Bonneagar Iompair Éireann
Transport Infrastructure Ireland

NTA
Údarás Náisiúnta Iompair
National Transport Authority

Luas Finglas

Environmental Impact Assessment Report 2024

Appendix A9.1: Aquatic Plant Survey and Report

BARRY TRANSPORTATION
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Project Ireland 2040
Building Ireland's Future

ROYAL CANAL AQUATIC PLANT SURVEY

October 2022

Report produced by Denyer Ecology for:
Barry Transportation

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CONTENTS

1 INTRODUCTION

1.1 Background and aims

Denyer Ecology was commissioned by Barry Transportation to undertake an aquatic plant survey of a 400m section of the Royal Canal, Broombridge, Cabra West, Dublin 7. The survey is in relation to a proposed project in this location, including a new bridge over the Royal Canal. There are no in-stream works proposed.

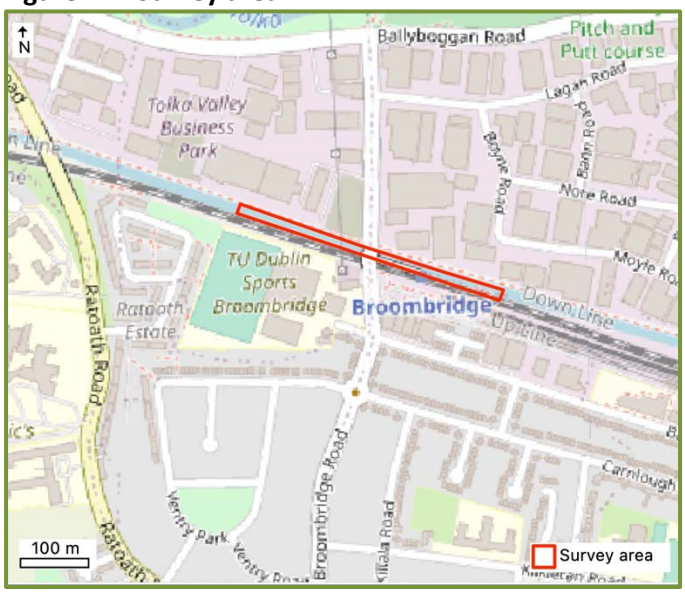
The aim of the survey was to assess whether this Canal section supports/ has the potential to support the rare/ protected aquatic plant species Opposite-leaved Pondweed *Groenlandia densa* and Tassel Stonewort *Tolypella intricata. Groenlandia densa* is protected under the Flora (Protection) Order, 2015 and is listed as 'Near Threatened' on the Irish Vascular Plant Red List (Wyse Jackson et al., 2016). *Tolypella intricata* is listed as 'Vulnerable' on the Irish Stonewort Red List (Stewart & Church, 1992; Nelson et al., 2019).

Both of these aquatic plant species have been recorded from the Royal Canal. The site synopsis for the Royal Canal pNHA (NPWS, 2009) states that '*The rare and legally protected Opposite-leaved Pondweed (Groenlandia densa) (Flora Protection Order 1987) is present at one site in Dublin, between Locks 4 and 5. Tolypella intricata (a stonewort listed in the Red Data Book as being vulnerable) is also in the Royal Canal in Dublin, the only site in Ireland where it is now found.* The *Groenlandia densa* record is downstream (east) of the project site.

1.2 Site

The survey area comprises 200m of canal up and downstream of the existing bridge (Figure 1.1).

Figure 1.1. Survey area



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2 METHODOLOGY

Two site visits were undertaken, one in early May 2022 and one in early June 2022. On each visit the length of the survey area was walked, and notes were made on aquatic and bank vegetation. In addition, the canal downstream for approximately 850m was walked to assess whether there may be downstream populations of the two protected species (no grapnel was used in this area as it was outside of the Section 21 Licence area).

2.1 Aquatic plant survey

A 'Licence to Take or Interfere with Protected Plant Species' under Section 21 of the Wildlife Act in relation to survey of *Groenlandia densa* within the survey area was applied for (Appendix A). This

was granted on 20th April 2022 (Licence number Licence No. FL02/2022). The licence application (Appendix A) detail the methodology for the aquatic plant survey.

2.2 Bank vegetation survey

Notes were made on the main wetland species present on the canal bank within the survey area. Habitat classification follows Fossitt (2000).

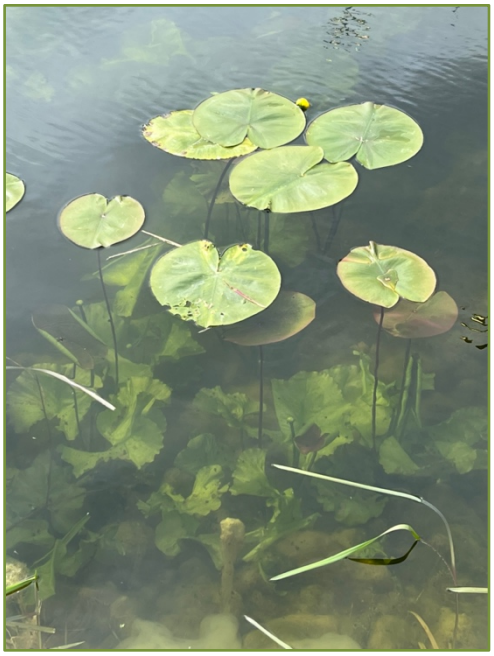
2.3 Plant species nomenclature

Vascular plant nomenclature follows that of the *New Flora of the British Isles*. 4th Edition (Stace, 2019). The bryophyte nomenclature adopted by Blockeel et al. (2021) is used.

3 RESULTS

3.1 General aquatic vegetation and habitat notes

- The water depth in the canal was 0.5 to 2m, this varied along the canal length and width.
- The water clarity in the canal was generally good. The canal bed was visible at the deepest section in most areas, but this was sometimes obscured by vegetation (Photograph 3.1).
- Water chemistry was measured during the May 2022 survey. The pH of the water within the canal was 7.95 (temperature 16.5^{0}C) and the conductivity was 2.18 mS/cm.
- The aquatic vegetation was early successional in some areas (particularly upstream of the bridge where there was little aquatic vegetation). The aquatic flora was more developed downstream of the bridge.
- There was no/ little natural shading (e.g. by tree cover) of the canal within the survey section. However, the bridge does shade a small section of the canal and there was lower cover of aquatic vegetation in this area.
- The cover of filamentous algae was occasional to frequent through most of the length of the survey section. However, under and downstream of the bridge the cover of filamentous algae was abundant to dominant (Photograph 3.2 and 3.3).
- Two non-native aquatic plants Canadian Waterweed *Elodea canadensis* and *E. nuttallii Nuttall's Waterweed* were recorded from the canal within the survey area. These were the only aquatic plant present where there was high filamentous algae cover (e.g. Photograph 3.4). *Elodea canadensis* was rare to occasional and *E. nuttallii* was frequent.



Photograph 3.1. Good water clarity downstream of the bridge, within the 400m survey area

Photograph 3.2. High filamentous algae cover adjacent to the bridge

Photograph 3.3. Grapnel throw with only filamentous algae retrieved from canal section immediately downstream of bridge.

Photograph 3.4. Filamentous algae and non-native *Elodea canadensis* from canal section immediately downstream of bridge.

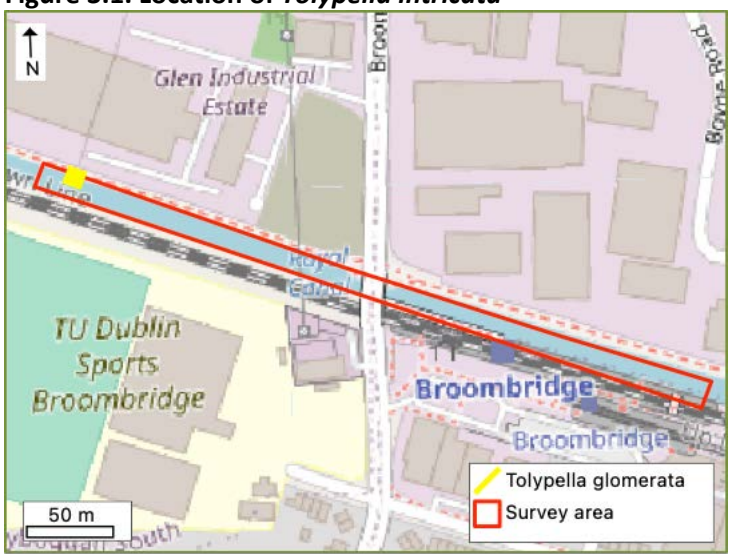
3.1.1 Groenlandia densa

No plants of *Groenlandia densa* were observed within the survey area or downstream section. The water clarity was good and there were areas with early successional vegetation which would be suitable habitat for *Groenlandia densa*. However, it was not recorded during either survey, or from downstream of the 400m survey section.

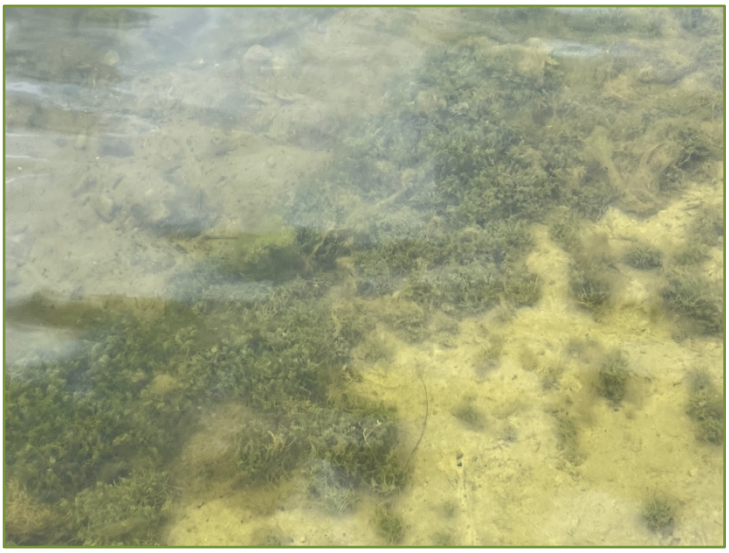
3.1.2 Tolypella intricata

Tolypella intricata was recorded 180m upstream of the bridge (Figure 3.1, Photographs 3.5-3.7). In this area there was shallow water near the edge of the canal of less than 0.5m deep. In the May 2022 survey, there was abundant *Tolypella intricata* within a section of *c.* 10m length and 1m width. Other vegetation cover was low at this time. The plant was still present in the June 2022 survey but there was slightly higher cover of filamentous algae. A small sample was removed and checked microscopically.

Figure 3.1. Location of *Tolypella intricata*



Photograph 3.5. Canal section with *Tolypella intricata*, view upstream (May 2022)



Photograph 3.6. Abundant *Tolypella intricata* in shallow clear water with little aquatic vegetation (May 2022)

Photograph 3.7. *Tolypella intricata*

3.1.3 Other aquatic flora

There was little aquatic flora up and downstream of the bridge. Downstream of the bridge there was high cover of filamentous algae for about 30m (Photograph 3.2), but upstream the water was clearer and shading by the bridge may be reducing the submerged macrophyte flora (Photograph 3.8). The aquatic flora was best developed in the 200m section downstream of the bridge (e.g. Photograph 3.9). Vascular plants and bryophytes recorded from within the canal channel are listed below with an indication of overall abundant within the survey area (D = Dominant, A = Abundant, F = Frequent, O = Occasional, R = Rare):

Elodea canadensis Canadian Waterweed – R to O
Elodea nuttallii Nuttall's Waterweed – F to A
Fontinalis antipyretica Greater Water-moss – O (on stonework at edge of canal)
Glyceria maxima Reed Sweet-grass – A
Hippuris vulgaris Mare's-tail – O to F
Lemna trisulca Ivy-leaved Duckweed - O
Myriophyllum spicatum Spiked Water-milfoil – O
Nuphar lutea Yellow Water-lily – F
Persicaria amphibia Amphibious Bistort - O
Sparganium species (not flowering) Bur-reed – O

Photograph 3.8. Little aquatic vegetation in the canal upstream of the bridge (view downstream)

Photograph 3.9. Aquatic vegetation with *Hippuris vulgaris c.* 30m downstream of the bridge

3.2 Bank vegetation

The vegetation on the northern canal bank supports a strip of wetland vegetation *c.* 1m wide (Photograph 3.10). The species present here are typical of Tall-herb swamps (FS2):

Agrostis stolonifera Creeping Bent
Anthriscus sylvestris Cow Parsley
Arrhenatherum elatius False Oat-grass
Calystegia sepium Hedge Bindweed*
Cardamine pratensis Cuckooflower
Carex remota Remote Sedge
Dactylis glomerata Cock's-foot
Epilobium hirsutum Great Willowherb*
Equisetum arvense Field Horsetail
Festuca rubra Red Fescue
Filipendula ulmaria Meadowsweet*
Iris pseudacorus Yellow Iris*
Juncus inflexus Hard Rush
Myosotis scorpioides Water Forget-me-not*
Oenanthe crocata Hemlock Water-dropwort
Persicaria amphibia Amphibious Bistort*
Plantago lanceolata Ribwort Plantain
Ranunculus acris Meadow Buttercup
Ranunculus repens Creeping Buttercup
Rumex obtusifolius Broad-leaved Dock
Salix cinerea subsp. *oleifolia* Rusty Willow
Smyrnium olusatrum Alexanders
Urtica dioica Common Nettle
Valeriana officinalis Common Valerian*
Vicia sepium Bush Vetch

The species marked with * are indicators of the Annex I habitat '*Hydrophilous tall herb fringe communities of plains and of the montane to alpine levels' (*6430). In order to qualify as this habitat, the vegetation requires ≥3 positive indicator species per 2m x 2m plot (O'Neill et al., 2013). No plots were recorded as this was not the focus of the survey work. However, at least 7 positive indicator species for 6430 were recorded within the survey area and most areas supported ≥3species and cover of positive indicator species was ≥40%. Therefore, it is considered that most of the bankside vegetation within the survey area is an example of this Annex I habitat and disturbance to this vegetation should be avoided/ minimised. In addition, no landscape planting should be undertaken at the edge of the canal (if required).

Photograph 3.10. Tall-herb swamp along the northern bank of the canal (view upstream to bridge)

4 CONCLUSIONS

- The Red Data Book 'Vulnerable' charophyte *Tolypella intricata* was recorded *c.* 180m upstream of the bridge.
- The Flora Protection Order species *Groenlandia densa* was not recorded within the survey area or *c.* 850m downstream of this area.
- The water clarity in the canal was good in most areas but there was high algal cover in the vicinity of the bridge.
- There was a moderate diversity of aquatic plants recorded from the channel of the canal, mostly downstream of the bridge. However aquatic plant cover was low in the vicinity of the bridge, this may be due to nutrient input or shading.
- The canal banks support a diverse strip of wetland vegetation *c.* 1m wide for most of the length of the survey section. This is an example of the Annex I habitat '*Hydrophilous tall herb fringe communities of plains and of the montane to alpine levels' (*6430). Disturbance to this vegetation should be avoided/ minimised and there should be no landscape planting at the edge of the canal.

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SECTION 21 APPLICATION
Groenlandia densa

METHODS STATEMENT

April 2022

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1 BACKGROUND INFORMATION

Dr Joanne Denyer (Denyer Ecology) is applying for a 'Licence to Take or Interfere with Protected Plant Species' under Section 21 of the Wildlife Act in relation to surveys of the aquatic plant: Opposite-leaved Pondweed *Groenlandia densa* within a 400m section of the Royal Canal, Broombridge, Cabra West, Dublin 7.

1.1 Relevant experience

Dr Joanne Denyer is a highly experienced botanist and bryologist with over 20 years' experience of ecological survey and research. She holds a first class honours degree in Environmental Science from Leicester University. She completed a DPhil in Plant Ecology at the University of Sussex and subsequently worked on the impacts of land-use, climate change and grazing on upland plant communities and plant functional traits at the Macaulay Institute in Aberdeen (now James Hutton Institute). She is a full member of the Chartered Institute of Ecology and Environmental Management (IEEM). Skills from her academic and research background include a high standard in experimental design, report writing, data collation, literature review and data analysis. Dr Denyer has published in high-ranking international peer-reviewed journals and presented data at over ten international conferences. She is a Guest Lecturer at University College Dublin (UCD) and Trinity College Dublin (TCD).

Joanne Denyer has considerable experience of macrophyte identification and ecology in Ireland and the UK. She has knowledge of all groups of aquatic macrophytes, including difficult groups such as *Potamogeton*, *Ranunculus*, bryophytes and charophytes. She has undertaken macrophyte surveys on a range of waterbody types and is experienced in survey techniques such as boat survey, grapnel survey, wading, and snorkel diving. She has undertaken monitoring and condition assessment of aquatic macrophytes in streams, ditches, lakes and reservoirs and has conducted research into macrophyte regeneration and ecology.

1.2 Project

The aquatic plant survey will be undertaken to assess the potential impacts of a proposed new bridge over the Royal Canal at Broombridge, Dublin. There are no instream works proposed as part of the bridge construction. The aim of the 2022 aquatic plant survey is to assess whether this canal section supports/ has the potential to support the rare/ protected aquatic plant species Opposite-leaved Pondweed *Groenlandia densa* and Tassel Stonewort *Tolypella intricata*. *Groenlandia densa* is protected under the Flora (Protection) Order, 2015 and is listed as 'Near Threatened' on the Irish Vascular Plant Red List (Wyse Jackson et al., 2016). *Tolypella intricata* is listed as 'Vulnerable' on the Irish Stonewort Red List (Stewart & Church, 1992; Nelson et al., 2019).

1.3 Disturbance to protected aquatic plant species

Aquatic macrophyte survey (unless by snorkelling in clear water) generally requires material to be obtained using a grapnel (from the river bank or a boat). This can cause some disturbance to aquatic macrophyte populations. This is minimal and most aquatic macrophytes are able to withstand such disturbance and quickly regenerate, as this disturbance is typical in river systems. As the aquatic plant *Groenlandia densa* has the potential to be present in this location, a Section 21 licence is being applied for before any aquatic plant surveys are undertaken.

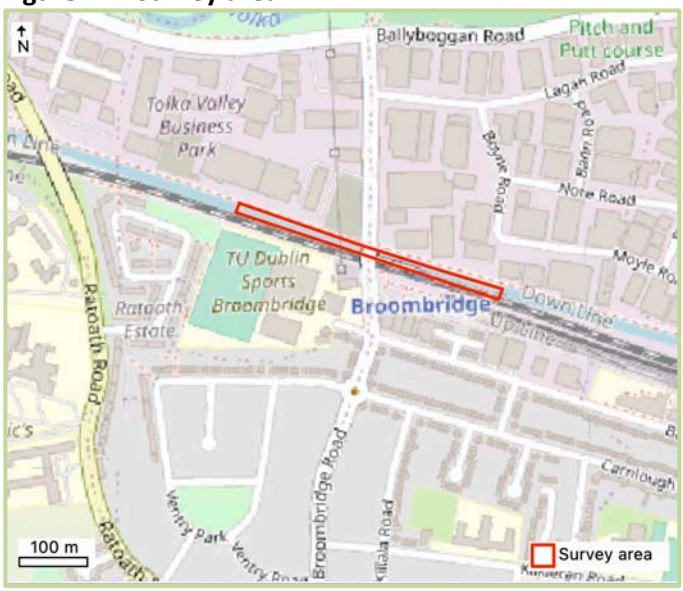
1.4 Groenlandia densa

The species that is the subject of this licence application is the aquatic plant *Groenlandia densa*. This species is protected by Section 21 of the Wildlife Act (1976) and is listed on the Flora (Protection) Order (2015). *Groenlandia densa* is listed as 'Near Threatened' on the Irish Vascular Plant Red List (Wyse Jackson et al., 2016).

1.5 Project survey area

The aquatic plant survey area comprises 200m of canal up and downstream of the existing bridge in this location (Figure 1.1).

Figure 1.1. Survey area



2 METHODOLOGY

2.1 Survey site

As outlined in Section 1.5, the project survey area comprises a 400m section of the Royal Canal at Broombridge, Dublin (Figure 1.1).

2.2 Survey method

The 400m section of the canal (Figure 1.1) will be walked from the riverbank. Aquatic plant samples will be taken using grapnel where there are visible populations of aquatic plants present (unless these can be identified without removing plant material). If water clarity is low at the time of survey then grapnel sampling will be undertaken at 25m intervals to assess if aquatic plants are present but not visible from the water surface.

All species of aquatic macrophytes present (submerged and floating) will be recorded and their abundance (percentage cover) estimated.
The following habitat information will be recorded (based on JNCC, 2005):

- Water depth (approximate)
- Water clarity (using three-point scale in JNCC, 2005)
- pH and Conductivity (if water accessible)
- Successional stage of vegetation
- Shading (using three-point scale in JNCC, 2005)
- Total macro-algal cover (filamentous species and Enteromorpha) (using DAFOR scale)
- Total cover of any non-native aquatic plant species

The aquatic plant survey will be undertaken in early to mid-June 2022. However, the Section 21 licence is requested from 1st June to 31st July 2022, in case any repeat surveys are required.

Where possible, all taxa (excluding macroalgae) will be identified to species level. For some species, identification to species level requires particular features, such as fruits or flowers, to be present. If these are absent then it may not be possible to identify to species level, or a repeat survey visit may be required.

2.3 Identification and nomenclature

Vascular plant nomenclature will follow that of the *New Flora of the British Isles*. 4th Edition (Stace, 2019). The bryophyte nomenclature adopted by Blockeel et al. (2021) will be used.

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