GORTLOUGHRA WIND FARM
FISH POPULATION ASSESSMENT



Version: 12th December 2023

ecofact
Environmental Consultants

Tait Business Centre, Dominic Street,
Limerick City, Ireland.

t. +353 61 419477, f. +353 61 414315

e. info@ecofact.ie
w. www.ecofact.ie

TABLE OF CONTENTS

1. INTRODUCTION

This report provides a baseline description of the fish populations in the watercourses draining the proposed Gortloughra wind farm site. The general location and layout of the proposed wind farm in relation to local watercourses is shown in Figures 1-3.

The fish populations were assessed with a fish habitat survey and electrofishing survey completed during September 2022. A total of 10 sites were selected for the survey work and assessments. This survey was completed under authorisation from the Department of Communication, Energy and Natural Resources under Section 14 of the Fisheries Act (1980). The location of the aquatic sampling survey sites is indicated in Figures 2.

1.1 Legislative Context

A diversity of flora and fauna, rare at a national level, are protected under the provisions of the Wildlife Act, 1976 and Wildlife (Amendment) Act, 2000, which includes the Flora Protection Order (1999). The Habitats Directive 1992 has been transposed into Irish legislation as the European Union (Natural Habitats) Regulations SI 94/1997 and amended in 1998 and 2005. The Habitat Regulations have been updated in 2011 as the European Communities (Birds and Natural Habitats) Regulations (2011) to bring the Irish transposition of these regulations into line with the requirements of the EU Habitats Directive (1992).

Under the Fisheries (Consolidation) Act, 1959, it is an offence to disturb the bed of a river; therefore, it will be necessary to get written permission from Inland Fisheries Ireland to proceed with the works in any areas where disturbance to the spawning and nursery areas of both salmonids and lampreys will occur as a result of the proposed development. Salmon, all lamprey species and their habitats are further protected under the EU Habitats Directive, 1992.

Under Section 3 of the Local Government (Water Pollution) Act, 1977 (as amended by Sections 3 and 24 of the 1990 Act) it is an offence to cause or permit any polluting matter to enter waters. Suspended solids would be a key parameter here. Likewise, any visual evidence of oil/fuel in the river would constitute an offence.

Section 171 of the Fisheries (Consolidation) Act 1959 creates the offence of throwing, emptying, permitting or causing to fall onto any waters deleterious matter. Deleterious matter is defined as not only as any substance that is liable to injure fish but is also liable to damage their spawning grounds or the food of any fish or to injure fish in their value as human food or to impair the usefulness of the bed and soil of any waters as spawning grounds or other capacity to produce the food of fish.

2. METHODOLOGY

2.1 Selection of Watercourses for Assessment

All watercourses / water bodies which could be affected directly (i.e. within the site) or indirectly (i.e. drain areas close to the site) were considered as part of the current appraisal. Generally only streams and other watercourses shown on the EPA online maps were examined, as watercourses smaller than this are not normally of fisheries or aquatic ecological significance. A total of 10 sites were selected for the habitat and electrofishing surveys. The location and watercourses are shown in Figures 1-2. The location of these sites is given in Table 1 and Figure 3.

The surveys completed at each site were at a level required to make an evaluation of the importance of the site for fish. The surveys included fish habitat assessments and electrofishing surveys.

2.2 Habitat Surveys

Fish habitat was evaluated with reference the Department of Agriculture for Northern Irelands Fisheries Division document, the '*Evaluation of habitat for Salmon and Trout'* (DANI, 1995) and the English Nature manual '*Ecology of the River Brook and Sea Lamprey'* by Maitland (2013). When considering the aquatic habitats at each site regard was also given to the information contained in the Environment Agency's "*River Habitat Survey in Britain and Ireland Field Survey Guidance Manual 2003*" (EA, 2003) and "*A Guide to Habitats in Ireland*" (Fossitt, 2000).

2.3 Electrical Fishing Survey

Aquatic surveys were carried out at all of the survey sites in September 2022. Each site was assessed for potential salmon and lamprey habitat. An electrical fishing survey was undertaken during September 2022. This was completed under authorisation from the Department of Communication, Energy and Natural Resources under Section 14 of the Fisheries Act (1980). The survey had regard to the CFB (2008) guidance and Matson *et al* (2018).

A portable electrical fishing unit (Smith Root-LR 24 backpack) was used during the assessments. Fishing was carried out continuously for 10 minutes at each of the sites. Captured fish were collected into a container of river water using dip nets. On completion of the survey fish were then anaesthetised using a solution of 2-phenoxyethanol, identified, and measured to the nearest mm using a measuring board. Subsequent to this the fish were allowed to recover in a container of river water and were the released alive and spread evenly over the sampling area. No mortalities were recorded.

Juvenile lamprey surveys generally followed the methodology for ammocoete surveys given in the manual 'Monitoring the River, Brook and Sea Lamprey, *Lampetra fluviatilis*, *L. planeri* and *Petromyzon marinus* by Harvey & Cowx (2003). Electrical fishing for juvenile lampreys was carried out at three $1m^2$ habitat patches where habitat was available.

Table 1 Location of the aquatic ecology sites assessed for the proposed Gortaloughra wind farm site.

Site No.	Catchment	Sub-catchment	Watercourse Name	Watercourse Order	Segment Code	EPA Code
1	Dunmanus-Bantry-Kenmare	Coomhola_SC_010	Inchiroe	3rd	21_2504	21I15
2	Dunmanus-Bantry-Kenmare	Coomhola_SC_010	Inchiroe	1st	21_1040	21I15
3	Bandon-Ilen	Bandon_SC_010	Shehy Beg	3rd	20_908	20S15
4	Bandon-Ilen	Bandon_SC_010	Shehy Beg	2nd	20_396	20S15
5	Bandon-Ilen	Bandon_SC_010	Unnamed	1st	20_392	-
6	Bandon-Ilen	Bandon_SC_010	Shehy Beg	1st	20_399	20S15
7	Bandon-Ilen	Bandon_SC_010	Shanacrane East	3rd	20_2115	20S11
8	Bandon-Ilen	Bandon_SC_010	Shanacrane East	3rd	20_1022	20S11
9	Bandon-Ilen	Bandon_SC_010	Glanycarney	2nd	20_405	20G19
10	Bandon-Ilen	Bandon_SC_010	Shanacrane East	3rd	20_1170	20S11

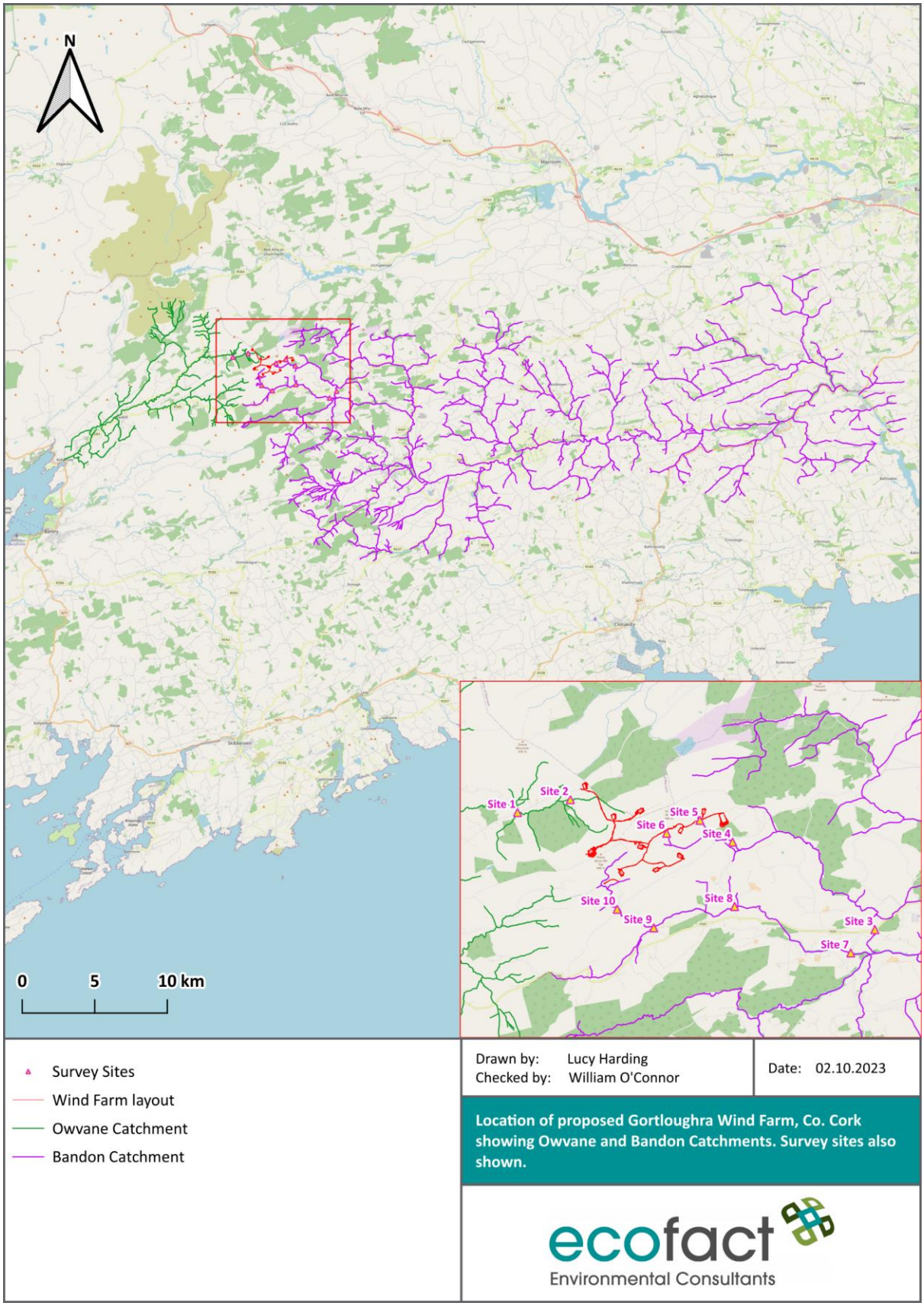

Figure 1 Location of the aquatic study area for the proposed Gortloughra wind farm.

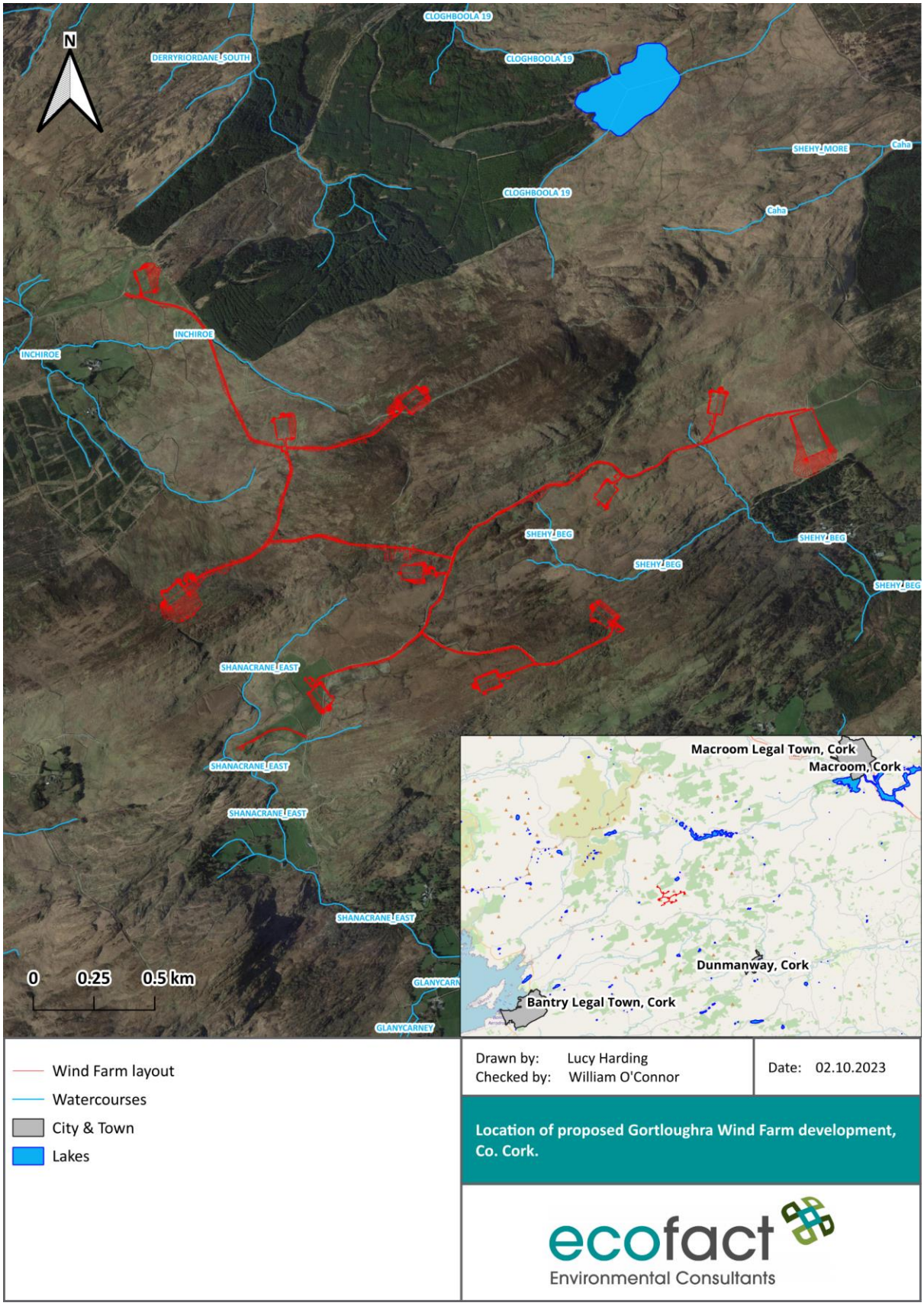

Figure 2 Location of the proposed Gortloughra wind farm in Co Cork.

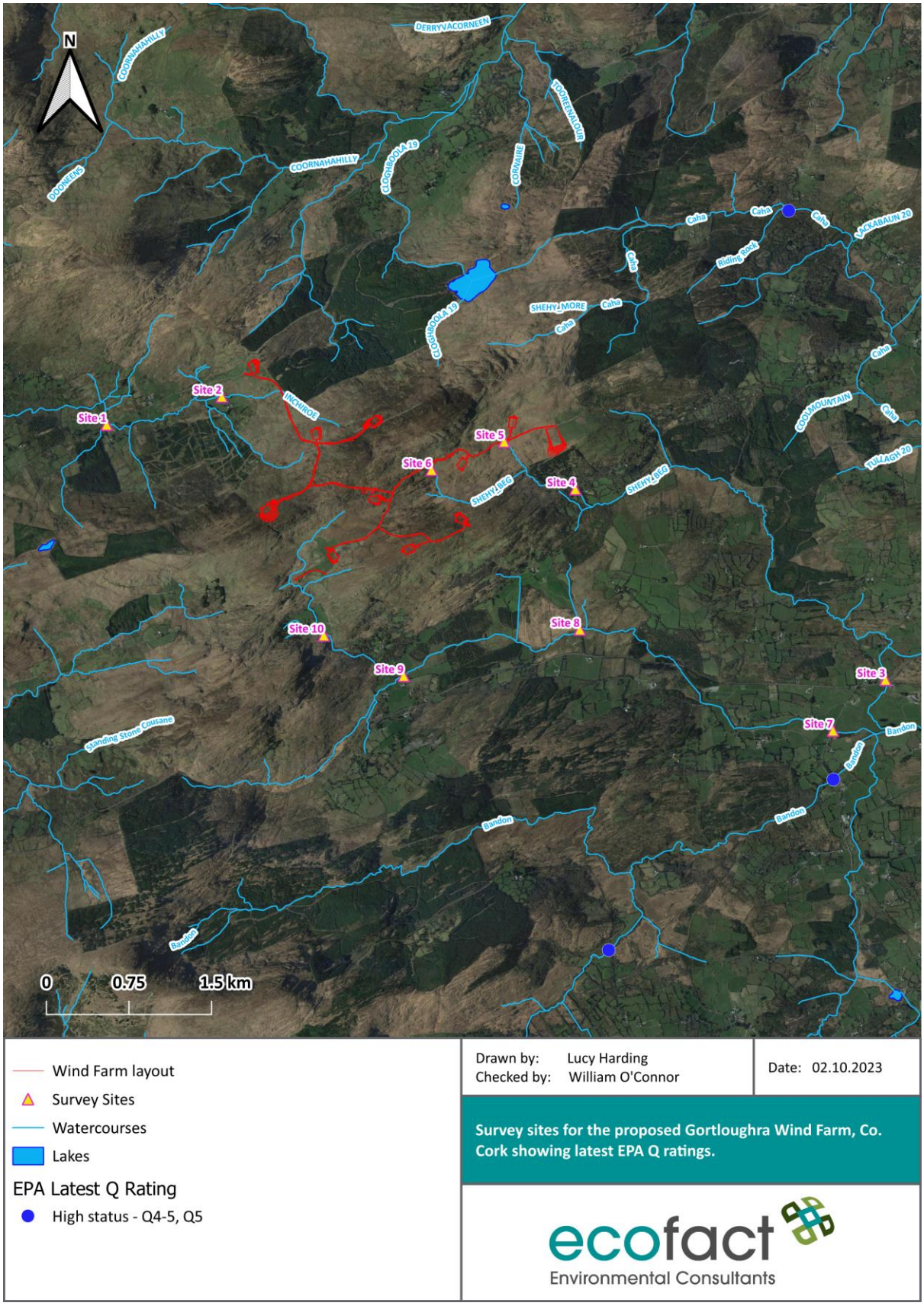

Figure 3 Location of September 2022 survey sites for the proposed Gortloughra wind farm.

3. RECEIVING ENVIRONMENT

3.1 Desk study

The proposed Gortaloughra wind farm site is located within two catchment areas: the Owvane River catchment (Dunmanus-Bantry-Kenmare) and the River Bandon (Bandon-Ilen) catchment. The proposed wind farm site is located c. 3.7km north-west of Shanacrane Cross town in Co. Cork. Figure 1 shows the location of the proposed wind farm site in relation to the two catchments.

The R585 road is located to the south, and there are some smaller unnamed access roads through the site itself. The site is located within an upland area, with some commercial forestry plantations also present. The site is situated between the Shehy More mountain summit and the south-west summit. Douce Mountain is located to the north-west.

The north-western side of the proposed wind farm site is within the Dunmanus-Bantry-Kenmare catchment, including Turbines T1 and T2, eventually draining to the Inchiroe River. The rest of the proposed wind farms site to the south and east, including Turbines T3-T9, are within the Bandon-Ilen catchment, with the two main watercourses being the Shehy Beg and the Shanacrane East. There are no lakes within the site.

The Inchiroe stream (EPA Code: 21I15) rises on the western side of Shehy More, c. 260m from Turbine T2, flowing west. The watercourse continues for c. 600m until it reaches the proposed access route from the north-west. Approximately c. 750m downstream, it is joined by an unnamed 1st order stream (EPA Segment Code: 21_655) which rises also within the proposed wind farm site. This stream rises just c. 170m south of the proposed Turbine T1 location. This stream is also joined by a 2nd order stream, which has a 1st order stream also along its length (EPA Segment Codes: 21-2953; 21_5331) before flowing into the Inchiroe stream. The Inchiroe Stream continues in a westerly direction for c. 3.6rkm, joined by some smaller tributaries within this stretch, before joining the 3rd order River Owvane [Cork] (EPA Code: 21O07). The River Owvane continues south-west after this for c. 6.1rkm, until it is joined by the 4th order Owengar [Cork] River (EPA Code: 21O04) upstream of Kealkill. The river continues through Kealkill, after which it is joined by the 3rd order River Owenbeg [Owvane, Cork] (EPA Code: 21O03). The River Owvane then flows for a further c. 4km before flowing into the sea at Ballylicky town in Bantry Bay.

The other side of the proposed wind farm site, within the Bandon-Ilen catchment, is also located where some smaller watercourses rise due to its upland location. Just c. 300m north of the proposed Turbine T7 location, the Shanacrane_East stream rises (EPA Code: 20S11) on the Shehy More south-west top summit. This stream flows west and then south where it is joined by two small 1st order streams (EPA Segment Codes: 20_407; 20_1269), the latter of which rises just south of Turbine T7. After this it continues south for another c. 430m before being joined by an unnamed 2nd order stream (EPA Segment Code: 20_410), which is just c. 320m in length but is joined by a smaller 1st order unnamed stream on its way (EPA Segment Code: 20_412). After this the Shanacrane east stream flows in a south-easterly direction for c. 1km before it is joined by the 2nd order Glanycarney stream (EPA Code: 20G19). It then flows for another c. 5rkm before entering the 3rd order Bandon River (EPA Code: 20B02).

The rest of the wind farm site is also drained by smaller streams, with the Shehy Beg stream (EPA Code: 20S15) rising in Shehy more mountain just c. 200m north of Turbine T4's proposed location. It is joined by a 1st order stream (EPA Segment Code: 20_398) just c. 150m in length, which also rises just c. 50m south of Turbine T4's location. The Shehy Beg stream continues east for c. 860m before being joined by an unnamed 1st order stream (EPA Segment Code: 20_392) which rises just c. 150m east of

the proposed Turbine T5's location. The Shehy Beg then continues south-east for c. 5.8rkm before joining the Bandon River, immediately downstream of the Shanacrane East confluence. The Bandon River flows east for c. 4km before it reaches the boundary of the designated Bandon River SAC. The Bandon River then continues for c. 40rkm, through Bandon town, to where it turns tidal at Innishannon. After this it flows into the sea at Kinsale harbour.

The proposed farm site is located c. 7.6km north-west of the Bandon River SAC. The location of the proposed wind farm site in relation to the River Bandon SAC is indicated in Figure 4. The Bandon River Special Areas of Conservation (SAC) consists of relatively short adjoining stretches of the Bandon and Caha Rivers near Dunmanway, Co. Cork. The site is a Special Area of Conservation (SAC) selected for the following habitats and/or species listed on Annex I / II of the E.U. Habitats Directive

- [3260] Floating River Vegetation [91E0]
- Alluvial Forests [1029]
- Freshwater Pearl Mussel (*Margaritifera margaritifera*) [1096]
- Brook Lamprey (*Lampetra planeri*)

The Environmental Protection Agency (EPA) assess water quality in the Dunmanus-Bantry-Kenmare catchment as part of the National Water Quality Monitoring Programme. The EPA's most recent biological assessment of the Owvane River is as follows: *'Continuing satisfactory with High ecological quality at both sites.* The Owvane [Cork] River has been assigned Q4-5 for a number of years. For the EPA's biological monitoring of the Bandon river, the most recent assessment (2020) is as follows: *'Largely satisfactory with seven out of the nine sites surveyed at Good or High ecological quality.'*

3.2 Field Survey Results

3.2.1 Site 1

Site 1 was on the Inchiroe Stream (EPA Code: 21I15) within the River Owvane catchment (Dunmanus-Bantry-Kenmare catchment). This site was located at Gortaloughra Bridge on the L8544 road north-west of the proposed wind farm site. An unnamed 1st order stream (EPA Segment Code: 21_5334) joins just upstream of the bridge.

The is a moderate gradient stream with a rock and boulder substrate. It has been modified in the past – it may have been lowered and there is bank armoring upstream of the bridge. It was clean with no signs of elevated siltation or excessive algae growth. Water levels were low/normal at the time of the survey. The habitats here were considered ideal for juvenile salmonids with both spawning and nursery habitats recorded. There was no suitable nursery habitat present for juvenile lampreys. The site was fished for 10 minutes and a total of n=16 Brown Trout were captured, ranging from young-of-the-year to larger adult trout. The fish leech (*Piscicola geometra*) was noted on some of the trout. No salmon were recorded, and it is understood that a series of falls in the middle reaches of the Owvane River prevent access of migratory salmonids to this part of the catchment. This stream provides an important spawning and nursery habitat for trout. No other fish species was recorded during the survey. There are records of Freshwater Pearl Mussels in the River Owvane.

3.2.2 Site 2

Site 2 was also located on the Inchiroe Stream (EPA Code: 21I15), approximately 1.2km upstream of Site 1. This site was located c. 540m from the proposed wind farm site boundary, at the proposed

access road to the north-western extent. The Inchiroe Stream is a 1st order watercourse at this point, only c. 1km downstream of where this stream rises within the proposed wind farm site.
This stream is much smaller at this point and is a high gradient channel with a rock and boulder substrate. Potential salmonid spawning and nursery habitats were present, but the stream is very small here. The site was fished for 10 minutes, and small numbers of small Brown Trout were recorded, confirming the use of this stream as a salmonid spawning and nursery habitat. No other fish species was recorded during the survey. There was no suitable nursery habitat present for juvenile lampreys. Water levels were low/normal at the time of the survey. This stream was considered to be clean with no water quality issues recorded.

Even though this stream is small and has a nominal trout population at this site, it is rated as being a high value salmonid channel as important salmonid habitats are located downstream. It is also noted that there are records of Freshwater Pearl Mussels in the downstream main channel of the River Owvane.

3.2.3 Site 3

Site 3 was located on the Shehy Beg Stream (EPA Code: 20S15) within the River Bandon catchment. This site was located at Togher bridge on the R585 road, which is located approximately 600m upstream of where this watercourse flows into the River Bandon (EPA Code: 20B02). This site has been modified in the past and the banks were high. The substrate was dominated by gravel and cobbles. The habitats here were considered suitable for juvenile salmonids with potential spawning and nursery habitats recorded. There were some areas of potentially suitable juvenile lamprey habitat present also. There was some siltation at this site. Water levels were low/normal at the time of the survey.

The site was fished for 10 minutes, and Atlantic salmon, Brown Trout, and Minnows were recorded. This stream provides important salmonid spawning and nursery habitat. The fact that both salmon and trout were recorded is significant. There are records of Freshwater Pearl Mussels in the River Bandon further downstream.

3.2.4 Site 4

Site 4 was located within the Bandon-Ilen catchment on the Shehy Beg stream (EPA Code: 20S15), approximately 4.7km upstream of Site 3. This site was located c. 500m from the proposed wind farm site boundary. The Shehy beg stream is a 2nd order watercourse at this point, and the survey area was located downstream of a bridge on the L8546 road. This site is located at the base of Shehy More mountain.

This is a very high gradient stream with a rock and boulder substrate. No water quality issues were apparent. There is a waterfall at the top of the section that is likely to be impassable for salmonids. Water levels were low/normal at the time of the survey. The stream was fished for 10 minutes and small numbers of Brown trout were recorded. No other fish species was recorded during the survey, and salmon were absent. There are also very high gradient stretches between Sites 3 and 4 that are likely to affect access for migratory salmonids. This stream provides important salmonid spawning and nursery habitat and is becomes more important downstream of this point.

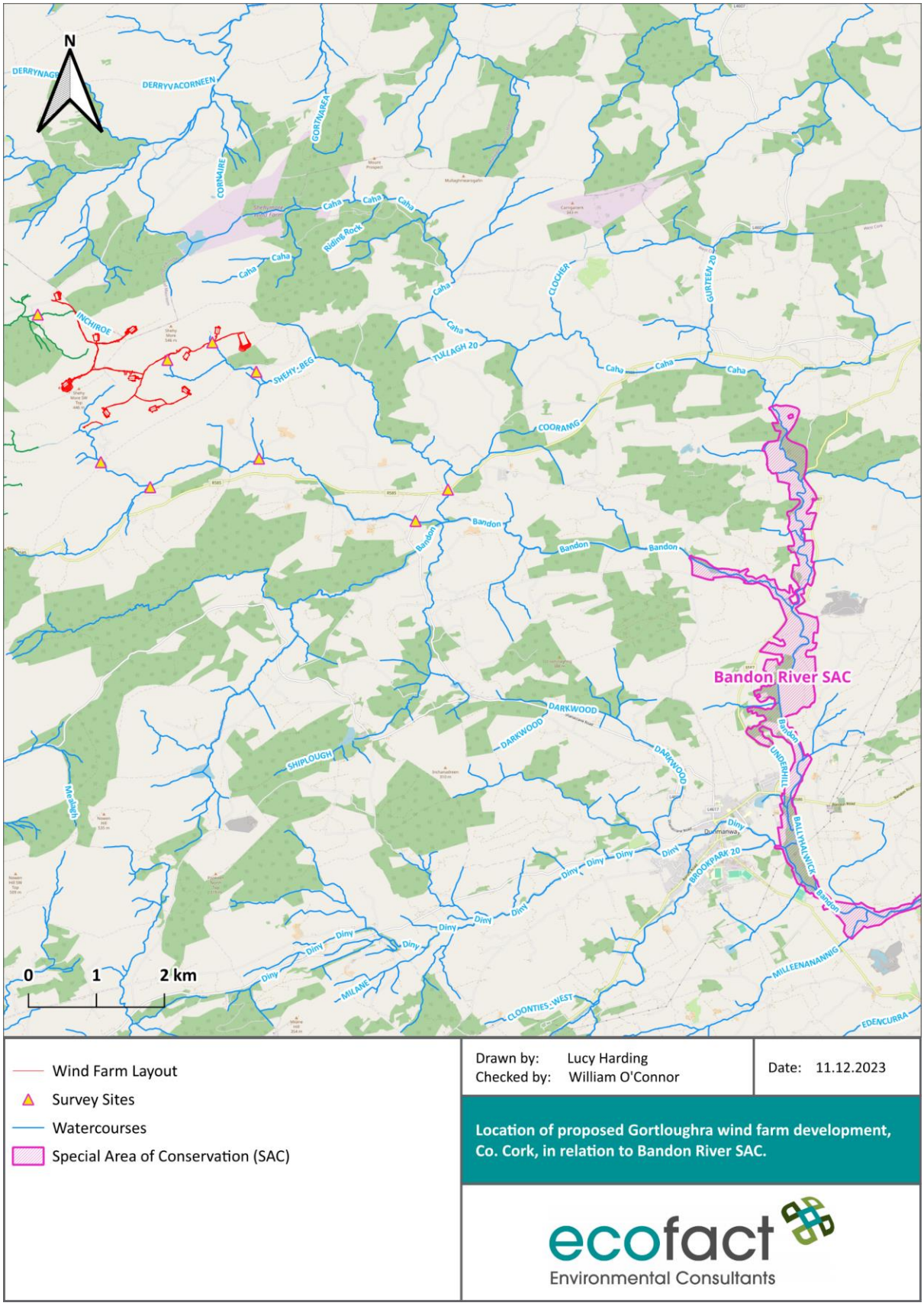

Figure 4 Location of the proposed wind farm site in relation to the River Bandon SAC.

3.2.5 Site 5

Site 5 was situated further upstream in the Shehy Beg stream sub-catchment, on an unnamed 1st order stream (EPA Segment Code: 20_392). Site 5 is located c. 330m upstream of where this stream flows into the Shehy Beg (EPA Code: 20S15). This site was located along a proposed access road for the wind farm site. This site is located c. 230m south of the proposed location for Turbine T5. This stream is c. 430m in total length.

This is a very small and very high gradient stream. There is a small hydroelectric scheme and a series of waterfalls downstream of here. This area is therefore inaccessible for fish - and no fish are present. The Shehy Beg Stream does have important salmonid spawning and nursery habitats but these occur at Site 4 and downstream from that point. Upstream of the hydroelectric scheme and waterfalls in this area the watercourses are not of fisheries importance. However, as noted previously small streams influence the water quality of channels further downstream. The lower reaches of the Shehy Beg stream have both salmon and trout populations present.

3.2.6 Site 6

Site 6 was located where the Shehy Beg Stream (EPA Code: 20S15) rises within the proposed wind farm site. The survey site is located c. 190m from the proposed location of Turbine T4. At this survey site, the Shehy beg is a tiny 1st order watercourse, rising on the slopes of Shehy More Mountain.

This is also a very small and very high gradient stream. There is a small hydroelectric scheme and a series of waterfalls downstream of here. This area is therefore inaccessible for fish - and no fish are present. The Shehy Beg Stream does have important salmonid spawning and nursery habitats but these occur at Site 4 and downstream from here.

3.2.7 Site 7

Site 7 was located in the River Bandon catchment, on the Shanacrane East stream (EPA Code: 20S11). This survey site is located upstream of a bridge on the L4609 road. The Shanacrane east stream is a 3rd order watercourse at this point. This site is located just c. 400m upstream of where the Shanacrane East river flows into the River Bandon, just upstream of the confluence with the Shehy beg stream.

The is a moderate gradient stream with a substrate dominated by gravel. There was some siltation; and algae growths were also present. There was evidence of previous modifications in the past (possible channelisation). Water levels were low/normal at the time of the survey. The site was fished for the standard 10 minutes. Water levels were low/normal at the time of the survey.

Reasonable numbers of juvenile Atlantic salmon were recorded. At least three age groups of Brown trout were also intercepted. Significant numbers of non-native Minnow were also recorded. Three-spined sticklebacks were also present. There were areas of potential juvenile lamprey habitats at the site. However, lampreys were not recorded during the survey. This stream provides important spawning and nursery habitat for both salmon and trout.

3.2.8 Site 8

Site 8 was also located on the Shanacrane East stream (EPA Code: 20S11) within the Bandon-Ilen catchment. This site was situated upstream of a bridge on the L8546 road, immediately upstream of the confluences with two small 1st order streams (Derragh 20 stream (EPA Code: 20D46) and an unnamed stream (EPA Segment Code: 20_403)). This site is located c. 1km south-east of the proposed wind farm site.

The is a moderate gradient stream with a substrate dominated by gravel and cobbles. There were no indications of water quality issues at this site. Water levels were low/normal at the time of the survey. The habitat at this site was much better than at Site 7. The site was fished for the standard 10 minutes and very good numbers of juvenile Atlantic salmon and Brown Trout were recorded. Minnows and Three-spined sticklebacks were also present. There were areas of potential juvenile lamprey habitats, but no lampreys were recorded. This stream is a very high value spawning and nursery habitat for both salmon and trout.

The fish leech (*Piscicola geometra*) was frequent on the salmonids at this site. Some of the trout had several leeches present. This leech is not considered harmful and is an indicator of good salmonid stocks.

3.2.9 Site 9

Site 9 is located on the Glanycarney stream (20G19) which is part of the Shanacrane East stream which drains the proposed wind farm site. This is a 2nd order watercourse at this point. The surveyed area was located just downstream of a bridge over an unnamed access road at the base of the Shehy mountains. This site is c. 900m south of the proposed wind farm site.

The is a moderate gradient stream with a substrate dominated by gravel. The channel was overgrown in parts which affected access. It was clean with no signs of elevated siltation or excessive algae growth. The site was fished for 10 minutes. Water levels were low/normal at the time of the survey. Both juvenile Atlantic salmon and brown trout were recorded in good numbers. Minnows were also present at this site. There were areas of potential juvenile lamprey habitats present. However, lampreys were not recorded during the survey. This stream provides important spawning and nursery habitat for both salmon and trout.

3.2.10 Site 10

Survey site 10 is located on the Shanacrane East stream which drains the proposed wind farm site, within the Bandon-Ilen catchment on the southern side. This survey site is located at a bridge on an unnamed road. The site is situated c. 600m south of the proposed wind farm site, south of Shehy More south-west summit. Despite it being a 3rd order watercourse at this site, this stretch is located only approximately 1.5km downstream of where this stream rises, near the proposed location of Turbine T7.

This is a high gradient stream with a rock and boulder substrate. There is a waterfall at the top of the section that is likely to be impassable for salmonids. Water levels were low/normal at the time of the survey. The stream was fishing for 10 minutes and small numbers of Brown trout were recorded. No other fish species was recorded during the survey. This stream provides salmonid spawning and nursery habitat, and there are very important salmonid habitats located downstream of this area.

Table 2 Results of the 10 site electrofishing fishing surveys completed during September 2022.

Site No.	Watercourse Name	Time fished	Trout	Salmon	Other fish species	Overall evaluation
1	Inchiroe	10	16	0	None	Important salmonid spawning and nursery habitat.
2	Inchiroe	10	3	0	None	Marginal salmonid spawning and nursery channel.
3	Shehy Beg	10	6	4	Minnows Three-spined stickleback	Important salmonid spawning and nursery channel
4	Shehy Beg	10	7	0	None	Important salmonid spawning and nursery channel
5	Unnamed	n/a	0	0	None	This area is not used by fish, but important habitats are present downstream.
6	Shehy Beg	n/a	0	0	None	This area is not used by fish, but important habitats are present downstream.
7	Shanacrane East	10	5	12	Minnow Three-spined stickleback	Important salmonid spawning and nursery channel
8	Shanacrane East	10	11	22	Minnow Three-spined stickleback	Important salmonid spawning and nursery channel
9	Glanycarney	10	7	10	Minnow	Important salmonid spawning and nursery channel
10	Shanacrane East	10	8	0	None	Important salmonid spawning and nursery channel

Table 3 Results of the 10 site juvenile lamprey surveys completed during September 2022.

Site No.	Watercourse Name	Potential lamprey habitats present (Y/N)	Area fished (M2)	Results	Other fish species	Overall evaluation
1	Inchiroe	No	No habitat	n/a	trout	Lampreys absent
2	Inchiroe	No	No habitat	n/a	Trout	Lampreys absent
3	Shehy Beg	Yes	$3m^2$	Lampreys absent	Salmon, trout, and minnow	Lampreys absent despite present of potential habitat
4	Shehy Beg	No	No habitat	n/a	Trout	Lampreys absent
5	Unnamed	No	No habitat	n/a	n/a	Lampreys absent
6	Shehy Beg	No	No habitat	n/a	n/a	Lampreys absent
7	Shanacrane East	Yes	$3m^2$	Lampreys absent	Salmon and trout	Lampreys absent despite present of potential habitat
8	Shanacrane East	Yes	$3m^2$	Lampreys absent	Salmon and trout	Lampreys absent despite present of potential habitat
9	Glanycarney	Yes	$3m^2$	Lampreys absent	Salmon and trout	Lampreys absent despite present of potential habitat
10	Shanacrane East	No	No habitat	n/a	n/a	Lampreys absent

4. SUMMARY AND CONCLUSIONS

This report outlines the findings of a baseline fish population survey and assessment of the watercourses draining the proposed Gortloughra Wind Farm site. The assessment included a desk study and fish habitat / electrofishing fishing survey. This study provides a baseline description and evaluation of all the watercourses draining the proposed wind farm site. The current survey was undertaken during September 2022. A total of 10 sites were surveyed and the fish populations present were described and evaluated. The conditions for the electrofishing surveys were ideal; water levels at all of the sites were considered to be low/normal and the survey was undertaken at the optimal time of year.

A total of four fish species were recorded during the survey. These were Atlantic salmon, Brown Trout, Minnow, and Three-spined sticklebacks. No lampreys were recorded at any of the sites surveyed. However, lampreys are known to be present in other parts of the River Bandon catchment.

The proposed wind farm site drains into important salmonid catchments with salmonid spawning and nursery areas present downstream of the site boundary. The watercourses on the actual site are very small and are not significant fisheries channels. The northwestern side of the proposed wind farm site is drained by the Inchiroe stream, which is part of the upper River Owvane catchment, which flows into Bantry Bay. The rest of the proposed wind farm site is drained by the upper reaches of the Shehy Beg stream and Shanacrane East stream sub-catchments which drain into the River Bandon. The Inchiroe stream is a tiny high gradient first order stream within the proposed wind farm boundary. However, important spawning and nursery habitats for trout are located further downstream from the proposed wind farm site boundary.

There is a small hydroelectric scheme and a series of waterfalls on the Shehy Beg stream downstream of the wind farm site. The Shanacrane east stream and an unnamed stream are the upper tributaries of this catchment and are tiny high gradient first order streams on the proposed wind farm site, with no fisheries potential. However, the lower reaches of the Shehy Beg stream do have important salmonid spawning and nursery habitats present, and both Atlantic salmon and trout were recorded here during the current survey. The Shanacrane east stream also has both salmon and trout present – however, these populations are located in the lower reaches of this catchment (where it is called the Glanycarney Stream, is really the upper River Bandon main channel). There are no important fisheries channels on the actual wind farm site. This is due to the small size of the streams, high gradient, and the presence of natural fish migration barriers (i.e. waterfalls and cascades). Water quality impacts on the proposed wind farm site could of course be conveyed downstream into significant fish habitats in the absence of mitigation.

Overall, the watercourses drained by the proposed wind farm site are all important salmonid watercourses. However, the important fish habitats are located downstream of the proposed wind farm site boundary and will need to be carefully protected during the construction and operation of the proposed wind farm site. The streams near the wind farm site boundary are small but significant salmonid populations were present in the Inchiroe stream, Shehy Beg stream, and Shanacrane East.

Small streams play a crucial, yet frequently underestimated, role in river catchment ecosystems. They not only contribute to salmonid populations but also fundamentally influence the water quality of larger channels, as the condition of water in these smaller tributaries directly affects the overall system. Furthermore, these streams are particularly sensitive to environmental impacts, such as contaminated runoff, which underscores their importance. Streams that support salmonid spawning, especially those feeding into larger salmonid habitats, are of particular ecological importance and must be valued

accordingly. These sensitivities will need to be fully considered in the impact assessment and development of water quality protection measures for the proposed wind farm.

It is also noted that there are records of Freshwater Pearl Mussels in the downstream main channels of both the River Owvane and River Bandon. The Bandon River SAC is also in the receiving environment of the proposed wind farm site.

REFERENCES

DANI (1995) *Evaluation of habitat for Salmon and Trout.* Fisheries Division of the Department of Agriculture for Northern Ireland.

Environment Agency (2003). *River Habitat Survey in Britain and Ireland Field Survey Guidance Manual: 2003 Version*' published by the Environment Agency, United Kingdom.

Fossitt, J.A. (2000) A Guide to Habitats in Ireland. The Heritage Council, Kilkenny.

EPA (2018a). Dunmanus-Bantry-Kenmare Catchment Assessment 2010-2015 (HA 21). Catchment Science & Management Unit. Environmental Protection Agency. Version No. 3. https://www.catchments.ie/wp-content/files/catchmentassessments/21%20Dunmanus-Bantry-Kenmare%20Catchment%20Summary%20WFD%20Cycle%202.pdf

EPA (2018b). Bandon Ilen Catchment Assessment 2010-2015 (HA 20). Catchment Science & Management Unit. Environmental Protection Agency. December 2018. Version no. 3. https://catchments.ie/wp-content/files/catchmentassessments/20%20Bandon-Ilen%20Catchment%20Summary%20WFD%20Cycle%202.pdf

EPA (2021a). 3rd Cycle Draft Dunmanus-Bantry-Kenmare Catchment Report (HA 21). Catchment Science & Management Unit. August 2021. Environmental Protection Agency. Version No. 1. https://catchments.ie/wp-content/files/catchmentassessments/21%20Dunmanus-Bantry-Kenmare%20Catchment%20Summary%20WFD%20Cycle%203.pdf

EPA (2021b). 3rd Cycle Draft Bandon Ilen Catchment Report (HA 20). Catchment Science & Management Unit. August 2021. Environmental Protection Agency. Version No. 1. https://catchments.ie/wp-content/files/catchmentassessments/20%20Bandon-Ilen%20Catchment%20Summary%20WFD%20Cycle%203.pdf

Maitland PS (2003). Ecology of the River, Brook and Sea Lamprey. Conserving Natura 2000 Rivers Ecology Series No. 5. English Nature, Peterborough.

Matson, R., Delanty, K., Shephard, S., Coghlan, B. and Kelly, F. (2018) Moving from multiple pass depletion to single pass timed electrofishing for fish community assessment in wadeable streams. *Fisheries Research,* 198, 99-108.

PLATES

Plate 1 Electrofishing survey at Site 1 on the Inchiroe Stream, September 2022.

Plate 2 Brown Trout from the Inchiroe Stream at Site 1, September 2022.

Plate 3 Site 2 on the Inchiroe Stream, September 2022.

Plate 4 Site 3 on the Shehy Beg Stream, September 2022.

Plate 5 Juvenile Brown trout (top) and Atlantic salmon from Site 3 on the Shehy Beg Stream.

Plate 6 Electrofishing survey at Site 4 on the Shehy Beg Stream.

Plate 7 Juvenile Brown Trout from Site 4 on the Shehy Beg Stream.

Plate 8 Waterfalls on the Shehy Beg Stream between Site 4 and Site 5.

Plate 9 Small hydroelectric scheme on the Shehy Beg Stream between Sites 4 and 5.

Plate 9 Small hydroelectric scheme on the Shehy Beg Stream upstream of Sites 5.

Plate 11 Electrofishing survey at Site 7 on the River Shanacrane East, September 2022.

Plate 12 Juvenile Atlantic salmon from the River Shanacrane East at Site 7.

Plate 13 Juvenile Atlantic salmon (top), Minnow (centre), and Three-spined stickleback from the River Shanacrane East at Site 7.

Plate 14 Site 8 on the River Shanacrane East, September 2022.

Plate 15 Juvenile Atlantic salmon from the River Shanacrane East at Site 8.

Plate 16 Juvenile Brown Trout from the River Shanacrane East at Site 8. Note the presence of a fish leech (*Piscicola geometra*) above the anal fin.

Plate 17 Another Brown Trout from the River Shanacrane East at Site 8.

Plate 18 Site 9 on the River Glanycarney, September 2022.

Plate 19 Brown trout from the River Glanycarney at Site 9.

Plate 20 Atlantic salmon (top) and Brown trout from the River Glanycarney at Site 9.

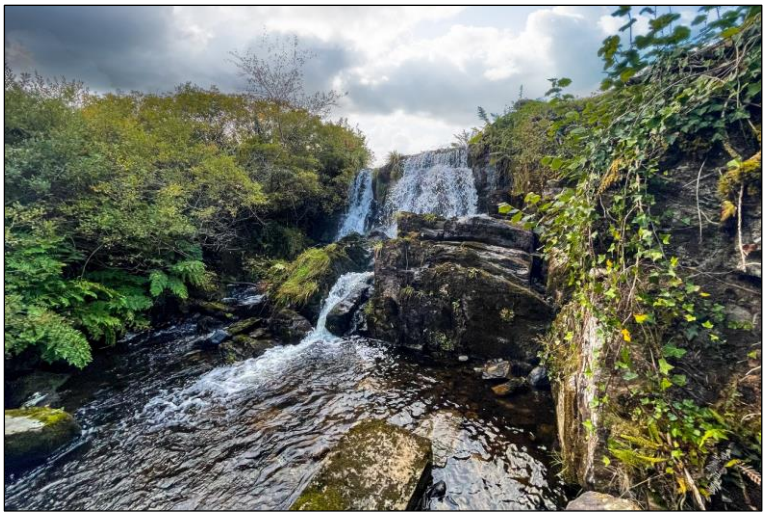

Plate 21 Site 10 on the River Shanacrane East, September 2022.