Comhairle Cathrach & Contae Luimnigh

Limerick City & County Council

Limerick City Greenway (UL to NTP) Project

Invasive Species Management Plan

December 2024

RYAN HANLEY

5th Floor Jervis House, Jervis Street, Dublin 1, D01 E3W9
1 Galway Business Park, Upper Newcastle Rd, Dangan, Galway H91 A3EF
Innovation House, Moneen Road, Castlebar, Co. Mayo, F23 E400
Unit 1203, Building 1000, Gateway Business Park, New Mallow Road, Cork.

CLIENT	Limerick City and County Council
PROJECT NO.	2535
PROJECT TITLE	Limerick City Greenway (UL to NTP)
REPORT TITLE	Invasive Species Management Plan

REV.	STATUS	AUTHOR	REVIEWED BY	APPROVED BY	ISSUE DATE
0	DRAFT	G. Kilbane	J. O'Connor	B. Larkin	31/08/2021
1	Updated following LCCC review	G. Kilbane	J. O'Connor	B. Larkin	8/11/2021
2	Updated for new route	B. Quinn/P. Rodolfi	T. Stafford	B. Larkin	31/01/2024
3	Updated for new route	B. Quinn	T. Stafford	B. Larkin	17/07/2024
4	Updated for revised route	B. Quinn	T. Stafford	B. Larkin	16/12/2024

TABLE OF CONTENTS

1. INTRODUCTION

1.1 Introduction and Objectives

Ryan Hanley was commissioned by the Limerick City and County Council (LCCC) to carry out an invasive species survey and prepare an Invasive Species Management Plan (ISMP) for the prevention of spread, and the management of invasive species within the footprint of the proposed Limerick City Greenway (University Limerick (UL) to National Technology Park (NTP)), County Limerick herein referred to as the Greenway project.

The purpose of this ISMP is to set out options for control and initiate a plan to manage and prevent the spread of invasive species recorded within the Study Area of the Greenway project.

Walkover surveys were conducted on 5th November 2020, 14th May 2021, 28th April 2022, 3rd May 2023 and the 26th of June 2024. A number of invasive alien species (IAS) including Himalayan balsam (*Impatiens glandulifera*) and Giant hogweed (*Heracleum mategzzianum*) were recorded during these walkovers and documented growing within the Study Area of the proposed Greenway project. The main objectives of the ISMP are as follows:

1. To identify the extent of these invasive species infestations within the Study Area of the Limerick City Greenway project;
2. To identify appropriate eradication and/or control measures to prevent the spread of invasive species within the Study Area; and
3. To identify and recommend the most favoured method for avoiding the spread of invasive species as per the European Communities (Birds and Natural Habitats) Regulations 2011 (S.I. No. 477/2011).

This ISMP outlines the biosecurity strategies that will be adopted before and during the construction of the Limerick City Greenway to prevent the spread of invasive species. **The ISMP is intended to be a working document and will be updated annually during the pre-construction, construction and operational phases of the Project.** The ISMP will inform and be instructive to the Construction Environmental Management Plan (CEMP). Following construction, the plan will be updated for the operational phase of the project, taking into account any operational maintenance requirements.

Construction and any scheduled maintenance work undertaken during the project could potentially disturb stands of invasive plants and/or soils contaminated with invasive plant material. In addition to lands within the proposed works areas, there is a potential risk of invasive plant species being spread to neighbouring lands, public roads, and other locations.

1.2 Legislative Framework

Action 28 of the first National Biodiversity Plan (2002) required Ireland to prepare strategies, in consultation with Northern Ireland, to control introduced species and to prevent, or minimise future (accidental or deliberate) introduction of alien species, which might threaten biodiversity both within and outside protected areas. The National Biodiversity Action Plan 2017-2021, Irelands 3rd National Biodiversity Plan builds on this and Target 4.4 of Objective 4- Conserve and restore biodiversity and ecosystem services in the wider countryside aims to ensure '*Harmful invasive alien species are controlled and there is reduced risk of spread of new species*'.

1.2.1 European Communities (Birds and Natural Habitats) Regulations 477/2011

The European Communities (Birds and Natural Habitats) Regulations 2011 (S.I. No. 477/2011) contains specific provisions that govern control of invasive species listed on its Third Schedule. Article 49 of the Regulation prohibits the introduction, breeding, release or dispersal of certain species and Article 50 prohibits dealing in and keeping certain species.

Article 49 (2) states; '*Save in accordance with a licence granted under paragraph (7), any person who plants, disperses, allows or causes to disperse, spreads or otherwise causes to grow in any place specified in relation to such plant in the third column of Part 1 of the Third Schedule, any plant which is included in Part 1 of the Third Schedule, shall be guilty of an offence*'.

Article 50 (2) states; '*Save in accordance with a licence granted under paragraph (70, a person shall be guilty of an offence if he or she imports or transports:*

(a) An animal or plant listed in Part 1 or Part 2 of the Third Schedule;
(b) Anything from which an animal or plant referred to in Part 2 of the Third Schedule can be reproduced or propagated; or
(c) A vector material listed in Part 3 of the Third Schedule.

Into or in or to any place in the State specified in relation to such an animal or plant or vector material in relation to that animal or plant or vector material in the third column of the Third Schedule.'

The implications of Article 50 result in the requirement of a license for the disposal of non-native alien species at an offsite licenced facility where onsite management is not feasible. Part 50 of the 2011 Regulation has not yet come into effect.

Species listed on the Third Schedule were derived from the Invasive Species in Ireland prioritisation risk assessment undertaken in 2013. From this, 48 non-native species were ranked as at risk of having a High Impact and 78 species at risk of having a Medium Impact.

1.2.2 EU Regulation 1143/2014

EU Regulation 1143/2014 on invasive alien species was entered into force on the 1st January 2015. It provides for a set of measures to prevent, minimise and mitigate adverse impacts in relation to invasive alien species to be taken across the EU that are included on the list of Invasive Alien Species of Union concern. Three distinct types of measures are envisaged, which follow an internationally agreed hierarchical approach to combatting IAS:

- Prevention: a number of robust measures aimed at preventing IAS of Union concern from entering the EU, either intentionally or unintentionally;
- Early detection and rapid eradication: Member States must put in place a surveillance system to detect the presence of IAS of Union concern as early as possible and take rapid eradication measures to prevent them from establishing; and
- Management: some IAS of Union concern are already well-established in certain Member States and concerted management action is needed so that they do not spread any further and to minimize the harm they cause.

Chapter II Preventions - Article 7 Restrictions

1. Invasive alien species of Union concern shall not be intentional:

a) brought into the territory of the Union, including transit under customs supervision;

b) kept, including in contained holding;
c) bred, including in contained holding;
d) transported to, from or within the Union, except for the transportation of species to facilities in the context of eradication;
e) placed on the market;
f) used or exchanged;
g) permitted to reproduce, grow or cultivate, including in contained holding; or
h) released into the environment.

2. Member States shall take all necessary steps to prevent the unintentional introduction or spread, including where applicable, by gross negligence, of invasive alien species of Union concern.

1.3 Guidance Documents

The eradication/control measures identified in this ISMP for the proposed Scheme apply the most relevant and current guidance in relation to the treatment and management of invasive alien plant species in construction projects. These measures were derived from best practice guidance manuals from both the UK and Ireland, in particular:

- The Management of Invasive Alain Plant Species on National Roads- Technical Guidance (TII, 2020);
- NRA Guidelines on the Management of Noxious Weeds and Non-Native Invasive Plant Species on National Road Schemes (NRA, 2010);
- Managing Invasive Non-native Plants in or near Freshwater, Environment Agency (2010);
- Best Practice Management Guidelines Himalayan balsam *Impatiens glandulifera*, Invasive Species Ireland (2008); and
- Best Practice Management Guidelines Giant hogweed *Heracleum mantegazzianum*, Invasive Species Ireland (2008).

1.4 What are Invasive Species?

In an Irish context, invasive species relates to any animal or plant which have been introduced into Ireland by humans and their activities, either purposefully or accidentally. Invasive species are also referred to as 'invasive non-native species', or 'invasive alien species', are those non-native species that have the ability to spread rapidly and become dominant in an area or ecosystem.

Invasive non-native species are so-called as they typically display one or more of the following characteristics or features:

a) prolific reproduction through seed dispersal and/or re-growth from plant fragments;
b) rapid growth patterns; and
c) resistance to standard weed control methods.

Where a non-native species displays invasive qualities, and is not managed, it can potentially:

a) outcompete native vegetation, affecting plant community structure and habitat for wildlife;

b) cause damage to infrastructure including road carriageways, footpaths, walls and foundations; and

c) have an adverse effect on landscape quality through a loss of naturalness, aesthetics and regional identity.

Himalayan balsam (*I. glandulifera*) and Giant hogweed (*H. mategzzianum*) were among the invasive species identified during the Study Area walkover surveys.

The Invasive Species Ireland project identified Himalayan balsam and Giant hogweed as some of the highest risk (most un-wanted) non-native invasive species in Ireland, while Himalayan balsam and Giant hogweed have been listed as Invasive Species of European Concern. There is strict legislation surrounding these species in both Ireland and the EU as described in Section 1.2 above. These species are described in detail below.

1.4.1 Giant hogweed (*H. mantegazzianum*)

Source: https://www.biodiversityireland.ie/wordpress/wp-content/uploads/Giant-Hogweed.pdf

Giant hogweed is a perennial plant that is native to Asia that reaches heights of up to 5 meters. Initially introduced into Ireland as an ornamental plant of parks and gardens, this species has a high competitive advantage over native plants and can outcompete native flora for space and resources through shading that occurs due to dense stand formation. It is found across many habitat types including bog and fen habitats, grasslands, woodlands, urban areas and riparian zones. It is predominantly found along watercourses as it thrives in rich, moist soils. Giant hogweed leaves can grow up to 3m in length and 1.5m wide, with a stem diameter between 5-10cm. It produces large umbels of white flowers up to 80cm across. The stem is green with purple blotches and is covered in fine hairs that are particularly dense at the leaf joints.

It reproduces through seed dispersal and can produce up to 50,000 seeds after 3 to 4 years of growth. Seeds can remain viable in the poor soil for up to 5 years and in favourable soil for up to 15 years if conditions are unsuitable for germination. This is particularly problematic along riparian zones of rivers and streams as large numbers of seeds are dispersed into the flowing water which are carried downstream invading new areas. In addition, severe erosion of riverbanks can occur in winter when the species dies back as native vegetation cannot establish during the growing season.

Giant hogweed is considered a significant health hazard. Giant hogweed is a phototoxic plant its sap contains a chemical (furanocoumarins) that can cause severe reactions when it comes into contact with skin and is then exposed to sunlight. The furanocoumarins alter the genetic structure of skin they come into prolonged contact with, eliminating the skins ability to protect itself from sunlight. The first symptom to occur is itching, followed by blistering of the skin which may recur for several years after the initial exposure that can result in permanent scaring of skin tissue. Extreme caution must be taken around this plant as just brushing into it can cause sap to be released. The intensity of the reaction varies with individual sensitivity.

1.4.2 Himalayan balsam (*I. glandulifera*)

Source: https://www.biodiversityireland.ie/wordpress/wp-content/uploads/Himalayan-Balsam_PRINT.pdf

Himalayan balsam is native to the western Himalayas that was first introduced into Ireland as an ornamental garden plant. It is a tall (up to 2m), shallow-rooted, annual plant that is particularly prevalent in damp areas, mainly colonising riverbanks, waste ground and wet woodlands. The plant has lance-shaped leaves with heavily serrated edges, arranged opposite each other. The stem is jointed, hollow and easily broken. It flowers from June onward, producing pink to white, bonnet shaped flowers. These flowers are very distinctive, making identification easy once they are evident.

It reproduces through seed dispersal from seed pods that explode when mature, scattering the small seeds up to 7 meters from the parent plant. Each plant can produce up to 4,000 seeds that float in water and remain viable in soil for up to 18 months.

Himalayan balsam outcompetes native plants for space, light and nutrients through rapid growth and shading, thereby replacing existing flora resulting in reduced local biodiversity. It is also known as a 'pollinator robber' since Himalayan balsam produces copious quantities of nectar, attracting bees and other pollinators away from native species that require their services to reproduce. It is particularly prevalent along riverbanks and disturbed soils; it has shallow roots making riverbanks bare and vulnerable to erosion when the plant dies back, which in turn leads to soil loss and increased siltation in the water.

1.5 Limitations to Construction and Need for a Management Plan

The negative economic, social and environmental impacts of invasive species have been increasing in recent years. There are significant risks associated with the presence of invasive species during the construction of proposed developments. If left untreated Japanese knotweed has been documented to cause structural damage to infrastructure, concrete, tarmac and the stability of riverbanks. Similarly Himalayan balsam can impede flow in rivers and drainage ditches causing a rise in flow levels, leading to flooding. The invasive species present within the study area represent areas of immediate concern owing to the potential delays and associated costs with their management.

A study on the economic impacts of invasive species in Ireland and Northern Ireland was published in 2013 (Kelly *et al.,* 2013) and estimated the total damage and treatment costs of invasive species on construction, development, and infrastructure projects to be upwards of €26,672,863.

The unintentional spread of invasive species during construction works is a significant issue and if not managed correctly, species could be spread to uninfested areas which would increase the future cost and effort required to control the species and could pose further biosecurity and public health and safety risks. The most common ways in which invasive species can spread during construction of a project are:

- Site and vegetation clearance, mowing, hedge-cutting or other landscaping activities;
- Spread of seed or plant fragments during the movement or transport of soils;
- Spread of seeds or plant fragments through the local surface water and drainage network;
- Contamination of vehicles or equipment with seeds or plant fragments which are then transported to other areas, especially on machinery with tracks; and

- Importation of soil from off-site sources contaminated with invasive species plant material.

Early intervention in the spread of invasive species can prevent invasions and subsequent impacts on infrastructure and habitats, thus reducing long-term management requirements with associated financial costs.

Giant hogweed and Himalayan balsam are listed under the Third Schedule for the purpose of the restriction imposed by Section 49 and 50 of the Regulations. It is therefore an offence to cause the spread of these species.

2. METHODS

2.1 Study Area

The Study Area for the ISMP is centred on the route of the proposed greenway along the banks of the River Shannon, from the west side of the bridge on the River Groody, past Plassey Beach, diverting south along McLoughlan Road and along University Road to Plassey Park Road, as shown in **Figure 2.1**. The Study Area is the area within which physical works are proposed to be constructed, accessed, and maintained.

For the project, the ISMP will only be put in place within the footprint of the proposed Greenway.

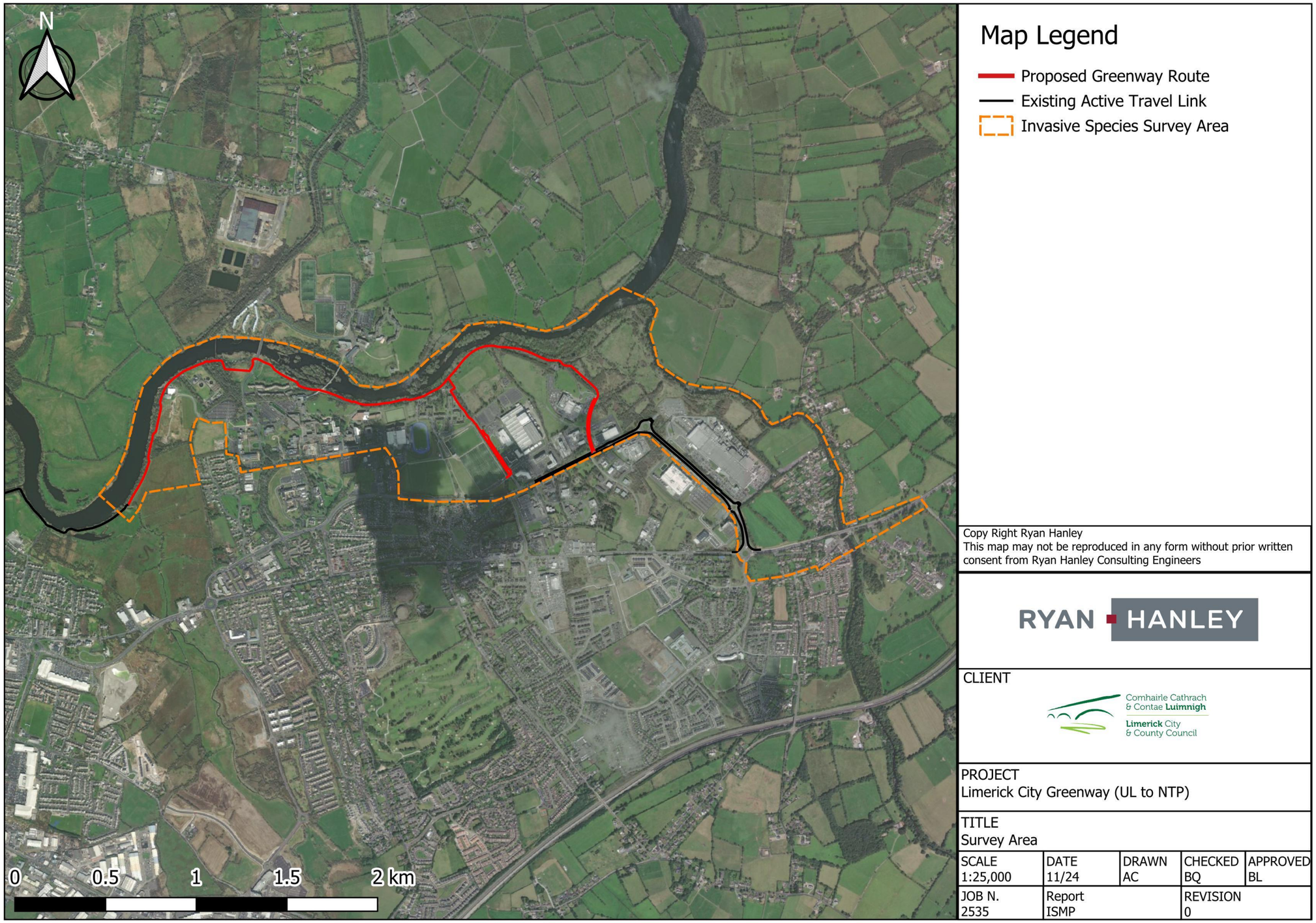


Figure 2.1- Invasive Species Study Area Limerick City Greenway

2.2 Desktop Study

Prior to the commencement of the walkover surveys, a desktop review of the relevant literature and databases (e.g. Biodiversity Ireland Database, NPWS Database, LCCC Invasive Species App) was undertaken for the Study Area in order to identify the presence of any invasive species which are listed on the Third Schedule of the Birds and Natural Habitats Regulations within the 10km grid squares/hectads R65 within which the proposed greenway is located. See **Section 3.1** below for results of this study.

2.3 Field Surveys

Walkover surveys of the proposed greenway Study Area were undertaken on 5th November 2020, 14th May 2021, 28th April 2022, 3rd May 2023 and 26th of June 2024 in order to identify the location and map the extent of any stands or individuals of invasive species recorded within the footprint of the preferred greenway route from the Groody River bridge to NTP. Where invasive species were identified, their location and extent were recorded. The area was also searched for new and or emerging shoots of any invasive species. See **Section 3.2** for results of these surveys.

2.4 Identification of Constraints

Constraints relative to the implementation of eradication/control measures were identified on the basis of the walkover surveys, best practice guidance and knowledge of the Study Area. This included a review of designated areas and health and safety constraints and flooding.

3. RESULTS

The presence of invasive species at locations within the Study Area has the potential to increase the financial burden on this project both in terms of treatment costs and delays in commencing construction works. Their presence within the Study Area requires the development of an ISMP prior to construction of the greenway in order to provide biosecurity protocols to eradicate/ avoid disturbing and spreading existing invasive species within the site, at new adjacent locations or off site.

3.1 Desktop Study

Invasive species listed on the Third Schedule identified during the desktop review of the Biodiversity Ireland Database, NPWS Database and LCCC Invasive Species APP are presented in **Table 3.1** below. Appendix A provides an illustration for the location of the invasive species on the LCCC APP.

Table 3.1- Invasive Species Identified within the Study Area during the Desktop Study

Common Name	Latin Name	Records
Brown Rat	*Rattus norvegicus*	Biodiversity Ireland Database
Canadian Waterweed	*Elodea canadensis*	Biodiversity Ireland Database
Dace	*Leuciscus leuciscus*	Biodiversity Ireland Database
Eastern Grey Squirrel	*Sciurus carolinensis*	Biodiversity Ireland Database
Fallow Deer	*Dama dama*	Biodiversity Ireland Database
Giant Hogweed	*Heracleum mantegazzianum*	Biodiversity Ireland Database, LCCC App
Giant Knotweed	*Fallopia sachalinensis*	Biodiversity Ireland Database
Greylag Goose	*Anser anser*	Biodiversity Ireland Database
Himalayan Balsam	*Impatiens glandulifera*	Biodiversity Ireland Database, LCCC App
Japanese Knotweed	*Fallopia japonica*	Biodiversity Ireland Database, LCCC App
Nuttall's Waterweed	*Elodea nuttallii*	Biodiversity Ireland Database
Three-cornered Garlic	*Allium triquetrum*	Biodiversity Ireland Database
Water Fern	*Azolla filiculoides*	Biodiversity Ireland Database

3.2 Field Surveys

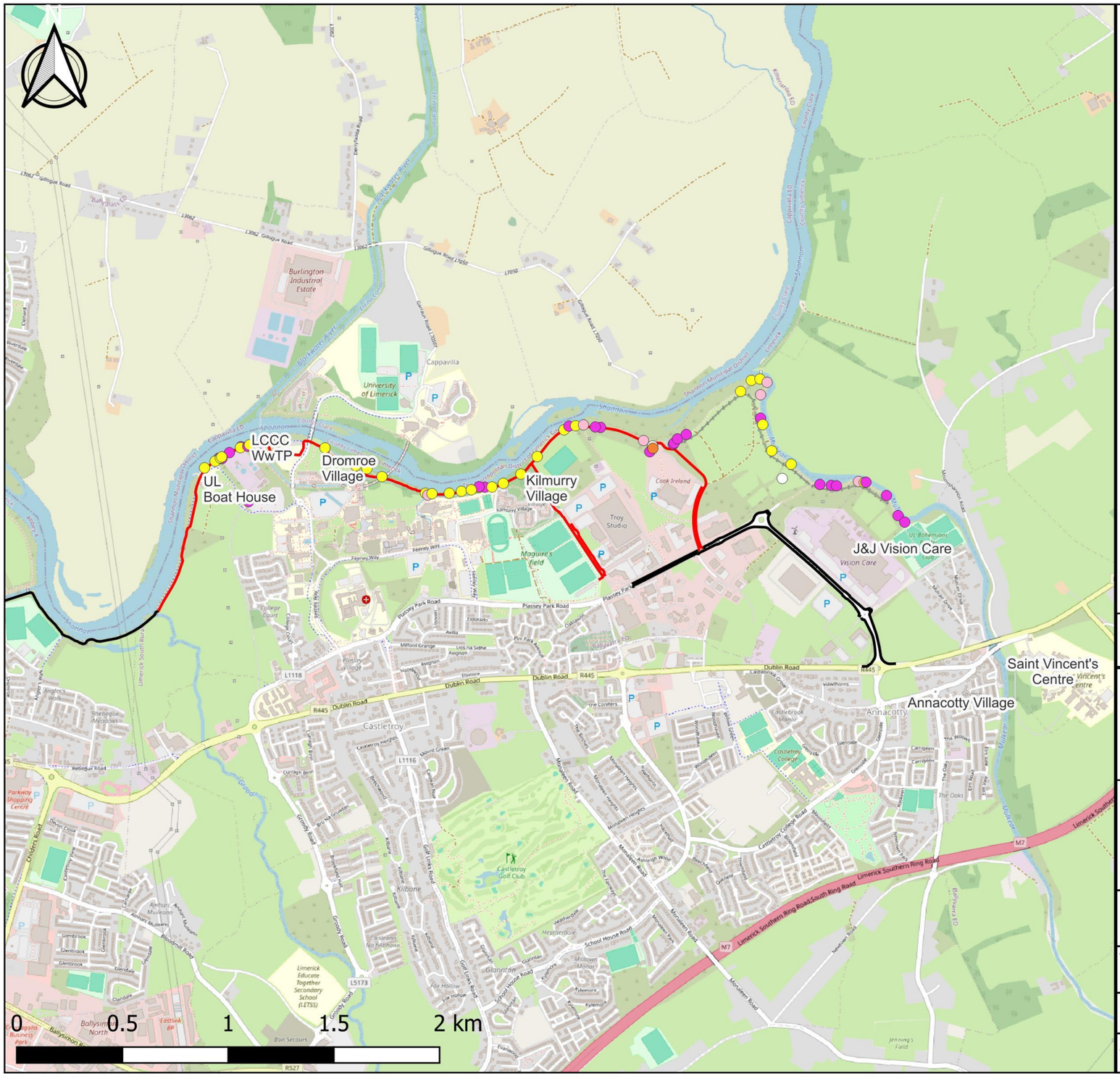
Stands of Giant Hogweed and Himalayan Balsam were identified along the length of the proposed greenway route interspersed with one another within the Study Area (**Plates 3.1- 3.6**). No other species listed in Table 3.1 on the Third Schedule were identified within the Study Area during any of the field surveys. Additionally, the non-native species Winter Heliotrope (*Petasites fragrans*) and Cherry laurel (*Prunus laurocerasus*) were recorded, however, these species are not listed on the Third Schedule and as such do not require specific measures for their control or disposal, therefore no further assessment for these species are required. However, best practice measures will ensure that avoidance of disturbance and spread of these non-native species as part of the works. The invasive species infestation was found to be extensive throughout the length of the greenway as shown in **Figure 3.1 to Figure 3.4** and **Table 3.2 to Table 3.3.**

Table 3.2- Invasive Species Identified during Walkover Surveys 2020-2021

ID Ref	Species	Grid ref (Easting, Northing)	Details
GH19	Giant hogweed (*H. mantegazzianum*)	160760, 158304	GH stands identified have been sprayed with herbicide in this area
HB14	Himalayan balsam (*I. glanduifera*)	160556, 158464	HB stands approximately 5m X30m in size identified on the riverbank.
HB8	Himalayan balsam (*I. glanduifera*)	160606, 158499	HB stands identified under dry culvert
GH18	Giant hogweed (*H. mantegazzianum*)	160622, 158512	10 stands of GH were identified
HB9	Himalayan balsam (*I. glanduifera*)	160630, 158514	HB stands were identified covering the base of a ditch
GH23	Giant hogweed (*H. mantegazzianum*)	160638, 158511	Extensive area of GH was identified within the boundary of the WWTP
HB10	Himalayan balsam (*I. glanduifera*)	160636, 158519	HB stands identified on both the right and left side of the path for 30m. Evidence of herbicide spraying
GH22	Giant hogweed (*H. mantegazzianum*)	160673, 158529	Stands of GH identified along the boundary fence of the WWTP
HB11	Himalayan balsam (*I. glanduifera*)	160725, 158562	HB stands identified on the left side of the existing track and covering the river bank in this area and additionally within a ditch on the right side of the track
GH21	Giant hogweed (*H. mantegazzianum*)	160728, 158566	An extensive area of GH was identified within the boundary of the WWTP
GH5	Giant hogweed (*H. mantegazzianum*)	160761, 158570	Several stands of GH were identified on the right side of the bridge and plants were approx. 1.5m high
HB16	Himalayan balsam (*I. glanduifera*)	160767, 158576	An extensive area of HB was identified
GH&HB4	Giant hogweed (*H. mantegazzianum*) and Himalayan balsam (*I. glanduifera*)	160830, 158583	Treatment signage present in this area and several GH and HB plants were identified at an early stage of growth
GH&HB3	Giant hogweed (*H. mantegazzianum*) and Himalayan balsam (*I. glanduifera*)	160861, 158600	Several GH and HB plants were identified at an early stage of growth
HB15	Himalayan balsam (*I. glanduifera*)	161126, 158561	HB plants were identified at an early stage of growth
HB26	Himalayan balsam (*I. glanduifera*)	161271, 158475	HB stands identified on the right side of the existing track
HB27	Himalayan balsam (*I. glanduifera*)	161323, 158463	Stands of HB identified on both the right and left sides of the riverbank
HB23	Himalayan balsam (*I. glanduifera*)	161396, 158426	HB interspersed with Mares tail
HB24	Himalayan balsam (*I. glanduifera*)	161602, 158348	HB stands identified on the left side of the existing track and covering the river bank for approx. 100m.
GH&HB7	Giant hogweed (*H. mantegazzianum*) and Himalayan balsam (*I. glanduifera*)	161610, 158336	An extensive area of HB identified with several stands of GH interspersed
HB25	Himalayan balsam (*I. glanduifera*)	161633, 158344	HB stands identified either side of the path in this area
HB3	Himalayan balsam (*I. glanduifera*)	161712, 158347	HB stands identified either side of the path for approximately 100m
HB4	Himalayan balsam (*I. glanduifera*)	161772, 158358	HB stands identified either side of the path for approximately 100m
HB6	Himalayan balsam (*I. glanduifera*)	161820, 158361	HB stands identified either side of the path for approximately 100m

ID Ref	Species	Grid ref (Easting, Northing)	Details
HB5	Himalayan balsam (*I. glanduifera*)	161853, 158373	HB stands identified within the river bank
GH1	Giant hogweed (*H. mantegazzianum*)	161855, 158377	GH immature plants x 4
GH24	Giant hogweed (*H. mantegazzianum*)	161882, 158375	GH immature plants large area adjacent to river bank
HB28	Himalayan balsam (*I. glanduifera*)	161917, 158377	HB stands identified on the left side of the path for approximately 100m
HB1	Himalayan balsam (*I. glanduifera*)	161968, 158394	HB stands identified either side of the path for approximately 100m
HB12	Himalayan balsam (*I. glanduifera*)	162052, 158439	HB stands identified either side of the path for approximately 100m
HB13	Himalayan balsam (*I. glanduifera*)	162130, 158519	HB stands identified either side of the path for approximately 20m
HB2	Himalayan balsam (*I. glanduifera*)	162253, 158643	HB stands identified either side of the path for approximately 25m
GH3	Giant hogweed (*H. mantegazzianum*)	162280, 158663	Stands of GH identified in the area with evidence of spraying being undertaken. Evidence of spray drift on adjacent vegetation.
HB7	Himalayan balsam (*I. glanduifera*)	162311, 158665	HB large area of infestation either side of trail path
GH&HB2	Giant hogweed (*H. mantegazzianum*) and Himalayan balsam (*I. glanduifera*)	162351, 158669	Large area of HB and GH infestation identified in this area
GH2	Giant hogweed (*H. mantegazzianum*)	162406, 158659	Large area of GH identified along the path for approximately 100m
GH4	Giant hogweed (*H. mantegazzianum*)	162429, 158657	Large area of GH identified along the path
GH&HB1	Giant hogweed (*H. mantegazzianum*) and Himalayan balsam (*I. glanduifera*)	162634, 158599	Large area of GH identified along the right side of the path
GH20	Giant hogweed (*H. mantegazzianum*)	162664, 158540	Large area of GH identified by the left corner of the path
GH6	Giant hogweed (*H. mantegazzianum*)	162772, 158577	Large area of GH infestation identified
GH7	Giant hogweed (*H. mantegazzianum*)	162781, 158586	GH stands identified in castle ruins
GH8	Giant hogweed (*H. mantegazzianum*)	162792, 158604	Stands of GH identified in and around the castle ruins
GH9	Giant hogweed (*H. mantegazzianum*)	162836, 158625	GH stands identified either side of path in this area
HB17	Himalayan balsam (*I. glanduifera*)	163094, 158827	HB - Extensive infestation of HB identified in this area
HB18	Himalayan balsam (*I. glanduifera*)	163141, 158880	HB large area of infestation on left side of trail path
HB19	Himalayan balsam (*I. glanduifera*)	163184, 158887	Extensive infestation of HB identified in this area
GH&HB5	Giant hogweed (*H. mantegazzianum*) and Himalayan balsam (*I. glanduifera*)	163219, 158872	HB and GH infestation identified to the left side of the trail path
GH&HB6	Giant hogweed (*H. mantegazzianum*) and Himalayan balsam (*I. glanduifera*)	163187, 158813	Large area of HB and GH infestation identified either side of path for approximately 40m
GH12	Giant hogweed (*H. mantegazzianum*)	163185,158703	Approximately 20 stands of GH identified either side of the path
HB22	Himalayan balsam (*I. glanduifera*)	163196, 158670	Large areas of HB identified either side of the track
HB29	Himalayan balsam (*I. glanduifera*)	163237, 158547	HB small stands identified on right side of trail path

ID Ref	Species	Grid ref (Easting, Northing)	Details
HB21	Himalayan balsam (*I. glanduifera*)	163333, 158484	HB immature stands identified on left side of trail path
GH10	Giant hogweed (*H. mantegazzianum*)	163462, 158389	GH stands identified on right side of path
GH13	Giant hogweed (*H. mantegazzianum*)	163520, 158384	GH stands identified on left side of the trail path
GH11	Giant hogweed (*H. mantegazzianum*)	163543, 158381	GH stands identified on left side of the trail path
GH&HB5	Giant hogweed (*H. mantegazzianum*) and Himalayan balsam (*I. glanduifera*)	163647, 158400	Several GH and HB plants were identified at an early stage of growth by the stone foot bridge
HB20	Himalayan balsam (*I. glanduifera*)	163677, 158400	HB immature stands identified on left side of trail path by the overwater pipe
GH16	Giant hogweed (*H. mantegazzianum*)	163685, 158399	GH large stands identified on left side of the trail path
GH17	Giant hogweed (*H. mantegazzianum*)	163783, 158338	GH stands identified on left side of the trail path
GH14	Giant hogweed (*H. mantegazzianum*)	163836, 158244	GH large stands identified on right side of the trail path
GH15	Giant hogweed (*H. mantegazzianum*)	163868, 158208	GH large stands identified on right side of the trail path by entrance to Bohs rugby club



Map Legend

- Proposed Greenway Route
- Existing Active Travel Link

IAPS Records 2020-2021

- Himalayan Balsam
- Giant Hogweed
- Cherry Laurel
- Giant Hogweed & Himalayan Balsam
- Snowberry

RYAN HANLEY

CLIENT

Comhairle Cathrach & Contae Luimnigh
Limerick City & County Council

PROJECT
Limerick City Greenway (UL to NTP)

TITLE
Invasive Species Locations

SCALE	DATE	DRAWN	CHECKED	APPROVED
1:25,000	07/24	AC	BQ	BL

JOB N.	Report	REVISION
2535	ISMP	0

Figure 3.1- Invasive Species Locations Identified during the Walkover Survey 2020-2021

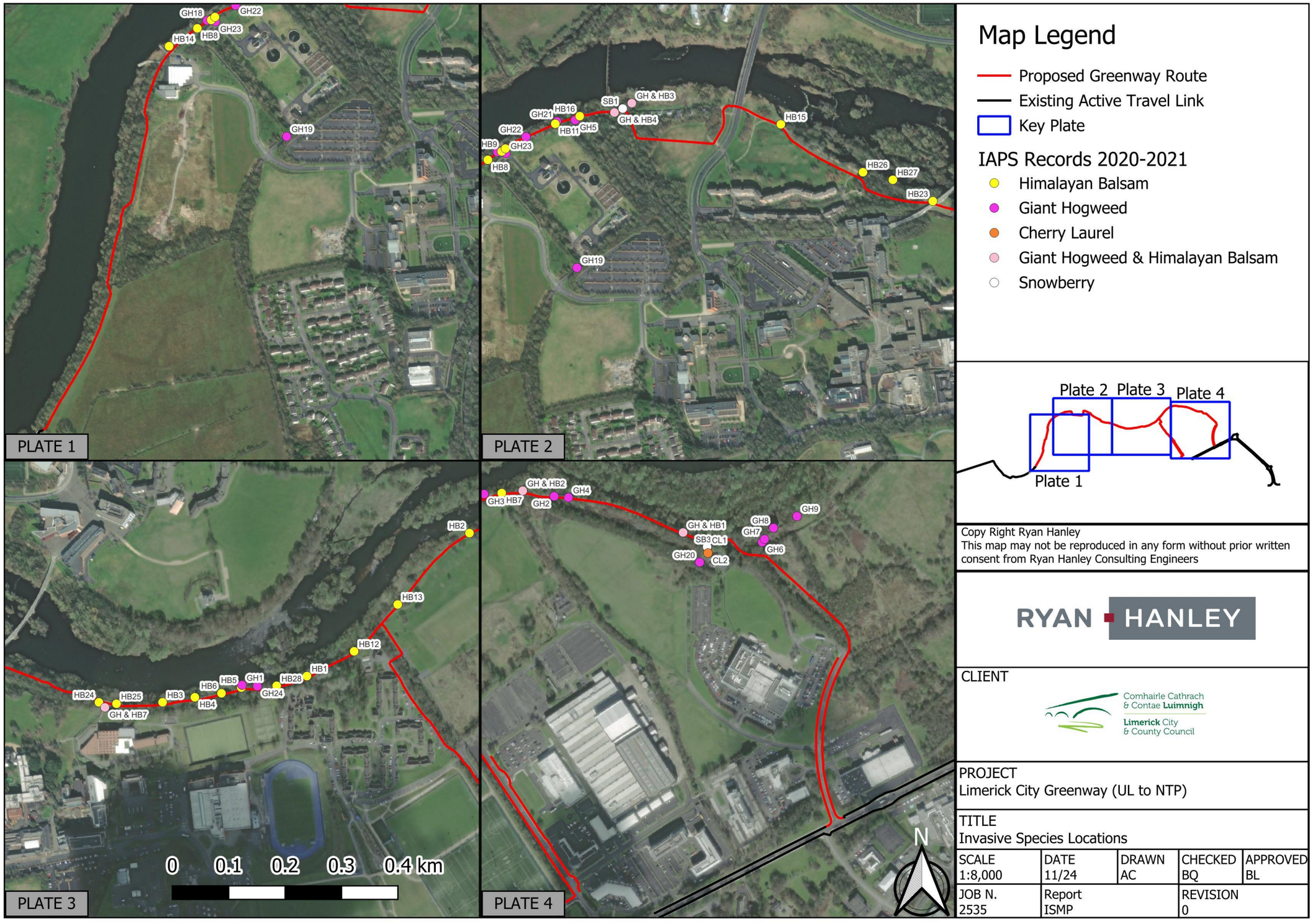


Figure 3.2- Invasive Species Locations Recorded during the Walkover Survey 2020-2021

Plate 3.1 Young Giant Hogweed adjacent to existing track at 163677, 158420 (May, 2021)

Plate 3.2 Young Giant Hogweed adjacent to existing track at 162774, 158592 (May, 2021)

Plate 3.3 Young Giant Hogweed adjacent to existing track at 162466, 158670 (May, 2021)

Plate 3. 4 Young Himalayan Balsam adjacent to existing track at 161221, 158516 (May, 2021)

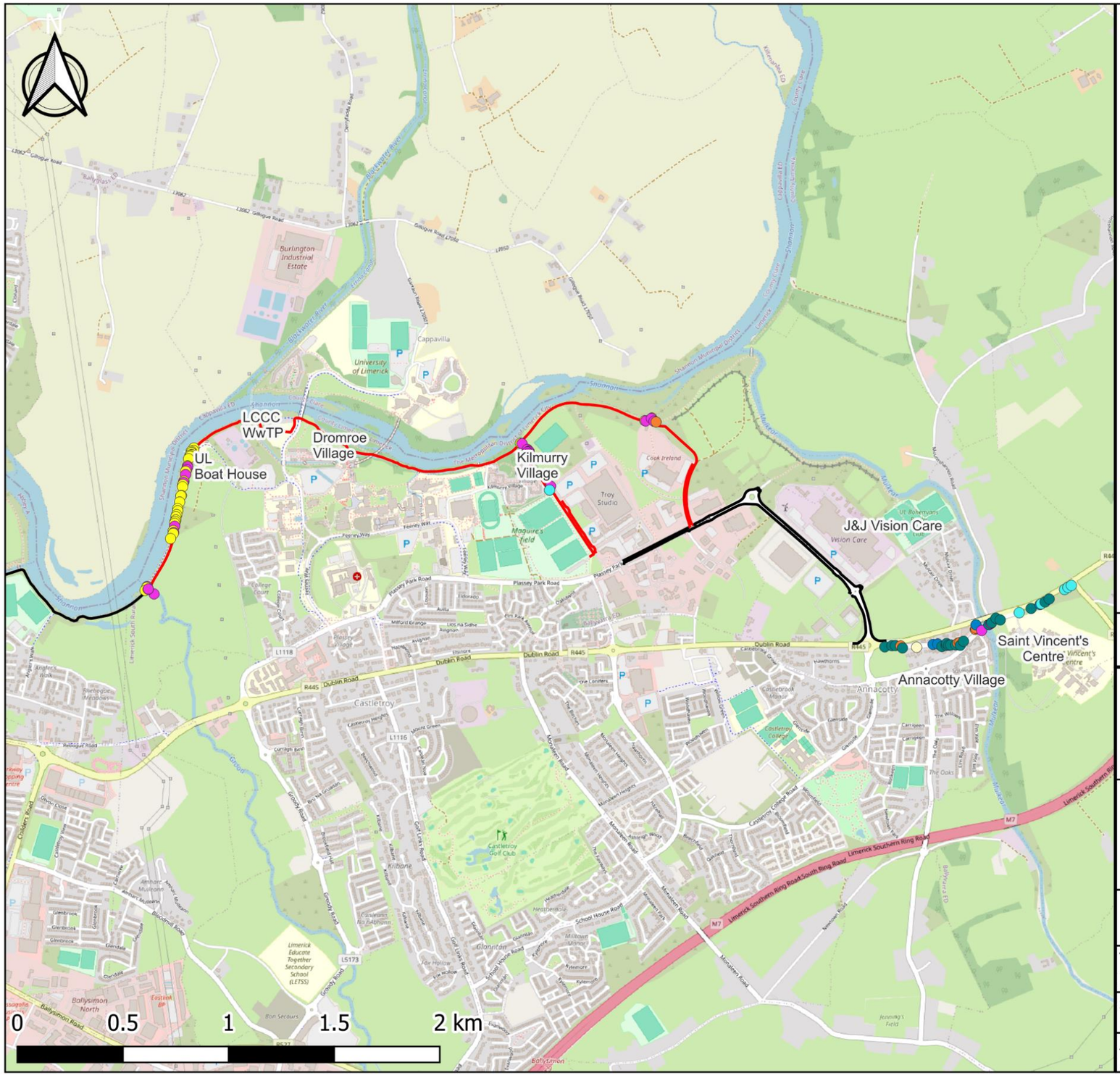
Plate 3.5 Mature Himalayan Balsam on both sides of existing track at 161671, 158354 (Nov, 2020)

Plate 3.6 Young Himalayan Balsam in drainage ditch near existing track at 160756,158580 (May,2021)

Table 3.3- Invasive Species Identified during Walkover Surveys 2024

TN	Invasive species	ITM X	ITM Y	Notes
TN1	Himalayan balsam	560506.54	658496.972	Within riverbank, west of the existing pathway
TN2	Himalayan balsam	560505.259	658484.763	Within ditch, east of the existing pathway
TN3	Himalayan balsam	560494.103	658481.288	Large carpet of HB underneath and adjacent to the pontoon
TN4	Himalayan balsam	560495.932	658474.476	Within grassy verge
TN5	Himalayan balsam	560494.423	658474.796	Large carpet of HB within bankside
TN6	Himalayan balsam	560496.16	658465.422	Within ditch
TN7	Himalayan balsam	560488.204	658462.496	HB carpeting riverbank
TN8	Himalayan balsam	560488.845	658457.329	Within ditch
TN9	Himalayan balsam	560481.392	658445.807	HB carpeting riverbank as well as grassy verges on both sides of the path
TN10	Himalayan balsam	560476.179	658412.543	HB still dominating both sides of the path
TN11	Himalayan balsam	560476.842	658408.199	Within field
TN12	Giant hogweed	560476.842	658408.199	Within field
TN13	Giant hogweed	560472.27	658395.328	Within field
TN14	Himalayan balsam	560467.263	658386.64	HB in grassy verges beside path and riverbank
TN15	Giant hogweed	560467.08	658371.231	GH in ditch
TN16	Himalayan balsam	560458.964	658340.23	HB within grassy verges
TN17	Giant hogweed	560457.272	658334.149	Within riverbank
TN18	Himalayan balsam	560454.072	658324.136	HB continues to carpet riverbank and grassy verges
TN19	Himalayan balsam	560452.746	658313.39	Within ditch
TN20	Himalayan balsam	560447.442	658272.651	Within ditch
TN21	Himalayan balsam	560445.018	658270.41	Within riverbank
TN22	Himalayan balsam	560438.96	658241.375	On both sides of the pathway
TN23	Himalayan balsam	560429.769	658210.169	Within riverbank
TN24	Himalayan balsam	560430.04	658199.88	Large carpet of HB around bridge
TN25	Himalayan balsam	560424.97	658181.64	Within grassy verges
TN26	Himalayan balsam	560421.54	658171.76	Carpeting riverbank
TN27	Himalayan balsam	560420.72	658156.53	Within ditch
TN28	Himalayan balsam	560417.42	658149.13	Within riverbank
TN29	Himalayan balsam	560415.23	658140.35	Dominating grassy verges
TN30	Giant hogweed	560415.23	658127.18	Within ditch
TN31	Himalayan balsam	560408.78	658105.64	Within riverbank and grassy verge
TN32	Giant hogweed	560410.7	658096.87	Within ditch/stream bank
TN33	Himalayan balsam	560408.65	658092.75	Within riverbank and both grassy verges
TN34	Himalayan balsam	560396.06	658068.574	Large carpet of HB in riverbank and within grassy verges
TN35	Giant hogweed	560285.054	657841.932	Within riverbank
TN36	Himalayan balsam	560283.133	657837.68	Within riverbank
TN37	Himalayan balsam	560275.52	657823.551	Within riverbank
TN38	Giant hogweed	560317.7	657806.679	Large stand of GH in field
TN39	Himalayan balsam	560289.94	657829.038	Coming through wooden fence
TN40	Giant hogweed	560290.558	657829.415	Near pathway, behind wooden fence
TN41	Giant hogweed	560290.489	657830.067	Within ditch
TN42	Sycamore	563776	657556.58	10x sycamore trees within treeline
TN43	Sycamore	563809.74	657562.07	Within treeline
TN44	Sycamore	563826.48	657562.62	Within treeline
TN45	Cherry laurel	563851.44	657560.97	Within planted area

TN46	Sycamore	563859.67	657551.37	Within treeline
TN47	New Zealand Flax	563926.61	657554.66	Within garden
TN48	Butterfly-bush	564004.66	657567.83	Within garden
TN49	Butterfly-bush	564026.61	657569.75	Within garden
TN50	Sycamore	564046.09	657558.37	Within treeline
TN51	Sycamore	564067.08	657563.58	Within treeline
TN52	Sycamore	564068.31	657572.22	Within garden
TN53	Sycamore	564078.05	657564.4	Within treeline
TN54	Sycamore	564087.24	657565.36	Within treeline
TN55	Sycamore	564111.66	657565.91	Within treeline
TN56	Cherry laurel	564122.49	657574	Hedging for boundary of a house
TN57	Cherry laurel	564130.17	657576.47	Behind wall
TN58	Sycamore	564133.47	657563.85	Within treeline
TN59	Sycamore	564148.56	657582.78	Saplings behind wall
TN60	Cherry laurel	564204.66	657638.2	Within hedgerow
TN61	Cherry laurel	564206.72	657644.79	Within hedgerow
TN62	Butterfly-bush	564207.54	657660.7	Within hedgerow
TN63	Giant hogweed	564234.43	657633.81	Growing out from wall edge of the Mulkear river
TN64	Sycamore	564268.615	657661.451	Within riparian treeline
TN65	Giant hogweed	564278.8	657667.521	On top of wall
TN66	Sycamore	564281.544	657670.848	Within treeline
TN67	Sycamore	564301.81	657692.35	Multiple planted sycamores within treeline
TN68	Sycamore	564322.39	657683.84	Within treeline
TN69	Winter heliotrope	564412.028	657718.275	Within grassy verge
TN70	Sycamore	564468.47	657738.03	Planted tree
TN71	Butterfly-bush	564510.86	657756.82	Sapling within grassy verge
TN72	Winter heliotrope	564516.21	657760.11	Within grassy verge
TN73	Sycamore	564534.18	657768.89	Planted tree
TN74	Sycamore	564553.726	657782.865	Planted tree
TN75	Winter heliotrope	564626.79	657827.67	Within grassy verge
TN76	Winter heliotrope	564642.7	657837.68	Within grassy verge
TN77	Winter heliotrope	564659.02	657847.01	Surrounding signpost in grassy verge
TN78	Himalayan balsam	562052.4	658519.6	Large carpet before treeline
TN79	Giant hogweed	562059.07	658517.92	Stand in front of treeline
TN80	Giant hogweed	562084.73	658490.21	Small stand in front of treeline
TN81	Giant hogweed	562092	658482.25	In front of treeline
TN82	Giant hogweed	562089.25	658479.51	Multiple stands within and around treeline
TN83	Giant hogweed	562084.73	658477.45	Large stands behind fence
TN84	Giant hogweed	562088.7	658470.45	Multiple stands within and around treeline
TN85	Giant hogweed	562194.46	658316.41	Large GH stands within treeline
TN86	Winter heliotrope	562189.52	658298.17	Carpeting field boundary line
TN87	Himalayan balsam	562640.48	658626.29	Carpeting south side of pathway
TN88	Giant hogweed	562644.73	658625.15	Large stands within the HB
TN89	Himalayan balsam	562673.69	658638.49	Carpeting the north side of the pathway
TN90	Giant hogweed	562671.7	658636.79	Large stands within the HB
TN91	Giant hogweed	562683.62	658623.73	Large stands
TN92	Cherry laurel	562693.56	658620.04	Large tree where pathway is proposed



Map Legend

- Proposed Greenway Route
- Existing Active Travel Link

IAPS Records 2024

- Himalayan Balsam
- Giant Hogweed
- Sycamore
- Cherry Laurel
- New Zealand Flax
- Butterfly-bush
- Winter heliotrope

RYAN HANLEY

CLIENT

Comhairle Cathrach & Contae Luimnigh
Limerick City & County Council

PROJECT
Limerick City Greenway (UL to NTP)

TITLE
Invasive Species Locations

SCALE	DATE	DRAWN	CHECKED	APPROVED
1:25,000	11/24	AC	BQ	BL

JOB N.	Report	REVISION
2535	ISMP	0

Figure 3.3- Invasive Species Locations Recorded during the Walkover Survey 2024

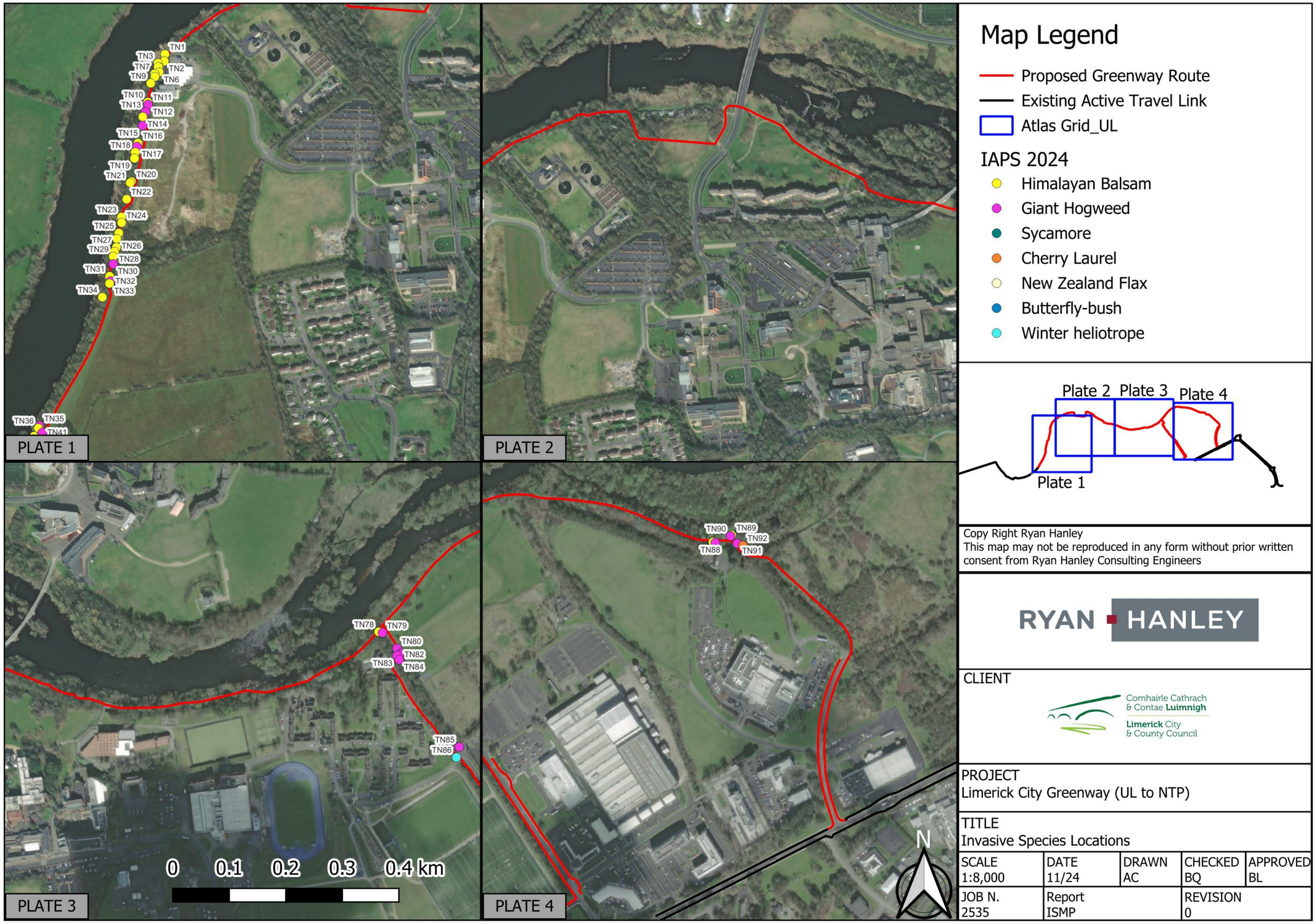


Figure 3.4- Invasive Species Locations Recorded during the Walkover Survey 2024

4. BEST PRACTICE CONTROL MEASURES FOR INVASIVE SPECIES

Invasive species have been identified at a number of locations adjacent to the proposed Greenway route within the Study Area. Himalayan balsam and Giant hogweed are invasive species listed on the Third Schedule whereby interference is legally controlled. They are highly invasive and can easily spread to new areas and are effective colonisers of disturbed ground (e.g. construction sites).

4.1 Advanced Treatment

Depending on the timescale of the construction of a project it may be possible to eradicate some species prior to the onset of construction on site via advanced treatment and in most cases, this is considered preferable. It is the aim of this ISMP to accomplish effective control or eradication of invasive plants within the managed area. By treating in advance of construction there will be control over the spread of infestations. However, if advanced control is not entirely achieved before construction, then biosecurity measures which includes site hygiene protocols, will be needed to avoid spread of invasive species.

Given the high level of invasive species infestation along the Greenway route, it is expected that the advanced treatment for invasives will likely be chemical treatment rather than excavation. Giant hogweed and Himalayan balsam all respond well to chemical treatment.

The specific treatment method will be decided on a site-by-site basis and in consideration of the time of year.

Use of an aquatic approved herbicide for any infestation close to water will be required. Biosecurity measures, as per Section 4.3, will be required even if the control of spread of invasive species is achieved prior to construction.

4.2 Monitoring

This ISMP must be revised by the specialist contractor on the basis of annual monitoring in early summer to assess the effectiveness of controls, treatment of plants/areas in the previous year or any newly discovered infestation including young plants. This will be undertaken by a suitably qualified person, with competence in identifying invasive species, within the proposed boundary of the greenway and any additional areas where construction works are required (e.g. temporary construction compounds, haul routes etc). Further treatment targets and operations will be undertaken thereafter. In advance of works commencing on Greenway:

- Pre-construction surveys will be completed 3-4 weeks before construction begins;
- Data collected as part of this survey will include a detailed description of any infestations identified including the approximate area of the respective stands where feasible;
- Ongoing monitoring throughout the growing season in all areas adjacent to the biosecurity zones; and
- Mapping of the most up to date invasive species distribution and extent of infestations will be produced.

4.3 Biosecurity Measures

All personnel that will be working on the proposed greenway route shall be educated through tailored tool-box talks to recognise each of the invasive species present within the footprint of the works.

Biosecurity zones must be established on-site prior to site works commencing and will specify the area of the zones, the required actions that must be taken in each zone and who must carry out the actions. All staff will be educated on the health and safety and biosecurity measures that should be followed around each species. Personnel must be familiar with the location of all biosecurity zones, and emergency procedures should they come into contact with Giant Hogweed material. Only those who have been inducted into biosecurity measures on-site should enter the biosecurity zones within the works area. Should any risk of contaminated material escaping be observed by the site supervisor, additional tool box talks and any additional necessary training that is needed shall be given.

Maintaining biosecurity measures at all times in an area where invasive species are present is essential to prevent further spread. Biosecurity measures are also necessary on sites where invasive species are not present, but where there is risk of contaminated material being brought to site, i.e., site machinery being used on multiple sites, construction staff travelling between infested and not infested sites. Careful preparation of the site and planning of the works is crucial to successful treatment of invasive species.

At all site locations during the construction stage, the contractor will adhere to the following best practice biosecurity measures in order to avoid the spread and introduction of invasive species where applicable:

- Fence off (biosecurity zones) 8m from the furthermost stand of invasive species in infested areas prior to and during construction where possible in order to avoid spreading seeds or plant fragments around or off the construction site. If this is not possible the biosecurity zones will be determined by a suitably qualified person in agreement with the site manager;
- Clearly identify and mark out infested areas. Erect signs at the construction site entrances and by the biosecurity zones to inform site users of the risk;
- Dedicated biosecurity zone entry and exit points should be created for operators on foot and for mobile plant equipment;
- Personnel working on or between biosecurity zones should ensure their clothing and footwear are cleaned to prevent spread;
- Don't use machinery with caterpillar tracks in infested areas. Machinery tyres must be cleaned prior to exiting the biosecurity zones;
- Clearly identify and mark out areas where contaminated soil is to be stockpiled on site, which cannot be within 50m of any watercourse or within the flood zone. Biosecurity zones need to be fenced and surround all stockpiles of contaminated soils containing invasive species;
- Infested areas which will not be excavated will be protected by a root barrier membrane if they are likely to be disturbed by machinery;
- Appropriate silt barriers will be installed in drains that may occur within infested areas;
- Biosecurity facilities must be installed on-site prior to site works commencing. Installation of a dedicated footwear and vehicular wheel wash down facility, into a contained area by the entrance and exit points of the construction site and in the biosecurity zones, away from drains and watercourses. All run-off will be isolated and treated as contaminated material;
- Vehicles entering and leaving the construction site and biosecurity zones will be cleaned using stiff-haired brush and pressure washers, paying special attention to any areas that might retain seed and plant material;

- Where there is potential for cross-contamination on site (machinery or personnel moving from one biosecurity zone to another or from the biosecurity zone to other areas on site), consideration should be given to designating vehicles or machinery to specific sites to prevent spread;
- Vehicles leaving the site to be inspected for any plant material and will be washed down into a dedicated wastewater contained storage area then tinkered off site to a licenced waste facility;
- If soil is imported to the site for landscaping, infilling or embankments, the contractor shall gain documentation from suppliers that it is free from invasive species;
- Ensure all site users are aware of measures to be taken and alert them to the presence of the ISMP; and
- An Environmental/Ecological Clerk of Works shall be on site to monitor and oversee the implementation of this ISMP and installation of the biosecurity zones.

4.4 Treatment Methods

There are a number of management options that may be implemented to control and prevent the spread of invasive species. These are presented in the sections below. It must also be noted that it may not be possible to completely eradicate invasive species before or during the construction phase.

4.4.1 Chemical Treatment

The use of suitable herbicides/pesticides should only be recommended and applied by a suitably qualified person. Appropriate training must include achieving competency certification in the safe use of herbicides/pesticides through a National Proficiency Test Council registered assessment centre or achieving an appropriate FETAC award in this area.

Chemical treatment involves the application of a herbicide to invasive species which will be absorbed into the plant's root/rhizome system and kill the plant without any excavation or removal of the plant material. In order for herbicide treatment programmes to be successful, it is important that the initial infestation remains as healthy as possible until the herbicide is applied. The preferred types of herbicides to be used in treatment are Glyphosate or similar. Generally, if herbicide is applied as the treatment option, it will need to be reapplied for up to four years (depending on the targeted invasive species) after the first application to ensure the plant control measures have been effective, or monitored for a minimum of two years during which no regrowth is recorded.

The selection of the most appropriate chemical treatment eradication/control measure for invasive species is dependent on a number of factors including lead in time available before construction activities, the extent of funding available to the management of invasive species within a site and land ownership. Where land is privately owned, chemical treatment and eradication of invasive species on the site may not be an option.

Table 4.1- Type of Herbicide used in Invasive Species Treatment

Herbicide	Licenced Product	PCS No.	Selectivity	Persistence	Timing of 1st Application	Aquatic Approved Product
Glyphosate	Roundup Biactive	04660	Non-selective	Non-persistent	Mar-Oct	Yes

Glyphosate is non-persistent and can be used near water but is not selective (will impact all plant species). The most effective time to apply Glyphosate is dependent on the species being treated but, in general, application should be undertaken before October (or before cold weather causes leaves to discolour and fall). The application of Glyphosate should not be undertaken on foggy days, in windy weather or if rain is forecast within twelve hours of application where there is a risk of spray drift occurring. Consultation should be undertaken with the National Parks and Wildlife Service (NPWS) when herbicide treatment is undertaken adjacent to or within a European Site. Foliar treatment (spraying) is usually applied with a sprayer such as a knapsack sprayer or a larger spray system. Treatment dyes and sticking agents can be used to clearly identify all areas treated and reduce foliar run-off and increase absorption of the herbicide respectively. It is an effective way to treat large monocultures of invasive species, or to spot-treat individual plants. Reapplication rates will depend on site specific considerations including the extent of the infestation, its location and the time of year treatment commences.

4.4.1.1 Himalayan balsam

Chemical control of Himalayan balsam is readily achieved with the use of Glyphosate as a foliar spray where infestations occur. It should be applied during active growth in late spring (May-June) to ensure that germinating seedlings have grown sufficiently to be covered by the spray. Herbicide can be applied as a spot treatment to individual plants or as an overall spray. Where accessibility is problematic e.g. riverbanks, a long lance sprayer may be used. Herbicide application will not kill Himalayan balsam seeds in the seed bank. Monitoring with follow-up treatments to control seedling germination will be required over a period of two or more years to ensure complete removal from the seed bank. It is essential to establish native riparian vegetation quickly after herbicide treatment to prevent erosion of the riverbank. Monitoring of the site will be required in mid-summer (July-August) to assess the occurrence of seedlings and determine appropriate control.

Spraying is considered the most suitable treatment method for large dense infestations of Himalayan balsam and is considered suitable for projects that have a limited timescale, as disposal of treated plants is not required.

4.4.1.2 Giant hogweed

Giant hogweed sap poses a major hazard to human health and appropriate PPE must be worn by personnel at all times when undertaking herbicide treatment in areas contaminated with this species. This includes at a minimum: coveralls with hood made of synthetic, water-resistant fibres, rubber gloves with long sleeves, goggles or face visor with face mask and rubber boots/wellingtons.

Appropriate PPE should be agreed with the contractor's Health & Safety manager prior to any application of herbicide.

Following any incident with Giant Hogweed sap, the site supervisor and qualified first aider should be notified immediately, and appropriate medical advice should be sought. A record must be kept of all incidents involving Giant hogweed.

Giant hogweed plants can be sprayed or injected with Glyphosate when actively growing, usually in April and May when the plants have grown to about 50cm in height with full leaves, potentially killing the plant with one application.

In order to be effective, spraying must be carried out before the plant flowers and sets seed, otherwise there will be additional seeds within the seedbank that will require future treatment in subsequent years.

Long-lance spraying may assist in accurate application of herbicide to plants growing in inaccessible sites and taller plants being treated later in the season. Use of long-lance sprayers have the added benefit of ensuring a safe distance is maintained between the operator and the plants. Re-application in the same season (late August and early September) should be planned in order to treat new plants that typically grow from the seedbank to replace the dead plants or any plants that may have been missed. Herbicide treatment will not kill seeds in the seed bank and monitoring and herbicide application must be repeated annually over 3-5 years to eradicate new plants growing in subsequent years. Numbers of plants will decrease significantly from one year to the next and treatment should be sustained until there is at least one clear year with no new Giant hogweed plants.

Spraying is the most suitable method for treating large dense infestations of Giant hogweed and is considered an efficient method of control.

Stem injections are an option for Giant hogweed with Glyphosate, but since Giant Hogweed is easily and safely treated using conventional spraying methods and stem injections run a higher risk of sap coming into contact with personnel involved in the treatment programme, this should only be conducted where a specific risk assessment has been carried out.

4.4.2 Excavation and Disposal of Material

Even if stands of invasive species are treated using herbicide, care should still be taken regarding the disposal of invasive species plant material and the future use of excavated soil in the Study Area that may be contaminated with invasive species. It is not possible at this stage to accurately estimate the volume of material that will have to be excavated as part of the construction of Limerick City Greenway. Invasive species (particularly roots, flower heads or seeds) must be disposed of at licenced waste facilities or composting sites, appropriately buried on site, or incinerated (under licence) having regard to relevant legislation. It should be noted that some invasive species plant material (such as Giant hogweed) or soil containing residual herbicides may be classified as either 'hazardous waste' or 'non-hazardous waste' under the terms of the Waste Management Acts, and both categories may require special disposal procedures or permissions.

4.4.2.1 Himalayan balsam

Cutting (Mowing or Strimming)

Himalayan balsam can be successfully controlled by cutting back the plants via mowing or strimming before the plants flower in June. If cutting is done earlier in the season this may promote the plants to resprout with greater seed production. In order to prevent vigorous regrowth, plant stems must be cut at ground level, below the first node. Cutting should be undertaken frequently during the growing season to prevent sprouting and flower formation. This process should be repeated annually until Himalayan balsam stops growing in the infested area.

Hand Pulling

As Himalayan balsam have very shallow roots, hand pulling is also an effective treatment option. A gentle tug is usually enough to remove the entire root system and normally best done if pulled from the base of the plant. Hand pulling should ideally commence in May-June when plants can be easily identified and will not have set seed. Hand pulling will require a follow up pull in August due to new seeds sprouting from the seed bank. Plants that are hand pulled should not be placed on soil or in damp areas as they will readily re-root. Waste material should be left to dry out or incinerated. These methods

are particularly useful for smaller infestations to avoid damage to non-target species. Herbicide application can be used as a follow up to hand pulling later in the year to deal with missed plants or regrowth from the seed bank.

While hand pulling is labour intensive and can be time consuming depending on the size of infestation it is considered to be an effective method of treating Himalayan balsam where infestations are relatively low.

Excavated Material

Himalayan balsam can eject its seeds up to 7m from the parent plant and any excavation works from within this area should be considered to be contaminated with Himalayan balsam seeds. The vast majority of these seeds remain in the top 5cm of soil, however, the recommended excavation depth to ensure complete removal of Himalayan balsam from the seed bank is 0.5m (Property Care Association, 2015).

This excavated material should be retained onsite, if possible, either stockpiled/bunded and treated or buried under other substrate. If contaminated soil is stockpiled on site, the stockpile biosecurity area should be cordoned off and fenced from the rest of the site with appropriate signage put in place. Stockpiled material will be monitored and regrowth will be treated with herbicide. If contaminated soil is to be buried a minimum depth of 2m is required. Burial at this depth is sufficient to prevent regrowth. Himalayan balsam seeds do not contain sufficient energy reserves to allow them to germinate and grow up through hard substrate.

It is recommended that work is avoided within areas contaminated with Himalayan balsam during the time when the plant is seeding (late July – Oct). If work is planned during this period, then these areas must be cleared of Himalayan balsam by herbicide application, strimming or hand-pulling plants in May/June in advance of works taking place.

4.4.2.2 Giant Hogweed

Hand cutting of Giant hogweed should never be undertaken unless the operator is wearing full PPE as described above and approval has been agreed with the Site Project Manager and the contractor's Health & Safety representative. A Risk Assessment and Method Statement should be signed off before works commence. Machine operators should take similar precautions as the sap can be spread onto machinery and subsequently come into contact with skin. Cutting must be undertaken before flowering using long-handled loppers in order to maintain a safe distance from the leaves and other parts of the plant. Power equipment, such as trimmers, strimmers or weed whackers, should not be used on Giant hogweed as they can result in the airborne spray of sap and plant material.

If the use of such equipment is unavoidable, a full Risk Assessment and Method statement will be required and approval agreed with the Health & Safety representative and the employer's representative.

Cutting is a treatment method used when a site is unsuitable for herbicide application due to water quality or sensitive area constraints. This technique is considered moderately effective as it is time consuming therefore making it suitable for sites with small infestations or low density and widely dispersed plants.

Cut material must be collected and disposed of as material left in situ is considered a health risk. Seed heads should be bagged before cutting to reduce dispersal. Care should be taken when deciding the most appropriate means of disposing of Giant hogweed plant material in order to avoid the spread of seeds and minimise health hazards to the public.

Small infestations can be controlled by digging out the whole plant. This should be done in April or May, cutting the plant at a 45 degree angle below ground to ensure damage to the rootstock and to prevent regrowth from the base. It is possible that large infestations may be controlled by deep cultivation (ploughing) although this is generally impractical on river banks. This method is very effective but time consuming and labour intensive therefore increasing the costs associated with treatment and therefore is only considered suitable for individual plants or small stands and not areas of significant infestation. This treatment method requires staff to work in close proximity to Giant hogweed and may thereby increase health and safety risks which can be mitigated with PPE and good work practices.

Ensure that soils from within 8m of the plant is not transferred to other areas as it is likely to contain vast numbers of seeds from previous years flowering. The majority of seeds are contained within the top 5cm of the soil and are viable for up to 15 years. Excavated soil and cut vegetative material should not be stock piled within 10m of any watercourse due to the risk of material being transferred by water. Giant hogweed material and infected soil should be stored on top of an invasive species membrane/ fabric in a designated biosecurity area for appropriate disposal.

4.4.2.3 Off-site Disposal

The waste mitigation hierarchy dictates that the licencing, transportation and off-site disposal of invasive species material is only considered as a last resort when none of the other treatment methods described above can be carried out (site is too small to contain excavated material, too shallow for burial, where there is a lack of space or where the infestation simply cannot be avoided by the construction works). For disposal off site to a licenced facility, consultation must be undertaken with the National Parks and Wildlife Service (NPWS), the Environmental Protection Agency (EPA) and the Local Authority prior to the disposal of invasive species. The movement of invasive species plant material including contaminated soil off-site **requires a licence** from the Licensing Unit of the NPWS **and must be transported by a licenced haulier to a licenced facility**. All off site disposals must be carried out in accordance with the relevant Duty of Care and Waste Management legislation (as per guidance from NRA, 2008). The licenced waste facility must:

- Be informed in advance of the nature of the waste material;
- Be licenced to accept this material; and
- Be prepared to accept the material.

Great care is required to ensure that no material is lost when the excavated material is being transported off site.

4.4.4 Post-construction Monitoring

Following the construction of the Greenway, it is important that the site is systematically re-surveyed to determine the success of control measures and to identify areas where invasive plants are reinvading. It is important to note that untreated Giant Hogweed and Himalayan balsam in the wider environment of Limerick, adjacent to or on the riverbanks of the Shannon and Mulkear upstream of the proposed greenway route are a risk to recolonise the study area after treatment. Work in partnership with neighbouring landowners to treat Giant hogweed and Himalayan balsam is encouraged. Establishing a good sward of grasses/ native riparian vegetation soon after treatment of these invasive species will help to reduce the rate of re-colonisation of the area by these species and help to prevent the slippage of banks. If invasive species are found, then they shall be treated as per the measures outlined in this plan and the species- specific guidelines above.

5. PROJECT SPECIFIC TREATMENT PLAN

The proposed Limerick City Greenway (UL to NTP) is a linear project, and construction is proposed to be carried out in five separate sections. The proposed construction works will typically take 6-12 months to construct so the specific treatment method for each section will be decided on a site-by-site basis and in consideration of the time of year.

Before the specialist treatment and invasive species management period begins in each section of the proposed greenway works area, an invasive species specialist should carry out a pre-construction re-survey to confirm the extent of invasive species and adopt/amend this plan accordingly.

Chemical treatment is the preferred treatment for Himalayan balsam and Giant hogweed for this project.

The site must be monitored through the treatment period and in the subsequent years. Any re-growth of Himalayan balsam and Giant hogweed must be subsequently treated as detailed in section 4.

The biosecurity control measures listed in section 4.3 should be implemented. Control measures and treatment shall be implemented by a suitably qualified licenced specialist.

An outline ISMP programme of works is provided in the table below. There is no preference or sequence provided for the completion of particular sections. The periods provided assume the specialist treatment and monitoring works will be carried out by an LCCC appointed specialist over a 24-month period.

Additional monitoring in each section will be required by the Works Contractor's specialist (ideally the appointed Environmental/Ecological Clerk of Works) who is likely to require additional treatment ahead of the site clearance and construction of the proposed greenway given the extensive spread of invasive species currently proliferating in the area.

Table 5-1: Outline ISMP programme for Limerick City Greenway (UL to NTP)

Task	Period	Timing of Treatment	Responsibility
Appoint Specialist	0		LCCC
Specialist re-survey of proposed works area	Month 0-1		Specialist
Specialist works in 1st Section	Month 1-2	Mar/Apr/May/Jun	Specialist
Monitoring in 1st Section	Month 4-24		Specialist
Specialist works in 2nd Section	Month 1-3	Mar/Apr/May/Jun	Specialist
Monitoring in 2nd Section	Month 4-24		Specialist
Specialist works in 3rd Section	Month 1-3	Mar/Apr/May/Jun	Specialist
Monitoring in 3rd Section	Month 4-24		Specialist
Specialist works in 4th Section	Month 2-3	Mar/Apr/May/Jun	Specialist

Monitoring in 4th Section	Month 4-24		Specialist
Specialist works in 5th Section	Month 2-3	Mar/Apr/May/Jun	Specialist
Monitoring in 5th Section	Month 4-24		Specialist

6. CONCLUSION

This Invasive Species Management Plan inclusive of biosecurity measures has been prepared for the proposed Limerick City Greenway (UL to NTP) project.

Advanced chemical treatment has been identified as the preferred treatment option for this project. However, given the extent of the invasive species infestation within the Study Area eradication of these species within the construction site is considered unlikely and further biosecurity control measures during the construction of the greenway will be required. A pre-construction re-survey shall be undertaken by the Works Contractor's specialist to confirm the extent of invasive species within the proposed greenway works area at the time. This plan provides measures to prevent the spread of invasive species listed on the Third Schedule of the Birds and Habitats Regulations (S.I. 477 of 2011) within the proposed greenway works area and adjacent lands.

Invasive species control measures have been described in section 4, and section 5 states the project specific proposals for this project. Control measures and treatment shall be implemented by a suitably qualified licenced specialist. The site will be monitored through the treatment period of this plan and in the subsequent years. Any re-growth of Himalayan balsam and Giant hogweed will be subsequently treated as detailed in section 4.

LCCC engaged a spraying contractor to carry out herbicide treatment during the summer and autumn of 2021. This spraying did not go ahead because the contractor withdrew from the contract.

It is recommended that LCCC engages a specialist to carry out IAPS treatment over two calendar years which should be completed before the works contractor starts on site, following the recommended treatment methods detailed in section 4 and section 5 of this invasive species management plan.

7. REFERENCES

DCHG, (2017). National Biodiversity Action Plan 2017-2021. Department of Culture, Heritage and the Gaeltacht.

Delbart, E., Mahy, G., Weickmans, B., Henriet, F., Cremer, S., Pieret, N., Vanderhoeven, S. and Monty, A. (2012). Can land management control Japanese knotweed? Lessons from control tests in Belgium. Environmental Management, 50(6), pp. 1089-1097.

Kelly, J., Maguire, C.M. and Cosgrove, P.J., Muir, R.A. (2015). Best Practice Management Guidelines Japanese knotweed Fallopia japonica. Prepared for NIEA and NPWS as part of Invasive Species Ireland.

National Roads Authority (2010). Guidelines on The Management of Noxious Weeds and Non-native Invasive Plant Species on National Roads. Prodiced by EirEco Consultants.

European Commission (2017) Invasive Alien Species of Union Concern.

A Guide to Habitats in Ireland The Heritage Council by Julie A. Fossitt (October 2000).

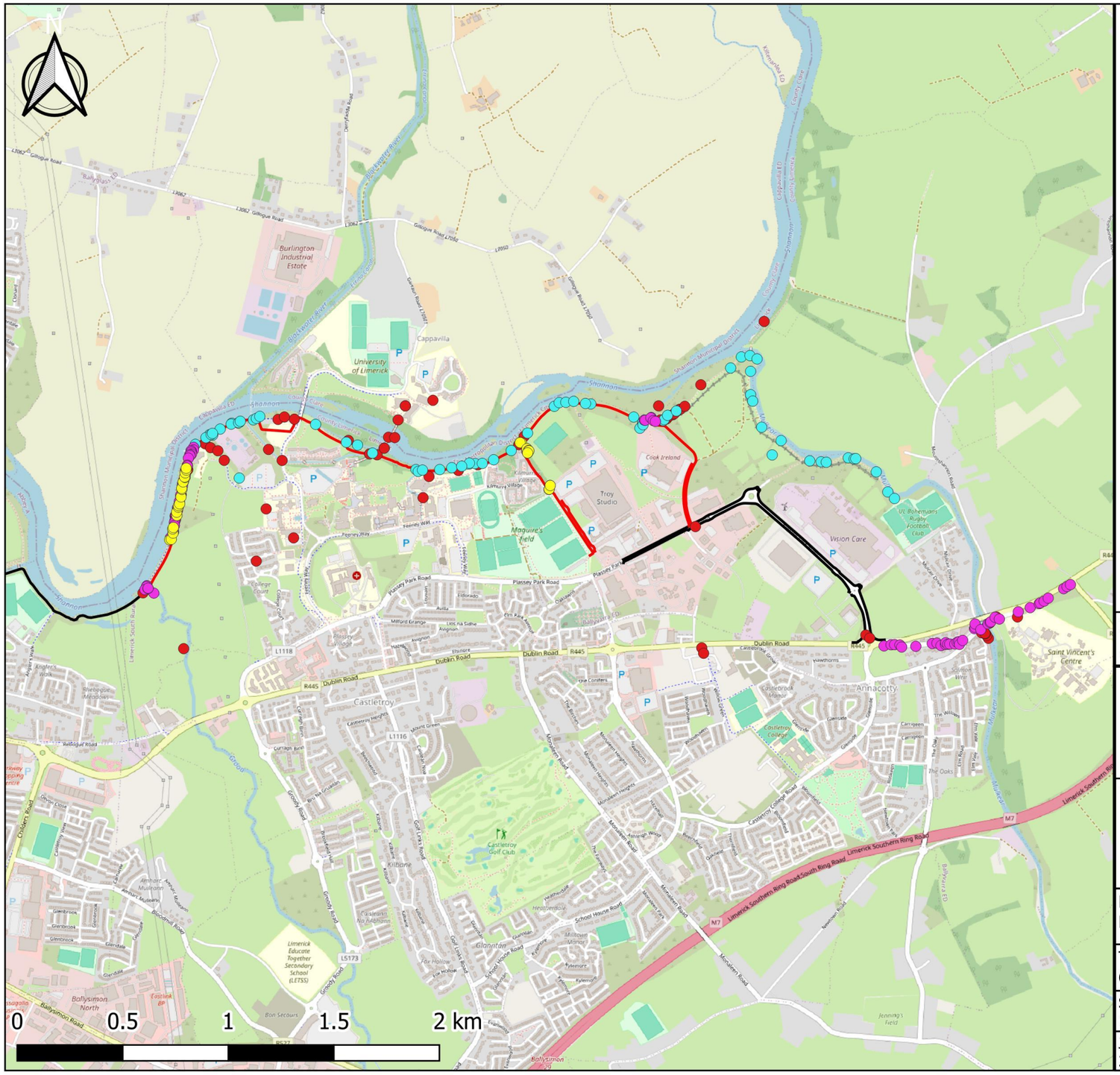
Appendix A

Desktop Study and Field Survey Results

A1: All Invasive Species Records for the Limerick City Greenway Study Area

A2: Limerick City & County Council App Invasive Species Records

A3: National Biodiversity Data Centre Invasive Species Records



Map Legend

- Proposed Greenway Route
- Existing Active Travel Link
- IS from LCCC App
- IS from NBDC
- IAPS Records 2020-2021
- IAPS Records 2022_2023
- IAPS Records 2024

RYAN HANLEY

CLIENT

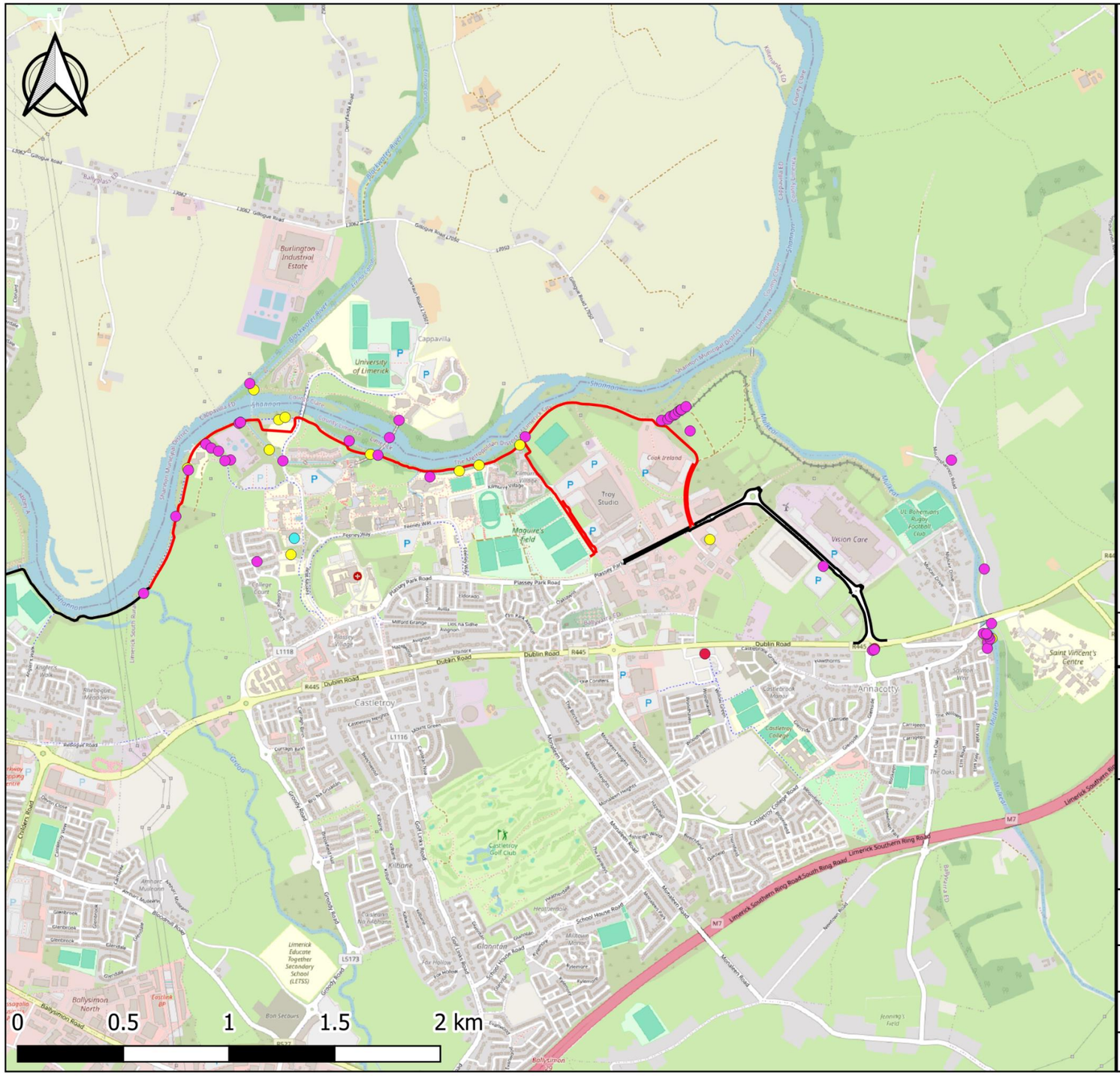
Comhairle Cathrach & Contae Luimnigh
Limerick City & County Council

PROJECT
Limerick City Greenway (UL to NTP)

TITLE
Combined IAPS Records

SCALE	DATE	DRAWN	CHECKED	APPROVED
1:25,000	11/24	AC	BQ	BL
JOB N. 2535	Report ISMP		REVISION 0	

Appendix A1- All Invasive Species Records for the Limerick City Greenway



Map Legend

- Proposed Greenway Route
- Existing Active Travel Link

IS from LCCC App

- Himalayan Balsam
- Giant Hogweed
- Winter heliotrope
- Japanese Knotweed

RYAN HANLEY

CLIENT

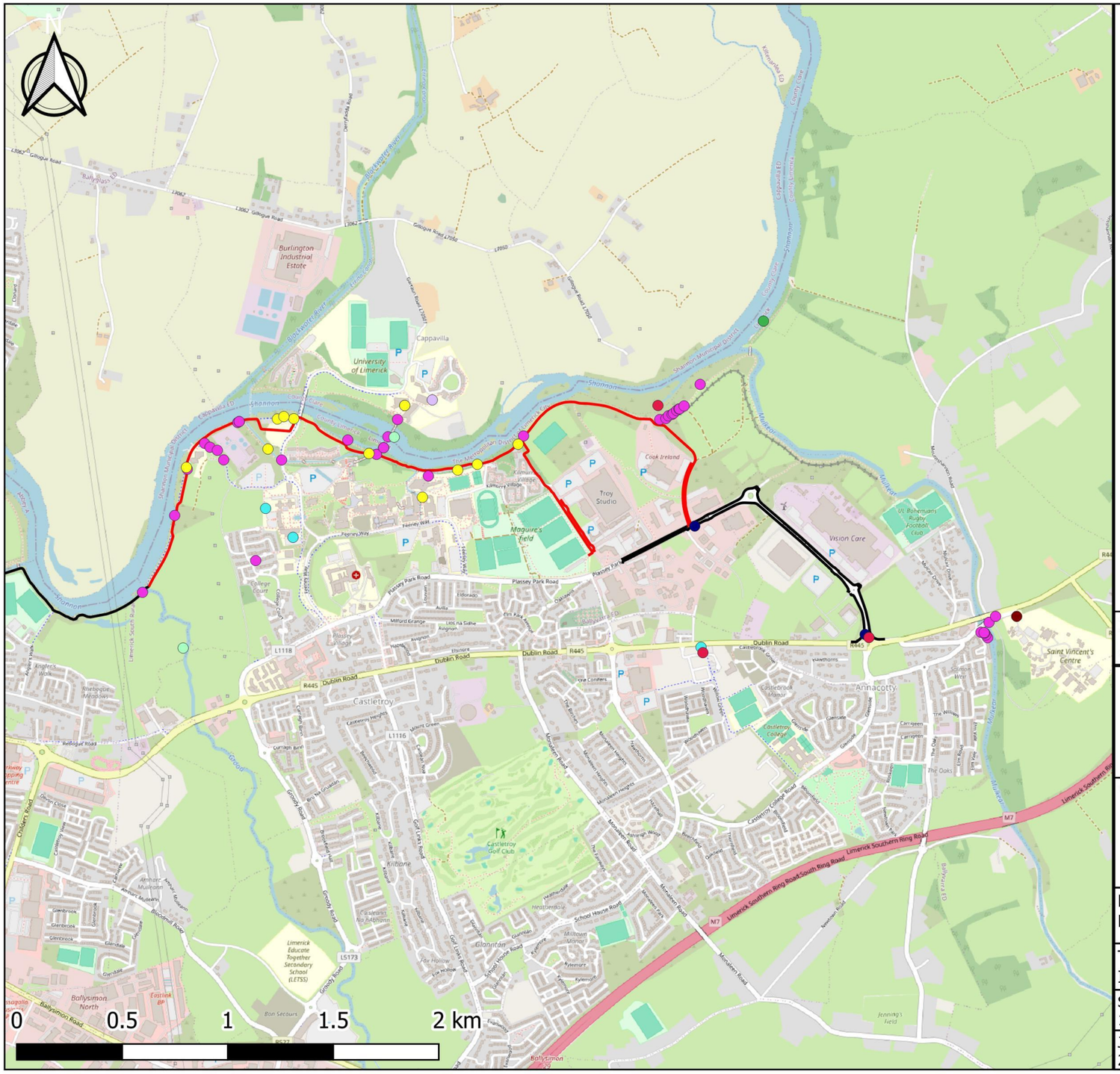
Comhairle Cathrach & Contae Luimnigh
Limerick City & County Council

PROJECT
Limerick City Greenway (UL to NTP)

TITLE
LCCC App - Invasive Species Locations

SCALE	DATE	DRAWN	CHECKED	APPROVED
1:25,000	11/24	AC	BQ	BL
JOB N. 2535	Report ISMP		REVISION 0	

Appendix A2- Limerick City and County Council App Invasive Species Records



Map Legend

- Proposed Greenway Route
- Existing Active Travel Link

NBDC Records

- Himalayan Balsam
- Giant Hogweed
- Butterfly-bush
- Water Fern
- Nutall's Waterweed
- Common Dace
- European Rabbit
- Winter heliotrope
- Japanese Knotweed

RYAN HANLEY

CLIENT

Comhairle Cathrach & Contae Luimnigh
Limerick City & County Council

PROJECT
Limerick City Greenway (UL to NTP)

TITLE
IAPS Records from National Biodiversity Centre

SCALE	DATE	DRAWN	CHECKED	APPROVED
1:25,000	11/24	AC	BQ	BL

JOB N.	Report	REVISION
2535	ISMP	0

Appendix A3- National Biodiversity Data Centre Invasive Species Records