FLOWER HILL & ABBEYLANDS

URBAN DESIGN PLAN

APPENDICES

Nov 2021

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APPENDICES

- Preliminary Ecological Scoping: Abbeylands, Navan - WM Associates
- Arboricultural Report - Charles McCorkell Arboricultural Consultancy
- Bat Survey - Dr Tina Aughney, Bat Eco Services
- Assessment of Japanese Knotweed - Forest, Environmental Research and Services Ltd
- Natural Impact Statement In Support of Appropriate Assessment of the Urban Design Plan for Flower Hill and Abbeylands, Navan, Co Meath - Forest, Environmental Research and Services Ltd

Preliminary Ecological Scoping : Abbeylands, Navan

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Date: 25/04/2019

WM ASSOCIATES
ECOLOGY NI

Preliminary Ecological Scoping :
Abbeylands, Navan

Contents:

Preliminary Ecological Scoping :
Abbeylands, Navan

Background:

The Paul Hogarth Company have been engaged by Meath County Council to prepare an Urban Design Plan for lands at Flowerhill and Abbeylands, Navan, Co Meath, an area of the town that has experienced recent decline and is now seen as an undesirable area in which to live or invest.

As a part of a comprehensive plan to regenerate the area, environmental improvement will include a consideration of the biodiversity value of the site ecology, and any redevelopment will require to be cognisant of the constraints which may be posed by the current biodiversity value and nature conservation designations. To this end a baseline inventory is required

The provision of site data will be undertaken in two phases, of which this preliminary ecological scoping is the first stage.

This scoping exercise is based upon a basic 'broad brush' habitat survey of the accessible parts of the whole site and aims to provide a basic inventory of existing biodiversity value, constraints and opportunities.

> Biodiversity value is assessed using normal criteria based upon e.g. habitat rarity, habitat quality indicator species; rare species; Priority and Key species; nutrient enrichment indicators; ecological position and connectivity; presence of valued habitats/species (e.g. those identified in Biodiversity Action Plans).
>
> Constraints could be elements with legal implications, such as Badger setts, Otter holts, Japanese Knotweed etc., or could be elements with policy implications, e.g. rare or threatened species, priority habitats connectivity with Natura 2000 sites etc…
>
> Opportunities are potentially practical projects which are achievable at reasonable cost given the prevailing environmental conditions (especially soil fertility); the capacity for on-going management; and the objectives of the master plan with respect to appearance, amenity, and the likely human use.

This is intended to inform the objective setting exercise that will be undertaken by the Paul Hogarth Company, and to help identify practical biodiversity enhancement projects within the master plan context.

Once specific objectives, plans and projects have been identified, there will be a further stage of targeted habitat survey in greater detail and with a higher spatial resolution where required, and the identification of further ecological data that may be required to support any requisite planning applications.

Survey details:

Site visits

18/04/2019	Shaun Wolfe-Murphy BSc., Dip. EIA Mgmt., MCIEEM

Statement of Authority: Shaun has > 30 years' experience as a professional botanist, including working for the NIEA habitat survey and designations team, the England Field unit of the (then) NCC and for the survey and designations unit of Dúchas in the government conservation agency of Republic of Ireland. During the time spent working for these agencies much emphasis was on the survey and ecological evaluation of sites.

Since establishing WM Associates in 1994 as an ecological consultancy, he has routinely compiled ecological impact assessments for a wide variety of development projects in both urban and rural habitats.

Statement of Objectivity: The data have been collected and presented impartially, as required by the CIEEM code of professional conduct. Payment or other favour is not dependent upon any particular planning outcome, and there is no other vested or personal interest in any particular outcome, or any commercial products mentioned.

Survey method

The site was visited and habitats within and around the site were described and assessed in survey compartments allocated on the survey day according to vegetation type. The habitat type was allocated to the Heritage Council's classification *A guide to Habitats in Ireland*, and notes were made of the main plant species, and other species that are indicative of the condition and management of the habitat.

In describing the status of plant species in an area, the qualitative DAFOR scale is used, where:

D	=	Dominant	Qualifying prefixes		
A	=	Abundant			
F	=	Frequent	L	=	Local – patchy distribution
O	=	Occasional	V	=	'very'
R	=	Rare			

Lists are tabulated in order of descending abundance.

Where trees were measured during this survey, their diameter at breast height (dbh) is given in cm. Tree maturity classes are sometimes referred to and occasionally tabulated. Maturity classes as they relate to a large species such as Ash (Fraxinus excelsior) as follows:

Very-Mature	60+	cm dbh (stem diameter at breast height)
Mature	30+	cm dbh
Early-Mature	20+	cm dbh
Semi-Mature	12+	cm dbh
Young	6+	cm dbh
Sapling	to 6	cm dbh
Seedling	0-2	yrs old

For smaller species such as Rowan (Sorbus aucuparia), the class threshold values are adjusted downwards.

The habitat suitability for different animals or animal groups was assessed, specifically:

Badgers – The survey included a search for signs of usage by Badger, such as foraging tracks, snagged guard hairs, dung etc. In particular a search was conducted for potential sett entrances.

Otters – The survey considered the potential suitable habitats for otters and notes were made of any signs of Otter use along waterways, plus any potential holt entrances. This including a 30m buffer up-stream and downstream.

Bats – Potential roosting places were noted, and the general suitability of the area for supporting foraging bats was assessed.

Birds - Suitable nesting and feeding habitats were noted on and around the site.

Common lizard – The survey included an assessment of suitable habitat for lizards.

Newts - The survey included an assessment of suitable habitat for lizards, including terrestrial habitats and potential breeding ponds.

Invertebrates - Habitats of special importance for invertebrates were noted.

All survey compartments were photographed. All photos are archived and may be available on request as high resolution graphic files.

Other Data Sources:

The Council commissioned Dr Tina Aughney to conduct a bat survey over parts of the site. This was conducted 7th to the 10th September 2018 and the draft report was available at time of writing (Eco Bat Services 2018).

The Council commissioned Forest, Environmental Research and Services Ltd to undertake a Japanese Knotweed survey of part of the site. This was conducted 27th June 2018 and the findings were available in two reports at the time of the writing. (FER 2018 [1 & 2]).

The Council have commissioned Charlie McCorkell to conduct a tree survey of the whole site. Charlie was conducting his surveys at time of writing, and his preliminary data will inform future ecological reports.

The status of Kingfisher is potentially an important issue on this site, so it is useful that the Kells Blackwater was included in a survey of 2010 (Birdwatch Ireland 2010).

The National Biodiversity Centre data was accessed to provide national distribution maps. E.g. National Biodiversity Data Centre, Ireland, Common Kingfisher (Alcedo atthis), accessed 24 April 2019, <https://maps.biodiversityireland.ie/Species/11112>

In 2006, Dr Jim Martin of BEC consultants reviewed the current status of rare plants in the archive relating to County Meath amounting to 41 locations (BEC 2006).

Site Description:

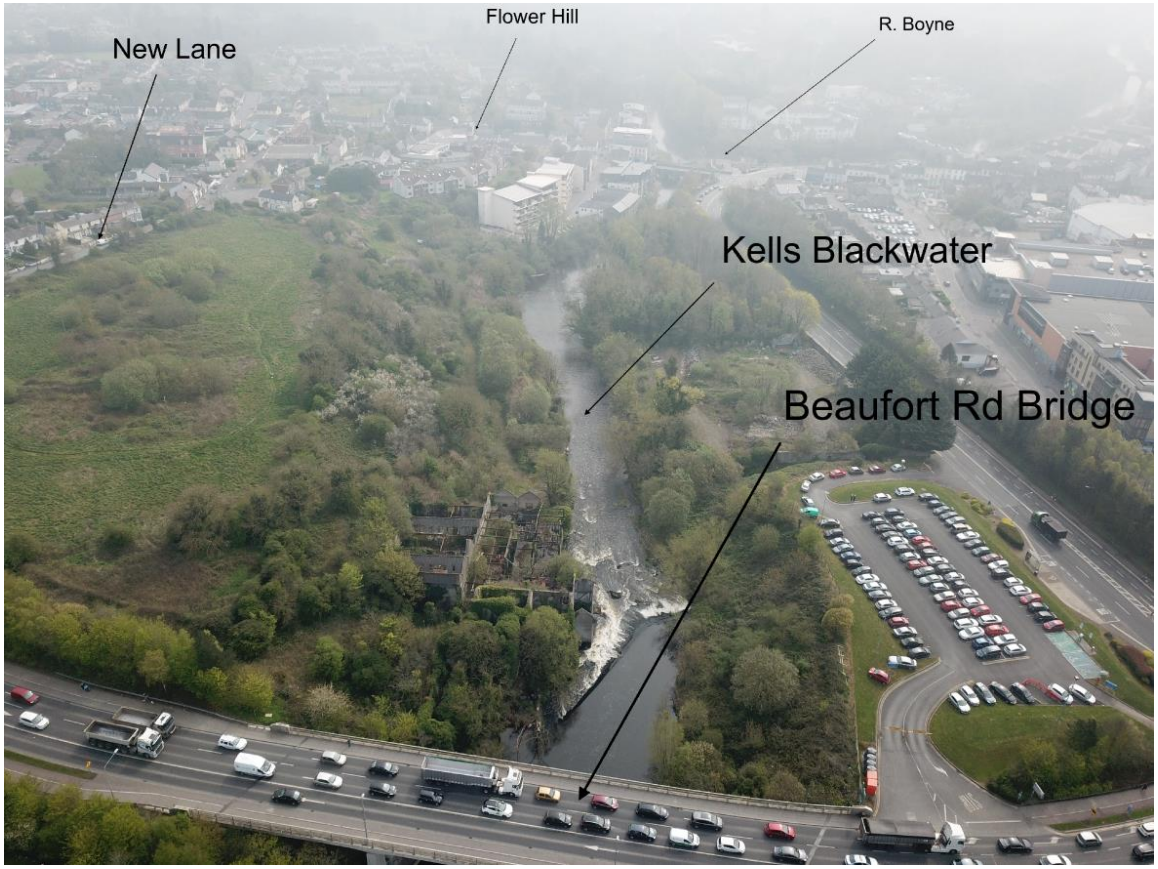
Setting:

The site includes the mixed urban areas of Abbeylands and Flowerhill north of the confluence between the Rivers Blackwater and Boyne, and a green wedge of currently undeveloped land that follows the Blackwater River. The western boundary is the N51 Beaufort Road, and the southern boundary the Inner Relief Road.

Underlying geology is of dark grey, well-bedded, cherty, graded carboniferous limestones and calcareous shales, with a covering of Midlandian till derived from limestones shales mudstones and greywackes. Soils are highly modified urban soils, including those of the main undeveloped area between the river and new lane, which appears to be made-up ground.

The Kells Blackwater is at an altitude of some 35m below the Beaufort Road bridge and falls around 2m through the site. Generally the river with steep banks (around 20°) rising some 4-5m on the south bank, and higher on the north bank, where downstream before Flower Hill, the valley side swings away from the river enclosing a terrace that is under urban development.

Surface drainage and stormflow is all towards the river. The entire site seems well-drained and there are no surface water channels. Several streams are culverted across the site.



Nature Conservation Designations:

The Kells Blackwater is subject to both Natura2000 (N2K) designations. **The River Boyne and River Blackwater SPA** (004232) SPA comprises the river itself. The Designation Feature is:

A229 Kingfisher (Alcedo atthis)

Whilst the **River Boyne and River Blackwater SAC** (002299) includes river side habitats and is designated for a wider variety of features:

7230 Alkaline fens
91E0 Alluvial forests with Alnus glutinosa and Fraxinus excelsior

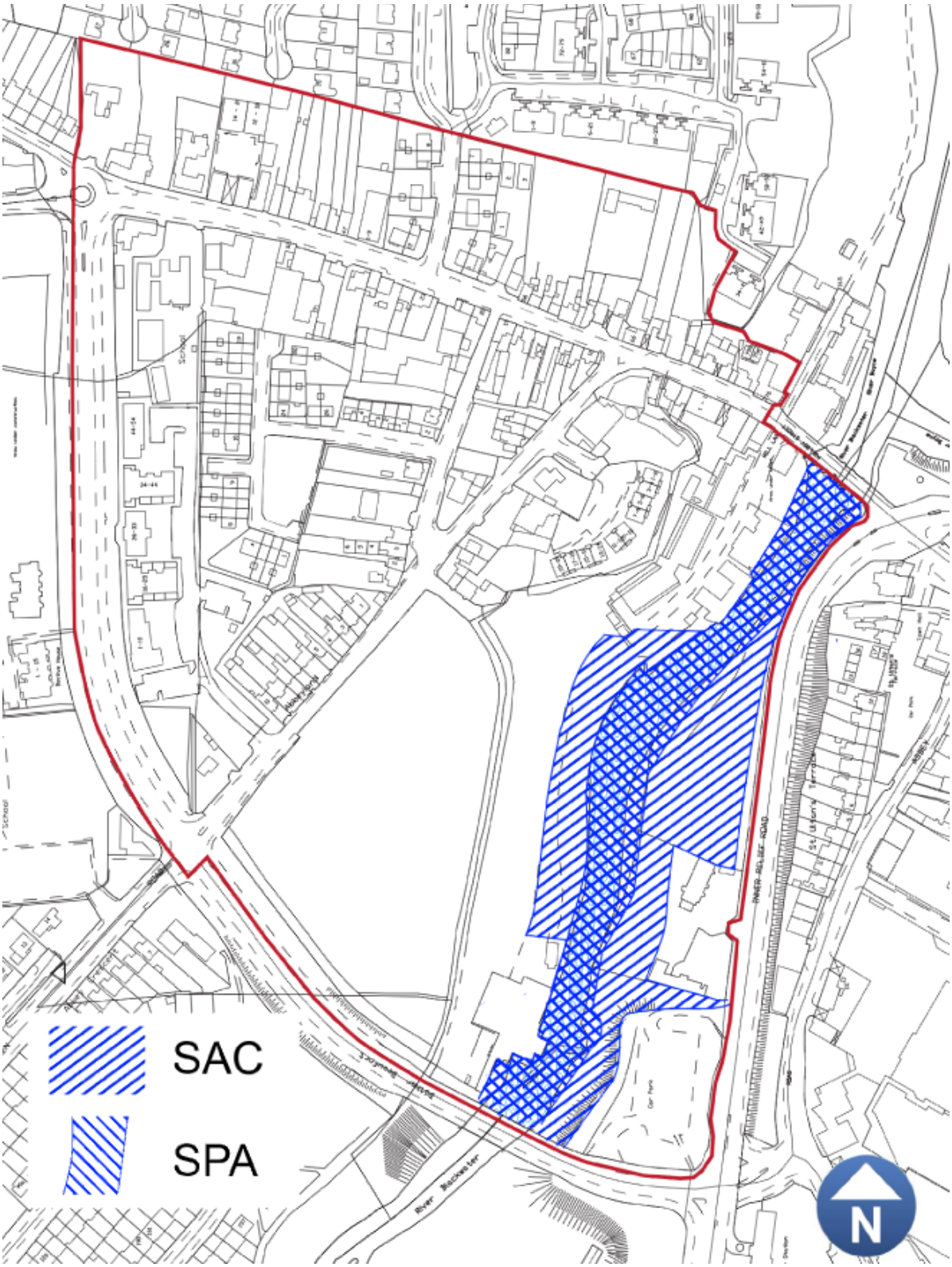
1099 River Lamprey (Lampetra fluviatilis)
1106 Salmon (Salmo salar)
1355 Otter (Lutra lutra)

A little over 35 km downstream beyond Drogheda., the River Boyne runs into the **Boyne Estuary SPA** (004080) designated for:

A999 Wetland and Waterbirds

A156 Black-tailed Godwit (Limosa limosa)
A140 Golden Plover (Pluvialis apricaria)
A141 Grey Plover (Pluvialis squatarola)
A143 Knot (Calidris canutus)
A142 Lapwing (Vanellus vanellus)
A195 Little Tern (Sterna albifrons)
A130 Oystercatcher (Haematopus ostralegus)
A162 Redshank (Tringa totanus)
A144 Sanderling (Calidris alba)
A048 Shelduck (Tadorna tadorna)
A169 Turnstone (Arenaria interpres)

There are no Natural Heritage Areas designated or proposed close to the site or the river downstream.



Map 1 N2K designations

Habitats on site:

Map 2 – Surveyed Compartments

Compartment 1: WS3 Non-native shrub

Roadside buildings burnt out (ex Turnkey Rentals premises) the long curtilage to the rear probably a former garden. Recently cleared and gravelled in the 2013 in the Google Earth satellite image, but now overgrown with young Butterfly-bush (Buddleja davidii). No access.

1

2a

Compartment 2: WL1 Hedge

Alongside New Lane. @ 2a a patchy hedge on a roadside embankment generally around 200cm wide x 80 cm tall:

Bramble (Rubus fruticosus agg.)	FLD	
Snowberry (Symphoricarpos albus)	LA	
Hawthorn (Crataegus monogyna)	O	
Ash (Fraxinus excelsior)	O	1 x mat x1 x young
Elder (Sambucus nigra)	R	

The embankment (roadside) with:

Cleavers (Galium aparine)	FLA	
Winter Heliotrope (Petasites fragrans)	OLD	
False Oat-grass (Arrhenatherum elatius)	OLA	
Hybrid Bluebell (Hyacinthoides x massartiana)	OLF	
Yorkshire-fog (Holcus lanatus)	OLF	
Common Ivy (Hedera helix)	LF	
Common Nettle (Urtica dioica)	LF	
Cow Parsley (Anthriscus sylvestris)	LO	
Garlic Mustard (Alliaria petiolata)	LO	
Dandelion (Taraxacum officinale)	R	
Yellow Archangel (Lamiastrum galeobdolon subsp argentatum)	R	Potentially invasive
Red Fescue (Festuca rubra)	VLO	

On the field side with a mantle of Bramble (Rubus fruticosus agg.) and in places Snowberry (Symphoricarpos albus) beginning to spread into the adjacent grassland.

@ 2b, there is a gap in the hedge where a water pipeline spread was cleared but not replanted. It remains an open access to the adjacent field (enabling minor tipping). Beyond the gap to the N51 is a continuous hedge of Portugal Laurel (Prunus lusitanica) neatly trimmed to 1.5m – just a few Laurustinus (Viburnum tinus) join the Laurel.

2b

3

Compartment 3: GS2 Dry Meadows and Grassy verges/WS1 Scrub

@3a Beaufort Abbey is a gated development off New Lane. At the entrance with landscaping of Spindle Tree (Euonymus fortunei cf. 'Emerald Gaiety'), Cherry Laurel (Prunus laurocerasus 'Otto Luyken') and Hybrid Oleaster (Elaeagnus x ebbingei).

There is a narrow, unmanaged plot to the left of the entrance, fenced from Beaufort Abbey spine road. This with coarse False Oat-grass (Arrhenatherum elatius) grassland becoming overtaken by scrub – including a few planted shrubs, but mainly spreading Bramble (Rubus fruticosus agg.)

Bramble (Rubus fruticosus agg.)	FLD	Around 60% cover
Ash (Fraxinus excelsior)	F	Saplings
Downy Birch (Betula pubescens ssp pubescens)	O	Saplings
Sycamore (Acer pseudoplatanus)	O	Saplings
Red-osier Dogwood (Cornus stolonifera)	O	
Butterfly-bush (Buddleja davidii)	O	
Wilson's Honeysuckle (Lonicera nitida)	O	
Raspberry (Rubus idaeus)	O	
Bird Cherry (Prunus padus)	R	

@3b the area behind the tree screen also seems to be unmanaged and dominated by Bramble (Rubus fruticosus agg.), but only identified from aerial images – requires further investigation.

Compartment 4: WD1 mixed broadleaved woodland

The Beaufort Abbey car park with mulched landscaping screen to the south comprising young:

Hornbeam (Carpinus betulus)
Holly (Ilex aquifolium)
Ash (Fraxinus excelsior)
Scots Pine (Pinus sylvestris)
Norway Maple (Acer platanoides)
Common Alder (Alnus glutinosa)

Trees are mainly in the dbh 8-14 cm range, max. 20 cm. small beds around the car park with landscaping of Hebe, Elaeagnus, Phormium, Euonymus etc…

Compartment 5: GA2 Amenity grassland

Species-poor frequently-mown amenity grassland beside another Beaufort Abbey car park. Here dominated by Perennial Rye-grass (Lolium perenne), with typical weeds, Daisy (Bellis perennis), Dandelion (Taraxacum officinale), White Clover (Trifolium repens) etc.. This with young to semi-mature scattered trees:

Himalayan Birch (Betula utilis 'Jaquemontii')	X3
Norway Maple (Acer platanoides)	X3
Pedunculate Oak (Quercus robur)	X2`
Pedunculate Oak (Quercus robur)	X2

4

5 = 6b (behind)

Compartment 6: WL2 Treeline

The Compartment 5 green space flanked on 2 sides by overgrown boundaries. Diverse and structurally varied cover dominated to the north by Beech (6a) and east (6b) by Poplar:

	Mature 30+ Early-Mature 20+	Semi-Mature 12+ Young 6+	Sapling to 6 Seedling 0-2 yr
Trees			
Beech (Fagus sylvatica)	LF	O	LF
Hornbeam (Carpinus betulus)		LO	LO
Balsam Spire Poplar (Populus 'Balsam Spire')	LA		
Ash (Fraxinus excelsior)	R	LF	O
Common Lime (Tilia x europaea)		R	
Sycamore (Acer pseudoplatanus)		R	
Downy Birch (Betula pubescens ssp pubescens)		R	
Grey Alder (Alnus incana)		LO	
Red Oak (Quercus rubra)			R
Norway Maple (Acer platanoides)		O	OLF
European Larch (Larix decidua)		R	
Shrubs			
Garden Privet (Ligustrum ovalifolium)		LO	
Elder (Sambucus nigra)		R	
Garden shrub, not identified as yet		R	
Cherry Laurel (Prunus laurocerasus 'Rotundifolia')		LO	
Hawthorn (Crataegus monogyna)		R	R

It seems that these trees are being blamed by residents for poor television reception and there is a campaign to remove them.

7

8

Compartment 7: WL1 Hedge

Cherry Laurel (Prunus laurocerasus) hedge on the Beaufort Abbey side of a low retaining wall. Trimmed at ±4m with several young trees, especially Scots Pine (Pinus sylvestris) and Common Alder (Alnus glutinosa), some also trimmed. The shorter section across the turning head with near continuous young European Larch (Larix decidua) and Hornbeam (Carpinus betulus) rising over the Laurel.

Compartment 8: WS3 Non-native shrub + GA2 Improved amenity grassland

The verge of the N51 Beaufort Road with a repeated pattern of landscaping in sinuous herbicided scrupulously bare soil beds in reseeded and intensively mown Perennial Rye-grass (Lolium perenne) grassland.

Box (Buxus sempervirens)	
Japanese Maple (Acer palmatum)	1 x bright green cv, 1 x red cv
Yew (Taxus baccata)	
Pedunculate Oak (Quercus robur cf 'Menhir')	Or fastigiata?
Magnolia (Magnolia cf liliflora cv)	
Magnolia (Magnolia cf stellata)	
Magnolia (Magnolia cf grandiflora)	

9 (Japanese Knotweed)

10

Compartment 9: ED3 Recolonising bare ground

Most of the properties north of Flower Hill are private an inaccessible. @ Compartment 9 there is a small hardcore car park for an upholsterer's located on the northern site boundary. This is largely bare gravel with typical small weeds. The hedge to the east is a tall Garden Privet (Ligustrum ovalifolium) structure. Where this stops to the north there is a stand of mature Japanese Knotweed (Fallopia japonica) measuring some 10m x 2-3 m aligned along the boundary.

Compartment 10: BC4 Flower beds, GA2 amenity grassland + ED3 Recolonising bare ground

The combined gardens behind a row of 4 unoccupied terraced properties. The gardens remain managed. Partly cleared and partly occupied by mounds of dumped rubble. No access, but a good view from the edge. No Schedule 3 invasive plants were noted.

Compartment 11: Habitat mosaic

A complex of empty, partly derelict buildings behind a largely unoccupied street-side terrace.

The sheds with steel roofs offer very few suitable bat roosting sites, and between them occupy some 20% of the area. The remainder is split between Butterfly-bush (Buddleja davidii) and Bramble (Rubus fruticosus agg.) scrub, and False Oat-grass (Arrhenatherum elatius) and Common Nettle (Urtica dioica) grassland. Easy to access and used for drinking. Much dumping of rubbish, often in bin bags, but no soil or rubble dumping and no Schedule 3 invasive plants.

11 roadside terrace


11


12


12 typical sward

Compartment 12: GS2 Dry meadows and grassy verges

Unmanaged and species-poor grassland developed in a single large field over well-drained soil and probably derived from re-seeded Perennial Rye-grass (Lolium perenne) which remains patchy along some of the numerous desire line paths around the field. Species richness supressed by the accumulating grass litter layer.

False Oat-grass (Arrhenatherum elatius)	A
Common Couch (Elytrigia repens)	FLA
Cleavers (Galium aparine)	F
Meadow Foxtail (Alopecurus pratensis)	F
Yorkshire-fog (Holcus lanatus)	O-F
Cock's-foot (Dactylis glomerata)	O-F
Lesser Stitchwort (Stellaria graminea)	OLF
Red Fescue (Festuca rubra)	OVLF
Creeping Thistle (Cirsium arvense)	LO
Common Nettle (Urtica dioica)	LO
Meadow Buttercup (Ranunculus acris)	R
Rosebay Willowherb (Chamerion angustifolium)	VLF
Perennial Rye-grass (Lolium perenne)	VLF

Bramble (Rubus fruticosus agg.) is slowly invading the field from the boundaries at Compartment 2 (especially) and Compartment 16. There is a single mature Horse-chestnut (Aesculus hippocastanum).

Compartment 13: WS1 Scrub

There are several blocks of partly joined scrub in the centre of field 13. Bramble (Rubus fruticosus agg.) forms a variable canopy over around 80 % of the area, often tall and dense. The remainder of the cover is predominantly Willow and Birch, although the ground is not at all damp.

	Mature 30+ Early-Mature 20+	Semi-Mature 12+ Young 6+	Sapling to 6 Seedling 0-2 yr
Trees			
Silver Birch (Betula pendula)	R	O	
Downy Birch (Betula pubescens ssp pubescens)		F	O
Goat Willow (Salix caprea) hybrid		R	
Goat Willow (Salix caprea)		O-F	O
Ash (Fraxinus excelsior)		R	R
Grey Alder (Alnus incana)			LF
Shrubs			
Rusty Willow (Salix cinerea subsp oleifolia)	R	F	O
Snowberry (Symphoricarpos albus)	VLA		
Hawthorn (Crataegus monogyna)			R

The ground is in places uneven and generally lower by some 30 cm that the adjacent field 12. There vestiges of the Compartment 12 grassland throughout, and in grassy areas, more species rich than the main Compartment 12 sward. Additional species are common grassland species:

Ribwort Plantain (Plantago lanceolata)
Dandelion (Taraxacum officinale)
Red Clover (Trifolium pratense)
Bush Vetch (Vicia sepium)
Common Ragwort (Senecio jacobaea)
Germander Speedwell (Veronica chamaedrys)
Creeping Cinquefoil (Potentilla reptans)
Rough Meadow-grass (Poa trivialis)
Soft-rush (Juncus effusus)
Creeping Buttercup (Ranunculus repens)
Dove's-foot Crane's-bill (Geranium molle)

The grassy layer not truly supressed anywhere unless by dense Bramble (Rubus fruticosus agg.). Common Ivy (Hedera helix) is very locally establishing and is the only shade adapted species so far recruited.

Drinkers frequent the heaviest cover.

13

14

Compartment 14: Not in the Heritage Council Classification

Relict type 12 grassland in this corner, but mainly occupied by Rosebay Willowherb (Chamerion angustifolium) with light Rubus fruticosus cover. 3 x mature Ash (Fraxinus excelsior) and a couple of isolated Hawthorn (Crataegus monogyna) also occur.

Compartment 15: WD1 (Mixed) broadleaved woodland

A tree screen extending from a little before New Lane, to the Beaufort Bridge. It widens from around 6m to around 9m towards the bridge, where it becomes a bank up to Compartment 12/14.

Trees are densely planted (spacing around 70-120 cm) and beginning to self-thin. The largest Cherry and Birch trees now to 22 cm dbh, but the main cover is generally in the 6-12 cm range. The planted species are mainly English natives (some species non-native to Ireland) except for an intermittent zone at the roadside with non-native landscaping shrubs.

Wild Cherry (Prunus avium)	F-A	
Hazel (Corylus avellana)	F	
Field Maple (Acer campestre)	F	Not an Irish native
Silver Birch (Betula pendula)	O-F	
Hawthorn (Crataegus monogyna)	O	
Downy Birch (Betula pubescens ssp pubescens)	O	
Cherry Laurel (Prunus laurocerasus 'Rotundifolia')	O	Non-native
Laurustinus (Viburnum tinus)	LF	
Garden Privet (Ligustrum ovalifolium)	LF	
Wayfaring-tree (Viburnum lantana)	LO	Not an Irish native
Holly (Ilex aquifolium)	R	
Ash (Fraxinus excelsior)	R	

Ground-flora is species-poor with near fully supressed grassland species but little recruitment of shade adapted species:

Common Ivy (Hedera helix)	VD
Lesser Celandine (Ficaria verna)	O-F
Cow Parsley (Anthriscus sylvestris)	OLA
Cleavers (Galium aparine)	OLF
Dandelion (Taraxacum officinale)	O
Bush Vetch (Vicia sepium)	R
Red Fescue (Festuca rubra)	R
Creeping Buttercup (Ranunculus repens)	R

15

16

Compartment 16: WL2 tree line

Embankment above the river valley side, typically 200 cm wide x 60-80 cm tall. Formerly a hedge, but now overgrown into semi-continuous generally multi-stemmed early-mature and mature Ash (Fraxinus excelsior). Hawthorn (Crataegus monogyna) now with stems to 20 cm diameter and pollarded at around 2.4 m

Ash (Fraxinus excelsior)	A	Early mature +
Bramble (Rubus fruticosus agg.)	A	
Elder (Sambucus nigra)	F	
Ash (Fraxinus excelsior)	F	< early mature
Hawthorn (Crataegus monogyna)	OLF	
Blackthorn (Prunus spinosa)	OLF	
Wych Elm (Ulmus glabra)	R	sapling

The bank with a eutrophic hedge base-flora of Common Nettle (Urtica dioica), Cleavers (Galium aparine) and Cow Parsley (Anthriscus sylvestris). Locally Common Ivy (Hedera helix).

Compartment 17: WS1 scrub

The bank mainly slopes at 17°, but in places up to 25°. Level at the top beside the Compartment 16 hedge, where there may have been a track once. Now with a few clearings used by drinkers.

	Mature 30+ Early-Mature 20+	Semi-Mature 12+ Young 6+	Sapling to 6 Seedling 0-2 yr
Trees			
Ash (Fraxinus excelsior)	O	F	F
Osier (Salix viminalis)		R	
Sycamore (Acer pseudoplatanus)		O	O
Goat Willow (Salix caprea)		R	R
Common Alder (Alnus glutinosa)		LO	
Shrubs			
Blackthorn (Prunus spinosa)		FLA	
Gorse (Ulex europaeus)		R	R
Bramble (Rubus fruticosus agg.)		ALD	
Rusty Willow (Salix cinerea subsp oleifolia)		OLF	O
Butterfly-bush (Buddleja davidii)		FLD	
Elder (Sambucus nigra)		OLF	
Box-leaved Honeysuckle (Lonicera pileata)		R	

In a few places, continuous Bramble (Rubus fruticosus agg.) fills gaps between other taller structural vegetation.

In places it is clear from exposed substrate that the bank is a fill slope. There is a track from the ruins of Elliot's Mill in the south, to Mill Lane in the north. The fill is heaped up on the river side of the track, forming an embankment that masks the river from the track. The vegetation between the track and the river is a part of the same unit.

The ground-flora is sparse throughout as the cover is not usually clear-stemmed and the canopy often occupies the ground level.

Japanese Knotweed (Fallopia japonica)	FLD
Common Ivy (Hedera helix)	OLF
Cow Parsley (Anthriscus sylvestris)	OLF
Common Feather-moss (Kindbergia praelonga)	OLF
Common Figwort (Scrophularia nodosa)	OLF
Hogweed (Heracleum sphondylium)	O
Nipplewort (Lapsana communis)	O
Dandelion (Taraxacum officinale)	O
Herb-Robert (Geranium robertianum)	O
Rough-stalked Feather-moss (Brachythecium rutabulum)	O
False Oat-grass (Arrhenatherum elatius)	O
Smooth Sow-thistle (Sonchus oleraceus)	O
Colt's-foot (Tussilago farfara)	LO
Red Valerian (Centranthus ruber)	LO
Red Fescue (Festuca rubra)	R
Garlic Mustard (Alliaria petiolata)	R

17

17 track

Compartment 18: BL3 Buildings and artificial surfaces

Elliots's Mill comprises a cluster of buildings of steel RSJ frames, rendered block walls, and corrugated asbestos gabled roofs, now largely un-sheeted.

Encroached in places by Compartment 17 scrub, and with Japanese Knotweed (Fallopia japonica) growing against the external walls in places on the north side.

18

19

Compartment 19: WS1 scrub + GS2 dry meadows and grassy verges

A clearing in the scrub cover largely occupied by False Oat-grass (Arrhenatherum elatius) grassland. Two old containers as store rooms, possibly left over from the construction of the Hampton Rise apartments? Around these, ruderal ground over rubble fill, and widespread Japanese Knotweed (Fallopia japonica) including small patches. Large stands occur in the undisturbed Bramble (Rubus fruticosus agg.) further up slope. Bramble (Rubus fruticosus agg.) is encroaching from most sides and occupies some 50% of the clearing already.

Yorkshire-fog (Holcus lanatus)	F-A
False Oat-grass (Arrhenatherum elatius)	FLA
Meadow Foxtail (Alopecurus pratensis)	FLA
Bramble (Rubus fruticosus agg.)	FLD
Common Couch (Elytrigia repens)	OLF
Common Nettle (Urtica dioica)	O
Rosebay Willowherb (Chamerion angustifolium)	O
Creeping Thistle (Cirsium arvense)	O
Creeping Buttercup (Ranunculus repens)	O
Cleavers (Galium aparine)	LO
Smooth Meadow-grass (Poa pratensis agg)	LO
Creeping Bent (Agrostis stolonifera)	LO
Common Knapweed (Centaurea nigra)	LO
Red Fescue (Festuca rubra)	LO
Spear thistle (Cirsium vulgare)	R
Germander Speedwell (Veronica chamaedrys)	R
Meadow Buttercup (Ranunculus acris)	R
Dandelion (Taraxacum officinale)	R
Carrot (Daucus carota)	R

A wall at the slope top provides a popular drinking spot with a pleasant view over the river.

Compartment 20: WS1 Scrub

There is no easy access to the steep bank between Blackwater Heights and Hampton Rise/Mill Lane. From aerial images it seems that it is largely occupied by tall Bramble (Rubus fruticosus agg.), with small trees, so similar to Compartment 17. Japanese Knotweed (Fallopia japonica) is confined to the very southern tip beside Compartment 19.

20

21

Compartment 21: WD1: Mixed Broadleaved woodland.

A small riverside stand of White Willow (Salix alba).

White Willow (Salix alba)	A	Early mature and mature
Elder (Sambucus nigra)	O	
Sycamore (Acer pseudoplatanus)	O	Saplings
Butterfly-bush (Buddleja davidii)	O	Small shrubs

Bramble (Rubus fruticosus agg.) and Common Nettle (Urtica dioica) form a near continuous dense understorey, with:

Butterbur (Petasites hybridus)
Montbretia (Crocosmia x crocosmiiflora)
Dandelion (Taraxacum officinale)
Common Nettle (Urtica dioica)
Cleavers (Galium aparine)
Creeping Buttercup (Ranunculus repens)
Cow Parsley (Anthriscus sylvestris)
Reed Canary-grass (Phalaris arundinacea)

Notably no Himalayan Balsam (Impatiens glandulifera) at the waterside.

22

22 (Traveller's-joy below scaffold)

Compartment 22: ED3 Recolonising bare ground/WS1 Scrub

A gap site between Mill Lane and the river. The riverside with a zone of some 8m of dense, low canopy Bramble (Rubus fruticosus agg.) with a stand of Japanese Knotweed (Fallopia japonica) around 6 m x 2.5 m beside the apartments.

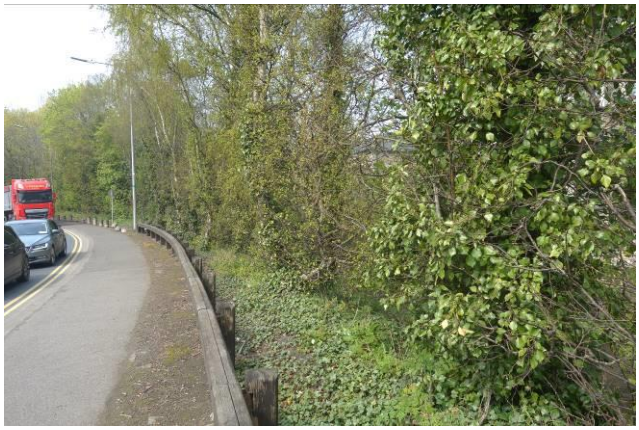
The bramble leads back to the remaining area occupied largely by Rusty Willow (Salix cinerea subsp oleifolia) saplings and Butterfly-bush (Buddleja davidii). These have been cleared at least once before and the brashings remain on site.

Rusty Willow (Salix cinerea subsp oleifolia)	A	Saplings
Bramble (Rubus fruticosus agg.)	FLD	
Butterfly-bush (Buddleja davidii)	FLA	
Red-osier Dogwood (Cornus stolonifera)	O	
Osier (Salix viminalis)	O	Saplings
Downy Birch (Betula pubescens ssp pubescens)	O	Saplings
Common Alder (Alnus glutinosa)	O	Saplings
Goat Willow (Salix caprea)	LO	Saplings
Common Nettle (Urtica dioica)	F	
Rosebay Willowherb (Chamerion angustifolium)	O	
False Oat-grass (Arrhenatherum elatius)	O	
Cow Parsley (Anthriscus sylvestris)	O	
Creeping Buttercup (Ranunculus repens)	O	
Hogweed (Heracleum sphondylium)	O	
Traveller's-joy (Clematis vitalba)	LA	
Lesser Celandine (Ficaria verna)	LO	
Creeping Buttercup (Ranunculus repens)	LO	
Wavy Bitter-cress (Cardamine flexuosa)	R	
Broad-leaved Dock (Rumex obtusifolius)	R	
Meadow Buttercup (Ranunculus acris)	R	
Meadowsweet (Filipendula ulmaria)	R	
Japanese Knotweed (Fallopia japonica)	VLA	

Compartment 23: WS3 non-native shrub

Bark-mulched landscaping at the bank top, comprising topiaried Hybrid Oleaster (Elaeagnus x ebbingei) with 1 x Hornbeam (Carpinus betulus 'Franz Fontaine'). The river bank dominated by Bramble (Rubus fruticosus agg.). Goat's-beard (Tragopogon pratensis) noted amongst the weeds at the bank top.

23



24

Compartment 24: WD1 mixed broadleaved woodland

A narrow planted screen of Silver Birch (Betula pendula) ad Grey Alder (Alnus incana) with recruited Ash (Fraxinus excelsior) and Sycamore (Acer pseudoplatanus). Blackthorn (Prunus spinosa) and Japanese Rose (Rosa rugosa) also probably planted.

Compartment 25: WD1 mixed broadleaved woodland

A tapering woodland comprising a mature stand on the sloping bank down to the river, and a young stand planted between the bank top and the Inner Relief Road. 25a and 25b are contiguous, but different.

@25a the mature trees on the bank are largely Sycamore (Acer pseudoplatanus) with a few Ash (Fraxinus excelsior). These trees to 36 cm dbh. Ash is ± confined to the river bank. The younger stand on the level is mixed planting, mainly of Grey Alder (Alnus incana).

	Mature 30+ Early-Mature 20+	Semi-Mature 12+ Young 6+	Sapling to 6 Seedling 0-2 yr
Trees			
Ash (Fraxinus excelsior)	F	R	R
Sycamore (Acer pseudoplatanus)	F	F	F
Grey Alder (Alnus incana)	OLF	F	FLA
Norway Maple (Acer platanoides)			O
Common Alder (Alnus glutinosa)		O	O
Aspen (Populus tremula)			LO
Cf. Western Balsam-poplar (Populus trichocarpa)			R
Pedunculate Oak (Quercus robur)			R
Beech (Fagus sylvatica)		R	
Downy Birch (Betula pubescens ssp pubescens)	R		
Shrubs			
Firethorn (Pyracantha coccinea)		R	
Garden Privet (Ligustrum ovalifolium)		R	
Hawthorn (Crataegus monogyna)		O	
Elder (Sambucus nigra)		O	O
Himalayan Cotoneaster (Cotoneaster simonsii)		R	
Thunberg's Barberry (Berberis thunbergii)		R	
Gagnepain's Barberry (Berberis gagnepainii)		R	

The ground-flora throughout largely dominated by species-poor Common Ivy (Hedera helix) even without large ferns.

Common Ivy (Hedera helix)	D
Broad-leaved Dock (Rumex obtusifolius)	
Bush Vetch (Vicia sepium)	
Common Feather-moss (Kindbergia praelonga)	
Lesser Celandine (Ficaria verna)	
Hart's-tongue (Asplenium scolopendrium)	R
Common Pocket-moss (Fissidens taxifolius)	
Herb-Robert (Geranium robertianum)	
Cow Parsley (Anthriscus sylvestris)	
False Oat-grass (Arrhenatherum elatius)	
Dandelion (Taraxacum officinale)	
Sweet Vernal-grass (Anthoxanthum odoratum)	
Common Bent (Agrostis capillaris)	
Hogweed (Heracleum sphondylium)	

25a bank

25a level

Between 25a and 25 b there has been local clearance to gather timber for small bonfires that have been lit in places at the bank top where drinkers congregate. In 25 b there has been machine clearance in a zone alongside the bank top.

@25b, the mature riverbank trees are dominated by White Willow (Salix alba), and the young planting on the level area to the Inner relief Road is dominated by Aspen (Populus tremula), with a large patch of Red-osier Dogwood (Cornus stolonifera).

Trees	Mature 30+ Early-Mature 20+	Semi-Mature 12+ Young 6+	Sapling to 6 Seedling 0-2 yr
White Willow (Salix alba)	LA	LF	
Norway Maple (Acer platanoides)			F
Aspen (Populus tremula)		ALD	F
Hybrid Larch (Larix x marschlinsii)		O	
Field Maple (Acer campestre)			O

Ash (Fraxinus excelsior)		R	R
Horse-chestnut (Aesculus hippocastanum)		R	
London Plane (Platanus x hispanica)	LO		
Downy Birch (Betula pubescens ssp pubescens)	O	R	
Sycamore (Acer pseudoplatanus)	O	R	O-F
Ash (Fraxinus excelsior)			R
Scots Pine (Pinus sylvestris)		R	
Cherry Plum (Prunus cerasifera)		LF	
Wild Cherry (Prunus avium)		R	
Common Alder (Alnus glutinosa)		R	
Osier (Salix viminalis)		R	

Shrubs

Red-osier Dogwood (Cornus stolonifera)		FLD	
Hawthorn (Crataegus monogyna)		R	R
Garden Privet (Ligustrum ovalifolium)		LA	
Elder (Sambucus nigra)		OLF	O
Wilson's Honeysuckle (Lonicera nitida)		LA	
Hollyberry Cotoneaster (Cotoneaster bullatus)		R	

The ground-flora is less obviously shaded than in 25a and with a sparse Bramble (Rubus fruticosus agg.) sub-canopy:

Common Ivy (Hedera helix)	FLA
Bramble (Rubus fruticosus agg.)	FLA
Common Feather-moss (Kindbergia praelonga)	FLA
Common Bent (Agrostis capillaris)	OLF
Great Willowherb (Epilobium hirsutum)	O
Common Nettle (Urtica dioica)	O
Cleavers (Galium aparine)	O
Bush Vetch (Vicia sepium)	O
Herb-Robert (Geranium robertianum)	O
Red Fescue (Festuca rubra)	O
Creeping Buttercup (Ranunculus repens)	O
Dandelion (Taraxacum officinale)	O
Cow Parsley (Anthriscus sylvestris)	O
Lesser Celandine (Ficaria verna)	LO
Creeping Buttercup (Ranunculus repens)	LO
Germander Speedwell (Veronica chamaedrys)	R
Hedge Woundwort (Stachys sylvatica)	R
Wood Avens (Geum urbanum)	VR
Wood dock (Rumex sanguineus)	VR

25b level

25 clearance

Compartment 26: ED3 recolonising bare ground

An area of around 4.5 ha. Part of the site of the eponymous abbey, now a vacant site, occasionally and recently cleared. The surface is on several levels and includes areas of bulldozed fill, some of which at the north end, with Japanese Knotweed. There are a few piles of rubble yet to be spread. The rubble mound beside the boundary with the car park, the only place on site where Soft Shield-fern (Polystichum setiferum) was recorded – this a species that would have been expected to be throughout the woods.

The river bank is a small feature here and continues the mature woodland theme from Compartment 25. The high canopy only about 60% cover though, so with infill shrub development.

White Willow (Salix alba)	F	
Sycamore (Acer pseudoplatanus)	O	
Common Alder (Alnus glutinosa)	O	
Ash (Fraxinus excelsior)	R	
Common Lime (Tilia x europaea)	R	+ 1 felled

Shrubs ± 40%

Cherry Laurel (Prunus laurocerasus)
Elder (Sambucus nigra)
Raspberry (Rubus idaeus)
Bramble (Rubus fruticosus agg.)

Within the site, a few stands were not recently bulldozed. These now 'islands' of:

Bramble (Rubus fruticosus agg.)	
Butterfly-bush (Buddleja davidii)	
Common Alder (Alnus glutinosa)	Saplings
Downy Birch (Betula pubescens ssp pubescens)	Saplings
Goat Willow (Salix caprea)	Saplings
Gooseberry (Ribes uva-crispa)	
Gorse (Ulex europaeus)	

Creeping Buttercup (Ranunculus repens)
Meadow Buttercup (Ranunculus acris)
Pendulous Sedge (Carex pendula)
Common Ivy (Hedera helix)
Rosebay Willowherb (Chamerion angustifolium)
Cleavers (Galium aparine)
Nipplewort (Lapsana communis)
Common Nettle (Urtica dioica)

The recent scraped areas with typical weeds:

Sun Spurge (Euphorbia helioscopia)
Annual Meadow-grass (Poa annua)
Shining Crane's-bill (Geranium lucidum)
Spear thistle (Cirsium vulgare)
Herb-Robert (Geranium robertianum)
Hairy Bitter-cress (Cardamine hirsuta)
Shepherd's-purse (Capsella bursa-pastoris)
Colt's-foot (Tussilago farfara)
Creeping Bent (Agrostis stolonifera)

26

26

27

28

Compartment 27: WL2 tree line

A row of Lawson's Cypress (Chamaecyparis lawsoniana) varying from 15 to 60 cm dbh, never clipped as a hedge.

Below these trees seems to be a popular drinking spot.

Compartment 28: WS3 non-native shrub

More topiaried landscaping at the base of the slope up to the car park, some trimmed as a sinuous hedge:

Warty Barberry (Berberis verruculosa)
Arrowwood (Viburnum bodnantense cv)
Cf Privet (Ligustrum japonicum)
Spindle tree (Euonymus cv)
Spotted-laurel (Aucuba japonica)
Portugal Laurel (Prunus lusitanica)
Mock-orange (Philadelphus cv)

Compartment 29: GA2 Amenity grass

The car park here surrounded by a bank of frequently mown amenity grass dominated by fine-leaved lawn cvs.

Red Fescue (Festuca rubra)	A	
Perennial Rye-grass (Lolium perenne)	A	Fine leaved cv
Ribwort Plantain (Plantago lanceolata)	F	
Creeping Buttercup (Ranunculus repens)	F	
White Clover (Trifolium repens)	F	
Common Feather-moss (Kindbergia praelonga)	F	
Daisy (Bellis perennis)	OLF	
Lesser Stitchwort (Stellaria graminea)	O	
Yorkshire-fog (Holcus lanatus)	O	
Common Mouse-ear (Cerastium fontanum)	O	
Dandelion (Taraxacum officinale)	O	
Cat's-ear (Hypochaeris radicata)	O	
Yarrow (Achillea millefolium)	LO	
Slender Speedwell (Veronica filiformis)	R	
Common Stork's-bill (Erodium cicutarium)	R	

The external bank sloping at around 33° and presumably difficult to mow.

29

29 sward

Compartment 30: WS1 scrub

Between the car park and the river, the bank slopes at 25° (measured below the bridge). It is densely occupied by Bramble (Rubus fruticosus agg.) and ± impenetrable. A scattering of young trees and taller shrubs emerge from the Bramble canopy:

Sycamore (Acer pseudoplatanus)
Butterfly-bush (Buddleja davidii)
Rusty Willow (Salix cinerea subsp oleifolia)
Osier (Salix viminalis)
Field Maple (Acer campestre)
Ash (Fraxinus excelsior)
Goat Willow (Salix caprea)

Compartment 31: FW2 Lowland River

The Blackwater before the confluence with the Boyne is between 15 and 20 m wide and flows briskly though a shallow channel. There is little opportunity to easily access the river bank, which is generally occupied by riverside trees, but without a flood zone. The bank steps down some 40 cm + to the water edge where there is often a narrow and intermittent zone of Reed Canary-grass (Phalaris arundinacea), Yellow Iris (Iris pseudacorus), Branched Bur-reed (Sparganium erectum) and Hemlock Water-dropwort (Oenanthe crocata).

The bankside trees often with Lesser Celandine (Ficaria verna) and Cow Parsley (Anthriscus sylvestris) frequent, occasionally with Meadowsweet (Filipendula ulmaria), Wild Angelica (Angelica sylvestris), etc.. Winter Heliotrope (Petasites fragrans) in places, but not Giant Hogweed (Heracleum mantegazzianum) (all hogweed seen was Hogweed (Heracleum sphondylium)) and no Himalayan Balsam (Impatiens glandulifera) which at the time of survey would be small but characteristic seedlings.

30

31

Compartment 32: GA2 Amenity grass

Abbeylands Crescent is arranged around a central green, reseeded Perennial Rye-grass (Lolium perenne) forms a hard-wearing sward, used by kids and provided with goal posts. A few small Cypresses timed to nubs at the roadside edge, and 3 x young Rowan (Sorbus aucuparia cv). The mature Sycamore (Acer pseudoplatanus) in the adjacent garden provides an important backdrop to the green.

Compartment 33: WS3 non-native shrub

Landscaping around the turning head. 4 x young Rowan (Sorbus aucuparia cv) rising from cf Bearberry Cotoneaster (Cotoneaster dammeri), with Red-osier Dogwood (Cornus stolonifera) and Firethorn (Pyracantha coccinea) at the rear backed by Butterfly-bush (Buddleja davidii) probably in cv. All carefully tended.

32

33

Protected Fauna:

Badger:

Difficulty in accessing the dense scrub areas presents problems in executing a thorough survey for Badgers.

No Badger setts were noted on the preliminary survey, and no signs of Badger were found (snuffle holes, snagged hairs, latrines etc.). Obvious paths in the rank grass in Compartment 12 were clearly desire lines used by pedestrians, some leading across the Compartment 16 boundary to concealed areas used for al fresco drinking. All paths across the boundary were followed, and none led to setts or appeared to continue into the scrub.

Badgers could use the pedestrian desire lines, and it is unlikely that the green space around the Blackwater is not within a group territory.

Bats:

Elliots's Mill, has already been identified by Bat Eco Services as being 'open and generally damp, which reduces its potential as a roosting site'. Tina classifies it as being of medium roosting potential.

Some of the larger trees on both sides of the river had heavy Ivy cover – thick lianas could provide roosting opportunities. Tina's daytime survey failed to find trees located on the northern side of the River Blackwater considered to be of Potential Bat Roost (PBR) value, but found 'a number of large mature trees, many with dense ivy growth that would be potentially used as roosting sites for bats located on the southern side of the River Blackwater.'

The bat surveys around the river corridor found Common Pipistrelle, Leisler's Bat, Soprano Pipistrelle, and Daubenton's Bat use the site.

Daubenton's are most closely associated with riparian habitat and were mainly using the upstream end. It is suggested because of lower levels of illumination.

The wooded habitats along the River Blackwater provide foraging habitat for the other species, with Soprano Pipistrelle the most frequent bats species.

Away from the river corridor, the urban section of the site was judged to have a low productivity for bats, with little green space, few tree lines and no open water or wetland habitat. Some of the properties would have potential for bat roosts, particularly the more intact, unoccupied buildings around Flower Hill, but newer and occupied buildings should not be ruled out. The Compartment 11 derelict buildings were judged to present a low risk.

Otter:

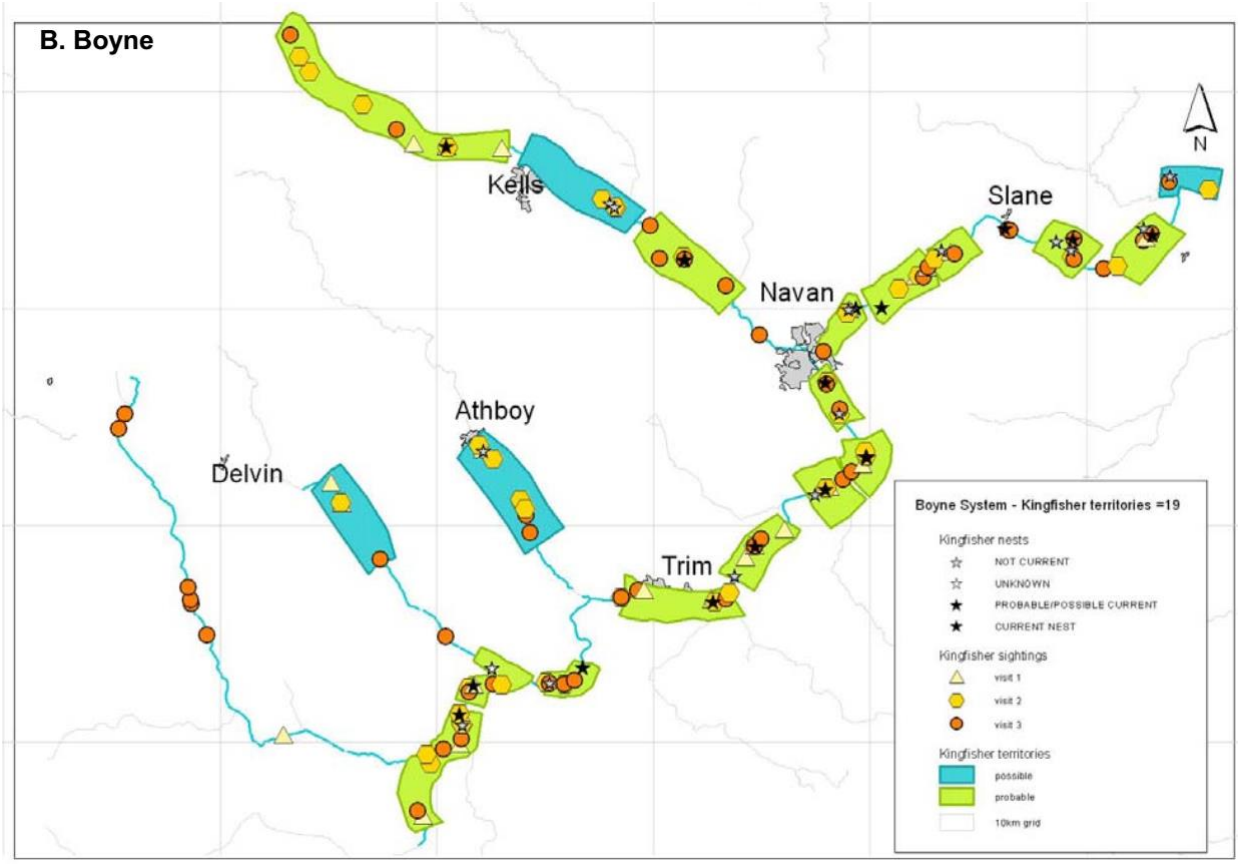
Otter were not satisfactorily surveyed due to poor access to the river. In the few places where the waterline was accessed, there were no signs, but the river looked to be in good condition to support Otter, and the adjacent banks provide good refuge and cover.

Birds:

The river corridor scrub was frequented by a high density of normal farmland passerines which find plenty of nesting and loafing cover. Grey Heron were busy in the river, particularly around the weir.

No Dipper, Grey Wagtail or Kingfisher were noted, and no suitable banks for Kingfisher tunnels were recorded, but poor access to the river made this a likely outcome.

The 2010 Riparian bird survey recorded no Kingfisher on the site:



Map 3 Reproduced from IWC (2010)

The surveyors do however report that the lower stretches of the river within the urban fringe of Navan were difficult to survey due to access and development.

Salmon:

Fish were not surveyed, but Salmon are well known from the Boyne and Blackwater. This from http://salmonireland.com:

> The spring fish usually start running in early March and keep going until the end of May, They run right through to the stretch between Slane and Navan. The main spring fishing effort is concentrated around Navan, and on downwards to Slane. The river used to get a decent run of big 3 winter fish of between 20lbs and 30lbs, but that has dried up in recent years and most spring fish now, are around the 10lb mark. The Ramparts and Sophies Island are a couple of the best spring locations.
>
> The Grilse begin running in July and continue through until the end of August. The best of the Grilse fishing is from Oldbridge, upstream to Slane, with the best areas being, Oldbridge, Staleen, Crewbawn, Johnstons and the Scabby Arch. Slane to Navan also yields a decent number of Grilse each year.
>
> The Boyne also gets a decent run of autumn fish through August and September, some of which can reach upwards of 20lbs. In low water conditions, autumn fish can back up in the stretches below Slane, giving excellent sport up as far as Navan on each flood.

Newts:

No potential breeding ponds were noted (the river is not suitable), so the suitable terrestrial habitat (the scrubland and unmanaged grassland) is unlikely to be utilised.

Lizard:

In Ireland Lizard are mainly associated with heathland, bog and coastal habitats none of which are present on the site. There is a low potential for this species.

Invertebrates: No study of invertebrates was undertaken. No special invertebrate habitats were noted.

Potential Ecological Constraints:

High Value Habitats

With the exception of the Kells Blackwater River itself, the habitats within the search area were in poor ecological condition.

It is confirmed that the SAC habitats 7230 Alkaline fens and 91E0 Alluvial forests with Alnus glutinosa and Fraxinus excelsior, are not present on the site.

Potential rare plants

BES (2006) list 3 scarce/rare or threatened plants for which there are un-localised records in Navan:

> Hairy St. John's-wort (Hypericum hirsutum), last recorded in 1896. This is a perennial herb of well-drained, neutral to basic soils in open or partially shaded habitats including rough and ungrazed grassland, woodland rides and clearings, river banks, roadside banks and verges. Not seen on the survey (no Hypericums were recorded) but clearly there is available suitable habitat in the search area.
>
> Common Wintergreen (Pyrola minor) last recorded in 1993. This is a plant of damp habitats. No suitable habitats for this species were identified in the search area.
>
> Shepherd's-needle (Scandix pecten-veneris) last recoded in 1896. This is a plant of disturbed habitats, which are represented in ruderal parts of the search area, however this species now appears to be extinct in Ireland.

N2K and Appropriate Assessment

Projects that are not directly connected with or necessary to the management of the Natura 2000 sites but could have significant impacts upon them, or more specifically upon the designation features of the N2K sites, will require to be subject to an Appropriate Assessment Stage 1 Screening.

Thus any projects (not necessarily restricted to those that will require Planning Permission) which may result in the risk of negative impacts upon water quality or quantity either during the construction phase or operational phase will require an AA.

Given that Salmon are a designation feature, the predicted input of suspended solids (in the form of soil or clay laden run-off, including fines washed from crusher run) will fail the screening and

require mitigation, and the anticipated use of percussive construction methods such as piling, (which can create an acoustic barriers to fish migration) during a Salmon run will also fail.

The clearance of bankside structural vegetation potentially of use to Kingfisher as perches, will require AA.

Any excavation within 30m of the river is also likely to require a dedicated Otter survey and search for holts.

The recent rejection of a nursing home proposal on the site of Elliot's Mill was partly because the applicant had failed to demonstrate no significant effect on the N2K sites. This must be either on Kingfisher, Salmon, Otter or less likely, Lamprey.

Try to gain insight, examine the application and decision before any further proposals are submitted. Commission whatever surveys are required to underpin any required Appropriate Assessment.

Protected species 1 - All Breeding Birds

Most structural vegetation on the site could host nesting birds.

Protection of nests in the breeding season is a legal requirement under the Wildlife Acts 1976 to 2018. The breeding season extends from 1st March to 31st August. Any required clearance of structural vegetation should be undertaken outside these dates (unless it is urgently required for public safety). These restrictions apply not only to private land-users but also to the Council, to public bodies and to contractors.

Protected species 2 - Bats

Current survey data has usefully identified important bat areas, but bat surveys cannot yet be ticked as 'done' in adequate detail to support a planning application.

Bat Conservation Trust guidelines (adopted in the Republic of Ireland) require that static bat recorders are in place for 5 days at a time, and that sites with a high potential productivity for bats are surveyed more than once in a season. Tina only had time for 1 nights recording on a single occasion at each location and the hand held detector surveys were rather abbreviated on health and safety grounds.

All native bats and their roosts are protected by the Wildlife Acts 1976 to 2012. It is an offence to disturb or destroy the breeding or resting place of any bat.

Large trees that may require to be felled to enable a project should be individually assigned to a Bat Roost Risk category before felling.

Suggested Bat Roost Risk Categories (after BS 8596 - Surveying for bats in trees and woodland)

Risk Category	Description
0	*No potential to host roosting bats*. Trees without loose bark, fissures and rot holes, and not with dense mature Ivy cover. Generally young to semi-mature specimens.
1	*Unlikely to host roosting bats*. Trees without loose bark, fissures and rot holes, and not with dense mature Ivy cover, but the tree is of a size and age that climbing surveys may result in cracks or crevices being found which may have limited potential to host roosts.
2	*Moderate potential to host roosting bats*. Trees with e.g. loose bark, deep fissures or splits and rot holes, or with dense thick-stemmed Ivy that seem likely to present potential at least for use by single bats.
3	*High potential to host roosting bats*. Trees with multiple, highly suitable features that appear capable of supporting larger roosts.
4	*Confirmed roost site or evidence of roost occupation.*

Trees that are category 2 or higher (or the equivalent in a different classification) will require an emergence/return survey to check for indications of bat roosts. Note that the Bat survey found no trees equivalent to category 2 or above on the north bank of the river.

The river corridor itself is important for bat feeding and is thus light sensitive as lighting can have harmful impacts upon bat foraging and up bat commuting.

Some Bat species, such as the Long-eared Bats and the Myotis species will avoid relatively low levels of light (3.7 lux is commonly cited). Some species, such as Pipistrelles, are less sensitive.

Insects attracted to light are not available as prey items in dark areas.

Less sensitive Bats attracted to insects in lit areas are vulnerable to predation.

The interruption of dark corridors with flood lighting will make commuting routes unavailable to bats once the threshold at which they avoid light is exceeded.

Bat Conservation Ireland's information leaflet Bats & Lighting Guidance Notes for: Planners, engineers, architects and developers, states that:

> 'Lighting can be particularly harmful to bat populations along river corridors, woodland edges, along hedgerows and treelines and at lake edges.

Some Authorities recommend adopting 1lux as the precautionary maximum amount of light spillage on to a bat foraging corridor needed to avoid impacts on bat foraging. On the basis of

scant evidence, 3 lux would appear to be a more reasonable limit where there is no likelihood of roosting/hibernating.

Any proposal in the river corridor here (Survey Compartments16, 17, 18, 19, 21, 24, 25, 26 and 30) should maintain dark corridors. In preferably in illuminated areas, make use of low level lighting (e.g. lighting bollards, but be aware that truly vandal-proof low level lights have yet to be made), or 'bat friendly' low pressure sodium lighting (the yellow lamps).

Otter

Otters and their holts and couches are protected by the Wildlife Acts 1976 to 2012. It is an offence to kill Otters or to disturb or destroy their resting places.

As a rule of thumb, holts or couches if present will be located within 10m of the Blackwater margin. Major works within 30m greenspace from the river will require an Otter survey. Because of the access difficulties from the bank, this would best be conducted from the river e.g. by kayak.

Invasive Plant Species

There are 35 invasive plant species listed in the European Communities (Birds and Natural Habitats) Regulations 2011. (S.I. No. 477/2011). Of these a few could reasonably be anticipated to be in the search area:

Giant Hogweed (Heracleum mantegazzianum)
Himalayan Balsam (Impatiens glandulifera)
Japanese Knotweed (Fallopia japonica)
Rhododendron (Rhododendron ponticum)
Wood dock (Rumex sanguineus)
Three-cornered Garlic (Allium triquetrum)
Waterweed (Elodea spp)

Of these, to date only Japanese Knotweed has actually been recorded.

The FERS surveys located and mapped the approximate positions of the Japanese Knotweed but did not exactly map the locations and did not describe the condition or accessibility of the plant in any location. It does not seem to be widespread beyond the FERS search area, with only two additional locations found, although some potential sites could not be accessed.

This is essential data when compiling an invasive species management plan (ISMP) so will be completed in the next phase of this study.

The preliminary study indicates that much of the Japanese Knotweed in site is not suitable for eradication by spraying. Stem injection (without cutting the cane) will be required. The treatment season should begin as soon as the canes are near their maximum diameter and the leaves fully expanded. Sometime in June, not September as reported by FERS. September is the ideal time for foliar sprays, but will not leave time for highly recommended follow up treatments after stem injection.

The optimal ISMP will depend upon the project being considered.

Potential Habitat Creation and Enhancement Opportunities:

The biodiversity element of the Urban Design Plan will have to fit in with other objectives relating to economic regeneration public access and amenity, visual aesthetics, maintenance budget etc….

The habitat creation and enhancement can be worked out in more detail as the Design Plan emerges. For now it is a 'brain-storming' exercise.

The main emphasis must be to identify projects and opportunities that can be realised given the environmental site conditions and the budget. Projects that are not suited to the environmental conditions (illumination, climate, soil wetness, soil fertility, soil reaction etc,), or are beyond the establishment and maintenance budget, will fail disappointingly.

Woodland, scrub and tree lines

Key to the biodiversity enhancement of the Design Plan area will be the treatment of the woodland and scrub along the river corridor. The current woodland areas on the site are in poor ecological condition and require re-structuring and the introduction of ground-flora species.

Before developing a management plan, key decisions need to be made in relation to its function in the Design Plan. Particularly with respect to:

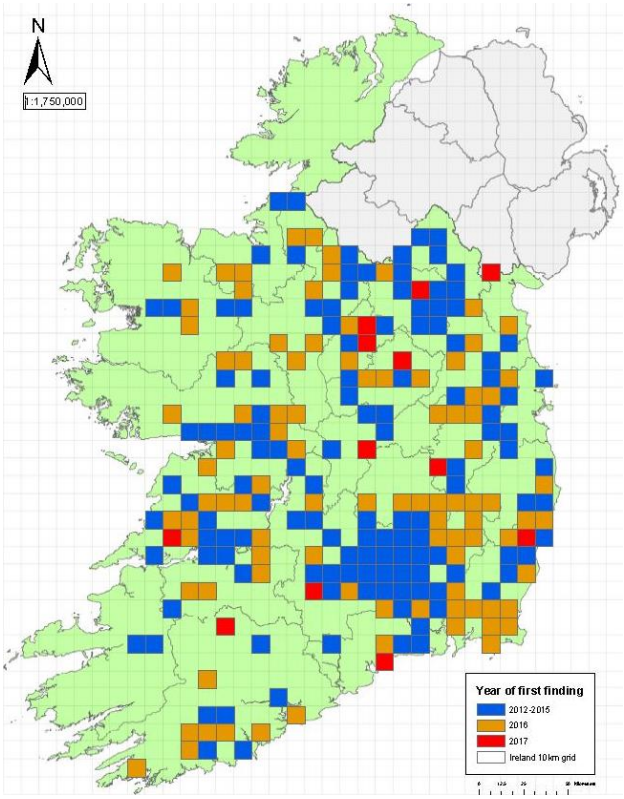
1. Target condition – representation of non-native trees/shrubs/herbs
2. Public access – existing path, new paths, river view seating areas???
3. Woodland structure – distribution of shrub layer, high shrub cover versus anti-social behaviour

Target Condition.

A facsimile of a semi-natural woodland here is not a realistic proposition. What is open to debate is whether to introduce further new non-native tree and shrub species, or whether to restrict all future introductions to native species.

The main tree species that would occupy a semi-natural stand in this location is Ash (Fraxinus excelsior), which is currently present in a few locations as mature trees and regenerating widely, but usually sparsely.

Ash (Fraxinus excelsior) should not be amongst the principal species planted due to the prospect of Ash Die-back (Chalara fraxinea).



Current Chalara distribution (from www.agriculture.gov.ie/forestservice/treediseases)

Suitable native tree and shrub species to introduce. Highlighted species are those recommended in larger quantities and species that thrive in damper soils than are typical are indicated:

Hazel (Corylus avellana)	Tall shrub	
Pedunculate Oak (Quercus robur)	Large tree	
Sessile Oak (Quercus petraea)	Large tree	
Downy Birch (Betula pubescens ssp pubescens)	Tree	
Aspen (Populus tremula)	Tree	Esp. Damper
wild Guelder-rose (Viburnum opulus)	Shrub	
Yew (Taxus baccata)	Tree	
Common Alder (Alnus glutinosa)	Tree	Damper
Hawthorn (Crataegus monogyna)	Tall shrub	
Holly (Ilex aquifolium)	Tall shrub	
Alder Buckthorn (Frangula alnus)	Small tree	Damper

Spindle (Euonymus europaeus)	Large shrub	
Bird Cherry (Prunus padus)	Large shrub	Damper
Wych Elm (Ulmus glabra)	Tree	
Wild Cherry (Prunus avium)	tree	
Dog-rose (Rosa canina agg)	shrub	
Sherard's Downy-rose (Rosa sherardii)	shrub	
Goat Willow (Salix caprea)	tree	
Rowan (Sorbus aucuparia)	Small tree	
Bay Willow (Salix pentandra)	Small tree	damper

Carefully selected non-native species will diversify the cover, be wildlife-friendly and are not inappropriate in an urban setting:

Spp	mature height (m)
Serviceberry (Amelanchier 'Ballerina')	8.00
Shadbush (Amelanchier canadensis)	6.00
Allegheny Serviceberry (Amelanchier laevis)	8.00
Snowy Mespile (Amelanchier lamarkii or hybrids)	10.00
Broad-leaved Cockspur (Crataegus persimilis 'Prunifolia')	8.00
wild Beech (Fagus sylvatica)	25.00
Crab (Malus x zumi 'Golden Hornet')	9.00
Scots Pine (Pinus sylvestris)	25.00
Pear (Pyrus communis)	12.00
Wild Pear (Pyrus pyraster) or variety	12.00
White Willow (Salix alba) or variety	15.00
Crack Willow (Salix fragilis)	10.00
Purple Osier (Salix purpurea)	5.00
Osier (Salix viminalis) or variety/hybrid	5.00
Exeter Elm (Ulmus glabra 'Exoniensis')	15.00
Huntingdon Elm (Ulmus x hollandica 'vegeta')	25.00

Where grassland and weed species have been supressed, and the ground is not fully occupied by Bramble (Rubus fruticosus agg.) a woodland ground-flora is desirable, however, ground-flora design is an element typically missing from woodland creation schemes. Left to its own devices, a shade adapted ground-flora developing in isolation will normally comprise Common Ivy (Hedera helix) and bulky ferns. Here even the bulky ferns are near absent.

Appropriate native ground-flora species once introduced, will spread by themselves, and should form the basis of the designed ground-flora. Suitable native ground-flora species to introduce. Highlighted species are those recommended for widespread introduction. Species that thrive in damper soils than are typical are indicated and species which are suitable at edge transition are also indicated:

	Well-drained	Damp	
Bluebell (Hyacinthoides non-scripta)	short		
Male-fern (Dryopteris filix-mas)	tall		
Hairy Wood-rush (Luzula pilosa)	short		
Giant Fescue (Schedonorus giganteus)	medium		
Wood Anemone (Anemone nemorosa)	short		
Early-purple Orchid (Orchis mascula)	short		
Greater Stitchwort (Stellaria holostea)	straggling		Inc edges
False Brome (Brachypodium sylvaticum)	medium		
Woodruff (Galium odoratum)	short		
Pignut (Conopodium majus)	medium		
Primrose (Primula vulgaris)	short		
Sanicle (Sanicula europaea)	medium		
Wood Melick (Melica uniflora)	medium		
Lords-and-Ladies (Arum maculatum)	medium		
Common Dog-violet (Viola riviniana)	short		
Germander Speedwell (Veronica chamaedrys)	short		
Wood Speedwell (Veronica montana)	short		
Barren Strawberry (Potentilla sterilis)	short		
Germander Speedwell (Veronica chamaedrys)	short		
Wild Strawberry (Fragaria vesca)	short		
Red Campion (Silene dioica)	medium		
Hart's-tongue (Asplenium scolopendrium)	medium		
Wood-sedge (Carex sylvatica)	medium	Inc damp	
Wood-sorrel (Oxalis acetosella)	short		
Broad Buckler-fern (Dryopteris dilatata)	tall	Inc damp	
Tufted Hair-grass (Deschampsia cespitosa)	tall	Inc damp	Inc edges
Ramsons (Allium ursinum)	short	Damp only	
Yellow Pimpernel (Lysimachia nemorum)	short	Inc damp	
Wood Horsetail (Equisetum sylvaticum)	medium	Inc damp	
Lady-fern (Athyrium filix-femina)	medium	Inc damp	Inc edges
Enchanter's-nightshade (Circaea lutetiana)	medium	Inc damp	
Remote Sedge (Carex remota)	medium	Inc damp	
Meadowsweet (Filipendula ulmaria)	tall	inc damp	
Opposite-leaved G-saxifrage (Chrysosplenium oppositifolium)	short	Damp only	
Bugle (Ajuga reptans)	short	Damp only	
Thin-spiked Wood-sedge (Carex strigosa)	medium	Damp only	
Cow Parsley (Anthriscus sylvestris)	tall		Inc edges
Hairy-brome (Bromus ramosus)	Tall		Inc edges
wild Yellow Flag (Iris pseudacorus)	Tall	Damp only	
Marsh Woundwort (Stachys palustris)	Medium	Damp only	
Upright Hedge-parsley (Torilis japonica)			Edges only

A decision needs to be made whether to also use carefully selected non-native ornamental species at strategic locations (e.g. path sides), for ornamental reasons. Appropriate species would be those which are suited to semi-shade, which are wildlife-friendly and attractive, but which would not spread densely to the detriment of native species.

Suggested species:

	Height cm
Bright Comfrey (Symphytum caucasicum)	60
Common Snowdrop (Galanthus nivalis)	10
Corsican Mint (Mentha requienii)	4
False Forget-me-not (Brunnera macrophylla)	40
Garden Solomon's-seal (Polygonatum x hybridum) or variety	140
Grey Yarrow (Achillea nobilis neilreichii)	35
Hidcote Blue Comfrey (Symphytum 'Hidcote Blue')	45
Hidcote Pink Comfrey (Symphytum 'Hidcote Pink')	45
Jerusalem Cowslip (Pulmonaria officinalis 'Cambridge')	30
Honesty (Lunaria annua)	80
Large Self-heal (Prunella grandiflora) or variety	25
Lungwort (Pulmonaria 'Cotton Wool')	30
Masterwort (Astrantia major)	75
Solomon's-seal (Polygonatum multiflorum agg) or variety	90
Spotted Dead-nettle (Lamium maculatum) or variety	15
Spring Crocus (Crocus chrysanthus 'Snow Bunting')	5
Tuberous Comfrey (Symphytum tuberosum)	60
White Dead-nettle (Lamium album 'Friday')	45
White Lungwort (Pulmonaria officinalis 'Sissinghurst White')	25
wild Columbine (Aquilegia vulgaris)	50
wild White Dead-nettle (Lamium album)	45

Public Access

Determine if public access through the woodland is desirable. If so, can it be linked with a path upriver to the pending Blackwater Park?

On the north bank the current path would be the easiest to adopt, but is poorly connected with the river. Consider spurs off the main path with steps up to clearings with a view of the river and provided with picnic tables.

The steep nature of the bank in most places will mitigate against much disturbance off designed paths.

Structure

Target a 70-90% high canopy and 25-50% shrub layer. In urban woods, the shrub layer provides cover for gatherings that may result in anti-social behaviour, and too close to public paths may feel threatening to the path user. Design the shrub layer so that external woodland edges are

feathered so that there are long views through the woodland interior, and so that the structure in a 10 m or so corridor around any path is of clear stemmed standard trees without tall shrubs.

This is essentially a design issue.

Connectivity

With the river corridor as the core biodiversity area, tree lies and other structural habitats will be most effective if there is a degree of connectivity.

Solid green – good existing structural connectivity
Dotted green – existing connectivity would benefit from enhancement planting
Red – aspirational new connectivity

Scrub and wood compartments:

6	Investigate the TV interference issue. Is there another option to secure better reception than removing these trees?
7	Could hedgerow trees be allowed to grow on?
13	It is presumed that these stands will be lost to development
14	Possibly plant the corner of this area as woodland
15	Left un-thinned, will develop 'leggy' trees with tall thin trunks and narrow crown and root growth. Such trees are susceptible to wind throw. Early selective thinning required, by as much as 50%. Ground-flora introductions once the canopy has re-closed
16	Retain the overgrown hedge structure. There may be scope for a path alongside it (to either side).
17	Remove Japanese Knotweed (Fallopia japonica) and Butterfly-bush (Buddleja davidii). Clear gaps in the current scrub cover and plant out new tree species – no signs of Rabbits were noted, so browse guards probably not required. Design public access if required. Stump killing of removed shrubs will be advisable. Occasional reduction of Bramble (Rubus fruticosus agg.) cover beside the path in the early stages should be anticipated.
19	Would be beneficial either as designed woodland or managed grassland.
20	Probably no intervention here
21	Probably no intervention here
25	Selectively thin trees on the upper level. Retain the mature trees on the bank down to the river, On the level area the current transplant cover is patchy, but a significant density reduction would be beneficial in places. Control Norway Maple (Acer platanoides) regeneration in places. Remove the large Red-osier Dogwood (Cornus stolonifera) patch and any Cherry Laurel (Prunus laurocerasus). Diversify the Aspen (Populus tremula) stand at 25b Design public access if required. Introduce ground-flora species into the more mature stand on the bank and plan for future introductions into the level area. Design public access if required. Perhaps grassy glades with picnic tables. Common Bent (Agrostis capillaris) reseed, not Perennial Rye-grass (Lolium perenne).
26	Remove the Japanese Knotweed (Fallopia japonica) and Cherry Laurel (Prunus laurocerasus) and beat-up the riverside woodland.
27	Introduce more tree species into clearings in the Bramble (Rubus fruticosus agg.). These transplants will require tending until they clear the Bramble canopy.

Grey space and landscaping

Much of the urban area has little by way of street trees or landscaped public green space. Where space can be found, considerable improvements in the appearance of the site if good quality landscaping is provided.

This will impact on psychological an emotional well-being, but if wildlife-friendly species predominate, can boot the biodiversity interest too.

There is a wide range to choose from on the WM Associates website EcologyNI.com, which includes 2 searchable free-to-use databases of plants known to be of benefit to wildlife, and which are suitable for use in Navan.

Criteria such as plant size, flower colour, thorniness etc. can be applied as search terms. Initially it is recommended to access via the Resources page to avail of the background information.

Some of the current landscaping uses few plants of biodiversity value. The Compartment 8 landscaping alongside the N51 is a significant landscaping feature that perhaps the Urban Plan should not mess with too much, but in the spirit of brainstorming, perhaps the introduction of the dwarf Snowberry (Symphoricarpos x chenaultii) as cover in the shrub beds would obviate the need for regular herbicide use (not environmentally friendly) and boost the value of the landscaping to pollinators.

Other landscaping at Compartment 23, 28 and along one edge of Compartment 32, is less prestigious and could perhaps be redesigned or supplemented using more wildlife-friendly species.

Amenity grassland

There is little amenity grassland in the plan area. The main area at Compartment 32 is presumed to be heavily used by kids playing. Here, and other areas with high footfall, a hard wearing sward based on Perennial Rye-grass (Lolium perenne) is most suitable, but of little biodiversity value.

In other areas, possibly Compartment 5, and probably Compartment 29, the sloping grassland around the car park, the grasslands are less intensively used and can be managed to provide a higher biodiversity value whilst still being subject to regular (if less frequent) mowing.

Option 1 – change mowing regime:

Simply increasing the interval between mowing (i.e. letting the grass grow longer before it is cut), will allow a wider variety of the existing species in the lawn to flower. There may be slow recruitment of species that can exist under the less stressful management regime.

Missing one or two cuts at the start, middle or end of the mowing season is likely to allow more species to be recruited at the expense of Perennial Rye-grass, and in the above case, especially of White Clover, and may allow a flowering opportunity for them.

Missing early season cuts may allow early-flowering bulbs to finish and die back before mowing commences. These suggested species are good for pollinators. Early-season nectar sources may be particularly beneficial for bees:

	Flowering time (1st or 2nd half of month)					
Spp	jan_1	jan_2	feb_1	feb_2	mar_1	mar_2
Yellow Wood Anemone (Anemone ranunculoides)					1	1
Spring Crocus (Crocus tommasinianus or varieties)			1	1	1	1
Winter Aconite (Eranthis hyemalis)	1	1	1	1	1	1
Lesser Celandine (Ficaria verna)					1	1
Common Snowdrop (Galanthus nivalis)	1	1	1	1	1	1
Spring Starflower (Ipheion uniflorum 'Wisley Blue')			1	1	1	1
Pyrenean Squill (Scilla liliohyacinthus)					1	1
Glory of the Snow (Chionodoxa forbesii)					1	1
Glory of the Snow (Chionodoxa luciliae)					1	1
Spring Crocus (Crocus chrysanthus) or variety			1	1	1	1
Dutch Crocus (Crocus vernus or varieties)					1	1
Siberian Squill (Scilla siberica) or variety					1	1

Scalping a mown grass sward is not a wildlife-friendly practice. Setting the mower blades no lower than 2.5 cm for lawns and 3 cm for wider areas provides a better habitat for invertebrates, and reduces the competitive advantage of the grass component. If practicable a blade height of 4 cm + would be even better.

Option 2 – flowering lawn

With the advent of slow growing cvs of Perennial Rye-grass (Lolium perenne) such as 'Paradise', 'Greensky' or 'Forever', and equivalent slow-growing cvs of other grasses, the amenity grassland mowing interval can be reduced allowing several potentially co-occurring species to flower between cuts.

For selected swards, kill off the existing improved grassland and reseed. These grass varieties are also dense tillering so reduce the normal seeding rate to allow space of the companion herbs, which are most economically introduced as seeds into the mix, rather than planted as plugs.

Suggested component of the mix:

Perennial Rye-grass (Lolium perenne)		Slow-growing cultivar
Smooth Meadow-grass (Poa pratensis agg)		Slow growing cultivar
Chewings Fescue (Festuca rubra commutata)		Low growth habit cultivar
Slender creeping Red Fescue (Festuca rubra littoralis)		Low growth habit cultivar
Common Bent (Agrostis capillaris)		Low growth habit cultivar
Sweet Vernal-grass (Anthoxanthum odoratum)		
Crested Dog's-tail (Cynosurus cristatus)		
Total Grass	75%	
Yarrow (Achillea millefolium)		
Lady's Bedstraw (Galium verum)		
Ribwort plantain (Plantago lanceolata)		
Daisy (Bellis perennis)		
Slender speedwell (Veronica filiformis)		
Common bird's-foot-trefoil (Lotus corniculatus)		
White clover (Trifolium repens)		
Selfheal (Prunella vulgaris)		
Field wood-rush (Luzula campestris)		
Autumn Hawkbit (Leontodon autumnalis)		
Common mouse-ear (Cerastium fontanum)		
Cat's-ear (Hypochaeris radicata)		
Meadow vetchling (Lathyrus pratensis)		
Scarlet Pimpernel (Anagallis arvensis ssp. arvensis)		
Parsley-piert (Aphanes arvensis)		
Lesser Trefoil (Trifolium dubium)		
Thyme-leaved Speedwell (Veronica serpyllifolia)		
Total Forbs	25%	

At Compartment 29, the low-growing Common Stork's-bill (Erodium cicutarium), normally a paramaritime plant, was already present and may be suitable.

Common Stork's-bill at C29

'NI CSH' mix was designed for an Accreditation Scheme operating in NI which benefitted from using very species-rich lawn seed mixes. It is a possible off-the-peg solution for flowering lawns in Navan and should be available from:

Habitat Aid Ltd.
The Old Rectory
Lamyatt
Somerset BA4 6NH
Tel: 01749 812775
www.Habitataid.co.uk

The cost of the mix per kg is high compared to normal lawn grass, but this is offset by a low recommended seeding rate (5 – 7.5 g per m2 compared to the normal seeding rate for a Lolium lawn of 35 – 40 g per m2).

It is important that the prepared seed bed is stale, so spray off weeds that germinate after preparation. If there is regeneration of weeds after the first application, this will need to be sprayed off as well. Seed to be scattered and rolled as normal (the herb seeds are small so rolling is important).

Mowing frequency required to maintain the resulting lawn will be around 50% of that for a normal lawn. The low frequency of mowing, especially in the early stages of establishment, may allow undesirable weeds such as Common Ragwort (Senecio jacobaea), Broad-leaved Dock (Rumex obtusifolius), Curled Dock (Rumex crispus), Common Nettle (Urtica dioica), Creeping Thistle (Cirsium arvense) and Spear thistle (Cirsium vulgare) to become established. If so, it may be most effective to control them by spot treatment or weed-wiping (taking reasonable care not to allow herbicide to contact the sown species). Otherwise do not treat with lawn herbicides.

Do not use lawn fertilisers unless there is an obvious and demonstrable need.

Compartment 29 may already comprise slow-growing grasses, and was notable more species-rich than typical improved amenity grass. A less intensive approach may be to create germination niches with a glyphosate spot spray, and plant out selected plugs – adjusting the mowing interval and blade height would also be required.

Bird boxes/Bat boxes

Bat boxes on some of the larger trees alongside the river may work, but better would be, with NRA National Roads Authority (NRA)'s permission, high up on the abutments of the Beaufort Rd Bridge would be better – preferably facing the river where they will not be vulnerable to stone throwers.

Bat boxes installed on buildings in the urban area would have less chance of being occupied.

Bird nesting opportunities are highly unlikely to be limiting the population in the parts of the Urban Plan area where passerines are frequent. Better to leave birds to establish nest in concealed places than to attract them to boxes that may be subject to subsequent vandalism.

In the urban sections of the Plan area, swift boxes and sparrow or starling terraces in inaccessible locations on buildings could be beneficial. Perhaps all the Council need to do is make them available to building owners and to provide advice on a site-by-site basis on the most beneficial installation locations.

More advice on box types can be provided later if necessary.

Community engagement/empowerment

There may be opportunities for local residents, schools and businesses (not necessarily restricted to those within the study area) to take ownership of enhancement projects.

It may be helpful to instigate 'Flagship projects' with a reasonable chance of success. For example:

1. Attract Kingfisher to the Kells Blackwater.
   The river itself looks to be in suitable condition for Kingfisher. The creation of nesting banks may be all that is required to attract this bird.

   Banks must be least 1.5m high, preferably taller. Big banks are more likely to be used.
   Banks at the river edge are ideal, otherwise, nor more than 100m away.

   If there is a naturally sandy clay soil close to the river in which a 1.5-2m cliff can be created with an excavator, then this could be a straightforward approach. Banks or cliffs can be constructed using a very weak builder's sand soil and lime (± 5%) mix either back-filled behind a built wall, or finished with a mortar mix against shuttering and subsequent provided with a 10 cm entrance. The Kingfisher can then excavate its own burrow.

   These birds are solitary nesters. Provision of a nest site can be a relatively small scale operation, and could easily be incorporated into a redesigned scrub/woodland area on the northern bank.

   Fully artificial nests can be bought and buried, e.g. of fibreglass or concrete. These may work, but the entrance still needs to be in a very steep or vertical cliff.

2. Re-introduce Hairy St. John's-wort in the river corridor woodland and scrub.

   Native genotype seeds are readily available, and the habitats in which it will thrive can be found at the edges of the main Compartment 17 scrub stand, and if alongside an access, would be conspicuous to pedestrians.

This from Emorsgate Seeds, promoting stock collected in Cambridgeshire:

Two British species of Hypericum have hairs on both upper and lower sides of the leaf; Marsh St John’s-wort which has runners and is found in bogs, and Hairy St John’s-wort which has an erect stem and black dots along the margin of its sepals. Being a medium to tall grassland perennial with a rounded stem Hairy St John’s-wort can be mistaken for Perforate St John’s-wort but, as the name suggests, it is hairy and the oblong leaves are much longer. It flowers from July to August with seed shed from September onwards. The plant normally dies back in winter but may persist in particularly sheltered sites.

Habitat Information

Hairy St John's-wort is a British native perennial of relatively unproductive grasslands on well-drained, neutral to basic soils. It is particularly characteristic of the transitional zone between shaded and unshaded habitat such as might be found in woodland rides and clearings, river banks, roadside banks and verges. Its ability to spread by vegetative means is limited and its very small seed requires open ground in which to germinate. This suggests that Hairy St John's-wort requires occasional disturbance to its habitat if it is to persist.

Growing Information

In the wild seed probably germinates in the spring after inhibitors found in the seed coat have been washed out. For this reason it is probably best sown in the autumn.

Advertise biodiversity projects to gain public support. Particularly where the initial stages of the project require the removal of existing vegetation (especially structural vegetation).

From a mini project in Falls Cemetery Belfast

BAP Context

National BAP

The National Parks and Wildlife Service's National Biodiversity Action Plan 2017-2021 is the over-riding plan for the country that should be taken into account in policy making.

Works on the Abbeylands regeneration may potentially serve some of the Plan actions:

1.1.2	Public and Private Sector relevant policies will use best practice in SEA, AA and other assessment tools to ensure proper consideration of biodiversity in policies and plans
1.1.3.	All Public Authorities and private sector bodies move towards no net loss of biodiversity through strategies, planning, mitigation measures, appropriate offsetting and/or investment in Blue-Green infrastructure
1.1.7.	Develop a Green Infrastructure at local, regional and national levels and promote the use of nature based solutions for the delivery of a coherent and integrated network
3.1.1.	Engage with local communities and stakeholders to help achieve the objectives of this plan
4.1.5.	Progress implementation of BirdWatch Ireland's Group Species Action Plans for birds (e.g. lowland farmland birds, riparian birds, woodland and scrub birds, upland birds and Lake, Fen and Turlough birds)
4.1.8.	Implement the All-Ireland Pollinator Plan including: making the Irish countryside more pollinator friendly; raising awareness of pollinators; supporting beekeepers and growers; expanding knowledge of pollinators; and collecting evidence to track changes.
4.4.3.	Continue and enhance measures for eradication, where feasible, control and containment of invasive species

LBAP

Meath County Councils (Draft) County Meath Biodiversity Action Plan 2015-2020 was compiled by John Wann of Aulino Wann Associates. This builds upon the County Meath Biodiversity Action Plan of 2008 – 2012

Neither plans identify habitats or species for priority action, but there remain elements of the plan that could be served by the Abbeylands regeneration project.

2020

3	As part of planning applications, encourage all developers and contractors commissioned to do EIAs and flora and fauna surveys to submit all biodiversity records collected as part of such surveys to the National Biodiversity Data Centre online record submission system in accordance with proper data collection and submission protocols.
5	Continue to monitor alien invasive species in the County focusing on the 'Dirty Dozen' as outlined 'Report on the Dirty Dozen non-native invasive species - Co. Meath' by National Biodiversity Data Centre (2010) and American Mink and Sea Buckthorn or other potential threats that may arise.
13	Develop an access to biodiversity programme at publically accessible sites to promote important habitat and species.
21	Commission an inventory of all sites of local nature conservation importance by utilising existing survey data (e.g. hedgerow, wetland and trees surveys) and further fieldwork in under surveyed areas. List the sites in any future County Development Plans to guide planning decisions.
22	Commission a survey of ash dieback in the County by the general public by way of a citizen science project in the light of the importance of ash as a hedgerow and woodland tree. Records to be submitted on-line including a specially created smartphone app.

2012

1.13	Promote and support the sustainable development of nature walks and trails, and associated interpretive signage [link to Heritage Plan actions 58 and 60].
1.14	Produce interpretative signage for important biodiversity sites in Meath that are accessible to the public [link to Heritage Plan action no. 16].
2.1	Identify areas of local nature conservation importance in the county. Include sites identified in the Meath County Development Plan. Explore options for protecting these areas.
2.5	Support the implementation of the relevant National Species and Habitat Action Plans, and the National BAP.
2.6	Promote the retention of existing natural habitats and the creation of new wildlife habitats in new developments

3.7	Support the collection of biological data and the lodging of these data in the National Biodiversity Data Centre.
4.5	Conduct an audit of the nature conservation value and potential of Local Authority owned and managed land. Identify opportunities for protecting and enhancing biodiversity at these sites.
4.7	Promote the adoption of the 'Green City Guidelines 2008' in relation urban planning in Meath.

References

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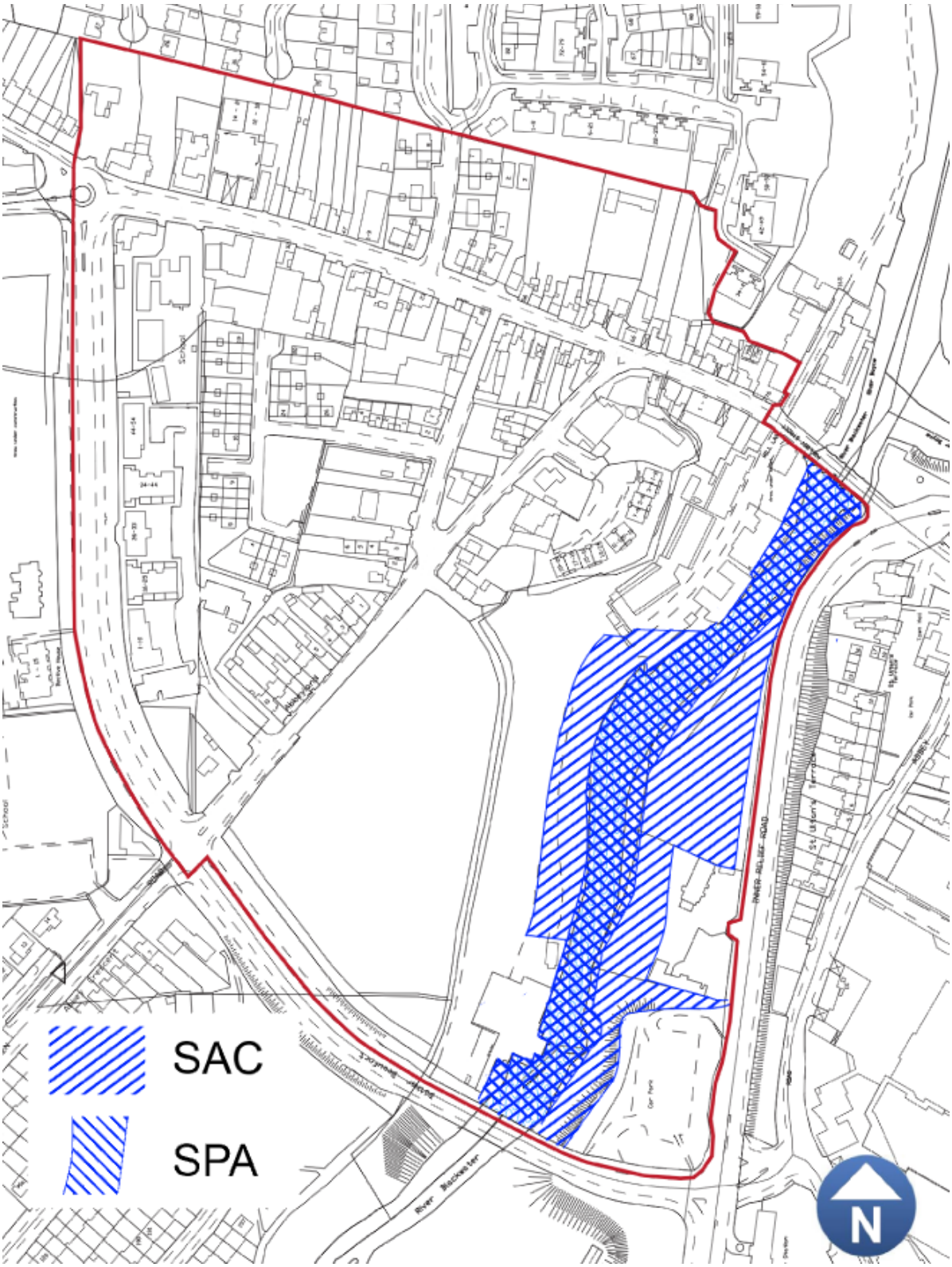
Acknowledgements:

All drone flights conducted with the kind consent of Trevor Kellet of Navan Airfield.



Map 1 N2K designations

Habitats on site:

Map 2 – Surveyed Compartments

Arboricultural Report

Tree Assessment for Urban Design Plan

at:

Lands at Flowerhill and Abbeylands

Navan

Co. Meath

April 2019

190411-TD-01

Charles McCorkell
Arboricultural Consultancy

CONTENTS

1 INTRODUCTION

Instructions

1.1 This arboricultural report has been commissioned by Meath County Council to provide information to all parties involved in creating the proposed Urban Design Plan for lands at Flowerhill and Abbeylands, Navan, Co. Meath.

1.2 The purpose of this assessment is to identify trees, groups of trees and hedgerows that should be considered for retention and protection during future development proposals, due to their quality and amenity value within the local area.

Qualification and experience

1.3 My name is Charles McCorkell. I am an arboricultural consultant dealing with trees in relation to all forms of human activity including the built environment. I am a qualified professional tree inspector (LANTRA), an Associate Member of the Institute of Chartered Foresters, a Professional Member of the Arboricultural Association and I have a 1st BSc Honours Degree in Arboriculture from the University of Central Lancashire.

Limitations

1.4 The contents of this report are copyright of Charles McCorkell Arboricultural Consultancy and may not be distributed or copied without the author's permission.

Methodology and guidance

1.5 The assessment of trees and groups of trees was carried out using the principles of *British Standard 5837: Trees in relation to design, demolition and construction (2012)* and *Tree Evaluation Method for Preservation Orders (TEMPO).*

Background and documents provided

1.6 This document has been prepared using an ordnance survey map and the information detailed within the Request for Tender Contract.

2 OBSERVATIONS AND CONTEXT

Site Visit

2.1 A walkover survey of the site was undertaken on 19 April 2019, to assess the quality and amenity value of trees, groups of trees and hedgerows that are located within lands at Flowerhill and Abbeylands, Navan, Co. Meath.

Site description

2.2 The site is located on the north-eastern side of Navan. The boundaries of the site are defined by the Kells Road to the south, the N51 to the west and north, and the Flower Hill Road to the east, refer to Map 1. Running through the centre of the site between the N51 and Flower Hill Road is Ratholdren Road.

2.3 The area to the northeast of the Ratholdren Road is well developed and contains a mixture of residential and commercial properties. To the southwest of the Ratholdren Road are grass fields with areas of naturally regenerated tree cover, unoccupied, derelict buildings and the River Blackwater. The River Blackwater runs along the southern boundary of the site and connects to the River Boyne beyond the eastern Flower Hill bridge.

2.4 The Flower Hill Road, which runs along the western boundary of the site, links across the bridge to Navan Town Centre. This area is also mixed-use and consists of both residential and commercial properties, along with St. Ultan's School which is located in the north eastern corner of the site.

Map 1 : Red line highlighting the area of the site.

Existing tree population

2.5 The main tree and canopy cover within the designated boundary of the site is largely located on either side of the River Blackwater. A large percentage of the trees within this area are of a young to early-mature age and have naturally regenerated due to the neglected nature of the surrounding lands. There is a planted woodland within this area that is of an early-mature age and contains a mixture of native, naturalised and non-native species. This woodland is situated within the eastern half of the site on the southern side of the River Blackwater.

2.6 The diversity of species growing adjacent to the river include white willow, goat willow, ash, sycamore, alder, birch and elder. Several of these are pioneer species and have colonised the currently neglected and unused areas of land.

2.7 The tree population within the occupied areas of the site is considered extremely poor. There are no public trees located along Flower Hill Road, Ratholdren Road and Abbeylands. Any tree cover that does exist is within the privately owned residential and commercial properties.

2.8 There are groups of trees located along the roadside of the N51. The western group between the Kells Road and the Ratholdren Road is densely populated with native and naturized species, while the northern group between the Ratholdren Road and Flower Hill Road roundabout, is made up of more ornamental non-native trees.

Photo 1: View of the tree cover along the River Blackwater.

3 TREE ASSESSMENT

Ref. Number	1	**Species**	Mixed native & naturalised woodland
Age	Semi-Mature to Mature	**Useful Life-Expectancy**	40+ years
Structural Condition	Good	**Physiological Condition**	Good
Comments	The woodland area is located between the Kells Road to the south, the River Blackwater to the north, and the Flower Hill bridge to the east. It is made up of native, naturalised and non-native tree species, the majority of which have been planted and are now of an early-mature age. There are several mature and self-seeded trees located along the northern side of the woodland, adjacent to the River Blackwater. The woodland does not contain any notable individual specimens but is of high public amenity and landscape value within the local area. Due to its prominence and value, it is worthy of retention and protection during any future developments that are proposed. There is a good opportunity to enhance this woodland by creating areas that can be used by the public.		
Location 		**Image** 	

Ref. Number	2	**Species**	Mixed native & naturalised trees, mainly: willow, ash, sycamore, alder & elder.
Age	Young to Mature	**Useful Life-Expectancy**	40+ years
Structural Condition	Fair	**Physiological Condition**	Fair
Comments	This group of trees is located along the southern side of the River Blackwater, east of the N51 bridge. It connects to the eastern woodland, Ref. 1. A large percentage of the trees within this group are self-seeded willow that are of a young and semi-mature age. There are no notable individual specimens within the group; however, as a group the trees significantly enhance the landscape character of the River Blackwater. There is a good opportunity to enhance the tree cover along this frontage by creating areas that can be used by the public. Even if certain trees are required to be removed and replaced to facilitate any improvement works within the area, the retention of a green buffer zone adjacent to the river that connects to the woodland should be retained and incorporated into future development proposals.		

Location

Image

Ref. Number	3	**Species**	Mixed native & naturalised trees, mainly: willow, ash, sycamore & alder.
Age	Young to Early-Mature	**Useful Life-Expectancy**	40+ years
Structural Condition	Fair	**Physiological Condition**	Fair
Comments	This group of trees is located on the northern side of the River Blackwater and to the south of an old access road which runs from Mill Lane to a series of derelict buildings located to the east of the N51. The group consists mainly of self-seeded willow trees which are growing in piles of rubble. There are some early-mature trees located on the eastern side of the group adjacent to the Mill Lane car parking. The majority of the trees are not of any significant value and Japanese Knotweed was evident throughout. Retaining the existing trees will not be essential; however, the green buffer zone along the river should be maintained as it contributes to the landscape character of the area.		

Location

Image

Ref. Number	4	**Species**	Mixed native & naturalised trees, mainly: willow, hawthorn, blackthorn, ash & alder.
Age	Young to Mature	**Useful Life-Expectancy**	40+ years
Structural Condition	Fair	**Physiological Condition**	Fair
Comments	This group of trees is located on the northern side of the River Blackwater and to the north of an old access road which runs from Mill Lane to a series of derelict buildings located to the east of the N51. The group consists mainly of self-seeded trees; however, there are a number of early-mature and mature ash trees that are worthy of consideration for future development proposals, as they would provide an element of maturity to the site. The majority of the trees are not of any significant quality and removals should not be a major constraint to future development considering the dilapidated nature of this area. It will be necessary to create areas of green space in this location due to its river side location.		

Location

Image

Ref. Number	5	**Species**	Mixed native trees and hedgerow
Age	Semi-Mature to Mature	**Useful Life-Expectancy**	40+ years
Structural Condition	Fair	**Physiological Condition**	Good
Comments	This group is an overgrown, neglected, native hedgerow located on the southern side of an open field, north of the River Blackwater. The group consists of mature ash trees with hawthorn and blackthorn understorey. It has some public amenity value as it is visible from Ratholdren Road. There are no notable individual trees within the group; however, it is of high value as it is the only hedgerow of its age and quality within the site. It provides a green corridor link to the tree group located along the N51 and adjacent to the River Blackwater. This hedgerow is worthy of retaining and incorporating into future developments due to its landscape and ecological value.		
Location 		**Image** 	

Ref. Number	6	**Species**	Mixed native & naturalised trees and shrubs
Age	Early-Mature	**Useful Life-Expectancy**	40+ years
Structural Condition	Fair	**Physiological Condition**	Good
Comments	A group of native and naturalised early-mature trees and shrubs located along the eastern side of the N51. This group of trees is of high amenity value due to its roadside location and, although there are no notable individual specimens, as a collection it provides an important visual and acoustic barrier along the edge of a busy road. It will be important to retain as much of this boundary tree cover as possible during future developments due to the screening benefits it provides. Management works will be required, in the future, to thin out poor quality trees and provide more growing space for the better quality trees to mature.		

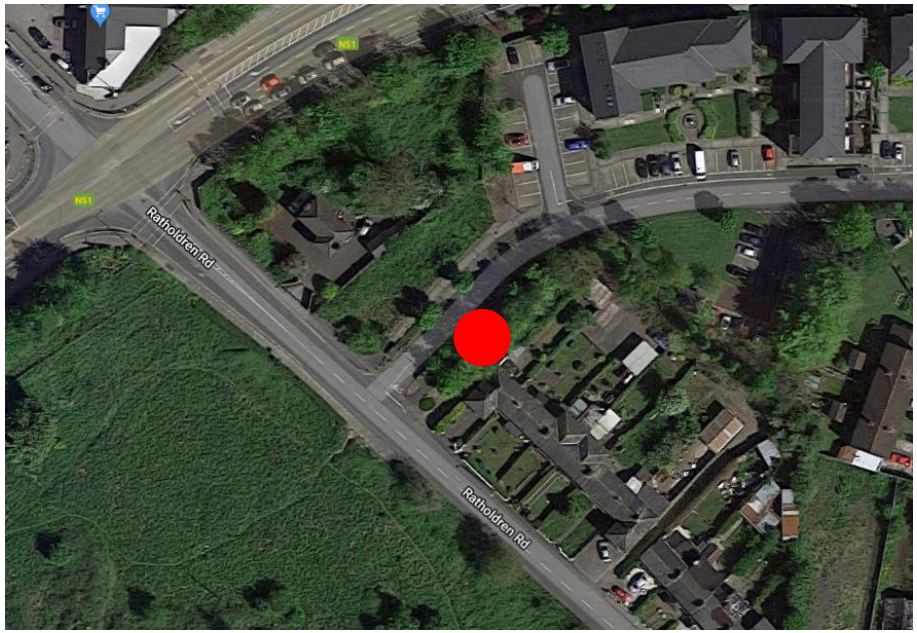
Location

Image

Ref. Number	7	**Species**	Common beech (*Fagus sylvatica*) & Common Ash (*Fraxinus excelsior*)
Age	Early-Mature	**Useful Life-Expectancy**	20-40+ years
Structural Condition	Fair	**Physiological Condition**	Fair
Comments	This group consists of early-mature beech and ash trees that are located on the eastern side of the car park, within the residential apartment complex along the northern boundary. These trees are prominently located within the immediate surrounding area and are of high public amenity value. It is recommended that these trees are retained as part of any future development proposals due to their age, quality and prominence within the local area.		

Location

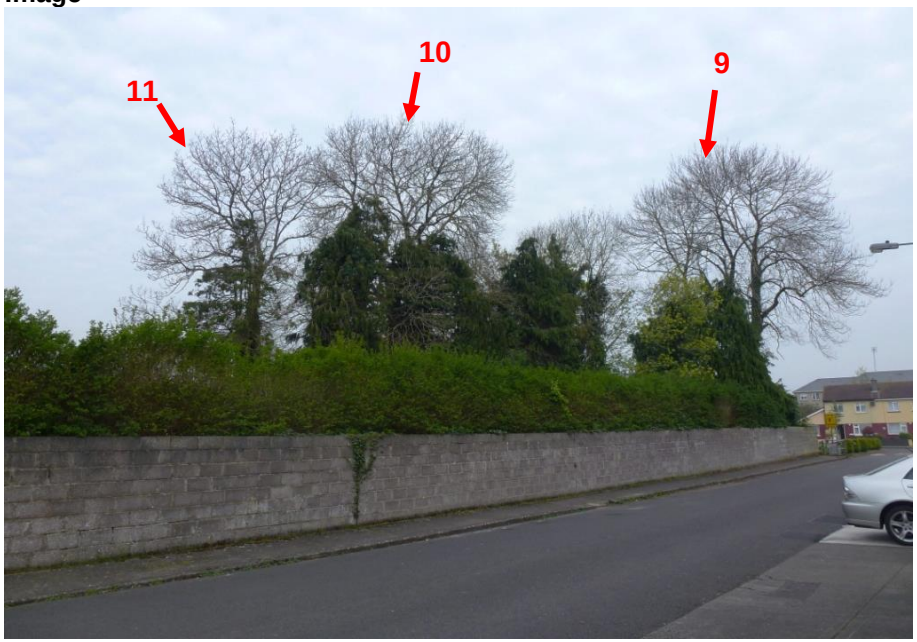
Image

Ref. Number	8	**Species**	Common beech (*Fagus sylvatica*)
Age	Early-Mature	**Useful Life-Expectancy**	40+ years
Structural Condition	Good	**Physiological Condition**	Good
Comments	This early-mature beech tree is located on the southern side of the main driveway into the residential apartment complex, which is situated along the northern boundary. The tree is in good condition and of high public amenity value. It has the potential to become a significant landscape feature in the future as it matures. It is recommended that this tree is retained and protected as part of any future development proposals.		
Location 		**Image** 	

Ref. Number	9, 10 & 11	**Species**	Common Ash (*Fraxinus excelsior*)
Age	Mature & Early-Mature	**Useful Life-Expectancy**	20-40+ years
Structural Condition	Fair	**Physiological Condition**	Fair
Comments	There is a group of trees situated within the rear garden of a residential property located to the north of New Lane and west of Abbey Lane. Of this group of trees, there are three large mature & early mature ash trees. As access into the site was not possible, a full assessment on their structural condition could not be carried out. These trees are of a notable size and of high public amenity value within the local area. It is recommended that the trees are considered for retention as part of future development proposals.		

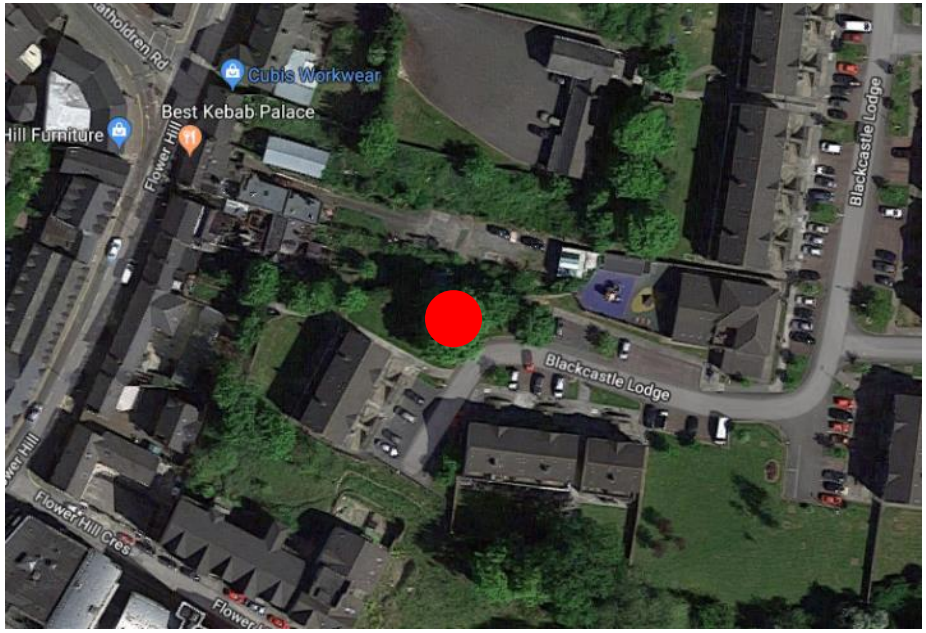
Location

Image



Ref. Number	12	**Species**	Sycamore (*Acer psuedoplatanus*)
Age	Mature	**Useful Life-Expectancy**	20-40+ years
Structural Condition	Good	**Physiological Condition**	Good
Comments	This mature sycamore tree is located within the Blackcastle Lodge residential estate. The tree is in good condition and is a significant landscape feature within the local area due to its age, size and high public amenity value. For these reasons, it is recommended that the tree is retained as part of any future development proposals.		

Location



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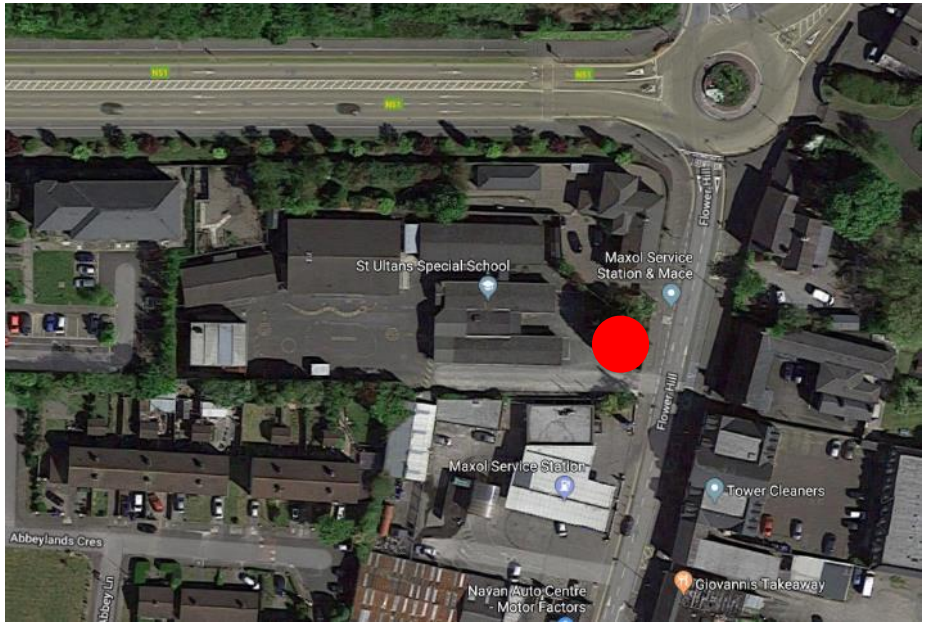
Ref. Number	13	**Species**	Common yew (*Taxus Baccata*)
Age	Mature	**Useful Life-Expectancy**	40+ years
Structural Condition	Good	**Physiological Condition**	Fair
Comments	This mature yew tree is located within the grounds of St Ultan's School, immediately adjacent to Flower Hill Road. Given the lack of tree cover within the surrounding area, this is the most prominent tree located along Flower Hill Road. It is also one of the oldest trees, if not the oldest, within the site boundary. The tree is showing signs of physiological stress as minor tip dieback was observed in the upper canopy. This is likely due to extensive soil compaction with the trees rooting area. Due to the tree's age and its prominent location along the street frontage, it should be protected and retained during any future development proposals.		

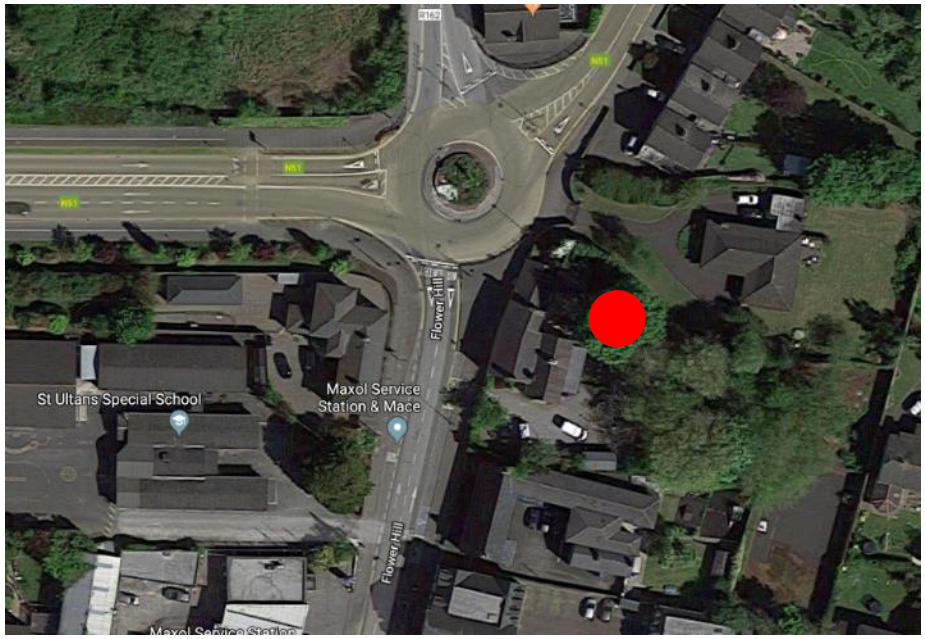
Location



Image

Ref. Number	14	**Species**	Sycamore (*Acer psuedoplatanus*)
Age	Mature	**Useful Life-Expectancy**	20-40+ years
Structural Condition	Good	**Physiological Condition**	Good
Comments	This mature sycamore tree is located within the rear garden of a property located on the eastern side of the Flower Hill Road, adjacent to the main roundabout. Although located in the rear garden of the site, the tree is of high public amenity value due to its visibility from public areas. The tree also appears to be in good condition; however, a close inspection was not possible due to its location. Due to the high public amenity and landscape value of the tree, it should be protected and retained as part of any future developments proposals.		

Location



Image

4 CONCLUSION

4.1 The main tree population is located on either side of the River Blackwater. A large percentage of these trees are of a relatively young age and have naturally regenerated over the years. These trees may not individually be of a high or notable quality, but they do have public amenity value and add to the landscape character of the local area.

4.2 Within the main occupied areas of the site, the current tree population is extremely poor. It is essential that future development proposals retain as many of the existing mature trees that are of a high public amenity value as they enhance the character of the local area.

4.3 Where future developments are proposed within the proximity of existing trees, an Arboricultural Impact Assessment must be carried out in accordance with BS 5837:2012 *Trees in relation to design, demolition and construction – Recommendations*, by a qualified and competent arboricultural consultant.

4.4 Where it becomes necessary to remove existing trees to facilitate future development proposals, suitable replacement tree planting must be undertaken. New planting should take into consideration the character of the local landscape. It is important that a diverse selection of species is chosen in order to increase the resilience of the tree population due to the risks posed by pests and diseases and climate change.

4.5 All new tree planting should take into consideration the mature growing size of the trees proposed to ensure that a harmonious relationship between structures can be sustained, for the long term, without the need for unnecessary pruning works.

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BAT ECO SERVICES

Meath Co. Co. lands along the River Blackwater,

Navan, Co. Meath.

Bat Survey

Dr Tina Aughney

2018

Report prepared for:

Meath County Council

ULEX HOUSE, DRUMHEEL, LISDUFF, VIRGINIA, COUNTY CAVAN
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SUMMARY

Site:	Meath County Council lands along the River Blackwater, Navan, Co. Meath
Grid reference (IG):	N 86826 68212 Mill Lane N 86921 68129 Derelict site
Proposed work:	Master Plan.
Survey by:	Bat Eco Services
Bat species recorded:	Common pipistrelle, Leisler's bat, soprano pipistrelle, Daubenton's bat.

1. Introduction

The vicinity of the River Blackwater, Navan, Co. Meath were surveyed by Bat Eco Services, in relation to bat activity. Such surveying was completed due to the fact that bats are protected species under the Wildlife Act (1976) and Wildlife [Amendment] Act (2000). Across Europe, they are further protected under the Convention on the Conservation of European Wildlife and Natural Habitats (Bern Convention 1982), which, in relation to bats, exists to conserve all species and their habitats. The Convention on the Conservation of Migratory Species of Wild Animals (Bonn Convention 1979, enacted 1983) was instigated to protect migrant species across all European boundaries. The Irish government has ratified both these conventions. Also, the EC Directive on The Conservation of Natural habitats and of Wild Fauna and Flora (Habitats Directive 1992), seeks to protect rare species, including bats, and their habitats and requires that appropriate monitoring of populations be undertaken. All bat species are protected under Annex IV of the EU Habitats Directive, while the lesser horseshoe bat is listed under Annex II. Member states are required to designate Special Areas of Conservation for all species listed under Annex II in order to protect them.

Therefore a bat survey was requested to determine the bat usage of this proposed work site and in view of the fact all bat species are protected under Irish and EU legislation.

1.1 Site description

The Master Plan site surveyed is depicted in Figure 1 below. This land is located upstream of the bridge at the base of Flower Hill. The lands are on either side of the River Blackwater between the Kells Road (R147), Mill Lane, N51 and Rathholdren Road.

Figure 1: Survey area.

There is a derelict mill at the end of Mill Lane. The vegetation at the end of the lane and towards the mill is dense and impeded access to the remainder on the site on north side of

the river. The field is accessible from Rathholdren Road. The lands on the south side of the river are accessible through a break in the wall. Much is this site is rubble with the remainder immature mixed woodland.

This bat survey was requested within no specific development plan details provide.

2. Survey Methodology

This report presents the results of a site visits completed on 7th to the 10th September 2018 during which a daytime assessments of the site and dusk surveys were completed. A daytime survey was undertaken to examine the site for mature trees and other potential roosting sites. The survey site was walked and habitats likely to provide foraging areas for bats were noted.

Surveying was completed using bat detectors (Wildlife Acoustics EchoMeter Touch 2 Pro and Pettersson D200 Heterodyne Bat Detectors). In addition two units of Bat Logger A+ (static units) were deployed during the survey and located as shown on Figure 2.

Figure 2: Location of the static units within the survey area.

Unit A – located on the northern side of the River Blackwater for 2 nights (Night 1 – Green Circle; Night 2 – Orange Circle).
Unit B – located on the southern side of the River Blackwater for 3 nights (Night 1 –Red Circle; Night 2 – Blue Circle and Night 3 – Purple Circle).s

The use of this recording devices results in a far greater sampling effort over a shorter period of time. Bat detectors are employed as the ultrasonic calls produced by bats cannot be heard by human hearing. Wildlife Acoustics Song Meter SM2 Units use Real Time recording as a technique to record bat echolocation calls and using specific software, the recorded calls are identified. It is these sonograms (2-d sound pictures) that are digitally stored on the SD card and downloaded for analysis. These results are depicted on a graph showing the number of bat passes per species per hour/night. Each bat pass does not correlate to an individual bat but is representative of bat activity levels. Some species such as the pipistrelles will continuously fly around a habitat and therefore it is likely that a series of bat passes within a similar time frame is one individual bat. On the other hand, Leisler's bats

tend to travel through an area quickly and therefore an individual sequence or bat pass is more likely to be indicative of individual bats.

The recordings were analysed using various software. Recordings made by SongMeter SM2Bat+ unit was analysis using SongScope,

2.1 Survey Constraints

This survey was undertaken during the preferred summer months of mid-April to September. As a consequence, there are no survey constraints in relation to the timing.

However, this site suffers greatly from anti-social behaviour and this impacted on the degree of dusk surveying that could be completed. This was only undertaken for 90 minutes each night to reduce potential encounters within the dark hours of the night. While there were no negative encounters, there was also a large amount of dangerous material discarded within the survey area, particularly on the southern side of the river.

3. Bat Survey Results

Weather Conditions	Overcast, dry, calm, 15^0C.	7th September 2018
Sunset	20:02 hours	7th September 2018
Dusk Survey	20:00 to 21:30 hrs	7th September 2018
Weather Conditions	Overcast, dry, light wind, 13^0C.	8th September 2018
Sunset	20:00 hours	8th September 2018
Dusk Survey	20:00 to 21:30 hrs	8th September 2018
Static Survey	20:00 hrs to 07:00 hrs approx	7th to 10th September 2018

(2 statics = 50 hours of surveillance)

3.1 Daytime Survey Results 7th September 2018

- No trees are located the northern side of the River Blackwater are considered to be of Potential Bat Roost (PBR) value.
- There are a number of large mature trees, many with dense ivy growth that would be potentially used as roosting sites for bats located on the southern side of the River Blackwater.
- The mill structure is open and, generally damp, which reduces its potential as a roosting site. It would be considered to be of medium roosting potential.
- The rubble and walls on the southern side of the River Blackwater do not offer roosting potential for bats.

3.2 Dusk Survey Results 7th September 2018

- The survey was concentrated on the northern side of the site on Night 1.
- Three species of bat were recorded during the survey. The Mill Lane was an active soprano pipistrelle commuting route and foraging area. Leisler's bats were occasionally recorded flying towards the river. Soprano pipistrelle was frequently encountered around the mill buildings and over the River Blackwater.
- Common pipistrelles were recorded foraging around the boundary of the field.
- Daubentons bat were recorded on the river in the darker stretches. There was a high level of activity adjacent to the mill buildings but less down at the river where there is street lighting and lighting from adjacent buildings.

3.3 Dusk Survey Results 8th September 2018

- The survey was concentrated on the southern side of the site on Night 2.
- Three species of bat were recorded during the survey. Leisler's bats were occasionally recorded foraging over the mature trees. Soprano pipistrelle was frequently encountered around the rubble area and over the River Blackwater.
- Common pipistrelles were recorded, occasionally, foraging around the boundary of this section of the survey area.

3.4 Static Unit Results

Details of the number of bat passes recorded on the static recorders are listed below (Tables 1 and 2). On night 1 (7th September 2018) the static unit was located within the mill structure adjacent to the River Blackwater. A high level of soprano pipistrelle activity was recorded with low levels of bat activity recorded for common pipistrelle, Leisler's bat and Daubenton's bat.

On Night 2, the static unit was located along the boundary of the field. A high level of soprano pipistrelle bat activity was recorded and a low level of common pipistrelle bat activity was recorded.

Table 1: Bat passes for each night of recording from 7th – 9th September 2018 at two locations on the northern side of the River Blackwater.

Time (hrs)	Leis	SP	CP	Daub
7th to 8th September 2018				
20:00–21:00	17 passes	759 passes	17 passes	42 passes
8th to 9th September 2018				
20:00–21:00	0 passes	473 passes	2 passes	0 passes

Note: Leis = Leisler's bat; SP = soprano pipistrelle; CP = common pipistrelle and Daub = Daubenton's bat

A very high level of bat activity was recorded for soprano pipistrelles on Unit B on Night 1. This unit was located within the rubble area of the southern side of the River Blackwater. Occasional passes of common pipistrelles was recorded while only on3 Leisler's bat pass was recorded.

On Night 2, the static unit was located along a track within the immature woodland on the southern side of the River Blackwater. Little bat activity was recorded for the three named bat species.

On Night 3 the static unit was located on a mature tree adjacent to the river. Four species of bat activity was recorded: soprano pipistrelle, common pipistrelle, Leisler's bat and Daubentons bat. However, activity was low and this may have been due to the poor weather conditions of this recording night (rain showers).

Table 2: Bat passes for each night of recording from 7th – 10th September 2018 at two locations on the northern side of the River Blackwater.

Time (hrs)	Leis	SP	CP	Daub
7th to 8th September 2018				
20:00–21:00	1 pass	1,354 passes	46 passes	0 passes
8th to 9th September 2018				
20:00–21:00	5 passes	5 passes	14 passes	0 passes
9th to 10th September 2018				
20:00–21:00	1 pass	133 passes	12 passes	6 passes

Comments on results

1. The River Blackwater is an important foraging and commuting area for local bat populations for at least four species of bats.
2. The mature trees along the River Blackwater are likely to provide roosting sites for bats.
3. The wooded habitats along the River Blackwater also provide essential foraging habitat for local bat populations.
4. The current dark corridor effect of the Master Plan lands along the River Blackwater provides a buffer to the lighting of the urban zone of the town of Navan.
5. The wooded habitats of the lands surveyed also provide a buffer zone for noise pollution of the urban zone of the town of Navan.

3.5 Species Profile

Common pipistrelle *Pipistrellus pipistrellus* (Taken from Roche *et al.,* 2014)

Irish Status	**Least Concern**
European Status	Least Concern
Global Status	Least Concern
Estimated Irish Population Size	1.2 to 2.8 million (2007-2012)
Irish Population Trend	2003-2013 ↑
Estimate Core Area (km^2) (Lundy *et al. 2011)*	56,485

Core Area (Lundy et al., 2011 and viewed on www.biodiversityireland.ie)
The modelled Core Area for common pipistrelles is a large area that covers much of the island of Ireland (56,485 km^2) which covers primarily the east and south east of the area (Roche *et al.,* 2014). Particularly suitable areas include east Clare, Kilkenny, Laois, south Offaly, Galway, Monaghan and east Wicklow.

Habitat Preference/Avoidance (Lundy et al., 2011 and viewed on www.biodiversityireland.ie)
The Irish Landscape Model indicated that the common pipistrelle selects areas with broadleaf woodland, riparian habitats and low density urbanization (<30%) (Roche *et al.,* 2014).

Population Trend (Roche et al., 2014)
Bat Conservation Ireland Irish Bat Monitoring Programme has reported a steady incline in common pipistrelle numbers since 2003 when monitoring by the Car-based Bat Monitoring Scheme was set up.

Concerns (Roche et al., 2014)
Principal concerns for common pipistrelles in Ireland that are relevant for this survey area are as follows:

- Lack of knowledge of roosting requirements.
- This species has complex habitat requirements in the immediate vicinity of roosts. Therefore careful site-specific planning for this species is required in order to ensure all elements are maintained.
- Renovation or demolition of derelict buildings.
- Tree felling.
- Increasing urbanisation (e.g. increase in lighting).

Leisler's bat *Nyctalus leisleri* (Taken from Roche *et al.,* 2014)

Irish Status	**Near Threatened**
European Status	Least Concern
Global Status	Least Concern
Estimated Irish Population Size	73,000 to 130,000 (2007-2013). Ireland is considered the world stronghold for this species
Irish Population Trend	2003-2013 ↑
Estimate Core Area (km^2) (Lundy *et al. 2011)*	52,820

Core Area (Lundy et al., 2011 and viewed on www.biodiversityireland.ie)
The modelled Core Area for Leisler's bats is a relatively large area that covers much of the island of Ireland (52,820 km^2). A large contiguous area spans the east and middle of the island with particular favourable areas in south Clare, east Wicklow, north Monaghan and north Cavan.

Habitat Preference/Avoidance (Lundy et al., 2011 and viewed on www.biodiversityireland.ie)
The Irish Landscape Model indicated that the Leisler's bat habitat preference has been difficult to define in Ireland. Habitat modelling for Ireland shows an association with riparian habitats and woodlands (Roche *et al.,* 2014). The landscape model emphasised that this is a species that cannot be defined by habitat preference at a local scale compared to other Irish bat species but that it is a landscape species and has a habitat preference at a scale of 20.5 km. In addition, of all Irish bat species, Leisler's bats have the most specific roosting requirements. They tend to select roosting habitat with areas of woodland and freshwater.

Population Trend (Roche et al., 2014)
Bat Conservation Ireland Irish Bat Monitoring Programme has reported a steady incline in Leisler's bat numbers since 2003 when monitoring by the Car-based Bat Monitoring Scheme was set up.

Concerns (Roche et al., 2014)
The principal concerns for Leisler's bats are poorly known in Ireland but those that are relevant for this survey area are as follows:

- Selection of maternity sites is limited to specific habitats.
- Relative to the population estimates, the number of roost sites is poorly recorded.
- Tree felling, especially during autumn and winter months.
- Increasing urbanisation.

Soprano pipistrelle *Pipistrellus pygmaeus* (Taken from Roche *et al.,* 2014)

Irish Status	**Least Concern**
European Status	Least Concern
Global Status	Least Concern
Estimated Irish Population Size	0.54 to 1.2 million (2007-2012)
Irish Population Trend	2003-2013 ↑
Estimate Core Area (km2) (Lundy *et al. 2011)*	62,020

Core Area (Lundy et al., 2011 and viewed on www.biodiversityireland.ie)
The modelled Core Area for soprano pipistrelle is a large area that covers much of the island of Ireland (62,020 km2). Strongholds include east Clare, west Galway and the Monaghan/Fermanagh area.

Habitat Preference/Avoidance (Lundy et al., 2011 and viewed on www.biodiversityireland.ie)
The Irish Landscape Model indicated that the soprano pipistrelle selects areas with broadleaf woodland, riparian habitats and low density urbanisation (Roche *et al.,* 2014)..

Population Trend (Roche et al., 2014)
Bat Conservation Ireland Irish Bat Monitoring Programme has reported a steady incline in the soprano pipistrelle numbers since 2003 when monitoring by the Car-based Bat Monitoring Scheme was set up.
Concerns (Roche et al., 2014)
Principal concerns for soprano pipistrelles in Ireland that are relevant for this survey area are as follows:

- Lack of knowledge of roosts
- Renovation or demolition of structures
- Tree felling
- Increasing urbanisation (e.g. increase in lighting)

Daubenton's bat *Myotis daubentoni* (Taken from Roche *et al.,* 2014)

Irish Status	**Least Concern**
European Status	Least Concern
Global Status	Least Concern
Estimated Irish Population Size	81,000 to 103,000 (2007-2012)
Irish Population Trend	2008-2013 Stable
Estimate Core Area (km2) (Lundy *et al. 2011)*	41,285

Core Area (Lundy et al., 2011 and viewed on www.biodiversityireland.ie)
The modelled Core Area for Daubenton's bats is a relatively large area that covers much of the island of Ireland (41,285 km2) reflecting the distribution of sizeable river catchments. Particularly favourable areas are in include the Corrib, Shannon and Erne Catchments.

Habitat Preference/Avoidance (Lundy et al., 2011 and viewed on www.biodiversityireland.ie)
The Irish Landscape Model indicated that the Daubenton's bat habitat preference is for areas with broadleaf woodland, riparian habitats and low density urbanisation (Roche *et al.,* 2014).

Population Trend (Roche et al., 2014)
Bat Conservation Ireland Irish Bat Monitoring Programme has reported that this species is stable from 2006-2013.

Concerns (Roche et al., 2014)
Principal concerns for Daubenton's bats is poorly known in Ireland but those that are relevant for this survey area are as follows:

- Potential roost loss due to bridge maintenance
- Loss of woodland and forest clearance
- Loss of woodland, scrub and hedgerows
- Tree surgery and felling
- Increasing urbanisation
- Light pollution

4. Management of structures in view of Bat Fauna

This report will draw on guidelines already available in Europe and will use the following documents:

- *A conservation plan for Irish vesper bats, Irish Wildlife Manual No. 20 National Parks and Wildlife Service, Department of Environment, Heritage and Local Government, Dublin, Ireland.*
- *Bat Mitigation Guidelines for Ireland. Irish Wildlife Manuals, No. 25. National Parks and Wildlife Service, Department of Environment, Heritage and Local Government, Dublin, Ireland.*
- *National Biodiversity Plan. Department of Arts, Heritage, Gaeltacht and the Islands.*
- *The status of EU protected habitats and species in Ireland: Conservation status in Ireland of habitats and species listed in the European Council Directive on the Conservation of Habitats, Flora and Fauna 92/43/EEC. National Parks and Wildlife Service, Department of Environment, Heritage and Local Government.*

4.1 Ecological Assessment

The following bat species have been recorded during this bat survey: common pipistrelle, soprano pipistrelle, Daubenton's bats and Leisler's bat.

In summary, any development of the lands survey will need to consider the following:

a. Bats and their bat roosts are protected by Irish legislation (Wildlife Acts 1976 to 2012), which make it an offence to wilfully interfere with or destroy the breeding or resting place of these species. All species of bats are listed in Schedule 5 of the 1976 Act and therefore are subject to the provisions of Section 23.

b. The EU Habitats Regulations Directive 1992 seeks to protect rare and vulnerable species, including all species of bats. All ten species of bat are protected with the lesser horseshoe bat listed as an Annex II species while all other bats (commonly known as vesper bats) are listed as Annex IV species.

c. Local Planning Authorities are required to give consideration to nature conservation interests under the guidance of the SEA Directive 2001/42/EC. This directive states that the protected status afforded to bats means that planning authorities must consider their presence in order to reduce the impact of developments through mitigation measures.

d. The National Biodiversity Plan confers general responsibilities on all participants in the development process to take into account of protected species. "*The overall objective is to secure the conservation, and where possible the enhancement, and sustainable use of biological diversity in Ireland and contribute to conservation and sustainable use of biodiversity globally".*

NPWS Conservation Status Assessment report for each of the species recorded is presented in a summary below the species list:

Leisler's bat *Nyctalus leisleri* (Species Code 1331)
Common pipistrelle *Pipistrellus pipistrellus* (Species Code 1309)
Soprano pipistrelle *Pipistrellus pygmaeus* (Species Code 5009)
Daubenton's bat *Myotis daubentonii (*Species Code 1314*)*

All Irish bat species are given a Favourable Status in Republic of Ireland. The Irish Leisler's bat population is of International Importance. The principal pressures on Irish bat species are as follows:

- urbanized areas (e.g. light pollution)
- bridge/viaduct repairs
- pesticides usage
- removal of hedges, scrub, forestry
- water pollution
- other pollution and human impacts (e.g. renovation of dwellings with roosts)
- infillings of ditches, dykes, ponds, pools and marshes
- management of aquatic and bank vegetation for drainage purposes
- abandonment of pastoral systems
- speleology and vandalism
- communication routes: roads
- forestry management

4.2 Predicted Impacts

Four species of bat were recorded commuting and foraging within the survey area. There is a potential that bats may occasionally roost in the mature trees and occasionally roost in the mill buildings/structures.

1. Development of Master Plan lands surveyed:

The impact of tree felling and hedgerow removal will be determined by the degree of removal. Potential increased lighting along the River Blackwater will also have a detrimental impact. Impact will involve:

a. Interruption of commuting routes
b. Loss of roosting sites
c. Loss of foraging areas
d. Reduced competitiveness
e. Disturbance
f. Loss of buffer zone for noise and lighting from passing traffic particularly adjacent to the River Blackwater.

Mitigation measures specifically designed for a development proposal will need to focus on lessen the potential impacts listed above. Some general mitigation measures are listed below.

4.2 Recommended General Mitigation Measures

The mitigation measures listed are only general ones. If the lands surveyed are to be developed, then specific mitigation measures in view of such plans would be required.

Mitigation by avoidance

1. Do not remove trees and shrubs, where possible, adjacent to the proposed work site. Protection of this habitat from any potential damage as a result of the proposed development works is also required.
2. Treelines and shrubs, where possible, should remain in-situ and remain protected from proposed work.
3. Lighting of the work area should be turned off each night to ensure that there is no impact from such on foraging bats.

Mitigation by Reduction

1 Removal of trees

Prior to any tree removal, a bat assessment of the trees will need to be undertaken to determine their PBR or Potential Bat Roost level. The author uses three classifications of A, B and C-value with A-value trees having the highest potential of providing roosting sites for bats.

a) Minimise the removal of mature trees, where possible. This is an essential measures along the banks of the River Blackwater. It is important to ensure that there is a dark corridor along the river to provide safe commuting and travel of nocturnal animals.

b) If the trees are to be removed, then an assessment of the trees to be felled is required in relation to bats in order to provide detailed mitigation measures in relation to tree felling and planting. Planting will be required to mitigate for tree removal and landscaping plans will be required to be planted “like for like” in relation to tree and shrub species removed.

Where possible, trees, which are to be removed, should be felled during the autumn months of September, October or November (felling during the spring or autumn months avoids the periods when the bats are most active). The survey site has a large number of trees that could be potentially identified as Potential Bat Roosts (PBRs) within the proposed development site.

An assessment of trees according to their PBR value determines the methodology of felling. Trees with A-value PBR are highly suitable for roosting bats and require more intensive procedures prior to felling, e.g.

- Any trees showing crevices, hollows, *etc*., should be removed while a bat specialist is present to deal with any bats found. Such animals should be retained in a box until dusk and released on-site. Large mature trees will be felled carefully, essentially by gradual dismantling by tree surgeons, under supervision of a bat specialist. Care will be taken when removing branches as removal of loads may cause cracks or crevices to close, crushing any animals within. These cracks should be wedged open prior to

load removal. The dead branches should be lowered to the ground using ropes to avoid impacts which may injure or kill bats within. This measure refers to A- and B-value trees. A-value trees will required more extensive dismantling compared to B-value. These trees should be marked with spray paint prior to felling in order for them to be felled correctly in relation to method described above.

- A bat expert will survey all trees due for removal prior to construction works commencing once there is a consensus on what trees are to be removed and there is a clear access to all of the trees on-site.
- Any ivy covered trees which require felling will be left to lie for 24 hours after cutting to allow any bats beneath the cover to escape. B- and A-value trees with ivy should be felled as above and then left on the ground for 24 hours before removal.
- Any ivy to be removed from trees that are marked to be retained is required to be removed and left on the ground for 24 hrs after cutting (similar to actions above).

If trees are proposed to be felled then, a bat box scheme is required to mitigate for this. The number of bat boxes is calculated according to the number of trees to be felled and their PBR value. Bat box locations (exact trees for erection of bat boxes) should be undertaken by bat specialist prior to construction works are undertaken.

For each A-value tree proposed to be felled – one bat box is required
For every two B-value trees to be felled – one bat box is required
For every three C-value trees to be felled – one bat box is required

Details of sourcing these boxes and bat tubes and erection can be supplied. 'Schwegler' woodcrete bat box designs are recommended:
www.nhbs.com

The main function of bat boxes is to provide alternative safe roosting sites for groups of bats where natural sites become unavailable. The internal diameter of a bat box is required to be sufficient to allow bats to cluster together in numbers to retain body heat. It is important to understand the life cycle of bats and their tendency to use an array of roosting sites through the year. In summary, bats require different roost conditions for hibernation, during the sensitive time of rearing their young (maternity roost), night roosts for resting stops during night feeding and satellite roosts in between the main hibernation and maternity season. Roosting conditions also vary with each species. In general, hibernation boxes require greater insulation (wall thickness of 100 mm timber) to provide a constant temperature for bats throughout the winter to prevent bats from freezing. All other boxes, typically called summer boxes, are designed to provide secure and dry sheltered conditions. These boxes have relatively thin walls (about 20-30 mm timber) and are used by bats outside the hibernation period. These requirements mean that any Bat Box Schemes should provide suitable bat boxes to cover the general requirements of different bat species all year around.

'Woodcrete' boxes are made of a mixture of concrete, sawdust and clay moulded into to shape. They have the advantage of allowing natural respiration, stable temperature and durability. 'Woodcrete' boxes last, on average, for 25 years.

To ensure that bats use the bat boxes, it is very important to site them carefully and this should be undertaken by a bat specialist. Some general points to follow include:

- Straight limb trees (or telegraph pole) with no crowding branches or other obstructions for at least 3 metres above and below position of bat box.

- Diameter of tree should be wide and strong enough to hold the required number of boxes.

- Locate bat boxes in areas where bats are known to forage or adjacent to suitable foraging areas. Locations should be sheltered from prevailing winds.

- Bat boxes should be erected at a height of 4-5 metres to reduce the potential of vandalism and predation of resident bats.

- It is recommended to erect a number of bat boxes on one tree at an array of aspects. South facing boxes will receive the warmth of the sun, which is necessary for maternity colonies. In large bat box scheme it is generally recommended to have three bat boxes arranged at the same height facing North, South-East and South-West. This ensues a range of temperatures are available all day. If the South facing boxes become warm, bats can safely remove to the cooler North facing box.

- Locations for bat boxes should be selected to ensure that the lighting plan for the proposed site does not impact on the bat boxes.

Acceptance of boxes by bats is less predictable than those for birds. Therefore, it is essential to monitor their use over a period of time. Those boxes that remain unused within two years of date of erection should be re-located. Bat boxes should also be checked in wintertime for general wear and tear and to remove droppings from the previous summer use.

NB: Bats use boxes intermittently and the chance of finding a bat in a box at the time of inspection is considered to be 1 in 10.

Bat boxes should be inspected, by bat licence holder (bat specialist), at least once within 12 months of erection at appropriate season in order to monitor bat use and the species using boxes. This should be followed up with another inspection within 24 months of setting up. At this point, any bat boxes not used should be re-located to a new site. Any bats found should be counted and identified to species level. All data collected should be submitted to Bat Conservation Ireland.

Safety is also essential during erection and monitoring of bat boxes. Use of hard hats, a strong aluminium ladder with safety strap for trees, and use of gloves (if handling bats) are recommended. Only a licensed person (NPWS Licence) can handle bats.

2 Removal of buildings / structures

Any structure / building proposed to be removed will need to be further assessed by a bat specialist to determine if bat roosting sites are present.

3 Lighting

Lighting is not recommended in vicinity of the river as this will reduce the usage of the River Blackwater by bats. Dark commuting corridors are an essential component of the bat landscape especially in relation to Daubenton's bats. This is also a requirement along the linear habitat features that the bats use to commute to river. Lighting considerations should also be applied to the general environs of development of the Master Plan lands.

Local authorities have a duty to ensure impacts upon legally protected species are avoided. This can be achieved by the following principals:

- Artificial lights shining on bat roosts, their access points and the flight paths away from the roost must always be avoided.
- Lighting design should be flexible and be able to fully take into account the presence of protected species. Therefore, appropriate lighting should be used along a route with more sensitive lighting regimes deployed in wildlife sensitive areas.
- Dark buffer zones can be used as a good way to separate habitats or features from lighting by forming a dark perimeter around them. This could be used for habitat features noted as foraging areas for bats.
- Buffer zones can be used to protect Dark buffer zones and rely on ensuring light levels (levels of illuminance measured in lux) within a certain distance of a feature do not exceed certain defined limits. The buffer zone can be further subdivided in to zones of increasing illuminance limit radiating away from the feature or habitat that requires to be protected.
- Luminaire design is extremely important to achieve an appropriate lighting regime. Luminaires come in a myriad of different styles, applications and specifications which a lighting professional can help to select. The following should be considered when choosing luminaires. This is taken from the most recent BCT Lighting Guidelines (BCT, 2018).
    - All luminaires used should lack UV/IR elements to reduce impact.
    - LED luminaires should be used due to the fact that they are highly directional, lower intensity, good colour rendition and dimming capability.
    - A warm white spectrum (<2700 Kelvins is recommended to reduce the blue light component of the LED spectrum).
    - Luminaires should feature peak wavelengths higher than 550nm to avoid the component of light most disturbing to bats.
    - The use of specialist bollard or low-level downward directional luminaires should be considered in bat sensitive areas to retain darkness above.
    - Column heights should be carefully considered to minimise light spill. The shortest column height allowed should be used where possible.

- Only luminaires with an upward light ratio of 0% and with good optical control should be used.
- Luminaires should always be mounted on the horizontal, ie no upward tilt.
- Any external security lighting should be set on motion-sensors and short (1min) timers.
- As a last resort, accessories such as baffles, hoods or louvres can be used to reduce light spill and direct it only to where it is needed.

Planting of screening could also be effectively used to prevent lighting spillage onto the surface of canal in areas where bat foraging is recorded.

4 Artificial Roosting Sites

It is recommended that roosting sites are built into the structures any new development proposed for the Master Plan lands. There a numerous pre-cast bat structures available for such. Examples include a bat tube which can be viewed at the following link:

https://www.nhbs.com/browse/search?q=bat+tubes&qtview=161276

An example of this artificial bat roost used in a bridge structure is provided below:

Figure 4: Example of a bat tube incorporated into the parapet walls of a newly maintained bridge (Ross Bridge, County Clare).

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Appendices

Bat ecology – general

The bat is the only mammal that is capable of true flight. There are over 1,100 species worldwide, representing almost a quarter of all mammal species. There are 47 species in Europe - in Ireland, ten species of bat are currently known to exist, which are classified into two families, the Rhinolophidae (Horseshoe bats) and the Vespertilionidae (Common bats).

Prey

All the European bat species feed exclusively on insects. A Pipistrelle, weighing only 4 to 8 grammes, will eat up to 3000 insects every night, ensuring a build up of fat in the bat's body to allow it to survive the winter deep in hibernation.

Breeding and longevity

Irish bats can produce one young per year but, more usually, only one young is born every two years. This slow rate of reproduction inhibits repopulation in areas of rapid decline. Although bats have been known to live for twenty or more years, this is rare as most die in their first year, and the average lifespan, in the wild, is four years.

Threats

All bat species are in decline as they face many threats to their highly developed and specialised lifestyles. Many bats succumb to poisons used as woodworm treatments within their roosting sites (Racey & Swift, 1986). Agricultural intensification, with the loss of hedgerows, treelines, woodlands and species-rich grasslands have impacted bat species also. Habitual roosting or hibernation sites in caves, mines, trees and disused buildings are also often lost to development. Summer roosts are prone to disturbance from vandals. Agricultural pesticides accumulate in their prey, reaching lethal doses (Jefferies, 1972). Chemical treatments in cattle production sterilise dung thus ensuring that no insects can breed within it to be fed upon by bats. Likewise, river pollution, from agricultural runoff, reduces the abundance of aquatic insects. Road building, with the resultant loss of foraging and roosting sites, is a significant cause in the reduction of bat populations across Europe.

Extinction

As recently as 1992, the greater mouse-eared bat *Myotis myotis* became the first mammal to become extinct in Britain since the wolf in the 18th century.

Ireland Red List No. 3: Terrestrial Mammals

Bats

Species: Common Name	Irish Status	European Status	Global Status
Brandt's bat	Data deficient	Least Concern	Least Concern
Daubenton's bat	Least Concern	Least Concern	Least Concern
Whiskered bat	Least Concern	Least Concern	Least Concern
Natterer's bat	Least Concern	Least Concern	Least Concern
Leisler's bat	Near threatened	Least Concern	Least Concern
Nathusius' pipistrelle	Least Concern	Least Concern	Least Concern
Common pipistrelle	Least Concern	Least Concern	Least Concern
Soprano pipistrelle	Least Concern	Least Concern	Least Concern
Brown long-eared bat	Least Concern	Least Concern	Least Concern
Lesser horseshoe bat	Least Concern	Least Concern	Least Concern

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Assessment of Japanese Knotweed population occurring at a site adjacent to Elliot's Mill, Navan, Co Meath and proposed management

Report prepared August 2018 by:

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Executive Summary

Meath Co Council commissioned FERS Ltd to undertake an assessment of a site in the vicinity of Elliot's Mill, Navan, Co. Meath for the occurrence of Japanese Knotweed. The site has been largely derelict for some time, and a well-established population of Japanese Knotweed, a species listed on Part (1) of the Third Schedule of the European Communities (Birds and Natural Habitats) Regulations of 2011, was observed to be present during a site visit on the 27th of June 2018. A sizeable portion of the site occurs within the River Boyne and River Blackwater Special Area of Conservation (SAC) and some lands are also included within the River Boyne and River Blackwater Special Protection (SPA). The primary objective of this report is to assess the issues posed by the population of Japanese Knotweed present on site and evaluate the possible solutions to eradicate the population.

The primary purposes of the survey and this report are:

- *To determine the extent of the infestation of the site with Japanese Knotweed; and*
- *To evaluate solutions to eradicate the population from the site.*

The Japanese Knotweed infestation at the site is very extensive, and the nature of the site will make any eradication program both costly and time consuming. It is suggested that owing to the location of the site, the nature of the topography of the site and the extent of the Japanese Knotweed infestation that development of the site would be prohibitively expensive. It is suggested that as an alternative, a long-term plan for the eradication of Japanese Knotweed at the site be undertaken and that the site be utilized for amenity purposed in conjunction with Blackwater Park, which will considerably enhance the ecological and amenity value of both sites.

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Table of Contents

1 Introduction

1.1 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, has a 1st class honours degree in Environmental Biology (UCD), a Ph.D. in Ecology (UCD), a Diploma in EIA and SEA management (UCD) and a M.Sc. in GIS (University of Ulster, Coleraine). He 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 Ltd. has a 1st class honours degree in Botany (UCD), and a Ph.D. in Botany (UCD). She has in excess of 10 years of experience in carrying out ecological surveys on both an academic and a professional basis. Ciaran Byrne, senior ecologist with FERS, holds a B.Sc. (Hons) in Environmental Management (DIT) and a M.Sc. in Applied Science and Ecological Assessment. He has in excess of 5 years of experience in carrying out ecological surveys on both an academic and a professional basis.

FERS client list includes National Parks and Wildlife Service, An Bord Pleanala, Teagasc, County Councils, the Heritage Council, University College Dublin, the Environmental Protection Agency, Inland Waterways Association of Ireland, the Department of Agriculture, and the Office of Public Works. FERS has a large body of experience working with Alien Invasive Plant Species, including the preparation of Alien Invasive Species Management and Control Plans.

1.2 Description of site

The site is bounded by the N51 to the east, Ratholdren Road to the North and the R147 to the south. Various buildings form the western boundary of the site. The northern half of the site is comprised of rank agricultural grassland reverting to scrub. The southern half of the site, which is bounded by the River Blackwater, is comprised of an "Island" of habitat, comprising primarily regenerating woody species, with Ash (*Fraxinus excelsior*), Hawthorn (*Crataegus monogyna)*, Sycamore (*Acer pseudoplatanus*) and Elder (*Sambucus nigra*) in habitat disturbed in the recent decades. There are also older growth trees in areas not subject to disturbance. The majority of the southern half of the site is strongly sloping in aspect, with a path in a "valley" running parallel with the river. Much of the substrate in the vicinity of the river would appear to consist of rubble and loose rock, likely generated when the buildings to the west of the site were developed. This material has been colonised by plants over the recent past. Within this aggregate of material occurs a heavy infestation of Japanese Knotweed, which may have been imported to the site during construction of the buildings to the west,

or spread from within the site during disturbance events. In virtually all areas in which there has been disturbance of the substrate, Japanese Knotweed is prevalent, but particularly so at the entrance to the site and between the path and the River Blackwater. Maps outlining the location of the site are illustrated in Figure 1, Figure 2 and Figure 3.

Figure 1: Approximate location of site (Scale 1:25,000)

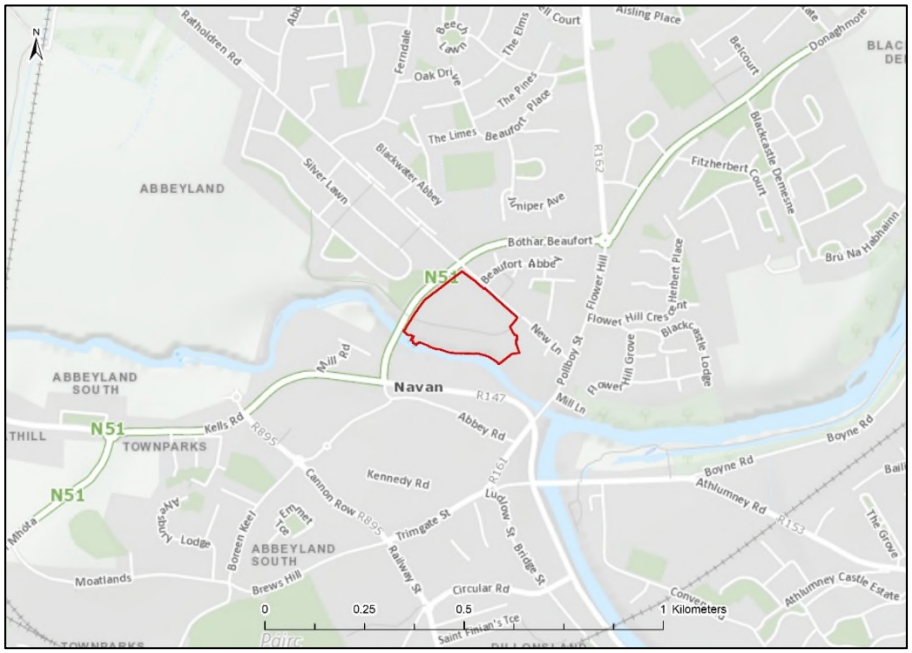

Figure 2: Approximate location of site (Scale 1:8,000)

Figure 3: Aerial image indicating location of site (Scale 1:2,500)

1.3 Background – Alien Invasive Plant Species

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.

2 Legislation – Biodiversity and Invasive Species

2.1 Irish Law – The Wildlife (Amendment) Act 2000

The primary domestic legislation providing for the protection of wildlife in general, and the control of some activities adversely impacting upon wildlife is the Wildlife Act of 1976. The aims of the wildlife act according to the National Parks and Wildlife Service are "... *to provide for the protection and conservation of wild fauna and flora, to conserve a representative sample of important ecosystems, to provide for the development and protection of game resources and to regulate their exploitation, and to provide the services necessary to accomplish such aims*." All bird species are protected under the act. The Wildlife (Amendment) Act of 2000 amended the original Act to improve the effectiveness of the Act to achieve its aims. The main objectives of the Wildlife (Amendment) Act, 2000 are to:

- Provide a mechanism to give statutory protection to NHAs;
- Provide for statutory protection for important geological and geomorphological sites, including fossil sites by designation as NHAs;
- Improve some existing measures, and introduce new ones, to enhance the conservation of wildlife species and their habitats;
- Enhance a number of existing controls in respect of hunting, which are designed to serve the interests of wildlife conservation;
- Broaden the scope of the Wildlife Acts to include most species, including the majority of fish and aquatic invertebrate species which were excluded from the 1976 Act;
- Introduce new provisions to enable regulation of the business of commercial shoot operators;
- Ensure or strengthen compliance with international agreements and, in particular, enable Ireland to ratify the Convention on International Trade in Endangered Species (CITES) and the African-Eurasian Migratory Waterbirds Agreement (AEWA).
- Increase substantially the level of fines for contravention of the Wildlife Acts and to allow for the imposition of prison sentences;
- Provide mechanisms to allow the Minister to act independently of forestry legislation, for example, in relation to the acquisition of land by agreement;
- Strengthen the provisions relating to the cutting of hedgerows during the critical bird-nesting period and include a requirement that hedgerows may only be cut during that period by public bodies, including local authorities, for reasons of public health or safety;
- Strengthen the protective regime for Special Areas of Conservation (SACs) by removing any doubt that protection will in all cases apply from the time of notification of proposed sites;

- Give specific statutory recognition to the Minister's responsibilities in regard to promoting the conservation of biological diversity, in light of Ireland's commitment to the UN Convention on Biological Diversity.

2.2 European Law – The Birds Directive and the Habitats Directive

2.2.1 Habitats Directive

The Habitats Directive (Council Directive 92/43/EEC on the Conservation of Natural Habitats and of Wild Flora and Fauna) is the main legislative instrument for the protection and conservation of biodiversity within the European Union and lists certain habitats and species that must be protected within wildlife conservation areas, considered to be important at a European as well as at a national level. A "Special Conservation Area" or SAC is a designation under the Habitats Directive. The Habitats Directive sets out the protocol for the protection and management of SACs.

2.2.2 Birds Directive

The Birds Directive (Council Directive 2009/147/EC on the Conservation of Wild Birds) provides for a network of sites in all member states to protect birds at their breeding, feeding, roosting and wintering areas. This directive identifies species that are rare, in danger of extinction or vulnerable to changes in habitat and which need protection (Annex I species). A Special Protection Area or SPA, is a designation under The Birds Directive.

2.2.3 European Communities (Birds and Natural Habitats) Regulations 2011

With the introduction of the Birds Directive and the Habitats Directive, came the obligation to establish the Natura 2000 network. In 1997, the Habitats Directive was transposed into Irish national law. The relevant Regulations, the European Communities (Natural Habitats) Regulations 1997, SI 94/1997 represent a fundamental shift in nature conservation policy and law. The European Communities (Birds and Natural Habitats) Regulations 2011 consolidate the European Communities (Natural Habitats) Regulations 1997 to 2005 and the European Communities (Birds and Natural Habitats)(Control of Recreational Activities) Regulations 2010, as well as addressing transposition failures identified in judgments of the Court of Justice of the European Union (CJEU).

3 Species of plant listed in Part (1) of the Third Schedule

There are more than 30 species listed in Part (1) of the Third Schedule of the European Communities (Birds and Natural Habitats) Regulations of 2011, which states (49) "…*Save in accordance with a licence granted under paragraph (7), any person who plants, disperses, allows or causes to disperse, spreads or otherwise causes to grow in any place specified in relation to such plant in the third column of Part 1 of the Third Schedule, any plant which is included in Part 1 of the Third Schedule, shall be guilty of an offence…*" The species listed on Part (1) the Third Schedule are listed in Table 1.

Table 1: List of plant species appearing on the Third Schedule

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	*Eoldea (all species)*	*Yes*
Wireweed	*Sargassum muticum*	*Marine/transition*

Most of the species listed on Part (1) of the Third Schedule are particularly problematic within riparian habitats, with constant disturbance and the presence of a medium for spread. In the case of developments adjacent to water-courses, therefore, there is a particular threat posed by many of these plants. In the event of the presence of a Source-Pathway-Receptor linkage between a proposed development and a Natura 2000 site, in particular a riparian site, a very significant threat is posed to the ecological integrity of that site in the event of the spread of an Alien Invasive Plant Species to that site.

4 Japanese Knotweed on site

4.1 Japanese Knotweed description

Japanese Knotweed is a rhizomatous perennial, capable of reaching 2m in height. This plant spreads exclusively by vegetative means, spreading very aggressively under disturbed conditions. The plant is capable of forming extensive monoculture stands. There is a negative impact on ecosystem function and biodiversity through a number of mechanisms – primarily through the shading-out of native plants due to the rapidity with which large stands of the plant can form. In addition, this plant has a deleterious effect on the banks of waterways owing to the fact that during the winter, when *F. japonica* dies back, there is little or no vegetation growing underneath, and hence nothing to prevent erosion of the bank. This species is well established in Ireland and is rapidly spreading throughout the country, especially by roadsides and along watercourses.

4.2 Presence of Japanese Knotweed on site

The site was visited on 27th June 2018 to survey for presence of Japanese Knotweed. The entire site was surveyed through walk-over. The northern half of the site comprises rank agricultural fields reverting to scrub. There is no evidence of the presence of Japanese Knotweed within this habitat. The southern half of the site comprises wooded habitat and scrub on steeply sloping ground. The area adjacent to the river has been heavily disturbed in the recent past (likely 10 – 15 years). The ruins of Elliot's Mill also are within this area. There is a significant infestation of Japanese Knotweed along the northern bank of the river Blackwater. The population extends from the buildings at Elliott's Mill westward to the site entrance, and also north of the entrance. The approximate location of the infestation of Japanese Knotweed is indicated in Figure 4. Most of the habitat occurring within this zone (orange hatch) is infested with Japanese Knotweed to a greater or lesser extent and in places, the vegetation is entirely dominated by Japanese Knotweed, in particular, on area of raised disturbed ground immediately adjacent to the river Blackwater. The presence of a heavy infestation of this species at the site, and immediately adjacent to the River Blackwater poses a threat to the general ecology of the area. Of particular note, the presence of such an extensive population of Japanese Knotweed has a significant potential for negative impact on ecology of the River Blackwater and the River Boyne. Photographs indicating the extent of the infestation are illustrated in Figure 5, Figure 6, Figure 7, Figure 8 and Figure 9

Figure 4: Aerial imagery indicating location of population of Japanese Knotweed relative to site boundary

Figure 5: Large population of Japanese Knotweed occurring at entrance to site

Figure 6: Over-grown path leading to Elliot's Mill

Figure 7: Elliot's Mill

Figure 8: Strongly sloping bank with heavy Japanese Knotweed infestation

Figure 9: View of heavy Japanese Knotweed infestation from opposite river bank

5 Proximity to Natura 2000 sites

Of significance, the site is immediately adjacent to the River Blackwater, and a proportion of the site (almost all of which is infested heavily with Japanese Knotweed) is within the River Boyne and River Blackwater SAC (Figure 10). The site is also within the River Boyne and River Blackwater SPA. The presence of this species, which is listed on Part (1) of the Third Schedule of the European Communities (Birds and Natural Habitats) Regulations of 2011, poses a potentially significant threat to the conservation objectives of the qualifying interests of both these Natura 2000 sites. Of note, while the presence of the species poses a significant threat, the eradication of the population also has the potential to pose a significant threat to the conservation objectives of the qualifying interests of both these Natura 2000 sites owing to the extent of the infestation, the occurrence of the population within the Natura 2000 sites, and the nature of the habitat present.

Figure 10: **Aerial image indicating approximate location of Japanese Knotweed population relative to the River Boyne and River Blackwater SAC**

Figure 11: **Aerial image indicating approximate location of Japanese Knotweed population relative to the River Boyne and River Blackwater SPA**

6 Options for Control and Management of Japanese Knotweed at the site

For any invasive alien plan species management, there are basically two options of control:

- Physical removal/control; and/or
- Chemical control.

6.1 Physical control

Japanese Knotweed spreads purely through vegetative, non-sexual means – i.e. this species does not produce viable seeds in Ireland. Japanese Knotweed does, however, regenerate readily and rapidly from even small fragments of plant tissue, and in particular, rhizome. Any attempt to control this species through physical control (such as strimming, pulling up, bull-dozing, etc.) will almost certainly result in the spread of the plant and an increase in the population size.

6.2 Chemical control

For the reasons outlined in 6.1, chemical control of large populations of Japanese Knotweed is the only viable option. Chemical control is typically achieved through the application of systemic herbicides such as glyphosate. There are broadly speaking two methods for chemical control:

- Foliar application; and
- Cut and inject.

6.2.1 Foliar Application

The foliar application of herbicide is the least expensive of the two methods of chemical control, typically applying herbicide through broadcast spraying utilising a knapsack sprayer. In the case of Japanese Knotweed, it would likely be necessary to carry out the treatment several times throughout the growth season, for several years until no regrowth is observed for two consecutive growth seasons (requiring a licence from the Department of Culture, Heritage and the Gaeltacht). This method could potentially take up to 10 years to eradicate a population of the size present at the Elliott's Mill site. Treatment by foliar application at this site is complicated by a number of factors:

- The proximity of the population to a sensitive ecological receptor in the form of the River Blackwater, which is one of the primary components of the River Boyne and River Blackwater SAC/SPA. Broadcast spraying of herbicides in close proximity to such a sensitive water body cannot be recommended as an ecologically viable solution, given the extended time period over which broadcast foliar spraying would be required. Appropriate Assessment of any such

activity would be required, and it would be very difficult to discount any potential negative impacts on the conservation interests of the qualifying interests of the sites involved;

- The substrate in which much of the infestation occurs appears to be comprised largely of an aggregate of rubble and stone mixed with organic material. Drainage of this substrate is very free, indicating that there is a high potential for any sprayed herbicide to run-off into the river;
- Foliar application of herbicide through broadcast spraying is entirely non-selective. It is possible that rare/protected species of flora occur within the habitat being treated. Qualitative and quantitative botanical surveys of the entire area would be required prior to any commencement of treatment; and
- During the treatment period, the entire area would be largely devoid of vegetation, resulting in a very high rate of erosion, possibly resulting in the spread of the target species through release of fragments of rhizome in eroded material, thus defeating the purpose of the eradication program.

6.2.2 Cut and inject

An alternative to the foliar application of herbicide is the "Cut and Inject" method. This methodology is both time-consuming and requires a higher concentration of the active ingredient than is used in foliar applications. As a result the control of large infestations of Japanese Knotweed in difficult terrain such as that present utilising this methodology is more expensive than foliar application. "Cut and Inject" chemical control methodology entails cutting of Japanese Knotweed stems approximately 20-30cms from the base of each cane and the injection of approximately 10ml of herbicide into each cane through the use of a specialist stem injection tool by trained and certified professionals. Regrowth will occur and follow-up treatments will be required until no regrowth is observed. It is estimated that it could take up to 10 years to eradicate the population of Japanese Knotweed occurring at the Elliott's Mill site owing to the ecological sensitivity of the site and the topographical complexity of the site. The site cannot be considered to be free of Japanese Knotweed until two consecutive growth seasons without any observations of Japanese knotweed are recorded.

Of note, cut Japanese Knotweed canes must be disposed of very carefully, as regrowth from the canes can occur (particularly in high-humidity environments such as riparian habitats). Cut canes must not be stored on site and must be disposed of at a licensed landfill site for deep burial via the use of a licensed waste carrier. The landfill site must be notified that the waste material contains Japanese knotweed. Alternatively, through seeking the necessary exemptions to burn, the canes may be burned on site. The burning of the canes on site is the preferable option as this prevents the "Export" of the

problem from the site. Appropriate Assessment of the eradication program must be undertaken and any appropriate licences secured.

6.3 Biannual Monitoring of the site

The site should be subject to a comprehensive monitoring regime during any eradication program, with the site being surveyed for the presence of Japanese Knotweed twice a year, in Late April/Early May and again in September over the duration of the treatment program. Any populations of Japanese Knotweed observed should be recorded and "signposted" for treatment. This biannual monitoring will ensure that any plants regenerating from rhizome will not be missed.

6.4 Biosecurity measures – incoming and outgoing personnel and vehicles

One of the primary sources of the spread of propagules of Japanese Knotweed (aside from contaminated material) is the movement of personnel, equipment and vehicles between sites. All incoming vehicles must be subject to a wheel-wash prior to entering the site, and prior to leaving the site. The discharge from this wheel-wash must not be discharged from site, but allowed percolate to ground within a quarantine zone, in order to avoid the inadvertent spread of any propagules of Japanese Knotweed that may become dislodged during the wheel-wash process. This quarantine area must be subject to inspection during the biannual monitoring.

Of primary importance, no material such as earth, stones, vegetation, etc. can be removed from the site until it has been shown to be completely free of Japanese Knotweed.

7 Recommendations for use of site

The site is in an ecologically sensitive area, providing a "stepping stone" of habitat along an ecological corridor of regional and national importance. Given the nature of the material in the southern half of the site, any development of the area would require a large degree of movement of material off the site. Much of this material is currently contaminated with Japanese Knotweed, and therefore must be disposed of at a licensed landfill site for deep burial via the use of a licensed waste carrier. The landfill site must be notified that the waste material potentially contains propagules of Japanese Knotweed.

Given the ecological importance of the site and the presence of a heavy infestation of Japanese Knotweed within the site, the possibility of linking up the site with Blackwater Park to form a "Looped-Walk" should be investigated. The long-term treatment (over several decades – the population is unlikely to expand if not disturbed) of the infestation of Japanese Knotweed utilising the "Cut and Inject" method in small sections could gradually eradicate the species from the site.

Figure 12: Aerial imagery indicating proximity of site to Blackwater Park

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www.epa.ie – official website of the Environmental Protection Agency.

www.invasivespeciesireland.com – official website of Invasive Species Ireland.

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Assessment of Japanese Knotweed population occurring at a site adjacent to the R147 in Navan, Co Meath and proposed management

Report prepared August 2018 by:

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Executive Summary

Meath Co Council commissioned FERS Ltd to undertake an assessment of a site for the Alien Invasive Plant Species Japanese Knotweed, occurring along the R147 at Navan, Co. Meath. The site contains a long-term carpark and a significant area of WD1 habitat. Within the site is a small area (measuring approximately 0.5 Ha) that appears to be utilised as a storage depot. Within this area, which has been recently disturbed, is a relatively small but well-established population of Japanese Knotweed. The site is immediately adjacent to the River Blackwater and a large proportion of the site occurs within the River Boyne and River Blackwater Special Area of Conservation. The site also overlaps with the River Boyne and River Blackwater Special Protection Area.

Japanese Knotweed is listed on Part (1) of the Third Schedule of the European Communities (Birds and Natural Habitats) Regulations of 2011. This species was observed to be present within the site during a site visit on the 27th of June 2018. The population is within the boundary of the River Boyne and River Blackwater SAC.

The primary purposes of the survey and this report are:

- *To determine the extent of the infestation of the site with Japanese Knotweed; and*
- *To present a number of solutions for management of Japanese Knotweed at the site.*

The Japanese Knotweed infestation at the site is relatively minor, and it would be feasible to eradicate the population from the site at minimal cost utilizing the "Cut and Inject" method of herbicide application. It should be noted that the eradication of the population will likely take 3 – 5 years.

There is a caveat, as there has been significant disturbance of the habitat immediately adjacent to the population of Japanese Knotweed. It is possible that this habitat contains fragments of rhizome from which new populations of Japanese Knotweed could regenerate.

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Table of Contents

1 Introduction

1.1 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, has a 1st class honours degree in Environmental Biology (UCD), a Ph.D. in Ecology (UCD), a Diploma in EIA and SEA management (UCD) and a M.Sc. in GIS (University of Ulster, Coleraine). He 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 Ltd. has a 1st class honours degree in Botany (UCD), and a Ph.D. in Botany (UCD). She has in excess of 10 years of experience in carrying out ecological surveys on both an academic and a professional basis. Ciaran Byrne, senior ecologist with FERS, holds a B.Sc. (Hons) in Environmental Management (DIT) and a M.Sc. in Applied Science and Ecological Assessment. He has in excess of 5 years of experience in carrying out ecological surveys on both an academic and a professional basis.

FERS client list includes National Parks and Wildlife Service, An Bord Pleanala, Teagasc, County Councils, the Heritage Council, University College Dublin, the Environmental Protection Agency, Inland Waterways Association of Ireland, the Department of Agriculture, and the Office of Public Works. FERS has a large body of experience working with Alien Invasive Plant Species, including the preparation of Alien Invasive Species Management and Control Plans.

1.2 Description of site

The site in question is located west of the N51, between the river Blackwater and the R147. The site includes a long-term car park, and an area of semi-mature woodland of the type WD1 dominated by Sycamore (*Acer pseudoplatanus*) and Ash (*Fraxinus excelsior*) with Willow species (*Salix spp.*) closer to the river and a ground layer dominated by Ivy (*Hedera helix*). A small section of the site (approximately 0.5 Ha) appears to be utilised as a storage compound for various building materials such as stone. Much of this site is disturbed or reverting to scrub. Within the area of scrub occurs a relatively small but established population of Japanese Knotweed (*Fallopia japonica*). Maps outlining the location of the site are illustrated in Figure 1, Figure 2 and Figure 3. A map indicating the location of the storage compound and illustrating the approximate location of the Japanese Knotweed is shown in Figure 4. Photographs illustrating the habitats present within the storage compound in the vicinity of the Japanese Knotweed population are pictured in Figure 5, Figure 6, Figure 7, Figure 8 and Figure 9.

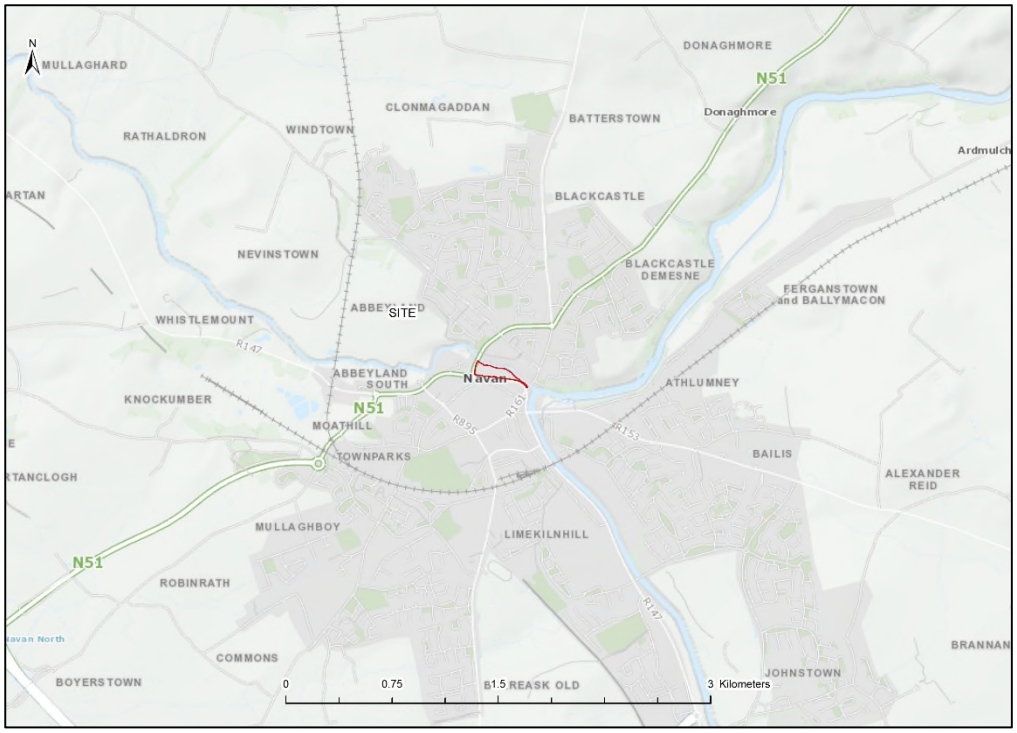

Figure 1: Approximate location of site (Scale 1:25,000)

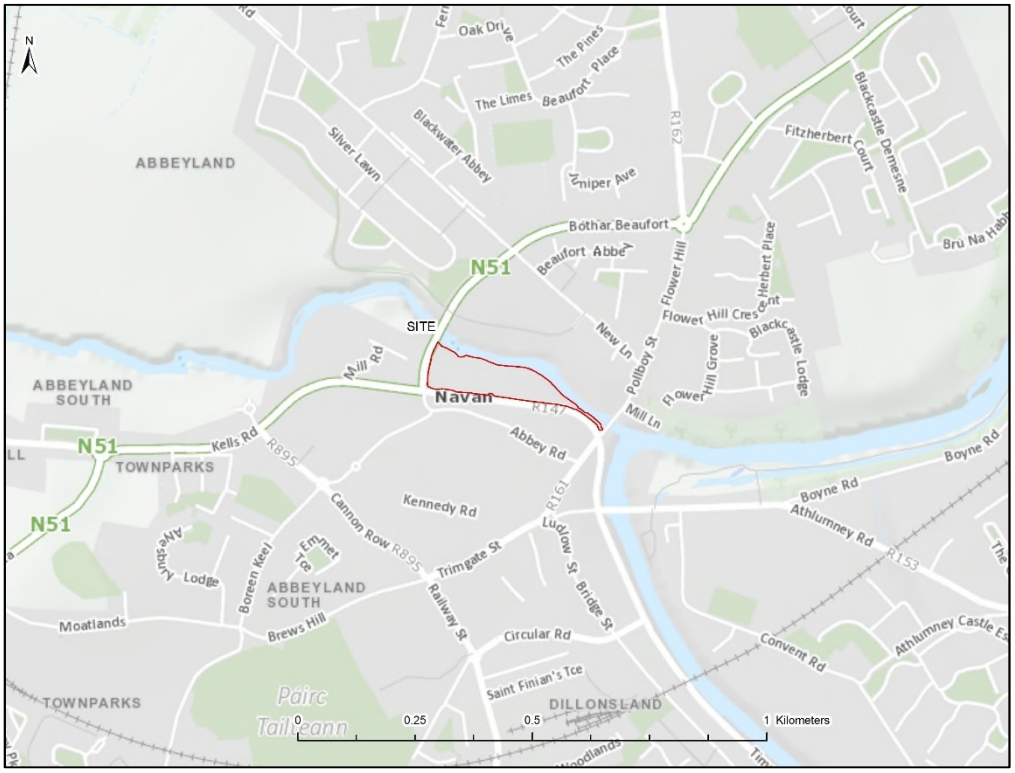

Figure 2: Approximate location of site (Scale 1:8,000)

Figure 3: Aerial image indicating location of site (Scale 1:2,500)

Figure 4: Map outlining location of storage depot and approximate location of Japanese Knotweed population (1:2500)

Figure 5: Recently disturbed habitat at compound

Figure 6: Recently disturbed habitat at compound

Figure 7: Recently disturbed habitat at compound

Figure 8: Japanese Knotweed population occurring adjacent to recently disturbed area

Figure 9: Close-up photograph of Japanese Knotweed on site

1.3 Background – Alien Invasive Plant Species

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.

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The Habitats Directive (Council Directive 92/43/EEC on the Conservation of Natural Habitats and of Wild Flora and Fauna) is the main legislative instrument for the protection and conservation of biodiversity within the European Union and lists certain habitats and species that must be protected within wildlife conservation areas, considered to be important at a European as well as at a national level. A "Special Conservation Area" or SAC is a designation under the Habitats Directive. The Habitats Directive sets out the protocol for the protection and management of SACs.

2.2.2 Birds Directive

The Birds Directive (Council Directive 2009/147/EC on the Conservation of Wild Birds) provides for a network of sites in all member states to protect birds at their breeding, feeding, roosting and wintering areas. This directive identifies species that are rare, in danger of extinction or vulnerable to changes in habitat and which need protection (Annex I species). A Special Protection Area or SPA, is a designation under The Birds Directive.

2.2.3 European Communities (Birds and Natural Habitats) Regulations 2011

With the introduction of the Birds Directive and the Habitats Directive, came the obligation to establish the Natura 2000 network. In 1997, the Habitats Directive was transposed into Irish national law. The relevant Regulations, the European Communities (Natural Habitats) Regulations 1997, SI 94/1997 represent a fundamental shift in nature conservation policy and law. The European Communities (Birds and Natural Habitats) Regulations 2011 consolidate the European Communities (Natural Habitats) Regulations 1997 to 2005 and the European Communities (Birds and Natural Habitats)(Control of Recreational Activities) Regulations 2010, as well as addressing transposition failures identified in judgments of the Court of Justice of the European Union (CJEU).

3 Species of plant listed in Part (1) of the Third Schedule

There are more than 30 species listed in Part (1) of the Third Schedule of the European Communities (Birds and Natural Habitats) Regulations of 2011, which states (49) "…*Save in accordance with a licence granted under paragraph (7), any person who plants, disperses, allows or causes to disperse, spreads or otherwise causes to grow in any place specified in relation to such plant in the third column of Part 1 of the Third Schedule, any plant which is included in Part 1 of the Third Schedule, shall be guilty of an offence…*" The species listed on Part (1) the Third Schedule are listed in Table 1.

Table 1: List of plant species appearing on the Third Schedule

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	*Eoldea (all species)*	*Yes*
Wireweed	*Sargassum muticum*	*Marine/transition*

Most of the species listed on Part (1) of the Third Schedule are particularly problematic within riparian habitats, with constant disturbance and the presence of a medium for spread. In the case of developments adjacent to water-courses, therefore, there is a particular threat posed by many of these plants. In the event of the presence of a Source-Pathway-Receptor linkage between a proposed development and a Natura 2000 site, in particular a riparian site, a very significant threat is posed to the ecological integrity of that site in the event of the spread of an Alien Invasive Plant Species to that site.

4 Proximate Natura 2000 sites

A large proportion of the site occurs within the River Boyne and River Blackwater SAC (see Figure 10). The site is also adjacent/borders with the River Boyne and River Blackwater SPA (see Figure 11). The population of Japanese Knotweed (indicated by red star) occurs within the SAC boundary.

Figure 10: Aerial image indicating site/Knotweed relative to the River Boyne and River Blackwater SAC (green hatch)

Figure 11: Aerial image indicating site/knotweed relative to the River Boyne and River Blackwater SPA (pink hatch)

5 Japanese Knotweed - description

Japanese Knotweed is a rhizomatous perennial, capable of reaching 2m in height. This plant spreads exclusively by vegetative means, spreading very aggressively under disturbed conditions. The plant is capable of forming extensive monoculture stands. There is a negative impact on ecosystem function and biodiversity through a number of mechanisms – primarily through the shading-out of native plants due to the rapidity with which large stands of the plant can form. In addition, this plant has a deleterious effect on the banks of waterways owing to the fact that during the winter, when *F. japonica* dies back, there is little or no vegetation growing underneath, and hence nothing to prevent erosion of the bank. This species is well established in Ireland and is rapidly spreading throughout the country, especially by roadsides and along watercourses. The presence of a population of this species at the site immediately adjacent to the River Blackwater poses a threat to the general ecology of the area, and in particular, has a significant potential for negative impact on the conservation interests of the qualifying interests of the River Boyne and River Blackwater SAC and the River Boyne and River Blackwater SPA. Of concern, the habitat immediately adjacent to the Japanese Knotweed population has been recently disturbed, and there is a possibility that this area of disturbed habitat contained Japanese Knotweed.

Figure 12: Japanese Knotweed occurring on site within 50 metres of the River Blackwater

6 Options for Control and Management of Japanese Knotweed at the site

For any invasive alien plan species management, there are basically two options of control:

- Physical removal/control; and/or
- Chemical control.

6.1 Physical control

Japanese Knotweed spreads purely through vegetative, non-sexual means – i.e. this species does not produce viable seeds in Ireland. Japanese Knotweed does, however, regenerate readily and rapidly from even fragments of plant tissue, and in particular, rhizome. Any attempt to control this species through physical control (such as strimming, pulling up, bull-dozing, etc.) will almost certainly result in the spread of the plant and an increase in the population size.

6.2 Chemical control

For the reasons outlined in 6.1, chemical control of large populations of Japanese Knotweed is the only viable option. Chemical control is typically achieved through the application of systemic herbicides such as glyphosate. There are broadly speaking two methods for chemical control:

- Foliar application; and
- Cut and inject.

6.2.1 Foliar Application

The foliar application of herbicide is the least expensive of the two methods of chemical control, typically applying herbicide through broadcast spraying utilising a knapsack sprayer. In the case of Japanese Knotweed, it would likely be necessary to carry out the treatment several times throughout the growth season, for several years until no regrowth is observed for two consecutive growth seasons (requiring a licence from the Department of Culture, Heritage and the Gaeltacht). This method would likely take between 3 and 5 years to eradicate completely the population of Japanese Knotweed present at the site. Of note, foliar application of herbicide through broadcast spraying is entirely non-selective. It is possible that rare/protected species of flora occur within the habitat being treated. Qualitative and quantitative botanical surveys of the entire area would be required prior to any commencement of treatment. In addition, the recently disturbed habitat **must be monitored** over the coming years for any signs of Japanese Knotweed. It is possible that prior to disturbance Japanese Knotweed occurred in this area and that fragments of rhizome are present within the substrate.

6.2.2 Cut and inject

The preferred methodology at this site, given the small population size present is the “Cut and Inject” method. Given the small population size, the “Cut and Inject” chemical control methodology is financially feasible at this site. The methodology entails cutting of all Japanese Knotweed stems approximately 20- 30cms from the base of each cane and the injection of approximately 10ml of herbicide into each cane through the use of a specialist stem injection tool by trained and certified professionals. Regrowth will occur and follow-up treatments will be required until no regrowth is observed. It is estimated that for a population of the size present, it would take between three and five years to completely eradicate the population from the site.

Of note, cut Japanese knotweed canes must be disposed of correctly, as regrowth from the canes can occur. Cut canes must not be stored on site and must be disposed of at a licensed landfill site for deep burial via the use of a licensed waste carrier. The landfill site must be notified that the waste material contains Japanese knotweed. Alternatively, through seeking the necessary exemptions to burn, the canes may be burned on site. The burning of the canes on site is the preferable option as this prevents the “Export” of the problem from the site. Appropriate Assessment of the eradication program must be undertaken and appropriate licences secured.

It is recommended that treatment be commenced in September, as the application of glyphosate-based products to control populations of Japanese Knotweed are most effective when applied in the early Autumn (Mid to Late Sept). The recently disturbed habitat within the storage compound **must be monitored** over the coming years for any signs of the presence of Japanese Knotweed. It is possible that prior to disturbance Japanese Knotweed occurred in this area and that fragments of rhizome are present within the substrate.

6.3 Biannual Monitoring of the site

The site should be subject to a comprehensive monitoring program, with the site being surveyed for the presence of Japanese Knotweed twice a year, in Late April/Early May and again in September over the duration of the treatment program. Any populations of Japanese Knotweed observed should be recorded and “signposted” for treatment. This biannual monitoring will ensure that any plants regenerating from rhizome will not be missed. The site cannot be considered to be free from Japanese Knotweed infestation until two consecutive growth seasons without any presence of Japanese Knotweed are recorded during monitoring.

6.4 Biosecurity measures – incoming and outgoing personnel and vehicles

One of the primary sources of the spread of propagules of Alien Invasive Plant Species (aside from contaminated material) is the personnel and vehicles moving between sites. All incoming vehicles must be subject to a wheel-wash prior to entering the site, and prior to leaving the site. The discharge from this wheel-wash must not be discharged from site, but allowed percolate to ground within a quarantine zone, in order to avoid the inadvertent spread of any propagules of Japanese Knotweed that may become dislodged during the wheel-wash process. This quarantine area must be subject to inspection during the biannual monitoring.

Of primary importance, no material such as earth, stones, vegetation, etc. can be removed from the site until it has been shown to be free of Japanese Knotweed.

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www.npws.ie – website of the National Parks and Wildlife Service, source of information for data regarding Natura 2000 sites.

www.europa.eu – official website of the European Union, source of information on EU Directives.

www.epa.ie – official website of the Environmental Protection Agency.

www.invasivespeciesireland.com – official website of Invasive Species Ireland

NATURA IMPACT STATEMENT IN SUPPORT OF APPROPRIATE ASSESSMENT OF THE URBAN DESIGN PLAN FOR FLOWERHILL AND ABBEYLANDS, NAVAN, CO MEATH

AUGUST 2021

fers

August 2021 by:

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Table of Contents

EXECUTIVE SUMMARY

In January 2019 Meath County Council commissioned the preparation of an Urban Design Plan for Lands at Flowerhill and Abbeylands, Navan. In recent times population decline, vacancy, dereliction and antisocial behaviour have led to the undesirability of Flowerhill as a place to live and invest in.

The four primary aims and objectives of the Urban Design Plan are:

1) *To restore and celebrate local heritage;*
2) *To bring together a vibrant community;*
3) *To reconnect the Flowerhill and Abbeylands areas to the town of Navan and the river Blackwater; and*
4) *To create new opportunities.*

Five projects have been created for the overall plan area:

1) *Flowerhill – the street;*
2) *Abbeylands- a new urban quarter;*
3) *Blackwater – the river park;*
4) *Rebuilding Flowerhill; and*
5) *Our Flowerhill, Our Community*

The area of the Urban Design Plan for Flowerhill and Abbeylands is situated in an ecologically sensitive location, with the River Blackwater, one of the primary components of the River Boyne and River Boyne Special Area of Conservation and the River Boyne and River Blackwater Special Protection Area passing through area. As such, Appropriate Assessment screening of any plan/project in this sensitive location is required. In May of 2021, FERS Ltd was commissioned by Meath Co Council to undertake an Appropriate Assessment screening of the Urban Design Plan for Flowerhill and Abbeylands. In order for Appropriate Assessment (AA) to comply with the criteria set out in the Habitats Directive and Part XAB of the Planning and Development Act 2000, an AA undertaken by the Competent Authority must include an examination, analysis, evaluation, findings, conclusions, and a final determination.

Screening having identified significant potential impacts, Phase II Appropriate Assessment was undertaken, and a Natura Impact Statement prepared. Following an examination, analysis, and evaluation of the relevant information, and applying the precautionary principle, it is considered that there would be no adverse impact of the proposed Urban Design Plan (assuming the implementation of mitigation measures) on the Qualifying Interests, nor the attainment of specific conservation objectives, either alone or in-combination with other plans or projects on the Natura 2000 sites described herein.

1 Introduction

1.1 FERS Ltd. 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 10 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 5 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. FERS Ltd. has prepared in excess of 300 Appropriate Assessment Screenings/Natura Impact Statements for a wide range of plans and projects.

1.2 The aim of this report

This report has been prepared in compliance with Appropriate Assessment of Plans and Projects in Ireland – Guidance for Planning Authorities (DoEHLG 2009, February 2010) and the European Communities (Birds and Natural Habitats) Regulations 2011 (DoEHLG 2011) in support of the Appropriate Assessment of the Urban Design Plan for lands occurring at Flowerhill and Abbeylands, Navan, Co Meath. This report provides the information required in order to establish whether or not the proposed development is likely to have a significant ecological impact on any Natura 2000 sites,

in the context of their conservation objectives and specifically on the habitats and species for which the sites have been designated.

This report has similarly been prepared with regard to relevant rulings by the Court of Justice of the European Union (CJEU), the High Court, and the Supreme Court including but not limited to:

- [2013] C-258/11 Peter Sweetman and Others v An Bord Pleanála. The CJEU ruled that Article 6 (3) of Council Directive 92/43 / EEC of 21 May 1992 on the conservation of natural habitats and of wild fauna and flora must be interpreted as meaning that a project not directly linked to it is not immediately necessary for the management of a site to prejudice the integrity of that site if it is likely to prevent the preservation of the constituent characteristics of the site concerned in relation to the presence of a natural priority habitat whose purpose is to maintain gave the reason for registering that site in the list of sites of Community importance within the meaning of that directive. For this verification, the precautionary principle must be applied;
- [2018] C – 164/17 Edel Grace and Peter Sweetman v An Bord Pleanála. The CJEU ruled that Article 6 of Council Directive 92/43/EEC of 21 May 1992 on the conservation of natural habitats and of wild fauna and flora must be interpreted as meaning that, where it is intended to carry out a project on a site designated for the protection and conservation of certain species, of which the area suitable for providing for the needs of a protected species fluctuates over time, and the temporary or permanent effect of that project will be that some parts of the site will no longer be able to provide a suitable habitat for the species in question, the fact that the project includes measures to ensure that, after an appropriate assessment of the implications of the project has been carried out and throughout the lifetime of the project, the part of the site that is in fact likely to provide a suitable habitat will not be reduced and indeed may be enhanced may not be taken into account for the purpose of the assessment that must be carried out in accordance with Article 6(3) of the directive to ensure that the project in question will not adversely affect the integrity of the site concerned; that fact falls to be considered, if need be, under Article 6(4) of the directive;
- [2018] C-323/17 People Over Wind and Sweetman v Coillte Teoranta - The (CJEU) ruled that Article 6(3) of Council Directive 92/43/EEC of 21 May 1992 on the conservation of natural habitats and of wild fauna and flora must be interpreted as meaning that, in order to determine whether it is necessary to carry out, subsequently, an appropriate assessment of the implications, for a site concerned, of a plan or project, it is not appropriate, at the

screening stage, to take account of the measures intended to avoid or reduce the harmful effects of the plan or project on that site;

- [2018] C-461/17 Holohan v An Bord Pleanála – The CJEU ruled that:

1. Article 6(3) of Council Directive 92/43/EEC of 21 May 1992 on the conservation of natural habitats and of wild fauna and flora must be interpreted as meaning that an 'appropriate assessment' must, on the one hand, catalogue the entirety of habitat types and species for which a site is protected, and, on the other, identify and examine both the implications of the proposed project for the species present on that site, and for which that site has not been listed, and the implications for habitat types and species to be found outside the boundaries of that site, provided that those implications are liable to affect the conservation objectives of the site.

2. Article 6(3) of Directive 92/43 must be interpreted as meaning that the competent authority is permitted to grant to a plan or project consent which leaves the developer free to determine subsequently certain parameters relating to the construction phase, such as the location of the construction compound and haul routes, only if that authority is certain that the development consent granted establishes conditions that are strict enough to guarantee that those parameters will not adversely affect the integrity of the site.

3. Article 6(3) of Directive 92/43 must be interpreted as meaning that, where the competent authority rejects the findings in a scientific expert opinion recommending that additional information be obtained, the 'appropriate assessment' must include an explicit and detailed statement of reasons capable of dispelling all reasonable scientific doubt concerning the effects of the work envisaged on the site concerned.

4. Article 5(1) and (3) of, and Annex IV to, Directive 2011/92/EU of the European Parliament and of the Council of 13 December 2011 on the assessment of the effects of certain public and private projects on the environment, must be interpreted as meaning that the developer is obliged to supply information that expressly addresses the significant effects of its project on all species identified in the statement that is supplied pursuant to those provisions.

5. Article 5(3)(d) of Directive 2011/92 must be interpreted as meaning that the developer must supply information in relation to the environmental impact of both the chosen option and of all the main alternatives studied by the developer, together with the reasons for his choice, taking into account at least the environmental effects, even if such an alternative was rejected at an early stage.

- [2018] IESC 31 Connelly v An Bord Pleanála – Appropriate Assessment must contain complete, precise, and definitive findings;
- [2019] IEHC 84 Kelly v An Bord Pleanála - The Irish High Court concluded that SUDS form part of the development and are not mitigation measures which a competent authority cannot consider at the screening for AA stage.

Furthermore, there have been a number of recent Judicial Reviews that are pertinent as regards this report (e.g. [2020] No. 238 J.R.).

1.3 An outline of the Appropriate Assessment process

The "Habitats Directive" (Council Directive 92/43/EEC on the Conservation of Natural Habitats and of Wild Flora and Fauna) is the main legislative instrument for the protection and conservation of biodiversity within the European Union and lists certain habitats and species that must be protected within wildlife conservation areas, considered to be important at a European as well as at a national level. A "Special Conservation Area" or SAC is a designation under the Habitats Directive.

The "Birds Directive" (Council Directive 2009/147/EC on the Conservation of Wild Birds) provides for a network of sites in all member states to protect birds at their breeding, feeding, roosting, and wintering areas. This directive identifies species that are rare, in danger of extinction or vulnerable to changes in habitat and which need protection. A "Special Protection Area" or SPA, is a designation under The Birds Directive.

Special Areas of Conservation and Special Protection Areas form a pan-European network of protected sites known as Natura 2000 sites.

The Habitats Directive sets out the protocol for the protection and management of SACs. The Directive sets out key elements of the system of protection including the requirement for Appropriate Assessment of plans and projects. The requirements for an Appropriate Assessment are set out in the EU Habitats Directive. Articles 6(3) and 6(4) of the Directive respectively, state:

> "*…Any plan or project not directly connected with or necessary to the management of the site but likely to have a significant effect thereon, either individually or in combination with other plans or projects, shall be subject to appropriate assessment of its implications for the site in view of the site's conservation objectives. In the light of the conclusions of the assessment of the implications for the site and subject to the provisions of paragraph 4, the competent national authorities shall agree to the plan or project only after having ascertained that it will not adversely affect the integrity of the site concerned and, if appropriate, after having obtained the opinion of the general public….*"
>
> "*…If, in spite of a negative assessment of the implications for the site and in the absence of alternative solutions, a plan or project must nevertheless be carried out for imperative reasons of over-riding public interest, including those of social or economic nature, the Member State shall take all compensatory measures necessary to ensure that the overall coherence of Natura 2000 is protected. It shall inform the Commission of the compensatory measures adopted….*"

1.4 Methodology for Appropriate Assessment

A number of guidance documents on the appropriate assessment process have been consulted during the preparation of this document. These are:

- Managing Natura 2000 Sites: The provisions of Article 6 of the 'Habitats' Directive 92/43/EEC (2000);
- Assessment of plans and projects significantly affecting Natura 2000 sites. Methodological guidance on the provisions of Article 6(3) and (4) of the Habitats Directive 92/43/EEC (Nov. 2001 – published 2002);
- EU Guidance document on Article 6(4) of the 'Habitats Directive' 92/43/EEC (2007);
- Appropriate Assessment of Plans and Projects in Ireland - Guidance for Planning Authorities (DoEHLG 2009, Revised February 2010);
- European Communities (Birds and Natural Habitats) Regulations 2011 (DoEHLG 2011); and
- Commission notice "Managing Natura 2000 sites The provisions of Article 6 of the 'Habitats' Directive 92/43/EEC, Brussels, 21.11.2018 C (2018) 7621 final.

The assessment requirements of Article 6 are generally dealt with in a stage-by-stage approach. The stages as outlined in "Appropriate Assessment of Plans and Projects in Ireland - Guidance for Planning Authorities" are:

1.4.1 Stage (1) Appropriate Assessment (Habitats Directive) Screening

This initial process identifies the likely impacts of a proposed project or plan upon a Natura 2000 site, either alone, or in combination with other projects or plans and considers whether these impacts are likely to be significant. A recent judgement in the ECJ (C323/17) that has large implications for appropriate assessment screening in Ireland has found that:

"…Article 6(3) of Council Directive 92/43/EEC of 21 May 1992 on the conservation of natural habitats and of wild fauna and flora must be interpreted as meaning that, in order to determine whether it is necessary to carry out, subsequently, an appropriate assessment of the implications, for a site concerned, of a plan or project, it is not appropriate, at the screening stage, to take account of the measures intended to avoid or reduce the harmful effects of the plan or project on that site…"

1.4.2 Stage (2) Preparation of Natura Impact Statement

The consideration of the impact of the project or plan on the integrity of the Natura 2000 Site, either alone or in combination with other projects or plans to the sites structure and function and its conservation objectives. Additionally, where there are adverse impacts, an assessment of the potential mitigation of those impacts.

1.4.3 Stage (3) Assessment of Alternative Solutions

The process which examines alternative ways of achieving the objectives of the project or plan that avoid adverse impacts on the integrity of the Natura 2000 site.

1.4.4 Stage (4) Assessment where Adverse Impacts Remain

An assessment of compensatory measures where, in the light of an assessment of Imperative Reasons of Overriding Public Interest (IROPI), it is deemed that the project or plan should proceed.

At each stage, there is a determination as to whether a further stage in the Appropriate Assessment process is required. If, for example, the conclusions of the Screening stage indicate that there will be no significant impacts on the Natura 2000 site, there is no requirement to proceed further. Appropriate Assessment stages 1 and 2 deal with the main requirements for assessment under Article 6.3. Stage 3 may be part of Article 6(3) or a necessary precursor for Stage 4. This report is comprised of the ecological impact assessment and testing required under the provisions of Article 6(3) by means of the first stage of Appropriate Assessment, the screening process (as set out in the EU Guidance documents).

EU guidance states:

"…This stage examines the likely effects of a project or plan, either alone or in combination with other projects or plans, upon a Natura 2000 site and considers whether it can be objectively concluded that these effects will not be significant...".

This report has been undertaken in accordance with the European Commission's Guidance on Appropriate Assessment (European Commission, 2001) which comprises the following:

1. Description of the Plan.
2. Identification of Natura 2000 sites potentially affected by the Plan.
3. Identification and description of individual and cumulative impacts likely to result from the Plan.
4. Assessment of the significance of the impacts identified on the conservation objectives of the site(s).

5. Exclusion of sites where it can be objectively concluded that there will be no significant impacts on conservation objectives.

1.5 Consultations

1.5.1 NPWS

The primary body consulted with regard to matters involving Natura 2000 sites 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.
- To manage, maintain and develop State-owned National Parks and Nature Reserves.

Information pertaining to Natura 2000 sites within the Republic of Ireland is typically held by NPWS and is publicly accessible through their on-line database at www.npws.ie . Consultations carried out involved querying the NPWS database for information pertaining to Natura 2000 sites within 15 km of the proposed development.

1.5.2 NBDC Database

The National Biodiversity Database Centre database was queried for records of species of conservation concern present within the immediate vicinity of the proposed development.

1.5.3 Other relevant data-sources

Other relevant data-sources were queried as necessary

2 Screening

Following the guidelines set out by NPWS (2009), Appropriate Assessment Screening (Phase I Appropriate Assessment) is the process that addresses and records the reasoning and conclusions in relation to the first two tests of Article 6(3) of the EU Habitats Directive. According to the guidelines as laid by NPWS (2009), Appropriate Assessment Screening is the process that addresses and records the reasoning and conclusions in relation to the first two tests of Article 6(3):

(1) Is the plan or project directly connected to or necessary for the management of the site?

(2) Is the plan or project, alone or in combination with other such plans or projects likely to have significant negative effects on a Natura 2000 site(s) in view of the conservation objectives of that site(s)?

The proposed Urban Design Plan (UDP) does not comply with the first screening test (i.e., the proposed plan is not directly connected to, or necessary for the management of any Natura 2000 site). The screening exercise will therefore inform the Appropriate Assessment process in determining whether the UDP, alone or in combination with other plans and projects, has any potential to have significant effects on the Natura 2000 sites within the study area. If the effects are deemed to be significant, potentially significant, or uncertain, or it the screening process becomes overly complicated, then applying the Precautionary Principle and in accordance with Article 6(3) of the Habitats Directive, a Stage 2 Appropriate Assessment is required stage, i.e., "*The consideration of the impact of the project or plan on the integrity of the Natura 2000 Site, either alone or in combination with other projects or plans to the sites structure and function and its conservation objectives. Additionally, where there are adverse impacts, an assessment of the potential mitigation of those impacts."*

2.1 Description of proposed development

The Urban Design Plan for Flowerhill and Abbeylands entailed developing a shared vision for the future development/identify of these areas. Four key aims and objectives were developed:

1) **Restoring and celebrating our heritage** - There is a rich and plentiful supply of social and built heritage in Flowerhill and Abbeylands. These precious assets are currently overlooked and require further interpretation and conservation to get maximum enjoyment and value;
2) **Bringing together a vibrant community** - It is the people that give the area its unique character and depth of personality. Harnessing, growing and sustaining the strong community spirit of Flowerhill and Abbeylands will be one of the driving forces behind the fulfilment of the area's potential;
3) **Reconnecting with the river and town The River Blackwater** - its green connections and the walkability of the area are major assets which are currently overlooked, providing enormous potential and opportunities to reconnect the area; and
4) **Creating new opportunities** - To return Flowerhill to its full potential, both short and long term, social and physical projects are needed to create community growth, civic pride and reverse current impressions of the area.

The extent of the Urban Design Plan (UDP) area for Flowerhill and Abbeylands is indicated in Figure 1, Figure 2 and Figure 3. A map indicating the location of the UDP area relative to surrounding habitats is presented in Figure 4. An outline of the FlowerHill and Abbeylands Concept MasterPlan is presented in Figure 5.

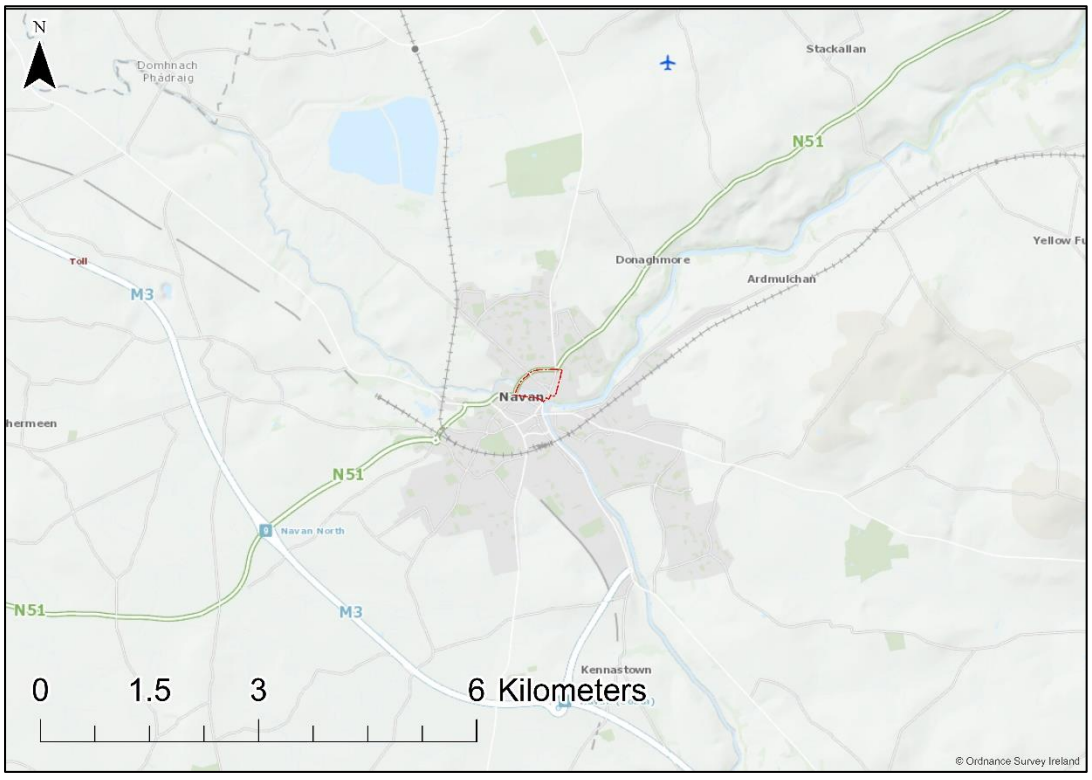

Figure 1: Location of UDP area (1:50,000)

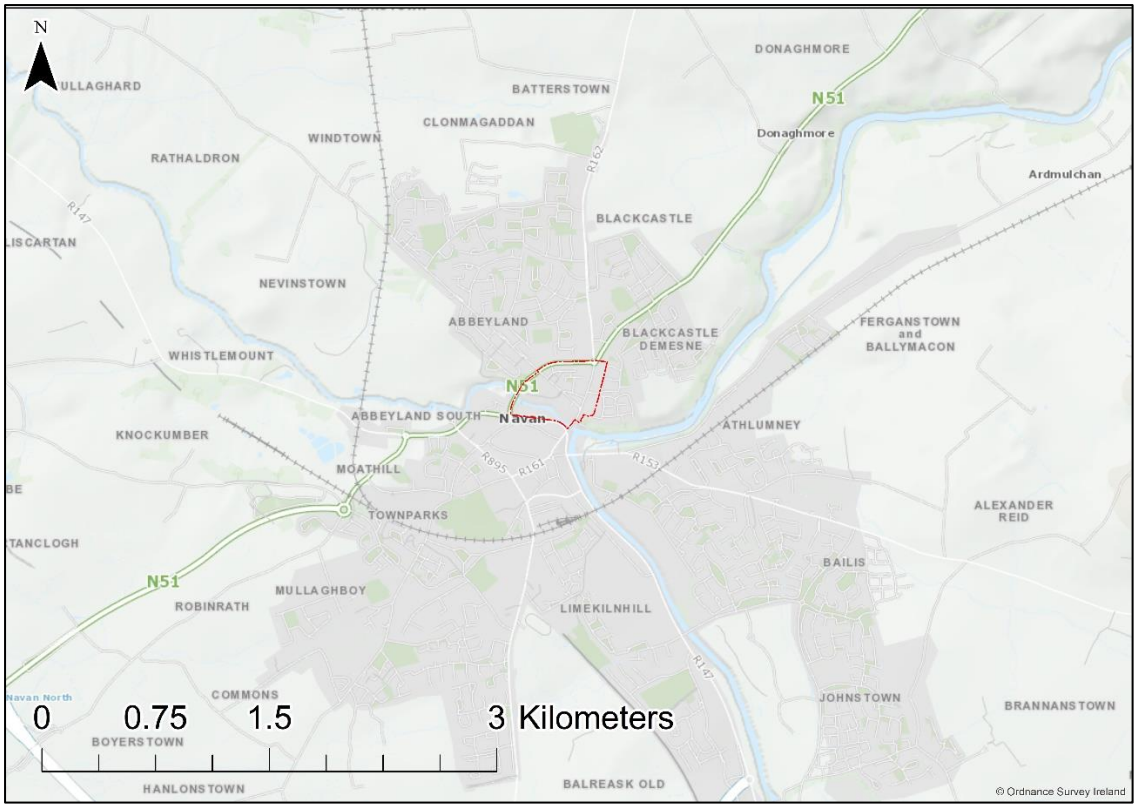

Figure 2: Location of UDP area (1:25,000)

Figure 3: Location of UDP area (1:8,000)

Figure 4: Location of UDP area relative to *environs* (1:3,000)

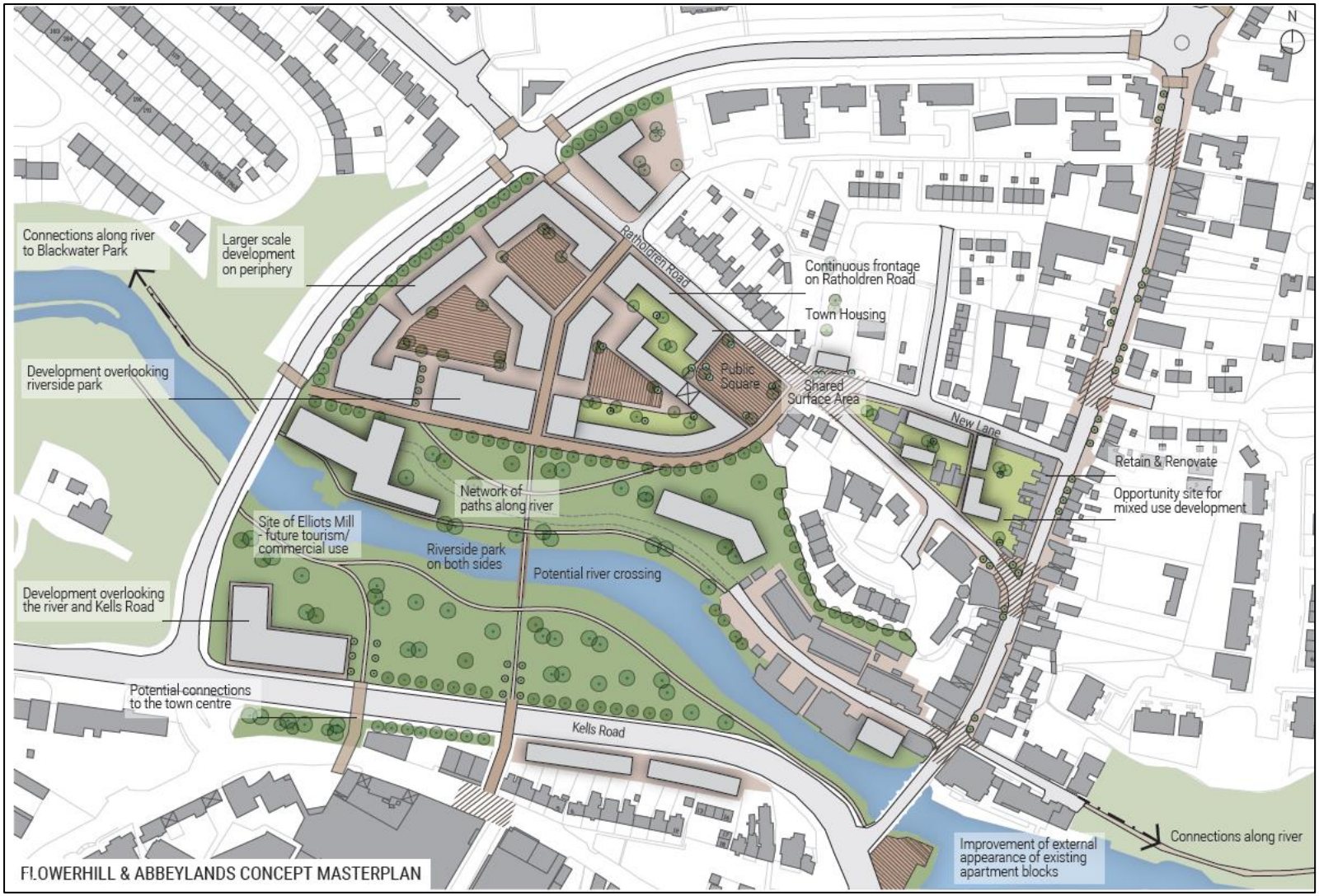

Figure 5: Excerpt from UDP illustrating Flowerhill and Abbeylands Concept Masterplan

2.2 Description of existing conditions on site

A site visit was carried out on June 26th, 2021, by Dr Patrick Moran. Images of Flowerhill, Abbeylands, and *environs* illustrating some of the key areas to which the Urban Design Plan are applicable are provided in Figure 6, Figure 7, Figure 8, Figure 9, Figure 10, Figure 12, Figure 13, Figure 14, Figure 15, Figure 16, Figure 17, Figure 18, Figure 19, Figure 20 and Figure 21. Historical mapping (2nd Edition OSI) is overlain on the aerial imagery illustrating the relative lack of major change over the last 100 years to the layout of the town in Figure 22.

Several species of conservation concern are known to occur within the area of the Urban Design Plan, including Otter and Kingfisher (Qualifying Interests of the River Boyne and River Blackwater SAC and SPA respectively). The Rivers Blackwater and Boyne are internationally important ecological corridors and are of high National importance for numerous species not designated as Qualifying Interests, but key to the ecological integrity of the Natura 2000 sites. Large numbers of bats forage along the River corridor and associated habitat and there are numerous optimal roost sites present within the area of the Urban Design Plan.

Figure 6: Confluence of River Blackwater and River Boyne, just outside of the UDP boundary

Figure 7: Flowerhill north

Figure 8: Flowerhill South

Figure 9: Abbeylands "Triangle"

Figure 10: Ratholdren Road

Figure 11: Field to the south of Ratholdren Road

Figure 12: Elliot's Mill – optimal conditions for roosting bats and nesting birds

Figure 13: Mill wheel

Figure 14: Conditions at Elliot's Mill are optimal for roosting bats of numerous species

Figure 15: Bridge over the Blackwater and Carpark

Figure 16: Wooded area south of Blackwater

Figure 17: River Blackwater passing through UDP

Figure 18: River Blackwater as it passes through the UDP

Figure 19: Apartments at Southern end of Flowerhill

Figure 20: Japanese Knotweed is prevalent on the Northern river-bank within the UDP

Figure 21: Example of derelict buildings on Flowerhill

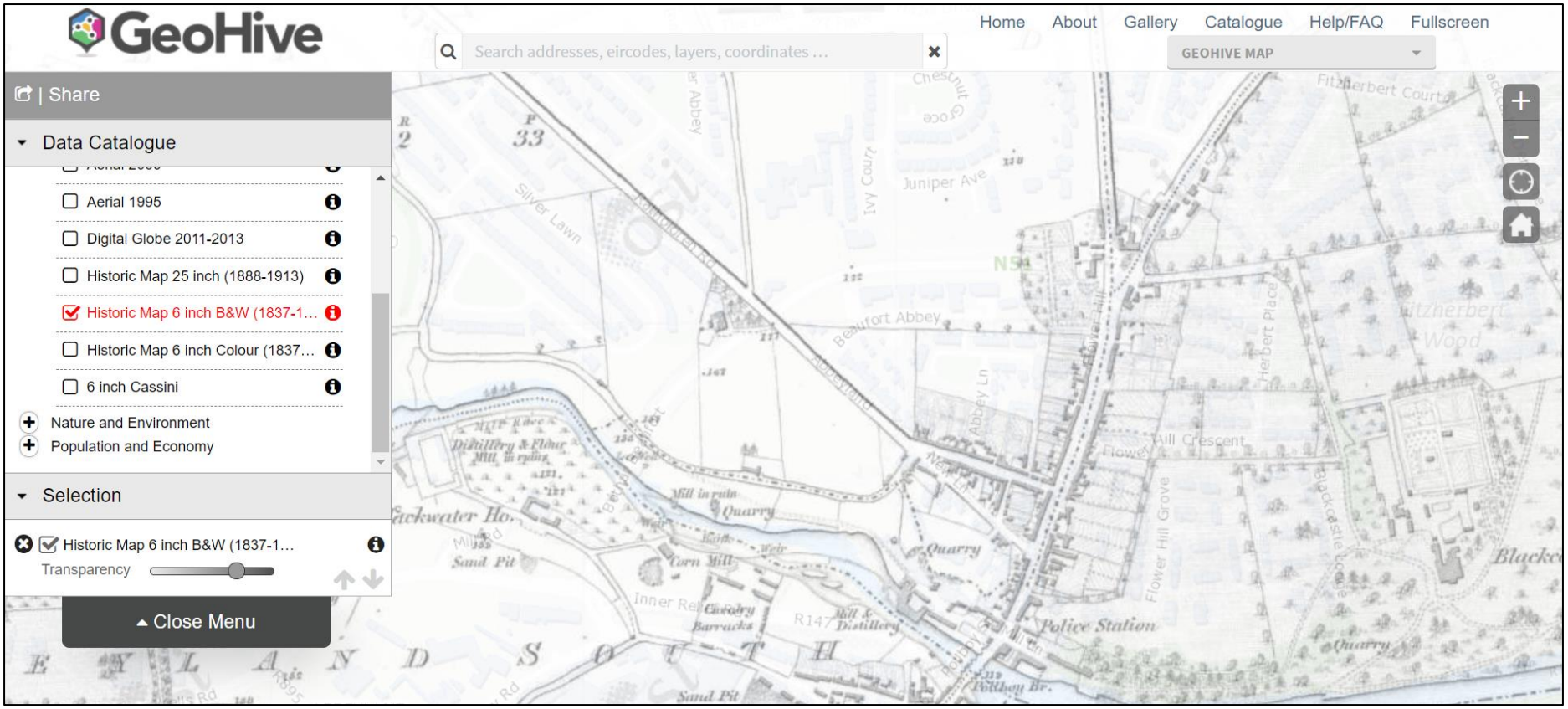

Figure 22: **1st Edition OSI mapping overlain on modern map indicating the historic and more recent elements the UDP area**

2.3 Description of scope

The geographical scope of the assessment is to determine if the proposed works/development has the potential to have any significant negative impact on the Natura 2000 sites occurring within 15 km of the proposed development.

The NBDC database was accessed on 28/06/21 to query records occurring within the vicinity of the Urban Design Plan (2 km square, N86U see Figure 23). The species of conservation concern as recorded within this 2 km square are illustrated in Table 1.

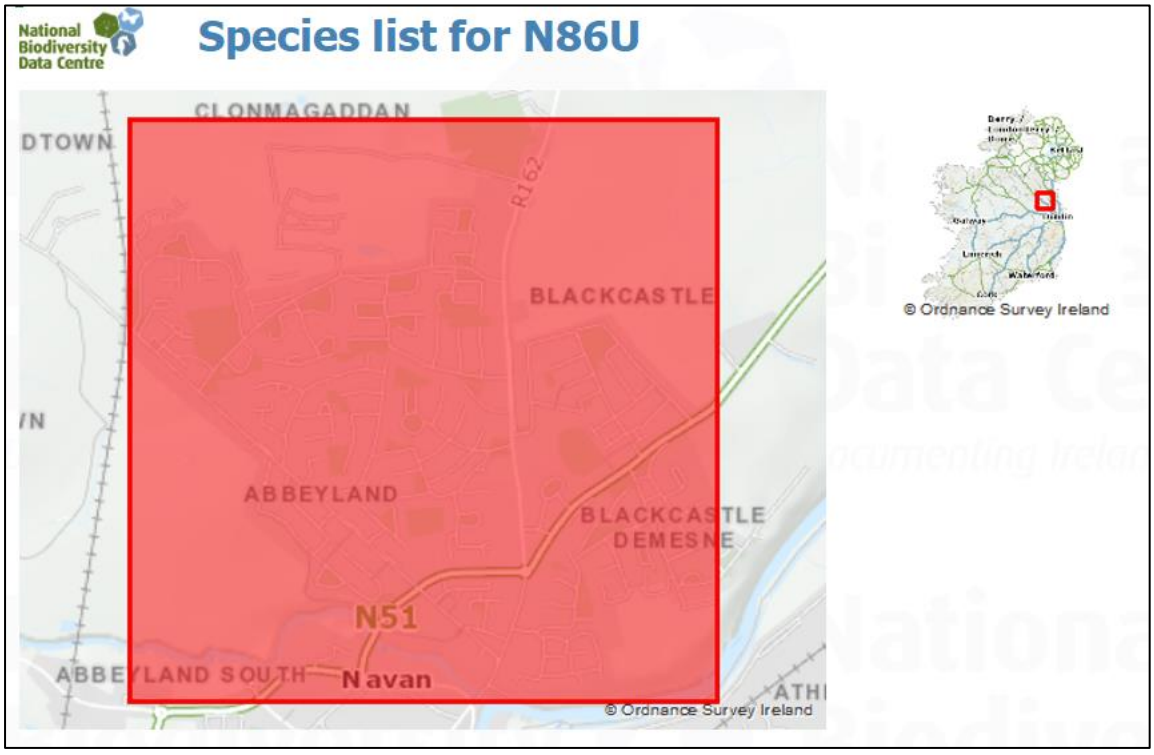

Figure 23: Location of polygon queried (National Biodiversity Data Centre)

Table 1: Species of conservation concern recorded in the vicinity of the proposed development site

Scientific Name	**Common Name**	**Date of last record**
Rana temporaria	Common Frog	28/03/2020
Hirundo rustica	Barn Swallow	21/05/2010
Alcedo atthis	Common Kingfisher	31/12/2011
Sturnus vulgaris	Common Starling	31/12/2011
Apus apus	Common Swift	31/12/2011
Larus argentatus	Herring Gull	31/12/2011
Delichon urbicum	House Martin	31/12/2011

Scientific Name	**Common Name**	**Date of last record**
Passer domesticus	House Sparrow	31/12/2011
Columba livia	Rock Pigeon	31/12/2011
Riparia riparia	Sand Martin	31/12/2011
Fallopia japonica	Japanese Knotweed	08/01/2020
Myotis daubentonii	Daubenton's Bat	15/08/2009
Lutra lutra	European Otter	14/06/2015

There are many more species of conservation concern certain to occur within the Urban Design Plan area. This paucity of records would indicate that a comprehensive ecological assessment of the non-built land habitats is required, which should include a full season-long assessment of flora and fauna (the identification of any bat hibernation roosts in addition to maternity roosts is key).

2.4 Identification of Natura 2000 sites potentially impacted upon by the development

It is general practice, when screening a plan or project for compliance with the Habitats Directive, to identify all Natura 2000 sites within the functional area of the plan/project itself and within 15 km of the boundaries of the area the plan/project applies to (with an appropriate "Zone of Influence" identified from any Source-Pathway-Receptor linkages). This approach is currently recommended in the Department of the Environmental, Heritage and Local Government's document Guidance for Planning Authorities and as a precautionary measure, to ensure that all potentially affected Natura 2000 sites are included in the screening process. The maintenance of habitats and species within individual Natura 2000 sites at favourable conservation condition contributes to the overall maintenance of favourable conservation status of those habitats and species at a national level. It is therefore necessary to identify any potential impacts of the proposed development on the conservation status of Natura 2000 sites. The National Parks and Wildlife Service deem that the favourable conservation status of a habitat is achieved when:

- Its natural range, and area it covers within that range, is stable or increasing.
- The ecological factors that are necessary for its long-term maintenance exist and are likely to continue to exist for the foreseeable future.
- The conservation status of its typical species is favourable.

The National Parks and Wildlife Service deem that the favourable conservation status of a species is achieved when:

- Population data on the species concerned indicate that it is maintaining itself.
- The natural range of the species is neither being reduced, or likely to be reduced in the foreseeable future.
- There is, and will probably continue to be, a sufficiently large habitat to maintain its populations on a long-term basis.

There is one area designated as a special area of conservation (SAC) and one area designated as a Special Protection Area within 15 km of the Urban Design Plan for Flowerhill and Abbeylands (see Table 2, Figure 24 and Figure 25).

Table 2: Natura 2000 sites within 15km of the proposed development

SITE CODE	DESIGNATION	SITE NAME
002299	SAC	RIVER BOYNE AND RIVER BLACKWATER SAC
004232	SPA	RIVER BOYNE AND RIVER BLACKWATER SPA

Both Natura 2000 sites pass through the Urban Design Plan area for Flowerhill and Abbeylands.

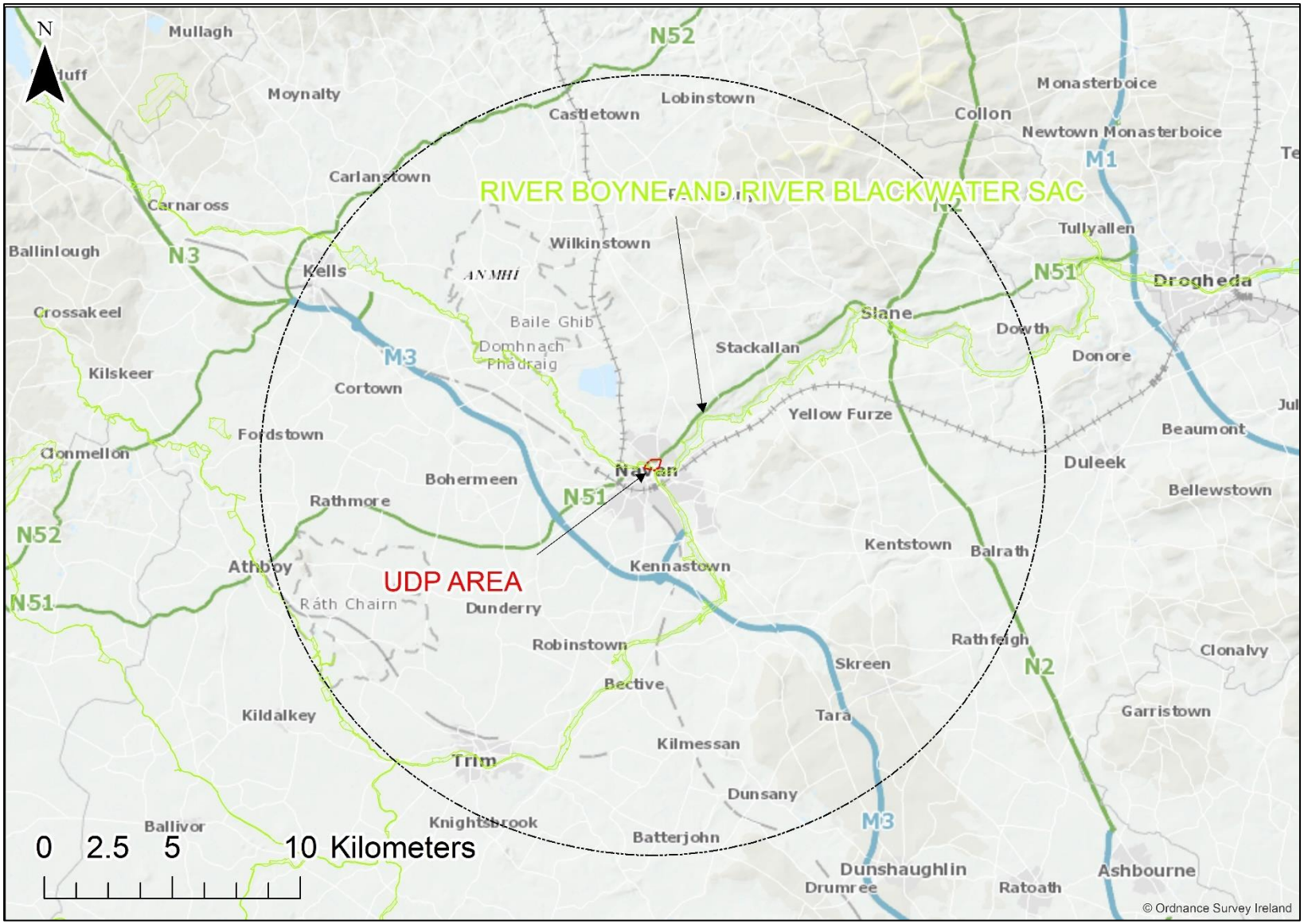

Figure 24: Location of SACs within 15 km of Urban Design Plan Area

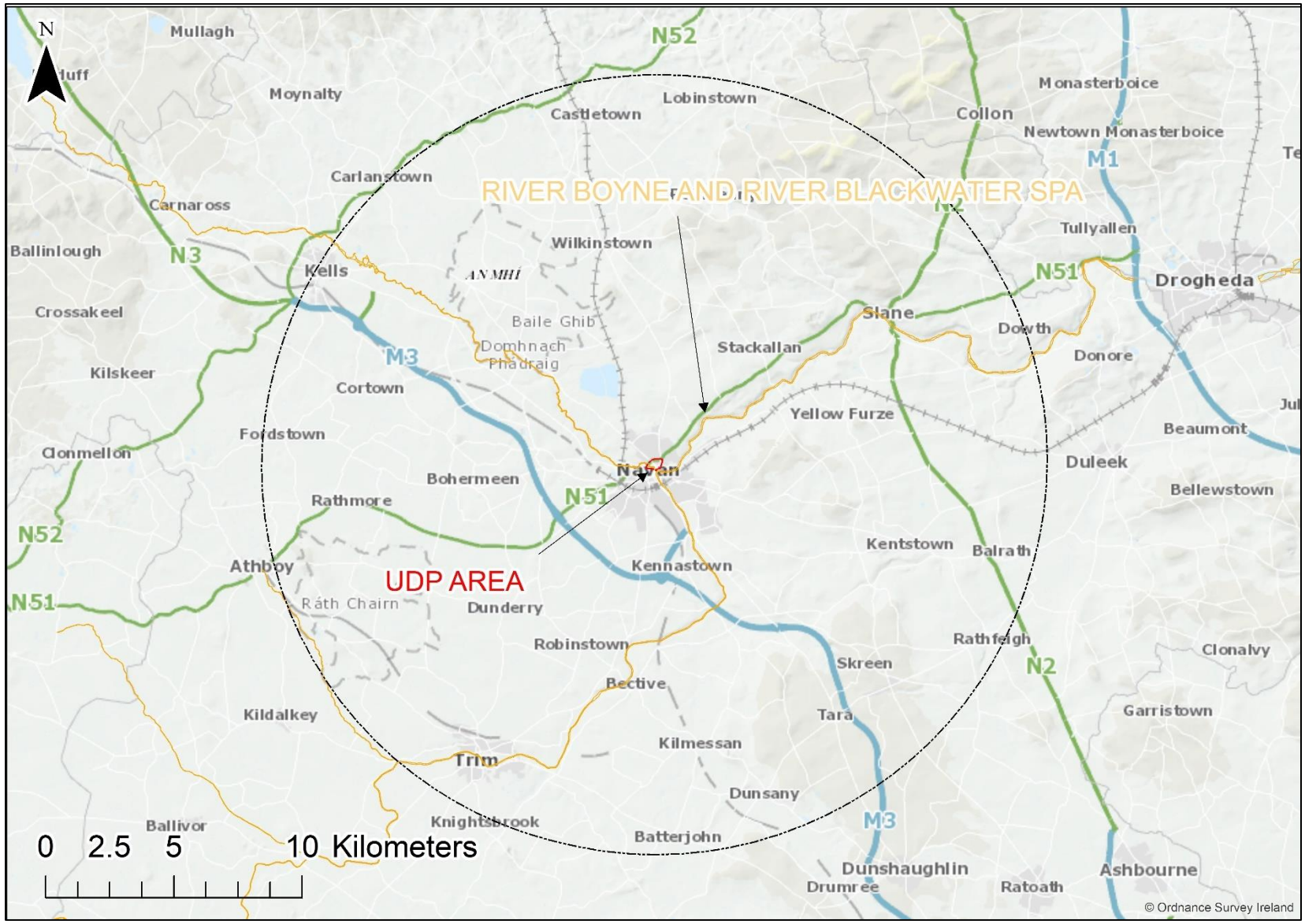

Figure 25: Location of SPAs within 15 km of Urban Design Plan area

Figure 26: Location of River Blackwater and River Boyne SAC relative to the Flowerhill and Abbeylands UDP

Figure 27: Location of River Blackwater and River Boyne SPA relative to the Flowerhill and Abbeylands UDP

2.5 Description of Natura 2000 sites potentially impacted upon by the proposed development

It is the goal of NPWS to draw up conservation plans for all areas designated for nature conservation, and that these plans will, among other things, set clear objectives for the conservation of the features of interest within a site. Where a detailed Conservation Objectives Document is not available, NPWS have provided a site synopsis, generic Conservation Objectives and a Natura 2000 data form from which information is sourced.

In this section, the Natura 2000 sites potentially impacted upon by the proposed development are described according to:

1) General description of the site;
2) Qualifying Interests (QI) of the site;
3) Threats, pressures and activities with negative impacts on the site;
4) Conservation Objectives of the site; and
5) Conservation status of the site.

The codes utilized within the Natura 2000 forms are available from http://bd.eionet.europa.eu/activities/Natura_2000/reference_portal

2.5.1 River Boyne and River Blackwater SAC (Site synopsis version date 06/01/2014, Natura 2000 form update 09/19, Conservation Objectives (generic) version 8.0)

2.5.1.1 General Description

This site comprises most of the freshwater element of the River Boyne from upriver of the Boyne Aqueduct at Drogheda, the Blackwater River as far as Lough Ramor and the principal Boyne tributaries, notably the Deel, Stoneyford and Tremblestown Rivers. This system drains a considerable area of Cos. Meath and Westmeath and smaller areas of Cavan and Louth. The underlying geology is Carboniferous Limestone for the most part with areas of Upper, Lower and Middle well represented. In the vicinity of Kells Silurian Quartzite is present while close to Trim are Carboniferous Shales and Sandstones. The rivers flow through a landscape dominated by intensive agriculture, mostly of improved grassland but also cereals. Much of the river channels were subject to arterial drainage schemes in the past. Natural floodplains now exist along only limited stretches of river, though often there is a fringe of reed swamp, freshwater marsh, wet grassland or deciduous wet woodland. Along some parts, notably between Drogheda and Slane, are stands of tall, mature mixed woodland. Substantial areas of

improved grassland and arable land are included in site for water quality reasons. There are many medium to large sized towns adjacent to but not within the site.

The main channel of the Boyne contains a good example of alluvial woodland of the *Salicetum albo-fragilis* type which has developed on three alluvium islands. Alkaline fen vegetation is well represented at Lough Shesk, where there is a very fine example of habitat succession from open water to raised bog. The Boyne and its tributaries is one of Ireland's premier game fisheries and offers a wide range of angling, from fishing for spring salmon and grilse to sea trout fishing and extensive brown trout fishing. The site is one of the most important in eastern Ireland for *Salmo salar* and has very extensive spawning grounds. The site also has an important population of *Lampetra fluviatilis*, though the distribution or abundance of this species is not well known. *Lutra lutra* is widespread throughout the site. Some of the grassland areas along the Boyne and Blackwater are used by a nationally important winter flock of *Cygnus cygnus*. Several Red Data Book plants occur within the site, with *Pyrola rotundifolia*, *Poa palustris* and *Juncus compressus*. Also occurring are a number of Red Data Book animals, notably *Meles meles*, *Martes martes* and *Rana temporaria*. The River Boyne is a designated Salmonid Water under the EU Freshwater Fish Directive.

2.5.1.2 Qualifying Interests

The qualifying interests for this site are:

- [7230] Alkaline Fens;
- [91EO] Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (*Alno-Padion*, *Alnion incanae*, *Salicion albae*) – PRIORITY HABITAT;
- [1099] *Lampetra fluviatilis;*
- [1106] *Salmo salar; and*
- [1355] *Lutra lutra*

2.5.1.3 Threats, pressures and activities with negative impacts on the site

Details as to the threats, pressures and activities with negative impacts on the site are identified from the Natura 2000 data form for the sites and are illustrated in Table 3.

Table 3: Threats, pressures and activities with impacts on the site

RANK	SECTOR	THREATS AND PRESSURES	INSIDE/OUTSIDE/BOTH
HIGH	AGRICULTURE	GRAZING	BOTH
HIGH	AGRICULTURE	CULTIVATION	BOTH
HIGH	AGRICULTURE	FERTILISATION	BOTH
MEDIUM	AGRICULTURE	SYLVICULTURE/AGRICULTURE	OUTSIDE
HIGH	BIOLOGICAL RESOURCE USE (OTHER THAN AGRICULTURE/ FORESTRY)	FISHING	INSIDE
MEDIUM	HUMAN INTRUSIONS AND DISTURBANCES	NAUTICAL SPORTS	INSIDE
MEDIUM	HUMAN INTRUSIONS AND DISTURBANCES	WALKING, HORSERIDING AND NON-MOTORISED VEHICLES	INSIDE
MEDIUM	NATURAL SYSTEM MODIFICATIONS	HUMAN INDUCED CHANGES IN HYDRAULIC CONDITIONS	INSIDE
HIGH	SYLVICULTURE/AGRICULTURE	SYLVICULTURE/AGRICULTURE	INSIDE
HIGH	TRANSPORTATION AND SERVICE CORRIDORS	ROADS, MOTORWAYS	BOTH
HIGH	URBANISATION, RESIDENTIAL AND COMMERCIAL DEVELOPMENT	DISPERSED HABITATION	OUTSIDE
HIGH	URBANISATION, RESIDENTIAL AND COMMERCIAL DEVELOPMENT	URBANISED AREAS, HUMAN HABITATION	OUTSIDE
MEDIUM	URBANISATION, RESIDENTIAL AND COMMERCIAL DEVELOPMENT	DISCHARGES	INSIDE

2.5.1.4 Conservation Objectives of the site

A detailed Conservation Objectives document for this site has not yet been generated. The (generic) Conservation Objective of this site is to maintain or restore the favourable conservation condition of the Annex I habitat(s) and/or the Annex II species for which the SAC has been selected. More detailed conservation objectives for habitats/species at this site can be inferred, based on the Conservation Objectives for the same habitat at a different site. Please note although not addressed in the NPWS Conservation Objectives, hydrological changes in association with climate change are possible if not probable. The conservation objective of any qualifying interest dependent on hydrological regime/water quality is, therefore, potentially at risk of impact from climate change.

[7230] Alkaline Fens

Conservation objectives for this habitat at this site can be inferred (see Table 4), based on the Conservation Objectives for the same habitat at a different site – in this case [site code 000268].

Table 4: Conservation Objectives for [7230]

ATTRIBUTE	MEASURE	TARGET
HABITAT AREA	HECTARE	AREA STABLE/INCREASING
HABITAT DISTRIBUTION	OCCURRENCE	NO DECLINE
HYDROLOGICAL REGIME	FLOW RATES, METRES	APPROPRIATE NATURAL HYDROLOGICAL REGIME
PEAT FORMATION	FLOOD DURATION	ACTIVE PEAT FORMATION WHERE APPROPRIATE
WATER QUALITY: NUTRIENTS	WATER CHEMISTRY MEASURES	APPROPRIATE WATER QUALITY
VEGETATION COMPOSITION: TYPICAL SPECEIS	PRESENCE	MAINTAIN VEGETATION COVER OF TYPICAL SPECIES
VEGETATION COMPOSITION: TREES AND SHRUBS	PERCENTAGE	COVER OF SCATTERED NATIVE TREES/SHRUBS LESS THAN 10%
PHYSICAL STRUCTURE: DISTURBED BARE GROUND	PERCENTAGE	COVER OF DISTURBED BARE GROUND LESS THAN 10%
PHYSICAL STRUCTURE: DRAINAGE	PERCENTAGE	AREAS SHOWING SIGNS OF DRAINAGE AS A RESULT OF DRAINAGE DITCHES OR HEAVY TRAMPLING LESS THAN 10%

[91EO] Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (*Alno-Padion*, *Alnion incanae*, *Salicion albae*)

Conservation objectives for this habitat at this site can be inferred (see Table 5), based on the Conservation Objectives for the same habitat at a different site – in this case [site code 002162]

Table 5: Conservation Objectives for [91E0]

ATTRIBUTE	MEASURE	TARGET
HABITAT AREA	HECTARES	AREA STABLE OR INCREASING
HABITAT DISTRIBUTION	OCCURRENCE	NO DECLINE
WOODLAND SIZE	HECTARES	AREA STABLE OR INCREASING
WOODLAND STRUCTURE: COVER AND HEIGHT	PERCENTAGE AND METRES	DIVERSE STRUCTURE
WOODLAND STRUCTURE: COMMUNITY DIVERSITY AND EXTENT	HECTARES	MAINTAIN DIVERSITY AND EXTENT OF COMMUNITY TYPES
WOODLAND STRUCTURE: NATURAL REGENERATION	SEEDLING: SAPLING: POLE RATIO	SEEDLINGS, SAPLINGS AND POLE AGE-CLASSES OCCUR IN ADEQUATE PROPORTIONS TO ENSURE SURVIVAL OF WOODLAND CANOPY
HYDROLOGICAL REGIME: FLOODING DEPTH/HEIGHT OF WATER TABLE	METRES	APPROPRIATE HYDROLOGICAL REGIME
WOODLAND STRUCTURE: DEAD WOOD	NUMBER PER HECTARE	AT LEAST 30M3/HA OF FALLEN TIMBER GREATER THAN 10CM DIAMETER; 30 SNAGS/HA; BOTH CATEGORIES SHOUD INCLUDE STEMS GREATER THAN 40 CM DIAMETER (GREATER THAN 20 CM DIAMETER IN THE CASE OF ALDER)
WOODLAND STRUCTURE: VETERAN TREES	NUMBER PER HECTARE	NO DECLINE
WOODLAND STRUCTURE: INDICATORS OF LOCAL DISTINCTIVENESS	OCCURRENCE	NO DECLINE
VEGETATION COMPOSITION: NATIVE TREE COVER	PERCENTAGE	NO DECLINE. NATIVE TREE COVER NOT LESS THAN 95%
VEGETATION COMPOSITION: TYPICAL SPECIES	OCCURRENCE	A VARIETY OF TYPICAL NATIVE TREE SPECIES PRESENT
VEGETATION COMPOSITION: NEGATIVE INDICATOR SPECIES	OCCURRENCE	NEGATIVE INDICATOR SPECIES, PARTICULARLY NON-NATIVE INVASIVE SPECIES ABSENT OR UNDER CONTROL

[1099] *Lampetra fluviatilis*

Conservation objectives for this species at this site can be inferred (see Table 6), based on the Conservation Objectives for the same species at a different site – in this case [site code 002162]

Table 6: Conservation Objectives for [1099]

ATTRIBUTE	MEASURE	TARGET
DISTRIBUTION: EXTENT OF ANADROMY	% OF RIVER ACCESSIBLE	GREATER THAN 75% OF MAIN STEM AND MAJOR TRIBUTARIES DOWN TO SECOND ORDER ACCESSIBLE FROM ESTUARY
POPULATION STRUCTURE OF JUVENILES	NUMBER OF AGE/SIZE GROUPS	AT LEAST 3 AGE/SIZE GROUPS OF RIVER/BROOK LAMPREY PRESENT
JUVENILE DENSITY IN FINE SEDIMENT	JUVENILES PER M2	MEAN CATCHMENT JUVENILE DENSITY OF BROOK/RIVER LAMPREY AT LEAST 2/M2
EXTENT OF DISTRIBUTION OF SPAWNING HABITAT	M2 AND OCCURRENCE	NO DECLINE IN EXTENT AND DISTRIBUTION OF SPAWNING BEDS
AVAILABILITY OF JUVENILE HABITAT	NUMBER OF POSITIVE SITES IN 2ND ORDER CHANNELS (AND GREATER), DOWNSTREAM OF SPAWNING AREAS	MORE THAN 50% OF SAMPLE SITES POSITIVE

[1106] *Salmo salar*

Conservation objectives for this species at this site can be inferred (see Table 7), based on the Conservation Objectives for the same species at a different site – in this case [site code 002162]

Table 7: Conservation Objectives for [1106]

ATTRIBUTE	MEASURE	TARGET
DISTRIBUTION: EXTENT OF ANADROMY	% OF RIVER ACCESSIBLE	100% OF RIVER CHANNELS DOWN TO SECOND ORDER ACCESSIBLE FROM ESTUARY
ADULT SPAWNING FISH	NUMBER	CONSERVATION LIMIT FOR EACH SYSTEM CONSISTENTLY EXCEEDED
SALMON FRY ABUNDANCE	NUMBER OF FRY/5 MINUTES ELECTROFISHING	CURRENTLY SET AT 17 SALMON FRY/5 MIN ELECTROFISHING
OUTMIGRATING SMOLT ABUNDANCE	NUMBER	NO SIGNIFICANT DECLINE
NO AND DISTRIBUTION OF REDDS	NUMBER AND OCCURRENCE	NO DECLINE IN NUMBER/DISTRIBUTION OWING TO ANTHROPOGENIC CAUSES
WATER QUALITY	EPA Q VALUE	AT LEAST Q4 AT ALL SITES SAMPLED BY EPA

[1355] *Lutra lutra*

Conservation objectives for this species at this site can be inferred (see Table 8), based on the Conservation Objectives for the same species at a different site – in this case [site code 002162].

Table 8: Conservation Objectives for [1355]

ATTRIBUTE	MEASURE	TARGET
DISTRIBUTION	PERCENTAGE POSITIVE SURVEY SITES	NO SIGNIFICANT DECLINE
EXTENT OF TERRESTRIAL HABITAT	HECTARES	NO SIGNIFICANT DECLINE
EXTENT OF MARINE HABITAT	HECTARES	NO SIGNIFICANT DECLINE
EXTENT OF FRESHEWATER HABITAT	HECTARES/KILOMETRES	NO SIGNIFICANT DECLINE
COUCHING SITES AND HOLTS	NUMBER	NO SIGNIFICANT DECLINE
FISH BIOMASS AVAILABLE	KILOGRAMS	NO SIGNIFICANT DECLINE

2.5.1.5 Baseline Conservation Status of the site

A synopsis of the conservation status of this site is provided in Table 9 and Table 10.

Table 9: Habitat types present on site and assessment for them

Annex I Habitat types						Site assessment			
Code	PF	NP	Cover [ha]	Cave [number]	Data quality	A|B|C|D	A|B|C		
						Representativity	Relative Surface	Conservation	Global
7230			23.21		M	B	C	B	B
91E0			23.21		M	B	B	B	B

Table 10: Species referred to in Article 4 of Directive 2009/147/EC and listed in Annex II of Directive 92/43/EEC and site evaluation for them

Species					Population in the site						Site assessment			
G	Code	Scientific Name	S	NP	T	Size		Unit	Cat.	D.qual.	A|B|C|D	A|B|C		
						Min	Max				Pop.	Con.	Iso.	Glo.
B	A038	Cygnus cygnus			w	50	200	i		G	C	B	C	B
F	1099	Lampetra fluviatilis			r				P	DD	C	B	C	B
M	1355	Lutra lutra			p				P	DD	C	A	C	A
F	1106	Salmo salar			r				C	DD	C	B	C	B

2.5.2 Girley (Drewstown) Bog SAC (Site synopsis version date 14/09/2017, Natura 2000 form update 06/2015, Conservation Objectives (generic) version 8.0)

2.5.2.1 General Description

Girley (Drewstown) Bog (002203) consists of 32.26 ha of raised bog (15.05 ha of high bog and 17.21 ha of cutover bog) which occupies the south-western part of Girley Bog NHA (001580). Girley Bog is a Midland type raised bog developed in a basin. The SAC is bounded by open high bog on its northern and eastern sides, by agricultural land on its western side and by cutover bog with forestry on its southern side. Most of the SAC, and all of the high bog included in the SAC, was completely covered by coniferous forestry, which has been recently clear-felled as part of the restoration program for the site. Most of the conifers in the SAC were removed and the associated intensive drainage system was blocked by 2013 as part of an EU LIFE funded Coillte project (Demonstrating Best Practice in Raised Bog Restoration in Ireland) so as to raise the water table and restore Active Raised Bog (ARB) on the site. With the clear-felling of conifers and blocking of drains, water-levels have risen and remain high throughout most of the year. As a consequence, raised bog vegetation, including typical sphagnum species, has returned to the wetter areas of the high bog. Overall, the high bog appears to be re-wetting with limited areas of wet flats and hummock/hollows. However, the majority of the restored areas have not yet developed vegetation characteristic of the wettest conditions and there is a considerable amount of conifer and birch regeneration occurring in these areas. Two areas in the north-east of the site covering 2.28 ha have been identified by hydrological modelling as Degraded Raised Bog (7120) (DRB) habitat. They now have standing surface water in the hollows and pools for most of the year with considerable areas of rapidly regenerating bog mosses. These wet areas with

regenerating Sphagnum moss are expected to develop into Active Raised Bog habitat within 20 years. However, to ensure that these areas reach their full potential it will be necessary to block the boundary drains in consultation with other stakeholders. The cutover bog to the south of the site is generally drier and is developing into wet and dry woodland dominated currently by Downy Birch scrub with occasional conifers from the former plantation. Cherry Laurel, Rhododendron and conifers are regenerating strongly in this area and are subject to ongoing control programs. The Degraded Raised Bog in Girley (Drewstown) Bog SAC is of conservation significance as it has the potential for restoration to Active Raised Bog which is a priority habitat in the EU and one that is scarce and under threat in Ireland. Despite the relatively small area of Degraded Raised Bog present the restoration actions have resulted in active redevelopment of the habitat towards Active Raised Bog which add significantly to the diversity and scientific value of the site. The site is being actively managed for conservation as part of the Coillte EU LIFE Project and most of the required restoration measures have already been carried out. However, some significant threats remain and an After LIFE management plan is being developed for the future conservation management of the SAC. The SAC is located within the raised bog Girley Bog NHA (001580) the conservation management of which should support the maintenance and improvement of Degraded Raised Bog in the SAC. It is estimated that restoration works carried out on the SAC will in turn benefit the conservation of 0.5 ha of Active Raised Bog and the restoration of 0.5 ha of Degraded Raised Bog in the adjacent area of Girley Bog NHA (001580)

2.5.2.2 Qualifying Interests

The qualifying interests for this site are:

- [7120] Degraded raised bogs still capable of regeneration.

2.5.2.3 Threats, pressures and activities with negative impacts on the site

Details as to the threats, pressures and activities with negative impacts on the site are identified from the Natura 2000 data form for the sites and are illustrated in Table 11.

Table 11: Threats, pressures and activities with impacts on the site

Negative Impacts			
Rank	Threats and pressures [code]	Pollution (optional) [code]	inside/outside [i|o|b]
H	J02.15		b
M	I01		b
M	I02		b
M	J01.01		b

Positive Impacts			
Rank	Activities, management [code]	Pollution (optional) [code]	inside/outside [i|o|b]
H	B02.02		i
M	I02		b
H	J02.01		i
M	J02.15		b
M	I01		b

Rank: H = high, M = medium, L = low
Pollution: N = Nitrogen input, P = Phosphor/Phosphate input, A = Acid input/acidification,
T = toxic inorganic chemicals, O = toxic organic chemicals, X = Mixed pollutions
i = inside, o = outside, b = both

2.5.2.4 Conservation Objectives of the site

A detailed Conservation Objectives document for this site has not yet been generated. The (generic) Conservation Objective of this site is to maintain or restore the favourable conservation condition of the Annex I habitat(s) and/or the Annex II species for which the SAC has been selected. More detailed conservation objectives for habitats/species at this site can be inferred, based on the Conservation Objectives for the same habitat at a different site.

[7210] Degraded raised bogs still capable of regeneration

Conservation objectives for this habitat at this site are difficult to infer from other sites as the conservation objective for this habitat is typically inherently linked to the conservation objectives for the habitat [7110] Active raised bogs. There are conservation objectives specific to this habitat for Lough Ree SAC (000440) and conservation objectives can (cautiously) be inferred from those at this site (see Table 12)

Table 12: Conservation Objectives for [7230]

Attribute	Measure	Target
Habitat area	Hectares	Restore area of active raised bog to 70.1ha, subject to natural processes
Habitat distribution	Occurrence	Restore the distribution and variability of active raised bog across the SAC. See map 6 for distribution in 2003
High bog area	Hectares	No decline in extent of high bog necessary to support the development and maintenance of active raised bog. See map 5
Hydrological regime: water levels	Centimetres	Restore appropriate water levels throughout the site
Hydrological regime: flow patterns	Flow direction; slope	Restore, where possible, appropriate high bog topography, flow directions and slopes. See map 7 for current situation
Transitional areas between high bog and adjacent mineral soils (including cutover areas)	Hectares; distribution	Restore adequate transitional areas to support/protect active raised bog and the services it provides
Vegetation quality: central ecotope, active flush, soaks, bog woodland	Hectares	Restore 35.1ha of central ecotope/active flush/soaks/bog woodland as appropriate
Vegetation quality: microtopograph-ical features	Hectares	Restore adequate cover of high quality microtopographical features
Vegetation quality: bog moss (*Sphagnum*) species	Percentage cover	Restore adequate cover of bog moss (*Sphagnum*) species to ensure peat-forming capacity

Continued overleaf

Typical ARB species: flora	Occurrence	Restore, where appropriate, typical active raised bog flora
Typical ARB species: fauna	Occurrence	Restore, where appropriate, typical active raised bog fauna
Elements of local distinctiveness	Occurrence	Maintain features of local distinctiveness, subject to natural processes
Negative physical indicators	Percentage cover	Negative physical features absent or insignificant
Vegetation composition: native negative indicator species	Percentage cover	Native negative indicator species at insignificant levels
Vegetation composition: non-native invasive species	Percentage cover	Non-native invasive species at insignificant levels and not more than 1% cover
Air quality: nitrogen deposition	kg N/ha/year	Air quality surrounding bog close to natural reference conditions. The total N deposition should not exceed 5kg N/ha/yr
Water quality	Hydrochemical measures	Water quality on the high bog and in transitional areas close to natural reference conditions

2.5.2.5 Baseline Conservation Status of the site

A synopsis of the conservation status of this site is provided in Table 13.

Table 13: Habitat types present on site and assessment for them

Annex I Habitat types						Site assessment			
Code	PF	NP	Cover [ha]	Cave [number]	Data quality	A|B|C|D	A|B|C		
						Representativity	Relative Surface	Conservation	Global
7120			2.28		G	B	C	C	B

2.5.3 The River Boyne and River Blackwater SPA (Site synopsis version date 25/11/10, Natura 2000 form update 10/2020, Conservation Objectives (generic) Version 8.0.

2.5.3.1 General Description

The River Boyne and River Blackwater SPA is a long linear site that comprises stretches of the River Boyne and several of its tributaries: most of the site is in Co Meath but it extends also into Counties Cavan, Louth and Westmeath. It includes the following river sections: The River Boyne from the M1 motorway bridge, west of Drogheda, to the junction with the Royal Canal, west of Longwood, Co Meath; the River Blackwater from its junction with the River Boyne in Navan to the junction with Lough Ramor in Co Cavan; the Tremblestown River (and Athboy River) from the junction with the River Boyne at Kilnagross Bridge to the bridge in Athboy, Co Meath; the Stoneyford River from its junction with the River Boyne to Stonestone Bridge in Co. Westmeath; the River Deel from its junction with the River Boyne to Cummer Bridge, Co.Westmeath. The site includes the river channel and marginal vegetation. The River Boyne and River Blackwater SPA supports nationally important numbers of *Alcedo atthis*. Other species which occur within the site include *Cygnus olor*, *Anas crecca*, *Anas platyrhynchos*, *Phalacrocorax carbo*, *Ardea cinerea*, *Gallinula chloropus*, *Gallinago gallinago* and *Riparia riparia*.

2.5.3.2 Qualifying Interests

The Qualifying Interest (QI) of the River Boyne and River Blackwater SPA is

- Kingfisher, *Alcedo atthis*

2.5.3.3 Threats, pressures and activities with negative impacts on the site

Details as to the threats, pressures and activities with negative impacts on the site are identified from the Natura 2000 data form for the sites and are illustrated in Table 14.

Table 14: Threats, pressures and activities with impacts on the site

RANK	SECTOR	THREATS AND PRESSURES	INSIDE/OUTSIDE/BOTH
HIGH	URBANISATION, RESIDENTIAL AND COMMERCIAL DEVELOPMENT	ROADS, MOTORWAYS	BOTH
MEDIUM	NATURAL SYSTEM MODIFICATIONS	HUMAN INDUCED CHANGES IN HYDRAULIC CONDITIONS	INSIDE

HIGH	URBANISATION, RESIDENTIAL AND COMMERCIAL DEVELOPMENT	URBANISED AREAS, HUMAN HABITATION	OUTSIDE
HIGH	URBANISATION, RESIDENTIAL AND COMMERCIAL DEVELOPMENT	DISPERSED HABITATION	OUTSIDE

2.5.3.4 Conservation Objectives

The primary conservation objective (generic) of this site is to maintain or restore the favourable conservation condition of the bird species listed as Special Conservation Interests for this SPA:

- Kingfisher (*Alcedo atthis*)

There is currently no detailed conservation objectives document prepared referring specifically to Kingfisher as a Qualifying Interest. It is, therefore, not possible to infer Conservation Objectives for this Qualifying Interest.

2.5.3.5 Baseline Conservation Status

A synopsis of the conservation status of this site is provided in Table 15.

Table 15: Species referred to in Article 4 of Directive 2009/147/EC and listed in Annex II of Directive 92/43/EEC and site evaluation for them

Species					Population in the site						Site assessment			
G	Code	Scientific Name	S	NP	T	Size		Unit	Cat.	D.qual.	A|B|C|D	A|B|C		
						Min	Max				Pop.	Con.	Iso.	Glo.
B	A229	Alcedo atthis			r	19	19	p		G	C	B	C	B
B	A052	Anas crecca			w	166	166	i		G	C	B	C	C
B	A053	Anas platyrhynchos			w	219	219	i		G	C	B	C	C
B	A028	Ardea cinerea			w	44	44	i		G	C	B	C	C
B	A017	Phalacrocorax carbo			w	36	36	i		G	C	B	C	C

2.6 Identification and evaluation of likely significant effect

2.6.1 Description of source-pathway-receptor linkages and identification of "Zone of Influence"

The basis for identifying potential impacts/significance thereof and defining the zone of influence is the "Source-Pathway-Receptor" (S-P-R) model. This model underpins all water-protection schemes in Ireland, as well as the EU Water Framework Directive on which both surface water and groundwater regulations are based. When examining S-P-R relationships in regard to impacts on Natura 2000 sites, the main questions to be considered are:

1) Source characterisation – Identification of potential source(s) of the impact(s);
2) Pathway's analysis – Identification of means through which potential impacts could take place, for example is there a hydrogeological or hydrological link that can deliver a pollutant source to a nearby receptor; and
3) Receptor identification – identification of Natura 2000 sites/qualifying interests potentially affected.

Both the River Boyne and River Blackwater SAC and River Boyne and River Blackwater SPA pass through the area of the Urban Design Plan for Flowerhill and Abbeylands. The conservation objectives of the qualifying interests of the River Boyne and River Blackwater SAC and River Boyne and River Blackwater SPA (and indeed those species for which the sites are not designated, but which are key to the ecological integrity of the sites) are directly or indirectly dependent on water quality and disturbance levels.

The sources of impact most likely to impact on these Natura 2000 sites concern:

- Impacts on water quality within the Urban Design Plan area associated with components of the plan;
- Impacts on Qualifying Interests sensitive to changes in disturbance levels, such as Otter and Kingfisher;
- Impacts on species present that while not Qualifying Interests of either Natura 2000 site, are nonetheless integral to the ecological integrity of the sites (bats, for instance) associated with any changes in artificial lighting.
- It is known that there is a significant population of Japanese Knotweed, a species listed in Part (1) of the Third Schedule of the European Communities (Birds and Natural Habitats) Regulations of 2011 (as amended), within the area of the UDP proximate to the River Blackwater. The spread of this species into the river could have serious implications through impacts on erosion, bankside management, etc.

Therefore, the key questions to be considered are:

1) Is there any source(s) of impact(s) on water quality and/or disturbance levels (including disturbance associated with changes in artificial lighting) associated with the Urban Design Plan?
2) Is there a pathway present between the source of impact and a Natura 2000 site?; and
3) What are the Natura 2000 sites/qualifying interests potentially impacted upon?

2.6.2 Sources of potential impacts

Sources of potential impacts are:

- Impacts associated with contamination of surface and/or ground water during construction and/or operation;
- Impacts associated with increased disturbance of the River Blackwater and associated ecological corridor as it passes through the Urban Design Plan area (and indeed beyond if components of the Urban Design Plan result in increased footfall);
- Impacts associated with disturbance through changes in artificial illumination; and
- Impacts associated with the spread of Alien Invasive Plant Species and in particular Japanese Knotweed and any other species listed on Part (1) the Third Schedule of the European Communities (Birds and Natural Habitats) Regulations of 2011 (as amended).

2.6.3 Presence of pathway and receptor

The primary receptor of concern is the River Blackwater and associated ecological corridor (a primary component of both the River Boyne and River Blackwater SAC and the River Boyne and River Blackwater SPA), which passes through the area of the Flowerhill and Abbeylands Urban Design Plan. The confluence of the Rivers Blackwater and Boyne is immediately outside of the UDP area. Several components of the plan have the potential to impact on ground and/or surface waters during the construction and/or operation of the proposed plan, providing a source-pathway-receptor linkage during the operational phase. There will inevitably be increased disturbance associated with elements of the Urban Design Plan that in the absence of mitigation measures could impact negatively on Qualifying Interests and the ecological integrity of the Natura 2000 sites.

2.6.4 Natura 2000 site(s) with potential to be impacted upon and Zone of Influence

There is potential for negative impacts on both the River Boyne and River Blackwater SAC and River Boyne and River Blackwater SPA through several impacts and pathways. The “Zone of Influence” should include these Natura 2000 sites. Owing to the nature and scale of the Urban Design Plan, the zone of influence is deemed to be restricted to these two sites.

2.6.5 Sources of potential Direct, Indirect or Secondary Impacts

2.6.5.1 Direct Impacts

One of the components of the Urban Design Plan is a "River Park", which will entail works within and/or immediately adjacent to the River Boyne and River Blackwater SAC/SPA. There is potential for direct impacts on the Natura 2000 site through land take, habitat loss, etc.

2.6.5.2 Indirect Impacts

There are numerous potential indirect impacts:

- Several components of the Urban Design Plan have the potential to impact on the water quality of the River Blackwater. There are two water monitoring stations within (RS07B011790) or immediately adjacent (RS07B011800). The latest Q Value (2020) at monitoring station RS07B011790 indicates the water quality is moderate (Q 3-4). The latest Q Value (2020) at monitoring station RS07B011800 indicates the water quality is poor (Q 3). There is, therefore, a deterioration in water quality over a short distance;
- There are a number of components of the Urban Design Plan that also have the potential to increase disturbance levels in the vicinity of the River Blackwater and associated ecological corridor – for instance, the River Park has the potential to increase disturbance levels to Otter, Kingfisher, etc.;
- There are a number of components of the Urban Design Plan that also have the potential to increase disturbance levels in the form of changes in artificial lighting, in particular along the River Blackwater, which could impact negatively on usage of the habitat by bats (which are a key component of the ecological integrity of the riparian ecosystem); and
- There is a significant and well-established population of the Third Schedule-listed species Japanese Knotweed (*Fallopia japonica*) occurring within the UDP area. If spread, this plant could have very serious negative impacts on the riparian ecosystem as regards erosion, bank management, etc.

2.6.5.3 Secondary Impacts

Major secondary impacts are unlikely owing to the nature and scale of the proposed plans.

A summary of the potential for impacts upon Natura 2000 sites within the zone of influence of the proposed development is summarized in Table 16. The potential for impacts upon the Natura 2000 sites identified in the event of negative impacts is summarized in Table 17. The potential impacts on the qualifying interests of identified Natura 2000 sites is summarized in Table 18.

Table 16: Summary of the potential for impacts upon Natura 2000 sites.

Site Name	Direct Impacts	Indirect/ Secondary Impacts	Resource requirements (water abstraction etc.)	Emissions (to land, water or air)	Excavation requirements	Duration of construction, operation and decommissioning
River Boyne and River Blackwater SAC	Potential	Potential	None foreseen	Potential	Potential	Potential
River Boyne and River Blackwater SPA	Potential	Potential	None foreseen	Potential	Potential	Potential

Table 17: Summary of the potential for changes to Natura 2000 sites.

Site Name	Reduction of habitat area	Disturbance to key species	Habitat/species fragmentation	Reduction in species density	Changes in Key Indicators of Conservation Value	Climate change
River Boyne and River Blackwater SAC	Potential	Potential	Potential	Potential	Potential	Potential
River Boyne and River Blackwater SPA	Potential	Potential	Potential	Potential	Potential	Potential

Table 18: Summary of potential impacts on Qualifying Interests of Natura 2000 sites identified as at risk of impact

Site name	Qualifying Interest	Potential Impact
River Boyne and River Blackwater SAC	[7230] Alkaline fens	Habitat is located many kilometres upstream of proposed development – no impact foreseen
	[91E0] Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (priority)	Habitat is located many kilometres downstream of proposed development – no impact foreseen
	[1099] River Lamprey	Potential impacts associated with changes in hydrology/water quality
	[1106] Atlantic Salmon	Potential impacts associated with changes in hydrology/water quality
	[1355] Otter	Potential impacts associated with changes in hydrology/water quality, impacts on prey items, potential impacts through increased disturbance
River Boyne and River Blackwater SPA	A229 Kingfisher *Alcedo atthis*	Potential impacts associated with changes in hydrology/water quality, impacts on prey items, potential impacts through increased disturbance

2.6.6 Potential cumulative impacts in association with other plans

Article 6(3) of the Habitats Directive requires an assessment of a plan/project to consider other plans/projects that might, in combination with the proposed plan/project, have the potential to adversely impact upon Natura 2000 sites. A generic list of such plans/projects is indicated in Table 19.

Table 19: Potential cumulative impacts.

Plan	Purpose	Cumulative impact
EU Water framework Directive	Maintain and enhance water quality within the EU	None predicted
EU Freshwater Fish Directive	Protect freshwater bodies within the EU suitable for sustaining fish populations	None predicted
EU Groundwater Directive	Maintain and enhance the quality of groundwater within the EU	None predicted
EU Floods Directive	The Floods Directive applies to river basins and coastal areas at risk of flooding	None predicted
Nitrates Directive	Reducing water pollution within the EU	None predicted
Urban Waste-water treatment Directive	Protecting the environment from adverse impacts of waste-water discharge	None predicted
Sewage Sludge Directive	Regulate the use of sewage sludge	None predicted
The IPPC Directive	To achieve a high level of environmental protection	None predicted
National Development Plan	To promote more balanced spatial and economic development	None predicted
National Spatial Strategy	To achieve a better balance of social, economic and physical development across Ireland	None predicted
Eastern CRFAM	Long-term planning for reducing and managing flood risk	Potential in combination impacts on water quality in absence of mitigation measures.
Meath Development Plans	Sustainable development of Co. Meath	None predicted
Local Area Development Plans	Various	None predicted
Quarrying activities, water abstraction, discharge, etc	Various	Potential in-combination impacts on water quality in absence of mitigation measures
Current and future planning permissions –	Various	An Appropriate Assessment Screening exercise of any planning permission would be undertaken.
Meath Co. Council Part 8's	Various	An Appropriate Assessment Screening exercise of any Part 8 would be undertaken
Land spreading of organic waste by farmers in the locality	Fertilising land, disposing of organic waste	Potential in-combination impacts on water quality in absence of mitigation measures

The Urban Design Plan Area is located within the Navan Agglomeration. The primary source of any cumulative impacts concerns impacts on ground and/or surface water. The Navan Wastewater Treatment Plant (D0059) with discharge reference point TPEFF2300D0059SW001 is several km

downstream of the Urban Design Plan. According to the latest on-line AER[1], the compliance status of the Emission Limit Values is "Compliant".

In addition to the WWTP discharge point are several stormwater over-flow points, the majority of which according to the Annual Environmental Report are monitored. There are likely numerous other point sources of emissions that are currently unrecorded.

The cumulative impact of such point sources must be considered through ensuring that the proposed Urban Design Plan has no significant potential to impact on water quality and/or hydrology. An excerpt from the National Planning Application Database is provided in Figure 28.

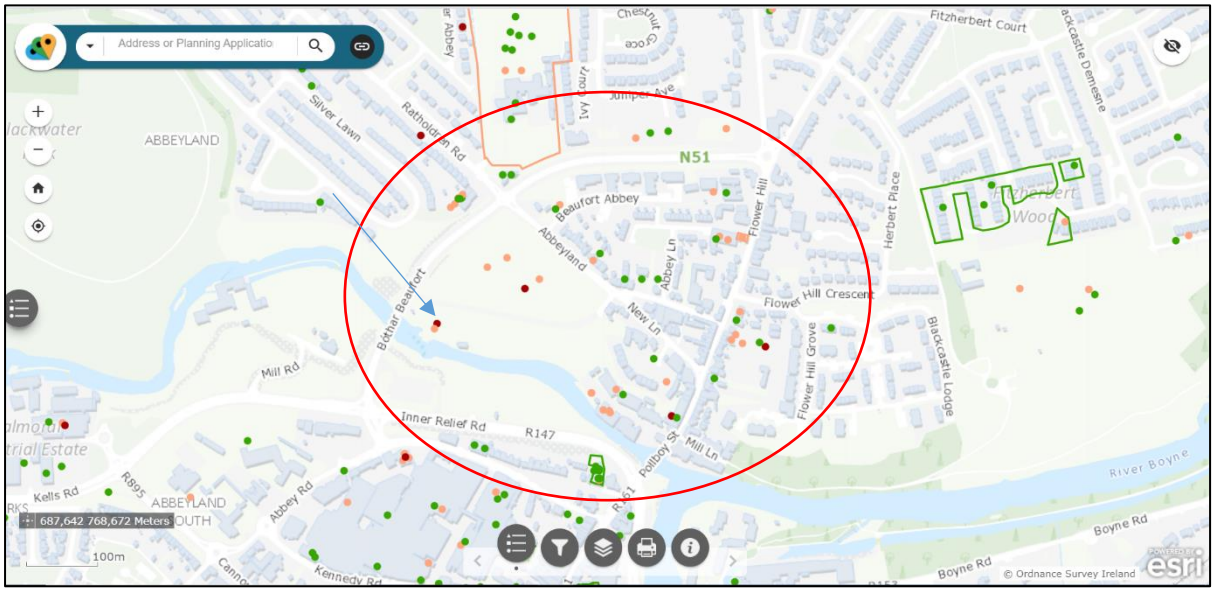

Figure 28: **Excerpt from online National Planning Database application indicating several recent planning permissions in the area of the UDP immediately adjacent to the River Blackwater. The most significant of these (NA181319) as indicated by the blue arrow was refused.**

A query of the EIA portal[2] would indicate that there are no projects in the vicinity of the Flowerhill and Abbeylands Urban Design Plan requiring EIA (see Figure 29).

[1] https://www.water.ie/__uuid/b0a23a95-fd3d-43c8-baae-bde1959cb32e/d0059-01_2020_aer.pdf

2 https://housinggovie.maps.arcgis.com/apps/webappviewer/index.html?id=d7d5a3d48f104ecbb206e7e5f84b71f1

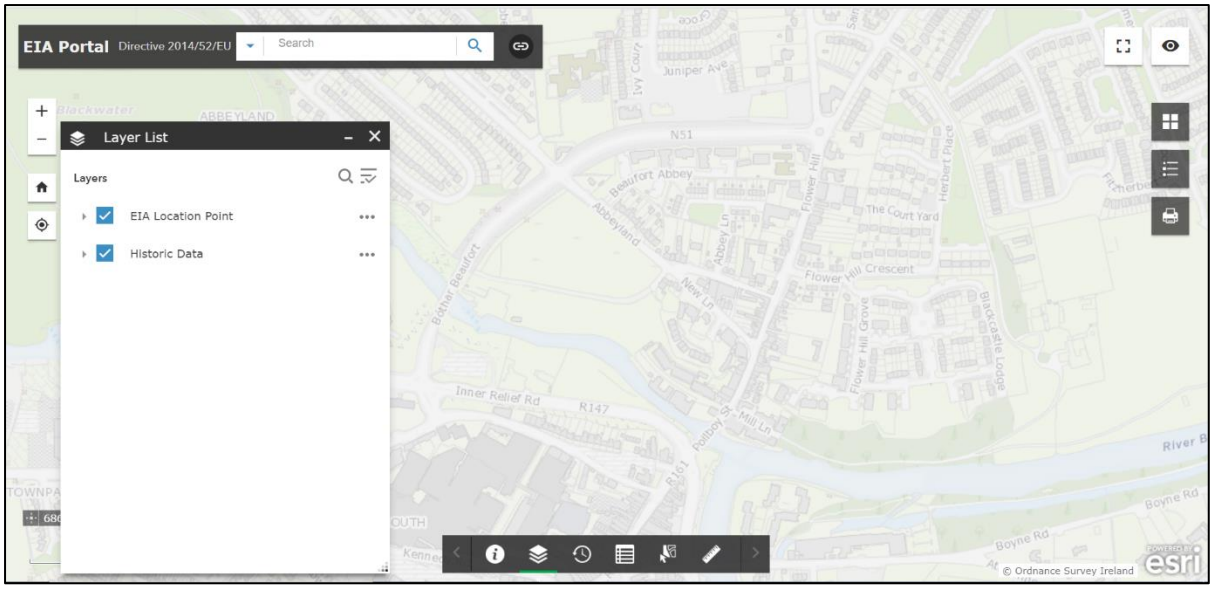

Figure 29: Query of EIA portal for projects requiring EIA in the vicinity of the Flowerhill and Abbeylands UDP area.

Any potential impacts on water quality must be avoided.

2.6.7 "Do nothing" scenario

Any potential negative impacts associated with the Urban Design Plan would be avoided. Of note, if undertaken in an ecologically sensitive manner, informed by comprehensive ecological surveys, the UDP would have a positive impact as regards the ecological integrity of the River Blackwater and associated corridor.

2.6.8 Gauging of Impacts on Natura 2000 sites – Integrity of site checklist

The potential impacts of the proposed development on Natura 2000 sites are gauged using a checklist, which aids in determining the potential of development to have a significant impact on any Natura 2000 site. This checklist consists of a number of pertinent questions as set out in Table 20.

Table 20: Potential of the proposed development to impact on Natura 2000 sites in the absence of suitable mitigation/preventative measures

Does the Plan have the potential to:	**Yes/No**
Cause delays in progress towards achieving the conservation objectives of the Natura 2000 site?	YES
Interrupt progress toward achieving the conservation objectives of the Natura 2000 site?	YES
Disrupt those factors helping to maintain the favourable conditions at the Natura 2000 site?	YES
Interfere with the balance, distribution and density of key species that are the indicators of the favourable condition of the Natura 2000 site?	YES
Cause changes to the vital defining aspects (e.g., nutrient balance) that determine how the Natura 2000 site functions as a habitat or ecosystem?	YES
Change the dynamics of the relationships (between, for example, soil and water or plants and animals) that define the structure and/or function of the Natura 2000 site?	YES
Interfere with predicted or expected natural changes to the Natura 2000 site (such as water dynamics or chemical composition)?	YES
Reduce the area of key habitats within the Natura 2000 site?	YES
Reduce the population of key species of the Natura 2000 site?	YES
Alter the balance between key species of the Natura 2000 site?	YES
Reduce the biodiversity of the Natura 2000 site?	YES
Result in disturbance that could affect population size or density or the balance between key species within the Natura 2000 site?	YES
Result in fragmentation?	YES
Result in the loss or reduction of key features of Natura 2000 sites?	YES

2.7 Conclusions of screening

According to the guidance published by the NPWS (DoEHLG, 2009), Screening for Appropriate Assessment can either identify that a Natura Impact Statement (NIS) is not required where:

(1) A project/proposal is directly related to the management of the site; or

(2) There is no potential for significant impacts affecting the Natura 2000 network

Where the screening process identifies that significant impacts are certain, likely or uncertain the project must either proceed to Stage II Appropriate Assessment or be rejected.

The potential impacts that will arise from the Flowerhill and Abbeylands Urban Design Plan have been examined in the context of a number of factors that could potentially impact upon the integrity of the Natura 2000 network. On the basis of the findings of this Screening for Appropriate Assessment, it is concluded that the proposed plan:

(1) Is not directly connected with or necessary to the management of a Natura 2000 site and

(2) May have significant impacts on one or more Natura 2000 sites.

Following an examination, analysis and evaluation of the relevant information and the potential for significant effects on the conservation objectives of Natura 2000 sites, and applying the Precautionary Principle, it is not possible to exclude (on the basis of objective information and in the absence of specific prescribed precautionary/mitigation measures) that the proposed plan individually or in combination with other plans or projects, has the potential to have significant negative impacts on the following Natura 2000 sites:

- River Boyne and River Blackwater SAC; and
- River Boyne and River Blackwater SPA

Screening having identified potential impacts of the proposed plan upon these Natura 2000 sites and in accordance with Article 6(3) of the Habitats Directive, a Stage 2 Appropriate Assessment is required, i.e., "*The consideration of the impact of the project or plan on the integrity of the Natura 2000 Site, either alone or in combination with other projects or plans to the sites structure and function and its conservation objectives. Additionally, where there are adverse impacts, an assessment of the potential mitigation of those impacts.*"

3 Appropriate Assessment

The potential for significant negative impacts of the Urban Design Plan for Flowerhill and Abbeylands on the ecological integrity of the River Boyne and River Blackwater SAC and River Boyne and River Blackwater SPA, in light of the conservation objectives of these sites, is examined in this section.

3.1 Stage 2 Appropriate Assessment background

Screening having identified potential impacts Stage 2 Appropriate Assessment is carried out to determine if the plan/project will have any significant negative impacts on the integrity of the Natura 2000 site(s) identified as being at risk. For the purposes of Appropriate Assessment, a significant effect is any effect that may affect the Conservation Objectives of the Qualifying Interest for which a site was designated but excluding inconsequential effects. If the effect is not relevant to the conservation objective, then it cannot be a significant effect for the purposes of Appropriate Assessment. A likely significant effect, for the purpose of Appropriate Assessment must be:

(a) Significant;

(b) Relevant to the conservation objective for that site; and

(c) The possibility of effects cannot be reasonably excluded.

This stage of the Appropriate Assessment process includes:

1) Impact Prediction - the potential impact of the proposed development on the ecological integrity of Natura 2000 sites in terms of the conservation objectives of those sites is assessed; and
2) Mitigation Measures – mitigation/preventative measures are identified (either in place or to be implemented) in relation to any significant negative impacts associated with the proposed development on the Natura 2000 sites as described herein.

This stage of the Appropriate Assessment process involves the identification of potentially impacted sites, the identification of the qualifying interests of those sites, and an assessment of the significance of impacts on the conservation objectives of those sites. Any negative impacts on the integrity of structure, function or conservation objectives of these sites will require the implementation of avoidance or mitigation measures to avoid progression to Stages 3 and 4 of the Appropriate Assessment process.

3.2 Summary of Natura 2000 sites relevant to the Stage Two Appropriate Assessment

3.2.1 River Boyne and River Blackwater SAC (Site synopsis version date 06/01/2014, Natura 2000 form update 09/19, Conservation Objectives (generic) version 7.0)

This site is described in the Natura 2000 data form as "*…This site comprises most of the freshwater element of the River Boyne from upriver of the Boyne Aqueduct at Drogheda, the Blackwater River as far as Lough Ramor and the principal Boyne tributaries, notably the Deel, Stoneyford and Tremblestown Rivers. This system drains a considerable area of Cos. Meath and Westmeath and smaller areas of Cavan and Louth. The underlying geology is Carboniferous Limestone for the most part with areas of Upper, Lower and Middle well represented. In the vicinity of Kells Silurian Quartzite is present while close to Trim are Carboniferous Shales and Sandstones. The rivers flow through a landscape dominated by intensive agriculture, mostly of improved grassland but also cereals. Much of the river channels were subject to arterial drainage schemes in the past. Natural floodplains now exist along only limited stretches of river, though often there is a fringe of reed swamp, freshwater marsh, wet grassland or deciduous wet woodland. Along some parts, notably between Drogheda and Slane, are stands of tall, mature mixed woodland. Substantial areas of improved grassland and arable land are included in site for water quality reasons. There are many medium to large sized towns adjacent to but not within the site. The main channel of the Boyne contains a good example of alluvial woodland of the Salicetum albo-fragilis type which has developed on three alluvium islands. Alkaline fen vegetation is well represented at Lough Shesk, where there is a very fine example of habitat succession from open water to raised bog. The Boyne and its tributaries is one of Ireland's premier game fisheries and offers a wide range of angling, from fishing for spring salmon and grilse to sea trout fishing and extensive brown trout fishing. The site is one of the most important in eastern Ireland for Salmo salar and has very extensive spawning grounds. The site also has an important population of Lampetra fluviatilis, though the distribution or abundance of this species is not well known. Lutra lutra is widespread throughout the site. Some of the grassland areas along the Boyne and Blackwater are used by a nationally important winter flock of Cygnus cygnus. Several Red Data Book plants occur within the site, with Pyrola rotundifolia, Poa palustris and Juncus compressus. Also occurring are a number of Red Data Book animals, notably Meles meles, Martes martes and Rana temporaria. The River Boyne is a designated Salmonid Water under the EU Freshwater Fish Directive…"*

NPWS has not yet drawn up a detailed Conservation Objectives document for this site.

3.2.2 The River Boyne and River Blackwater SPA (Site synopsis version date 25/11/10, Natura 2000 form update 09/2018, Conservation Objectives (generic) Version 7.0.

This site is described in the Natura 2000 data form as "*…The River Boyne and River Blackwater SPA is a long linear site that comprises stretches of the River Boyne and several of its tributaries: most of the site is in Co Meath but it extends also into Counties Cavan, Louth and Westmeath. It includes the following river sections: The River Boyne from the M1 motorway bridge, west of Drogheda, to the junction with the Royal Canal, west of Longwood, Co Meath; the River Blackwater from its junction with the River Boyne in Navan to the junction with Lough Ramor in Co Cavan; the Tremblestown River (and Athboy River) from the junction with the River Boyne at Kilnagross Bridge to the bridge in Athboy, Co Meath; the Stoneyford River from its junction with the River Boyne to Stonestone Bridge in Co. Westmeath; the River Deel from its junction with the River Boyne to Cummer Bridge, Co.Westmeath. The site includes the river channel and marginal vegetation. The River Boyne and River Blackwater SPA supports nationally important numbers of Alcedo atthis. Other species which occur within the site include Cygnus olor, Anas crecca, Anas platyrhynchos, Phalacrocorax carbo, Ardea cinerea, Gallinula chloropus, Gallinago gallinago and Riparia riparia.*

NPWS has not yet drawn up a detailed Conservation Objectives document for this site.

3.3 Summary of qualifying interests of Natura 2000 sites potentially exposed to significant negative impacts

Two Natura 2000 sites have been identified as being potentially exposed to significant negative impacts, which are directly or indirectly dependent on the water quality of the Rivers Boyne and Blackwater.

3.3.1 River Boyne and River Blackwater SAC

All of the qualifying interests of this Natura 2000 site are directly or indirectly dependent on the water quality/hydrology of the Rivers Boyne and Blackwater. Any habitats or species dependent on water quality/hydrological regime within this Natura 2000 site would potentially be at risk from changes in water quality/hydrology associated with the proposed works. A description of the national conservation status (taken from The Status of EU Protected Habitats and Species in Ireland, Vol 1, 2 and 3, 2019) of Qualifying Interest (Annex I habitat(s) and/or the Annex II species for which the SAC has been selected) is given as follows.

3.3.1.1 [7230] Alkaline Fens

Alkaline fens are groundwater-fed, generally peat-forming systems with extensive areas of species-rich small sedge and brown moss communities. They occur in areas where there is a high-water table and a base-rich, often calcareous water supply. Alkaline fens can develop in areas where vertical water movement predominates (topogenous), such as poorly drained basins or hollows and open water transitions; or where horizontal water movement is also important (soligenous), such as flushes, valley fens and the laggs of raised bogs. However, this distinction is not always clear (such as in large floodplain fens which can include both elements). Fen systems are often a complex mosaic of habitats, with tall sedge beds, reedbeds, wet grasslands, springs and open water co-occurring. Alkaline fens are relatively widespread in Ireland. The most extensive areas of alkaline fens are thought to occur in lowland basins associated with limestone groundwater bodies (often in midland areas). Alkaline fens associated with flushes and open water transitions tend to be smaller but may be more widespread than those in lowland basins. The main pressures facing the habitat in Ireland are land abandonment (and associated succession), overgrazing, drainage and pollution. The Overall Status is assessed as Bad with a deteriorating trend due to losses of area and habitat quality, as well as the pressures and threats faced by the habitat.

3.3.1.2 [91EO] Alluvial forests with Alnus glutinosa and Fraxinus excelsior (Alno-Padion, Alnion incanae, Salicion albae) – PRIORITY HABITAT

A number of variants of Alluvial woodland habitat exist, of which riparian forests of ash (Fraxinus excelsior) and alder (*Alnus glutinosa*) (Alno-Padion) of temperate and Boreal Europe lowland and hill watercourses are the most common in Ireland. All types occur on heavy soils which are periodically inundated by the annual rise of river levels but otherwise well-drained and aerated during low water. The herbaceous layer includes many large species such as meadowsweet (*Filipendula ulmaria*), wild angelica (*Angelica sylvestris*), wood dock (*Rumex sanguineus*) and sedges (*Carex* spp.), vernal species such as lesser celandine (*Ficaria verna*) and wood anemone (*Anemone nemorosa*), and other indicative species such as remote sedge (*Carex remota*), gypsywort (*Lycopus europaeus*), common nettle (*Urtica dioica*) and water avens (*Geum rivale*). In addition, there are gallery forests of tall willows (Salicion albae) alongside river channels and occasionally on river islands, where the tree roots are almost continuously submerged. These are dominated by white willow (*Salix alba*), osier (*S. viminalis*) and almond willow (*S. triandra*), sometimes with grey willow (*S. cinerea*), but alder should be rare. There is a luxuriant herb layer of species such as reed canary-grass (*Phalaris arundinacea*), common nettle and meadowsweet. A number of pressures affect this habitat in Ireland, the most serious being invasive species, particularly sycamore (*Acer pseudoplatanus*), beech (*Fagus sylvatica*), Indian balsam (*Impatiens glandulifera*) and currant species (*Ribes nigrum* and *R. rubrum*). Some native species such as brambles (*Rubus fruticosus* agg.) and common nettle can also become over-vigorous. Small area losses due to clearfelling have also occurred. As a result, the Overall Status is Bad and the trend is declining. This poorer trend since the previous assessment is mainly due to the availability of more accurate data, and the decline is considered to have been ongoing since before the last assessment.

3.3.1.3 [1099] Lampetra fluviatilis

Given the large area of habitat availability and the likelihood that, in certain flow conditions, river lamprey are able to ascend many of the significant weirs on Irish rivers, it is possible that, in reality, they have a favourable conservation status. The inability to distinguish between *L. fluviatilis* and *L. planeri* larvae, however, and the challenges associated with sampling for adult river lamprey, means that an evaluation of their actual range and population size cannot be undertaken and status is assessed as unknown for the current reporting period. This represents a change from the previous reporting period (where a favourable status was assigned) but does not represent a downgrade in status. Data on larval *Lampetra* sp. were used to assign status in the previous reporting period. Records for adult river lamprey, although difficult to obtain, are considered more appropriate for

making a true assessment of this species. A targeted sampling programme for river lamprey will be required for assessing conservation status in the next reporting cycle.

3.3.1.4 [1106] Salmo salar

There is no evidence of a decline in range since the Directive came into force. The current range is considered sufficient for the long-term survival of the species. Therefore, Range has been assessed as Favourable. Increasing trends have been noted in Salmon population size in the last 5 years. However, the current population estimate is 78% of the Favourable Reference Population. Therefore, Population has been assessed as Inadequate. There is sufficient available habitat and ongoing pressures linked with habitat quality are not considered to be compromising the viability of the species. Therefore, Habitat for the species has been assessed as Favourable. Population estimates are unlikely to reach Favourable status in the next 12 years. Therefore, Future prospects have been assessed as Inadequate. The overall conservation status has been assessed as Inadequate with a stable trend. Although a short-term negative trend is reported for this species, the trend has reversed in the last 5 years. Therefore, an overall stable trend is reported.

3.3.1.5 [1355] Lutra lutra

The most recent distribution data shows that the otter continues to be widespread throughout Ireland and present nationwide in a wide variety of habitat types. Although recent studies on territory overlaps and animal movements suggest that refinements to the population estimation formula are needed, the otter population is considered to be stable and none of the threats or pressures identified is considered likely to impact significantly on the species. Overall, the species is assessed as Favourable, and the overall trend is demonstrating an on-going increase. There were no qualifiers for Favourable assessments in 2013.

3.3.2 River Boyne and River Blackwater SPA

Breeding Kingfisher, the Qualifying Interest of this site is dependent on the maintenance of the water quality (for prey items) and hydrological regime (changes could potentially impact on nesting sites of the River Boyne and Blackwater). This species would potentially be at risk from changes in water quality associated with the proposed works. There is currently no description of the national conservation status of Kingfisher.

3.4 Summary of Conservation Objectives of Natura 2000 sites potentially exposed to significant negative impacts

The focus of the Appropriate Assessment process at the second stage must be on the integrity of European sites "in light of their conservation objectives." A detailed analysis of Natura 2000 sites is given in Section 2.5 as regards:

- General Description;
- Qualifying Interests;
- Threats, Pressures and Activities with negative impacts;
- Conservation Objectives; and
- Conservation Status

A summary of the current conservation status of the qualifying interests (Nationally as indicated in the NPWS document "Status of EU Protected Habitats and Species in Ireland (2019)", and site specific as recorded in the individual Natura 2000 form) and conditions underpinning site integrity is presented in Table 21. A summary of the Conservation Objectives of each site is presented in Table 22.

Table 21: Summary of Conservation Status of Qualifying Interests and conditions underpinning site integrity

SITE NAME/CODE	QUALIFYING INTERESTS HABITAT/SPECIES CODE	NATIONAL CONSERVATION STATUS (2019)		SITE ASSESSMENT OF CONSERVATION STATUS (NATURA 2000 DATA FORM)		CONDITIONS UNDERPINNING SITE INTEGRITY
RIVER BOYNE AND RIVER BLACKWATER SAC						
	[7230]	RANGE	FAVOURABLE	REPRESENTATIVITY	B	• WATER QUALITY • APPROPRIATE AGRICULTURAL PRACTICES • SURFACE AND GROUND WATER QUALITY • APPROPRIATE LEVELS OF DISTURBANCE • WATER LEVELS • AIR QUALITY • TIDAL CURRENTS (LOWER REACHES)
		AREA	INADEQUATE ↓	RELATIVE SURFACE	C	
		STRUCTURES AND FUNCTIONS	BAD (unknown)	CONSERVATION	B	
		FUTURE PROSPECTS	UNFAVOURABLE/BAD	GLOBAL	B	
		OVERALL STATUS	BAD (↓)			
		OVERALL TREND	DETERIORATING			
	91E0 (PRIORITY HABITAT)	RANGE	FAVOURABLE (=)	REPRESENTATIVITY	B	
		AREA	BAD (↓)	RELATIVE SURFACE	B	
		STRUCTURES AND FUNCTIONS	INADEQUATE (↓)	CONSERVATION	B	
		FUTURE PROSPECTS	BAD	GLOBAL	B	
		OVERALL STATUS	BAD↓			
		OVERALL TREND	DETERIORATING			
	[1099]	RANGE	UNKNOWN	REPRESENTATIVITY	C	
		POPULATION	UNKNOWN	RELATIVE SURFACE	B	
		HABITAT	FAVOURABLE (=)	CONSERVATION	C	
		FUTURE PROSPECTS	UNKNOWN	GLOBAL	B	
		OVERALL STATUS	UNKNOWN			
		OVERALL TREND	UNKNOWN			
	[1106]	RANGE	FAVOURABLE (=)	REPRESENTATIVITY	C	
		POPULATION	INADEQUATE (↓)	RELATIVE SURFACE	B	
		HABITAT	FAVOURABLE (=)	CONSERVATION	C	
		FUTURE PROSPECTS	UNFAVOURABLE/INADEQUATE	GLOBAL	B	
		OVERALL STATUS	INADEQUATE (=)			
		OVERALL TREND	STABLE			

SITE NAME/CODE	QUALIFYING INTERESTS HABITAT/SPECIES CODE	NATIONAL CONSERVATION STATUS (2019)		SITE ASSESSMENT OF CONSERVATION STATUS (NATURA 2000 DATA FORM)		CONDITIONS UNDERPINNING SITE INTEGRITY
	[1355]	RANGE	FAVOURABLE (=)	REPRESENTATIVITY	C	
		POPULATION	FAVOURABLE (↑)	RELATIVE SURFACE	A	
		HABITAT	FAVOURABLE (=)	CONSERVATION	C	
		FUTURE PROSPECTS	FAVOURABLE	GLOBAL	A	
		OVERALL STATUS	FAVOURABLE (↑)			
		OVERALL TREND	IMPROVING			
RIVER BOYNE AND RIVER BLACKWATER SPA						
	[A229]	N/A	N/A	POPULATION	C	• WATER QUALITY • APPROPRIATE AGRICULTURAL PRACTICES • SURFACE AND GROUND WATER QUALITY • APPROPRIATE LEVELS OF DISTURBANCE • WATER LEVELS • AIR QUALITY • TIDAL CURRENTS (LOWER REACHES)
		N/A	N/A	CONSERVATION	B	
		N/A	N/A	ISOLATION	C	
		N/A	N/A	GLOBAL	B	

Table 22: Summary of Conservation Objectives of relevant Natura 2000 sites

SITE NAME/CODE	QUALIFYING INTERESTS	CONSERVATION OBJECTIVE
RIVER BOYNE AND RIVER BLACKWATER SAC		
	ALKALINE FENS [7230]	To maintain or restore favourable conservation condition
	ALLUVIAL FORESTS WITH ALNUS GLUTINOSA AND FRAXINUS EXCELSIOR [91E0] (PRIORITY HABITAT)	To maintain or restore favourable conservation condition
	RIVER LAMPREY [1099]	To maintain or restore favourable conservation condition
	ATLANTIC SALMON [1106]	To maintain or restore favourable conservation condition
	OTTER [1355]	To maintain or restore favourable conservation condition
RIVER BOYNE AND RIVER BLACKWATER SPA		
	KINGFISHER [A229]	To maintain or restore favourable conservation condition

3.5 Summary of pressures, threats and activities with potential for negative impacts on qualifying interests of sites

Using the standard Natura 2000 form for each of the Natura 2000 sites potentially at risk of impact from the proposed works, a summary of the threats, activities, and pressures with negative impacts on qualifying interests of the sites in question is presented in Table 23.

Table 23: Summary of threats, pressures and activities on relevant Natura 2000 sites

SITE NAME/CODE	PRESSURE/THREAT/ACTIVITY	INSIDE/OUTSIDE /BOTH	RANK
RIVER BOYNE AND RIVER BLACKWATER SAC			
	GRAZING	BOTH	HIGH
	CULTIVATION	BOTH	HIGH
	FERTILISATION	BOTH	HIGH
	SYLVICULTURE/AGRICULTURE	OUTSIDE	MEDIUM
	FISHING	INSIDE	HIGH
	NAUTICAL SPORTS	INSIDE	MEDIUM
	WALKING, HORSERIDING AND NON-MOTORISED VEHICLES	INSIDE	MEDIUM
	HUMAN INDUCED CHANGES IN HYDRAULIC CONDITIONS	INSIDE	MEDIUM
	SYLVICULTURE/AGRICULTURE	INSIDE	HIGH
	ROADS, MOTORWAYS	BOTH	HIGH
	DISPERSED HABITATION	OUTSIDE	HIGH
	URBANISED AREAS, HUMAN HABITATION	OUTSIDE	HIGH
	DISCHARGES	INSIDE	MEDIUM
RIVER BOYNE AND RIVER BLACKWATER SPA			
	ROADS, MOTORWAYS	BOTH	HIGH
	HUMAN INDUCED CHANGES IN HYDRAULIC CONDITIONS	INSIDE	MEDIUM
	URBANISED AREAS, HUMAN HABITATION	OUTSIDE	HIGH
	DISPERSED HABITATION	OUTSIDE	HIGH

3.6 Impact Prediction

3.6.1 Identified Pathways

As identified in Section 2, the Urban Design Plan area includes the ecological corridor associated with the River Blackwater, one of the primary components of the River Boyne and River Blackwater SAC and the River Boyne and River Blackwater SPA. There is potential for some elements of the proposed Urban Design Plan to impact on the Conservation Objectives of the Qualifying Interests of these Natura 2000 sites. For ease of interpretation, the primary components of the Urban Design Plan are broken down into their constituent elements and the potential for impact assessed.

3.6.1.1 Flowerhill – the street

The main actions and their potential for impact are:

1) Streetscape enhancement – **potential for impact on Natura 2000 sites through increased disturbance**;
2) Shopfront improvement – **no potential impacts foreseen**;
3) Lighting/CCTV – **potential impact on Natura 2000 sites, and ecological integrity of River Blackwater Corridor in general, through increased disturbance associated with artificial lighting**;
4) Aesthetic building enhancements – **no potential impacts foreseen.**

3.6.1.2 Abbeylands – a new urban quarter

The main actions and potential for impacts are:

1) Routes (including river bridge) - A network of connections to link Abbeylands with the river, Flowerhill and the surrounding areas - **potential for impact on Natura 2000 sites through increased disturbance, lighting, water contamination, etc**.;
2) Public spaces - Public spaces are important in creating an attractive and vibrant place. These spaces provide a destination where people can gather, and events can take place. In this instance, public spaces will also provide locations where all residents from Flowerhill and Abbeylands can enjoy - **potential for impact on Natura 2000 sites through increased disturbance, lighting, water contamination, etc**.;
3) Mixed use development - A mix of uses will complement both Flowerhill and the Town Centre while encouraging activity and ensuring spaces are overlooked. Development will be of an

appropriate density that respectfully reflects its adjacent environs - **potential for impact on Natura 2000 sites through increased disturbance, lighting, water contamination, etc**.;

3.6.1.3 Blackwater – The River Park

The main actions and potential for impacts are:

1) Habitat restoration and creation – **there are numerous potential impacts here, including direct impacts on the SAC and/or SPA**;
2) Archaeology & interpretation – no impacts associated directly with this action are foreseen;
3) River Park - **there are numerous potential impacts here, including direct impacts on the SAC and/or SPA**; and
4) River park developments - Opportunity for development to overlook the river park, creating activity, passive surveillance and ensuring a safe environment - **there are numerous potential impacts here, including direct impacts on the SAC and/or SPA**.

3.6.1.4 Rebuilding Flowerhill

The main actions and potential for impacts are:

1) Protection and conservation - Retain and protect the character and heritage of Flowerhill through the redevelopment of vacant buildings - **there are numerous potential impacts here, including direct impacts on the SAC and/or SPA. Of particular note, derelict buildings (and in particular Elliot's Mill) have the potential to serve as important bat roosting sites**;
2) New development - Encourage new development that is of a high-quality design and an appropriate scale and massing to complement the built heritage of the area - **there are numerous potential impacts here, primarily associated with water quality and/or disturbance levels**;
3) Community destination - Create an environment that is vibrant, where people can meet, hold activities and be proud of Flowerhill - **there are numerous potential impacts here, primarily associated with water quality and/or disturbance levels**;
4) Masterplan for the lands at the triangle – the Masterplan will be subject to Appropriate Assessment in order to ensure that there are no impacts or that any such impacts are mitigated against; and
5) Improving the aesthetics of existing dwellings, commercial units and apartment developments - **no impacts associated directly with this action are foreseen**.

3.6.1.5 Our Flowerhill, Our Community

1) Community partnership - Collaborative partnership between the community and other groups to drive forward short-term solutions such as a clean-up project and planting of flowers - **no impacts associated directly with this action are foreseen**;
2) Capacity building - Opportunity to build civic pride and bring the community together by providing more opportunities for local involvement through short term interventions - **no impacts associated directly with this action are foreseen**; and
3) Placemaking initiatives - Opportunity for creative arts and cultural projects to implement community led change, such as the use of a local artist to create a mural within Flowerhill - **no impacts associated directly with this action are foreseen**.

3.6.2 Potential Impacts on Qualifying Interests of sites

The Qualifying Interests (habitat/species), Primary Location of Qualifying Interests, Sensitivities of Qualifying Interests and Potential Impacts affecting Qualifying Interests is indicated in Table 24. The location of the Primary Locations of two Qualifying Interest habitats (both within the River Boyne and River Blackwater SAC – [7230] and [91E0]) are indicated in Figure 30 and Figure 31.

Table 24: Summary of potential impacts on Qualifying Interests of relevant Natura 2000 sites

SITE NAME/CODE	QUALIFYING INTERESTS	PRIMARY LOCATION	SENSITIVITIES	POTENTIAL IMPACTS (INCLUDING THOSE ASSOCIATED WITH CLIMATE CHANGE)
RIVER BOYNE AND RIVER BLACKWATER SAC				
	ALKALINE FENS [7230]	LOUGH SHESK, FREEHAN LOUGH AND NEWTOWN LOUGH - APPROXIMATELY 30 KM (UPSTREAM) FROM OPERATIONS (SEE MAP A)	• DISRUPTION TO AND/OR ACIDIFICATION OF WATER FEEDING FEN	• CHANGES IN HYDROLOGICAL REGIME
	ALLUVIAL FORESTS WITH ALNUS GLUTINOSA AND FRAXINUS EXCELSIOR [91E0] (PRIORITY HABITAT)	BOYNE ISLANDS, 2.5 KM WEST OF DROGHEDA, APPROIXIMATELY 22 KM (DOWNSTREAM) FROM OPERATIONS (SEE MAP B)	• CHANGES IN HYDROLOGICAL REGIME • ALIEN INVASIVE PLANT SPECIES	• CHANGES IN HYDROLOGICAL REGIME
	RIVER LAMPREY [1099]	THROUGHOUT	• CHANGES IN HYDROLOGICAL REGIME • CHANGES IN WATER QUALITY • ALIEN INVASIVE PLANT SPECIES	• CHANGES IN HYDROLOGICAL REGIME • CHANGE IN CHEMICAL AND/OR NUTRIENT STATUS OF WATER AND/OR SILT • CHANGES IN DEPOSITION OF SILT IN HABITAT • IMPACTS ON FEEDING AMMOCOETES THROUGH SILTATION AND/OR BIOACCUMULATION
	ATLANTIC SALMON [1106]	THROUGHOUT	• CHANGES IN HYDROLOGICAL REGIME • CHANGES IN WATER QUALITY • ALIEN INVASIVE PLANT SPECIES	• CHANGES IN HYDROLOGICAL REGIME • CHANGE IN CHEMICAL AND/OR NUTRIENT STATUS OF WATER • BIOACCUMULATION OF CONTAMINANTS

SITE NAME/CODE	QUALIFYING INTERESTS	PRIMARY LOCATION	SENSITIVITIES	POTENTIAL IMPACTS (INCLUDING THOSE ASSOCIATED WITH CLIMATE CHANGE)
River Boyne and River Blackwater SPA	OTTER [1355]	THROUGHOUT	• CHANGES IN HYDROLOGICAL REGIME • CHANGES IN WATER QUALITY • ALIEN INVASIVE PLANT SPECIES • DISTURBANCE	• CHANGES IN HYDROLOGICAL REGIME • CHANGE IN CHEMICAL/NUTRIENT STATUS COULD IMPACT ON PREY SPECIES • BIOACCUMULATION OF CONTAMINANTS
	KINGFISHER [A229]	THROUGHOUT	• CHANGES IN HYDROLOGICAL REGIME • CHANGES IN WATER QUALITY • ALIEN INVASIVE PLANT SPECIES • DISTURBANCE	• CHANGES IN HYDROLOGICAL REGIME • CHANGE IN CHEMICAL/NUTRIENT STATUS COULD IMPACT ON PREY SPECIES • BIOACCUMULATION OF CONTAMINANTS

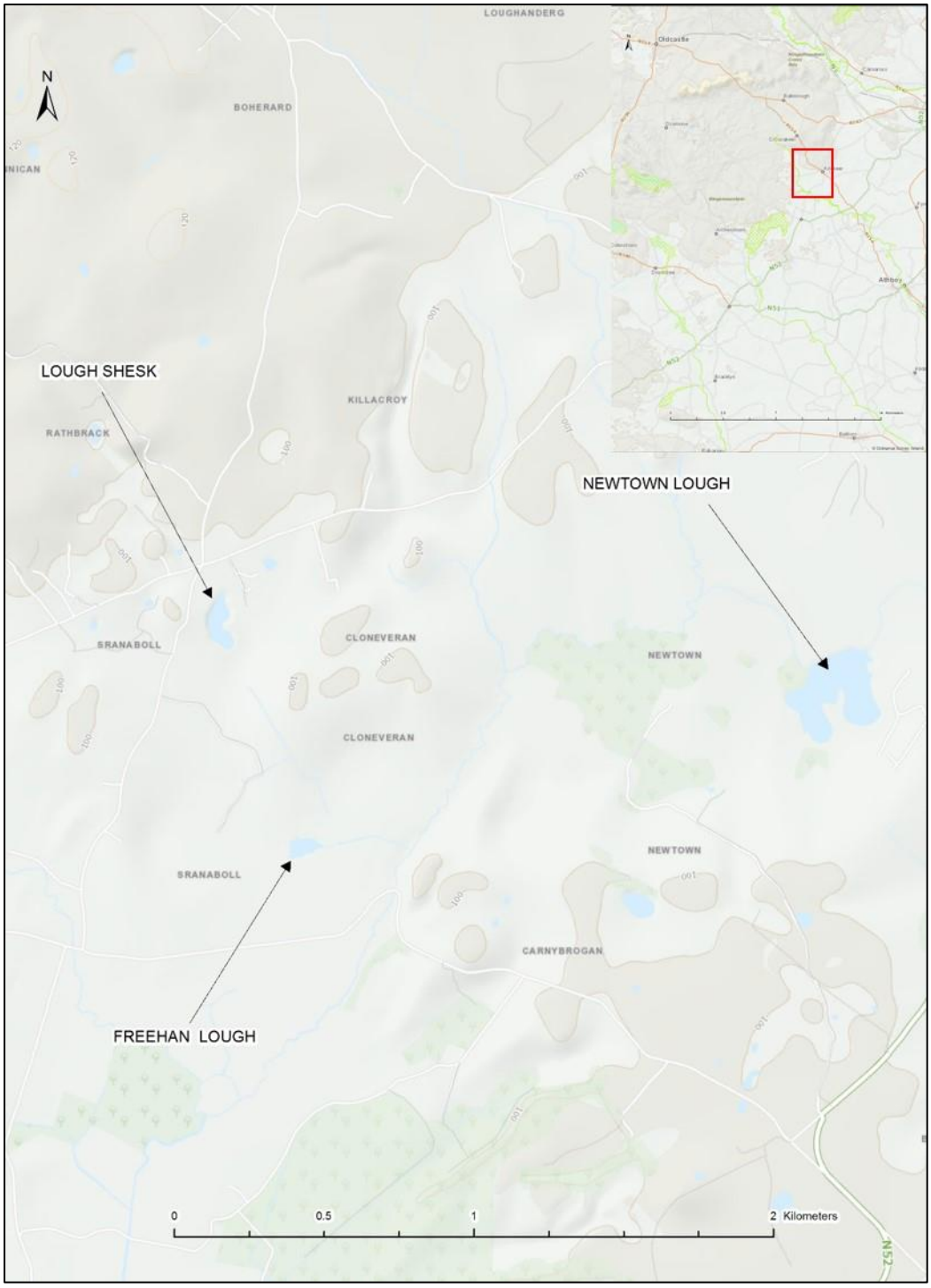

Figure 30 Map illustrating location of three loughs within the River Boyne and River Blackwater where [7230] occurs

Figure 31: Map illustrating location of Boyne Islands, on which [91E0], a priority habitat occurs

3.6.3 Sources of Potential Impacts associated with Urban Design Plan

The sources of potential Direct and Indirect impacts related to the proposed plan are identified in Section 2. The sources of impacts are primarily associated with:

- Direct Impacts on Qualifying Interests of River Boyne and River Blackwater SAC/SPA;
- Impacts on water quality;
- Impacts associated with disturbance (including artificial lighting); and
- Impacts associated with the spreading/introduction of propagules of Alien Invasive Plant Species (primarily Third Schedule-listed species).

A summary of potential impacts on Qualifying Interests of relevant Natura 2000 sites and the sources of potential impacts are provided in Table 25.

Table 25: Summary of potential impacts on Qualifying Interests of relevant Natura 2000 sites and the sources of potential impacts

SITE NAME/CODE	QUALIFYING INTERESTS	POTENTIAL IMPACTS	SOURCE(S) OF IMPACT(S) ASSOCIATED WITH PROPOSED PLAN
RIVER BOYNE AND RIVER BLACKWATER SAC			
	ALKALINE FENS [7230]	• CHANGES IN HYDROLOGICAL REGIME	• None foreseen
	ALLUVIAL FORESTS WITH ALNUS GLUTINOSA AND FRAXINUS EXCELSIOR 91E0 (PRIORITY HABITAT)	• CHANGES IN HYDROLOGICAL REGIME	• None foreseen
	RIVER LAMPREY [1099]	• CHANGE IN CHEMICAL AND/OR NUTRIENT STATUS OF WATER AND/OR SILT • CHANGES IN EROSION/DEPOSITION OF SILT IN HABITAT • IMPACTS ON FEEDING AMMOCOETES THROUGH SILTATION AND/OR BIOACCUMULATION • CHANGES IN HYDROLOGICAL REGIME	• CONTAMINATION OF SURFACE WATER DURING CONSTRUCTION/OPERATION • CONTAMINATION OF GROUND WATER DURING CONSTRUCTION/OPERATION • CHANGES IN EROSION/SEDIMENTATION PROCESSES ASSOCIATED WITH ALIEN INVASIVE PLANT SPECIES
	ATLANTIC SALMON [1106]	• CHANGE IN CHEMICAL AND/OR NUTRIENT STATUS OF WATER • CHANGES IN EROSION/DEPOSITION OF SILT IN HABITAT • BIOACCUMULATION OF CONTAMINANTS • CHANGES IN HYDROLOGICAL REGIME	• CONTAMINATION OF SURFACE WATER DURING CONSTRUCTION/OPERATION • CONTAMINATION OF GROUND WATER DURING CONSTRUCTION/OPERATION • CHANGES IN EROSION/SEDIMENTATION PROCESSES ASSOCIATED WITH ALIEN INVASIVE PLANT SPECIES
	OTTER [1355]	• CHANGE IN CHEMICAL/NUTRIENT STATUS COULD IMPACT ON PREY SPECIES • BIOACCUMULATION OF CONTAMINANTS • INCREASED DISTURBANCE IMPACTING ON HABITAT USAGE • CHANGES IN HYDROLOGICAL REGIME	• CONTAMINATION OF SURFACE WATER DURING CONSTRUCTION/OPERATION • CONTAMINATION OF GROUND WATER DURING CONSTRUCTION/OPERATION • DISTURBANCE/LOSS OF HABITAT • IMPACTS ON PREY ITEMS AS A RESULT OF CHANGES IN EROSION/SEDIMENTATION PROCESSES ASSOCIATED WITH ALIEN INVASIVE PLANT SPECIES

SITE NAME/CODE	QUALIFYING INTERESTS	POTENTIAL IMPACTS	SOURCE(S) OF IMPACT(S) ASSOCIATED WITH PROPOSED PLAN
RIVER BOYNE AND RIVER BLACKWATER SPA	KINGFISHER [A229]	• CHANGE IN CHEMICAL/NUTRIENT STATUS COULD IMPACT ON PREY SPECIES • CHANGES IN EROSION/DEPOSITION OF SILT IN HABITAT • BIOACCUMULATION OF CONTAMINANTS • CHANGES IN HYDROLOGICAL REGIME	• CONTAMINATION OF SURFACE WATER DURING CONSTRUCTION/OPERATION • CONTAMINATION OF GROUND WATER DURING CONSTRUCTION/OPERATION • DISTURBANCE/LOSS OF HABITAT • IMPACTS ON PREY ITEMS AS A RESULT OF CHANGES IN EROSION/SEDIMENTATION PROCESSES ASSOCIATED WITH ALIEN INVASIVE PLANT SPECIES

3.7 Elements of Urban Design Plan with potential for significant negative impacts on Conservation Objectives of Qualifying Interests

Several elements of the Flowerhill and Abbeylands Urban Design Plan have the potential, in the absence of mitigation measures, to impact negatively on the Natura 2000 network:

3.7.1.1 Flowerhill – the street

The primary potential for impact are:

1) Streetscape enhancement – this will entail "*…Improved street design including widened pedestrian pavements, the introduction of quality paving, street trees, quality street furniture, car parking and lighting. This will create an improved environment which encourages pedestrian activity and will help return Flowerhill to the role of a street rather than a road…"*. Any construction works in the proximity of a water course such as the Rivers Boyne and Blackwater have the potential to result in contamination of ground and/or surface water, resulting in a negative impact on the water quality of these rivers. All of the Qualifying Interests of the Natura 2000 sites of which these rivers are a component are directly or indirectly dependent on water quality. Increased car parking, lighting and footfall all have the potential to impact on Qualifying Interests sensitive to disturbance such as Otter and Kingfisher. It must be noted that increased artificial illumination in the vicinity of the River Blackwater/River Boyne also has significant potential to impact on the use of the habitat by light sensitive bat species, including Daubenton's Bat – a waterway specialist;
2) Lighting/CCTV – Increased lighting has the potential to impact on Qualifying Interests sensitive to disturbance such as Otter and Kingfisher. It must be noted that increased artificial illumination in the vicinity of the River Blackwater/River Boyne also has significant potential to impact on the use of the habitat by light sensitive bat species, including Daubenton's Bat – a waterway specialist;

3.7.1.2 Abbeylands – a new urban quarter

The primary potential for impacts are:

1) Routes (including river bridge) - A network of connections to link Abbeylands with the river, Flowerhill and the surrounding areas. Increased footfall and likely associated lighting have the potential to impact on Qualifying Interests sensitive to disturbance such as Otter and

Kingfisher, especially when a river bridge is concerned. It must be noted that increased artificial illumination in the vicinity of the River Blackwater/River Boyne also has significant potential to impact on the use of the habitat by light sensitive bat species, including Daubenton's Bat – a waterway specialist;

2) Public spaces - Public spaces are important in creating an attractive and vibrant place. These spaces provide a destination where people can gather, and events can take place. In this instance, public spaces will also provide locations where all residents from Flowerhill and Abbeylands can enjoy. Increased footfall or concentrations of people in the vicinity of the river could result in disturbance of Qualifying Interests including Otter and Kingfisher. It must be noted that any increased artificial illumination in the vicinity of the River Blackwater/River Boyne also has significant potential to impact on the use of the habitat by light sensitive bat species, including Daubenton's Bat – a waterway specialist;
3) Mixed use development - A mix of uses will complement both Flowerhill and the Town Centre while encouraging activity and ensuring spaces are overlooked. Development will be of an appropriate density that respectfully reflects its adjacent *environs*. Any construction works in the proximity of a water course such as the Rivers Boyne and Blackwater has the potential to result in contamination of ground and/or surface water, resulting in a negative impact on the water quality of these rivers. All of the Qualifying Interests of the Natura 2000 sites of which these rivers are a component are directly or indirectly dependent on water quality. Increased car parking, lighting and footfall all have the potential to impact on Qualifying Interests sensitive to disturbance such as Otter and Kingfisher. It must be noted that increased artificial illumination in the vicinity of the River Blackwater/River Boyne also has significant potential to impact on the use of the habitat by light sensitive bat species, including Daubenton's Bat – a waterway specialist;

3.7.1.3 Blackwater – The River Park

The main actions and potential for impacts are:

1) Habitat restoration and creation – there are numerous potential impacts here, including direct impacts on the SAC and/or SPA. A comprehensive ecological assessment of this area is required in order to inform any works;
2) Archaeology & interpretation – no impacts associated directly with this action are foreseen;
3) River Park - there are numerous potential impacts here, including direct impacts on the SAC and/or SPA. A comprehensive ecological assessment of this area is required in order to inform any works; and

4) River park developments - Opportunity for development to overlook the river park, creating activity, passive surveillance and ensuring a safe environment - there are numerous potential impacts here, including direct impacts on the SAC and/or SPA. A comprehensive ecological assessment of this area is required in order to inform any works

3.7.1.4 Rebuilding Flowerhill

The main actions and potential for impacts are:

1) Protection and conservation - Retain and protect the character and heritage of Flowerhill through the redevelopment of vacant buildings - there are numerous potential impacts here, including direct impacts on the SAC and/or SPA. Of particular note, derelict buildings (and in particular Elliot's Mill) have the potential to serve as important bat roosting sites;
2) New development - Encourage new development that is of a high-quality design and an appropriate scale and massing to complement the built heritage of the area - there are numerous potential impacts here, primarily associated with water quality and/or disturbance levels;
3) Community destination - Create an environment that is vibrant, where people can meet, hold activities and be proud of Flowerhill - there are numerous potential impacts here, primarily associated with water quality and/or disturbance levels;
4) Masterplan for the lands at the triangle – the Masterplan will be subject to Appropriate Assessment in order to ensure that there are no impacts or that any such impacts are mitigated against; and
5) Improving the aesthetics of existing dwellings, commercial units and apartment developments - no impacts associated directly with this action are foreseen.

3.7.1.5 Our Flowerhill, Our Community

1) Community partnership - Collaborative partnership between the community and other groups to drive forward short-term solutions such as a clean-up project and planting of flowers - no impacts associated directly with this action are foreseen;
2) Capacity building - Opportunity to build civic pride and bring the community together by providing more opportunities for local involvement through short term interventions - no impacts associated directly with this action are foreseen; and

3) Placemaking initiatives - Opportunity for creative arts and cultural projects to implement community led change, such as the use of a local artist to create a mural within Flowerhill - no impacts associated directly with this action are foreseen.

3.8 Mitigation Measures – avoiding potential impacts

The three primary sources of potential impacts associated with numerous components of the Flowerhill and Abbeylands Urban Design Plan are:

- Direct impacts on Qualifying Interests of River Boyne and River Blackwater SAC/SPA;
- Impacts on water quality; and
- Impacts associated with increased disturbance.

3.8.1 Direct impacts on Qualifying Interests

The UDP includes a significant area within the River Boyne and River Blackwater SAC and SPA. In order to avoid potential direct impacts on the Qualifying Interests, a comprehensive ecological assessment of the non-built land habitats occurring is required, primarily within the riparian ecological corridor and associated habitat. Mitigation measures must be informed by this assessment.

3.8.2 Impacts on water quality

One of the primary sources of potential negative impacts on the conservation objectives of both the River Boyne and River Blackwater SAC and the River Boyne and River Blackwater SPA regards the potential for impacts on ground and/or surface waters.

The primary mitigation measures to be implemented will involve the protection of water quality. During any works, protection of water quality is paramount, and should be ensured by implementing the following mitigation measures in addition to any site-specific mitigation measures identified by the site engineer, etc.:

The Contractor shall undertake all proposed works in such a manner as to avoid degradation of water quality either by pollution (in particular, from any paint-chips, chemicals utilised to remove paint/rust, etc.) from oil spills, or contamination due to concreting or grouting operations, or by causing turbidity due to disturbance of silt or spoil from operations.

Specific measures to be taken to prevent the above shall include the following:

- The Undertaker shall take special precautions in relation to protection of watercourses. Temporary environmental screens shall be erected sufficient to prevent construction debris (paint chips/rust, etc.), abrasive materials, oils, chemicals or other construction materials from entering any watercourse/drain for the duration of the works. The Undertaker's method statement should make specific reference to measures for the protection of river quality;
- Undertaker's plant, equipment etc. shall be free of any mechanical defects, and be well maintained so as to prevent soil or fuel leaks into the river;
- Undertaker's plant, equipment etc. must arrive on site free of propagules of any plant species listed on Part (1) of the Third Schedule of the European Communities (Birds and Natural Habitats) Regulations of 2011;
- The Undertaker shall so arrange that the cleaning out of concrete delivery trucks and equipment does not cause run-off to enter any watercourse/drains, etc.;
- The Undertaker's method statement should make specific reference to measures for the protection of river water quality, to include measures to ensure no spillage of fuel or cement/lime-based material or any other leakages occur to any drains/water courses for the duration of the works;
- All works will be undertaken in accordance with the following best practice guidelines for working alongside watercourses:
    - CIRIA Control of Water Pollution from Construction sites – Guidance for Consultants and Contactors (2001).
    - Eastern Regional Fisheries Board Guidance Notes 'Requirements for the Protection of Fisheries Habitat during Construction and Development Works at River Sites' (Eastern Regional Fisheries Board, 2006);
    - NRA Guidelines (2006) NRA Guidelines for the Crossing of Watercourses during the Construction of National Road Schemes.

It is essential that there be no impact on water quality of the River Blackwater associated with the operation of the Urban Design Plan. To this end:

1) There must be no changes in discharge of any kind (including storm drains, etc.) to water courses. There must be protective/preventative elements put in place associated with any buildings/ car parking areas/etc., such that any contamination during operation (leaking hydrocarbons from cars/ water associated with the extinguishing of a fire, etc.) does not enter the River Blackwater (or River Boyne); and

2) Any major works within the proximity of the riparian corridor will require a detailed hydrological assessment in order to ensure that there will be no hydrological impacts associated with the UDP.

3.8.3 Impacts associated with disturbance

There is potential for increased disturbance of both Qualifying Interests of the relevant Natura 2000 sites and other fauna of conservation concern – in particular, bats. A comprehensive, season long ecological assessment of non-built land habitats and in particular adjacent to the River Blackwater must be undertaken in order to inform the mitigation measures necessary. The significance of potential impacts on the conservation objectives of qualifying interests following the implementation of mitigation measures is outlined in Table 26.

Table 26: Significance of potential impacts following implementation of mitigation measures

SITE NAME/CODE	QUALIFYING INTERESTS	POTENTIAL IMPACTS	SIGNIFICANCE OF IMPACTS ON QI FOLLOWING IMPLEMENTATION OF MITIGATION MEASURES
RIVER BOYNE AND RIVER BLACKWATER SAC			
	ALKALINE FENS [7230]	• NO IMPACTS FORESEEN	NOT SIGNIFICANT
	ALLUVIAL FORESTS WITH ALNUS GLUTINOSA AND FRAXINUS EXCELSIOR [91E0] (PRIORITY HABITAT)	• NO IMPACTS FORESEEN	NOT SIGNIFICANT
	RIVER LAMPREY [1099]	• CHANGE IN CHEMICAL AND/OR NUTRIENT STATUS OF WATER AND/OR SILT • CHANGES IN DEPOSITION OF SILT IN HABITAT • IMPACTS ON FEEDING AMMOCOETES THROUGH SILTATION AND/OR BIOACCUMULATION	NOT SIGNIFICANT
	ATLANTIC SALMON [1106]	• CHANGE IN CHEMICAL AND/OR NUTRIENT STATUS OF WATER • BIOACCUMULATION OF CONTAMINANTS	NOT SIGNIFICANT
RIVER BOYNE AND RIVER BLACKWATER SPA	OTTER [1355]	• CHANGE IN CHEMICAL/NUTRIENT STATUS COULD IMPACT ON PREY SPECIES • BIOACCUMULATION OF CONTAMINANTS	NOT SIGNIFICANT
	KINGFISHER [A229]	• CHANGE IN CHEMICAL/NUTRIENT STATUS COULD IMPACT ON PREY SPECIES • BIOACCUMULATION OF CONTAMINANTS	NOT SIGNIFICANT

4 Conclusions

In order for AA to comply with the criteria set out in the Habitats Directive and the Planning and Development Act 2000, an AA undertaken by the Competent Authority must include an examination, analysis, evaluation, findings, conclusions, and a final determination.

Following the identification of a potential impact(s) upon one or more Natura 2000 sites through an Appropriate Assessment Screening exercise, a Stage 2 Appropriate Assessment of the Flowerhill and Abbeylands Urban Design Plan has been carried out in accordance with the requirements of Article 6(3) of the Habitats Directive (Council Directive 92/43/EEC). The information to enable the Competent Authority to perform its statutory function in this regard is presented within this NIS.

Following an examination, analysis, and evaluation of the relevant information, and applying the precautionary principle, it is the professional opinion of the author of this report that there will be no adverse impact on the integrity of any of relevant Natura 2000 sites, assuming the implementation of all mitigation/preventative measures as outlined (informed by a comprehensive ecological assessment of non-built land habitats and in particular along the riparian corridor and associated habitat). Consequently, there will be no risk of adverse effects on Qualifying Interest habitats or species, nor the attainment of specific conservation objectives, either alone or in-combination with other plans or projects, for the relevant Natura 2000 sites. The ecological integrity of the Natura 2000 sites concerned (connected with qualifying interests for which the sites have been designated) will not be significantly impacted.

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www.meath.ie – official website of Meath County Council.

www.npws.ie – website of the National Parks and Wildlife Service, source of information for data regarding Natura 2000 sites and Article 17 Conservation Assessments.

www.europa.eu – official website of the European Union, source of information on EU Directives.

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&
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