ECOLOGICAL SURVEYS OF THE AREA OF THE SPICER'S MILL MASTERPLAN, NAVAN, CO MEATH

SEPTEMBER 2022

Prepared September 2022 by:

Forest, Environmental Research and Services Ltd. (www.fers.ie)
Sillogue
Kilberry
Navan
Co. Meath
087 7573121
pat.moran@fers.ie
OSI License No.: EN0064509

EXECUTIVE SUMMARY

In April of 2022, an EcIA identifying potential ecological constraints associated with the proposed Spicer's Mill Masterplan was prepared on behalf of Meath Co. Council. This report concluded that given the nature and ecologically sensitive location of the proposals within the Masterplan, the following surveys should be undertaken within the appropriate ecological window:

- Terrestrial flora and habitat survey to include qualitative and quantitative assessments;
- Aquatic flora survey to include the Boyne Navigation Canal as it occurs in the lands and the River Boyne as it occurs adjacent;
- Survey and mapping of any Alien Invasive Plant Species (plant species listed in Part(1) of the Third Schedule of the European Communities (Birds and Natural Habitats) Regulations of 2011;
- General bird survey;
- Kingfisher survey;
- Non-volant mammal survey;
- Otter survey; and
- Bat survey – in addition to (a combination of both static and emergence/dawn) surveys undertaken in June/July to assess activity during the Maternity Roosting season, surveys should be undertaken in September (static and emergence) to assess and mating swarm activity and during the winter months to assess use of habitats such as the Spicers buildings as hibernacula.

During the period June – August 2022, these surveys (with the exception of bat surveys, which were undertaken by Dr Tina Aughey) were undertaken by FERS Ltd. The summary of the results are:

- There are no terrestrial or aquatic Flora Protection Order plant species or Red Data List species present within the Masterplan area;
- There are significant populations of two plant species listed in Part (1) of the Third Schedule of the European Communities (Birds and Natural Habitats) Regulations of 2011 (as amended);
- The woodland habitat and riparian corridor is important with regard to the local avifauna resource;
- Both the River Boyne and the Boyne Navigation Canal are utilised by Kingfisher, with Kingfisher observed utilising both habitats;
- Virtually no signs of non-volant mammals were observed (including trail camera footage) – this is likely owing to the high levels of human use, high levels of dog activity and likely high levels of domestic cat activity; and
- Although no otter were observed during targeted surveys, otter are certain to utilise both the river habitat and Boyne Navigation Canal habitat and the terrestrial habitat adjacent, although activity is curtailed by human and dog presence.

The primary constraints (bats notwithstanding) regard potential impacts on water quality, spread of Japanese Knotweed and/or Himalayan Balsam, and disturbance of fauna – in particular Otter and Kingfisher.

Contents

1 Introduction

1.1 FERS Company Background

Forest, Environmental Research and Services have been conducting ecological surveys and research since the company's formation in 2005 by Dr Patrick Moran and Dr Kevin Black. Dr Moran, the principal ecologist with FERS, holds a 1st class honours degree in Environmental Biology (UCD), a Ph.D. in Ecology (UCD), a Diploma in EIA and SEA management (UCD) a Diploma in Environmental and Planning Law (King's Inn) and a M.Sc. in Geographical Information Systems and Remote Sensing (University of Ulster, Coleraine). Patrick has in excess of 20 years of experience in carrying out ecological surveys on both an academic and a professional basis. Dr Emma Reeves, senior ecologist with FERS holds a 1st class honours degree in Botany, and a Ph.D. in Botany. Emma has in excess of 15 years of experience in undertaking ecological surveys on an academic and professional basis. Ciarán Byrne, a senior ecologist with FERS holds a 1st class honours degree in Environmental Management (DIT) and a M.Sc. in Applied Science/Ecological Assessment (UCC). Ciarán has in excess of 10 years in undertaking ecological surveys on both an academic and a professional basis.

FERS client list includes National Parks and Wildlife Service, An Bord Pleanála, various County Councils, the Heritage Council, Teagasc, University College Dublin, the Environmental Protection Agency, Inland Waterways Association of Ireland, the Department of Agriculture, the Office of Public Works and Coillte in addition to numerous private individuals and companies.

1.2 Aims of this report

The primary aim of this report is to document the results of ecological surveys undertaken in line with recommendations following an ecological impact assessment (EcIA), the aim of which was the identification of potential ecological constraints as regards the Spicer's Mill Masterplan. The primary aims of the surveys undertaken were:

- To survey habitats, flora and fauna occurring within the study area;
- To produce baseline information on the presence, distribution and conservation status of ecological habitats and species of flora/fauna within the study area;
- To highlight elements or particular areas of specific potential for biodiversity or conservation interest;

- To highlight elements with the potential to damage the ecological integrity of the study area;
- To identify the potential presence and effectiveness of ecological corridors within the study area and linking the study area to adjoining areas of potential biodiversity interest;
- To assess and make recommendations on conservation priorities regarding the identified biodiversity resource of the site; and
- To make recommendations regarding future habitat management and ecological monitoring at the site.

1.3 Description of lands within Masterplan area

The Spicer's Mill Masterplan is still at a conceptual and design stage. The lands include, Spicer's Bakery and associated buildings, Andy Brennan Park and a portion of the Ramparts, primarily the existing car park and a section to the rear of Spicers Bakery.

The location of the lands in question is indicated in Figure 1, Figure 2, Figure 3 and Figure 4.

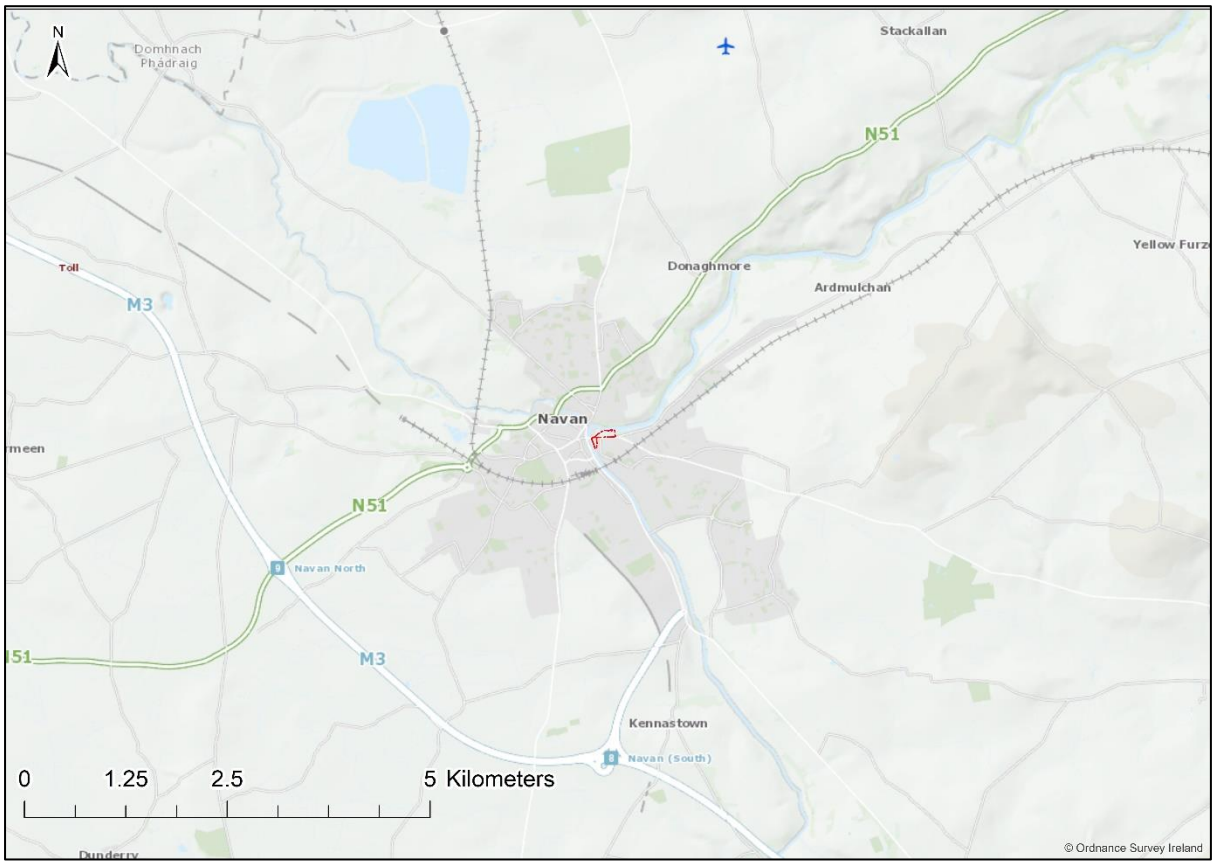

Figure 1: Approximate location of lands in question (1:50,000)

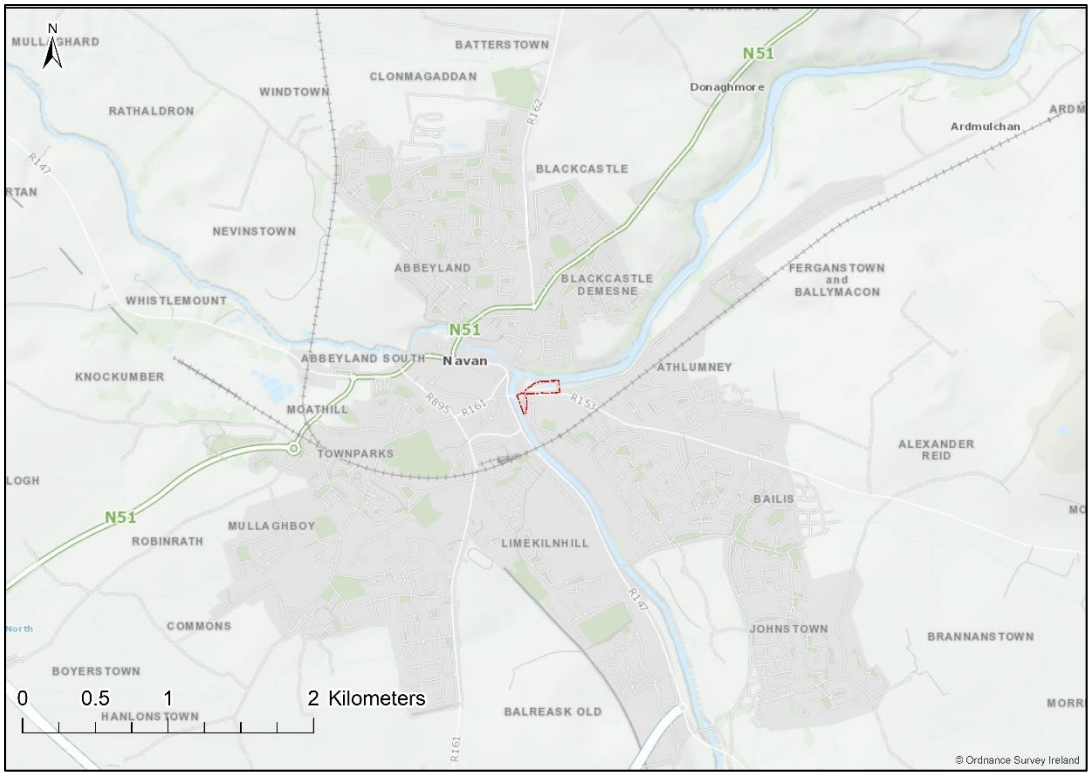

Figure 2: Approximate location of lands in question (1:25,000)

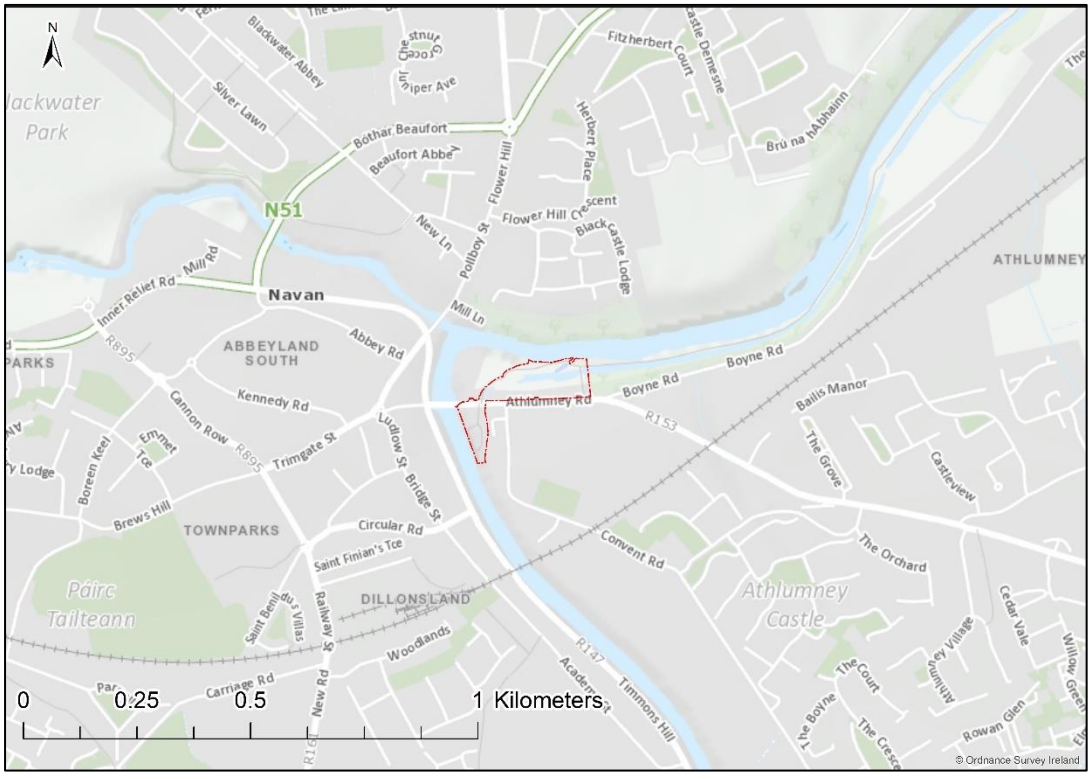

Figure 3: Approximate location of lands in question (1:8,000)

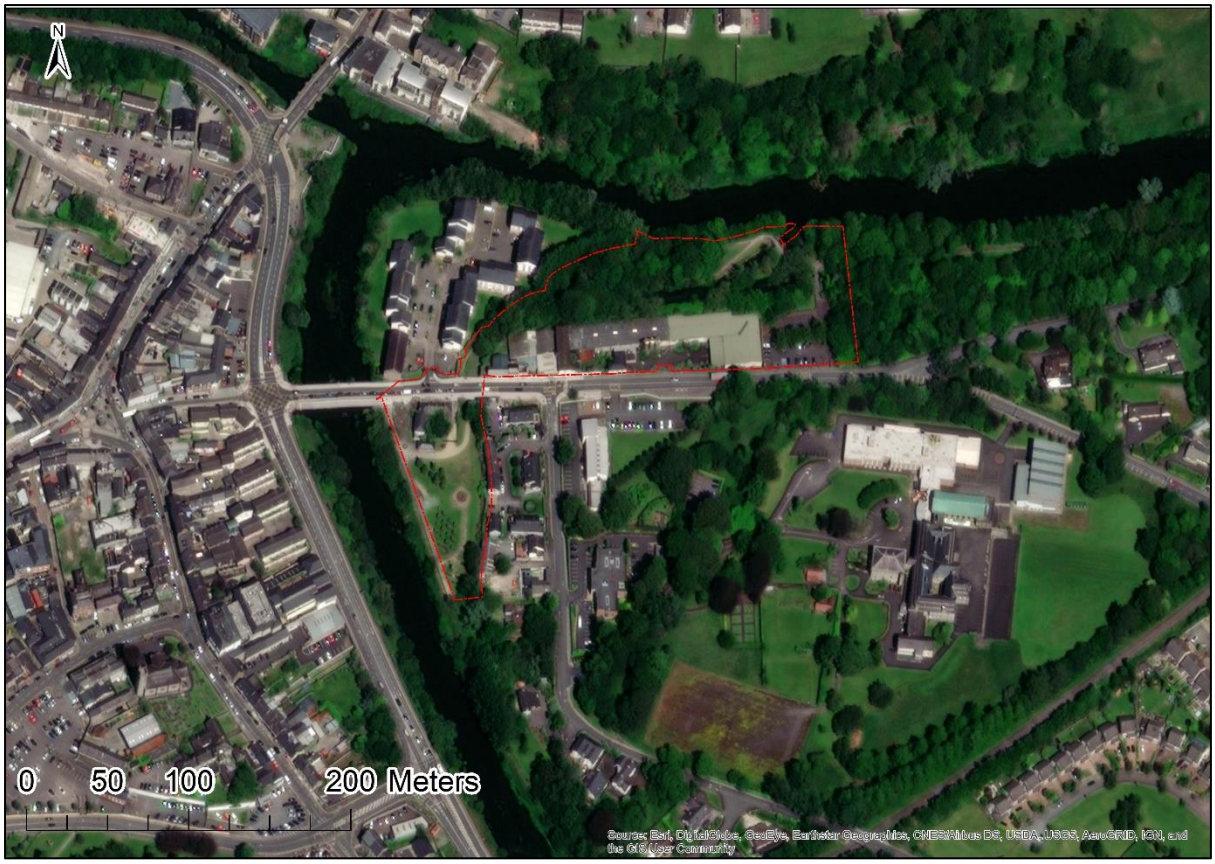

Figure 4: Approximate location of lands in question (1:2,500)

2 Survey Methodology

2.1 Desk Study

2.1.1 NPWS database

The primary body consulted with regard to matters involving ecology within the Republic of Ireland is the National Parks and Wildlife Service (NPWS). The role of the NPWS is:

- To secure the conservation of a representative range of ecosystems and maintain and enhance populations of flora and fauna in Ireland;
- To implement the EU Habitats and Birds Directives;
- To designate and advise on the protection of Natural Heritage Areas (NHA) having particular regard to the need to consult with interested parties;
- To make the necessary arrangements for the implementation of National and EU legislation and policies and for the ratification and implementation of the range of international Conventions and Agreements relating to the natural heritage; and
- To manage, maintain and develop State-owned National Parks and Nature Reserves.

The desk study as pertaining to this survey involved querying the NPWS database for information pertaining to designated sites (Special Areas of Conservation (SAC), Special Protection Areas (SPA), Natural Heritage Areas (NHA) and Proposed Natural Heritage Areas (pNHA)) occurring within 5 km of the proposed development.

2.1.2 NBDC Database

In addition to consulting the NPWS database, the National Biodiversity Data Centre Database was consulted regarding species of conservation concern recorded as occurring within the vicinity of the study area

2.1.3 Other relevant datasets

Other relevant datasets were queried where appropriate

2.2 Field surveys

2.2.1 Botanical/Habitat surveys

Field surveys of vegetation were carried out during the optimal window for such surveys. An initial botanical survey was carried out on the morning of June 13th, 2022, by Dr Patrick Moran. A second botanical survey was undertaken by Dr Emma Reeves on the morning of July 5th, 2022. This is within the optimal window for undertaking ecological assessments. Nomenclature follows "Webb's An Irish Flora" (2012 – 8th Edn) and "Mosses and Liverworts of Britain and Ireland a Field Guide" (2010) The botanical and habitat survey consisted of walk-over surveys through study area. The surveys recorded all species of flora observed occurring within the study area. The botanical survey placed particular emphasis on rare, protected or annexed habitats/species by reference to -

a) Irish Plant Red Data Book;
b) Habitats listed on Annex I of the EU Habitats Directive;
c) Species listed on Annex II of the EU Habitats Directive; and
d) Ecological stepping stones and ecological corridors (as covered under Article 10 of the EU Habitats Directive.

Written descriptions of all habitats within the receiving environment were recorded, to include the dominant species occurring within each habitat. Photographs of representative areas of each habitat are presented. An evaluation of the ecological significance of flora and habitats occurring within the site relative to surrounding habitats was also undertaken.

2.2.2 Species of Invasive Alien Plants listed on Part (1) of the Third Schedule of the European Communities (Birds and Natural Habitats) Regulations of 2011

The human introduction of alien plant species into ecosystems (intentionally or unintentionally) is historically a common-place occurrence. The vast majority of these alien plant species, when introduced into a foreign ecosystem for which they are not adapted, will die without specific care. In a small number of cases, however, these plants can come to dominate the ecosystem into which they have been introduced and become "Invasive". There is presently a great deal of concern regarding the potential for invasive plant species to threaten the species composition, community structure and overall biodiversity of native Irish habitats. Invasive species can change the character and/or condition

of an ecosystem over an extensive area through several mechanisms, depending on the species of plant and the nature of the habitat. Given the location of the Spicer's Mill Masterplan area, immediately adjacent to the River Boyne, specific cognisance was given to the potential presence of Alien Invasive Plant Species within the survey area. There are more than 30 species on the Third Schedule of the European Communities (Birds and Natural Habitats) Regulations of 2011 (as amended). Riparian systems are particularly vulnerable to plant invasions owing largely to the naturally high disturbance frequencies within riparian habitats and the rapidity with which an invasive can spread utilising the medium of flowing water. In addition, there has been an historic tendency for people to plant "ornamental" species beside water. As a result, the vast majority of the species listed on the Third Schedule are associated broadly with riparian systems, occurring within the water course, or proliferating along the bank (see Table 1).

Table 1: List of plant species appearing on the Third Schedule (as amended)

Common Name	Latin Name	Associated with freshwater habitats
American skunk-cabbage	*Lysichiton americanus*	*Yes*
Red alga	*Grateloupia doryphora*	*No*
Brazilian giant-rhubarb	*Gunnera manicata*	*Yes*
Broad-leaved rush	*Juncus planifolius*	*Yes*
Cape pondweed	*Aponogeton distachyos*	*Yes*
Cord-grasses	*Spartina (all species hybrids)*	*No*
Curly waterweed	*Lagarosiphon major*	*Yes*
Dwarf eel-grass	*Zostera japonica*	*No*
Fanwort	*Cabomba caroliniana*	*Yes*
Floating pennywort	*Hydrocotyle ranunculoides*	*Yes*
Fringed water-lily	*Nymphoides peltata*	*Yes*
Giant hogweed	*Heracleum mantegazzianum*	*Yes*
Giant knotweed	*Fallopia sachalinensis*	*Yes*
Giant-rhubarb	*Gunnera tinctoria*	*Yes*
Giant salvinia	*Salvinia molesta*	*Yes*
Himalayan balsam	*Impatiens glandulifera*	*Yes*
Himalayan knotweed	*Persicaria wallichii*	*Yes*
Hottentot-fig	*Carpobrotus edulis*	*No*
Japanese knotweed	*Fallopia japonica*	*Yes*
Large-flowered waterweed	*Egeria densa*	*Yes*
Mile-a-minute weed	*Persicaria perfoliata*	*Yes*
New Zealand pigmyweed	*Crassula helmsii*	*Yes*
Parrot's feather	*Myriophyllum aquaticum*	*Yes*
Rhododendron	*Rhododendron ponticum*	*No*
Salmonberry	*Rubus spectabilis*	*Yes*
Sea-buckthorn	*Hippophae rhamnoides*	*No*
Spanish bluebell	*Hyacinthoides hispanica*	*No*
Three-cornered leek	*Allium triquetrum*	*No*
Wakame	*Undaria pinnatifida*	*No*
Water chestnut	*Trapa natans*	*Yes*
Water fern	*Azolla filiculoides*	*Yes*
Water lettuce	*Pistia stratiotes*	*Yes*
Water-primrose	*Ludwigia (all species)*	*Yes*
Waterweeds	*Elodea (all species excepting E. canadensis)*	*Yes*
Wireweed	*Sargassum muticum*	*Marine/transition*

Of the species listed in Part (1) of the Third Schedule, three species are of particular concern owing to the location of the survey area, the abundance of these species in Meath and the potential for spread along the River Boyne:

- Japanese Knotweed (*Fallopia Japonica);*
- Himalayan Balsam (*Impatiens glandulifera*); and
- Giant Hogweed (*Heracleum mantegazzianum*).

The survey for Alien Invasive Species listed in Part (1) of the Third Schedule of the European Communities (Birds and Natural Habitats) Regulations of 2011 was undertaken by Dr Patrick Moran on the 20th of July 2022.

2.2.3 Habitat Mapping

Field maps were prepared utilising a base-map and ESRI Digital Globe Satellite Imagery. Field maps were prepared prior to surveys, allowing the surveyor to mark pertinent information (habitat type, location of unusual species, etc.) on field maps. These field maps were then utilised to generate a habitat map in ArcGIS 10.8. Habitat mapping was carried out based on "Best Practice Guidance for Habitat Survey and Mapping" (Smith *et al* 2011).

2.2.4 Breeding Bird Surveys

Bird Watch Ireland and the RSPB NI have agreed a list of priority bird species for conservation action on the island of Ireland. These Birds of Conservation Concern in Ireland are published in a list known as the BoCCI List. In this BoCCI List, birds are classified into three separate lists (Red, Amber and Green), based on the conservation status of the bird and hence conservation priority. The Red List birds are of high conservation concern, the Amber List birds are of medium conservation concern and the Green List birds are not considered threatened.

A general bird survey was undertaken by Dr Patrick Moran on the 13th of June 2022 under optimal conditions. Transects through the study area were walked and all birds recorded following a modified common bird census or Brown & Shepherd survey. Transects were walked at a slow pace, with all bird species observed noted and recorded and identified. All birds observed were considered to be breeding in the vicinity of the site. McKinnon Lists were not compiled owing to relatively small numbers of species utilising the habitats present. A second bird survey was undertaken on the 20th of July 2022 in order to identify any further species.

In order to comprehensively the avifauna present within the woodland habitat, Passive Acoustic Monitoring Equipment (Songmeter Micro) was deployed between the 20th of July and the 27th of July 2022. The purpose of these bird surveys was to:

- Record any priority species (Annex I, Red or Amber listed) and assess their breeding status within the site;
- Identify any areas of habitat of particular interest with regard to avian biodiversity.

2.2.5 Kingfisher Survey

The importance of the biodiversity of Ireland's waterways is reflected in the designation of many of our waterways under the Birds and Habitats Directives. A number of species of European significance occur on our waterways including the Kingfisher (*Alcedo atthis*), which is listed on Annex I of the EU Birds Directive. In 2010 (Cummins *et al*), six major river systems - the Rivers Barrow, Blackwater (Munster), Boyne, Clare, Moy and Nore (in addition to two smaller systems, the Rivers Gill and Illen) – were surveyed in order to assess the distribution and abundance of Kingfisher in representative habitats throughout Ireland. Kingfisher were recorded on all river systems surveyed. Kingfisher are known to occur within the Spicer's Mill Masterplan Area.

The primary goal of Kingfisher surveys was:

(1) To identify if there are areas suitable for nesting Kingfisher within the site; and

(2) To note any indications of foraging Kingfisher immediately adjacent.

Kingfisher surveys were carried out by Dr Patrick Moran on the 13th of June and 20th of July 2022 under optimal conditions (clear visibility, no rain, no wind), using a modified version of the methodology as presented in "Assessment of the distribution and abundance of Kingfisher *Alcedo atthis* and other riparian birds on six SAC river systems in Ireland" (Cummins *et al*, 2010) – which was prepared by Birdwatch Ireland for the NPWS. The survey concentrated on areas known to be previously utilised by Kingfisher.

2.2.6 Non-volant Mammal survey

A general mammal survey was undertaken at the site by Dr Patrick Moran on dates in June (13th), July (27th), August (3rd) and September (9th) 2022. In addition to a survey of the area through direct observations (seeing the animal), observation of faeces, prey remains, shelters, hair, a potential wildlife trail was identified during a bird survey on the 20th of July 2022 and a trail camera was deployed at the location for a period of 2 weeks. The trail camera (Bushnell Aggressor No Glow) is equipped with an infrared flash, enabling the capture of both still and video footage at night without being detected. The location of the deployment of the camera was limited by human activity as the camera necessarily must be deployed in a relatively open location. The camera was located on a tree adjacent to a pathway between the Boyne Navigation Canal and the River Boyne in woodland habitat (see Figure 5).

Figure 5: Location of trail camera on path between canal and river through woodland habitat

2.2.6.1 Otter Survey

Otter (*Lutra lutra*) is a primarily piscivorous species, depending largely on salmonids but also consuming frogs, crayfish, etc. An Otter survey was undertaken by Dr Patrick Moran on the 20th of July, 3rd of August and 20th of September 2022. The methodology utilised was based on that presented by NPWS in the Irish Wildlife Manual 76 (National Otter Survey of Ireland 2010/12 – Reid *et al.,* 2013), with a survey being carried out for spraints (but also recording other signs, such as footprints, fish remains, slides, etc.). Otter are known to occur in the river Boyne proximate to the proposed Spicer's Mill Masterplan.

2.2.7 GIS

Habitat mapping was achieved utilising standard methodologies and according to best practice (Smith *et al* 2011). Habitats having been identified and surveyed from field maps, these were digitised within ArcGIS 10.8.

3 Results

3.1 Desk Study

3.1.1 National Parks and Wildlife Service database

This section of the desk study primarily involved the consultation of the NPWS data-base, which is publicly accessible. A GIS-based analysis of sites designated for conservation interests (Special Area of Conservation (SAC), Special Protection Area (SPA), Natural Heritage Area (NHA) and Proposed Natural Heritage Area(pNHA)) occurring within 5 km of the survey areas was undertaken. The desk study as pertaining to this survey involved querying the NPWS database for information pertaining to designated sites in the vicinity of the survey area. European designated site (Special Areas of Conservation (SAC) and Special Protection Areas (SPA)) within 15 km and Domestic designated sites (Natural Heritage Areas (NHA) and Proposed Natural Heritage Areas (pNHA)) occurring within 5 km of the survey area were identified. There are one SAC, one SPA and one pNHA occurring within these buffers. Please see Table 2, Table 3, Figure 6, Figure 7, Figure 8, Figure 9 and Figure 10.

Table 2: Domestic designated sites (NHA/pNHA) within 5 km of proposed development area

SITE NUMBER	DESIGNATION	SITE NAME
001592	pNHA	Boyne Woods

Table 3: European Designated sites within 15 km of proposed development area

SITE NUMBER	DESIGNATION	SITE NAME
002299	SAC	River Boyne and River Blackwater
004232	SPA	River Boyne and River Blackwater

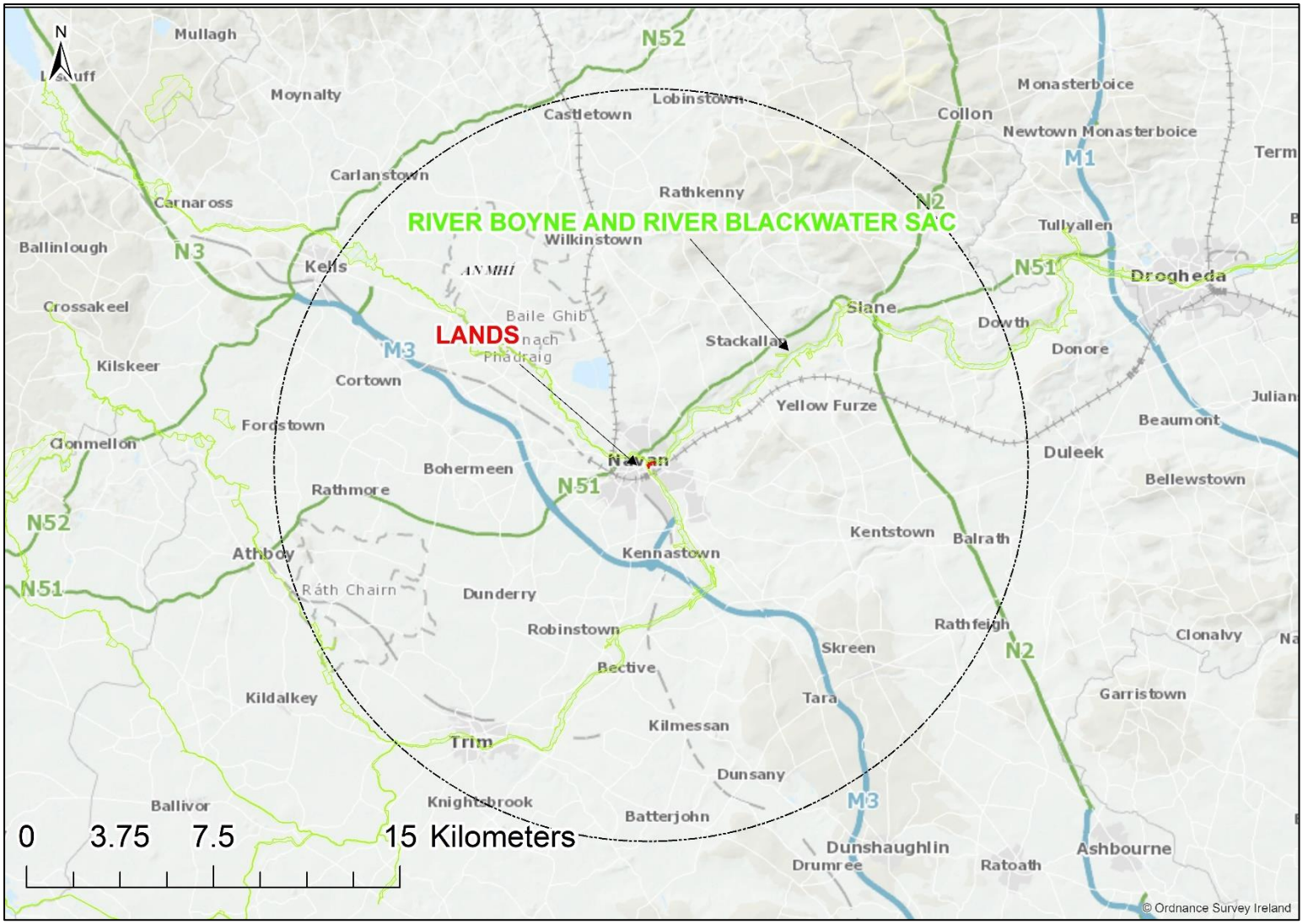

Figure 6: SACs within 15 km of the proposed development area

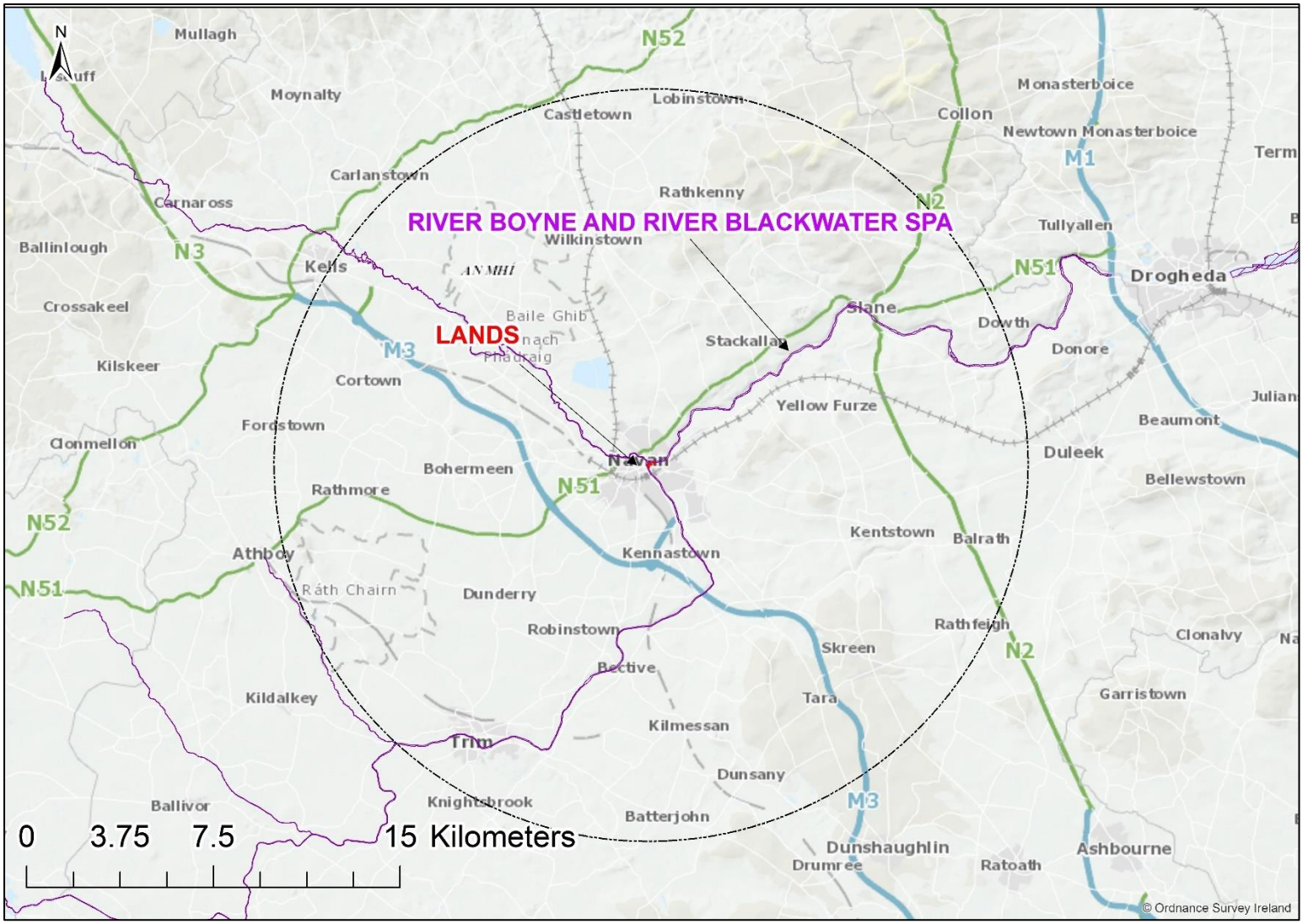

Figure 7: SPAs within 15 km of the proposed development area

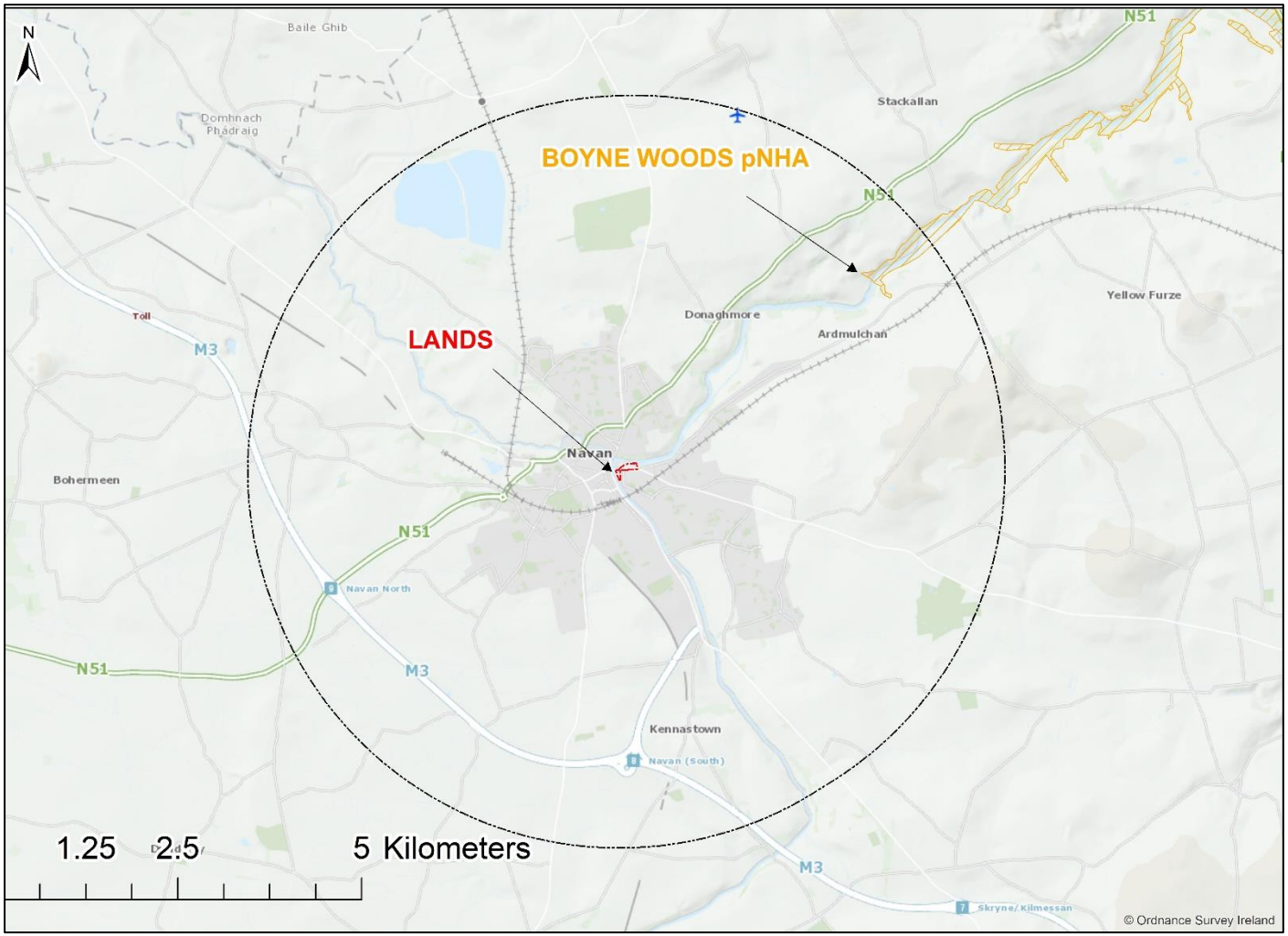

Figure 8: pNHAs within 5 km of the proposed development area (please note there are no NHAs within the buffer zone)

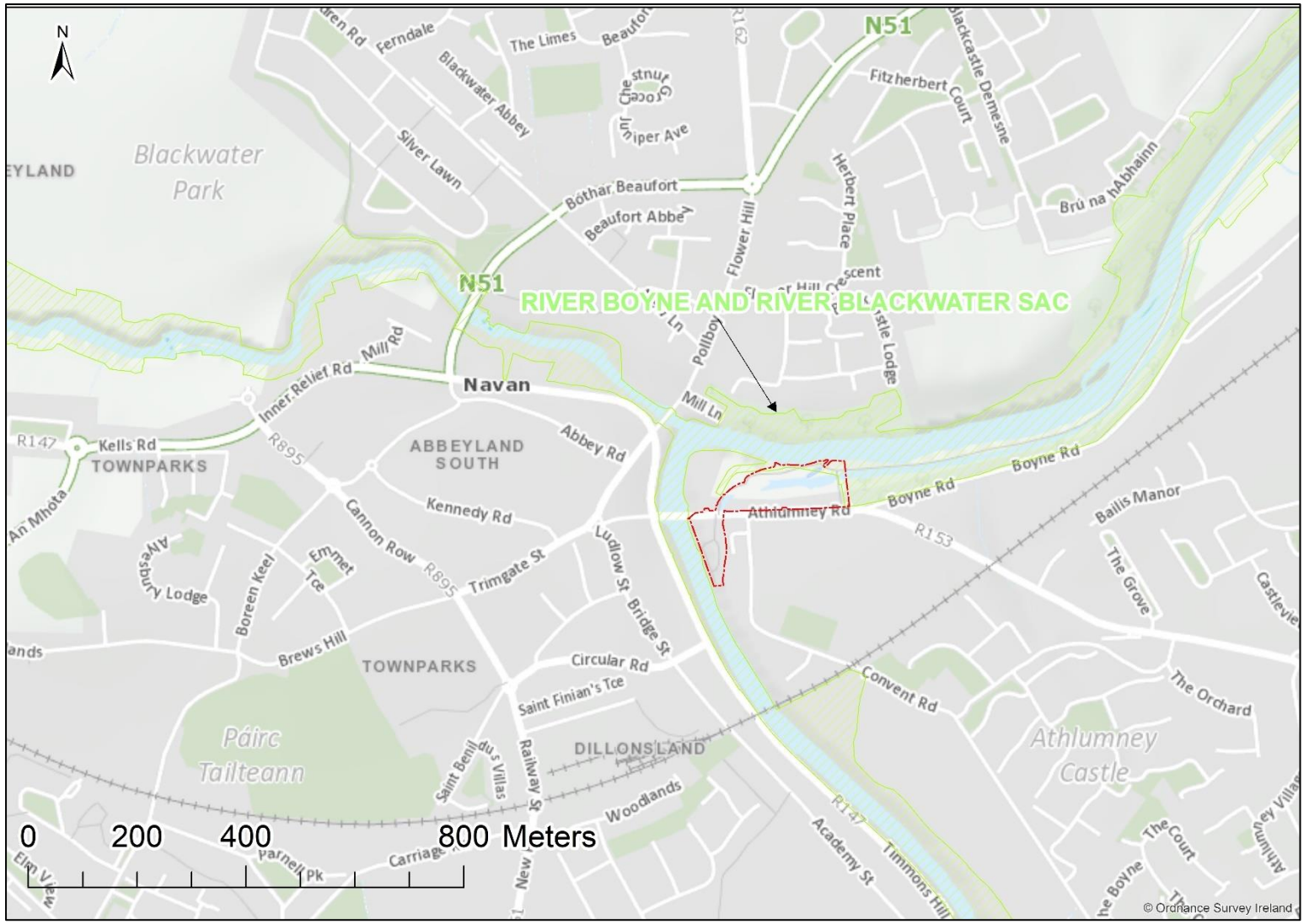

Figure 9: Map illustrating location of lands in question relative to River Boyne and River Blackwater SAC

Figure 10: Map illustrating location of lands in question relative to River Boyne and River Blackwater

3.1.2 National Biodiversity Data Centre database

The NBDC database was accessed on 09/09/22 to query records occurring within the vicinity of the proposed development (1 km square, N8767 see Figure 11). The species of conservation concern as recorded within this 1 km square are illustrated in

Table 4. Both Otter (QI of SAC) and Kingfisher (QI of SPA) are known to occur within the Masterplan area. Also, the map presented in Figure 12 indicates that as regards the "Habitat Suitability Index" for all bats, the proposed development is located in the second highest category.

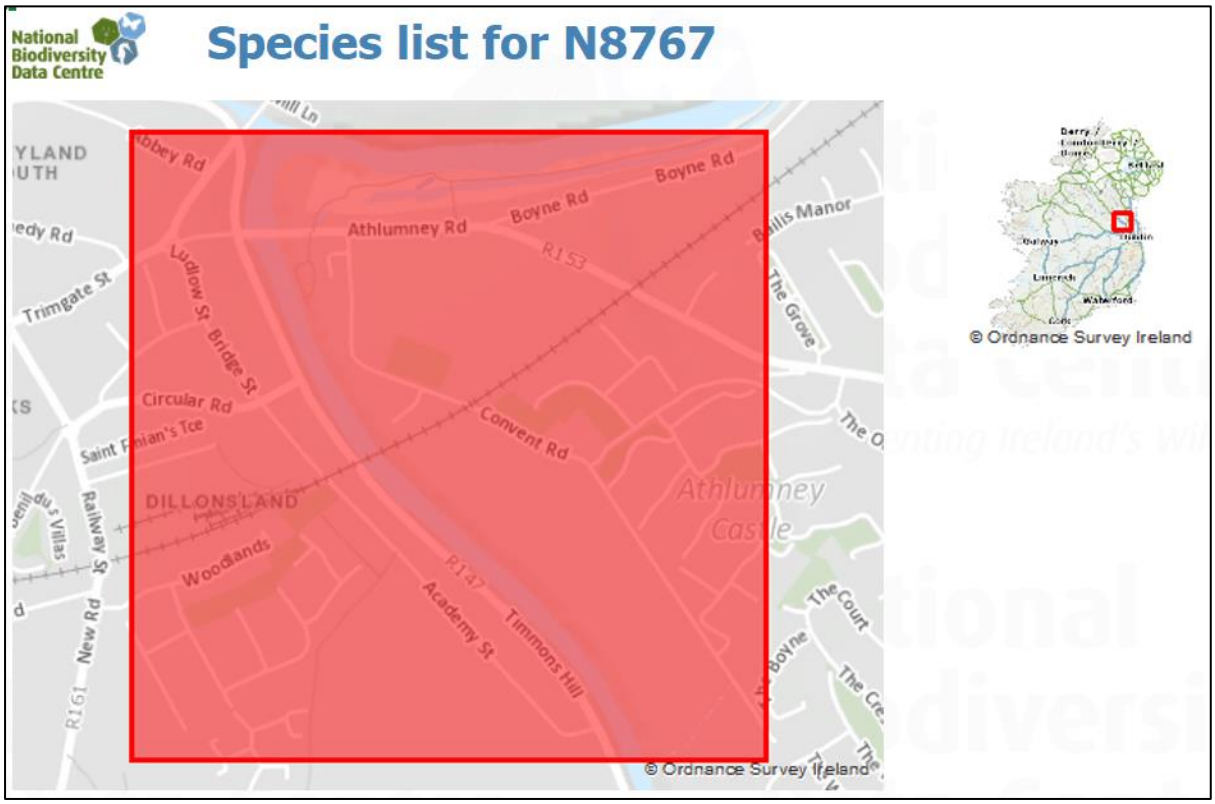

Figure 11: Location of 1 km square queried (National Biodiversity Data Centre)

Table 4: Species of conservation concern recorded within 1 km square (* indicates invasive concern)

Scientific name	Common Name	Date of last record
Rana temporaria	Common Frog	06/06/2003
Hirundo rustica	Barn Swallow	07/09/2020
Actitis hypoleucos	Common Sandpiper	24/04/2010
Apus apus	Common Swift	16/05/2022

Scientific name	**Common Name**	**Date of last record**
Phalacrocorax carbo	Great Cormorant	25/02/2018
Delichon urbicum	House Martin	01/04/2014
Passer domesticus	House Sparrow	24/02/2018
Anas platyrhynchos	Mallard	18/09/2020
Riparia riparia	Sand Martin	21/05/2010
*Impatiens glandulifera**	Indian Balsam	05/08/2021
*Fallopia japonica**	Japanese Knotweed	18/09/2020
*Tandonia budapestensis**	Budapest Slug	07/04/1982
Plecotus auritus	Brown Long-eared Bat	02/10/2011
Myotis daubentonii	Daubenton's Bat	23/08/2013
Meles meles	Eurasian Badger	30/04/2010
Lutra lutra	European Otter	15/02/1980
Nyctalus leisleri	Lesser Noctule	14/08/2010
Myotis nattereri	Natterer's Bat	02/10/2011
Pipistrellus pipistrellus sensu lato	Pipistrelle	02/10/2011
Pipistrellus pygmaeus	Soprano Pipistrelle	02/10/2011
Erinaceus europaeus	West European Hedgehog	20/04/2021

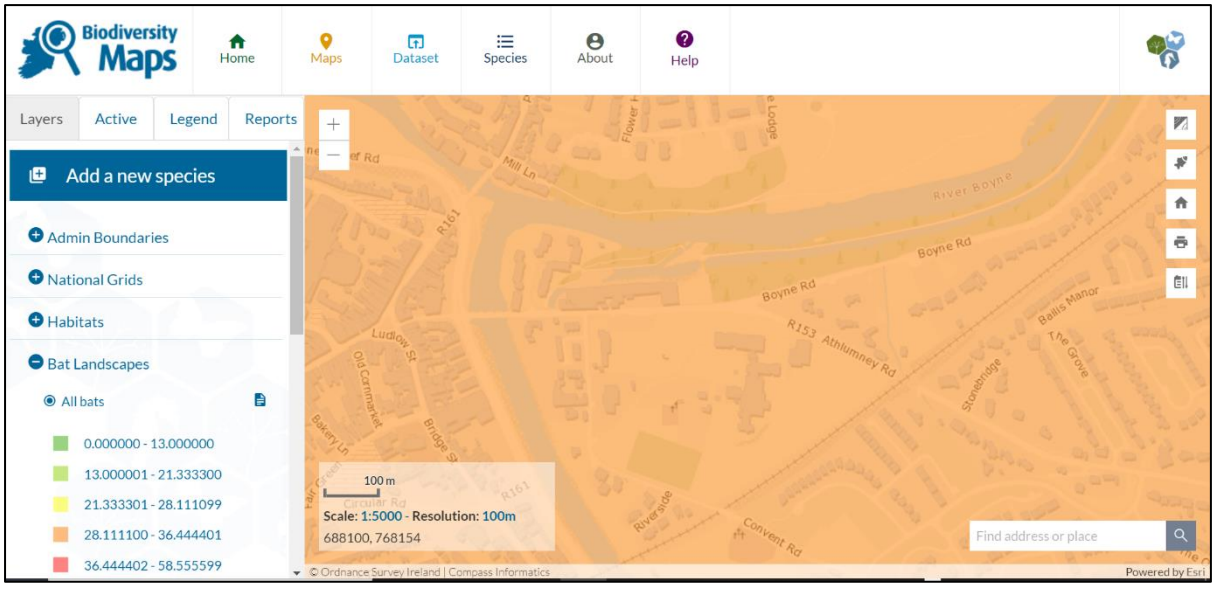

Figure 12:Excerpt from NBDC database online resource indicating Habitat Suitability index of general area

3.2 Field Surveys

3.2.1 Botanical/Habitat surveys

Botanical/Habitat surveys were undertaken within the optimal window for undertaking ecological assessments. In excess of 100 species of plant were observed to occur within the study area. Please note that planted exotics/ornamentals (largely occurring in Andy Brennan Park) are not included in this. A species list is provided in Appendix I. There were no Flora Protection Order species, or Red Data Species observed. Two species (*Fallopia japonica* and *Impatiens glandulifera*) listed on Part (1) of the Third Schedule of the European Communities (Birds and Natural Habitats Regulations) 2011 (as amended) were observed to occur within the Masterplan area.

Several habitats occur on-site:

- FW2 – Depositing/Lowland rivers (River Boyne);
- FW3 – Canals (Boyne Navigation Canal);
- GA2 – Amenity Grassland (with ornamental planting – largely in Andy Brennan Park);
- BL1 – Stone walls and other stone-work;
- BL3 – Buildings and Artificial Surfaces;
- WD1 – (Mixed) Broadleaved Woodland; and
- Hedgerow/Treeline/Scrub – WL/WS.

Aerial Images of the site and *environs* are provided in Figure 13 and Figure 14.

Figure 13: Aerial image of proposed Masterplan Area

Figure 14: Confluence of River Blackwater and River Boyne

3.2.1.1 FW – River Boyne and Boyne Navigation Canal

The River Boyne runs adjacent to and forms the Northern boundary of the site. Emergent vegetation included Branched bur-reed, Water figwort, Hemp agrimony, Flag Iris, and Water mint. There is abundant evidence of disturbance to the river bank by human activity, likely including fishing.

The Boyne Navigation Canal occurs adjacent to the river along the length of the site. On the surface of the canal, *Lemna minor* dominated, with little other aquatic vegetation observed. Emergent species such as *Iris Pseudacorus, Butomus umbellatus*, *Eupatorium cannabinum*. Kingfisher was observed utilising this habitat, perching on metal posts at Ruxton's Lock.

Figure 15: River Boyne as it passes by the survey area

Figure 16: Ruxton's Lock on Boyne Navigation Canal

Figure 17: *Butomus umbellatus* - flowering Rush occurs withing the BNC

Figure 18: Sparganium erectum is abundant in the riparian zone and BNC

3.2.1.2 Grassland – primarily Amenity Grassland (GA2)

Andy Brennan Park is comprised primarily of Amenity Grassland (GA2) A concrete wall runs the length of the park, along the boundary with the river. Rough grassland and Willow scrub dominate this area (outside of the Masterplan area) on a slope to the water's edge. There is an area of scrubby habitat immediately upstream of the park.

Figure 19: Aerial image of Andy Brennan Park

Figure 20: Primary habitats in Andy Brennan Park

Figure 21: Himalayan Balsam (*Impatiens glandulifera*) occurs on both sides of the concrete wall separating Andy Brennan Park from the Boyne

Figure 22: Amenity grassland and playground at Andy Brennan Park

3.2.1.3 Built Land - Stone walls/other stonework (BL1) and Built Land and Artificial Surfaces (BL3)

The "Built Land" habitat within the Masterplan area consists primarily of pathways, bridge surfaces, amenity areas, slipway to the river, the Boyne navigation towpath and car-park. This habitat type is very well maintained. Surfaces are kept well managed and are generally weed free. Floristically, the pathways exhibit ruderals such as members of the *Senecio* genus and grasses such as *Poa annua*. This habitat type is found throughout the study area.

Built land habitat of the subtype BL1 occurs within the Masterplan area also. A stone and cement wall is present at the front of the main carpark. This is a recent addition and exhibits little diversity. Ruxton's bridge and lock, along the Boyne navigation towpath and the historic Spicer's Mill are constructed of stone and contrast with the "Artificial surfaces and Built-land" component as regards biodiversity. There is an abundance of crevices within the structures and various species are present including Hart's tongue fern, Wall Rue and Ivy leaved toadflax.

Of note, Ruxton's bridge and the lock are bounded by areas of grassland. While managed as amenity grassland (GA2), with appropriate (simple, minimal and cost-effective) management this habitat would revert rapidly to "GS1 – Dry Calcareous – neutral grassland". Herbaceous species such as Yarrow, Selfheal and Knapweed are abundant, with fine-leaved grasses dominating these small grassland habitats.

Figure 23: Ramparts carpark

Figure 24: Derelict houses

Figure 25: Built land/Artificial (BL3) surface occurring at Spicer's Mill

Figure 26: Derelict stone building at Spicer's Mill site (BL1)

Figure 27: Ruxton's Bridge

3.2.1.4 Woodland – (mixed) Broadleaved woodland (WD1)

A significant portion of the site is of mixed woodland. The area is heavily used as an amenity but there is evidence of anti-social behaviour in areas (people rough sleeping by the river were observed on more than one occasion). Paths traverse the habitat with desire lines leading off the main paths. Non-native broadleaved trees dominate the woodland with a smaller proportion of native broadleaves and non-native conifers. Sycamore, Beech, Horeschestnut and Oak are the dominant tree species. Ash, Alder and Holly are also present. Structurally the habitat varies with a well-defined stratification (with canopy, scrub and herb layers) in some areas, and poor stratification in others (Canopy and Ivy ground-cover). The scrub layer is composed primarily of Hawthorn and Hazel. Herb bennet, Ivy and Bramble are the most abundant species in the herb layer.

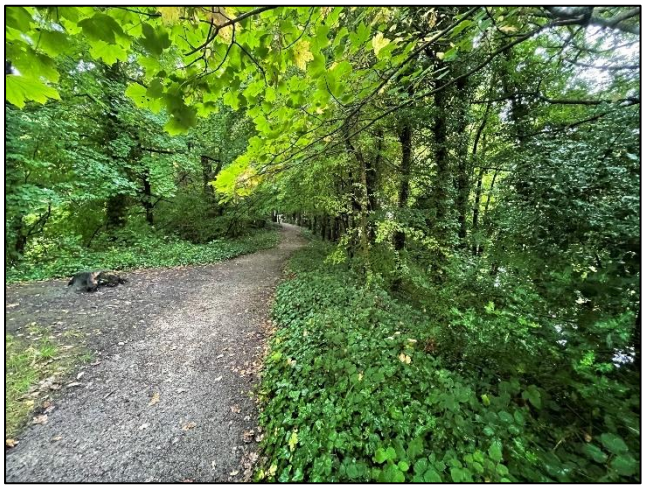

Figure 28: (Mixed) Broadleaved Woodland habitat (WD1)

Figure 29: Ground layer dominated by Ivy

Figure 30: Evidence of antisocial behaviour

3.2.1.5 Scrub/hedgerow/treeline

Tree line/hedgerow (WL) habitat is found on all boundaries with the river, around most of the car park and with buildings adjacent to Andy Brennan Park. The tree lines on site are dominated by Sycamore, Beech, Horse chestnut and Laurel. Along the River and Canal, Willow becomes more dominant. Most treelines are upwards of 10m. Of particular interest is a beech tree line of 7 Beech trees within the main car park.

At the southern end of Andy Brennan Park, there is a small area reverting to scrub. This area is dominated by Bramble, Bindweed, Thistles and rank grass. Of note, there is a population of Himalayan Balsam occurring within this area that is concentrated along the line of the concrete wall running through it. It is possible that this population of Himalayan Balsam was introduced to the site during the construction of this wall.

Figure 31: Area of scrub dominated by Bramble and Bindweed in which occurs Himalayan Balsam

The existing habitats on-site and adjacent provide optimal habitat for numerous species of conservation concern, including species for which the SAC (Otter, Salmon and Lamprey) and SPA (Kingfisher) are designated. In addition, the habitats present, and in particular the River Boyne and Boyne Navigation Canal, Woodland habitat and old/derelict buildings are likely to support populations of commuting/foraging/roosting bats of several species. All species of bat occurring in Ireland are listed on Annex IV of the EU Habitats Directive.

3.2.2 Species listed on the Third Schedule of the European Communities (Birds and Natural Habitats) Regulations of 2011

There are present within the Masterplan Area well-established populations of Japanese Knotweed (*Fallopia japonica*) in the vicinity of the buildings associated with Spicer's Mill. The area to the rear of these buildings has hosted a population of Japanese Knotweed for decades, which has been relatively stable. In March of 2022, it was observed that this population had been recently extensively disturbed (Figure 32). Japanese Knotweed spreads exclusively by vegetative means (the plant in Ireland does not produce viable seed) and disturbance is the primary means by which this species spreads.

Figure 32: Extensive population of Japanese Knotweed that had been disturbed

The area was visited several times during the Summer of 2022, and a survey undertaken on the 9th of September indicates that this population has spread significantly with plants present for virtually the entire length of the buildings associated with Spicer's Mill. Fortunately, the disturbance did not occur adjacent to flowing water and the spread of the plant has been limited by the static nature of the water within the canal. Pictures illustrating the extent of the population are shown in Figure 33. This population has almost certainly undergone significant expansion as a result of the disturbance.

Figure 33: Photomontage of population of Japanese Knotweed to rear of Spicer's Mill

In addition to the primary population to the rear of Spicer's Mill, there is another population associated with an area of concrete and wall along the main road to the fore of Spicer's Mill and associated buildings. While this population is limited in size and is not likely to be disturbed, there is evidence that the population has begun to undermine the wall and has likely weakened the foundations.

Figure 34: Population of Japanese Knotweed undermining wall at fore of buildings

In addition to Japanese Knotweed, another species listed in Part (1) of the Third Schedule of the European Communities (Birds and Natural Habitats) Regulations of 2011 (as amended) occurs within the Masterplan Area. It is important to note that while the Himalayan Balsam plants observed were limited to the area in the vicinity of Andy Brennan Park, propagules of this species are almost certainly present along the bank of the Boyne at the Ramparts and any disturbance here would almost certainly result in a proliferation of this species, which reproduced by seed and thrives under conditions of disturbance. Currently, the plant is relatively limited in distribution, being confined to the area associated with the wall on the boundary of Andy Brennan Park. Indeed, this population may be present as a direct result of the construction of the wall, which provided the disturbance necessary to allow this species to gain a foothold.

Figure 35: Himalayan Balsam occurring on both sides of the wall at Andy Brennan Park and in adjacent scrub

3.2.3 General bird surveys

A total of 22 species of bird were observed to occur within the survey area during bird surveys. The sonograms recorded using the Songmeter micro added Herring Gull to the list. A collection of sonograms is provided in Figure 36. A number of other species such as Buzzard (*Buteo buteo*), Dabchick (*Tachybaptus ruficollis*) and Coot (*Fulica atra*) are known to occur in the immediate vicinity also.

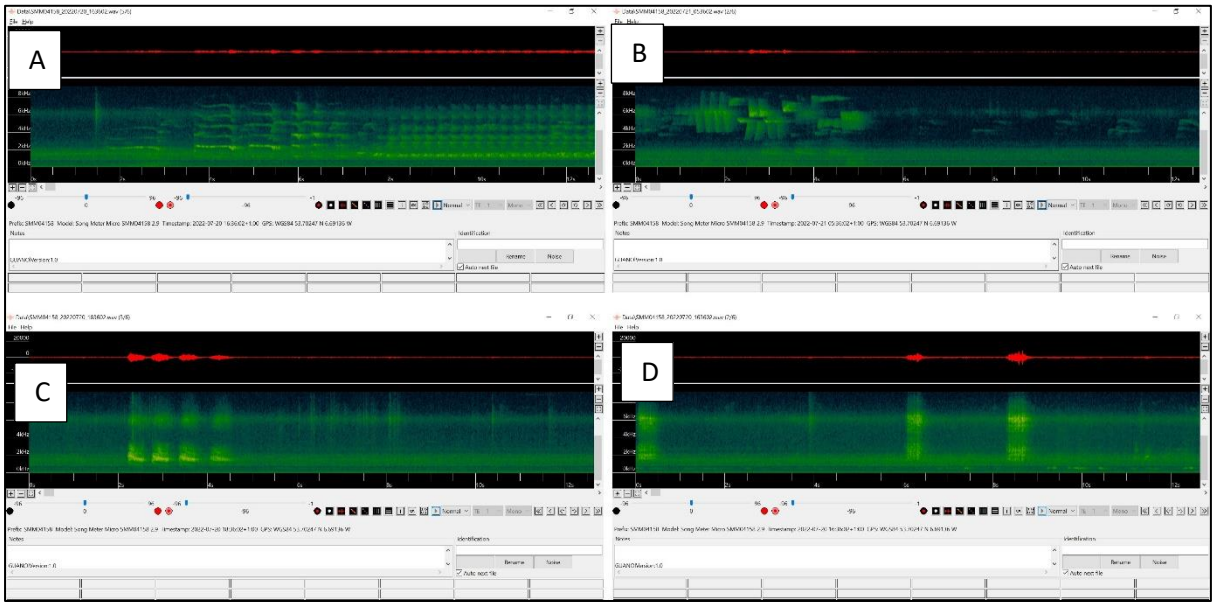

Figure 36: Sonogram of Herring Gull (A), Wren (B), Rook (C) and Magpie (D)

Common Name	***Scientific Name***
Kingfisher	*Alcedo atthis*
Mallard	*Anas platyrhynchos*
Greenfinch	*Carduelis chloris*
Wood Pigeon	*Columba palumbus*
Rook	*Corvus frugilegus*
Jackdaw	*Corvus monedula*
Robin	*Erithacus rubecula*
Chaffinch	*Fringilla coelebs*
Moorhen	*Gallingula chloropus*
Swallow	*Hirundo rustica*
Herring Gull	*Larus argentatus*
Pied Wagtail	*Motacilla alba yarrelli*
Coal Tit	*Parus ater*
Blue Tit	*Parus caeruleus*
Great Tit	*Parus major*
Chiffchaff	*Phylloscopus collybita*
Willow Warbler	*Phylloscopus trochilus*
Magpie	*Pica pica*

Common Name	***Scientific Name***
Goldcrest	*Regulus regulus*
Sand marten	*Riparia riparia*
Wren	*Troglodytes troglodytes*
Blackbird	*Turdus merula*
Song Thrush	*Turdus philomelos*

3.2.4 Kingfisher Surveys

A male Kingfisher was observed on the 13th of June hunting in the vicinity of Ruxton's Lock, using a metal post as a perch. A Kingfisher was observed flying downstream immediately adjacent to the Spicer's Mill Masterplan area on the 20th of July 2022 The habitat occurring is optimal for foraging Kingfisher, but optimal breeding sites are not present.

3.2.5 Non-volant Mammal surveys

General mammal surveys indicate that there is a paucity of non-volant mammals within the Masterplan area. This may be owing to a large presence of off-lead dogs. In addition to "scaring off" larger mammals, dogs tend to disguise indications of mammals through, for example rolling in any scat present. The trail camera deployed recorded no non-volant mammal activity. It is almost certain, however that at minimum, Fox, Brown Rat, Wood-mouse and Pygmy Shew occasionally utilise the habitat present, even if only passing through. The levels of human activity, presence of dogs and likely a large population of domestic cats limit the use of the habitat by non-volant mammals in such close proximity to the town.

3.2.6 Otter Survey

There were no indications of Otter observed during surveys. Otter have been observed in the immediate vicinity within the river and it is almost certain that the lack of activity on the southern bank of the river is owing to high levels of human activity and dogs. Otter very likely utilise the northern bank for hauling out, etc. Otter are known to utilise the habitat immediately adjacent.

4 Summary of findings

4.1 Elements or particular areas of specific potential for biodiversity or conservation interest;

A large proportion of the Masterplan Lands at Spicer's Mill are comprised of habitat of high ecological value – primarily the River Boyne and associated riparian corridor, the Boyne Navigation Canal and the woodland habitat. The River Boyne and BNC are of International Importance with regard to biodiversity and conservation. The ecological integrity of these habitats are dependent on the quality of the adjacent habitats and the woodland occurring provides invaluable ecosystem services, including controlling run-off during heavy rainfall events, etc. This habitat also provides an invaluable *refugia* for flora and fauna, and an ecological "Stepping stone" of habitat in close proximity to the urban centre of Navan.

The majority of Built Land and Artificial Surfaces (BL3) and Amenity Grassland (GA2) are of limited ecological significance. Important to note, however, there are structures present that almost certainly support important assemblages of bat species. Given the location of the lands, optimal foraging habitat and the presence of the River Boyne ecological corridor, structures such as the historic Spicer's Mill are highly likely to be of high importance with regards to bat populations.

4.2 Elements with the potential to damage the ecological integrity of the study area, such as Alien Invasive Plant Species

Given the riparian nature of the Masterplan lands, Alien Invasive Plan Species are likely to pose the greatest threat to the ecological integrity of the study area. There were two plant species listed in Part (1) of the Third Schedule of the European Communities (Birds and Natural Habitats) Regulations of 2011 (as amended) observed on site:

- Japanese Knotweed (*Fallopia japonica*); and
- Himalayan Balsam (*Impatiens glandulifera*).

Given the proximity of the site to the River Boyne and the ability of these invasive species to cause large degrees of both physical (to bank-side integrity) and biological damage, their presence is deemed to be the most important element as regards potential to damage the ecological integrity of the study area. The area is subject to intensive anthropogenic usage, and the Masterplan may reduce the extent of antisocial behaviour, such as fire lighting. Assuming that there is no impact on hydrology or water

quality or increase in artificial lighting, Alien Invasive Plant Species pose the greatest threat to ecological integrity at this location.

4.3 Presence and effectiveness of ecological corridors within the study area

The River Boyne and associated ecological corridor of habitats is immediately adjacent to/within the Masterplan area. This ecological corridor is of International importance, and there must be no negative impacts of the proposed development on this ecological corridor.

4.4 Conservation priorities regarding the identified biodiversity resource of the site

The conservation priorities regarding the identified biodiversity resource identified should concentrate on the River Boyne and associated corridor of habitats adjacent. The primary conservation priorities should be:

- To maintain and enhance the water quality of the River Boyne;
- To maintain/enhance the ecological integrity of the Boyne River ecological corridor;
- To prevent any negative impacts on the Conservation Objectives of the Qualifying Interests of the River Boyne and River Blackwater SAC and River Boyne and River Blackwater SPA;
- To prevent introduction of species of Alien Invasive Plants to the Masterplan area, prevent the spread of such species already present (Japanese Knotweed and Himalayan Balsam); and
- To eradicate (Japanese Knotweed) or control (Himalayan Balsam) such species already present

4.5 Recommendations regarding future habitat management and ecological monitoring at the site

4.5.1 Habitat Management

There are a number of recommendations regarding future habitat management at the site:

1) In order to enhance the overall biodiversity and conservation significance of the site, it is recommended that a biodiversity and habitat management plan be drawn up and implemented such as to maximise benefits to local ecology – for example management of some grassland areas within the site such as to encourage the development of semi-natural grassland.
2) It is imperative that an Alien Invasive Plant Control and Management Plan be prepared and implemented in order to eradicate (Japanese Knotweed) or control (Himalayan Balsam) such species at the site;
3) The River Boyne and adjacent habitats immediately adjacent to the proposed development are of high importance for bats. It is recommended that a Bat Conservation Management Plan be drawn up and implemented for the study area in order to ensure that any development within the study area is conducive to the continued use of the habitats by bats.

4.5.2 Ecological monitoring

The Masterplan will largely only impact on habitats of limited ecological value (Buildings and Artificial Surfaces, Amenity Grassland, etc.). The majority of habitats of ecological significance will be largely unaffected by the Masterplan. Although an increase in footfall may increase disturbance, this increase in footfall may decrease antisocial behaviour Owing to the human use of the habitats present, there are limited species of conservation concern recorded as occurring at/within the Masterplan lands.

The Masterplan Lands are immediately adjacent to an ecological corridor of International Importance and is almost certainly of particular importance for foraging and commuting bats. It is recommended that annual monitoring, to include a baseline assessment prior to development of bat usage of the habitats present be undertaken in order to assess any potential impacts on the local bat population and mitigate against any such impacts.

5 Appendix I – site plant list

Scientific name	**Common Name**
Acer pseudoplatanus	Sycamore
Achillea millefolium	Yarrow
Aegopodium podograria	Ground elder
Aesculus hippocastanum	Horse chestnut
Agrostis canina	Velvet bent grass
Agrostis stolonifera	Creeping bent grass
Alliaria petiolata	Hedge garlic
Alnus glutinosa	Alder
Anthriscus sylvestris	Cow parsley
Arrhenatherum elatius	False oat grass
Asplenium ruta-muraria	Wall rue
Asplenium scolopendrium	Hart's tongue fern
Bellis perennis	Daisy
Buddleja japonica	Butterfly bush
Callitriche stagnalis	Water starwort
Calystegia sepium	Bindweed
Castanea sativa	Sweet chestnut
Catapodium rigidum	Fern grass
Centranthus ruber	Red valerian
Chamaenerion angustifolium	Rosebay willowherb
Cirsium vulgare	Spear thistle
Corylus avellana	Hazel
Crataegus monogyna	Hawthorn
Crepis capillaris	Smooth hawk's beard
Cymbalaria muralis	Ivy leaved toadflax
Cynosurus cristatus	Crested dog's tail
Dactylis glomerata	Cock's foot grass
Epilobium ciliatum	Canadian willowherb
Epilobium parviflorum	Hoary willowherb
Equisetum arvense	Field horsetail
Equisetum telmateia	Great horsetail
Eupatorium cannabinum	Hemp agrimony
Euphorbia helioscopia	Sun spurge
Fagus sylvatica	Beech
Fallopia japonica	Japanese knotweed
Filipendula ulmaria	Meadowsweet
Gallium aparine	Cleavers
Geranium robertianum	Herb robert
Geum urbanum	Herb Bennet
Glechoma hederacea	Ground ivy
Glyceria maxima	Sweet reed grass
Hedera helix	Ivy
Hedera hibernica	Irish Ivy

Scientific name	**Common Name**
Heracleum sphondylium	Hogweed
Holcus lanatus	Yorkshire fog
Hypochaeris radicata	Cat's ear, Flatweed
Ilex aquifolium	Holly
Impatiens glandulifera	Himalayan balsam
Iris pseudacorus	Yellow flag iris
Kindbergia praelonga	Feather moss
Lapsana communis	Nipplewort
Larix sp.	Larch
Lemna minor	Duckweed
Lolium perenne	Perennial Ryegrass
Lotus corniculatus	Bird's foot trefoil
Matricaria discoidea	Pineapple mayweed
Mentha aquatica	Water mint
Myosotis scorpioides	Water forget me not
Nuphar lutea	Yellow waterlily
Parietaria judaica	Pellitory of the wall
Persicaria maculosa	Bistort
Phalaris arundinacea	Reed canary grass
Picea stichensis	Sitka spruce
Plantago lanceolata	Ribwort plantain
Plantago major	Broad-leaved Plantain
Poa annua	Annual Meadow grass
Polygonum aviculare	Knot grass
Polystichum setiferum	Soft shield fern
Potentilla reptans	Creeping cinquefoil
Prunella vulgaris	Selfheal
Prunus avium	Cherry
Prunus laurocerasus	Laurel
Quercus robur	Oak
Ranunculus repens	Creeping buttercup
Rhytidiadelphus squarrosus	Springy turf moss
Rosa canina	Dog rose
Rubus fruticosus	Brambles
Rumex crispus	Curled dock
Rumex obtusifolius	Obtuse dock
Sagina procumbens	Pearlwort
Sagittaria sagittifolia	Arrowhead
Salix x fragilis	Crack willow
Salix sp.	Willow
Sambucus nigra	Elderberry
Scorzoneroides autumnalis	Autumn Hawkbit
Scrophularia auriculata	Water Figwort
Scrophularia nodosa	Figwort
Senecio jacobaea	Ragwort
Senecio vulgaris	Groundsel
Solanum dulcamara	Bittersweet

Scientific name	**Common Name**
Sonchus asper	Prickly Sow Thistle
Stachys sylvatica	Hedge nettle, woundwort
Symphytum officinale	Comfrey
Taraxacum agg	Dandelion
Trifolium dubium	Yellow clover
Trifolium repens	White clover
Tussilago farfara	Coltsfoot
Ulmus glabra	Wych elm
Urtica dioica	Nettles
Veronica chamaedrys	Germander speedwell
Veronica serpyllifolia	Thyme leaved speedwell
Vicia sepium	Bush vetch

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