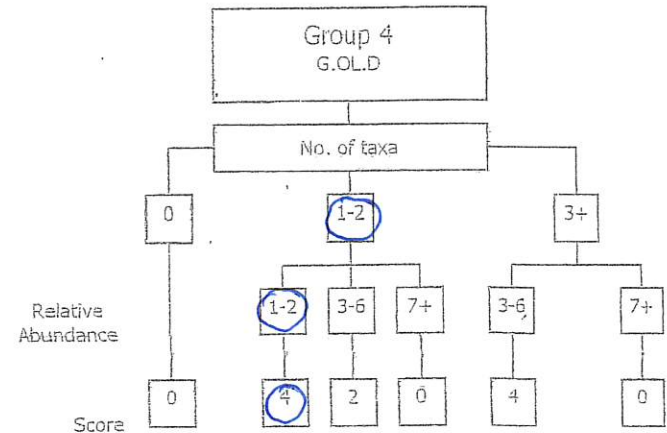
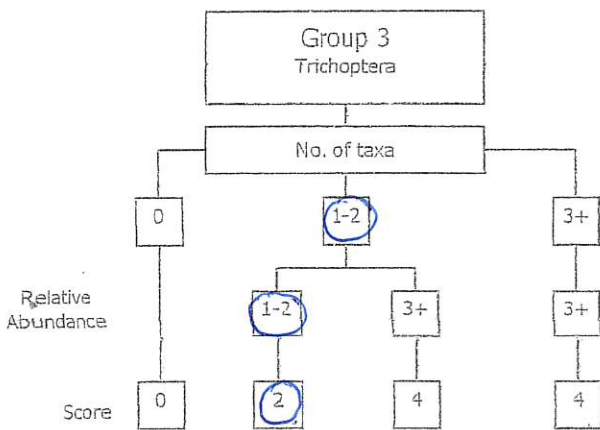
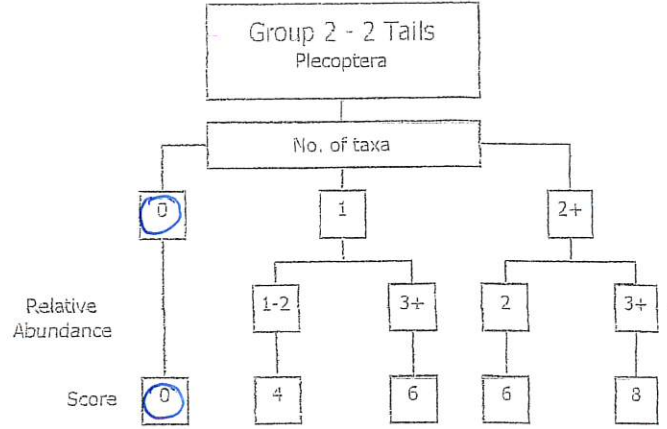
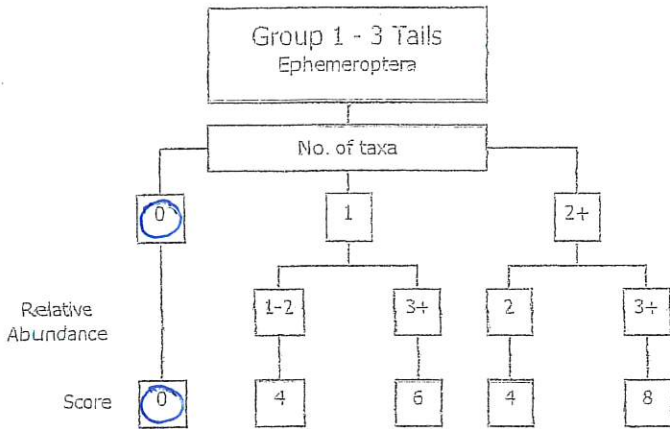
Total no. of Taxa **1** Total Relative Abundance **1**

Total no. of Taxa **2** Total Relative Abundance **2**

NOTE: *Asellus* must be recorded as absent if none are found

NOTE *Baetis* is an Ephemeropteran and is the most commonly occurring invertebrate genus in streams in Ireland. It is vital that *Baetis* is not counted in SSRS. See Appendix B for more details on how to identify *Baetis*.

Step 1. Calculate the Index Score by circling the appropriate box representing the total number of taxa and the total abundance calculated from *each macroinvertebrate group* calculated from page 1 of the recording sheet and enter in to the boxes in Step 2.



**Step 2**

- a) Index Score Group 1
- b) Index Score Group 2
- c) Index Score Group 3
- d) Index Score Group 4
- e) Index Score Group 5

Step 3. Calculate the Total Index Score, the Average Index Score and the SSR Score using the boxes below

Total Index Score (TIS) sum (a+b+c+d+e)

Average Index Score (AIS) TIS/5 (5 for 5 groups)

SSR Score (AIS x 2)

Step 4. Assess the stream by comparing the final SSR score with the categories below and tick the appropriate box

> 7.25  Probably not at risk

> 6.5 – 7.25  Indeterminate. Stream may be at risk

< 6.5  Stream at risk

Surveyor (signed): Patrick McCabe Name (print): PATRICK mCABE Date: 06 / 07 / 23