

Ecological Impact Assessment: DRUMSHANBO to BATTLEBRIDGE BLUEWAY.

PREPARED FOR WATERWAYS IRELAND

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Ecological Impact Assessment: DRUMSHANBO to BATTLEBRIDGE BLUEWAY.

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1 Introduction

BEC Consultants Ltd was contracted by Waterways Ireland to undertake an ecological survey and impact assessment of the Lough Allen Canal from Drumshanbo Lock to Battle Bridge, Co. Leitrim, in relation to a proposed walkway.

The aim of the survey was to collect data on the flora, fauna and habitats that exist along the Lough Allen Canal corridor and Acres Lake, which will form the basis of the impact assessment.

Note: The convention of left and right bank assigned while facing downstream will be used throughout this report.

2 Study area

The study area was the Lough Allen Canal corridor between Drumshanbo Lock and Battle Bridge, including Acres Lake; a distance of approximately 7 km.

3 Project description

Waterways Ireland proposes:

1. To construct a new multi-use boardwalk enhancement at Acres Lake, Drumshanbo, Co Leitrim.
2. To improve the east bank (left) of the canal from Drumleague Lock to Acres Lake using stone surfacing.
3. To continue Waterways Ireland's back drain maintenance programme.

The project will also see the existing crushed stone paths from Battle Bridge to Drumleague Lock and from Drumshanbo Lock to Acres Lake connected in as part of the Blueway, with a change-of-use application.

Once operational, maintenance of the new towpath walkway will differ from the existing maintenance regime by the inclusion of regular surface agitation and rolling of stoned surface, and bi-annual spraying of herbicide.

4 Methodology

4.1 Desk study

A desk study was carried out to gather existing information on the Lough Allen Canal, its habitats and species, including fish and aquatic macroinvertebrates. This desk study included a review of the NPWS mapping tool, the National Biodiversity Data Centre mapping tool, an internet search and a review of scientific papers.

4.2 Consultation

Consultation was carried out with a number of people and agencies in order to gather as much data as possible related to the species and habitats found within the study area. Consultation was carried out by means of e-mail and telephone conversations. People/organisations contacted as part of the consultation include:

- a) Paul McLoone and Catherine Kerins of Inland Fisheries Ireland (IFI) to obtain any relevant fish data for the survey area.
- b) Tara Gallagher of IFI to obtain data on aquatic macroinvertebrates of the study area.
- c) Dr Tina Aughney of Bat Conservation Ireland.
- d) National Parks and Wildlife Service (NPWS) Conservation Ranger John Matthews, with responsibility for south Co. Leitrim.
- e) Relevant Biodiversity and Heritage Officers.

4.3 Field survey

A field survey was carried along the Lough Allen Canal and Acres Lake on 25th-27th May 2015. The project team consisted of John Brophy and Dr Jim Martin. The aim of the field survey was to map the habitats and record plant, bird and mammal species within the study area, while highlighting habitats and species of particular importance (e.g. rare or protected, invasive, etc.).

4.3.1 Habitats & plants

The habitats present in the study area were identified and recorded following the Fossitt (2000) classification. Habitats were mapped on to base-maps in the field and on return to the office digitised using ArcGIS. Habitat mapping protocol followed those of Smith *et al.* (2011). It should be noted that the accuracy of standard GPS units usually ranges from 5 – 15 metres and the aerial photograph base maps were also utilised to inform the habitat mapping. In the case of mapping the linear habitats along the canal corridor, a small margin of error should be expected and maps should be treated as schematic rather than precise representations of what is on the ground. This is particularly true when considering the width of linear habitats; mapped as polylines, which are always less than 4 m but could vary considerably within the range of 0.1 m to 4 m. An inventory of plant species was prepared for the entire study area. Species names used throughout the survey for vascular plants are according to the current Irish National Biodiversity Data Centre (NBDC) species checklist; at the time of writing, this is Ireland2008v2.

Submerged aquatic vegetation was sampled by means of a double-headed rake. However, after a number of unsuccessful grapnels, the survey was discontinued. The high colour of the canal water greatly reduces the presence of submerged aquatic plants.

4.3.2 Mammals

The study area was surveyed for the presence of non-volant mammals, including otters (*Lutra lutra*) and badgers (*Meles meles*). This included looking for signs such as droppings, footprints, potential dwellings (holts/setts/warrens, etc.), latrines, tracks and feeding signs. The locations of any particularly notable signs found were recorded using a handheld GPS.

4.3.3 Birds

A bird survey of the study area was carried out. This survey consisted of walking the study area and recording all bird species utilising the canal corridor and Acres Lake. Bird species were identified by sight or calls and a species inventory for entire study area compiled. Bird species were only recorded if they were considered to be interacting with the canal corridor and so species transiting the area were not recorded.

4.3.4 Amphibians

Spot checks of the back drains along the canal were carried out for the presence of amphibians (common frog and smooth newt). The locations of any signs found were recorded using a handheld GPS.

4.3.5 Reporting

This assessment has been prepared with regard to *Guidelines on the information to be contained in Environmental Impact Statements* (EPA, 2002).

5 Existing environment

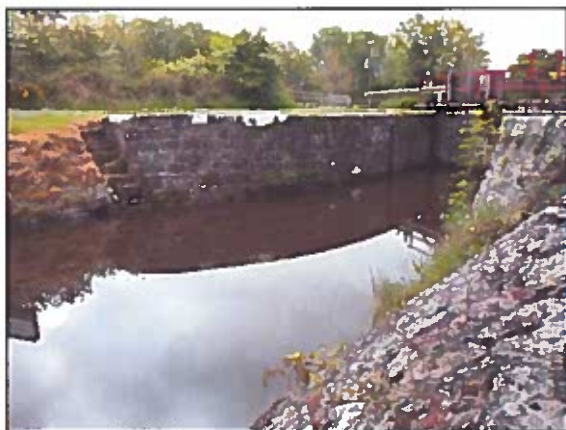
The Lough Allen Canal extends from Lough Allen and re-joins the Shannon system at Battle Bridge and is approximately 7 km in length.

No data was found on the water quality of the Lough Allen Canal. The water of the canal is highly coloured, which is likely to be the result of peat entering the system.

5.1 Habitats

Twenty-two habitat types described in Fossitt (2000) were recorded within the study area in the course of the current survey. The habitat maps are presented in Appendix I and each habitat is described below. Two EU Annex I habitats, [6430] Hydrophilous tall herb fringe communities of plains and of the montane to alpine level and [91E0] Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (Alno-Padion, Alnion incanae, Salicion albae) (NPWS, 2013, O'Neill and Barron, 2013) were recorded during the survey.

5.1.1 BL1 Stone walls and other stonework



The habitat Stone walls and other stonework (BL1) was recorded 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 and walls in locks, and along other parts of the canal bank. Stone walls and other stonework of this type provides habitat for a number of specialised species, including ferns, lichens and mosses. Plant species recorded in this habitat within the study area included Common Ivy (*Hedera*

helix), Wall-rue (*Asplenium ruta-muraria*), Maidenhair Spleenwort (*Asplenium trichomanes*) and Ivy-leaved Toadflax (*Cymbalaria muralis*).

5.1.2 BL2 Earth banks



Only one good example of an Earth bank (BL2) was recorded during the study (shown opposite) and this was in the vicinity of Battle Bridge. While earth banks also occurred in other sections, the treelines, which were found on top of them always dominated and therefore these areas were mapped as part of the treeline (WL2) habitat. Although trees do shade the example shown here a distinctive flora had developed on the bank with Wild Strawberry (*Fragaria vesca*) and Primrose (*Primula vulgaris*)

common, as was Big Saggy-moss (*Rhytidiadelphus triquetrus*).

5.1.3 BL3 Buildings and artificial surfaces



Within the study area, the habitat Buildings and artificial surfaces (BL3) was represented by a number of features including buildings and roads. This habitat has minimal ability to support species and is generally of little conservation importance, though there can be exceptions (e.g. bats roosting within buildings). This habitat was most common between Drumleague and Battle Bridge Locks.

5.1.4 ED2 Spoil and bare ground



The Spoil and bare ground (ED2) habitat includes land that is kept unvegetated by heavy trampling or by the operation of vehicles, or unconsolidated surfaces such as the path on the right side of the canal between Drumleague Lock and Battle Bridge (shown opposite). This habitat is of little ecological interest only supporting a few plant species that can tolerate trampling or are early colonisers, such as Greater Plantain (*Plantago major*).

5.1.5 ED3 Recolonising bare ground



Recolonising bare ground (ED3) occurs when bare or disturbed ground becomes invaded by herbaceous plants, with plant cover exceeding 50%. It occurred in a few places within the survey area, often associated with recent works such as the clearing of drains. Species recorded in this habitat within the study area included Common Nettle (*Urtica dioica*) and Creeping Buttercup (*Ranunculus repens*).

5.1.6 FS1 Reed and tall sedge swamps



The reed swamp habitat was almost absent from the Canal habitat (FW3), but good examples were recorded around Acres Lake (shown opposite). The habitat can be dominated by stands of Reed Canary-grass (*Phalaris arundinacea*), Common Club-rush (*Schoenoplectus lacustris*), or Bottle Sedge (*Carex rostrata*), other common components are Bulrush (*Typha latifolia*) and Water Horsetail (*Equisetum fluviatile*). Around Acres Lake this habitat could often form a mosaic with Tall herb

swamps (FS2). All areas of FS1 within the survey area were listed as Environmentally Sensitive Areas (ESAs).

5.1.7 FS2 Tall herb swamps



Tall herb swamps (FS2) were only recorded around Acres Lake and almost all examples corresponded to the Annex I habitat Hydrophilous tall herb fringe communities of plains and of the montane to alpine level [6430] (NPWS, 2013). The habitat supported plants such as Meadowsweet (*Filipendula ulmaria*), Common Valerian (*Valeriana officinalis*), Wild Angelica (*Angelica sylvestris*) and Cowbane (*Cicuta virosa*). All areas of 6430 within the survey area were listed as Environmentally Sensitive Areas

(ESAs).

5.1.8 FW3 Canals

The water of Lough Allen canal is very dark in colour, indicating inputs of humic and other acids from peat. Plants which were recorded submerged beneath the water or floating upon it include Yellow water-lily (*Nuphar lutea*) and Broad-leaved Pondweed (*Potamogeton natans*). The canal lacks well-developed marginal growth with emergent plants occurring in isolated sections. These include Unbranched Bur-reed (*Sparganium emersum*), Branched Bur-reed (*Sparganium erectum*), Reed Canary-grass (*Phalaris arundinacea*) and Water-plantain (*Alisma plantago-aquatica*).

In addition to the plant species, the canal supports fish and macroinvertebrates.

5.1.9 FW4 Drainage ditches



Drainage ditches (FW4) were often associated with Hedgerows (WL1) and Treelines (WL2) and was found throughout the survey area. Common species within the habitat included Water Horsetail (*Equisetum fluviatile*) and Soft Rush (*Juncus effusus*). In places the habitat supported starworts (*Callitriche* spp.).

5.1.10 GA2 Amenity grassland (improved)



Amenity grassland (improved) (GA2) is identified by its low species diversity and its management for purposes other than the production of grass. Within the study area, this habitat is maintained by mowing and supports species such as Perennial Rye-grass (*Lolium perenne*), plantains (*Plantago* spp.) and White Clover (*Trifolium repens*).

5.1.11 GM1 Marsh



Marsh (GM1) was one of the least common semi-natural habitats recorded within the study area, with the largest area recorded on Acres Lake. The marsh habitat existed just above the water level of the lake and broadleaved herbs, such as Meadowsweet (*Filipendula ulmaria*), accounted for greater than 50% of the vegetation. Water Horsetail (*Equisetum fluviatile*) was also a common component of the marsh habitat within the survey area.

5.1.12 GS1 Dry calcareous and neutral grassland



Dry calcareous and neutral grassland (GS1) was uncommon within the study area, recorded on the right side of the canal approaching Battle Bridge and on a small section of the canal east of Drumhauver Bridge where GS1 grassland has developed in the centre of the path on both sides of the canal (see opposite). This habitat can be identified by the presence of calcareous plant species and by its more open sward when compared with dry meadows and grassy verges

(GS2). The characteristic species Quaking-grass (*Briza media*) was recorded in one section.

5.1.13 GS2 Dry meadows and grassy verges



Dry meadow and grassy verges (GS2) was relatively common within the study area. The habitat is identifiable by large tussock-forming grasses such as Cock's-foot (*Dactylis glomerata*) and tall broadleaf herbs such as Meadowsweet (*Filipendula ulmaria*), and Cow Parsley (*Anthriscus sylvestris*).

5.1.14 GS4 Wet grassland



Wet grassland (GS4) was the most common grassland habitat recorded within the survey area, with a large polygon recorded around Acres Lake (shown opposite). Characteristic species of the wet grassland were Soft Rush (*Juncus effusus*), Meadowsweet (*Filipendula ulmaria*), Creeping Buttercup (*Ranunculus repens*) and Yellow Iris (*Iris pseudacorus*).

5.1.15 PF2 Poor fen and flush



One area of Poor fen and flush (PF2) was mapped around Acres Lake. Within the habitat Bog Moss (*Sphagnum* sp.) was common as was Bog Bead-moss (*Aulacomnium palustre*). Common Sedge (*Carex nigra*), Sharp-flowered Rush (*Juncus acutiflorus*) and Devil's-bit Scabious (*Succisa pratensis*) were all common components of the fen. The fen area was listed as an ESA.

5.1.16 WD1 (Mixed) broadleaved woodland

The habitat (Mixed) broadleaved woodland (WD1) was only recorded within one section of the canal between Battle Bridge and Drumleague Lock. The WD1 had a canopy of Beech (*Fagus sylvatica*), and Pedunculate Oak (*Quercus robur*).

5.1.17 WL1 Hedgerows



The habitat Hedgerows (WL1) was occasional within the study area and is defined as being mainly comprised of trees and shrubs less than 5 m high and 4 m wide. This habitat was most common where there was some maintenance, often for amenity purposes. Hedgerows provide shelter and foraging for animals, and habitat for woodland edge plant species. Numerous bird species nest within hedgerows and for this reason their removal is regulated between 1st March and 31st August under

Section 40 of the Wildlife Acts 1976 to 2012. While exceptions may apply in some cases, the destruction of birds' nests remains illegal at any time of the year without a derogation licence from the NPWS.

5.1.18 WL2 Treelines



Treelines (WL2) were recorded along the much of the Lough Allen Canal, both along the canal bank and on the landward side of the towpaths. Treelines are defined as rows of trees greater than 5 m in height and less than 4 m wide (at the base). Common species recorded within the WL2 habitat included Ash (*Fraxinus excelsior*), Hawthorn (*Crataegus monogyna*) and Grey Willow (*Salix cinerea*). Treelines provide important shelter and foraging habitat for animals and nesting sites for birds.

5.1.19 WN2 Oak-ash-hazel woodland



This habitat is defined as native, natural woodland that occurs on base-rich or neutral soils. Tree species recorded in this habitat include Pedunculate Oak (*Quercus robur*), Ash (*Fraxinus excelsior*) and Hazel (*Corylus avellana*), with occasional Beech (*Fagus sylvatica*) and Sycamore (*Acer pseudoplatanus*). Large areas of WN2 woodland were listed as ESAs, with some of the best examples recorded between Drumleague Lock and Battle Bridge and between Drumshambo Lock and

Acres Lake

5.1.20 WN6 Wet willow-alder-ash woodland

Eleven small areas of wet woodland (WN6) with a total area of 1.1 ha were recorded in the course of the survey. Grey Willow (*Salix cinerea*) was the dominant tree species recorded in the WN6 habitat, with Ash (*Fraxinus excelsior*) occasional. These areas of wet woodland were all associated with a watercourse, usually the canal, and corresponded to the Annex I habitat [91E0] Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (Alno-Padion, Alnion incanae, Salicion albae) (O'Neill and Barron, 2013). Almost all the areas of 91E0 Annex I habitat woodland were recorded between Drumleague Lock and Acres Lake and all areas of 91E0 were listed as an ESA

5.1.21 WS1 Scrub



Scrub (WS1) was recorded in a number of areas within the study area, most notably along the canal bank in sections where the treeline had been cut back or removed. Scrub areas are identified by the presence of more than 50% cover of shrubs, stunted trees or brambles, with a height of <5 m or < 4 m for wetlands. Scrub species recorded included Bramble (*Rubus fruticosus* agg.), Willows (*Salix* spp.) and

Gorse (*Ulex europaeus*). An example of Bramble scrub from Acres Lake is shown opposite. Scrub provides important cover for animals.

5.1.22 WS2 Immature woodland

A few areas of Immature woodland (WS2) were recorded that were dominated by young trees, usually Grey Willow (*Salix cinerea*), that had not yet reached their threshold height of 4 m. These areas were probably in succession between scrub and woodland.

5.2 Plant species

A total of 168 vascular plant species (including aquatic and invasive species) were recorded in the course of the survey. Bryophytes were not recorded as part of this survey, although notable species were listed where they were characteristic for a particular habitat. Forbs were the most abundant plant group (91 species), followed by woody species (trees, shrubs, woody climbers) (32 species), grasses (17 species), ferns (10 species), sedges (8 species), rushes (6 species), and horsetails (4 species).

Grapnel sampling of the submerged aquatic vegetation of the Lough Allen Canal was carried at a number of locations along the canal (Appendix I, Table A2). Only two species were recorded in the grapnel sampling: Broad-leaved Pondweed (*Potamogeton natans*) and Greater Water-moss (*Fontinalis antipyretica*), which were both recorded at the same station. The highly coloured water of the Lough Allen Canal means it is an unsuitable habitat for submerged aquatic plants. Floating plants

such as Yellow Water-lily (*Nuphar lutea*) and Unbranched Bur-reed (*Sparganium emersum*) were present in some locations, along with Broad-leaved Pondweed. The canal also lacks any real marginal fringe vegetation, typically found in other canals in Ireland. This may be down to a number of factors including steep rocky banks, the wash from boats operating along the canal and the fact that the canal was only reopened in 1996. Water-plantain (*Alisma plantago-aquatica*) was also recorded along the canal.

A full list of all plant species recorded is presented in Appendix II, Table A1. Rare/protected plants, invasive plant species are discussed in sections 4.3 and 4.4.

5.3 Rare/protected plants

No rare or protected plants were recorded in the course of the current survey. The only species of note was Cowbane (*Cicuta virosa*); a vascular plant species restricted to the northern counties of Ireland.

5.4 Invasive plant species

Alien invasive plant species are a major and increasing threat to biodiversity in Ireland. A number of species that are considered invasive were recorded within the study area; these included Snowberry (*Symphoricarpos albus*) (Appendix III, Plate 1), Cherry Laurel (*Prunus laurocerasus*), cotoneasters (*Cotoneaster* spp.) (Appendix III, Plate 3), Rhododendron (*Rhododendron ponticum*) (Appendix III, Plate 4), Butterfly-bush (*Buddleja davidii*) (Appendix III, Plate 5), Bridewort (*Spiraea salicifolia*), and Sycamore (*Acer pseudoplatanus*). Locations where invasive plant species were recorded in the course of the current survey are presented in Appendix II, Table A3. Due to the widespread distribution of Sycamore in treelines throughout the study area, no specific locations were recorded for this species.

Bridewort formed an extensive area along the canal edge on the east bank of the canal between Battle Bridge and Drumleague Lock and was also present on the opposite side of the road in this area. Snowberry was recorded in numerous places, but of particular note was the large hedgerow comprised almost entirely of Snowberry at the Acres Lake marina. The species also seems to have been planted in the car park at Drumleague Lock (along with Cherry Laurel).

5.5 Mammals

The semi-natural habitats recorded along the Lough Allen Canal within the study area are suitable for supporting many of Ireland's mammal species. A red squirrel (*Sciurus vulgaris*) was sighted on the towpath between Drumleague Lock and Drumhauver Bridge. Definite evidence of otter (*Lutra lutra*), in the form of a spraint was found at only one site on the Lough Allen Canal; just upstream of Acres Lake (Appendix III, Plate 6). Badger (*Meles meles*) feeding signs and two badger setts were also recorded within the study area. One sett was located in an area of woodland between the path and the canal on the section between Drumshanbo Lock and Acres Lake. The second was located in the

embankment on the landside of the towpath on the east side of the canal between Drumleague Lock and Drumhauver Bridge. This is a small, outlier sett and was present at the time of the previous survey in 2008 (Barron & McNutt, 2008).

Mammal droppings were recorded along the towpath in numerous locations. Based on the appearance, size and location of the droppings, it is concluded that they belong to pine marten (*Martes martes*).

Otters are protected under the Wildlife Acts 1976 to 2012 and are listed under Annex II and Annex IV of the Habitats Directive (92/43/EEC), which was transposed into Irish law by the European Communities (Birds and Natural Habitats) Regulations 2011 (S.I. 477/2011). Annex II lists species of community interest whose conservation requires the designation of Special Areas of Conservation (SACs), while those species listed under Annex IV are those in need of strict protection. Badgers and pine martens, and their breeding and resting places, are protected under the Wildlife Acts 1976 to 2012.

The woodlands and hedgerows of the Lough Allen Canal, and the surrounding lands, are also likely to support other mammal species, such as wood mouse (*Apodemus sylvaticus*) and hedgehog (*Erinaceus europaeus*), though these were not observed at the time of the survey.

While the locations in which evidence of specific mammal activity was recorded are presented in Appendix II, Table A4, these species are likely to occur more widely within the study area than illustrated by these data. Mammal paths were evident in numerous places along the canal banks, hedgerows and treelines, even where evidence of specific species was not recorded.

5.5.1 Bats

No dedicated bat survey was carried out as part of this survey. Bats were observed feeding along the canal banks and Daubenton's bat (*Myotis daubentonii*) would be expected to feed above the surface of the canal itself.

5.6 Birds

A total of 27 bird species were recorded in the course of the survey, with commonly recorded species including Robin, Chaffinch, Blue Tit, Blackbird and Wren. Kingfisher, listed under Annex I of the Bird Directive (2009/147/EC) and on the Birds of Conservation Concern in Ireland (BoCCI; Colhoun & Cummins, 2013) Amber List, was recorded at Drumshanbo Lock, while three other species recorded are also on the Amber List: Mute Swan, Starling and Swallow. Two species listed on the BoCCI Red List were recorded in the course of the survey: Barn Owl and Grey Wagtail. A full inventory of the species recorded in the course of the survey, including their scientific name and BoCCI status, is presented in Appendix II, Table A5.

A pair of Mute Swans recorded on Acres Lake had successfully produced six cygnets this breeding season and their nest was located on the western shore of Acres Lake, on the opposite side from the proposed walkway.

The hedgerows, treelines and areas of woodland provide nesting and feeding habitat for many terrestrial bird species, while the emergent vegetation of Acres Lake provides cover important to aquatic birds like Mallard and Moorhen. The aquatic vegetation of the Lough Allen Canal is extremely limited, with virtually no fringe of emergent plants present along the canal edge to provide cover for waterfowl. No likely kingfisher nest site was noted in the course of the survey.

5.7 Fish

The fish community of the Lough Allen Canal is comprised of coarse fish (excepting the occasional stray salmonid that may enter the system from nearby rivers and lakes). A local fisherman informed us that pike (*Esox lucius*) and roach (*Rutilus rutilus*) are present in the canal, while bream (*Abramis brama*), perch (*Perca fluviatilis*), tench (*Tinca tinca*) and rudd (*Scardinius erythrophthalmus*), along with bream x roach, bream x rudd and roach x rudd hybrids, have also been recorded in Acres Lake (NBDC, 2015a). The high colour of the canal water may reduce the suitability of the canal for supporting fish, as it prevents the development of an aquatic plant community suitable for providing cover and feeding opportunities for fish species.

Roach is considered an invasive species in Ireland.

5.8 Amphibians

Common frogs (*Rana temporaria*) were recorded at a number of locations within the study area, mainly on the towpath in areas of unmown GS4 or on the canal bank. Despite carrying out numerous spot checks in the back drains, no evidence of smooth newt (*Lissotriton vulgaris*) was recorded in the course of the survey. The back drains provide spawning habitat for amphibians, particularly frogs and should be maintained in an ecological sensitive manner.

5.9 Aquatic macroinvertebrates

Few data were found on the aquatic macroinvertebrate community of Lough Allen Canal and Acres Lake. The river snail (*Viviparus viviparus*) was noted in large numbers on a number of hard surfaces during the current survey. This species has been introduced to Ireland, though there is evidence that it was previously native (MolluscIreland, 2015).

A number of species of Odonata (dragonflies and damselflies) have been recorded in the 1 km square around Acres Lake, but also including Derrynahoo Lough (NBDC, 2015b): brown hawker (*Aeshna grandis*), Irish damselfly (*Coenagrion lunulatum*), Azure damselfly (*Coenagrion puella*), variable damselfly (*Coenagrion pulchellum*), blue-tailed damselfly (*Ischnura elegans*), Emerald dragonfly (*Lestes sponsa*), four-spotted chaser (*Libellula quadrimaculata*), large red damselfly (*Pyrrosoma nymphula*), ruddy darter (*Sympetrum sanguineum*) and common darter (*Sympetrum striolatum*). The

only damselfly species recorded in the course of the current survey was the blue-tailed damselfly; though this group was not subject to a dedicated survey.

5.10 Environmentally Sensitive Areas

While the canal corridor is highly modified, it has naturalised to a large degree allowing the development of semi-natural habitats. Some of these habitats are of higher ecological value than others and in need of greater protection. The Environmentally Sensitive Areas (ESAs) include all Annex I habitats, significant areas of woodland, and examples of semi-natural habitats that appeared particularly species diverse. All significant woodland areas within the context of the study area were deemed to be ESAs due to the fact that semi-natural woodland in Ireland today tends to be limited in extent and scattered in distribution. The woodland habitats within the survey area provide a valuable habitat for flora and fauna, particularly when the larger landscape of intensively managed farmland and urban areas surrounding the study area is considered.

Three areas were identified as ESAs owing to the presence of orchid species such as Early-purple Orchid (*Orchis mascula*).

A list of ESAs is presented in Appendix II, Table A6.

5.11 Designated sites

Natura 2000 sites in the vicinity of the area are illustrated in Figure 1. Sites listed as proposed National Heritage Areas (pNHA) and National Heritage Areas (NHA) are illustrated in Figure 2. There are no Ramsar sites in the vicinity of the proposed development.

Natura 2000 sites are designated under the Habitats Directive (92/43/EEC) (Special Areas of Conservation. SACs) and the Birds Directive (2009/147/EC) (Special Protection Areas. SPAs), which is transposed into Irish law by European Communities (Birds and Natural Habitats) Regulations 2011 (S.I. 477 of 2011).

NHAs are designated under the Wildlife Acts 1976 to 2012 and are subject to the full protections provided by this legislation. pNHAs have not been fully designated and therefore have no statutory protection, but are often considered in County Development Plans.

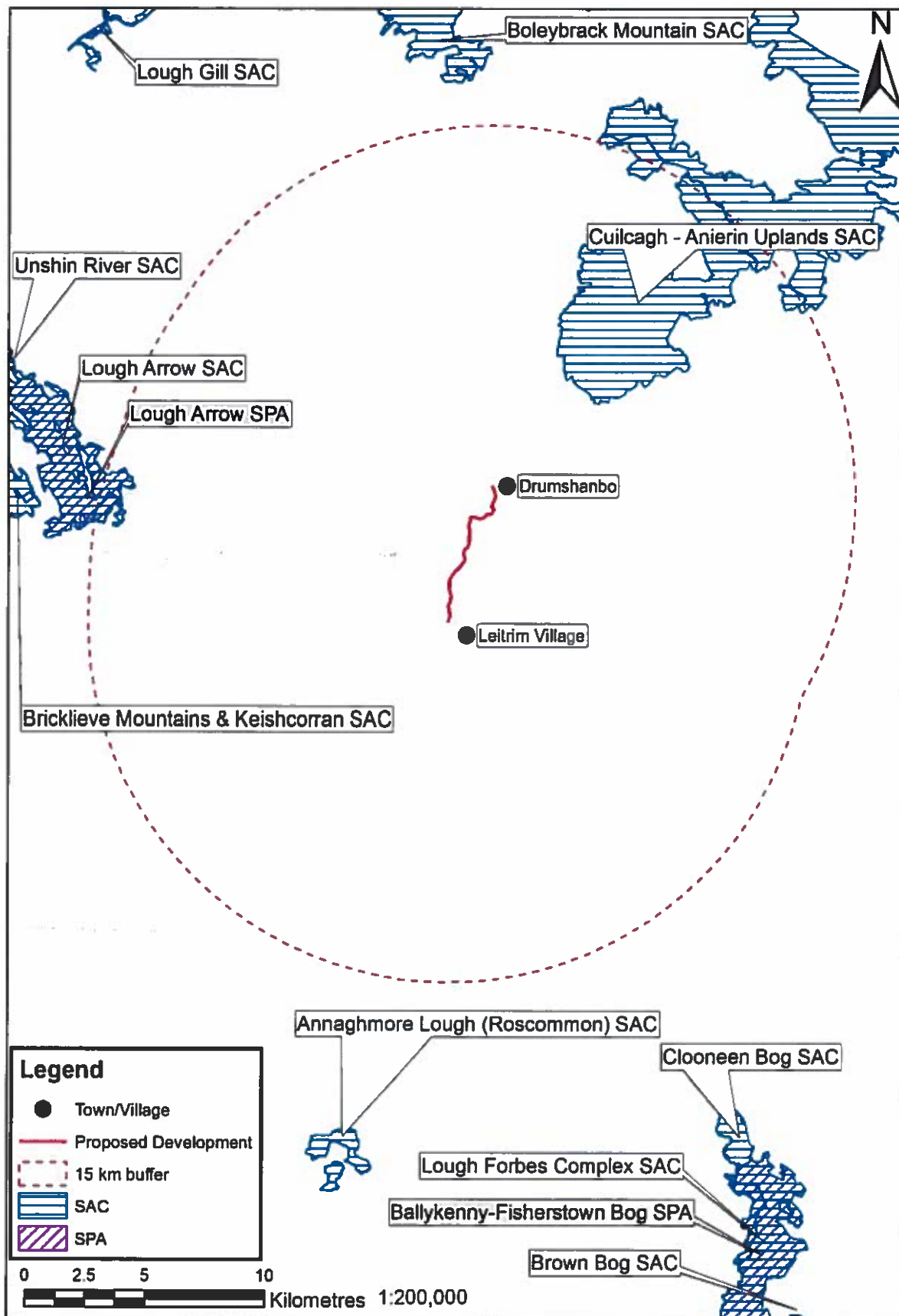


Figure 1. Natura 2000 sites in the vicinity of the proposed development, with 15 km buffer.

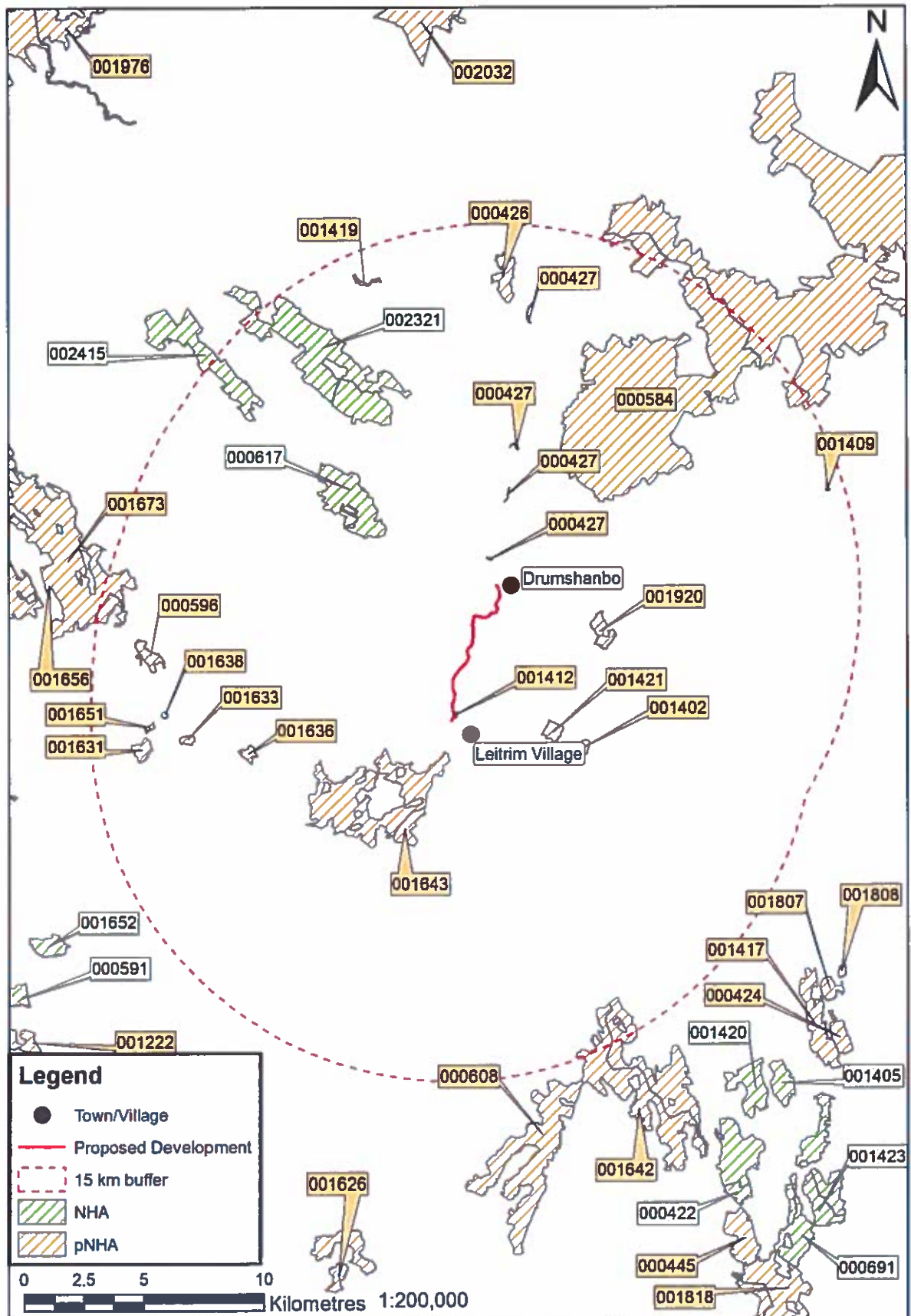


Figure 2. NHAs and pNHAs in the vicinity of the proposed development, with 15 km buffer. (see tables 1 and 2 for the names of NHAs and pNHAs, respectively).

Table 1. Names of NHAs in the vicinity of the proposed development illustrated in Figure 2.

Site code	Type	Site name
000422	NHA	Aghnamona Bog NHA
000591	NHA	Bella Bridge Bog NHA
000617	NHA	Kilronan Mountain Bog NHA
000691	NHA	Rinn River NHA
001405	NHA	Cashel Bog (Leitrim) NHA
001420	NHA	Corracramph Bog NHA
001423	NHA	Cloonageeher Bog NHA
001652	NHA	Tullaghan Bog (Roscommon) NHA
002321	NHA	Corry Mountain Bog NHA
002415	NHA	Carrane Hill Bog NHA

Table 2. Names of pNHAs in the vicinity of proposed development illustrated in Figure 2.

Site code	Type	Site name
000424	pNHA	Clooncoe Wood And Lough
000426	pNHA	Kilgariff Marsh
000427	pNHA	Lough Allen, South End and Parts
000445	pNHA	Clooneen Bog
000584	pNHA	Cuilcagh - Anierin Uplands
000587	pNHA	Lough Gara
000596	pNHA	Corrigeenroe Marsh
000608	pNHA	Kilglass And Grange Loughs
000976	pNHA	Blackrock's Cross
001222	pNHA	Ardagh Bog
001402	pNHA	Annaghealy Lough
001409	pNHA	Cromlin Bridge Wood
001412	pNHA	Drumhierny Wood
001417	pNHA	Lough Rinn
001419	pNHA	Owengar Wood
001421	pNHA	Sheemore Wood
001626	pNHA	Annaghmore Lough (Roscommon)
001627	pNHA	Corbally Turlough
001631	pNHA	Drum Bridge (Lough Key)
001633	pNHA	Drumman's Island (Lough Key)
001636	pNHA	Fin Lough (Roscommon)
001638	pNHA	Hog's Island (Lough Key)
001642	pNHA	Lough Boderg And Lough Bofin
001643	pNHA	Lough Drumharlow
001651	pNHA	Tawnytaskin Wood (Lough Key)
001656	pNHA	Bricklieve Mountains & Keishcorran
001673	pNHA	Lough Arrow
001807	pNHA	Lough Errew
001808	pNHA	Lough Sallagh
001818	pNHA	Lough Forbes Complex
001898	pNHA	Unshin River
001920	pNHA	Carrickaport Lough
001976	pNHA	Lough Gill
002032	pNHA	Boleybrack Mountain

6 Potential impacts

6.1 Construction impacts

6.1.1 Loss and disturbance of habitat

The construction of the proposed crushed stone path and boardwalk will result in the loss of the existing habitat under the development and has the potential to disturb other habitats. The section of the towpath from Drumleague Lock to Acres Lake, where any habitat loss will occur, is mostly GS4 Wet grassland. This habitat is common throughout Ireland, and particularly in the locality of the development, and will continue to be present on the section of bank between the canal and the new path and in some cases landward of the new path.

The lake fringe around Acres Lake supports the Annex I habitat Hydrophilous tall herb communities [6430] plus good examples of Reed and large sedge swamp habitat (FS1) that were all listed as ESAs. The construction of the proposed walkway following the original proposed route may have impacted significantly on these habitats; however, in order to avoid these areas of high conservation importance, the route of the walkway around Acres Lake was redesigned to minimise the effect. As a result of this change, approximately 4 m² of this habitat will be lost from the end of one stretch, from a total habitat area of 1844 m² along the southern shore of Acres Lake. This loss represents 0.2% of the habitat present and therefore the loss is considered a slight negative, permanent impact.

6.1.2 Disturbance to species

The construction of the proposed walkway has the potential to disturb bird and mammal species present along the route. Noise from the operation of machinery and the presence of people can result in species moving away from an area for a period of time. The fact that construction works will be limited to a small area at any given time, there is abundant similar habitat along the Lough Allen Canal to facilitate this temporary displacement. This is also likely to only be an issue for birds, as mammals are generally nocturnal, and so are unlikely to be active at the same time as the construction works are on-going. This is considered a negative, slight, temporary impact.

6.1.3 Water pollution

The operation of plant and machinery along the canal and close to Acres Lake during the construction of the proposed walkway has the potential to cause pollution of water through the release of suspended solids and hydrocarbons. This impact is considered a negative, slight, temporary impact.

6.1.4 Spread of invasive species

Invasive plant species can negatively impact on native habitats and species. There are numerous invasive species already present within the study area (and the wider surrounding area), including Snowberry, Bridewort and Cotoneaster. Construction activities, and the movement of construction

vehicles, could potentially result in the spread of these species to other, previously uninfected, sections of the canal.

In addition to the spread of species that are already within the study area, the importation of construction materials (crushed stone, *etc.*) and construction vehicles has the potential to bring novel invasive species into the area. The addition of new invasive species to the study area would have a cumulative impact on the native habitats and species along with the existing invasive species. The spread of invasive species would be considered a negative, moderate, permanent impact.

6.2 Operation impacts

6.2.1 Disturbance to species

The walkway is aimed at promoting the area for walkers and cyclists and so its development and operation is likely to lead to an increase in such traffic along Lough Allen Canal and Acres Lake. The presence of humans can temporarily or permanent displace various species from an area.

The mammals recorded within the study area are unlikely to be impacted by the operation of the proposed walkway. Mammals are generally nocturnal, and so will be temporally separated from the human activity along the canal and lake. Otter activity along the Lough Allen Canal appears to be very low.

Most of the bird species recorded in the course of the survey will not be impacted in any significant way by the presence of humans along the proposed walkway. Passerines such as Blackbird, Robin, Blue Tit, *etc.* may move away from humans, but will continue to use the treelines and woodlands along the Lough Allen Canal.

As noted in Section 4, emergent fringe vegetation is virtually non-existent along the Lough Allen Canal. This makes the reeds and Hydrophilous Tall Herb Communities of Acres Lake of particular importance to nesting waterfowl in the area, such as Moorhen. The placing of a raised boardwalk through the fringing vegetation could result in waterfowl being prevented from nesting in the area. The boardwalk can open the area up to disturbance by dogs and improved access for predators, both avian and terrestrial. Any railings along the boardwalk would provide a place for avian predators to perch when hunting in the area, making the area less suitable for nesting waterfowl. The raised nature of the board walk (~0.5 m above water level) means that waterfowl will still be able to access the fringe vegetation shoreward of the boardwalk. Overall this impact is considered a negative, moderate impact of permanent duration.

6.2.2 Water pollution

The building of a boardwalk over a section of Acres Lake is likely to result in the use of the area by dog walkers. Dog fouling on the boardwalk is likely to end up in the lake and result in an increase in the nutrient levels of the lake. This is considered a negative, slight, permanent impact.

The use of herbicide to help maintain a vegetation-free surface on the stoned path has the potential to impact on the aquatic environment, should it be allowed to enter the canal or linked back drains. Given the low frequency of this activity and the low likelihood of this impact, it is considered a negative, negligible impact of short-term duration

7 Mitigation measures

7.1.1 Loss and disturbance of habitat

The principal measure to reduce the effect of this impact on the habitats of Lough Allen Canal and Acres Lake is keeping the width of the proposed walkway to a minimum. The original plans for the walkway envision a 2-3 m wide path of crushed stone along the canal towpath. Where this has been implemented along the right towpath from Battle Bridge to Drumleague Lock in the construction of a maintenance track, it has resulted in the complete removal of the grassland habitat along the towpath in places and its serious restriction along most of the section (Appendix III, Plate 7). Given the likely low intensity of use, the walkway should be as restricted in width as possible in order to maximise the undisturbed grassland habitat along the Lough Allen Canal.

As noted in Section 6.1.1, the route of the walkway around Acres Lake was redesigned to minimise the effect of the project on the habitats of high-conservation importance around the lake.

The disturbance to habitats outside the footprint of the path should be minimised by restricting machinery movement and the storage of material, such as crushed stone, to the footprint of the path or areas such as car parks.

7.1.2 Disturbance to species

To minimise the risk of disturbance to waterfowl, particularly nesting waterfowl, the boardwalk around Acres Lake was relocated away from the fringe vegetation.

If possible, the construction of the walkway around Acres Lake should be completed outside the bird nesting season to prevent any disturbance to waterfowl nesting in the fringe vegetation and their young (1 March – 31 August according to Section 40 of the Wildlife Acts 1976 to 2012). However, as any removal of vegetation is for the purposes of construction, this activity is permitted under the Act by Section 40(2)e.

A section of fencing approximately 20 m in length, similar to that on the section of path from Drumshanbo Lock to Acres Lake, should be erected along the stretch where the badger sett is located between Drumleague Lock and Drumhauver Bridge. This fence will minimise the risk of interference with the sett by humans, while not preventing the badgers from accessing the canal bank.

7.1.3 Water pollution

The construction operations should be carried out in such a manner so as to preclude any pollution event that may affect the water quality of the Lough Allen Canal. 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 actions to take to protect water quality, or other best practice guidance for the protection of water quality for the construction industry.

Appropriate signage and facilities to encourage users with dogs to clean up after them should be erected, as necessary.

7.1.4 Spread of invasive species

Vehicles and equipment used within the survey area (e.g. tractors, mowing equipment and dredging equipment) should be periodically checked to ensure they are free from contamination. Vehicles should be washed down before coming on-site and should not move from an area of existing invasive species to an uncontaminated area without being thoroughly cleaned.

It must be ensured that the stone used in creating the walkway along the Lough Allen Canal towpath is free of invasive species and also does not introduce native pest species.

Targeted works should be carried out to remove existing areas of invasive species identified in the course of this survey. Any future planting carried out along the canal should use native species, preferably of local provenance.

8 Residual impacts

8.1.1 Loss and disturbance of habitat

As changes to the walkway to avoid habitats of high conservation importance have been incorporated into the design, this impact remains a slight, negative, permanent impact.

8.1.2 Disturbance to species

As there is little that can be done to lessen the disturbance to species during the construction of the proposed development, this impact remains a negative, moderate impact of permanent duration.

In terms of the operation of the walkway, the disturbance of species will be reduced somewhat by people adhering to the recommendation of keeping their dogs on a leash around Acres Lake. This impact is considered to be a negative, moderate impact of permanent duration.

Table A1. Plant species within the study area of Lough Allen Canal and Acres Lake, separated by the main plant groups.

Common name	Scientific name
Trees	
Sycamore	<i>Acer pseudoplatanus</i>
Horse-chestnut	<i>Aesculus hippocastanum</i>
Alder	<i>Alnus glutinosa</i>
Downy Birch	<i>Betula pubescens</i>
Butterfly-bush	<i>Buddleja davidii</i>
Hazel	<i>Corylus avellana</i>
Hawthorn	<i>Crataegus monogyna</i>
Beech	<i>Fagus sylvatica</i>
Ash	<i>Fraxinus excelsior</i>
Holly	<i>Ilex aquifolium</i>
Blackthorn	<i>Prunus spinosa</i>
Douglas fir	<i>Pseudotsuga menziesii</i>
Pedunculate oak	<i>Quercus robur</i>
Goat Willow	<i>Salix caprea</i>
Grey Willow	<i>Salix cinerea</i>
Osier	<i>Salix viminalis</i>
None	<i>Salix x multinervis</i>
Elder	<i>Sambucus nigra</i>
Western red-cedar	<i>Thuja plicata</i>
Low woody species	
Heather	<i>Calluna vulgaris</i>
Cotoneaster	<i>Cotoneaster</i> sp.
Ivy	<i>Hedera helix</i>
Honeysuckle	<i>Lonicera periclymenum</i>
Cherry Laurel	<i>Prunus laurocerasus</i>
Field-rose	<i>Rosa arvensis</i>
Dog-rose	<i>Rosa canina</i>
Brambles	<i>Rubus fruticosus</i> agg.
Raspberry	<i>Rubus idaeus</i>
Bridewort	<i>Spiraea salicifolia</i>
Snowberry	<i>Symphoricarpos albus</i>
Gorse	<i>Ulex europaeus</i>
Guelder-rose	<i>Viburnum opulus</i>
Forbs	
Bugle	<i>Ajuga reptans</i>
Water-plantain	<i>Alisma plantago-aquatica</i>
Wild angelica	<i>Angelica sylvestris</i>
Cow parsley	<i>Anthriscus sylvestris</i>
Lesser burdock	<i>Arctium minus</i>
Lords-and-Ladies	<i>Arum maculatum</i>
Daisy	<i>Bellis perennis</i>
Various-leaved water-starwort	<i>Callitriche platycarpa</i>
Common water-starwort	<i>Callitriche stagnalis</i>
Hedge bindweed	<i>Calystegia sepium</i>
Wavy bitter-cress	<i>Cardamine flexuosa</i>
Cuckooflower	<i>Cardamine pratensis</i>
Common knapweed	<i>Centaurea nigra</i>
Common mouse-ear	<i>Cerastium fontanum</i>
Sticky mouse-ear	<i>Cerastium glomeratum</i>
Rosebay willowherb	<i>Chamerion angustifolium</i>
Opposite-leaved golden-saxifrage	<i>Chrysosplenium oppositifolium</i>

Table A1 continued

Cowbane	<i>Cicuta virosa</i>
Enchanter's-nightshade	<i>Circaea lutetiana</i>
Creeping thistle	<i>Cirsium arvense</i>
Marsh thistle	<i>Cirsium palustre</i>
Spear thistle	<i>Cirsium vulgare</i>
Pignut	<i>Conopodium majus</i>
Ivy-leaved toadflax	<i>Cymbalaria muralis</i>
Common spotted-orchid	<i>Dactylorhiza fuchsii</i>
Foxglove	<i>Digitalis purpurea</i>
Great willowherb	<i>Epilobium hirsutum</i>
Broad-leaved willowherb	<i>Epilobium montanum</i>
Red fescue	<i>Festuca rubra</i>
Meadowsweet	<i>Filipendula ulmaria</i>
Wild strawberry	<i>Fragaria vesca</i>
Cleavers	<i>Galium aparine</i>
Common marsh-bedstraw	<i>Galium palustre</i>
Herb-robert	<i>Geranium robertianum</i>
Wood avens	<i>Geum urbanum</i>
Hogweed	<i>Heracleum sphondylium</i>
Bluebell	<i>Hyacinthoides non-scripta</i>
Tutsan	<i>Hypericum androsaemum</i>
Square-stalked st John's-wort	<i>Hypericum tetrapterum</i>
Cat's-ear	<i>Hypochaeris radicata</i>
Yellow Iris	<i>Iris pseudacorus</i>
Meadow vetchling	<i>Lathyrus pratensis</i>
Common duckweed	<i>Lemna minor</i>
Autumn hawkbit	<i>Leontodon autumnalis</i>
Common twayblade	<i>Listera ovata</i>
Perennial rye-grass	<i>Lolium perenne</i>
Ragged-robin	<i>Lychnis flos-cuculi</i>
Gipsywort	<i>Lycopus europaeus</i>
Yellow pimpernel	<i>Lysimachia nemorum</i>
Purple-loosestrife	<i>Lythrum salicaria</i>
Water mint	<i>Mentha aquatica</i>
Yellow water-lily	<i>Nuphar lutea</i>
Early purple orchid	<i>Orchis mascula</i>
Star-of-Bethlehem	<i>Omithogalum angustifolium</i>
Lousewort	<i>Pedicularis sylvatica</i>
Mouse-ear-hawkweed	<i>Pilosella officinarum</i>
Ribwort plantain	<i>Plantago lanceolata</i>
Greater plantain	<i>Plantago major</i>
Broad-leaved pondweed	<i>Potamogeton natans</i>
Silverweed	<i>Potentilla anserina</i>
Tormentil	<i>Potentilla erecta</i>
Barren strawberry	<i>Potentilla sterilis</i>
Primrose	<i>Primula vulgaris</i>
Selfheal	<i>Prunella vulgaris</i>
Meadow buttercup	<i>Ranunculus acris</i>
Lesser celandine	<i>Ranunculus ficaria</i>
Lesser spearwort	<i>Ranunculus flammula</i>
Creeping buttercup	<i>Ranunculus repens</i>
Common sorrel	<i>Rumex acetosa</i>
Broad-leaved dock	<i>Rumex obtusifolius</i>
Wood dock	<i>Rumex sanguineus</i>
Procumbent pearlwort	<i>Sagina procumbens</i>
Common figwort	<i>Scrophularia nodosa</i>
Marsh ragwort	<i>Senecio aquaticus</i>

Table A1 continued

Common ragwort	<i>Senecio jacobaea</i>
Alexanders	<i>Smyrnium olusatrum</i>
Unbranched bur-reed	<i>Sparganium emersum</i>
Branched bur-reed	<i>Sparganium erectum</i>
Devil's-bit scabious	<i>Succisa pratensis</i>
Dandelions	<i>Taraxacum officinale</i> agg.
Lesser trefoil	<i>Trifolium dubium</i>
Red clover	<i>Trifolium pratense</i>
White clover	<i>Trifolium repens</i>
Colt's-foot	<i>Tussilago farfara</i>
Common nettle	<i>Urtica dioica</i>
Common valerian	<i>Valeriana officinalis</i>
Wood speedwell	<i>Veronica montana</i>
Heath speedwell	<i>Veronica serpyllifolia</i>
Tufted vetch	<i>Vicia cracca</i>
Bush vetch	<i>Vicia sepium</i>
Common dog-violet	<i>Viola riviniana</i>
Grasses	
Common bent	<i>Agrostis capillaris</i>
Creeping bent	<i>Agrostis stolonifera</i>
Marsh foxtail	<i>Alopecurus geniculatus</i>
Meadow foxtail	<i>Alopecurus pratensis</i>
Sweet vernal-grass	<i>Anthoxanthum odoratum</i>
False oat-grass	<i>Arrhenatherum elatius</i>
False brome	<i>Brachypodium sylvaticum</i>
Quaking-grass	<i>Briza media</i>
Cock's-foot	<i>Dactylis glomerata</i>
Tufted hair-grass	<i>Deschampsia cespitosa</i>
Tall fescue	<i>Festuca arundinacea</i>
Field fescue	<i>Festuca pratensis</i>
Floating sweet-grass	<i>Glyceria fluitans</i>
Yorkshire-fog	<i>Holcus lanatus</i>
Purple moor-grass	<i>Molinia caerulea</i>
Reed canary-grass	<i>Phalaris arundinacea</i>
Annual meadow-grass	<i>Poa annua</i>
Rushes	
Sharp-flowered rush	<i>Juncus acutiflorus</i>
Compact rush	<i>Juncus conglomeratus</i>
Soft-rush	<i>Juncus effusus</i>
Hard rush	<i>Juncus inflexus</i>
Heath wood-rush	<i>Luzula multiflora</i>
Common club-rush	<i>Schoenoplectus lacustris</i>
Sedges	
Glaucous sedge	<i>Carex flacca</i>
Hairy sedge	<i>Carex hirta</i>
Common sedge	<i>Carex nigra</i>
Carnation sedge	<i>Carex panicea</i>
Pendulous sedge	<i>Carex pendula</i>
Remote sedge	<i>Carex remota</i>
Wood- sedge	<i>Carex sylvatica</i>
Little Green sedge	<i>Carex viridula</i>
Horsetails	
Field horsetail	<i>Equisetum arvense</i>

Table A1 continued

Water horsetail	<i>Equisetum fluviatile</i>
Marsh horsetail	<i>Equisetum palustre</i>
Great horsetail	<i>Equisetum telmateia</i>
Ferns	
Wall-rue	<i>Asplenium ruta-muraria</i>
Maidenhair spleenwort	<i>Asplenium trichomanes</i>
Hard-fern	<i>Blechnum spicant</i>
Scaly male-fern	<i>Dryopteris affinis</i>
Broad buckler-fern	<i>Dryopteris dilatata</i>
Male-fern	<i>Dryopteris filix-mas</i>
Hart's-tongue	<i>Phyllitis scolopendrium</i>
Polypody	<i>Polypodium vulgare</i>
Soft shield-fern	<i>Polystichum setiferum</i>
Bracken	<i>Pteridium aquilinum</i>

Table A2. Location of grapnel samples of aquatic vegetation along the Lough Allen Canal.

Date	Note	ITM	
25/05/2015	<i>Potamogeton natans</i> , <i>Fontinalis antipyretica</i>	595351	807531
26/05/2015	No plants	595693	809233
27/05/2015	No plants	595222	807353

Table A3. Invasive terrestrial plants recorded along the Lough Allen Canal within the study area

Common name	Scientific name	Note	ITM
Butterfly-bush	<i>Buddleja davidii</i>	Stonework of bridge	596696 810976
Cotoneaster	<i>Cotoneaster</i> spp.	-	594979 806558
Cotoneaster	<i>Cotoneaster</i> spp.	In hedgerow	959301 807468
Cotoneaster	<i>Cotoneaster</i> spp.	Canal bank	594996 806572
Cotoneaster	<i>Cotoneaster</i> spp.	Canal bank	595009 806533
Cotoneaster	<i>Cotoneaster</i> spp.	Hedge on canal bank	596714 810979
Cherry Laurel	<i>Prunus laurocerasus</i>	Drumshanbo Lock parking area - planted	596688 810954
Cherry Laurel	<i>Prunus laurocerasus</i>	Drumleague Lock parking area - planted	595314 807474
Cherry Laurel	<i>Prunus laurocerasus</i>	Hedge on canal bank	596714 810979
Rhododendron	<i>Rhododendron ponticum</i>	Edge of woodland/road	596765 810454
Bridewort	<i>Spiraea salicifolia</i>	Start - on canal bank	594968 806747
Bridewort	<i>Spiraea salicifolia</i>	End - on canal bank	595015 806511
Bridewort	<i>Spiraea salicifolia</i>	In roadside treeline	594982 806660
Bridewort	<i>Spiraea salicifolia</i>	Start - roadside verge	594977 806611
Bridewort	<i>Spiraea salicifolia</i>	End - roadside verge	594981 806727
Snowberry	<i>Symphoricarpos albus</i>	-	595687 809228
Snowberry	<i>Symphoricarpos albus</i>	-	596765 810268
Snowberry	<i>Symphoricarpos albus</i>	-	596809 810682
Snowberry	<i>Symphoricarpos albus</i>	Drumshanbo Lock parking area	596688 810954
Snowberry	<i>Symphoricarpos albus</i>	Drumleague Lock parking area - planted	595314 807474
Snowberry	<i>Symphoricarpos albus</i>	In hedgerow	595001 807032
Snowberry	<i>Symphoricarpos albus</i>	In roadside treeline	594982 806660
Snowberry	<i>Symphoricarpos albus</i>	Canal bank	595009 806533
Snowberry	<i>Symphoricarpos albus</i>	Start - roadside verge	594977 806611
Snowberry	<i>Symphoricarpos albus</i>	End - roadside verge	594981 806727
Snowberry	<i>Symphoricarpos albus</i>	Hedge on canal bank	596714 810979

Table A4. Mammal species recorded within the study area along Lough Allen Canal and Acres Lake, with locations.

Common name	Scientific name	Notes	ITM	
Pine marten	<i>Martes martes</i>	Droppings	595487	807731
Pine marten	<i>Martes martes</i>	Droppings	595553	808039
Badger	<i>Meles meles</i>	Footprint	595557	808307
Badger	<i>Meles meles</i>	Feeding sign	595741	808541
Pine marten	<i>Martes martes</i>	Droppings	595745	808591
Badger	<i>Meles meles</i>	Sett/holt/den	595748	808719
Badger	<i>Meles meles</i>	Sett/holt/den	595749	808724
Pine marten	<i>Martes martes</i>	Droppings	595750	808742
Red squirrel	<i>Sciurus vulgaris</i>	Live animal	595768	809108
Pine marten	<i>Martes martes</i>	Droppings	595737	808788
Badger	<i>Meles meles</i>	Droppings	595631	808380
Pine marten	<i>Martes martes</i>	Droppings	595917	809651
Pine marten	<i>Martes martes</i>	Droppings	595850	809627
Badger	<i>Meles meles</i>	Sett/holt/den	596781	810789
Otter	<i>Lutra lutra</i>	Feeding sign	596743	810273
Otter	<i>Lutra lutra</i>	Droppings	596735	810253
Pine marten	<i>Martes martes</i>	Droppings	595036	806297
Pine marten	<i>Martes martes</i>	Droppings	594945	805933

Table A5. Bird species recorded within the study area along Lough Allen Canal and Acres Lake

Common name	Scientific name	BoCCI
Barn Owl	<i>Tyto alba</i>	Red
Blackbird	<i>Turdus merula</i>	Green
Blackcap	<i>Sylvia atricapilla</i>	Green
Blue Tit	<i>Cyanistes caeruleus</i>	Green
Chaffinch	<i>Fringilla coelebs</i>	Green
Chiffchaff	<i>Phylloscopus collybita</i>	Green
Goldfinch	<i>Carduelis carduelis</i>	Green
Great Tit	<i>Parus major</i>	Green
Grey Wagtail	<i>Motacilla cinerea</i>	Red
Hooded Crow	<i>Corvus cornix</i>	Green
Jay	<i>Garrulus glandarius</i>	Green
Kingfisher	<i>Alcedo atthis</i>	Amber
Lesser Redpoll	<i>Carduelis flammea cabaret</i>	Green
Long-tailed Tit	<i>Aegithalos caudatus</i>	Green
Magpie	<i>Pica pica</i>	Green
Mallard	<i>Anas platyrhynchos</i>	Green
Moorhen	<i>Gallinula chloropus</i>	Green
Mute Swan	<i>Cygnus olor</i>	Amber
Pied Wagtail	<i>Motacilla alba yarrellii</i>	Green
Reed Bunting	<i>Emberiza schoeniclus</i>	Green
Robin	<i>Erithacus rubecula</i>	Amber
Song Thrush	<i>Turdus philomelos</i>	Green
Starling	<i>Sturnus vulgaris</i>	Amber
Swallow	<i>Hirundo rustica</i>	Amber
Willow Warbler	<i>Phylloscopus trochilus</i>	Green
Woodpigeon	<i>Columba palumbus</i>	Green
Wren	<i>Troglodytes troglodytes</i>	Green

Table A6. Environmentally Sensitive Areas (ESAs) along Lough Allen Canal and Acres Lake

Fossitt habitat	ESA description	Areas selected
FS1	Species diverse area of swamp	3 areas selected all around Acres Lake
FS2	Annex I habitat 6430	5 areas selected all around Acres Lake
GM1	Species diverse area of marsh	1 areas selected around Acres Lake
GS2	Species diverse grassland with population of orchids	1 area selected between Battle Bridge and Drumleague Lock
FW3	Aquatic community	1 area between Drumleague Lock and Drumhauver Bridge 2 areas selected within the vicinity of Drumleague Lock and one near Drumhauver Bridge
GS2, GS4, WS1	Orchid populations	Around Acres Lake
PF2	Only area of fen within the study	6 areas selected
WD1, WN2	Large areas of woodland	11 areas selected
WN6	Annex I habitat 91E0	

Appendix III – Plates







	
Plate 1 Snowberry (<i>Symphoricarpos albus</i>)	Plate 2 Cherry Laurel (<i>Prunus laurocerasus</i>) and Snowberry
	
Plate 3 Cotoneaster (<i>Cotoneaster</i> sp.)	Plate 4 Rhododendron (<i>Rhododendron ponticum</i>)
	
Plate 5 Butterfly-bush (<i>Buddleja davidii</i>)	Plate 6 Old otter spraint on log



Plate 7 Existing towpath between Battle Bridge and Drumleague Lock



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