Meath County Council

Ecology Report

Ratoath Pedestrian & Cycling Scheme

April 2020

ATKINS

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Document History

JOB NUMBER: 5139451			DOCUMENT REF: 5139451DG12			
3.1	Update Final Report	CR	CR	POD	KB	28-04-2020
3.0	Update Final Report	CR	CR	POD	KB	26-02-2020
2.0	Final Report	CR	CR	POD	KB	11-07-2019
1.0	Final Report	EB & POD	POD	POD	KB	21-04-2017
0	Ecological Report	EB	POD	POD	KB	23-11-2015
Revision	Purpose Description	Originated	Checked	Reviewed	Authorised	Date

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1. Introduction

1.1 Atkins has been commissioned by Meath County Council to conduct an ecological constraints assessment of the proposed greenway for the Ratoath Pedestrian & Cycling Scheme.

1.2 Ratoath is situated on the intersection of the R125 and R155 regional roads in the south east of County Meath. The town has developed significantly over the last 20 years and acts as a commuter town with more than three quarters of the population travelling to work in Dublin.

1.3 Meath County Council (MCC) in partnership with the National Transport Authority (NTA) propose to deliver a high-quality Pedestrian and Cycle Scheme within Ratoath. The proposed scheme consists of improvements and upgrades to the follow key routes: -

- Town Centre Streets
- Approach Roads
- Distributor Roads
- Greenway
- School Access Roads

1.4 The site location is presented in Figure 1.1. A full set of design drawing accompanies the Part 8 planning application (see also Appendix A).

- Book of Drawings
    - Drawing 5139451/HW/0000: Cover Sheet
    - Drawing 5139451/HW/0001: Site Location Plan
    - Drawing 5139451/HW/0002: Site Extents Key Plan
    - Drawing 5139451/HW/0003: Site Extents (Sheet 1 of 3)
    - Drawing 5139451/HW/0004: Site Extents (Sheet 2 of 3)
    - Drawing 5139451/HW/0005: Site Extents (Sheet 3 of 3)
    - Drawing 5139451/HW/800: General Layout Key Plan
    - Drawing 5139451/HW/800: General Layout Key Plan (Sheets 1 – 15)

1.5 The AA Screening should read in conjunction with the accompanying Part 8 Planning Report; an Ecology Report prepared for the proposed Greenway (see Figure 1-1) and the accompanying Construction and Environmental Management Plan.

Purpose of the Scheme

Scheme Purpose

1.6 Ratoath is a situated on the intersection of the R125 and R155 regional roads in the south east of County Meath. The town has developed significantly over the last 20 years and acts as a commuter town with more than three quarters of the population travelling to work in Dublin. In this time the town's population has also grown significantly with a stated population of just over 1,000 inhabitants in 1996, compared to over 9,000 inhabitants per the 2011 census records.

1.7 The expansion of both residential and educational developments within Ratoath over this period has coincided with national policy to promote and encourage sustainable travel among all age groups with a particular emphasis on creating a walking and cycling cultural among younger generations for the undertaking of short local short trip purposes. As such the need has arisen to provide improved pedestrian and cycle provision to form better connections between residential areas, schools, amenities and the town centre.

1.8 The proposed scheme will therefore aim to secure the development of pedestrian and cycle routes that will provide a high quality of service, whilst also ensuring that there remains an optimal balance of provision between the various competing transport modes within the town and its environs.

Scheme Objectives

1.9 The objectives of the proposed Pedestrian and Cycle Scheme are: -

- Provide appropriate pedestrian and cycle facilities within the town centre, along the Broadmeadow River and on all key approach roads
- To provide safe route link and crossing facilities for pedestrian and cyclists;
- To provide appropriate speed and traffic management within the town centre and on approach roads;
- To facilitate national/county policies/objectives in relation to sustainable transportation;
- To facilitate the development of the Greater Dublin Area Cycle Network Plan;
- To comply with the design standards and principles advocated within the Design Manual for Urban Roads and Streets and National Cycle Manual.

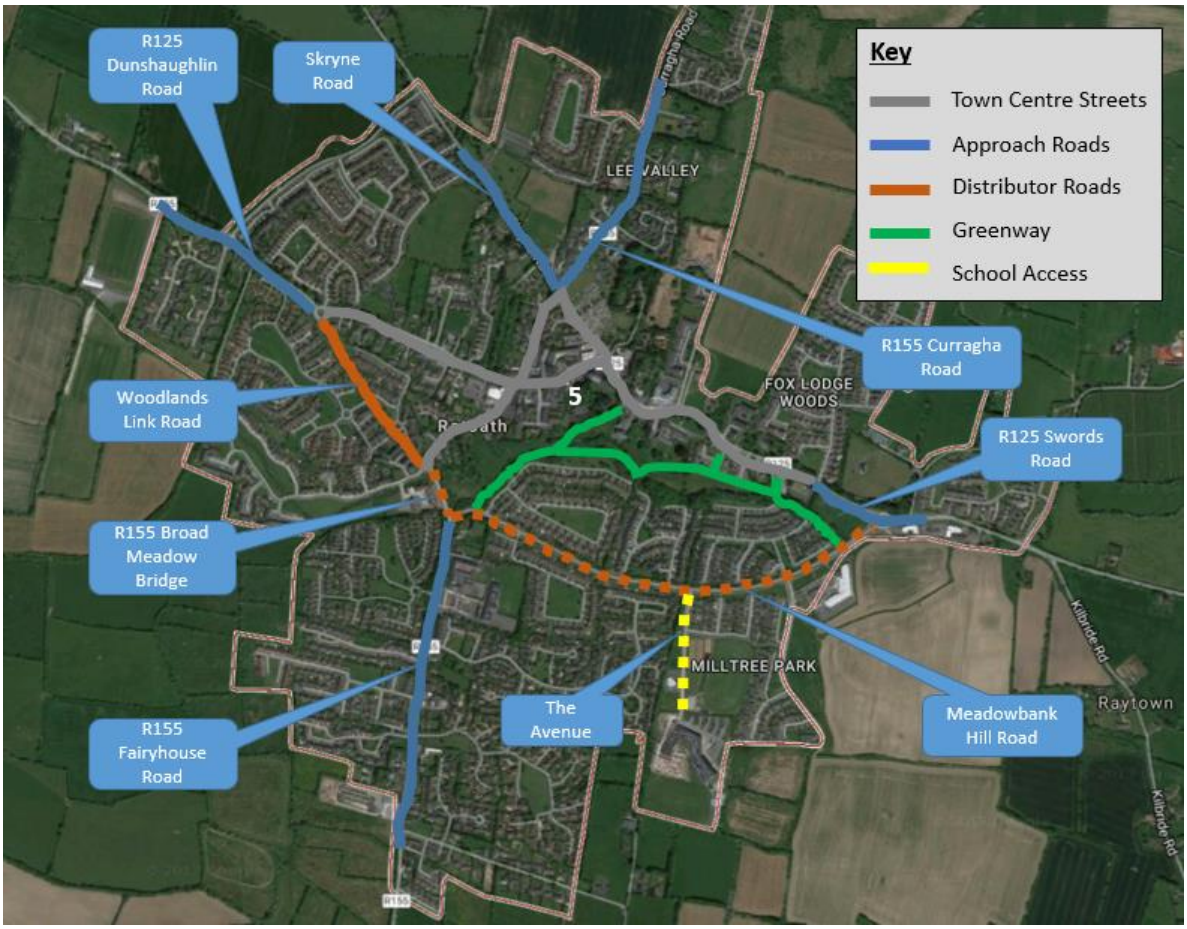


Figure 1-1. Ratoath Pedestrian and Cycle Network.

Proposed Development

1.10 The overall development consists of cycleways on existing paths/roadways with a Greenway element adjacent to the Broadmeadow River. This greenway running through lands adjacent to the Broadmeadow River was the focus of this Ecology Report. It should be noted the Broadmeadow River is also named as the Ratoath Stream (EPA Seg Code: 08_577) on the EPA River Network dataset. For the purpose of this this report it will, however, be called the Broadmeadow River. The stream is illustrated in Figure 1.1.

1.11 The following plates illustrate elements of the existing scheme (Plate 1.1).

Plate 1.1 Existing elements of the pathway at Ratoath.

Plate 1.2. Existing elements of the pathway at Ratoath (continued).

1.12 The proposed works facilitate the implementation of improvements to pedestrian and cycle facilities and general traffic management within the town centre itself, along the Broadmeadow River and along the following major approach roads: -

- Skryne Road
- Curragha Road
- Swords Road
- Fairyhouse Road
- Woodlands Link Road
- Dunshaughlin Road

1.13 This will comprise of the retrofitting of the existing street layout, realignment of kerbs, widening of the pedestrian footpaths, provision of new uncontrolled and controlled crossing layouts, reallocation of on street parking, retrofitting existing priority, roundabout and traffic signal junction layouts, upgrade of existing bus stops, relocation, upgrade and installation of public lighting, and implementation of speed management measures to create a self-regulating street environment conducive to pedestrian and cyclist safety and comfort. Certain sections of the works will also include the provision of appropriate street furniture and landscaping, removal of unnecessary street signage and furniture, installation of cycle parking and the resurfacing of road and footway pavements with appropriate materials. These elements are illustrated in full in the accompanying design drawings (Appendix A).

1.14 While, the majority of the pedestrian and cycle scheme would be located on made ground, the greenway adjacent to the Broadmeadow River consists of some existing informal paths, through improved grassland (GA1) and wet grassland (GS4), which will require re-surfacing; two additional pathway are proposed to link the Green Village Residential area north of the river along with the installation of stepped access pathways at existing pathways connecting the Meadowbrook Hill Residential Development to the south. In general, the proposals for the riverside greenway are straightforward and do not incorporate any significant earth works or tree removal. It is proposed to upgrade the existing path to a consistent standard in terms of width, surfacing and appropriate public lighting (see Plate 1.1 & Appendix A).

1.15 The additional paths north of the river will provide access further east towards the Village Green Hill, increasing permeability and offering additional walking and cycling amenity within the town (see Appendix A).

1.16 A new footpath is proposed on the southern side of the Dunshaughlin Road; this is to be positioned within the existing footpath and verge. Excavation would be 250 to 300mm and will be 1m back from the edge of the footpath; running parallel with the ivy-covered broad-leaved trees along the southern side of the road (Tree group 1 Drawing: 19277_T_101). No removal of trees is required here. Every effort will be made limit impact to these trees and the root zones of the trees (See Appendix C: Arboricultural Impact Assessment). There may be a minor interaction of the proposed pathway and the root systems of trees. However, the path will be constructed as far back as possible and where necessary might include a narrowing of the roadway; thus the retention of these trees has been integrated to the proposed development by means of designing / retaining buffer areas of public open space around them, however careful planning and site management will be required during construction works to ensure these areas are not adversely impacted by construction activities (CSR, 2019). It is proposed that tree protection fencing be used to achieve this aim - as illustrated in Dwg No. 19277/T/103. It is envisaged that works will not impact on mature beech trees on the opposite (north) side of the road which line the road west of the roundabout (i.e. R125 with Browstown / Steeplechase Court)

1.17 The proposed pedestrian and cycle facilities along Woodlands Link section of the scheme consist one-way cycle tracks on both sides of the road adjacent to the existing footpaths. A tree survey and root ball assessment carried out by Cunnane Stratton Reynolds on behalf of Atkins Ecology in November 2019 along this section of the scheme and found; the assessment found the works on the Woodland links will entail the removal of the 59 semi-mature ornamental trees *(Tilia cordata, Acer psuedoplatanus* & *Quercus robur).* Root ball protection zones have been incorporated into the design for the remaining trees not to be removal along the Woodland Links (See Drawing 19277_T_103 Appendix D). The removal of 59no. trees is required to install a bound pavement to form the cycle track and relocation of existing public lighting column to back edge of footpath. The carriageway and associated kerbs and drainage features are to be maintained as per existing.

1.18 Side road junctions will be negotiated via raised uncontrolled crossings. The removal of trees located within the grassed verge is necessary in order to provide a segregated cycling provision i.e. one-way cycle track on both sides of the road. It is evident that a segregated provision is the preferred option given the distributor road nature of this route along the Woodlands Link and the need to ensure segregation between cyclists, including children cycling to school, and high volume, high speed traffic. The design approach is discussed further in the Part 8 Report. The northern extent of this section will tie with proposed facilities on the R125 Dunshaughlin Road, whilst the southern extent will tie in with proposals at the Somerville Roundabout which are subject of a separate planning permission.

1.19 The Tree Survey found that mostly all trees along the Woodland Links had a leader broken or damaged at an average height of 1.3m from ground level causing them to branch heavily from this area. Consequently, most trees display overcrowding of branches which is causing structural issues

such as branch rubbing and significant compression forks to develop. These issues will increasingly compromise the trees structural integrity into the future if not addressed in the short term with selective pruning works. The 59 semi-mature trees will be removed from the landscaped roadside section. Compensatory tree planting will be carried out nearby, mostly on the opposite site of the road and southern where the road verge allows are proposed (See Drawing No 19277_T_103 Appendix D). See section 4.23 for details on proposed compensation tree planting and section 5.1 for biodiversity enhancement features at this location.

1.20 A new footpath and culvert upgrade works are proposed on western side of Curragha Road. This is to be positioned along the roadway within the existing roadside verge and adjacent to an ornamental hedge within a residential garden; the impact of this work be limited as the design does not impact on the adjacent field boundary. However, garden features impacted by the worked at this location will be replaced with same; the stream is a tributary of the Broadmeadow River.

1.21 Minor works to the culvert will also be required to widen lengthen the culvert to accommodate localised widening on the bend. The culvert spans the Crackenstown stream (EPA Segment Code: 08_752) this stream is a tributary of the Broadmeadow River. The existing culvert pipe box section will be extended by 2m and placed on appropriate bedding material. The new culvert extension will be back filled with suitable material and a new head wall will be constructed. New parapet with pedestrian guardrail to be constructed. New 2m minimum footpath to be constructed. In order to protect local aquatic species using the culvert works will be carried in accordance with Transport Infrastructure Ireland guidelines on crossing watercourses[1] and Inland Fisheries Ireland guidance on construction activities near waters[2].

1.22 During construction small plant will be used for resurfacing, widening and construction of the new paths. Plant will consist of dumper trucks, pavers and diggers. Access to the works locations will be from the existing entrances. For the widening and construction of the new path, shallow excavations of topsoil will be required and then stone will be laid for the sub-base layer. The stone will be compacted and then a paver used to surface the path. 70mm of asphalt concrete base will be installed and 30mm of stone mastic asphalt will provide the surface layer. The site laydown area / site compound will not be located in proximity to the watercourse.

1.23 The path which proceeds through north and south along the Broadmeadow River Greenway will be resurfaced into a 3m wide greenway path with bound surfacing. The path width and alignment will be identical for both north and south of the Broadmeadow River, as will be the associated impacts. Exact construction detail and method will be specified at detailed design stage. It will be a requirement that the appointed Contractor prepares a Construction and Environmental Management Plan and that the final design solution is arrived at in consultation with an appropriately qualified ecologist in order to minimise the impacts to trees.

1.24 In order to further enhance ecological pathways within the greenway bat boxes will be erected along the cycleway. Vegetation along the greenway will be managed to promote native species-rich ground flora. Planting should seek to establish and / or maintain ecological connectivity through the site. Vegetation adjacent to the cycleway should not be mown during the summer months. Long grass and native plants allow insect diversity, which in turn provides food for bats. Where the cycleway runs by the river, the area between the river and the cycleway should not be sprayed or cut. A nature panel can be designed to explain the ‘untidy’ areas left for insect diversity and young bats. All trees along the Cycle Network should be maintained and damage to root zones must not occur incorporating small adjustments to the path alignment.

1 Guidelines for crossing of watercourses during the construction of National Road Schemes. National Roads Authority.
2 Guidelines on protection of fisheries during construction works in adjacent to water. Inland Fisher Ireland 2016

2. Methodology

2.1 A desktop assessment was initially conducted to identify the presence of designated sites in proximity to the study area. The NPWS mapviewer (http://webgis.npws.ie/npwsviewer/; last accessed 22nd May, 2019) was reviewed to identify these sites. The NPWS website was also searched for records of rare or protected species from the 10km grid in which the site is located. Shapefiles of designated sites were downloaded for use in the creation of maps.

2.2 In addition to the NPWS website, the National Biodiversity Data Centre online mapping was also reviewed for records of protected flora and mammal species within the 2km grids in which the site is located. A data request was also issued to NPWS for protected species records in the vicinity.

2.3 The site was originally visited on the 7th October 2015 to identify any ecological constraints associated with the site and the proposed development. The assessment followed CIEEM guidance (*Guidelines for Preliminary Ecological Assessment*, 2nd Edition CIEEM 2017); as well as CIEEM (2018) *Guidelines for Ecological Impact Assessment in the UK and Ireland*. At that time of surveying it was proposed to develop a Greenway along the banks of the Broadway River and through an area of adjoining woodland. Subsequently the design was altered to instead follow the green line as shown in Figure 3.1. The site was revisited in 31 May 2019 to re-examine this area and to validate the earlier findings.

2.4 Ecological evaluation of sites was based on the National Roads Authority's evaluation methodology as set out in Table 2.1 below (after NRA, 2009).

2.5 The preliminary impact assessment follows the EPA Guidelines *Advice Notes on Current Practice in the Preparation of Environmental Impact Statements* (2003) and is as follows: -

- Imperceptible Impact - An impact capable of measurement but without noticeable consequences.
- Slight Impact - An impact which causes noticeable changes in the character of the environment without affecting its sensitivities.
- Moderate Impact - An impact that alters the character of the environment in a manner that is consistent with existing and emerging trends.
- Significant Impact - An impact which, by its character, magnitude, duration or intensity alters a sensitive aspect of the environment.
- Profound Impact - An impact which obliterates sensitive characteristics.

2.6 The surveys in 2015 and 2019 took place outside of the flowering season and as such, a full detailed botanical assessment was not conducted at that time; however, a baseline habitat survey of the Greenway was conducted. In relation to mammals, signs of mammals were looked for during the course of the field walkover. The subsequent survey of key areas of potential ecological constraint along the Greenway (see Figure 3.1) was undertaken during the appropriate season.

Table 2.1 – Ecological Evaluation (NRA, 2009).

Ecological Evaluation	Examples
International Importance	'European Site' including Special Area of Conservation (SAC), Site of Community Importance (SCI), Special Protection Area (SPA) or candidate Special Area of Conservation or proposed Special Protection Area (pSPA). Site that fulfils the criteria for designation as a 'European Site' (see Annex III of the Habitats Directive, as amended). Features essential to maintaining the coherence of the Natura 2000 Network. Site containing 'best examples' of the habitat types listed in Annex I of the Habitats Directive. Resident or regularly occurring populations (assessed to be important at the national level) of the following: • Species of bird, listed in Annex I and/or referred to in Article 4(2) of the Birds Directive; and/or • Species of animal and plants listed in Annex II and/or IV of the Habitats Directive. Ramsar Site (Convention on Wetlands of International Importance Especially Waterfowl Habitat 1971). World Heritage Site (Convention for the Protection of World Cultural & Natural Heritage, 1972). Biosphere Reserve (UNESCO Man & The Biosphere Programme). Site hosting significant species populations under the Bonn Convention (Convention on the Conservation of Migratory Species of Wild Animals, 1979). Site hosting significant populations under the Berne Convention (Convention on the Conservation of European Wildlife and Natural Habitats, 1979). Biogenetic Reserve under the Council of Europe. European Diploma Site under the Council of Europe. Salmonid water designated pursuant to the European Communities (Quality of Salmonid Waters) Regulations, 1988, (S.I. No. 293 of 1988).
National Importance	Site designated or proposed as a Natural Heritage Area (NHA). Statutory Nature Reserve. Refuge for Fauna and Flora protected under the Wildlife Acts. National Park. Undesignated site fulfilling the criteria for designation as a Natural Heritage Area (NHA); Statutory Nature Reserve; Refuge for Fauna and Flora protected under the Wildlife Act; and/or a National Park. Resident or regularly occurring populations (assessed to be important at the national level) of the following: • Species protected under the Wildlife Acts; and/or • Species listed on the relevant Red Data list. Site containing 'viable areas' of the habitat types listed in Annex I of the Habitats Directive.
County Importance	Area of Special Amenity. Area subject to a Tree Preservation Order. Area of High Amenity, or equivalent, designated under the County Development Plan.

Ecological Evaluation	Examples
	Resident or regularly occurring populations (assessed to be important at the County level) of the following: • Species of bird, listed in Annex I and/or referred to in Article 4(2) of the Birds Directive; • Species of animal and plants listed in Annex II and/or IV of the Habitats Directive; • Species protected under the Wildlife Acts; and/or • Species listed on the relevant Red Data list. Site containing area or areas of the habitat types listed in Annex I of the Habitats Directive that do not fulfil the criteria for valuation as of International or National importance. County important populations of species, or viable areas of semi-natural habitats or natural heritage features identified in the National or Local BAP, if this has been prepared. Sites containing semi-natural habitat types with high biodiversity in a county context and a high degree of naturalness, or populations of species that are uncommon within the county. Sites containing habitats and species that are rare or are undergoing a decline in quality or extent at a national level.
Local Importance (Higher Value)	Locally important populations of priority species or habitats or natural heritage features identified in the Local BAP, if this has been prepared; Resident or regularly occurring populations (assessed to be important at the Local level)12 of the following: • Species of bird, listed in Annex I and/or referred to in Article 4(2) of the Birds Directive; • Species of animal and plants listed in Annex II and/or IV of the Habitats Directive; • Species protected under the Wildlife Acts; and/or • Species listed on the relevant Red Data list. Sites containing semi-natural habitat types with high biodiversity in a local context and a high degree of naturalness, or populations of species that are uncommon in the locality; Sites or features containing common or lower value habitats, including naturalised species that are nevertheless essential in maintaining links and ecological corridors between features of higher ecological value.
Local Importance (Lower Value)	Sites containing small areas of semi-natural habitat that are of some local importance for wildlife; Sites or features containing non-native species that are of some importance in maintaining habitat links.

3. Ecological Baseline

Desktop Assessment

Designated Sites

3.1 A review of designated conservation sites (pNHAs, NHAs, SACs and SPAs) in proximity to the development or ecologically linked to the development was conducted. The only designated conservation sites which are linked to the development site are Malahide Estuary pNHA (000205), SAC (000205) and SPA (004025). As detailed in the accompanying Stage 1 Screening for Appropriate Assessment (5139451DG11) there are no likely significant impacts arising from the proposed development on these sites.

Rare / Protected Species

3.2 In relation to protected species records for the site, a data request was made to NPWS for information on rare and protected species. There are records for hedgehog (*Erinaceus europaeus*), Irish hare (*Lepus timidus*), frog (*Rana temporaria*) and golden dock (*Rumex maritimus*) within the wider environment, but not necessarily along the corridor of the pathway, much of which developed in character. The records for hedgehog are from Ratoath; Irish hare records are from the 10km grid square within which the study areas is located; while frog records are from Garristown, Co. Dublin. The records of golden dock are from Curragha Bog near Garristown.

3.3 The NBDC website has records for badger (*Meles meles*), Leisler's bat (*Nyctalus leisleri*) and pipistrelle bat (*Pipistrellus* sp.) (note information on bats below) within the 2km grids in which the proposed development is located; along with 12 protected bird species: -

- Common Linnet (*Carduelis cannabina*) [A 3]
- Common Snipe (*Gallinago gallinago*) [A]
- Common Wood Pigeon (*Columba palumbus*) [G]
- Yellowhammer (*Emberiza citrinella*) [R]
- Black-headed Gull (*Chroicocephalus ridibundus*) [R]
- Common Pheasant (*Phasianus colchicus*) [G]
- Common Starling (*Sturnus vulgaris*) [A]
- House Sparrow (*Passer domesticus*) [A]
- Lesser Black-backed Gull (*Larus fuscus*) [A]
- Mallard (*Anas platyrhynchos*) [G]
- Northern Lapwing (*Vanellus vanellus*) [R]

Field Assessment of proposed Greenway

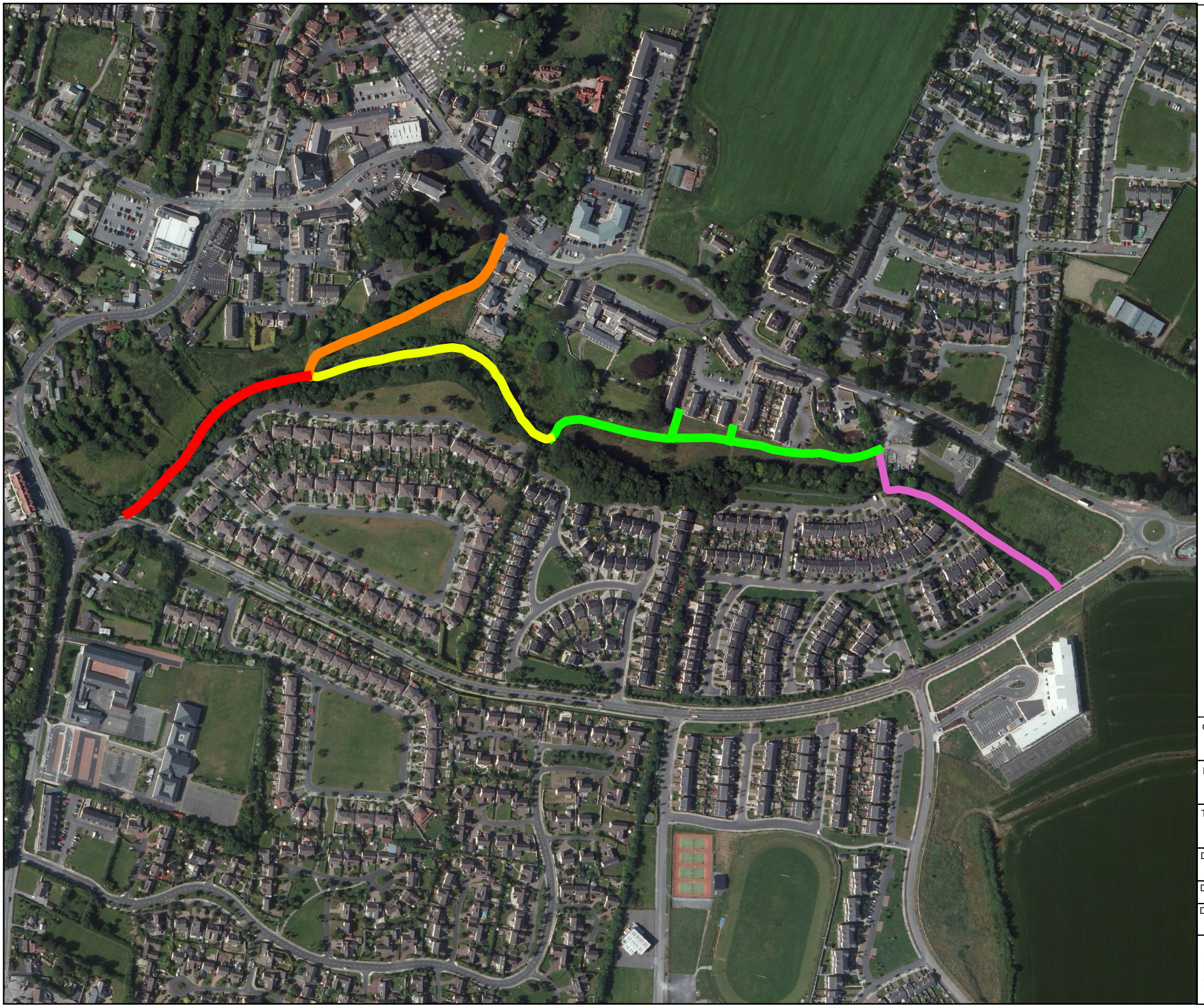
3.4 The proposed Greenway starts at north of the junction Meadowbrook Hill and the R155, south of the Broadmeadow River (see Figure 3.1). The route extends eastward along existing surfaced

[3] G = Green listed; A = Amber listed; R = Red listed; after Colhoun & Cummins (2013).

pathways and informal pathways through parkland and agricultural lands. Surfaced pathways was classified as having negligible ecological importance while the informal pathways through agricultural lands are of *Local Importance (Lower Value).*

3.5 The wetted width of the Broadmeadow River on the day of survey in 2015 and 2019 was between 2m – 3m. The river functions as an ecological corridor and so is evaluated as of *Local Importance (Higher Value).* Extensive litter was evident within the river, but there was still evidence visible of varied instream habitat comprising cobbles and gravels. Inland Fisheries Ireland (IFI) have conducted surveys along this river and recorded three-spined stickleback (*Gasterosteus aculeatus*), nine-spined stickleback (*Pungitius pungitius*), eel (*Anguilla anguilla*) and stone loach (*Barbatula barbatula*). However, as noted following design changes it is no longer proposed to run the Greenway along the river and adjoining woodland (refer to comments on bats below).

3.6 For the purposes of this report, the routes have been divided into 5 sections and these are shown in Figure 3.1, while Figure 3.2 illustrates the habitats present for the new-build section of the route (section 4). The habitats adjacent to the existing path in the remaining sections are described in the text below.



Section of Greenway

- Section 1
- Section 2
- Section 3
- Section 4
- Section 5

Client: Meath County Council

Project: Ratoath Cycleway and Greenway

Title: Site Location - Sections

Designed/Drawn:	Checked:	Authorised:
CR	PO'D	PO'D
Date: 26/02/2020	Date: 26/02/2020	Date: 26/02/2020
Drawing No: Figure 3.1		Rev: 0

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Galway - Tel: 353 - 91 386 633

Legend

- New Path
- Treeline 2
- Rank grassland
- Amenity grassland
- Wet grassland
- Woodland
- River

Client: Meath County Council		
Project: Ratoath Cycleway and Greenway		
Title: Habitat Map		
Designed/Drawn: CR	Checked: PO'D	Authorised: PO'D
Date: 26/02/2020	Date: 26/02/2020	Date: 26/02/2020
Drawing No: Figure 3.2		Rev: 0

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Section 1: Western entrance to bridge no.1

3.7 An existing path (BL3) is present along this section, which will require resurfacing; minor widening will be required at pinch points. The path is bordered by a grass verge (GS2) with ruderal species and treelines (WL2) on both sides. Near the western entrance there was abundant butterbur (*Petasites hybridus*), dock (*Rumex* spp.), hogweed (*Heracleum sphondylium*) and nettle (*Urtica dioica*); the butterbur had recently been cut. The treeline (WL2) to the south east consisted of sycamore (*Acer pseudoplatanus*), ash (*Fraxinus excelsior*), birch (*Betula* sp.), hawthorn (*Crataegus monogyna*), poplar (*Populus* sp.), beech (*Fagus sylvatica*) and elm (*Ulmus* sp.). The treeline along the river consisted of sycamore, ash, hawthorn and elder (*Sambucus nigra*). The habitat present in this section is of *Local Importance (Lower Value).*

Plate 3.1 Vegetation cut adjacent to path; and treelines either side of path.

Section 2: Bridge 1 along the existing northern path

3.8 An existing path (BL3) is present in this section which will require resurfacing. To the west is a fence; behind which is a treeline (WL2) of sycamore, hawthorn and ash. To the east are areas of rank grassland (GA1/GS4) with some planted trees. The grassland within 2-3m of the path had recently been cut. Dense areas of bramble are present adjacent to the river. Pockets of pendulous sedge (*Carex pendula*) are present with willow (*Salix cinerea*), vetch (*Vicia* sp.), clover (*Trifolium repens*), sedges (*Carex* spp.) and hard rush (*Juncus inflexus*), ribwort plantain (*Plantago lanceolata*), dock (*Rumex* spp.) and bramble (*Rubus fruticosus*). The habitat present in this section is evaluated as *Local Importance (Lower Value).*

Plate 3.2 Northern existing path with cut grass and pockets of pendulous sedge.

Section 3: Southern existing path between bridge 1 and 2

3.9 There is an existing path (BL3) in this section which will require resurfacing. To the north, the treeline (WL2) along the river consists of ash, sycamore, birch, blackthorn (*Prunus spinosa*), willow, lime (*Tilia x europaea)* and elder and also some recently planted trees. To the south, the treeline consists of elm, sycamore, ash and elder. Adjacent to the river are patches of reeds (FS1) (*Phragmites australis*), reed canary grass (*Phalaris arundinacea*), angelica (*Angelica sylvestris*), dock, nettle, creeping buttercup (*Ranunculus repens*), hogweed, thistle (*Cirsium* spp.) and rushes. The habitat present in this section can be evaluated as *Local Importance (Lower Value).*

Plate 3.3 Existing path between Bridges 1 and 2.

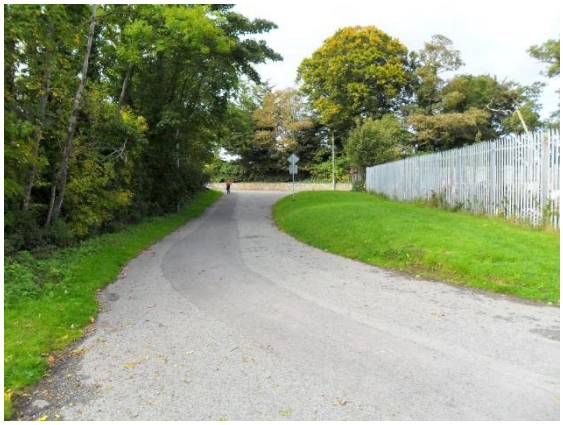
Section 4: Proposed new northern pathway between Bridge 2 and Bridge 3

3.10 To the north and to the rear of some dwellings is a small patch of mixed woodland (WD1) with Lawson Cypress (*Chamaecyparis lawsoniana*), pine *(Pinus* sp.) and elder. There is an existing informal track through the grassland at this location. To the south of the proposed new track is an area of species poor wet grassland (GS4), dominated in parts by hard rush and heading in an easterly direction, the grassland is less wet. Species present include dock, creeping buttercup, thistle, patches of pendulous sedge, bindweed (*Convolvulus arvensis*), clover, sorrel (*Rumex acetosa*), vetch and in wetter areas, silverweed (*Potentilla anserina*). Towards the east, the grassland consists of Yorkshire fog (*Holcus lanatus*), perennial rye grass (*Lolium perenne*), dock and vetch and small patches of hard rush. The treeline along the river consists of ash, hawthorn, hazel (*Corylus avellana*), alder (*Alnus glutinosa*), beech and sycamore. As the wet grassland in this section is quite species poor, overall it is classified as *Local Importance (Lower Value).*

Plate 4.1 Area of wet grassland; existing beaten track where new path is proposed.

Section 5: Existing north eastern path

3.11 This section consists of an existing road entrance (BL3) to the pumping station. There is a grassed bank (GS2) to the east and a treeline (WL2) of sycamore and ash to the west. This section has negligible ecological value. There is an existing footpath (BL3) in this section, which will require widening and resurfacing and the western section may require a new path through amenity grassland (GA2). The habitat present consists of amenity grassland and planted laurel and dogwood hedging. This section has *negligible ecological value*



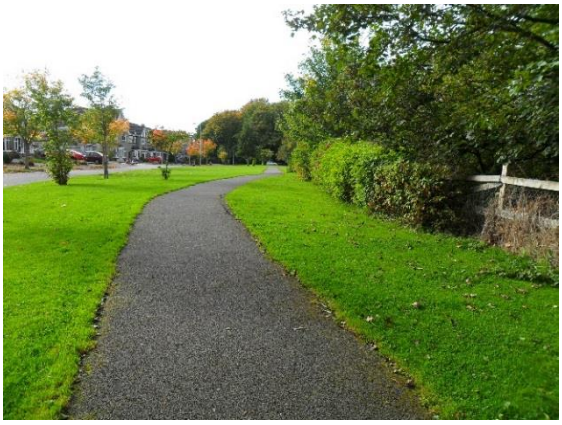


Plate 5 Existing road bordered by a treelines to the west and a grassy bank to the east and existing path to be widened in residential area.

Mammals

3.12 No otter holts or badger setts were identified from the study area on the day of survey and there was no evidence of badger tracks present; it is recommended that a pre-construction mammal survey is undertaken to ensure that there have been no changes to the status of mammals along the works corridor.

3.13 Bats are likely to commute and forage along the Broadmeadow River and use the small area of woodland through which informal paths run. Furthermore, as noted the NBDC website holds records for Leisler's bats and pipistrelle bats from the 2km grid in which the study area is located. It was therefore recommended that a bat survey be undertaken; the results of which would inform both the design as well as the design of lighting along the proposed scheme and to identify where specific mitigation measures for bats will need to be integrated into the lighting design or operation.

3.14 In July 2018 Wildlife Surveys Ireland were commission to carry out a bat assessment of the proposed cycle way in Ratoath, Co. Meath (for full report see Appendix B). Bats were not found

roosting in the trees on this site. However, bats were found feeding and commuting along the Broadmeadow River. Natterer's bats were found feeding in the woodland section along the river. Young bats were seen taking their first flights along the river, feeding off the insects in the grasses. The following bat species were found during the July 2018 bat survey: -

- Common pipistrelle (*Pipistrellus pipistrellus*)
- Soprano pipistrelle (*Pipistrellus pygmaeus*)
- Natterer's bat (*Myotis nattereri*)
- Leisler's bat (*Nyctalus leisleri*)

3.15 At the time of the Bat Survey in 2018, it was proposed to run the Greenway along the river and through adjoining woodland to the south of the river. Recommendations to avoid impacts to bats were provided by the bat specialist; these recommendations were used to inform the detailed design of the cycle way. However, as noted it is no longer intended to position the Greenway through the woodland to the south of the river, the Greenway will continue through grassland to the north of the Woodland as shown on Figure 3.1. The repositioning of the greenway will avoid the requirement for the removal of trees within the woodland which were to conflict with the formally proposed route.

4. Ecological Constraints and Advice for Development

Potential Construction Impacts

4.1 Along sections 1, 2 and 3, of the Greenway (See Figure 3.1) there are existing paths in place which do not need to be widened and so will only require resurfacing. Therefore, direct impacts on habitats will not occur as a result of the works. The western side of section 5 will require minor widening of the existing path at pinch points and resurfacing where necessary. The eastern section running south of the Meadowbrook stream will be resurfaced with the proposed bound greenway path. Similarly, no direct impacts on habitats will occur as a result of the works.

4.2 Section 4 will require the construction of a new 3m wide path. It is proposed that the line of the new path will follow the existing informal track and so will result in some loss of grassland habitat. This section is to be constructed ca. 20m – 40m from the river and for the most part and will also avoid the area of species poor wetter grassland closer to the river. These areas of grassland are, however, classified as of no more than *Local Importance (Lower Value);* construction of a new path should therefore result in no more than a localised slight ecological impact. Construction methods; proposals for pollution prevention and protection of vegetation to be retained (along the river and bordering the pathway) will be considered further at detailed design (see comments on CEMP / ecological advice below). The species poor wet grassland also offers an opportunity for biodiversity gain through appropriate landscaping / habitat management[4].

4.3 As noted, the woodland to the south of the proposed path is heavily degraded and shows extensive sign of trampling; furthermore, there is limited evidence of either a shrub layer or a field layer. Whilst there are benefits to providing a path through the Woodland, proposals have not been consider, any further given the likely impact on tree roots and light pollution that would impact on bats. Construction of a path away from the woodland may in fact help to reduce trampling pressures off line and allow recovery of the woodland areas (though some intervention may be needed to assist this). As mitigation a proposal should be developed to replace any trees removed with an equal or greater number of native trees (of local provenance) as part of the scheme – although beech could also be considered in this instance due to the prevalence of this species within the existing woodland. No ash should be planted due to ongoing concerns over ash-dieback. On balance removal of a small number of trees and subsequent woodland improvement should result in a slight negative to potentially positive impact on this stretch of woodland.

4.4 As noted above, the bat survey report (see Appendix B) noted that Natterer's bats are rarely recorded in Meath and are light intolerant; and as such it is important to keep light pollution to a minimum. This informed the relocation of the proposed Greenway to the area of grassland further from the river corridor; the final design of lighting will also be required to minimise light levels; include for directional lighting and be designed to be bat friendly (see e.g. BCT / ILP, 2018). Also, as the river and surrounding vegetation provides a good feeding area for bats. It is important to retain long grasses and vegetation, particularly between the new cycleway and the river. Avoidance of such impacts have been achieved by relocated this section of the Greenway to the north and away from these areas (see Figure 3.2).

4.5 In terms of indirect impacts, there is potential for impacts on the Broadmeadow River during the works. Sections 1 and 3 which require resurfacing are located close to the river. Also, the

[4] see for example http://www.biodiversityireland.ie/projects/irish-pollinator-initiative/all-ireland-pollinator-plan/

construction of the new section of pathway proposed in Section 4 has the potential for run-off during construction which could potentially impact the river; as does the lengthening of the culvert on the Curragha Road. It will be a requirement of the Contract that all on-site works will be required to be undertaken in strict adherence to published best practice in order to prevent any negative impacts to the Broadmeadow River. Prior to construction the appointed Contractor will be required to prepare a Construction and Environmental Management Plan, Site Management Plan, Waste Management Plan and Earthworks Management Plan - outlining how they propose to address pollution prevention and how this will be implemented and monitored on site.

4.6 As noted, a new footpath is proposed on the southern side of the Dunshaughlin Road; this is to be positioned within the existing footpath and verge. The advice of an ecologist should be sought should localised relocation of lighting poles be required. There proposed work area will be limited to the existing pathway the grass verge along this section. As detailed in section 1.16 and on following recommendations set out in the arboriculture assessment (Appendix C) the proposed pathway will be adjusted to accommodate tree and root systems as much as possible. Any potential impacts to the trees will be minor in nature due to mitigation measures proposed (see section 4.21).

4.7 During the upgrade works are the Woodland Links Road the removal of the 59 semi-mature existing ornamental trees *(Lime, Sycamore & Pedunculate oak)* is necessary to facilitate the works. While these trees provide limited ecological value compensatory planting as be proposed on the opposite side of the road (See section 4.23).

4.8 A new footpath is also proposed on western side of Curragha Road. This is to be positioned along the roadway within the existing roadside verge; these works will require extension of an existing culvert on the Curragha Road. Based on the proposed layout and working areas no impact to the young ornamental hedge positioned adjacent to the works is likely. In any case any impact to the beech hedge will be mitigated appropriately in the form of compensatory planting of same. The culvert works will comprise of lengthening of a culvert carrying the Crackenstown Stream under the road. As noted above in line with best practices and in interests of local aquatic ecology of the culvert works will be carried out in lines with best practice guidance on the protection of aquatic ecology within the stream (See section 4.19).

4.9 As noted, during the preliminary ecological survey no evidence of badger was identified along the study area. Likewise, no otter holts were identified along the river during the survey; however, it should be assumed that Otter are likely to use the river (there is a historical record of otter is recorded by www.nbdc.ie from the Broadmeadow River). By restricting all works to daylight hours (as otters are most active at dawn/dusk); by minimising any overnight lighting on site and preventing negative impacts on water quality within the Broadmeadow River the potential for negative impacts on otter should be avoided. However, due to the time that could elapse between planning and site works; a pre-construction mammal survey should be undertaken within the vicinity of the proposed Greenway to ensure that there have been no changes to the status of mammals along the works corridor.

4.10 There are three existing bridge crossings within the scheme, no widening works are proposed for these bridges as part of the scheme, just resurfacing; though as noted it is proposed to locally lengthen a culvert the Curragha Road.

4.11 No invasive species such as Japanese Knotweed (*Fallopia japonica*), Himalayan Balsam (*Impatiens glandulifera*) or Giant Hogweed (*Heracleum mantegazzianum*) were identified on the day of survey, however, due to the time that could elapse between planning and site works; it should be a requirement of the Contract, that the route of the proposed works is resurveyed for invasive plant species prior to the commencement of construction.

4.12 In conclusion, it will be a requirement of the contract that the appointed Contractor will be required to prepare a Construction and Environmental Management Plan which will focus in particular on preventing any pollutants entering the Broadmeadow River and its tributary; protect water quality; protect adjoining vegetation to be retained and inform the design of lighting. The Contractor will be required to outline how these measures will be implemented and supervised. The CEMP must be prepared with the input of a suitably qualified ecologist. The final design will also be required to identify areas of biodiversity gain within the final design; including identification of where trees can be planted (number equalling or greater than the number removed) and opportunities for inclusion of biodiversity gain within landscaping proposals can be located.

Potential Operational Impacts

4.14 Once the paths have been resurfaced and constructed, operational impacts are limited to disturbance and light pollution impacting on wildlife along the route. Surface water drainage will be over the edge drainage / infiltration and will not be directed to adjoining watercourses.

4.15 Due to the high usage of the site at present, it is not envisaged that following the completion of the scheme that the site would be significantly impacted by disturbance over and above the existing levels of disturbance.

4.16 As noted, there are existing paths in Sections 1, 2, 3 and 5. Of these only Section 3 is currently unlit; lighting proposals for Section 3 will be finalised at detailed design. The remaining sections are currently lit by sodium lamps. Section 4 will require the construction of a new path and associated new lights.

4.17 The effects of lighting on bats has been investigated and studies such as Emery (2008), Fure (2006), Jones (2000), Monhemius (2001), Stone *et al*., (2009) and the UK's Bat Conservation Trust (2008); all show that increased lighting can have a negative effect on bat behaviour. In general, artificial light can create a barrier to commuting bats (though not for all species), so lighting should be minimised where possible along the Greenway especially at areas of interest for bat species. See section 4.24 on guidance to reduce impact on bats.

Guidance – to reduce impacts

4.18 During construction, standard best practice methods shall be utilised to minimise suspended solids or other pollutants entering the river. This is described in detail in the accompanying Outline Construction Environmental Plan. Ratoath Pedestrian and Cycling Improvement Plan prepared by Meath County Council (MCC, 2019). At a minimum the following measures should be adhered to: -

- Storage of material well away from the river;
- No refuelling of machinery in proximity to the river;
- Broken pavement and underlying fill to be stored well away from the river and to be kept covered to prevent run-off;
- Spill kits to be kept on site;
- During earth works, silt fences should be installed to prevent silts from entering the river.

4.19 Upgrade works to the pedestrian footpath and culvert on the Curragha Road will minimal and follow best practice guidance. Measures to be considered to protect local aquatic ecology of the Crackenstown Stream should follow;

- Guidelines for crossing of watercourses during the construction of National Road Schemes. National Roads Authority.
- Guidelines on protection of fisheries during construction works in adjacent to water. Inland Fisher Ireland 2016

4.20 In relation to the removal of trees for the works, this can only be completed outside of the bird breeding season which is 1st March – 31st August inclusive[5] and outside the active season for bats (April – September).

4.21 Where work is necessary close to vegetation, the vegetation to be retained must be clearly marked so construction work does not extend beyond the agreed works area. Equally, when working close to mature trees appropriate care must be taken to prevent unnecessary damage to root zones or overhanging vegetation; Potential impacts on trees within the scheme have been assessed measures to reduce impact are outlined in pinch point areas; see Tree Survey Report (Appendix C) and Arboriculturally Impact Assessment (Appendix D). In general terms, when working close to vegetation the NRA's *Guidelines for the Protection and Preservation of Trees, Hedgerows, and Scrub prior to, during and post construction of National Road Schemes* should be considered to reduce impact on vegetation.

4.22 The following best practice guidance will be followed for construction in the vicinity of trees: -

- BS: 5837/2005 Trees in Relation to Construction
- BS 998/1989 Recommendations for Tree Work.
- NRA (2006). *Guidelines for the Protection and Preservation of Trees, Hedgerows and Scrub Prior to, During and Post Construction of National Road Schemes*.

4.23 The removal of 59 Lime, Sycamore and Pedunculate Oak trees and compensatory planting along the Woodland Links road will be carried out in line with recommendations detailed in the Arboricultural assessment carried out by Cunnane Stratton Reynolds in 2019 (Appendix C) namely:

- Removal/felling works as specified on Dwg No: 19277_T_102 (Appendix D), should be performed prior to project commencement, by reputable contractors in accordance with *Tree work. Recommendations* (BS 3998:2010) and current best practice;
- Removal of scrub vegetation and ivy clearance should preferably be performed in winter outside of the bird nesting season;
- Tree felling should be preceded by a competent assessment as to the presence of any protected wildlife species, where required specialist advice should be sought if necessary;
- Following above permitted, priority tree works, protective fencing (barriers) should be erected in the positions and alignments as indicated on the Tree Protection Plan Dwg No No19277_T_103 (Appendix D);
- Fencing should be signed 'Tree Protection Area – No Construction Access';
- Fencing is not to be taken down or re-positioned without written approval of the project Arborist;
- No excavation, plant or vehicle movement, materials handling, or soil storage is to be permitted within the fenced tree protection areas indicated on plan;
- Landscape works and installation of / work to boundary treatments within the Root Protection Area;
- Proposed landscaping works including new planting, shall be performed in accordance with *Trees in Relation to Design, Demolition and Construction – Recommendations* (BS

[5] Dates may change with the result of the Heritage Bill currently being discussed in the Seanad (at time of writing).

5837:2012). During these works, the ground around retained trees must not compacted by vehicles, nor be mechanically excavated for planting, nor be significantly altered in terms of ground levels;

- Compensatory tree planting will be carried out along the Woodland Links road to mitigate against the proposed removal of 59 Lime, Sycamore and Pedunculate Oak. 52no. native semi mature trees will be incorporating into the existing grassed verge including Sessile Oak *(Quercus petraea)* and Sliver Birch *(Betula pendula)* (See Figure 4.1 below). The number of trees to be replaced is slightly less than removed to ensure appropriate spacing specifications for root and canopy expansion;
- The guidance set out in the tree planting specification (See Appendix D) should be incorporated into in the main contractor's tender document for responsibility for the installation, costs and maintenance of tree planting and protection measures. The following items should be included in this document; tree minimum girth and height specifications; rooting specifications; topsoil and site preparation; plant material specifications; and planting timing (Later November – mid March);
- Additionally, a wildflower meadow will be established between the compensatory tree planting on the Woodland Links Road (See Section 5.1); and
- The proposed development will present an opportunity to implement a new native and sustainable tree planting design along the woodland links road. Once established the new planting scheme is aimed at providing high quality, diverse, long-term amenity tree cover, in keeping with the setting and proposed site use. The trees removed have low ecological value. No significant impacts to local ecological and all trees removed within this section will be replaced will similar broadleaf species.

4.24 Studies have found that Leisler's bat and pipistrelle bats can congregate around white mercury street lights and white metal halide lamps feeding on the insects attracted to the light. However, lighting can cause avoidance of an area for commuting bats and can prevent or reduce foraging for some species, including Myotis species[6]. Further, even bat species that have been shown to opportunistically forage in lit conditions have subsequently been recorded being impacted by artificial lighting. In cities, for example, common pipistrelles have been recorded avoiding gaps that are well lit, thereby creating a barrier effect[7]. Operational Lighting should not illuminate retained natural habitat features such as treelines and wooded areas. In order to minimise light pollution and impacts on bats within the proposed greenway it is recommended that the lighting within the greenway is designed in accordance with the current standards (of the time) at design stage and should include the following;

- Lighting should be directional; only shining on the track. This can be achieved by the design of the luminaire and by using accessories such as hoods, cowls, louvres and shields to direct the light to the intended area only;
- The intensity of the lighting on the pathway should be as low as guidelines permit; minimised at ground level and over-spill must be avoided;
- The National Cycle Manual quotes BS: 5489 which calls for an average luminance of 10 lux and a minimum luminance of 5 lux for footpaths and cycle paths at ground level; however, species such as e.g. Daubenton's bats seem to prefer a light level of less than 1 lux (Bat Conservation Ireland, 2010); and

[6] Stone E.L. (2013) Bats and Lighting: Overview of current evidence and mitigation.
[7] Bat Conservation Trust and Institute of Lighting Professionals (2018) Guidance Note 08/18: Bats and artificial lighting in the UK. ILP, Rugby

- There are a number of schemes (walks / cycleways) where the issue of bats and lighting is being actively assessed. The results of such work should be reviewed to inform design of an appropriate lighting option at Ratoath.

4.25 A further option to consider is to manage the time when lights in are on in order to minimise impacts on bat usage. During the period from late September to early April Irish bat species are hibernating and thus impacts from lighting would be largely avoided. In contrast during the mid-summer period of May to August bats will be active; however, day length is longer and in particular the commuting period for most people would coincide with daylight hours; thus, at such times public lighting may not be required. This potentially leaves a period during parts of September and April (immediately before and after hibernation) when the need for lighting to facilitate public use of the greenway might conflict with bat usage.

4.26 The potential for lighting to impact on bats has been considered as part of the detailed design; the following recommendations were taken from the Bat Report (see Appendix B) and will be used to inform the final design of lighting along the proposed scheme (notably in Sections 3 & 4 of the greenway): -

- Avoiding light pollution: - Light spillage must not occur on the river, and light pollution must be avoided. This can be achieved by using e.g. low-level bollard lights, with hoods and cowls fitted to prevent light entering the river area and sky. It is particularly important that light pollution is kept to a minimum in the wooded section of the cycleway.
- Retain trees where possible: - Common and soprano pipistrelles were found feeding along the canopy of the trees to the south of the site. These trees provide shelter and cracks and crevices to roost in (Note: No felling of trees will be carrying out in this area).
- Install Bat boxes: - Four bat boxes should be erected along the route of the cycleway – Two 2FN Schwegler bat boxes and two NHBS Kent boxes. These should be placed on trees, at least 4m high, with a clear drop below (no underlying branches – as bats need to drop to start their flight). These can be purchased from www.nhbs.com.
- Management of vegetation: - to prevent loss of feeding, grasses and vegetation adjacent to the cycleway should not be mown during the summer months. Long grass and native plants allow insect diversity, which in turn provides food for bats. In particular, where the cycleway runs by the river, the area between the river and the cycleway should not be sprayed or cut.
- Consideration should be given to use of LED lighting (Lewanzik & Voigt, 2017); directional lighting / louvers; timing controls on operation etc.

4.27 Thus, in summary, lighting must be designed to prevent overspill of light outside the footprint of the proposed path and in particular to prevent light spillage over the nearby Broadmeadow River, which most likely provides a commuting and foraging corridor for bats.

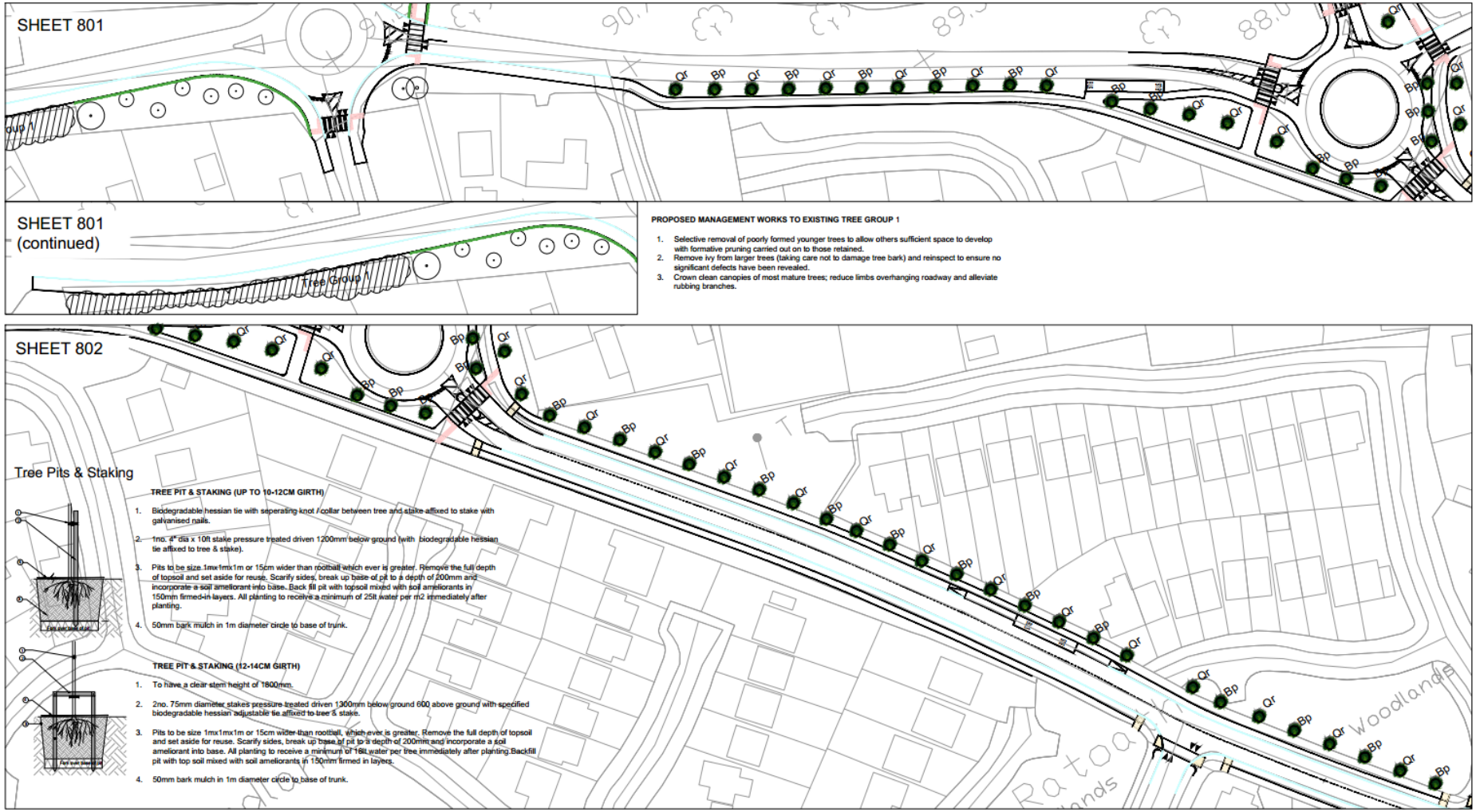


Figure 4.1 Compensatory Tree Planting (CSR Drawing: 19277_T_103 see Appendix D)

5. Biodiversity Enhancement

5.1 In line with the All Ireland Pollinator plan, a wildflower meadow will be established between the compensatory tree planting on the Woodland Links Road. This meadow will be incorporated into the existing landscaping as a biodiversity enhancement feature. Areas disturbed following tree planting will be graded and seeded with an All-Ireland Pollinator Plan Wildflower mix, while existing intact grassed areas will be left unmown until September and managed annually in accordance with guidelines on the creation and management of a wildflower meadow[8]. If the species composition is found to be dominated by ornamental species within the sward, established species-rich plugs should be incorporated into the landscape plan to enhance species diversity within the sward. Plug compositions should be in line with All-Ireland Pollinator Plan guidelines. The overall aim of this feature is to form a continuous linear meadow running along the Woodland link road within the existing grassed verge.

5.2 It is worth considering, as part of an ongoing management program, the selective thinning of a limited number of young trees within Tree Group 1 on the R125 Dunshaughlin Road (See Appendix D). Removing those specimens which have bolted, and or are of relatively poor form, will facilitate improved development of other trees within the group which are currently overcrowded and have inadequate space for strong future development. Most of the lager trees within this group are heavily obscured by ivy, (which should be carefully removed to facilitate full inspection), however they appear to be in good physiological condition. Given their roadside location it would be prudent to consider a crown cleaning exercise to remove rubbing limbs, future compression forks and reduce the length of limbs overhanging adjoining carriageway along with any other imbalances in growth. Where appropriate enforcement planting of hazel should be considered.

5.3 Post construction, it is recommended that habitat enhancement measures be implemented as part of any landscaping proposals along the Greenway. This could include sowing native wildflower and grass mixtures adjacent to the newly constructed path on the northern side of the river. The installation of new path north of the woodland, could itself benefit the regeneration of an herbaceous field layer within the woodland due to the use of a dedicated path and thereby reducing footfall through the woodland.

5.4 As noted, in order to further enhance ecological pathways within the greenway along the Meadowbrook River; bat boxes will be erected along the cycleway. Vegetation along the greenway will be managed to promote native species-rich ground flora. Planting should seek to establish and / or maintain ecological connectivity through the site. Vegetation adjacent to the cycleway should not be mown during the summer months. Long grass and native plants allow insect diversity, which in turn provides food for bats. Where the cycleway runs by the river, the area between the river and the cycleway should not be sprayed or cut. A nature panel can be designed to explain the ‘untidy’ areas left for insect diversity and young bats. All trees along the Cycle Network should be maintained and damage to root zones must not occur incorporating small adjustments to the path alignment.

[8] *How-to-guide Creating and management of a wildflower meadow.* All-Ireland Pollinator Plan 2015-2020

6. References

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Appendix A – Design Drawings

- 5139451/HW/0001 Site Location Plan
- 5139451/HW/0002 Site Extents Keyplan
- 5139451/HW/0003 Site Extents – Sheet 1 of 3
- 5139451/HW/0004 Site Extents – Sheet 2 of 3
- 5139451/HW/0005 Site Extents – Sheet 3 of 3

PART 8 PLANNING DRAWINGS

RATOATH PEDESTRIAN AND CYCLE SCHEME
PART 8 PLANNING DRAWINGS

Sheet List Table		
DRAWING No.	TITLE	REVISION
5139451 / HW / 0000	COVER SHEET	C
5139451 / HW / 0001	SITE LOCATION PLAN	C
5139451 / HW / 0002	SITE EXTENTS KEYPLAN	C
5139451 / HW / 0003	SITE EXTENTS – SHEET 1 OF 3	C
5139451 / HW / 0004	SITE EXTENTS – SHEET 2 OF 3	C
5139451 / HW / 0005	SITE EXTENTS – SHEET 3 OF 3	C
5139451 / HW / 800	PART 8 GENERAL LAYOUT KEY PLAN	C
5139451 / HW / 801	PART 8 GENERAL LAYOUT 1 OF 15	D
5139451 / HW / 802	PART 8 GENERAL LAYOUT 2 OF 15	D
5139451 / HW / 803	PART 8 GENERAL LAYOUT 3 OF 15	D
5139451 / HW / 804	PART 8 GENERAL LAYOUT 4 OF 15	E
5139451 / HW / 805	PART 8 GENERAL LAYOUT 5 OF 15	D
5139451 / HW / 806	PART 8 GENERAL LAYOUT 6 OF 15	D
5139451 / HW / 807	PART 8 GENERAL LAYOUT 7 OF 15	D
5139451 / HW / 808	PART 8 GENERAL LAYOUT 8 OF 15	D
5139451 / HW / 809	PART 8 GENERAL LAYOUT 9 OF 15	D
5139451 / HW / 810	PART 8 GENERAL LAYOUT 10 OF 15	D
5139451 / HW / 811	PART 8 GENERAL LAYOUT 11 OF 15	D
5139451 / HW / 812	PART 8 GENERAL LAYOUT 12 OF 15	D
5139451 / HW / 813	PART 8 GENERAL LAYOUT 13 OF 15	C
5139451 / HW / 814	PART 8 GENERAL LAYOUT 14 OF 15	D
5139451 / HW / 815	PART 8 GENERAL LAYOUT 15 OF 15	D

A1

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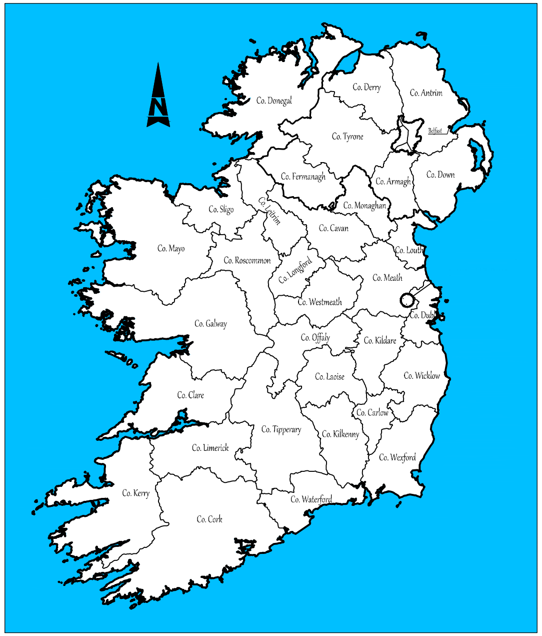

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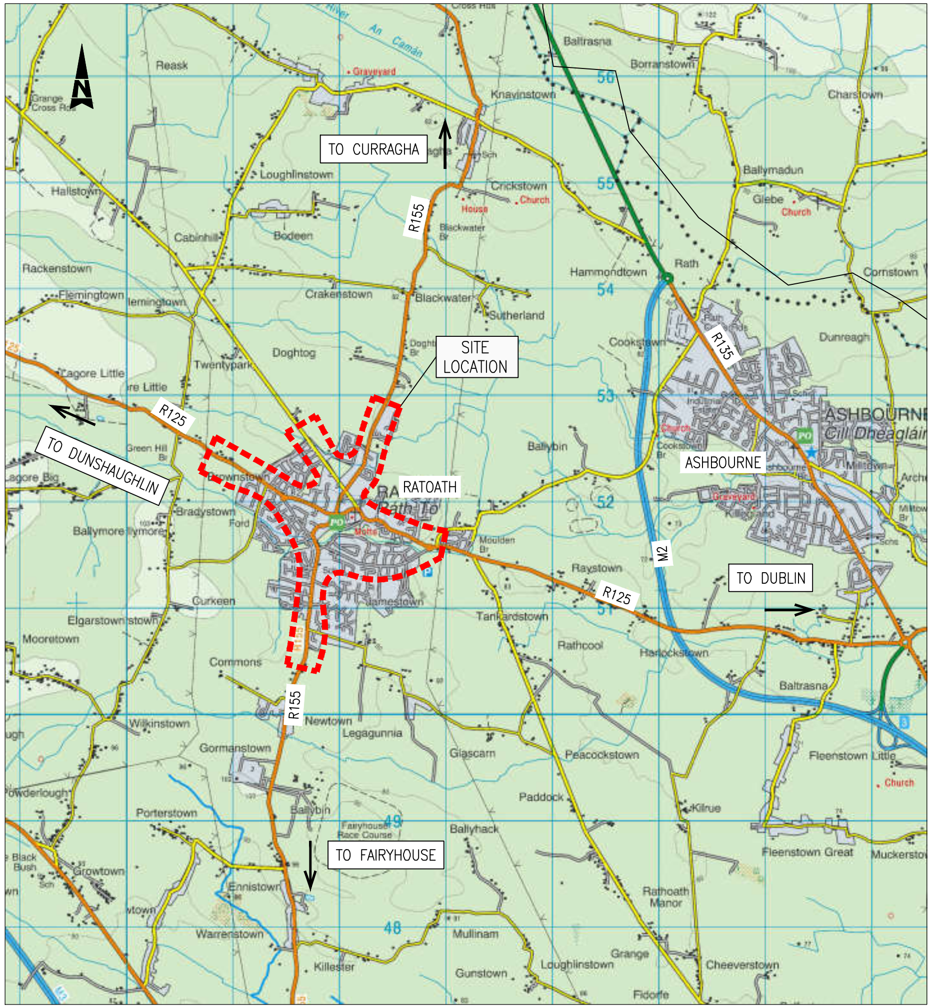

SITE PLAN
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1/50,000 at A3

NTA
Údarás Náisiúnta Iompair
National Transport Authority

Rev	Description	By	Date	Chk'd	Auth
C	PART 8	BM	21.02.20	CF	KB
B	DRAFT	CMK	21.04.17	CF	KB
A	AMENDMENTS	CMK	14.02.17	CF	KB
–	CLIENT REVIEW	CMK	22.12.16	CF	KB

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Client: MEATH COUNTY COUNCIL

Project: RATOATH PEDESTRIAN AND CYCLE SCHEME

Title: SITE LOCATION PLAN

Original Scale	Design/Drawn	Checked	Authorised
AS SHOWN	CMK	CF	KB
	Date 22.12.16	Date 22.12.16	Date 22.12.16

Status	Drawing Number	Rev
	5139451 / HW / 0001	C

File: 5139451 HW 0001.dwg
Date: Feb 21, 2020 – 4:18pm
Plotted by: bmiskovic

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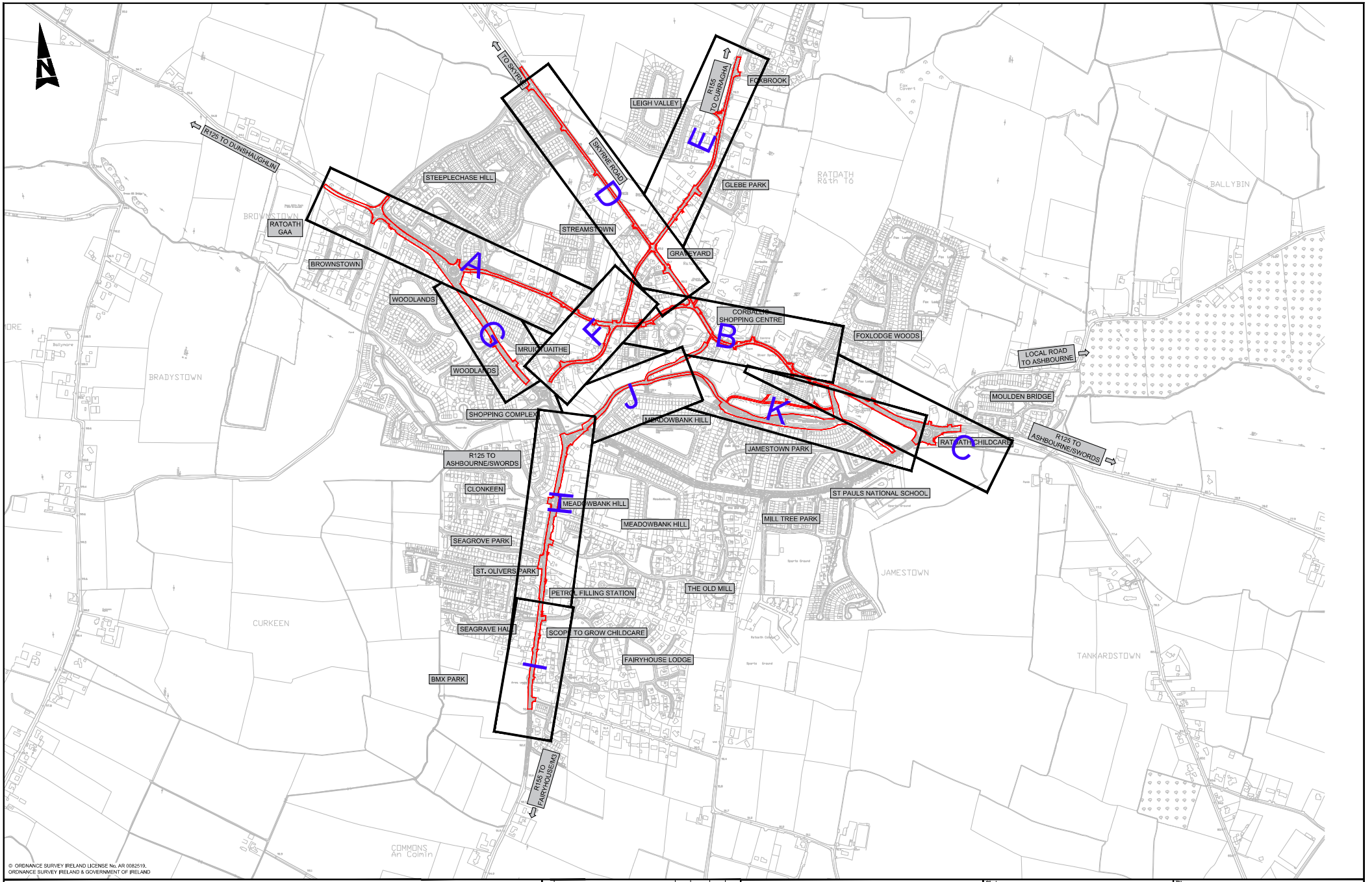

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Údarás Náisiúnta Iompair
National Transport Authority

Rev	Description	By	Date	Chk'd	Auth.
C	PART 8	BM	21.02.20	CF	KB
B	DRAFT	CMK	21.04.17	CF	KB
A	AMENDMENTS	CMK	14.02.17	CF	KB
–	CLIENT REVIEW	CMK	22.12.16	CF	KB

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Client: MEATH COUNTY COUNCIL

Project: RATOATH PEDESTRIAN AND CYCLE SCHEME

Title: SITE EXTENTS KEYPLAN

Original Scale	Design/Drawn	Checked	Authorised
1:5000 at A1 1:10000 at A3	CMK Date 22.12.16	CF Date 22.12.16	KB Date 22.12.16

Status:

Drawing Number: 5139451 / HW / 0002

Rev: C

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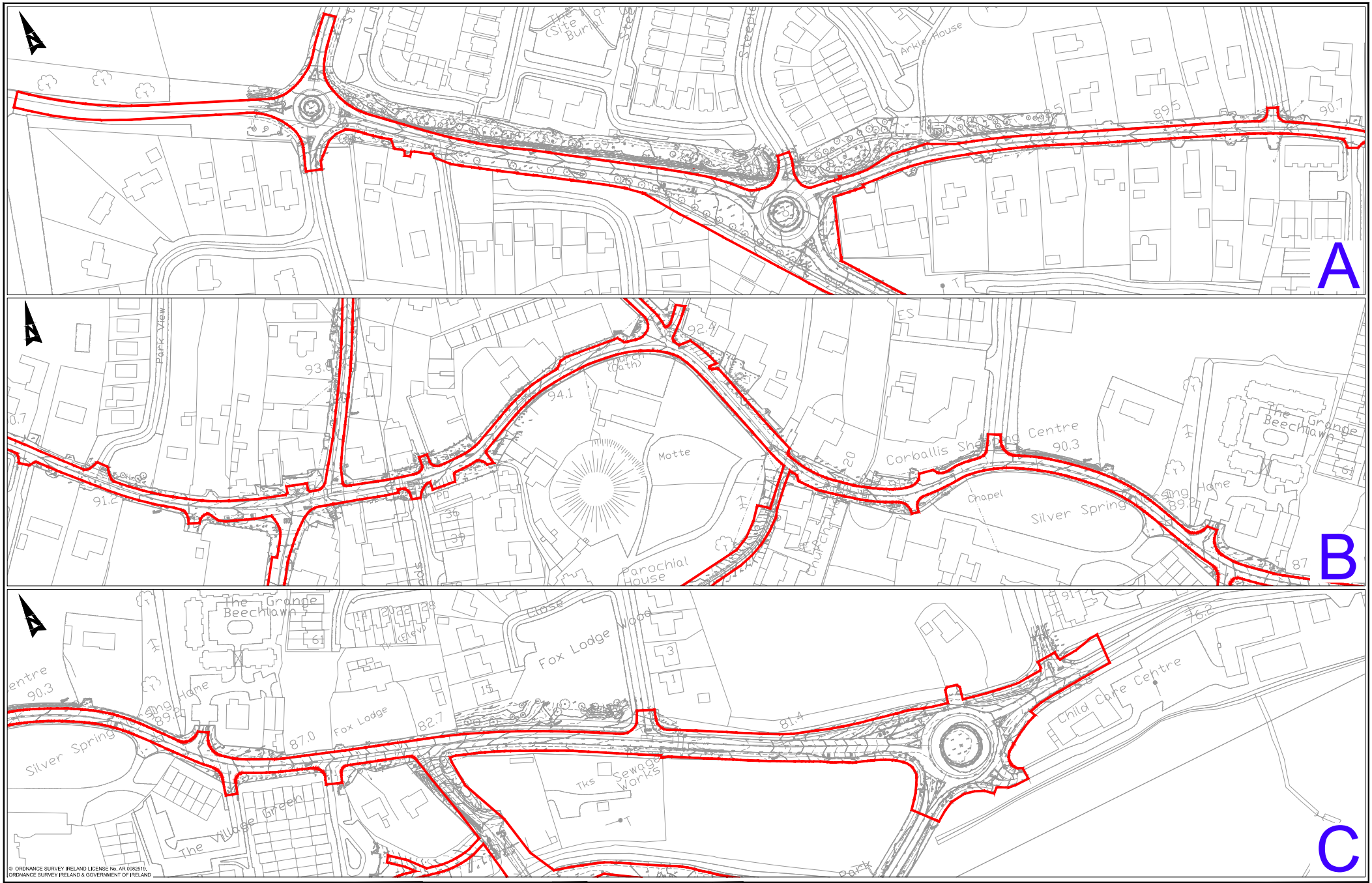

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PART 8 BOUNDARY

Rev	Description	By	Date	Chk'd	Auth
C	PART 8	BM	21.02.20	CF	KB
B	DRAFT	CMK	21.04.17	CF	KB
A	AMENDMENTS	CMK	14.02.17	CF	KB
–	CLIENT REVIEW	CMK	22.12.16	CF	KB

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Client: MEATH COUNTY COUNCIL

Project: RATOATH PEDESTRIAN AND CYCLE SCHEME

Title: SITE EXTENTS SHEET 1 OF 3

Original Scale	Design/Drawn	Checked	Authorised
1:1000 at A1 1:2000 at A3	CMK Date 22.12.16	CF Date 22.12.16	KB Date 22.12.16

Status:

Drawing Number: 5139451 / HW / 0003

Rev: C

Dates: Feb 21, 2020 - 4:45pm Plotted by: bmilanovic DO NOT SCALE A1 5139451 HW 0003

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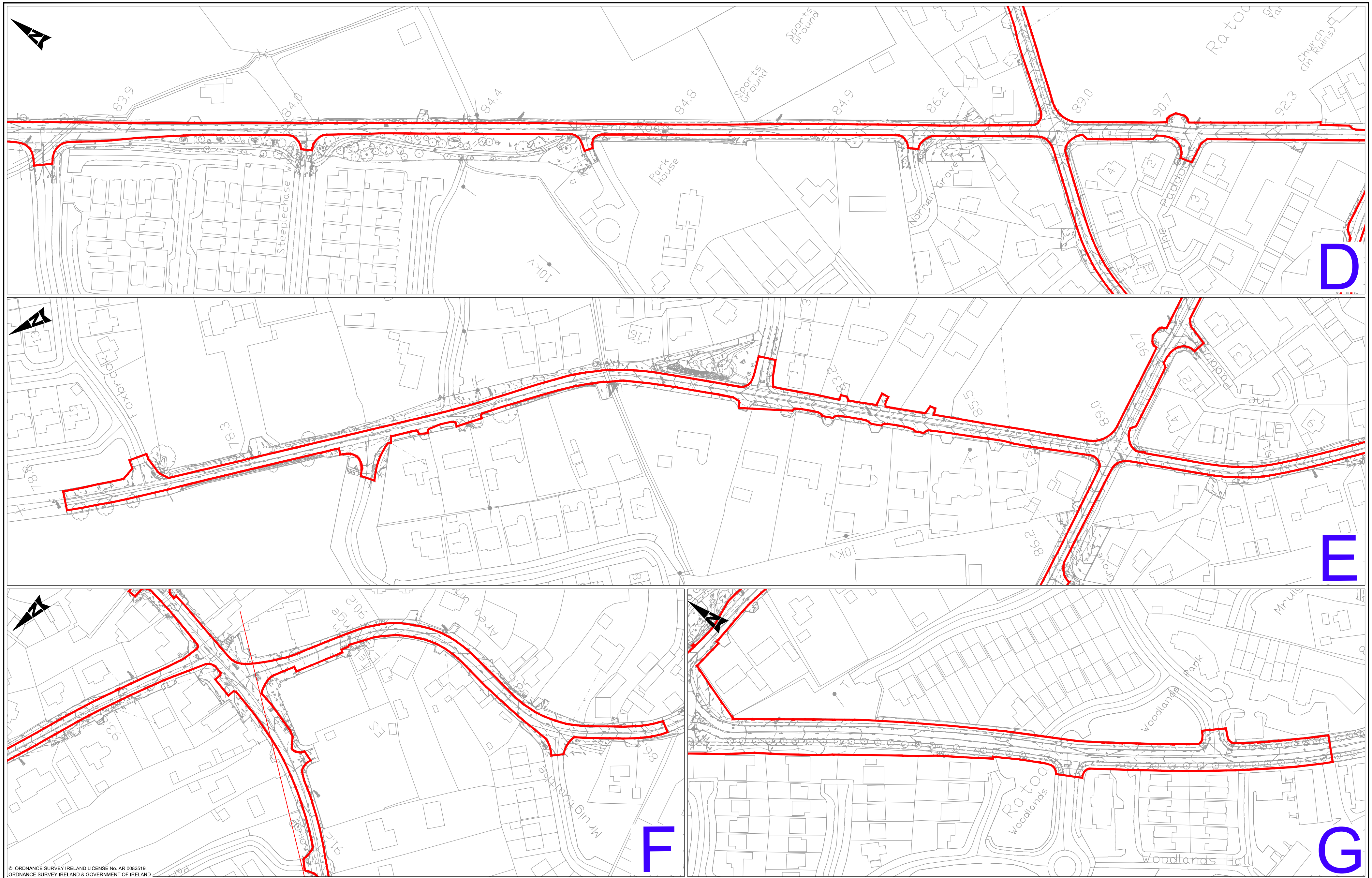
5139451 / HW / 0004



LEGEND :

PART 8 BOUNDARY

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National Transport Authority

Rev	Description	By	Date	Chk'd	Auth
C	PART 8	BM	21.02.20	CF	KB
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–	CLIENT REVIEW	CMK	22.12.16	CF	KB

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Client: MEATH COUNTY COUNCIL

Title: SITE EXTENTS SHEET 2 OF 3

Project: RATOATH PEDESTRIAN AND CYCLE SCHEME

Original Scale: 1:1000 at A1 / 1:2000 at A3

Design/Drawn	Checked	Authorised
CMK	CF	KB
Date 22.12.16	Date 22.12.16	Date 22.12.16

Status:

Drawing Number: 5139451 / HW / 0004

Rev: C

File: 5139451 HW 0004.dwg
Date: Feb 21, 2020 - 4:49pm
Plotted by: bmiskovic

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5139451 / HW / 0005

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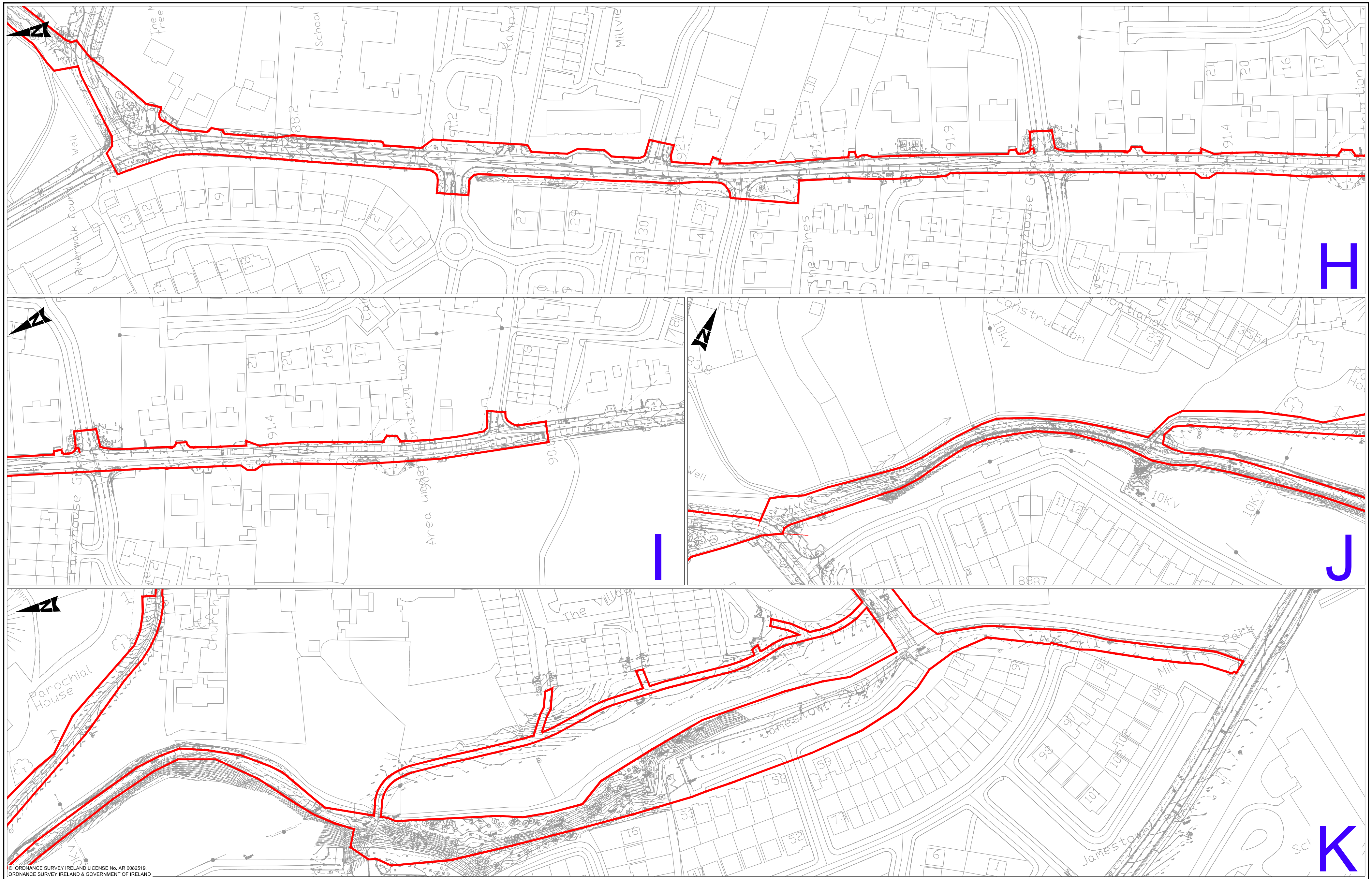

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PART 8 BOUNDARY

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Rev	Description	By	Date	Chk'd	Auth
C	PART 8	BM	21.02.20	CF	KB
B	DRAFT	CMK	21.04.17	CF	KB
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Client: MEATH COUNTY COUNCIL

Project: RATOATH PEDESTRIAN AND CYCLE SCHEME

Title: SITE EXTENTS SHEET 3 OF 3

Original Scale	Design/Drawn	Checked	Authorised
1:1000 at A1 1:2000 at A2	CMK Date 22.12.16	CF Date 22.12.16	KB Date 22.12.16

Status	Drawing Number	Rev
	5139451 / HW / 0005	C

File: 5139451 HW 0005.dwg Date: Feb 21, 2020 - 4:55pm Plotted by: bmiskovic

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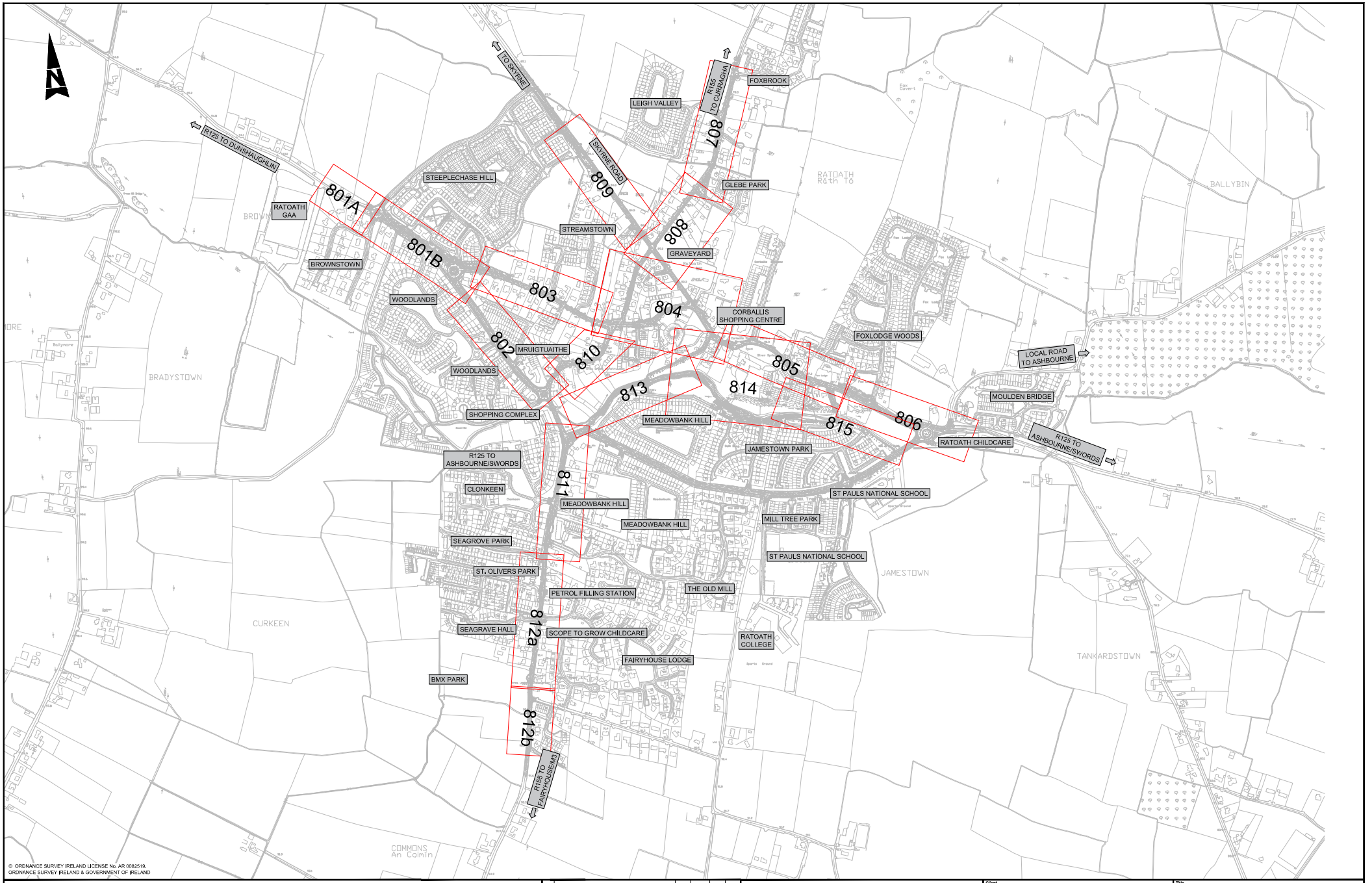

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Date: Feb 21, 2020 - 4:58pm
Plotted by: bridanvic

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National Transport Authority

Rev	Description	By	Date	Chk'd	Auth
C	PART 8	BM	21.02.20	CF	KB
B	DRAFT	CMK	21.04.17	CF	KB
A	AMENDMENTS	CMK	14.02.17	CF	KB
–	CLIENT REVIEW	CMK	22.12.16	CF	KB

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Client: MEATH COUNTY COUNCIL

Project: RATOATH PEDESTRIAN AND CYCLE SCHEME

Title: PART 8 GENERAL LAYOUT KEY PLAN

Original Scale	Design/Drawn	Checked	Authorised
1:5000 at A1 1:10000 at A3	CMK Date 22.12.16	CF Date 22.12.16	KB Date 22.12.16

Status:

Drawing Number: 5139451 / HW / 800

Rev: C

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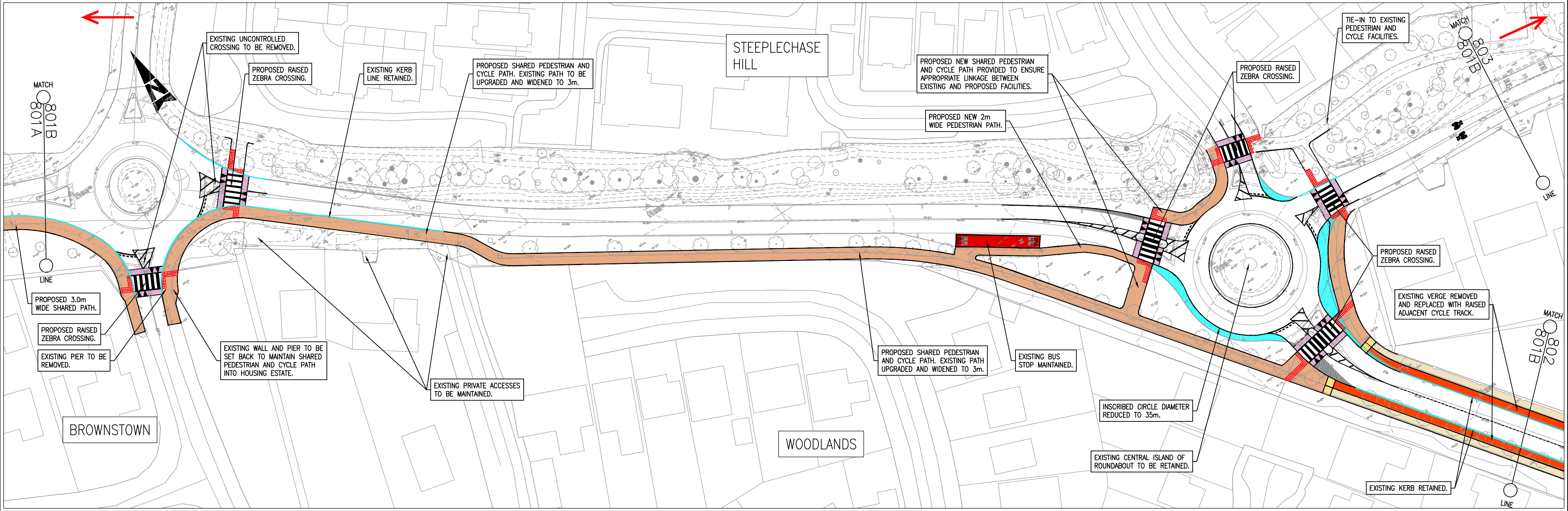
TO DUNSHAUGHLIN

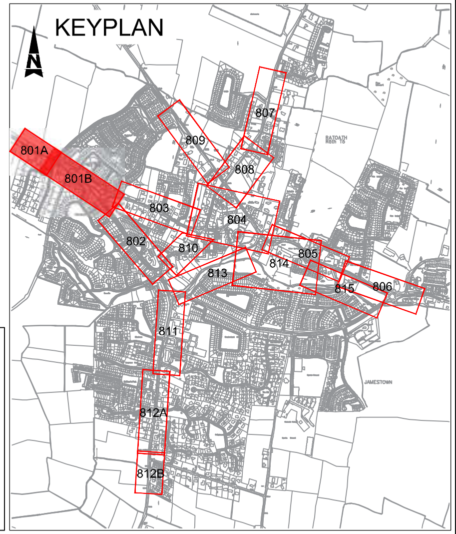
TO TOWN CENTRE



NOTES:

- SCHEME TO BE SUBJECT TO PUBLIC LIGHTING DESIGN AT DETAIL DESIGN STAGE. EXISTING & PROPOSED LIGHTING SHOWN ALONG GREENWAY SCHEME.
- WHERE WORKS ARE PROPOSED, EXISTING TREES TO BE RETAINED WHERE POSSIBLE.
- RAISED CROSSINGS AND JUNCTION TABLES TO BE "BITMAC" (ASPHALT CONCRETE) WITH COLOURED STONE.

KEYPLAN



LEGEND :

- CYCLE TRACK/CYCLE LANE
- SHARED PEDESTRIAN/CYCLE PATH
- FOOTPATH
- RAISED CROSSING/RAISED JUNCTION
- BUILD OUT/TRAFFIC ISLAND
- NEW CARRIAGEWAY
- BUS STOP
- STEPPED ACCESS
- BOARDWALK
- TACTILE PAVING - BEGINNING/END OF SHARED PATH
- TACTILE PAVING - CONTROLLED CROSSING
- TACTILE PAVING - UNCONTROLLED CROSSING
- EXISTING KERB TO BE RETAINED
- PROPOSED KERB
- SHARED STREET
- SEPARATE SCHEME
- Ex.PL EXISTING PUBLIC LIGHTING COLUMN
- PPL PROPOSED PUBLIC LIGHTING COLUMN

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National Transport Authority

Rev	Description	By	Date	Chk'd	Auth
D	PART 8	BM	21.02.20	CF	KB
C	DRAFT	CMK	21.04.17	CF	KB
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A	CLIENT REVIEW	CMK	22.12.16	CF	KB
–	WORKING DRAFT	CMK	16.12.16	CF	KB

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Client: MEATH COUNTY COUNCIL

Project: RATOATH PEDESTRIAN AND CYCLE SCHEME

Title: PART 8 GENERAL LAYOUT SHEET 1 OF 15

Original Scale	Design/Drawn	Checked	Authorised
1:500 at A1 / 1:1000 at A3	CMK, Date 16.12.16	CF, Date 16.12.16	KB, Date 16.12.16

Status | Drawing Number: 5139451 / HW / 801 | Rev: D

A1 | 5139451 / HW / 801 | D

DO NOT SCALE

File: 5139451 HW 801.dwg Date: Feb 21, 2020 - 5:06pm Plotted by: bmiskovic

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Appendix B – Bat Survey Report

A bat assessment of the proposed cycleway in Ratoath, Co Meath

To provide ecological data for Part 8 Planning to develop a greenway adjacent the Broadmeadow River, Ratoath, Co. Meath

By Donna Mullen M.P.P.M and Brian Keeley BSc Hons in Zool

Maio, Tierworker, Kells Co Meath

July 12th, 2018

www.wildlifesurveys.net

Summary

Bats were not found roosting in the trees on this site. However, bats were found feeding and commuting along the river. Natterers bats were found feeding in the woodland section along the river. As Natterer's bats are rarely recorded in Meath and are light intolerant, it is important to keep light pollution to a minimum.

Young bats were seen taking their first flights along the river, feeding off the insects in the grasses. The river and surrounding vegetation provide a good feeding area for bats. It is important to retain long grasses and vegetation, particularly between the new cycleway and the river.

Bat species found feeding and commuting on the site and along the river

Common pipistrelle	*Pipistrellus pipistrellus*
Soprano pipistrelle –	*Pipistrellus pygmaeus*
Natterer's bat –	*Myotis nattereri*
Leisler's bat –	*Nyctalus leisleri*

Recommendations

(1) Avoiding light pollution- Light spillage must not occur on the river, and light pollution must be avoided. This can be achieved by using low level bollard lights, with hoods and cowls fitted to prevent light entering the river area and sky. It is particularly important that light pollution is kept to a minimum in the wooded section of the cycleway.

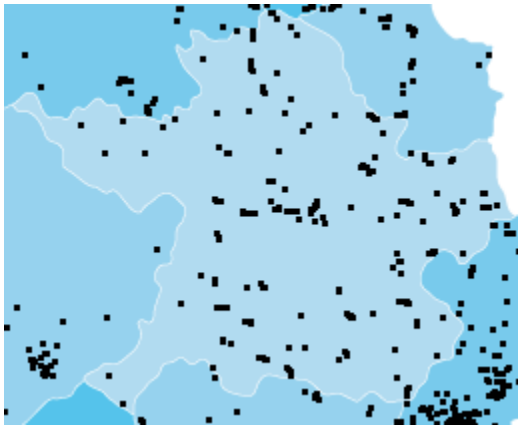
(2) Retain trees where possible. Common and soprano pipistrelles were found feeding along the canopy of the trees on the site. These trees provide shelter and cracks and crevices to roost in.

(3) Bat boxes- Four bat boxes should be erected along the route of the cycleway – Two 2FN Schwegler bat boxes and two NHBS Kent boxes. These should be placed on trees, at least 4m high, with a clear drop below (no underlying branches – as bats need to drop to start their flight). These can be purchased from www.nhbs.com.

(4) Management of vegetation- to prevent loss of feeding, grasses and vegetation adjacent to the cycleway should not be mown during the summer months. Long grass and native plants allow insect diversity, which in turn provides food for bats. In particular, where the cycleway runs by the river, the area between the river and the cycleway should not be sprayed or cut. If required, a nature panel can be designed (email info@wildlifesurveys.net) to explain the 'untidy' areas left for insect diversity and young bats.

Desktop Survey

Distribution of common pipistrelle in Meath



Distribution of Leisler's bat in Meath

Distribution of soprano pipistrelle in Meath

Distribution of Natterer's bat in Meath

Thanks to Bat Conservation Ireland for their data. All data from this report will be placed on their database.

Habitat; Improved and unimproved grassland, semi -mature trees and woodland, hedges, river and treelines.

Temperature -16ºC dropping to 14ºC

Sunset - 21.50 hours

Methodology

Bat Survey - Equipment

LED Lamp, Petzl Tikka Head torch

Echometer 3 bat detector x 2

Two surveyors with EM3 time expansion detectors and kaleidoscope sound analysis software with GPS – hand held

Survey and recommendations;
The survey took place on July 12th, commencing at 21.30 hours. Most trees are immature and unsuitable as roosts, however there are occasional trees with deadwood, cracks and crevices which would be suitable for bat usage.

This tree has crevices suitable for bat usage.

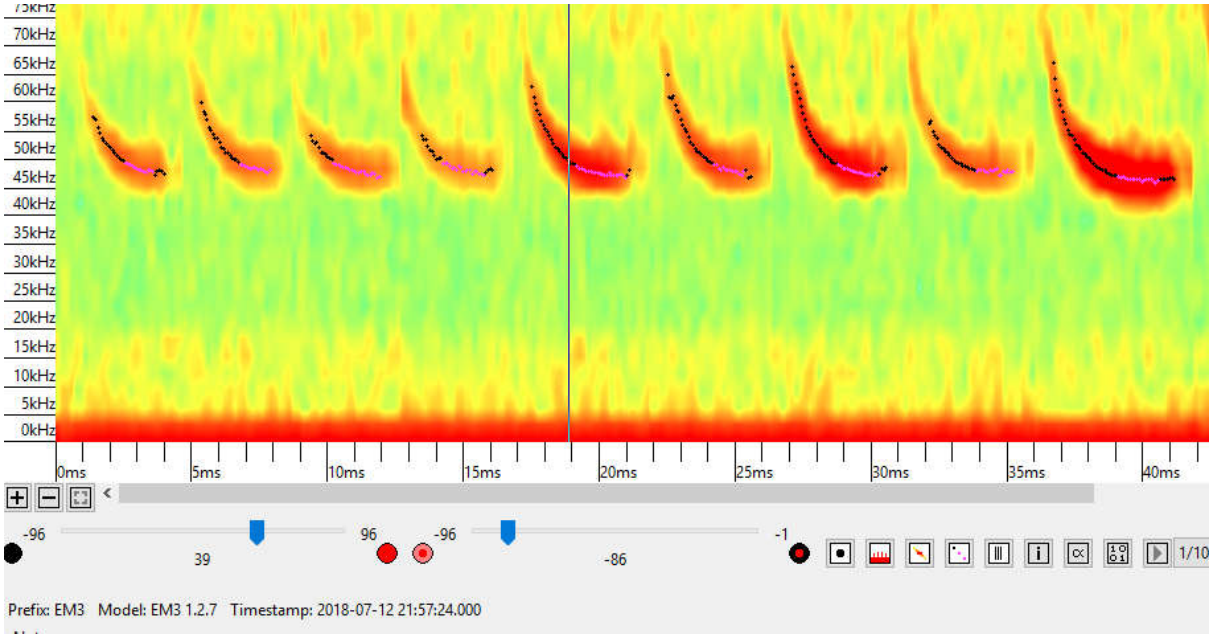
There is considerable light pollution, particularly along the western entrance at Meadowbank.

Light pollution with spillage into the sky at the western entrance

Some areas beside the river are intensively sprayed and cut and planted with laurel – which is toxic to both people and wildlife.

This area near the Jamestown estate is very poor for wildlife.

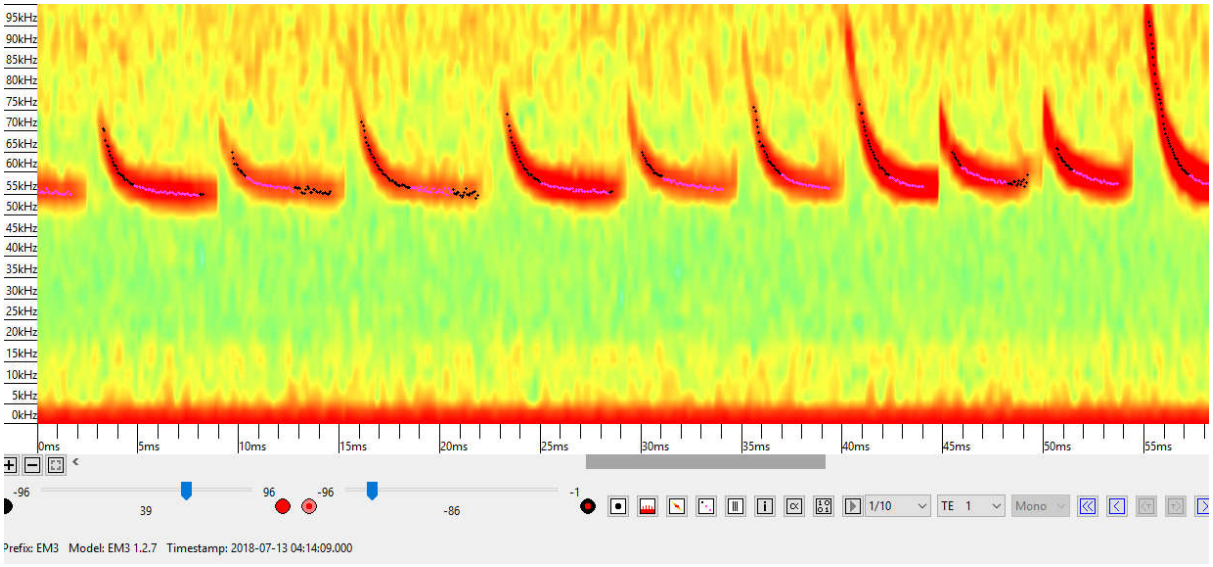
A common pipistrelle was seen in the woodland at 22.06.A second common pipistrelle was recorded at the 1st (eastern) bridge.



Common pipistrelle recorded at the eastern bridge

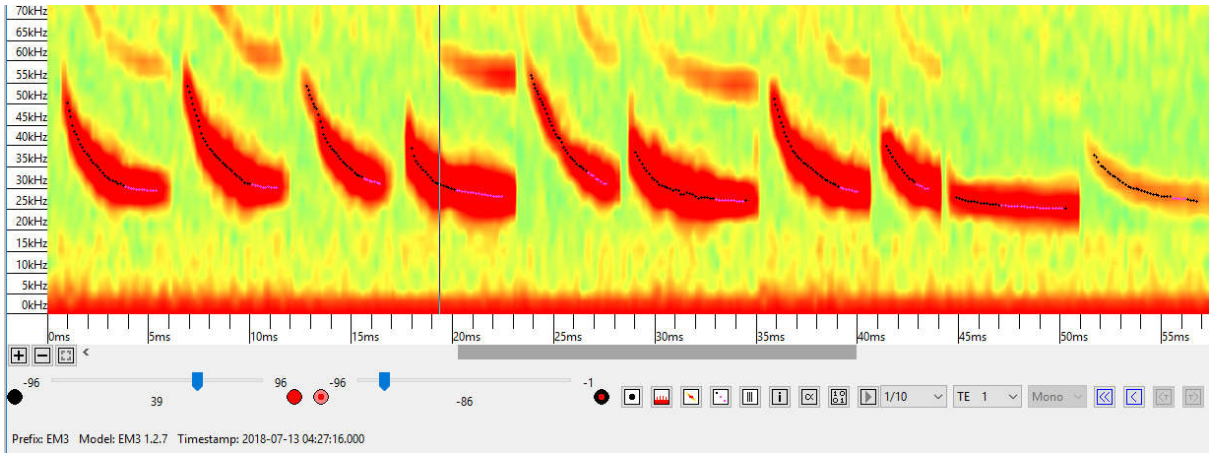
Soprano pipistrelles fed along the river at the forest area at 22.13. At 22.45, a natterer's bat flew along the wood behind Coill Beag. This bat flew in this area for several minutes, keeping to the dark areas. A common pipistrelle was seen on the entrance (west) track at 22.58

At 3.51 a common pipistrelle was seen at the eastern bridge. A Natterer's bat was seen flying north west through the woodland from 4.17 to 4.20. A stream of 5 common pipistrelles were seen passing along the laurel hedge at Jamestown Park and turning into the estate. It is likely that one of the houses in the estate is a maternity roost.

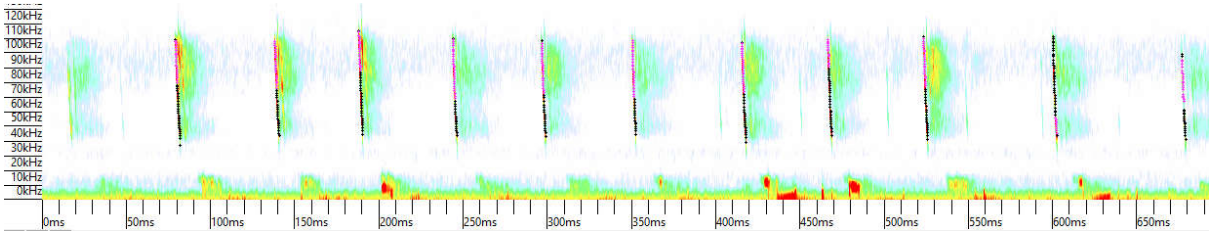


A soprano pipistrelle was recorded at 4.14 by the river

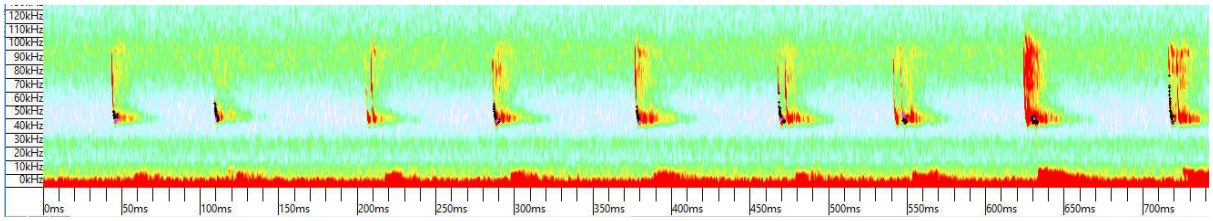
A Leisler's bat was seen feeding around a single tree in the field behind Ratoath Manor at 4.36.



Leisler's bat feeding at tree



Natterer's bat at 0414 hours along the darkest section of the river



A common pipistrelle bat at 0430 hours along the busiest section of the river

Both common and soprano pipistrelles fed under tree cover all along the river at dawn. Young bats were taking their first flights, and groups of two and three bats were seen flying together. This is clearly an important feeding area for bats taking their first flights.

This is the area where young bats were taking their first flights.

Note the tall vegetation.

Recommendations

This area is important for young common and soprano pipistrelles, and the wooded area is frequented by a Natterer's bat, which is uncommon in Meath.

(1) Avoiding light pollution- Light spillage must not occur on the river, and light pollution must be avoided. This can be achieved by using low level bollard lights, with hoods and cowls fitted to prevent light entering the river area. It is particularly important that light pollution is kept to a minimum in the wooded section of the cycleway, as this is where the Natterer's bat (a light intolerant species) was found

(2) Retain trees where possible. Common and soprano pipistrelles were found feeding along the canopy of the trees on the site. These trees provide food, shelter and cracks and crevices to roost in.

(3) Bat boxes- 4 bat boxes should be placed along the cycleway – Two 2FN Schwegler bat boxes and 2 NHBS Kent boxes. These should be placed on trees, at least 4m high, with a clear drop below (no underlying branches – as bats need to drop to start their flight). These can be purchased from online companies principally based in the UK such as www.nhbs.com.

This tree would be suitable to hang a bat box from, as it has no underlying branches

(4) Management of vegetation- to prevent loss of feeding, grasses and vegetation adjacent to the cycleway should not be mown during the summer months. Long grass and native plants allow insect diversity, which in turn provides food for bats. Whenever the cycleway runs by the river, the area between the river and the cycleway should not be sprayed or cut. If required, a nature panel can be designed (info@wildlifesurveys.net) to explain the 'untidy' areas left for insect diversity and young bats.

Bat Biology

Female bats gather in groups known as maternity roosts in summer to have their young. They generally have one baby each year, so are slow to reproduce, and disturbance of a maternity roost can be catastrophic.

In winter bats move to old stonework, trees and caves to hibernate. They are especially vulnerable here as they are slow to awaken, and if tree felling is carried out, they can easily be killed.

Legislation;

Bats are protected under the 1996 Wildlife Act, the 2000 Wildlife (Amendment) Act, Stat Ist 94 of 1997, Stat Ist 378 of 2005, The Habitats Directive, The Bonn and Bern Convention, and the Euro bats agreement.

The European Community (Natural Habitats) Regulations S.I. No 94 of 1997 states:

23(1) The minister shall take the requisite measures to establish a system of strict protection for the fauna consisting of the animal species set out in Part 1 of the First Schedule prohibiting –

a) All forms of deliberate capture or killing of specimens of those species in the wild.

1. The deterioration or destruction of breeding sites or resting places of those species.

The EU Habitats Directive

Article 12(1) of the 'Council Directive 92/43/EEC on the conservation of natural habitats and wild fauna and flora (Habitats Directive) states:

"Member States shall take the requisite measures to establish a system of strict protection for the animal species listed in Annex IV(a) and their natural range, prohibiting:

a) all forms of deliberate capture or killing of specimens of these species in the wild;

b) deliberate disturbance of these species, particularly during the period of breeding, rearing, hibernation and migration;

c) deliberate destruction or taking of eggs from the wild;

d. deterioration or destruction of breeding sites or resting places."

The EU Habitats Directive (92/43/EEC) lists all Irish bat species in Annex IV and one Irish species, the lesser horseshoe bat (Rhinolophus hipposideros), in Annex II. Annex II includes animal and plant species of community interest whose conservation requires the designation of Special Areas of Conservation (SACs) because they are endangered, rare, vulnerable or endemic. Annex IV includes various species that require strict protection. Article 11 of the Habitats Directive requires member states to monitor all species listed in the Habitats Directive and Article 17 requires States to report to the EU on the findings of monitoring schemes.

The Bern and Bonn Conventions

Ireland is also a signatory to a number of conservation agreements pertaining to bats such as the Bern and Bonn Conventions.

The European Bats Agreement (EUROBATS) is an agreement under the Bonn Convention. Ireland and the UK are two of the 31 signatories. The Agreement has an Action Plan with priorities for implementation. Devising strategies for monitoring of populations of selected bat species in Europe is among the resolutions of EUROBATS.

1.3.1 The Bern Convention

Article 6 of the “Convention on the Conservation of European Wildlife and Natural Habitats’ (Bern Convention) reads:

“Each Contracting Party shall take appropriate and necessary legislative and administrative measures to ensure the special protection of the wild fauna species specified in Appendix II. The following will in particular be prohibited for these species:

a) all forms of deliberate capture and keeping and deliberate killing;

b) the deliberate damage to or destruction of breeding or resting sites;

c) the deliberate disturbance of wild fauna, particularly during the period of breeding, rearing and hibernation, insofar as disturbance would be significant in relation to the objectives of this Convention; ...

Appendix II lists strictly protected fauna species and this list includes “Microchiroptera, all species except Pipistrellus pipistrelles”.

The EUROBATS Agreement

The ‘Agreement on the Conservation of Populations of European Bats’ (EUROBATS) was negotiated under the ‘Convention for the Conservation of Migratory Wild Species’ (Bonn Convention) and came into force in January 1994. The legal protection of bats and their habitats are given in Article III as fundamental obligations:

“1. Each Party shall prohibit the deliberate capture, keeping or killing of bats except under permit from its competent authority

2. Each Party shall identify those sites within its own area of jurisdiction which are important for the conservation status, including for the shelter and protection, of bats. It shall, taking into account as necessary economic and social considerations, protect such sites from damage or disturbance. In addition, each Party shall endeavour to identify and protect important feeding areas for bats from damage or disturbance.”

The Agreement covers all European bat species.

Contact Details:

The phone number for Bat Conservation Ireland is 086 4049468. Their website is www.batconservationireland.org. Wildlife Surveys can be contacted at 087 7454233 or 087 6753201. The following email addresses will ensure a response: info@wildlifesurveys.net

donnamullen@wildlifesurveys.net

briankeeley@wildlifesurveys.net and web site is www.wildlifesurveys.net

Appendix I

Bat distribution relative to the proposed cycleway July 2018

Appendix II

EM3 detector sound analysis data – hand held

Bat activity along the Broadmeadow River July 12th and 13th 2018

Legend

Yellow paddle	Leisler's bat	*Green paddle*	Common pipistrelle	*Blue paddle*	Soprano pipistrelle
"N" paddle	Natterer's bat	*"2" paddle*	Common and soprano pipistrelles in same location		
Red rectangle	Area most used by Natterer's bat to feed				

Data from the 1st EM3 of the survey

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10	Data	EM3___20180713_035931.wav	EM3___0_20180713_035931_000	PIPI	96	83	0.411550	PIPI
11	Data	EM3___20180713_040102.wav	EM3___0_20180713_040102_000	PIPI	15	14	0.334730	PIPI
12	Data	EM3___20180713_040635.wav	EM3___0_20180713_040635_000	PIPI	2	2	0.741576	PIPI
13	Data	EM3___20180713_040705.wav	EM3___0_20180713_040705_000	PIPI	24	16	0.254375	PIPI
14	Data	EM3___20180713_040735.wav	EM3___0_20180713_040735_000	PIPI	16	6	0.129582	PIPI
15	Data	EM3___20180713_040806.wav	EM3___0_20180713_040806_000	PIPI	4	4	0.655759	PIPI
16	Data	EM3___20180713_040836.wav	EM3___0_20180713_040836_000	PIPI	26	26	0.693635	PIPI
17	Data	EM3___20180713_040906.wav	EM3___0_20180713_040906_000	PIPI	2	2	0.676808	PIPI
18	Data	EM3___20180713_041138.wav	EM3___0_20180713_041138_000	PIPI	2	2	0.586410	PIPI
19	Data	EM3___20180713_041208.wav	EM3___0_20180713_041208_000	PIPI	7	7	0.725034	PIPI
20	Data	EM3___20180713_041238.wav	EM3___0_20180713_041238_000	PIPI	33	32	0.540253	PIPI
21	Data	EM3___20180713_041309.wav	EM3___0_20180713_041309_000	PIPI	96	47	0.182788	PIPI
22	Data	EM3___20180713_041339.wav	EM3___0_20180713_041339_000	PIPI	18	18	0.690991	PIPI
23	Data	EM3___20180713_041409.wav	EM3___0_20180713_041409_000	PIPY	48	28	0.174249	PIPY
24	Data	EM3___20180713_042214.wav	EM3___0_20180713_042214_000	PIPI	22	22	0.667867	PIPI
25	Data	EM3___20180713_042244.wav	EM3___0_20180713_042244_000	PIPI	27	26	0.556439	PIPI
26	Data	EM3___20180713_042415.wav	EM3___0_20180713_042415_000	PIPI	38	38	0.673081	PIPI
27	Data	EM3___20180713_042445.wav	EM3___0_20180713_042445_000	PIPI	14	13	0.586045	PIPI
28	Data	EM3___20180713_042515.wav	EM3___0_20180713_042515_000	PIPI	16	13	0.364747	PIPI
29	Data	EM3___20180713_042546.wav	EM3___0_20180713_042546_000	PIPI	2	2	0.716815	PIPI
30	Data	EM3___20180713_042716.wav	EM3___0_20180713_042716_000	EPSE	31	13	0.056557	Leislers bat
31	Data	EM3___20180713_042847.wav	EM3___0_20180713_042847_000	PIPI	9	9	0.421447	PIPI
32	Data	EM3___20180713_042918.wav	EM3___0_20180713_042918_000	PIPI	8	8	0.731609	PIPI
33	Data	EM3___20180713_042948.wav	EM3___0_20180713_042948_000	PIPI	4	4	0.751933	PIPI
34	Data	EM3___20180713_043048.wav	EM3___0_20180713_043048_000	PIPI	28	27	0.622867	PIPI
35	Data	EM3___20180713_043119.wav	EM3___0_20180713_043119_000	PIPI	119	111	0.408966	PIPI
36	Data	EM3___20180713_043219.wav	EM3___0_20180713_043219_000	PIPI	2	2	0.772364	PIPI
37	Data	EM3___20180713_043250.wav	EM3___0_20180713_043250_000	PIPI	91	86	0.507242	PIPI
38	Data	EM3___20180713_043320.wav	EM3___0_20180713_043320_000	PIPI	250	198	0.324304	PIPI
39	Data	EM3___20180713_043350.wav	EM3___0_20180713_043350_000	PIPI	118	96	0.351034	PIPI
40	Data	EM3___20180713_043420.wav	EM3___0_20180713_043420_000	PIPI	115	112	0.535232	PIPI
41	Data	EM3___20180713_043451.wav	EM3___0_20180713_043451_000	PIPI	115	112	0.477278	PIPI
42	Data	EM3___20180713_043521.wav	EM3___0_20180713_043521_000	PIPI	188	182	0.449189	PIPI
43	Data	EM3___20180713_043551.wav	EM3___0_20180713_043551_000	PIPI	196	192	0.510819	PIPI
39	Data	EM3___20180713_043350.wav	EM3___0_20180713_043350_000	PIPI	118	96	0.351034	PIPI
40	Data	EM3___20180713_043420.wav	EM3___0_20180713_043420_000	PIPI	115	112	0.535232	PIPI
41	Data	EM3___20180713_043451.wav	EM3___0_20180713_043451_000	PIPI	115	112	0.477278	PIPI
42	Data	EM3___20180713_043521.wav	EM3___0_20180713_043521_000	PIPI	188	182	0.449189	PIPI
43	Data	EM3___20180713_043551.wav	EM3___0_20180713_043551_000	PIPI	196	192	0.510819	PIPI
44	Data	EM3___20180713_043622.wav	EM3___0_20180713_043622_000	PIPI	168	161	0.440781	PIPI
45	Data	EM3___20180713_043652.wav	EM3___0_20180713_043652_000	PIPI	185	181	0.429090	PIPI
46	Data	EM3___20180713_043722.wav	EM3___0_20180713_043722_000	PIPI	235	224	0.417477	PIPI
47	Data	EM3___20180713_043752.wav	EM3___0_20180713_043752_000	PIPI	150	149	0.421704	PIPI

Data from the second EM3 in the survey

	FOLDER	IN FILE	OUT FILE	AUTO ID	PULSES	MATCHING	MARGIN	MANUAL ID
48		__20180712_215511.wav	__0_20180712_215511_000	NYLE	2	2	0.229712	NYLE
49		__20180712_215511.wav	__0_20180712_215541_000	NYLE	3	3	0.219556	NYLE
50		__20180712_220902.wav	__0_20180712_220902_000	PIPI	25	9	0.065089	PIPI
51		__20180712_220902.wav	__0_20180712_220932_000	PIPI	2	2	0.287088	PIPI
52		__20180712_221009.wav	__0_20180712_221009_000	PIPI	140	61	0.158791	PIPI
53		__20180712_221009.wav	__0_20180712_221039_000	PIPI	13	7	0.217672	PIPI
54		__20180712_221042.wav	__0_20180712_221042_000	PIPI	76	54	0.322813	PIPI
55		__20180712_221042.wav	__0_20180712_221112_000	PIPI	4	4	0.690650	PIPI
56		__20180712_221115.wav	__0_20180712_221115_000	PIPI	108	62	0.215874	PIPI
57		__20180712_221115.wav	__0_20180712_221145_000	PIPY	30	23	0.203149	PIPI
58		__20180712_221149.wav	__0_20180712_221149_000	PIPI	50	38	0.412973	PIPI
59		__20180712_221222.wav	__0_20180712_221222_000	PIPI	57	43	0.335739	PIPI
60		__20180712_221222.wav	__0_20180712_221252_000	PIPI	4	3	0.249428	PIPI
61		__20180712_221255.wav	__0_20180712_221255_000	PIPI	175	107	0.250225	PIPI
62		__20180712_221255.wav	__0_20180712_221325_000	PIPI	46	18	0.099275	PIPI PIPY
63		__20180712_221329.wav	__0_20180712_221329_000	PIPI	57	52	0.519110	PIPI PIPY
64		__20180712_221329.wav	__0_20180712_221359_000	PIPI	5	5	0.687477	PIPI
65		__20180712_221402.wav	__0_20180712_221402_000	PIPI	16	15	0.540805	PIPI
66		__20180712_221402.wav	__0_20180712_221432_000	PIPI	21	15	0.279218	PIPI
67		__20180712_221435.wav	__0_20180712_221435_000	PIPI	6	6	0.609563	PIPI
68		__20180712_221542.wav	__0_20180712_221542_000	PIPI	3	3	0.466709	PIPI
69		__20180712_221615.wav	__0_20180712_221615_000	PIPI	80	52	0.287318	PIPI
70		__20180712_221615.wav	__0_20180712_221645_000	PIPI	17	17	0.692315	PIPI
71		__20180712_221648.wav	__0_20180712_221648_000	PIPI	161	82	0.194493	PIPI
72		__20180712_221648.wav	__0_20180712_221718_000	PIPI	9	8	0.500689	PIPI
73		__20180712_221721.wav	__0_20180712_221721_000	PIPI	37	31	0.453559	PIPI
74		__20180712_221828.wav	__0_20180712_221828_000	PIPI	17	14	0.433824	PIPI
75		__20180712_221828.wav	__0_20180712_221858_000	PIPI	15	7	0.120365	PIPI
76		__20180712_224356.wav	__0_20180712_224356_000	MYBR	23	21	0.267920	MYNA
77		__20180712_225749.wav	__0_20180712_225749_000	PIPI	18	18	0.398252	PIPI
78		__20180712_225749.wav	__0_20180712_225819_000	PIPI	3	3	0.290811	PIPI

	FOLDER	IN FILE	OUT FILE	AUTO ID	PULSES	MATCHING	MARGIN	MANUAL ID
79		_20180713_040537.wav	_0_20180713_040537_000	PIPI	52	47	0.519349	PIPI
80		_20180713_040610.wav	_0_20180713_040610_000	PIPI	76	42	0.231645	PIPI
81		_20180713_040610.wav	_0_20180713_040640_000	PIPI	6	5	0.448864	PIPI
82		_20180713_040644.wav	_0_20180713_040644_000	PIPI	64	52	0.421020	PIPI
83		_20180713_040644.wav	_0_20180713_040714_000	PIPI	2	2	0.441822	PIPI
84		_20180713_040717.wav	_0_20180713_040717_000	PIPI	117	56	0.169801	PIPI
85		_20180713_040717.wav	_0_20180713_040747_000	PIPI	11	10	0.535107	PIPI
86		_20180713_040751.wav	_0_20180713_040751_000	PIPI	27	18	0.309315	PIPI
87		_20180713_040751.wav	_0_20180713_040821_000	PIPY	5	4	0.218133	PIP
88		_20180713_040857.wav	_0_20180713_040857_000	PIPI	27	27	0.620252	PIPI
89		_20180713_041143.wav	_0_20180713_041143_000	PIPY	26	26	0.281102	PIPY
90		_20180713_041356.wav	_0_20180713_041356_000	MYBR	26	15	0.138854	MYNA
91		_20180713_041504.wav	_0_20180713_041504_000	MYBR	10	8	0.164877	MYNA
92		_20180713_041538.wav	_0_20180713_041538_000	MYBR	6	5	0.298252	MYNA
93		_20180713_041538.wav	_0_20180713_041608_000	MYBR	11	11	0.337656	MYNA
94		_20180713_041611.wav	_0_20180713_041611_000	MYBR	18	16	0.231694	MYNA
95		_20180713_041751.wav	_0_20180713_041751_000	MYBR	5	5	0.348662	MYNA
96		_20180713_042004.wav	_0_20180713_042004_000	MYBR	24	23	0.284133	MYNA
97		_20180713_042037.wav	_0_20180713_042037_000	MYBR	8	8	0.349569	MYNA
98		_20180713_042217.wav	_0_20180713_042217_000	PIPY	11	11	0.297167	PIPY
99		_20180713_042250.wav	_0_20180713_042250_000	MYBR	10	7	0.170789	MYNA
100		_20180713_042324.wav	_0_20180713_042324_000	MYBR	8	7	0.259838	MYNA
101		_20180713_042751.wav	_0_20180713_042751_000	PIPY	2	2	0.285488	PIPY
102		_20180713_042931.wav	_0_20180713_042931_000	MYBR	2	2	0.271508	PIP
103		_20180713_042931.wav	_0_20180713_043001_000	PIPI	11	4	0.055199	
104		_20180713_043004.wav	_0_20180713_043004_000	PIPI	13	6	0.132646	PIP
105		_20180713_043037.wav	_0_20180713_043037_000	MYBR	48	27	0.106977	MYNA
106		_20180713_043111.wav	_0_20180713_043111_000	PIPY	23	19	0.207038	PIPY
107		_20180713_043144.wav	_0_20180713_043144_000	PIPY	18	15	0.233794	PIPY
108		_20180713_043217.wav	_0_20180713_043247_000	PIPY	11	10	0.257287	PIPY
109		_20180713_043251.wav	_0_20180713_043251_000	PIPY	27	22	0.188116	PIPY
110		_20180713_043644.wav	_0_20180713_043644_000	PIPY	70	70	0.298183	PIPY
111		_20180713_043644.wav	_0_20180713_043714_000	PIPY	29	29	0.353111	PIPY
112		_20180713_043718.wav	_0_20180713_043718_000	PIPY	250	238	0.289726	PIPY
113		_20180713_043718.wav	_0_20180713_043748_000	PIPY	21	21	0.307633	PIPY
114		_20180713_043752.wav	_0_20180713_043752_000	PIPY	247	219	0.260744	PIPY
115		_20180713_043752.wav	_0_20180713_043822_000	PIPY	19	18	0.296040	PIPY
116		_20180713_043825.wav	_0_20180713_043825_000	PIPY	242	230	0.288838	PIPY
117		_20180713_043825.wav	_0_20180713_043855_000	PIPI	6	3	0.165296	PIPI
118		_20180713_043859.wav	_0_20180713_043859_000	PIPI	83	49	0.265267	PIPI PIPY
119		_20180713_043859.wav	_0_20180713_043929_000	PIPY	43	40	0.267948	PIPI PIPY
120		_20180713_043932.wav	_0_20180713_043932_000	PIPY	389	270	0.165711	PIPI PIPY
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122		_20180713_044005.wav	_0_20180713_044005_000	PIPY	398	323	0.220443	PIPI PIPY
123		_20180713_044005.wav	_0_20180713_044035_000	PIPY	45	35	0.175643	PIPI PIPY
124		_20180713_044038.wav	_0_20180713_044038_000	PIPY	392	314	0.216560	PIPI PIPY
125		_20180713_044038.wav	_0_20180713_044108_000	PIPY	42	27	0.153785	PIPI PIPY
126		_20180713_044112.wav	_0_20180713_044112_000	PIPI	85	55	0.307224	PIPI PIPY
127		_20180713_044145.wav	_0_20180713_044145_000	PIPI	37	15	0.177580	PIPI
128		_20180713_044252.wav	_0_20180713_044252_000	PIPI	17	11	0.210222	PIPI
129		_20180713_044432.wav	_0_20180713_044502_000	PIPI	11	5	0.167247	PIPI
130		_20180713_044505.wav	_0_20180713_044505_000	PIPI	21	16	0.427074	PIPI
131		_20180713_044539.wav	_0_20180713_044539_000	PIPI	24	19	0.339059	PIPI
132		_20180713_044612.wav	_0_20180713_044612_000	PIPI	81	39	0.210245	PIPI
133		_20180713_044612.wav	_0_20180713_044642_000	PIPI	20	13	0.290197	PIPI
134		_20180713_044646.wav	_0_20180713_044646_000	PIPY	23	20	0.278857	PIPI PIPY
135		_20180713_044719.wav	_0_20180713_044719_000	PIPY	10	10	0.351424	PIPY
136		_20180713_044752.wav	_0_20180713_044752_000	PIPI	32	18	0.189096	PIPI
137		_20180713_044825.wav	_0_20180713_044825_000	PIPI	117	93	0.301332	PIPI
138		_20180713_044825.wav	_0_20180713_044855_000	PIPI	21	15	0.225659	PIPI
139		_20180713_044900.wav	_0_20180713_044900_000	PIPY	243	165	0.160254	PIPI PIPY

Appendix C – Tree Survey Report

LAND PLANNING & DESIGN

CUNNANE STRATTON REYNOLDS

TREE SURVEY

Pedestrian / Cycle Scheme,
Ratoath,
Co Meath.

November 2019

CUNNANE STRATTON REYNOLDS
LAND PLANNING & DESIGN
www.csrlandplan.ie

CONTENTS

SUMMARY

This report presents a record of those trees existing within or adjacent to the proposed works areas that may potentially be impacted by a proposed pedestrian cycle scheme development. Trees have been surveyed as individuals or tree groups in accordance with BS 5837 (2012). The site tree survey was undertaken on 6th November 2019 by Cunnane Stratton Reynolds arborist;

Keith Mitchell Diploma Arboriculture (Level 4)
Technician Member Arboricultural Association (UK)
Tree Risk Assessment Qualification (International Society of Arboriculture)
MA(Hons) Landscape Architecture
Member of the Irish Landscape Institute
Chartered Member of the Landscape Institute (UK)
Diploma EIA Management

This survey and report are based on the Topographic Survey information contained in drawing;

- Atkins Part 8 General Layout (Sheets 1 & 2)

A full survey record is presented in Appendix 1, together with accompanying drawings Tree Survey Dwg No 19277_T_101, Arboricultural Impact Assessment Dwg No 19277_T_102 and Tree Protection Plan Dwg No 19277_T_103. After introducing the terms of reference and the methodology of the survey, the report summarises the survey findings in an overview of the existing tree cover within the site.

A total of sixty-nine individual trees were recorded as part of the survey.

Where assessment takes the form of a Tree Group – trees of greatest arboricultural significance or relevance to proposed scheme within these groups may also be identified. Every effort has been made to access all trees for inspection, however in some instances where site conditions prevent full access, some measurements may be visually estimated.

It is noted that the site contains a number of trees of significant maturity and size - every effort should be made to safely retain these as part of any development proposal. Where this is not possible replacement tree planting nearby is recommended to ensure a future canopy cover in the locality. The proposed development will present an opportunity to implement additional new tree planting, both as part of a general landscape design scheme and also as part of a tree management program aimed at maintaining high quality diverse long-term amenity tree cover, in keeping with the setting and proposed site use.

The report concludes with recommendations for protection measures to ensure the conservation of retention trees during any development.

1. INTRODUCTION

Terms of Reference

Cunnane Stratton Reynolds (CSR) were instructed to conduct a tree survey on behalf of Meath County Council, to assess the impacts and inform the design of a proposed pedestrian and cycle route scheme.

CSR considered those tree and tree groups that might potentially be impacted upon by such a proposed development and produced a subsequent tree survey report presenting our findings, (in accordance with BS 5837:2012), together with recommendations for their best practice management in relation to the proposed development.

This involved a survey of the principal trees / tree groups concerned in accordance with BS 5837 (2012).

Documents supplied to CSR for purposes of conducting a tree survey include:

- Atkins Part 8 General Layout (Sheets 1 & 2)

Site Inspection & Methodology

The site was surveyed on 6th November 2019 by a qualified Arborist. A visualinspection from the ground was performed on all existing trees / tree groups on site.Where access allowed, principal individual trees were examined and referencenumber tags attached before critical measurements were taken and observationsmade.

A description was recorded of each tagged tree / group of trees, their species, age class, all relevant measured dimensions (height, stem diameter, crown spread radii and crown clearance height) and an assessment of the tree health / vitality, structural form, life expectancy and quality categorisation. Any recommended remedial works required were outlined. Any hedgerows or significant tree groups within/bounding the site are subject to group description and assessment, in accordance with BS 5837 (2012).

The findings of the survey are recorded and presented in this Tree Survey Report and Tree Schedule (Appendix 1). A Tree Classification and Constraints drawing was produced to inform the master planning process in November 2019. An Arboricultural Impact Assessment and Tree Protection Proposals were considered on final completion of the proposed masterplan in November 2019.

This report is subject to the scope and limitations as given at the end of the report.

Accompanying Drawings

The tree survey report should be read in conjunction with;

- Tree Classification (Dwg No 19277/T/101).
- Arboricultural Impact Assessment (Dwg No 19277/T/102).
- Tree Protection Plan (Dwg No 19277/T/103).

A1 size colour coded drawings which accompany this report, (monochrome drawings should not be relied upon). These drawings are based upon the topographical drawings supplied to CSR.

Site Location

The proposed works area is located along the R125 Dunshaughlin Road and the Woodland Link Road in Ratoath, Co Meath.

2. DESCRIPTION OF EXISTING TREES

2.1 The tree survey area (approximate area highlighted red – Fig 1) is an existing public roadway and footpaths located on the western side of Ratoath.

Figure 1: Low resolution satellite image of approximate tree survey area (courtesy of Google Earth).

A total of sixty-nine individual trees were recorded as part of the survey.

Their location, size and quality category may be reviewed with reference to the accompanying Tree Survey Dwg No 19277/T/101 and the tree survey (Appendix 1).

2.2 Photographic Summary of Trees Surveyed


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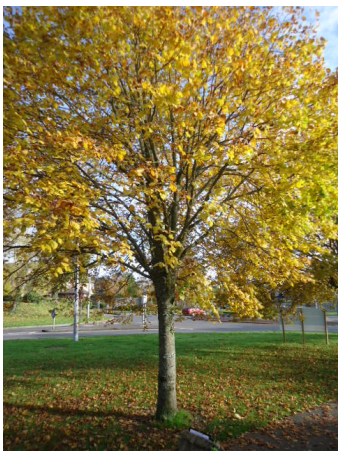

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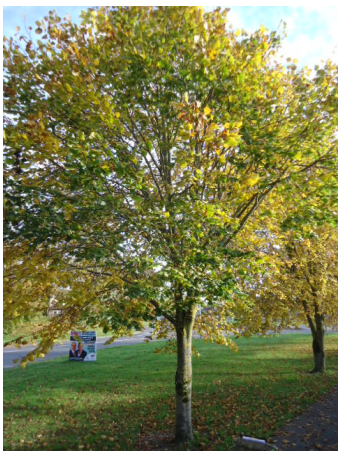

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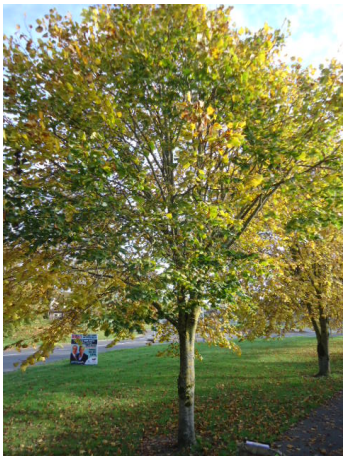

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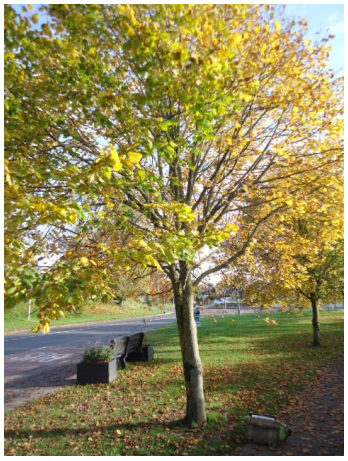
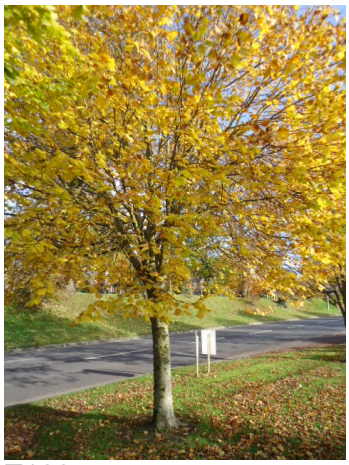


T118

T119

T120

T121

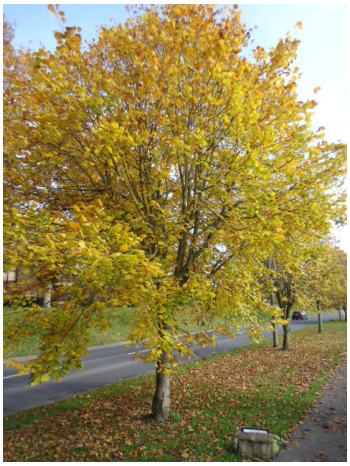


T122

T123

T124

T125


T126


T127


T128


T129


T130


T131


T132


T133


T134

T135

T136

T137

T141/T142

2.3 The majority of trees surveyed constitute an avenue of relatively young street trees, (almost exclusively small leaved Lime trees), situated intermittently along the roadside verge.

These trees are well established, (it is assumed they were planted as semi mature specimens and it appears that they have been in situ for at least 10 years), though still young in terms of their anticipated life cycle.

In addition, there is a small number of trees of considerable maturity and size located at the western end of the survey area.

It is notable that nearly all the street trees appear to have had their leader broken or damaged at an average height of 1.3m from ground level causing them to branch heavily from this area. Consequently, most trees display overcrowding of branches which is causing structural issues such as branch rubbing and significant compression forks to develop. These issues will increasingly compromise the trees structural integrity into the future if not addressed in the short term with selective pruning works. In addition, a large proportion of trees have inclusions around this area, including parts of stakes and tree ties – further compromising their future structural integrity.

However, in the short term most of the trees display good physiological health. (Some of the larger trees at the western end of the site survey area are currently

heavily obscured by ivy growth and it would be beneficial to re-inspect when ivy has been removed).

The existing trees make a positive contribution to the surrounding streetscape setting both through visual impact and ecological habitat value.

Trees often become more valuable as collective groups, than they might be when considered solely as individuals in isolation - a grouping or woodland being generally of significant visual and ecological value. As such it should be noted that the cumulative value of evaluated Tree Groups often reflects an increased catergorised value than might be awarded to the constituent trees if they were assessed in isolation as individuals.

3. ARBORICULTURAL IMPACT ASSESSMENT

3.1 This section discusses the potential impact of the proposed development on the existing tree cover on site and considers the need for mitigation measures, in accordance with BS 5837 (2012), for sustainable development.

The proposed scheme necessitates the use of the existing grass verge area to develop the proposed cycle path. Most trees are proposed for removal in order to facilitate the development, however new tree planting could readily mitigate against the proposed losses, particularly given the relatively young age of the trees.

3.2 Category 'U' trees are recommended for immediate removal, (fell or monolith to safe height), on general management grounds, irrespective of site development – none were identified during this survey.

Direct Loss of Trees

3.3 The following trees are in direct conflict with the proposed development and are therefore proposed for removal;

Tag No	Tree Species	Tree Class	Number of trees
T73 - T127	Tilia cordata (with exception of two Acer psuedoplatanus)	B2	56
T129	Tilia cordata	B1	1
T139	Quercus robur	B1	1
T140	Quercus robur	B1	1

Indirect Impacts

3.4 Cognisance must also be given to indirect impacts - in particular care must be taken to ensure the proposed development and ancillary works do not represent an unacceptable conflict with the calculated 'Root Protection Area' of the existing trees proposed for retention - as illustrated in Dwg No 19277/T/102.

Disturbance of 'Root Protection Area' may just as readily kill or destabilise a tree over time, by means of root damage/severance and or earth compaction/covering preventing essential transfer of water and air to roots.

There are a number of existing trees at the western end of the survey area whose retention has been integrated to the proposed development by means of designing / retaining buffer areas of public open space around them, however careful planning and site management will be required during construction works to ensure these areas are not adversely impacted by construction activities. It is proposed that tree protection fencing be used to achieve this aim - as illustrated in Dwg No 19277/T/103.

Provided proper tree protection measures are adhered to, it is not anticipated that any further trees will require removal due to indirect impacts.

Additional Loss of Trees – Considerations

3.5 It is worth considering, as part of an ongoing management program, the selective thinning of a limited number of young trees within Tree Group 1. Removing those specimens which have bolted, and or are of relatively poor form, will facilitate improved development of other trees within the group which are currently overcrowded and have inadequate space for strong future development.

Most of the lager trees within this group are heavily obscured by ivy, (which should be carefully removed to facilitate full inspection), however they appear to be in good physiological condition as a whole. Given their roadside location it would be prudent to consider a crown cleaning exercise to remove rubbing limbs, future compression forks and also reduce the length of limbs overhanging adjoining carriageway along with any other imbalances in growth.

Summary of Trees to be Removed

3.6 A total of 49 trees are proposed for removal to facilitate the scheme – all of these trees have been classified as B class.

Tag No	Tree Species	Tree Class	Number of trees
T73 - T127	Tilia cordata (with exception of two Acer psuedoplatanus)	B2	56
T129	Tilia cordata	B1	1
T139	Quercus robur	B1	1
T140	Quercus robur	B1	1

Tree Protection

3.7 Adequate protection and so successful retention of those trees to be retained within the land take area, (including those not individually surveyed), will be achieved by rigidly excluding all construction activities from tree root protection areas by fit for purpose barriers/fencing and/or additional ground protection.

3.8 Tree Protection Areas (TPAs) are proposed, as indicated on accompanying Tree Protection Plan (Dwg No 18357_T_103). Protective fence line locations and details for these areas are also indicated on the plan.

Services

3.9 Any services that are planned as part of this project must also avoid designated ‘Root Protection Area’ of tree / tree groups for retention.

4. RECOMMENDATIONS – Arboricultural Method Statement

Recommendations for the specific measures advised regarding management of the trees in relation to this development are detailed within Appendix 1. These recommendations should inform, and be referred to in, the method statements submitted for approval prior to commencement by the responsible building/engineering and landscape contractors whose works (subject to grant of permission) will affect retained trees and the Tree Protection Areas.

1. *Tree Works.*

Subject to the required permissions removal / felling works as specified on Dwg No No19277_T_102, should be performed prior to project commencement, by reputable contractors in accordance with BS 3998:2010 and current best practice. Removal of scrub vegetation and ivy clearance should preferably be performed in winter outside of the bird nesting season. Tree felling should be preceded by a competent assessment as to the presence of any protected wildlife species, where required specialist advice should be sought if necessary.

2. *Protective Fencing.*

Following above permitted, priority tree works, protective fencing (barriers) should be erected in the positions and alignments as indicated on the Tree Protection Plan (Dwg No No19277_T_103). Fencing should be in accordance with BS 5837:2012 unless otherwise agreed with the planning authority. Commencement of development should not be permitted without adequate protective fencing being in place. This fencing, enclosing the minimum tree protection areas indicated, must be installed prior to any plant, vehicle or machinery access on site. Fencing should be signed 'Tree Protection Area – No Construction Access'. Fencing is not to be taken down or re-positioned without written approval of the project Arborist. No excavation, plant or vehicle movement, materials handling or soil storage is to be permitted within the fenced tree protection areas indicated on plan.

3. Boundary Treatments

Landscape works and installation of / work to boundary treatments within the Root Protection Area should be undertaken to a specification and method statement in accordance with BS 5837: 2012 - submitted for approval prior to commencement of works, under the supervision of an Arborist and / or Landscape Architect.

4. Landscape Works

Proposed landscaping works including new planting, shall be performed in accordance with BS 5837:2012. During these works, the ground around retained trees must not compacted by vehicles, nor be mechanically excavated for planting, nor be significantly altered in terms of ground levels.

5. Monitoring & Compliance

A number of potentially critical future works in proximity to retained trees are potentially to be undertaken in association with the development of this greenfield site, these should be done in accordance with approved method statements and under direct supervision by a qualified consultant Arborist. Therefore, during the development, a professionally qualified Arborist is recommended to be retained as required by the principal contractor or developer to monitor and advise on any works

within the RPA of retained trees to ensure successful tree retention and planning compliance.

It is advised that tree protection fencing, any required special engineering and supervision works etc must be included / itemised in the main contractor tender document, including responsibility for the installation, costs and maintenance of tree protection measures throughout all construction phases.

Copies of the Tree Survey and all accompanying drawings, a copy of BS 5837:2012 and NJUG 4 (2007)*'Guidelines for the planning, installation and maintenance of utility apparatus in proximity to trees'* should all be kept available on site by the contractor during development. All works are to be in accordance with these documents.

It is advised that all retained trees be subject to expert re-inspection within 12 months and/or prior to completion of development and public occupancy/access of the site.

Limitations and Scope of this Survey Report

This report covers only those trees individually inspected, (shown on the 'Tree Survey Drawings' and described in the 'Schedule'), reflecting the condition of those trees at the time of inspection. Inspection is limited to visual examination of the subject trees from the ground without; test boring, use of tomographic equipment, dissection, probing, coring, ivy removal or excavation to establish structural integrity.

The trees were not climbed and dimensions are approximate, but considered a reasonable reflection of the trees measurements. A number of trees were visually obscured by heavy ivy growth, which could potentially hide from view existing faults or weaknesses, as such they would benefit from re-inspection upon removal of ivy growth. This survey can only therefore be regarded as a preliminary assessment.

There is no warranty or guarantee, expressed or implied, that problems or deficiencies of the subject trees may not arise in the future. The currency of this survey report and its recommendations is one year.

The accompanying drawings are illustrative and based on the land (topographical) survey supplied; CSR Ltd accept no legal liability or responsibility for any errors in the information contained in the supplied drawings.

CSR Ltd accept no responsibility for the performance of trees subject to pruning or other site works (including construction activities) not performed in strict accordance with recommendations as specified in this report and/or in accordance with BS 3998:2010 and BS 5837:2012

All retained trees mentioned in this report should be subject to expert re-inspection within 12 months and prior to completion of development works and public occupancy of the site.

This report was produced as a part of a planning application for the scheme; the author accepts no responsibility or liability for actions taken by reason of this report by the client or their agents unless subsequent contractual arrangements are agreed. Public disclosure or submission of any part of this report without title, or permission from the author, renders this report invalid and legally inadmissible.

References/Bibliography

BS 5837 (2012). *Trees in Relation to Design, Demolition and Construction - Recommendations*. British Standards Institution. TSO, London.

BS 3998 (2010) *Tree Work - Recommendations*. British Standards Institution. TSO, London.

NJUG 4 (2007) *Guidelines for the Planning, Installation and Maintenance of Utility Apparatus in Proximity to Trees (Issue 2).* National Joint Utilities Group.

TREE SURVEY KEY

Information in the attached schedule is given under the following headings:

Tree No.

Individual trees have been numbered and tagged on site with corresponding survey tag or treated as a group where appropriate (e.g. Woodlands/hedgerows) and illustrated on accompanying tree survey drawing.

Species

Common & Latin names of species are provided

Height

Overall estimated height given in meters (measured using Truplus 200 Laser Rangefinder).

Stem Diameter

The diameter of the main trunk taken at a height of 1.5m on a single stem tree, or, on each branch of multi-stemmed (MS) trees.

Crown Spread

The largest radius of branch spread is provided in meters for North / East / South and West directions.

Height of lowest branch

The distance between ground level and first significant branch or canopy (and direction of growth) given in meters (m).

Any measurement or dimension that has been estimated (for offsite or otherwise inaccessible trees where accurate data cannot be recovered) is identified by the suffix #.

Life stage

The tree's age is defined as:

Y = Young, in first third of life (tree which has been planted in the last 10 years or is less than 1/3 the expected height of the species in question).

MA = Middle Age, in second third of life (tree, which is between a 1/3 and 2/3's the expected height of the species in question).

M = Mature, in final third of life (tree that has reached the expected height of the species in question, but still increasing in size).

OM = Over mature (tree at the end of its life cycle and the crown is starting to break up and decrease in size).

V = Veteran Tree (exceptionally old tree).

Physiological Condition

The tree's physiological condition is defined as:

Good -Good vitality: normal bud growth, leaf size, crown density and wound closure

Fair - Average to below average vitality: reduced bud growth, smaller leaf size, lower crown density and reduced wound closure

Poor - Low vitality: limited bud growth, small chlorotic leaves, sparse crown, poor wound closure

Dead - No longer living.

Structural Condition

The trees structural condition is defined as:

Good - No major structural defects observed (possibly some minor defects)

Fair - Minor defects present, (such as bark wounds, isolated decay pockets or structure affected due to overcrowding), that could be alleviated by tree surgery/management

Poor - Major structural defects present such as extensive deadwood, decay or defective to the point of being dangerous. (Significant defects are noted e.g. decay, collapsing etc).

Preliminary Management Recommendations & Timescale

Recommendations actions based on limitations of survey – (may include further investigation and or assessment of suspected defects by means and or methods not undertaken / within the remit of this survey).

Estimated Remaining contribution (Years)

Life of the tree is given as;

10 < less than 10 years remaining
10 + in excess of 10 years remaining
20 + in excess of 20 years remaining
40 + in excess of 40 years remaining

Tree Quality Assessment Category

U Those in such a condition that they cannot realistically be retained as living trees in the context of the current land use for longer than 10 years.

• Trees that have a serious, irremediable, structural defect, such that their early loss is expected due to collapse, including those that will become unviable after removal of other category U trees (e.g. where, for whatever reason, the loss of companion shelter cannot be mitigated by pruning)

• Trees that are dead or are showing signs of significant, immediate, and irreversible overall decline

• Trees infected with pathogens of significance to the health and/or safety of other trees nearby, or very low quality trees suppressing adjacent trees of better quality

(NOTE: Category U trees can have existing or potential conservation value which it might be desirable to preserve).

A High quality

Trees of high quality with an estimated remaining life expectancy of at least 40 years

A1 Trees that are particularly good examples of their species, especially if rare or unusual; or those that are essential components of groups or formal or semi-formal arboricultural features (e.g. the dominant and/or principal trees within an avenue)

A2 Trees, groups or woodlands of particular visual importance as arboricultural and/or landscape features

A3 Trees, groups or woodlands of significant conservation, historical, commemorative or other value (e.g. veteran trees or wood-pasture)

B Moderate quality

Those trees of moderate quality with an estimated remaining life expectancy of at least 20 years.

B1 Trees that might be included in category A, but are downgraded because of impaired condition (e.g. presence of significant though remediable defects, including unsympathetic past management and storm damage), such that they are unlikely to be suitable for retention for beyond 40 years; or trees lacking the special quality necessary to merit the category A designation.

B2 Trees present in numbers, usually growing as groups or woodlands, such that they attract a higher collective rating than they might as individuals; or trees occurring as collectives but situated so as to make little visual contribution to the wider locality.

B3 Trees with material conservation or other cultural value

C Low quality

Trees of low quality with an estimated remaining life expectancy of at least 10 years, or young trees with a stem diameter below 150 mm.

C1 Unremarkable trees of very limited merit or such impaired condition that they do not qualify in higher categories.

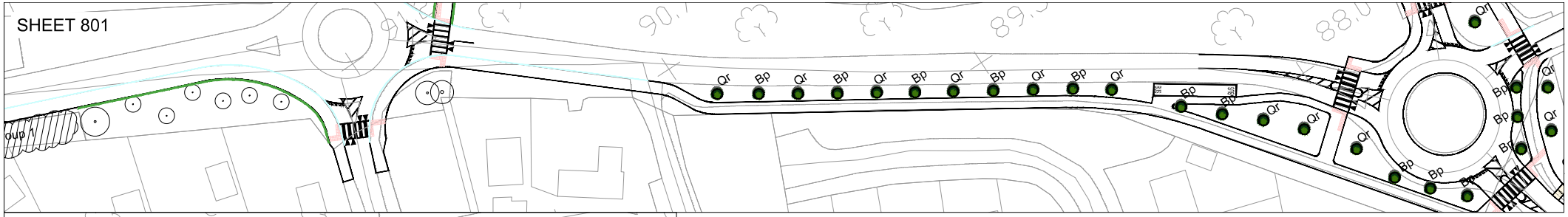
C2 Trees present in groups or woodlands, but without this conferring on them significantly greater collective landscape value; and/or trees offering low or only temporary/transient landscape benefits.

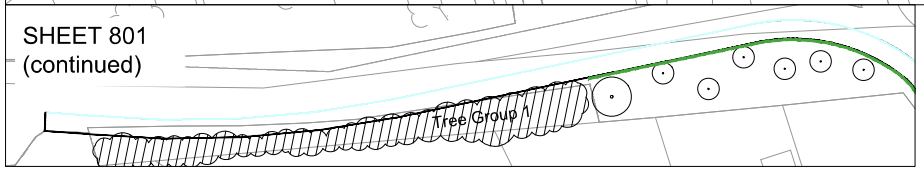
C3 Trees with no material conservation or other cultural value.

APPENDIX 1

Tag	Species	Height (m)	Crown Spread (m) N/S/E/W	Dia' (mm)@ 1.5m	RPA circle radius (m)	Ht of lowest branch (m) & direction of growth	Life Stage	Estimated remaining contribution (years)	PhysiologIcal Condition	Structural Condition	Preliminary management recommendations	Category of retention + sub-category	Notes
T71-T129	Tilia cordata (+2 Acer pseudoplatanus)	6	2/2/2/2	330	3.96	1m all	Y	40+	Good	Fair	Crown Clean	B2	Compression forks Inclusions Rubbing branches
T128	Acer pseudoplatanus	14	4/4/4/4	540	6.48	2m all	MA	40+	Good	Fair	Remove Ivy Crown Clean	B1	
T130	Quercus robur	13	3/3/3/3	500	6.00	4m all	MA	40+	Good	Fair	Remove Ivy Crown Clean	A1	
T131	Tilia cordata	6	2/2/2/2	290	3.48	2m all	Y	40+	Good	Good		B1	
T132	Acer platanoides	6	2/2/2/2	290	3.48	2m all	Y	40+	Good	Good		B1	
T133	Tilia cordata	6	2/2/2/2	290	3.48	2m all	Y	40+	Good	Good		B1	
T134	Acer platanoides	6	2/2/2/2	290	3.48	2m all	Y	40+	Good	Good		B1	
T135	Tilia cordata	6	2/2/2/2	290	3.48	2m all	Y	40+	Good	Good		B1	
T136	Acer platanoides	6	2/2/2/2	290	3.48	2m all	Y	40+	Good	Good		B1	
T137	Quercus robur	17	5/5/5/5	580	6.96	4m all	MA	40+	Good	Fair	Remove Ivy Crown Clean	A1	
T138	Quercus robur	6	3/3/3/3	310	3.72	2m all	Y	40+	Good	Good		B1	
T139	Quercus robur	5	2/2/2/2	290	3.48	2m all	Y	40+	Good	Good		B1	
T140	Quercus robur	6	3/3/3/3	310	3.72	2m all	Y	40+	Good	Fair		B1	
T141	Acer platanoides	7	2/2/2/2	280	3.36	2m all	Y	40+	Good	Good		B1	
T142	Fagus sylvatica	7	3/3/3/3	220	2.64	2m all	Y	40+	Good	Good		B1	
TG1	Mixed deciduous; Acer psuedoplatanus Fraxinus excelsior Fagus sylvatica Quercus robur	Av' 15		Av' 400	4.80		MA	40+	Good	Fair	Remove Ivy Crown Clean	B2	Consider selective thinning of young bolted specimens and formative pruning of remaining young trees.

Appendix D – Tree Survey Drawings





PROPOSED MANAGEMENT WORKS TO EXISTING TREE GROUP 1

1. Selective removal of poorly formed younger trees to allow others sufficient space to develop with formative pruning carried out on to those retained.
2. Remove ivy from larger trees (taking care not to damage tree bark) and reinspect to ensure no significant defects have been revealed.
3. Crown clean canopies of most mature trees; reduce limbs overhanging roadway and alleviate rubbing branches.

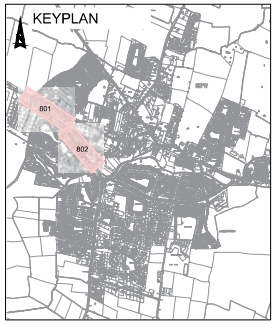
Tree Pits & Staking

TREE PIT & STAKING (UP TO 10-12CM GIRTH)

1. Biodegradable hessian tie with seperating knot / collar between tree and stake affixed to stake with galvanised nails.
2. 1no. 4" dia x 10ft stake pressure treated driven 1200mm below ground (with biodegradable hessian tie affixed to tree & stake).
3. Pits to be size 1mx1mx1m or 15cm wider than rootball which ever is greater. Remove the full depth of topsoil and set aside for reuse. Scarify sides, break up base of pit to a depth of 200mm and incorporate a soil ameliorant into base. Back fill pit with topsoil mixed with soil ameliorants in 150mm firmed-in layers. All planting to receive a minimum of 25lt water per m2 immediately after planting.
4. 50mm bark mulch in 1m diameter circle to base of trunk.

TREE PIT & STAKING (12-14CM GIRTH)

1. To have a clear stem height of 1800mm.
2. 2no. 75mm diameter stakes pressure treated driven 1300mm below ground 600 above ground with specified biodegradable hessian adjustable tie affixed to tree & stake.
3. Pits to be size 1mx1mx1m or 15cm wider than rootball, which ever is greater. Remove the full depth of topsoil and set aside for reuse. Scarify sides, break up base of pit to a depth of 200mm and incorporate a soil ameliorant into base. All planting to receive a minimum of 18lt water per tree immediately after planting.Backfill pit with top soil mixed with soil ameliorants in 150mm firmed in layers.
4. 50mm bark mulch in 1m diameter circle to base of trunk.



LEGEND

MITIGATION TREE PLANITNG

PLANTING SCHEDULE

Species	Specification	Quantity
Betula pendula	6-8cm girth / 2.5m min height / clearstem / bare-root	26
Quercus petraea	12-14cm girth / 3.5m min' height / clearstem / rootball	26

GENERAL CLEARANCE BEFORE PLANTING AND SPREADING TOPSOIL
1. All rubble, stone over 150mm, general rubbish and builders' debris to be cleared from the proposed planting areas to the depth of the cultivated medium depending if trees, shrubs or grass (see spec for depths) and removed from site to an approved tip prior to any cultivation works.
2. The planting area shall be treated with an approved herbicide 2 weeks before spreading topsoil.

SITE PREPARATION
1. Following herbicide treatment (duration depending on herbicide type) the entire area shall be leveled to a medium grade prior to topsoil being spread.
2. Topsoil to be cultivated so free of grass, pernicious weeds and weed seed, stones larger than 50mm and other debris. Similarly the top 50mm of subsoil for grass areas should be free of grass, pernicious weeds and weed seed, stones larger than 30mm and other debris.
3. Topsoil to be spread in 150mm layers and gently firmed. Subsoil to be spread in 300mm layers and gently firmed.

PLANT MATERIAL
1. All plant material shall be pest and disease free.
2. Topsoil shall be supplied in accordance with BS3882.
3. All plants to be planted at the same depth as previously grown.
4. Sufficient soil must be removed to allow all roots to fully spread. Care must be taken with root systems - with dry, damaged roots being carefully pruned prior to planting.

PLANTING
Time of year for planting: Late November to Mid March.
All planting to be watered thoroughly immediately after planting without damaging or displacing plants or soil.

REV	DATE	AMENDMENT

CUNNANE STRATTON REYNOLDS
LAND PLANNING & DESIGN

GALWAY OFFICE
ARDACONG, BALLYTRASNA, TUAM, CO GALWAY
TEL 093 60854
EMAIL galwayinfo@csrlandplan.ie
www.csrlandplan.ie

PROJECT: **RATOATH CO MEATH.**	DATE:	NOVEMBER 2019
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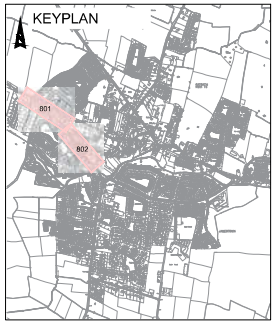
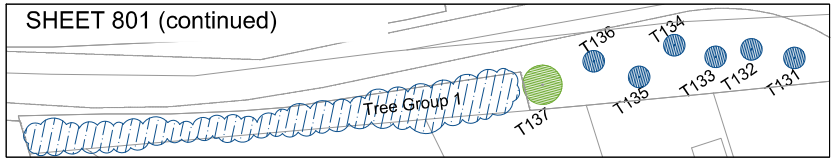
DRAWING: **TREE PROTECTION**	DRAWN:	KM
	CHECKED:	KM
	DRAWING NO:	**19277_T_103**



LEGEND

- CLASS A INDIVIDUAL TREE (HIGH QUALITY - RETENTION HIGHLY DESIRABLE)
- CLASS B INDIVIDUAL TREE (MODERATE QUALITY - RETENTION DESIRABLE)
- CLASS C INDIVIDUAL TREE (LOW QUALITY - RETENTION OPTIONAL)
- CLASS U INDIVIDUAL TREE (RECOMMEND REMOVAL)
- TREE GROUPS (COLOUR REPRESENTING GROUP CLASSIFICATION)



NOTE:

THIS DRAWING IS PRODUCED IN COLOUR, MONOCHROME VERSIONS SHALL NOT BE RELIED UPON.

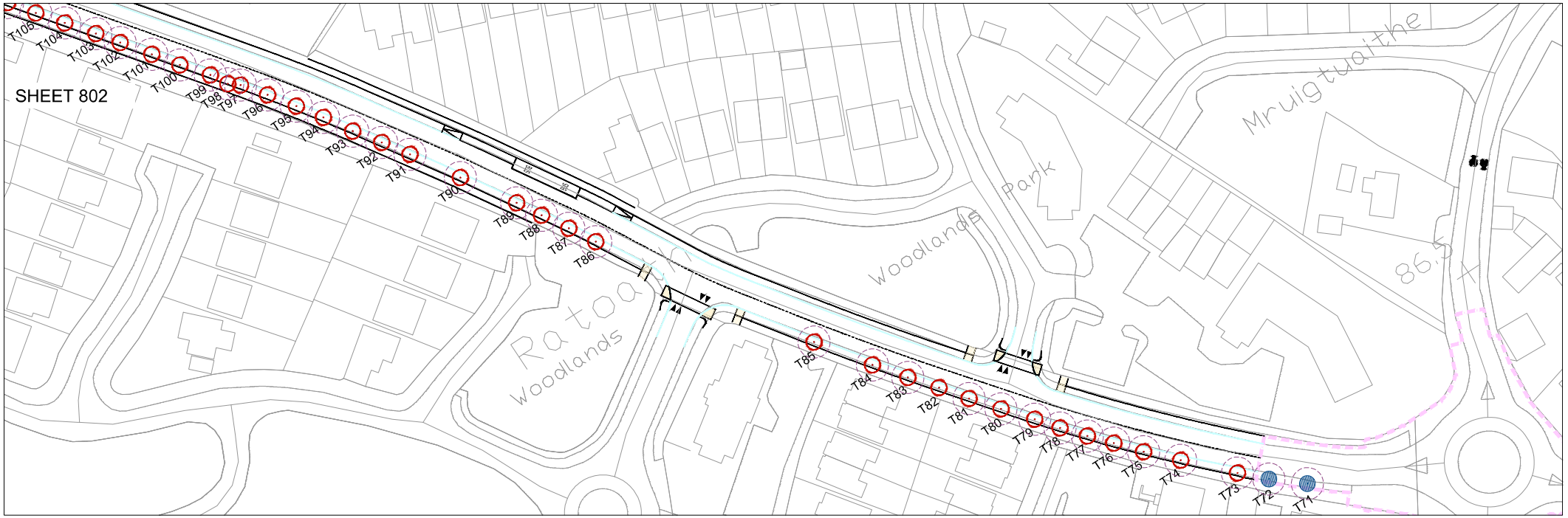
REV	DATE	AMENDMENT

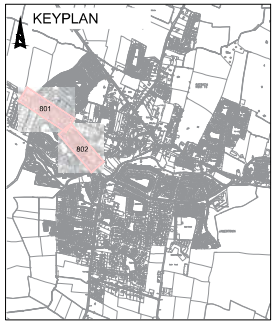
CUNNANE STRATTON REYNOLDS

LAND PLANNING & DESIGN

GALWAY OFFICE
ARDACONG, BALLYTRASNA, TUAM, CO GALWAY
TEL 093 60854
EMAIL galwayinfo@csrlandplan.ie
www.csrlandplan.ie

PROJECT: **RATOATH CO MEATH.**	DATE: NOVEMBER 2019
	SCALE: 1:500@A1
DRAWING: **TREE CLASSIFICATION**	DRAWN: KM CHECKED: KM
	DRAWING NO: **19277_T_101**



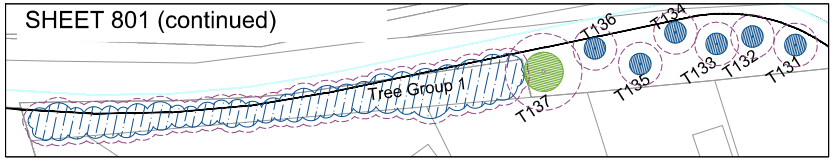


LEGEND

- CLASS A INDIVIDUAL TREE (HIGH QUALITY - RETENTION HIGHLY DESIRABLE)
- CLASS B INDIVIDUAL TREE (MODERATE QUALITY - RETENTION DESIRABLE)
- CLASS C INDIVIDUAL TREE (LOW QUALITY - RETENTION OPTIONAL)
- CLASS U INDIVIDUAL TREE (RECOMMEND REMOVAL)
- TREE GROUPS (COLOUR REPRESENTING GROUP CLASSIFICATION)
- CALCULATED ROOT PROTECTION AREA (RPA)
- TREES PROPOSED FOR REMOVAL

NOTE:

THIS DRAWING IS PRODUCED IN COLOUR, MONOCHROME VERSIONS SHALL NOT BE RELIED UPON.



REV	DATE	AMENDMENT

CUNNANE STRATTON REYNOLDS

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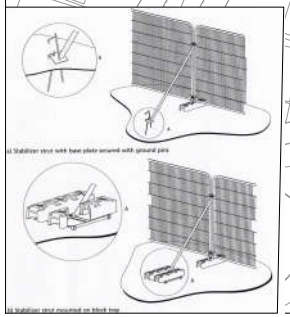
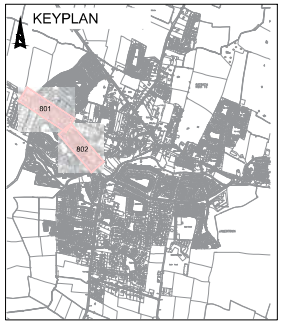
PROJECT: **RATOATH CO MEATH.**	DATE: NOVEMBER 2019
	SCALE: 1:500@A1
DRAWING: **ARBORICULTURAL IMPACT ASSESSMENT**	DRAWN: KM CHECKED: KM
	DRAWING NO: **19277_T_102**

SHEET 801

SHEET 802



KEYPLAN



LEGEND

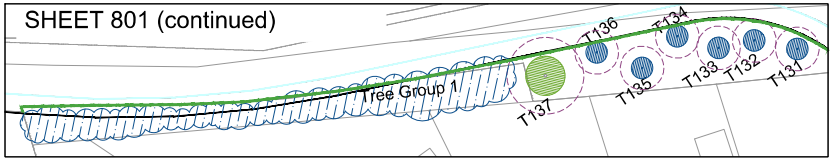
- CLASS A INDIVIDUAL TREE (HIGH QUALITY - RETENTION HIGHLY DESIRABLE)
- CLASS B INDIVIDUAL TREE (MODERATE QUALITY - RETENTION DESIRABLE)
- CLASS C INDIVIDUAL TREE (LOW QUALITY - RETENTION OPTIONAL)
- CLASS U INDIVIDUAL TREE (RECOMMEND REMOVAL)

NOTE:

THIS DRAWING IS PRODUCED IN COLOUR, MONOCHROME VERSIONS SHALL NOT BE RELIED UPON.

- TREE GROUPS (COLOUR REPRESENTING GROUP CLASSIFICATION)
- CALCULATED ROOT PROTECTION AREA (RPA)
- TREES PROPOSED FOR REMOVAL
- POSITION OF TEMPORARY PROTECTIVE BARRIERS TO EXCLUDE ALL CONSTRUCTION ACTIVITIES, (MACHINES & MATERIAL) TO BE INSTALLED PRIOR TO COMMENCEMENT OF WORKS IN ACCORDANCE WITH BS 5837:2012 AS ILLUSTRATED

SHEET 801 (continued)



REV	DATE	AMENDMENT

CUNNANE STRATTON REYNOLDS

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PROJECT: **RATOATH CO MEATH.**	DATE: NOVEMBER 2019
	SCALE: 1:500@A1
DRAWING: **TREE PROTECTION**	DRAWN: KM CHECKED: KM
	DRAWING NO: **19277_T_103**

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