

Ecological Survey & Habitat Mapping

Shannon-Erne Waterway Ecological Assessment Proposed Blueway: Lock 16 Killarcan to Kilclare



Planning & Environmental Consultants

DOCUMENT DETAILS

Client: Waterways Ireland

Project title: Shannon-Erne Waterway: Lock 16
Killarcan to Kilclare Ecological
Assessment Proposed Blueway

Project Number: 150523

Document Title: Habitat Mapping & Ecological Survey

Doc. File Name: 150523 – Eco-Survey – 2015.08.09 – F

Prepared By: McCarthy Keville O’Sullivan Ltd.
Planning & Environmental Consultants
Block 1, G.F.S.C.
Moneenageisha Road, Galway



Document Issue:

Rev	Status	Issue Date	Document File Name	Author(s)	Approved By:
01	Draft	08/09/2015	150523 – Eco-Survey – 2015.08.09 – F	JH	PR

Table of Contents

1	Introduction.....	2
1.1	General Introduction.....	2
2	Field Study	2
2.1	Methodology.....	2
2.2	Flora	3
2.2.1	Habitats Present on the Site	3
2.2.1.1	Amenity Grassland (GA2)	4
2.2.1.2	Buildings and Artificial Surfaces (BL3)	4
2.2.1.3	Canal (FW3).....	5
2.2.1.4	Drainage Ditch (FW4).....	7
2.2.1.5	Dry Meadows and Grassy Verges (GS2)	8
2.2.1.6	Dry Calcareous & Neutral Grassland (GS1)	9
2.2.1.7	Improved Agricultural Grassland (GA1)	10
2.2.1.8	Ornamental/non-native Shrub (WS3) & Flower Beds & Borders (BC4)	11
2.2.1.9	Reed and Large Sedge Swamp (FS1)	12
2.2.1.10	Scrub (WS1).....	13
2.2.1.11	Spoil and Bare Ground (ED2).....	14
2.2.1.12	Stone Walls and Other Stonework (BL1)	15
2.2.1.13	Hedgerow (WL1)/Treeline (WL2)	16
2.2.1.14	Wet Grassland (GS4)	17
2.2.1.15	Wet willow-alder-ash Woodland (WN6)	18
3	Assessment of Impacts	20
3.1	Proposed Blueway	20
3.1.1	Loss of Habitat	20
3.1.2	Impacts as a result of Habitat Loss	23
3.2	Proposed Plans and Projects.....	23
3.2.1	Construction Phase.....	23
3.2.1.1	Earth Works	23
3.2.1.2	Hydrocarbon usage.....	24
3.2.1.3	Disturbance to Fauna during the Works Stage.....	25
3.2.1.4	Pollution of Watercourses	25
3.2.1.5	Spread of Invasive Species	25
3.2.2	Operational Phase.....	26
3.2.2.1	Increased Human Activity.....	26
3.2.2.2	Disturbance.....	26
3.3	Overall Recommendations.....	26

1 INTRODUCTION

1.1 General Introduction

Waterways Ireland appointed McCarthy Keville O’Sullivan (McCarthyKOS) to undertake an Ecological Survey of the Shannon Erne Waterway between Lock 16 Killarcan and Kilclare, Co. Leitrim.

The objectives of the project as set out by Waterways Ireland are as follows:

- Classification of habitats and preparation of habitat maps identifying habitats (according to Level III Fossitt) within the allocated Study Areas adhering to Waterways Ireland GIS Data Standard Guidelines.
- Generation of habitat boundary polygons based on OSI mapping.
- Identification, mapping and provision of detailed information about habitats,
- Preparation of a digital habitat GIS dataset and habitat maps for the allocated Study Area which will be provided in an ArcGIS compatible format.
- Preparation of a report providing written information and photographs about habitats identified.
- Ecological Impact assessment of a proposed Blueway, including habitat loss calculations.

2 FIELD STUDY

2.1 Methodology

The flora and habitats of the site were assessed by means of a desk study of information and literature pertinent to the site and surrounding area, information pertaining to legislation/designations and other notable ecological records. In addition, a field survey of the site, including a habitat survey, was carried out by suitably qualified ecologist.

Seasonal factors that affect distribution patterns and habits of species were taken into account when conducting the surveys. The potential of the site to support certain populations (in particular those of conservation importance that may not have been recorded during the field survey due to their seasonal absence or nocturnal/cryptic habits) was assessed.

The field walkover survey of the proposed works area was conducted on the 23rd of June 2015, which falls within the recognised optimum period for vegetation surveys/habitat mapping i.e. May to September (NRA, 2008; The Heritage Council, 2010). The site was assessed and the habitats within and adjacent to the site were classified according to the guidelines set out in ‘A Guide to Habitats in Ireland’ (Fossitt, 2000), which classifies habitats based on the vegetation present and management history. The site was walked systematically and habitats were assessed, classified and sketched onto field maps of the site.

Summer is possibly the most appropriate time of year for ecological surveys when many plant species are in flower and faunal activity is at its peak. However, summer field visits are limited and may not record all the species that potentially use the site (e.g. wintering wildfowl). Ideally surveys should be carried out in all seasons. It was deemed unnecessary to carry out surveys in all seasons as it was possible to classify

each habitat and identify many of the species present, based on the site survey in June. Using this information, together with published information on the site and its environs, it is considered that a comprehensive ecological assessment was achieved.

An aquatic plant survey, using a grapnel, was carried out at random locations within each survey section within the Study Area. Species collected were identified and an aquatic species inventory was compiled. Polarised sunglasses were also used to aid visual observation of fish species within the canal.

2.2 Flora

2.2.1 Habitats Present on the Site

Habitats present on the site were classified as part of a habitat classification and mapping exercise completed in June 2015, according to the guidelines set out in 'A Guide To Habitats in Ireland' (Fossitt, 2000), which classifies habitats based on the vegetation present and management history.

The habitats recorded from the study area, within/adjacent to the Blueway route, are listed below. The habitat names are followed by their corresponding habitat reference code (in brackets). Habitat mapping Figures 2.1-2.4 are provided in Appendix I.

- Amenity Grassland (GA2)
- Buildings & Artificial Surfaces (BL3)
- Canals (FW3)
- Drainage Ditch (FW4)
- Dry Meadows and Grassy Verges (GS2)
- Dry Calcareous & Neutral Grassland (GS1)
- Hedgerow (WL1)
- Habitat Mosaic of Dry Meadows and Grassy verges and Scrub (GS2/WS1)
- Habitat Mosaic of Wet Grassland and Scrub (GS4/WS1)
- Improved Agricultural Grassland (GA1)
- Reed & Large Sedge Swamp (FS1)
- Scrub (WS1)
- Spoil & Bare Ground (ED2)
- Stone Walls & other Stonework (BL1)
- Treeline (WL2)
- Wet Grassland (GS4)
- Wet Willow-Alder-Ash Woodland (WN6)

2.2.1.1 Amenity Grassland (GA2)

Amenity Grassland was most commonly associated with built structures and canal infrastructure such as at locks, bridges, and roads. The best example of this habitat type were found between Lock 14 and Newbrook Bridge and in the vicinity of Locks 9 and 10 (Plate 2.1). This habitat was actively managed and was characterised by a low sward height and low species diversity. Species recorded from amenity grassland areas included Perennial Ryegrass (*Lolium perenne*), Meadow grasses (*Poa* spp.) Daisy (*Bellis perennis*), Dandelion (*Taraxacum officinale*), Rib-wort plantain (*Plantago lanceolata*) and White Clover (*Trifolium repens*). In most areas (away from locks/towns etc.) Amenity Grassland would soon succeed to other habitats such as Dry Meadows & Grassy Verges (GS2) or in time, Scrub (WS1).



Plate 2.1. Amenity Grassland at Lock 14

2.2.1.2 Buildings and Artificial Surfaces (BL3)

Throughout the study area the most common forms of this habitat type included domestic dwellings, abandoned buildings, artificial surfaces adjacent to locks, agricultural sheds and yards, tarmac sections of towpath and roadways (Plate 2.2). Generally, built habitats are not considered of high ecological significance and do not offer particularly good floral or faunal habitat. Built structures that were made of natural stone such as the locks and several of the bridges were included under the classification Stone Walls and Other Stonework (BL1).



Plate 2.2. Tarmac Road at Tirmactiernan Bridge

2.2.1.3 Canal (FW3)

The Shannon Erne Waterway was constructed in the early nineteenth century to allow the transport of freight between the River Shannon in the Republic of Ireland and the River Erne in Northern Ireland (Plate 2.3).

The watercourse was typically 10-15m in width and dominated by slow flowing glide habitat. The waters were turbid along the entire survey section.

The margins of the canal supported varying levels of vegetation from short grassland to occasional reed swamp. Typical species of the canal margins included Reed Canary Grass (*Phalaris arundinacea*), Reed Sweet-grass (*Glyceria maxima*), Common Reed (*Phragmites australis*), Common Clubrush (*Schoenoplectus lacustris*), Angelica (*Angelica sylvestris*), Amphibious Bistort (*Persicaria amphibia*) and Branched Bur-reed (*Sparganium erectum*).

Aquatic flora was sampled using a grapnel at random locations within each canal section of the survey area. The grapnel was tossed several times at each location, in order to obtain a good sample. Aquatic macrophytes were extremely scarce within the study area and no evidence of macrophytes was recorded from several canal sections (See Table 2.1 Below.)

Table 2.1 Grapnel sample locations and species recorded along the Study Area

Description	Grid Ref	Species Recorded
Killarcan Lock (Lock 16) to Tirmactiernan Bridge	196642, 304874	Broad Leaved Pondweed (<i>Potamogeton natans</i>)
Tirmactiernan Bridge to	197026, 305056	No macrophytes recorded from sample station.

Description	Grid Ref	Species Recorded
Tirmactiernan Lock (15)		
Tirmactiernan Lock (15)- Crossycarwill Bridge	197510, 305173	Nuttall's Waterweed (<i>Elodea nuttallii</i>)
Crossycarwill Bridge to Drumduff Bridge and Lock 14	197799, 305400	No macrophytes recorded from sample station.
Drumduff Bridge and Lock 14 to Newbrook Bridge	198442, 305905	No macrophytes recorded from sample station.
Newbrook Bridge to Newbrook Lock (Lock 13)	198673, 306001	No macrophytes recorded from sample station.
Newbrook Lock (Lock 13) to Kilclarebeg Bridge/Lock 12	198981, 306450	No macrophytes recorded from sample station.
Kilclarebeg Bridge/Lock 12 to Kilclare Lower Lock (Lock 11)	199056, 306728	No macrophytes recorded from sample station.
Kilclare Lower Lock (Lock 11) to Drumruekill Bridge & Kilclare Middle Lock (Lock 10)	199615, 306863	No macrophytes recorded from sample station.
Drumruekill Bridge & Kilclare Middle Lock (Lock 10) to Kilclare Upper Lock (Lock 9) and Footbridge	199754, 306874	Yellow Water Lily (<i>Nuphar lutea</i>), Branched Bur-reed (<i>Sparganium erectum</i>), Unbranched Bur-reed (<i>Sparganium emersum</i>), Nuttall's Waterweed (<i>Elodea nuttallii</i>) , Water Plantain (<i>Alisma plantago-aquatic</i>)

The canal offers an excellent habitat for coarse fish and Roach (*Rutilus rutilus*), Perch (*Perca fluviatilis*) and Pike (*Esox lucius*) were observed with the aid of polarised glasses, during the field surveys.



Plate 2.3. Canal section between Tiermactiernan Bridge and Lock 15

2.2.1.4 Drainage Ditch (FW4)

Over several sections of the study area, the towpath was accompanied by a drainage ditch inland of the path (Plate 2.4). This drain was often on the property boundary and was in many areas associated with a treeline or hedgerow. In some areas the drain was a defined channel with drier lands behind. Over the majority of the study area, the drains varied in width between 0.5 and 1.5m. All of the drains were dominated by a benthic substrate of silt and were invariably choked with vegetation. Typical species recorded from the drainage ditches included Floating Sweet-grass (*Glyceria fluitans*), Fool's Watercress (*Apium nodiflorum*), Reed Canary-grass (*Phalaris arundinacea*), Great Willowherb (*Epilobium hirsutum*), Yellow Iris (*Iris pseudacorus*) and occasional Branched Bur Reed (*Sparganium erectum*). In areas of more open water, species such as Duckweed (*Lemna* spp.) and Water Starwort (*Callitriche* sp.) were observed.



Plate 2.4. Drainage Ditch (FW4) on landward side of Towpath

2.2.1.5 Dry Meadows and Grassy Verges (GS2)

The presence of rank, overgrown grassland dominated by tall tussocky grasses and creeping herbs is generally indicative of the habitat 'Dry Meadows and Grassy Verges' as described in '*A Guide to Habitats in Ireland*' (Fossitt, 2000). Unmown strips of tall grassland vegetation within the study area are best described as Dry Meadows and Grassy Verges (Plate 2.5). This habitat was found along the unmown or annually mown bank margins (Plate 2.6) at many locations along the canal towpath and along roadside verges.

Where encountered within the study area, the habitat was dominated by tall grasses and creeping herbs with a reasonable proportion of hydrophilous species along the canal margin and ruderals on the landward side of the towpath. Tall tussocky grasses such as Cocksfoot (*Dactylis glomerata*) and False-oat Grass (*Arrhenatherum elatius*) and creeping herbs such as Bird's-foot Trefoil (*Lotus corniculatus*), Meadow Vetchling (*Lathyrus pratensis*) and Meadow Buttercup (*Ranunculus acris*) were recorded. Tall herbs such as Cow Parsley (*Anthriscus sylvestris*) were also frequently recorded in this habitat. Other species commonly recorded include Ribwort Plantain (*Plantago lanceolata*), Meadow grasses (*Poa* spp.), Yorkshire Fog (*Holcus lanatus*), Crested Dog's Tail (*Cynosurus cristatus*), Silverweed (*Potentilla anserina*), Sorrel (*Rumex acetosa*), Meadow Buttercup (*Ranunculus repens*) and Greater Willowherb (*Epilobium hirsutum*). The habitat often formed a mosaic with Scrub (WS1) particularly in areas where Bramble (*Rubus fruticosus* agg.) had encroached on the canal bankside (i.e. East of Lock 16)



Plate 2.5. Typical example of unmown Dry Meadows and Grassy Verge Habitat (GS2). (East of Lock 15, North bank)



Plate 2.6. Annual Mowing of a strip of Dry meadow and grassy verge habitat (East of Lock 15, South bank)

2.2.1.6 Dry Calcareous & Neutral Grassland (GS1)

Dry calcareous grassland is defined as '*unimproved or semi-improved dry grassland that may be either calcareous or neutral, but not acid*' (Fossitt, 2000). The bank and towpath along sections of the canal were built originally using imported calcareous

material. The majority of the bankside grassland habitat between the towpath and the canal wall along the main line of the canal reflects the calcareous nature of the substrate. In certain areas this habitat was moderately species-rich featuring a number of grasses common in calcareous grassland habitats such as Annual Meadow-grass (*Poa annua*), Crested Dog's-tail (*Cynosurus cristatus*), Quaking Grass (*Briza media*) and Timothy (*Phleum pratense*). Additional grasses recorded included Cock's-foot (*Dactylis glomerata*) and Yorkshire Fog (*Holcus lanatus*) (Plate 2.7).

Broadleaved herbs within this habitat included Red and White Clovers (*Trifolium pratense* and *T. repens*), Ladies Bedstraw (*Galium verum*), Tufted Vetch (*Vicia cracca*), Bush Vetch (*Vicia sepium*), Bird's Foot Trefoil (*Lotus corniculatus*), Self-heal (*Prunella vulgaris*), Yarrow (*Achillea millefolium*), Knapweed (*Centurea nigra*), Eyebright (*Euphrasia* spp.), Yellow Rattle (*Rhinanthus minor*) and Ox-eye Daisy (*Leucanthemum vulgare*). Common Spotted Orchid was recorded from a species rich example of this habitat located to the west of Lock 13.



Plate 2.7. Recently mown Dry Calcareous and Neutral Grassland (GS1) (East of Lock 16).

2.2.1.7 Improved Agricultural Grassland (GA1)

Much of the land in the vicinity of the Shannon Erne Waterway study area is of high agricultural quality with much of it being managed for grass and beef production. Commonly occurring species recorded from the agricultural fields adjacent to the towpath included Perennial Ryegrass (*Lolium perenne*), White Clover (*Trifolium repens*), Dandelion (*Taraxacum officinale*), Silverweed (*Potentilla anserina*), Yorkshire Fog (*Holcus lanatus*), Cocksfoot (*Dactylis glomerata*), Creeping Buttercup (*Ranunculus repens*), Annual Meadow Grass (*Poa annua*), Creeping Thistle (*Cirsium arvense*), Nettle (*Urtica dioica*), Spear Thistle (*Cirsium vulgare*) and Mouse-ear (*Cerastium fontanum*).

Whilst much of this quality agricultural land is set back from the canal and buffered from it by wetter grasslands, scrub or woodlands, there are large sections of the study area where the improved lands border the canal directly or are separated from it only

by the trackway with its associated back drain/hedgerow/treelines as is the case between Crossycarwill Bridge and Lock 14 (Plate 2.8).



Plate 2.8. Agricultural Grassland (GA1), between Crossycarwill Bridge and Lock 14

2.2.1.8 Ornamental/non-native Shrub (WS3) & Flower Beds & Borders (BC4)

Occasional areas of flower beds and borders were recorded. These often occurred in conjunction with villages, houses and locks. These areas were planted for decoration and landscaping and were well maintained and managed. Typically where they occurred they featured a range of non-native ornamental bedding species such as Marigolds, Dahlias, and Petunias.

As with the flowerbeds and borders, ornamental/non-native shrubs often occurred in conjunction with housing or along built up areas of the canal. This habitat was typically recorded in close proximity to canal locks (Plate 2.9).



Plate 2.9. Ornamental/non-native shrubs (WS3), Lock 9.

2.2.1.9 Reed and Large Sedge Swamp (FS1)

This habitat is classified as being a species poor stand of herbaceous vegetation that is dominated by reeds and other large grasses or sedges. This habitat was found in various scattered isolated locations throughout the study area and was most commonly recorded as a fringe along the canal bank (Plate 2.10). The dominant species recorded from linear fringes included Common Reed (*Phragmites australis*) and Reed Canary-grass (*Phalaris arundinacea*). The most commonly recorded broadleaved herbs included Watermint (*Mentha aquatica*), Wild Angelica (*Angelica sylvestris*), and Meadowsweet (*Filipendula ulmaria*). Water Horsetail (*Equisetum fluvitile*), and Hemp-agrimony (*Eupatorium cannabinum*) were occasionally recorded.



Plate 2.10. Fringing Common Reed dominated FS1 habitat. (East of Lock 16)

2.2.1.10 Scrub (WS1)

An abundance of Scrub (WS1) was recorded along the Canal corridor. The habitat varied substantially in species composition and management. The main species recorded in this habitat included Willow (*Salix* spp), Hawthorn (*Crataegus monogyna*), Blackthorn (*Prunus spinosa*), Bramble (*Rubus fruticosus* agg.), Elder (*Sambucus nigra*) and Gorse (*Ulex europaeus*).

Scrub (WS1) also formed intimate mosaics with areas of undermanaged Dry Meadows and Grassy Verges (GS2). Such a habitat mosaic was recorded between Lock 16 and Tirmactiernan Br (Plate 2.11).

Linear strips of Scrub were also recorded adjacent to the canal side of the towpath particularly where the towpath was located on an elevated embankment such as was recorded east of Crosscarwill Bridge.



Plate 2.11. Bramble, Willow and Hawthorn Scrub/ Dry meadows and grassy verge Mosaic (WS1/GS2), Lock 16 to Tirmactiernan Bridge, North bank.

2.2.1.11 Spoil and Bare Ground (ED2)

The existing canal towpath along some survey sections within the study area was dominated by paved trackways classified as Spoil and bare ground (ED2) (Plate 2.12). The trackways were mainly constructed from carboniferous Clause 804. The paved towpath occurred in areas that were actively utilized for recreation.

This habitat generally supported little vegetation cover except for common grasses and herbs growing up through the road gravel, e.g. Yorkshire Fog (*Holcus lanatus*), Annual Meadow-grass (*Poa annua*), Common Mouse-ear (*Cerastium fontanum*), Red Bartsia (*Odontites vernus*) and Rib-wort Plantain (*Plantago lanceolata*). This habitat type often graded into Dry meadows and grassy verges (GS2) where the towpath was less frequently utilised and vegetation recolonization was occurring.



Plate 2.12. Spoil and Bare Ground habitat (ED2) towpath, west of Lock 14.

2.2.1.12 Stone Walls and Other Stonework (BL1)

The habitat Stone walls and other stonework (BL1) was recorded in many locations within the study area. This habitat includes stone walls, other than those of intact buildings. In the case of the study area, the habitat occurred on bridges, walls in locks and along other parts of the canal bank (Plate 2.13).

Stone walls and other stonework of this type provide habitat for a number of specialised species, including ferns, lichens and mosses. Plant species recorded growing on stonework within the study area included Common Ivy (*Hedera helix*), Wall-rue (*Asplenium ruta-muraria*), Maidenhair Spleenwort (*Asplenium trichomanes*), Ivy-leaved Toadflax (*Cymbalaria muralis*) and occasional Brambles (*Rubus fruticosus* agg.).



Plate 2.13. Example of Stone Walls and Other Stonework at Lock 12

2.2.1.13 Hedgerow (WL1)/Treeline (WL2)

An abundance of treeline and hedgerow habitats was recorded along the Canal (Plate 2.14). These habitats varied in species composition and management. The dominant species recorded from hedgerow habitats included Hawthorn (*Crataegus monogyna*), Blackthorn (*Prunus spinosa*), Dog Rose (*Rosa canina*), Bramble (*Rubus fruticosus* agg.), Willow (*Salix* spp.), Elder (*Sambucus nigra*) and Gorse (*Ulex europaeus*).

Guelder Rose (*Viburnum opulus*) was recorded from more species rich hedgerow examples recorded between Newbrook Lock (Lock 13) to Kilclarebeg Bridge/Lock 12 and Drumruekill Bridge & Kilclare Middle Lock (Lock 10) to Kilclare Upper Lock (Lock 9) and Footbridge.

Treelines were recorded throughout the study area and were dominated by Ash, (*Fraxinus excelsior*), Sycamore (*Acer pseudoplatanus*) and Alder (*Alnus glutinosa*) with Copper Beech (*Fagus purpurea*) and Pedunculate Oak (*Quercus robur*) recorded occasionally.



Plate 2.14. Hedgerow (WL1) as typically found along the Waterways Ireland Property Boundary.

2.2.1.14 Wet Grassland (GS4)

Large areas of wet grassland were recorded within and adjacent to the study area (Plate 2.15). Some of these areas were dominated by rushes such as Soft Rush (*Juncus effusus*) and Sharp Flowered Rush (*Juncus acutiflorus*). Additional frequently recorded species included Marsh Foxtail (*Alopecurus geniculatus*), Sweet Vernal-grass (*Anthoxanthum odoratum*), Creeping Bent (*Agrostis stolonifera*), Silverweed (*Potentilla anserina*), Common Bent (*Agrostis capillaris*), Yorkshire Fog (*Holcus lanatus*), Devilsbit Scabious (*Succisa pratensis*), Watermint (*Mentha aquatica*), Rib-wort Plantain (*Plantago lanceolata*), Meadow Buttercup (*Ranunculus acris*), Creeping Buttercup (*Ranunculus repens*), Lesser Spearwort (*Ranunculus flammula*) and Ragged Robin (*Lychnis flos-cuculi*).

On the landward side of the towpath, this habitat often graded into Improved agricultural grassland (GA1), as was the case between Crossscarwill bridge and Lock 14. In some areas, it had a high proportion of tall herbs such as Great Willowherb (*Epilobium hirsutum*) and Meadowsweet (*Filipendula ulmaria*). The habitat also formed intimate mosaics with scrub and rank grassland where there was a lack of regular management adjacent to the canal towpath.



Plate 2.15 Wet Grassland east of Lock 16

2.2.1.15 Wet willow-alder-ash Woodland (WN6)

A small Isolated stand of this habitat was recorded to the west of Drumduff Bridge and Lock 14 on the northern canal bank (Plate 2.16). The woodland was dominated by Willow (*Salix* spp.) and Alder (*Alnus glutinosa*) and the ground flora was dominated by Brambles (*Rubus fruticosus* agg.) with occasional Nettles (*Urtica dioica*). An existing paved access track surround the woodland and it will not be impacted upon by the proposed Blueway.



Plate 2.16. Wet Woodland (WN6), West of Lock 14.

3 ASSESSMENT OF IMPACTS

Impacts likely to be specific to the construction of the Blueway are discussed below in Section 3.1. Impacts likely to arise from either the construction or operation of the Blueway are discussed, including best practice and mitigation in Section 3.2. Overall recommendations are provided in Section 3.3

3.1 Proposed Blueway

3.1.1 Loss of Habitat

Impact assessment including calculation of habitat loss has been undertaken for the proposed Blueway. Habitat loss calculations are based on the detailed design of the Blueway and habitat mapping completed by McCarthy Keville O'Sullivan, 2015. Habitat loss calculations were conducted using the GIS software MapInfo Professional 10.5.

The habitat loss calculations are based on the extent of the proposed Blueway located within the Waterways Ireland property boundary along the Shannon Erne Waterway. The total area of the proposed designed Blueway within the Waterways Ireland property boundary is approximately 16,330m².

In addition, habitat loss calculation were undertaken for a potential works area, which incorporated a **presumed** (worst case scenario) 0.5m buffer either side of the designed Blueway, in order to determine the habitats likely to be temporarily disturbed during the construction works. The total approximate area within the potential Blueway construction corridor is 21,4601m²

The results of the GIS database analysis in terms of loss of habitat, including loss of habitat within construction area working corridor are provided below in Tables 3.1 and 3.2. Please note the habitat area figures provided below are conservative and represent the worst case scenario.

A number of habitats which are unlikely to be traversed by the proposed works were identified as having a potential overlap (albeit minimal) during the GIS analysis; theses habitats are marked with an asterisk* in Tables 3.1 & 3.2 below. It is recommended that all habitats marked with an asterisk* are avoided during the actual construction works.

Table 3.1 Habitat Loss (Polygon/Regions)

Habitat Type	Habitat % within Designed Area	Loss of Area m2 (Designed Area)	Habitat Loss m2 within Identified ESA (Designed Area)	Habitat % within working corridor. (0.5m buffer of designed area)	Loss of Area m² (0.5m buffer of designed area)	Habitat Loss within Identified ESA (0.5m Design Buffer)
Dry meadow and grassy verge (GS2)	50.0	8239.9	-	51.68625	11091.87	-
Spoil & Bare Ground (ED2)	18.2	3021.1	-	16.63825	3570.568	-
Wet Grassland (GS4)	12.5	2075	-	11.03392	2367.88	-
Built and artificial surfaces (BL3)	9.5	1586.2	-	8.535887	1831.801	-
Amenity grassland (GA2)	8.0	1322.4	-	9.657982	2072.603	-
Scrub (WS1)	0.4	61.2	-	100.4389	0.468028	-
Mosaic: Dry Meadows and Grassy Verges (GS2)/ Scrub (WS1)	0.2	41.7	-	0.618425	132.714	-
Stone walls and other stonework (BL1)	0.2	24.3	-	0.153242	32.88577	-
Dry calcareous and neutral grassland (GS1)	0.03	6.3	-	0.192594	41.33059	*9.7m
Mosaic: Wet Grassland (GS4)/ Scrub (WS1)	-	-	-	0.02094	4.49362	-

Habitat Type	Habitat % within Designed Area	Loss of Area m2 (Designed Area)	Habitat Loss m2 within Identified ESA (Designed Area)	Habitat % within working corridor. (0.5m buffer of designed area)	Loss of Area m² (0.5m buffer of designed area)	Habitat Loss within Identified ESA (0.5m Design Buffer)
*Wet Willow-alder-ash Woodland (WN6)	-	-	-	0.538686	115.602	*115.6m

Table 3.2 Habitat Loss (Polyline/Linear Features)

Habitat Type	Loss habitat meters (Design Area and 3.5m presumed route)	Habitat Loss within Identified ESA (Design Area)	Loss of habitat meters (5m wide working corridor)	Habitat Loss within Identified ESA (5m)
* Hedgerows (WL1)	66m	-	82	-
Drainage Ditch (FW4)	97.5m	-	13.9	-
Stone walls and other stonework (BL1)	5.3m	-	6.4	-
Treeline (WL2)	-	-	59.6	-

3.1.2 Impacts as a result of Habitat Loss

The habitats within which the Blueway is proposed comprise mainly: species poor grassy verges classified as **Dry Meadows and Grassy Verges** (50%), gravel pathways classified as **Spoil and Bare Ground** (18.2%), species poor wet grassland (12.5%), the existing paved towpath, classified as **Buildings and Artificial Surfaces** (9.5%) and mown grassland classified as **Amenity Grassland** (8%). The latter habitats account for approximately 98% of the proposed Blueway route.

The latter habitats are common in a local, national and international context and none offer particularly good floral or faunal habitat.

Isolated patches of moderately species rich **Dry Calcareous and neutral grassland (GS1)** were recorded along and adjacent to the towpath. The habitat example, located to the west of Lock 13 containing Common Spotted orchid was classified as an Ecologically Sensitive Area owing to its uniqueness along the canal corridor. An approximated area of 9.7m² of species rich **Dry Calcareous and neutral grassland (GS1)** is located within the assumed working corridor. It is feasible for the grassland to be avoided during the construction works and the habitat is therefore unlikely to be impacted. This habitat does not correspond to the Annex I habitats *6210 calcareous grassland* or *6510 lowland hay meadows* as per O'Neill et.al. 2013.

An approximated area of 115.6m² of **Wet Willow-alder-ash Woodland (WN6)** is located within the assumed working corridor. This area was classified as an ESA as it is rare along the canal corridor. There is an existing paved footpath surrounding the woodland and construction works will be limited to this area and there shall be no disturbance of the woodland.

3.2 Proposed Plans and Projects

The proposed project relates to the proposed Blueway.

3.2.1 Construction Phase

3.2.1.1 Earth Works

Construction of the Blueway will involve excavation of a small amount of soil. This creates the potential for sediment and/or nutrient run-off, especially if soil is stored in an unconsolidated state for a period of time. Suspended solids or nutrients resulting from the decomposition of organic material could potentially enter the adjacent canal

and other drainage features. It is considered unlikely that this would happen to a significant degree.

Best Practice and Mitigation

- Excavation and infilling will be carried out in small progressive stages.
- Any topsoil that is of use for landscaping will be stored on the site. Where this is required during the construction phase, it will be stored suitably far away from the canal and covered to avoid excessive sediment run-off or windblow.
- Whilst no significant run off of silt laden run off is anticipated, given the proposed construction methodology, the site will be regularly monitored by construction staff for signs of run-off such as silt in surrounding vegetation and measures will be put in place to prevent this where necessary. This may include the provision of a solid containment berm (of soil) or alternatively the erection of a silt fence. A silt fence may be constructed by attaching a sheet of geotextile membrane to a stock fence and burying the bottom of it into the ground. Thus allowing water to pass through but not the heavier fraction of the sediment.
- Excavations will be carried out using a suitably sized excavator.
- Any excavated soil that is not re-used will be disposed of to a Local Authority approved waste disposal facility.
- In all circumstances, excavation depths and volumes will be minimised and excavated material will be re-used where possible.

3.2.1.2 Hydrocarbon usage

The use of hydrocarbons during the works leads to the potential for pollution to enter environment, including drainage ditches and, potentially, the canal. Leaks in poorly maintained plant and machinery could lead to hydrocarbon dispersal over the site. Leaks in fuel storage tanks and spillages during refueling operations could lead to larger releases of hydrocarbons into the environment.

Best practice and Mitigation

The use of machinery at the site carries the potential for accidental hydrocarbon contamination of the area, by fuel spillages or oil leaks for example. The works will be carried out in accordance with the following measures to avoid such impacts:

- Mobile storage such as fuel bowzers will be banded to 110% capacity to prevent spills. Tanks for bowzers and generators shall be double skinned.
- When not in use, all valves and fuel trigger guns from fuel storage containers will be locked.
- All plant refueling will take place on site using mobile fuel bowzers. Only dedicated trained & competent personnel will carry out refueling operations. Plant refueling will take place as far as practicable from watercourses. A spill kit and drip tray shall be on site at all times and available for all refueling operations. Equipment shall not be left unattended during refueling. All pipework from containers to pump nozzles will have anti siphon valves fitted.
- Strict procedures for plant inspection, maintenance and repairs shall be detailed in the contractor's method statements and machinery shall be checked for leaks before arrival on site.
- All site plant will be inspected at the beginning of each day prior to use. Defective plant shall not be used until the defect is satisfactorily fixed.
- All major repair and maintenance operations will take place off site.
- Care will be taken at all times to avoid contamination of the environment with contaminants other than hydrocarbons, such as uncured concrete or other chemicals.

- The plant refuelling procedures described above shall be detailed in the contractor's method statements.

3.2.1.3 Disturbance to Fauna during the Works Stage

Short Term Minor Negative Impact

The proposed plans and projects will result in increased levels of noise and activity around the towpath during the works period, in particular when stripping topsoil applying surface dressings, and conducting maintenance works. Species present along the canal corridor are likely to habituate to human activity and are unlikely to be significantly affected by the proposed works. Otter, a species known to occur along the canal corridor are crepuscular in nature and are unlikely to be significantly impacted by the proposed works. In relation to birds, there is potential for minor disturbance and temporary displacement. This is considered to be a short term minor negative impact given that the construction works will be limited to small areas at a time and given that there is an abundance of suitable habitat for such species in the surrounding landscape.

Mitigation

No mitigation necessary as the works will be short term in duration.

3.2.1.4 Pollution of Watercourses

Temporary Moderate Negative Impact

The proposed plans and projects have the potential to cause pollution of the surrounding environment. Pollution could take a number of forms and could occur during a number of the operations involved in the construction process. Reference should be made to the Eastern Regional Fisheries Board (now part of Inland Fisheries Ireland) Requirements for the Protection of Fisheries Habitat during Construction and Development Works at River Sites (Murphy, 2004) for relevant water quality protection measures, or other best practice guidance for the protection of water quality for the construction industry.

3.2.1.5 Spread of Invasive Species

Permanent Moderate Negative Impact

The proposed works will involve the movement of soil on the site and will create disturbed ground that may be subject to colonization with invasive species such as Japanese Knotweed (not recorded) or Winter Heliotrope (recorded adjacent to the Blueway to the east of Lock 10 at Grid Ref: 199668, 306855). No invasive species were recorded within the proposed Blueway working area. In stream works are not proposed as part of the Blueway.

Best Practice and Mitigation

- In the event that additional topsoil and quarried stone is required on the site, it will be sourced from a stock that has been screened for the presence of any invasive species and where it is confirmed that none are present.
- All machinery will be thoroughly cleaned and disinfected prior to arrival and departure from the site to prevent the colonization/spread of invasive species. This process will be detailed in the contractor's method statement.
- Sites of known infestation i.e. (Winter Heliotrope located to the east of Lock 10 at Grid Ref: 199668, 306855) shall be clearly marked and avoided, where possible, during the works. The importance of preventing the spread of invasive species will form part of a tool box talk to all personnel prior to construction stage.

3.2.2 Operational Phase

3.2.2.1 Increased Human Activity

Provision of a Blueway will probably attract an increased number of visitors. The effect of such an increase in human activity at the site is difficult to assess but three potential impacts are identified: increased visitor numbers could lead to 1) **disturbance** of local faunal communities, 2) an increase in **trampling and towpath erosion** and 3) **littering/dumping**.

3.2.2.2 Disturbance

The proposed development is likely to increase visitor numbers to the site and is designed primarily to promote the area as a tourist destination. This is considered to be a minor impact as the site is already used extensively by walkers in the area who utilize the existing towpaths. In addition the canal is a busy navigation route. Increased visitor activity in the area does have the potential to cause some disturbance to fauna. Generally, mammalian species of concern are crepuscular in nature, while the majority of disturbance by visitors to the route will be during daylight hours.

3.3 Overall Recommendations

During construction works, existing excavated material should be used where possible, with importation of material only where necessary. Material to be re-used should be stored in a suitable manner to avoid potential for impact to water quality. Imported material should come from a suitably assessed quarry, where there is no risk of importation of invasive species.

Construction should include best practice with regard to adjacent watercourses – the prevention of pollution and protection of the riverbank and its flora and fauna. Work should be completed in accordance with Eastern Regional Fisheries Board '*Requirements for the Protection of Fisheries Habitat during Construction and Development Works at River Sites*' and should include the best practice and mitigation measures described above in Section 3.2. In addition, all work completed should be in compliance with the Wildlife Act, 1976 and Amendment, 2000.

All contractors should incorporate strict biosecurity protocols into their Construction Environmental Management Plans. This should include the thorough cleaning and disinfection of all machinery prior to arrival and departure from the site, to prevent the spread of invasive species.

Appendix I

Habitat Mapping

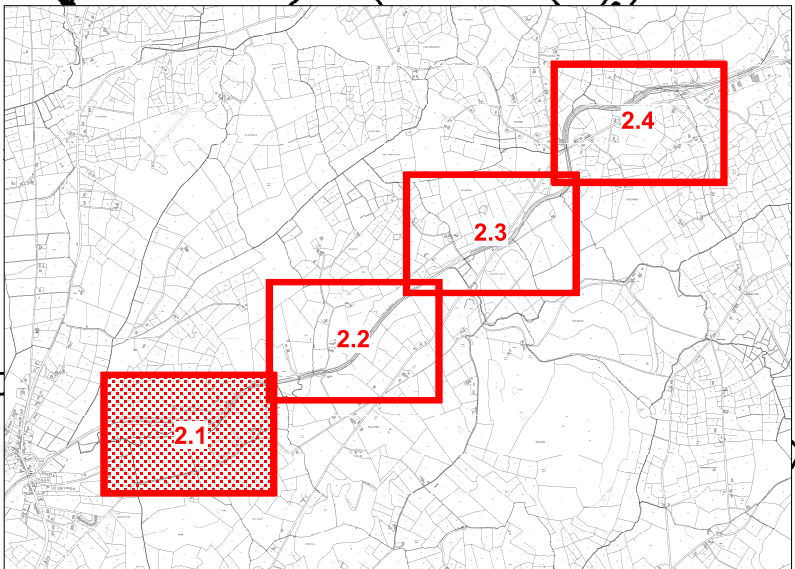
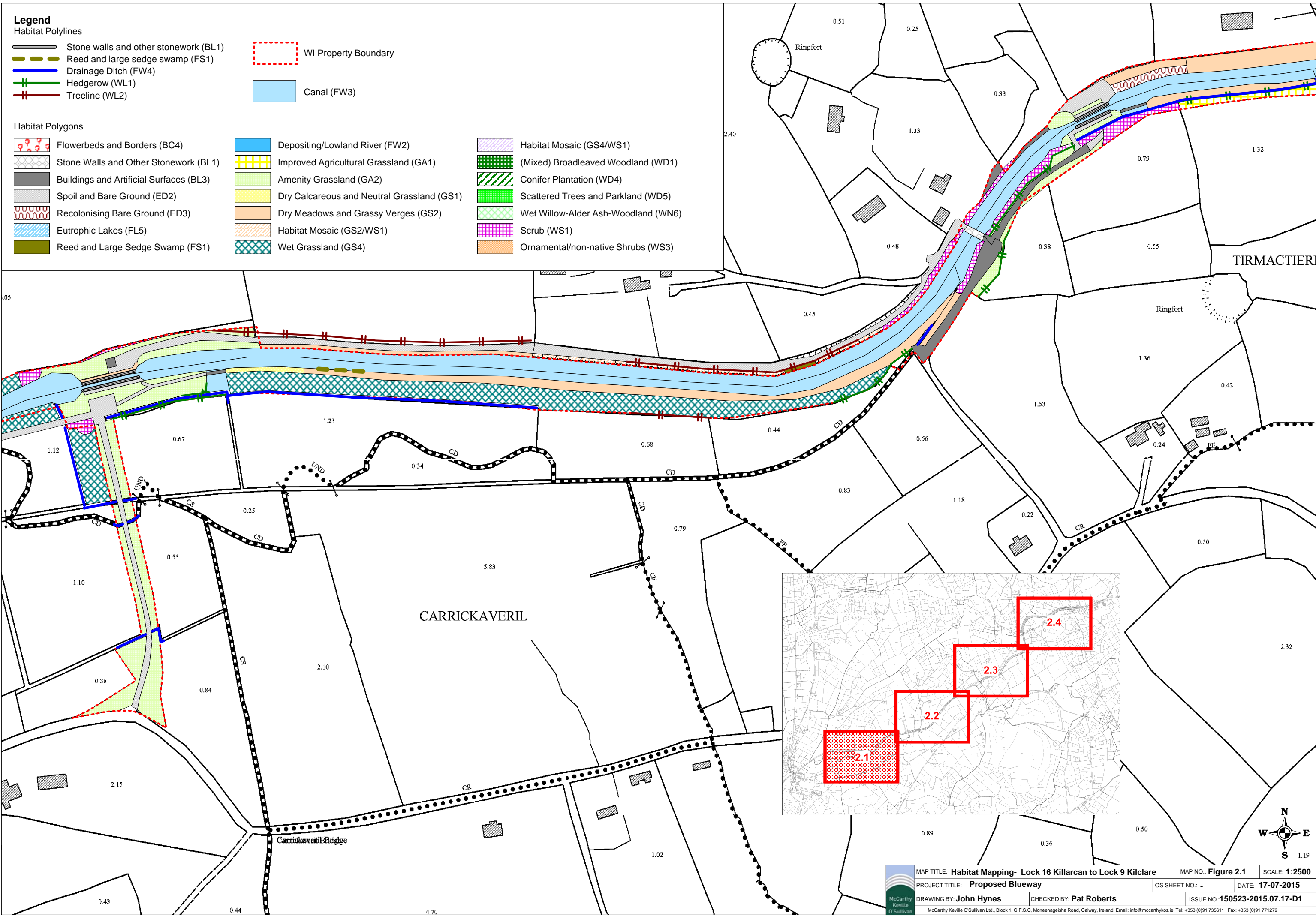
Legend

Habitat Polylines

- Stone walls and other stonework (BL1)
- Reed and large sedge swamp (FS1)
- Drainage Ditch (FW4)
- Hedgerow (WL1)
- Treeline (WL2)
- WI Property Boundary
- Canal (FW3)

Habitat Polygons

- Flowerbeds and Borders (BC4)
- Stone Walls and Other Stonework (BL1)
- Buildings and Artificial Surfaces (BL3)
- Spoil and Bare Ground (ED2)
- Recolonising Bare Ground (ED3)
- Eutrophic Lakes (FL5)
- Reed and Large Sedge Swamp (FS1)
- Depositing/Lowland River (FW2)
- Improved Agricultural Grassland (GA1)
- Amenity Grassland (GA2)
- Dry Calcareous and Neutral Grassland (GS1)
- Dry Meadows and Grassy Verges (GS2)
- Habitat Mosaic (GS2/WS1)
- Wet Grassland (GS4)
- Habitat Mosaic (GS4/WS1)
- (Mixed) Broadleaved Woodland (WD1)
- Conifer Plantation (WD4)
- Scattered Trees and Parkland (WD5)
- Wet Willow-Alder Ash-Woodland (WN6)
- Scrub (WS1)
- Ornamental/non-native Shrubs (WS3)



	MAP TITLE: Habitat Mapping- Lock 16 Killarcan to Lock 9 Kilclare		MAP NO.: Figure 2.1	SCALE: 1:2500
	PROJECT TITLE: Proposed Blueway		OS SHEET NO.: -	DATE: 17-07-2015
	DRAWING BY: John Hynes		CHECKED BY: Pat Roberts	ISSUE NO.: 150523-2015.07.17-D1
	McCarthy Keville O'Sullivan Ltd., Block 1, G.F.S.C. Moneenageisha Road, Galway, Ireland. Email: info@mccarthynos.ie Tel: +353 (0)91 735611 Fax: +353 (0)91 771279			

Ordnance Survey Ireland Licence No. AR 0021815© Ordnance Survey Ireland/Government of Ireland

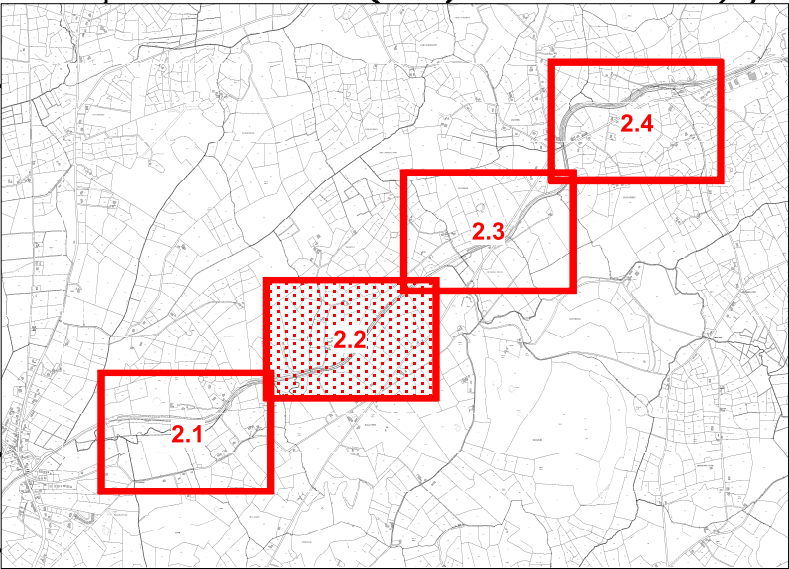
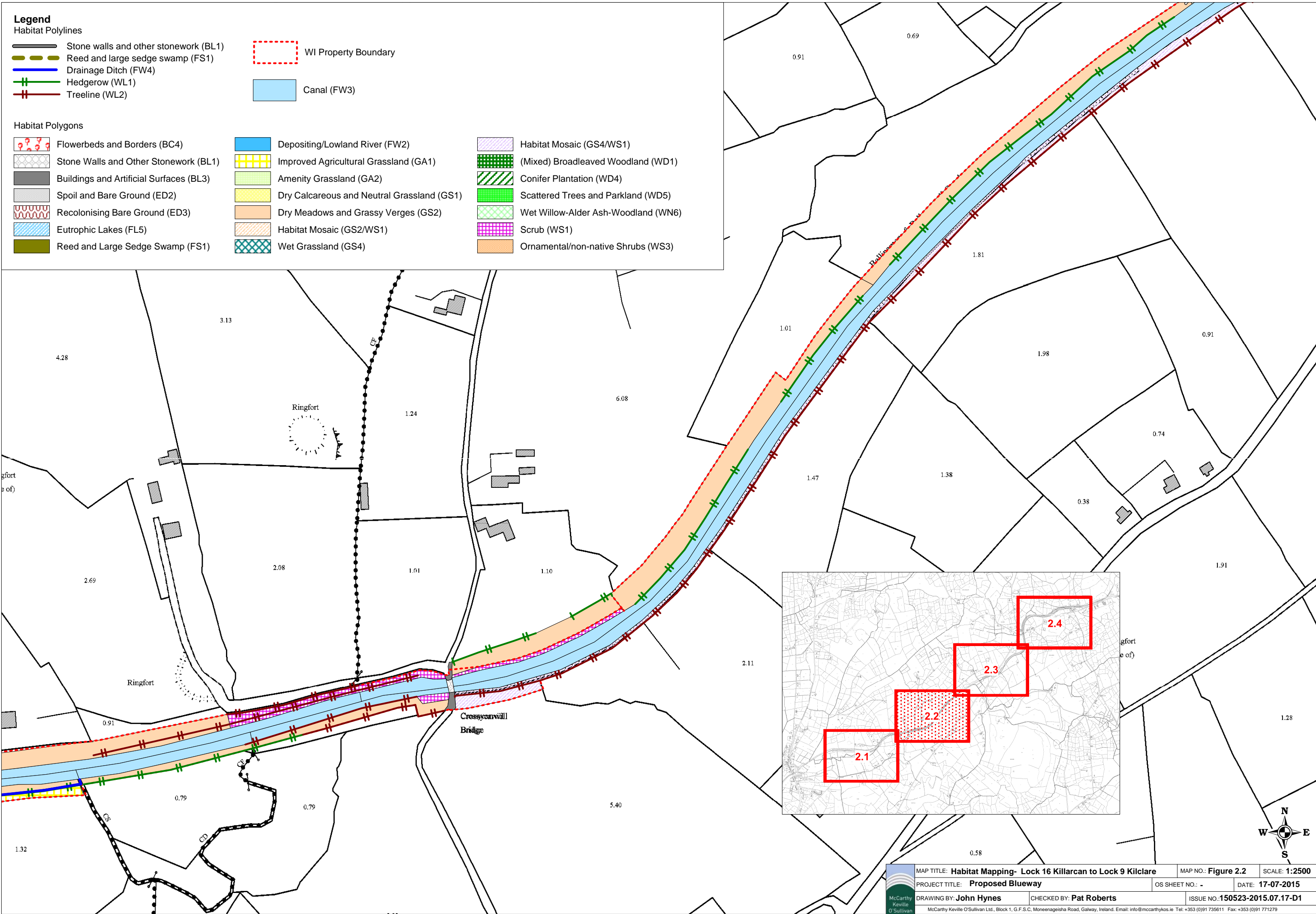
Legend

Habitat Polylines

- Stone walls and other stonework (BL1)
- Reed and large sedge swamp (FS1)
- Drainage Ditch (FW4)
- Hedgerow (WL1)
- Treeline (WL2)
- WI Property Boundary
- Canal (FW3)

Habitat Polygons

- Flowerbeds and Borders (BC4)
- Stone Walls and Other Stonework (BL1)
- Buildings and Artificial Surfaces (BL3)
- Spoil and Bare Ground (ED2)
- Recolonising Bare Ground (ED3)
- Eutrophic Lakes (FL5)
- Reed and Large Sedge Swamp (FS1)
- Depositing/Lowland River (FW2)
- Improved Agricultural Grassland (GA1)
- Amenity Grassland (GA2)
- Dry Calcareous and Neutral Grassland (GS1)
- Dry Meadows and Grassy Verges (GS2)
- Habitat Mosaic (GS2/WS1)
- Wet Grassland (GS4)
- Habitat Mosaic (GS4/WS1)
- (Mixed) Broadleaved Woodland (WD1)
- Conifer Plantation (WD4)
- Scattered Trees and Parkland (WD5)
- Wet Willow-Alder Ash-Woodland (WN6)
- Scrub (WS1)
- Ornamental/non-native Shrubs (WS3)



MAP TITLE: Habitat Mapping- Lock 16 Killarcan to Lock 9 Kilclare		MAP NO.: Figure 2.2	SCALE: 1:2500
PROJECT TITLE: Proposed Blueway		OS SHEET NO.: -	DATE: 17-07-2015
DRAWING BY: John Hynes		CHECKED BY: Pat Roberts	ISSUE NO.: 150523-2015.07.17-D1
McCarthy Keville O'Sullivan Ltd., Block 1, G.F.S.C. Moneenageisha Road, Galway, Ireland. Email: info@mccarthykos.ie Tel: +353 (0)91 735611 Fax: +353 (0)91 771279			

