Bruree-Charleville-Effin Wind Farm Action Group
Ballinagoul
Kilmallock
Co. Limerick
V35 AX97

The Secretary
An Coimisiún Pleanála
64 Marlborough Street
Dublin 1
D01 V902

30 October 2025

Subject: Formal objection to Garrane Green Energy application (323635)

A chara,

The Bruree-Charleville-Effin Wind Farm Action Group would like to formally object to the proposed development by Garrane Green Energy in the townlands of Garrane, Creggane and Ballynagoul in Co. Limerick (case 323635).

We have strong grounds for objection in ten main areas. We have arranged these objections into chapters, as listed in the Table of Contents on page 3 below.

Thank you for your attention to our detailed observations on the proposed project. We respectfully request that An Coimisiún Pleanála refuse permission for the development on the basis of our objections.

Le meas,
Bruree-Charleville-Effin Wind Farm Action Group


Eugene Costello
Joe Morrissey
P.P. J Stokes
Catherine Selley
Owen Culhane
Mike Ryan
Andrew Cussen
Denis O'Gorman
Des Fitzgerald
Anne Walsh
Eugene O'Shea
Mary O'Shea
Sheila Morrissey
Elizabeth Casey
Susan Kerwin
Olivier Lefebvre
Helen Lefebvre
Niamh Kelleher
Colm Carey
Joe Foley

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1. Breach of stated 680m setback distance as outlined in 2019 Draft Revised Wind Energy Development guidelines

The 2019 Draft Revised Wind Energy Development Guidelines remain in draft form. Nevertheless, in its application, Garrane Green Energy says that it is applying a 680m setback distance in line with the '4 times blade tip height' rule in the 2019 Draft Revised Wind Energy Development Guidelines. On Page 29 of Chapter 12, Garrane's Environmental Impact Assessment Report states that:

> "The Project has a turbine tip height of 170m thus a 680m setback distance has been applied giving due regard to the Draft Revised Wind Energy Development Guidelines (2019)."

It is added that there is one case of a dwelling being within the 680m setback distance, but that this is still in compliance given that it is happening with the agreement of the involved landowner.

In fact, there is at least one additional case in which Garrane Green Energy has not applied a setback of 680m, following the definition of setback distance given in the 2019 Draft Guidelines (which Garrane's EIAR says it is "giving due regard to"). We are not aware of any agreement in these other cases to have a setback distance lesser than 680m.

Before proceeding, let us examine exactly what the 2019 Draft Guidelines say (p.129):

> "a setback distance for visual amenity purposes of 4 times the tip height should apply between a wind turbine and the nearest point of the curtilage of any residential property in the vicinity of the proposed development"
>
> In a footnote, they define 'curtilage' as:
>
> "The curtilage of a domestic dwelling house for the purposes of these draft guidelines is defined as the land immediately surrounding a dwelling house which is used for purposes incidental to the enjoyment of the dwelling house as such and excludes for example any open fields beyond the immediate surrounds of the dwelling. In the case of buildings associated with other noise sensitive properties the curtilage would be the area in the immediate surrounds of the relevant buildings."

Taking their curtilage into account, it is clear that one residential property in Ballynagoul (called H9 in the EIAR) and possibly another in Creggane (called H30) will be closer than 680m to a wind turbine. The nearest point of the curtilage of H9 in Ballynagoul will be 660-676m from Turbine 2 and will certainly be less than 680m. Furthermore, the nearest point of the curtilage of H30 in Creggane may be just under 680m from Turbine 3, though this should be checked by An Coimisiún Pleanála. See illustrations below.

2. Failure of EIAR to address issue of varying turbine heights

On p. 9 and 11 of EIAR Chapter 2 and p. 91 of EIAR Chapter 10, it is said that all turbines within the flood zone will be placed on plinths. This means that these particular turbines will be slightly more than 170m in overall height.

The minutes of Garrane Green Energy's second pre-application consultation on 6 September 2024 include the following important point in relation to this:

> "The Board's representatives also noted that the difference in levels of a number of the proposed turbines, to address flood levels on the site, should be reflected in the consideration of other factors such as visual impact and ornithology" (https://www.pleanala.ie/anbordpleanala/media/abp/cases/records/319/p319139b.pdf?r=655360794949).

In the planning application that Garrane Green Energy have now submitted, the varying heights of the turbines, due to some of them being on plinths, appear not to have been taken into account as An Coimisiún Pleanála asked. They are not mentioned as a factor in Chapter 12 of the EIAR, in the assessment of the turbines' visual impact, and they are not taken into account in their shadow flicker calculations or bird collision analysis either (please see chapter 2 of this objection regarding ornithology and chapter 9 of this objection regarding shadow flicker).

We respectfully ask An Coimisiún Pleanála to take note of these serious shortcomings in the developer's application, along with all of those we outline in the following chapters. We respectfully request ACP to refuse planning permission on foot of all these shortcomings in the developer's application.

Chapter 1. Community Engagement

Prepared By: Joe Morrissey.
Graduate of NIHE Limerick (now UL), University of Wales (MSc Econ.). Post Grad Diploma from RCSI, along with qualification and experience in systems analysis. Over 20 years' experience developing services in the community in both statutory and voluntary sectors.

Introduction

Members of the Bruree and Effin communities first became aware of the proposed Garrane Green Energy (GGE) windfarm development in late April 2025. The extent of the proposed development slowly filtered out with people in the adjoining Charleville community becoming aware of this proposal and how it adversely affected them. And so, the Bruree, Charleville, Effin (BCE) windfarm Action Group was formed. The Action Group embarked on what was/is an ongoing steep and challenging learning curve.
This is the Action Groups response to the Community Engagement section of GGEs planning application to An Coimisiun Pleanala (ACP). It evaluates GGEs documented approach to and implementation of its community engagement, vis a vis the actual lived experience of the community.

Stakeholder and Community Engagement

When evaluating community engagement strategies and implementation of same, it is important to place them in the context of:
A: Legislation, regulations, conventions, treaties, public policies etc.
While the Irish Constitution is the bedrock of Irish law and the functioning of society, it has been enhanced and strengthened by the passing of further legislation, and the adoption of various conventions etc.
The Equal Status Acts (Ireland) and the UN Convention on the Rights of Persons with Disabilities (UNCRPD) are positive examples of this enhancement. The UNCPRD affirms and protects the rights of people with disabilities to fully participate in society and in turn places obligations on public bodies etc to ensure those rights are respected and implemented.
In a similar vein Article1 of the Aarhus convention sets out the objective of the Convention stating "*In order to contribute to the protection of the right of every person of present and future generations to live in an environment adequate to his or her health and well- being, each party shall guarantee the rights of access to information, public participation in decision- making and access to justice in environmental matters".*
The Introduction inter alia further states the Convention*: Links environmental rights and human rights.....and establishes that sustainable development can be achieved only through the involvement of all stakeholders*

Articles 6,7,8 of the convention specify when public participation is required. GGEs proposed development readily falls within the Aarhus Convention.

Various documents on the topic of Community Engagement have been produced by Government Departments etc. A Guide for inclusive Community Engagement in Local Planning and Decision Making was co-produced by the Department of Rural and Community Development, Pobal, CWI and ILDN in 2023. Reference is made to the Public Sector Equality and Human Rights Duty ie *"All public bodies in Ireland have a legal responsibility to promote equality, prevent discrimination and protect human rights of their employees, customers, service users and everyone affected by their policies and plans"* It outlines principles for community engagement including respect, transparency, inclusiveness, fit for purpose, accountability etc.
Referencing Involve UK (People and participation, How to put Citizens at the Heart of Decision Making) the Guide caveats "*...However when consultation exercises are poorly focused, rushed or superficial, they may create mistrust, waste peoples time and money and undermine future attempts at public engagement"*

B: <u>The industry's values, principles, standards/expectations</u> and commitment/adherence to the policy/legislative framework.
Research and Publications by Sustainable Energy Authority of Ireland (SEAI), Wind Energy Ireland (WEI) et al are significant resources in identifying and evaluating essential elements of positive stakeholder engagement.

Wind Europe (2020) – refers to wind industry standards on community engagement, as follows: "*Support from Government and society at large, including from the local communities where we want to build wind farms, is part of our licence to operate".*
The SEAIs 2023 publication Effective Community and Stakeholder Engagement builds on this referring to "*a social licence to operate (SLO)* ie *when a project has the ongoing approval and social acceptance from the local community and stakeholders"* and emphasises that this approval/social acceptance "*must be <u>sought</u> from the local community, <u>earned</u> and <u>maintained</u> throughout the lifetime of a project".*

Values
A) and B) above share essential elements and values in developing a successful project. These include values of respect, trust, inclusion, equality, equity, empowerment, fairness, sense of justness, transparency, full awareness of what the proposal contains, no barriers to participation, opportunities to voice opinions etc. GGEs commitment, adherence to and implementation of those values is addressed below and summarised in Appendix 1.

GGE Communication Engagement Commitment

GGEs documentation states "…..*As part of our community engagement process, we are committed to holding open and meaningful discussions with residents and interested parties. The feedback we receive will help shape and refine this project"*
While this commitment is commendable and reads well the community's actual lived experience of same is a world apart.

Conclusion/summary.
Having carried out the evaluation the stark conclusion that must be drawn is: from start to finish GGEs communication strategy and actual engagement are best described as structurally and operationally resistant to inclusive practices.

Pejorative preconceived opinion
GGE's approach to engagement with the community is based on a preconceived pejorative opinion of the community. This is manifested in GGEs refusals to organise/host a public information meeting or to attend a public information meeting organised by the community. The refusals are based on GGE's 'concerns' ranging from the health and safety of GGE staff to members of the community being unable/unwilling to contribute in a public forum. This preconceived bias is downright disrespectful to the community. It is a GGE self-inflicted serious impediment to establish trusting relationships and the antithesis of the values and principles referenced above.

Community Meeting, Resource Analysis
More than 250 members of the community signed a petition requesting GGE to hold a public meeting. This request was based on the dearth of information provided by GGE and given the restricted timeframe was seen as an essential aid for the community to make informed decisions.
An analysis of resources is brief but revealing. GGE have full time employees working on this proposal for several years. It is noteworthy the first landowner option agreement was signed on the 10th June 2021. In addition, GGE have the finance, expertise, experience together with access to ACP, including three pre-planning consultation meetings in 2024 and a pre-planning consultation meeting with Limerick City and County Council (LCCC) on 13/09/2024.
In stark contrast the community bereft of those assets or access to ACP and LCCC have endeavoured to organise and respond within weeks to an application consisting of thousands of pages. GGE would be very aware of this inequality and the community's disadvantage. The first the community was made aware of this proposal was through seriously deficient communications from GGE end of April 2025.

Stakeholder and Exclusions of Stakeholders

"A stakeholder is any person or entity that has a potential interest in the proposed project or has the potential to be impacted by it". (SEAI June 2023).

- By virtue of GGEs actual approach to communication they chose to ignore both the breath and the inclusive nature/impact of the above definition. The "criteria" used of distance from the turbines is too restrictive and excludes many people/stakeholders impacted or potentially impacted by the project as per the above SEAI inclusive definition.
- GGE state that they *reached out* via email, phone and formal letters "*to provide comprehensive information about the project, its benefits and the community consultation process"* to local councillors, TDs and other elected officials. This *reaching out* should be fully transparent, not confined to detailing the benefits to the community but also providing full information re: the challenges and potential impact on the community.
- An Bord Pleanala's Senior Planning Inspectors report (6th Jan 2025) states that "*the potential arises for significant effects to arise on the area of more than one planning authority as a result of impacts on factors such as traffic, visual and amenity considerations".* It appears that the municipal/electoral area elected representatives for the Charleville area were excluded, as were the general population in the area not advised of the proposed windfarm.
- The "circular haul route" submitted in GGEs application to ACP shows Charleville as a critical junction within the haul route. GGE estimate almost 8000 HGVs (plus other vehicles) will access the site during the construction period. Charleville is noted for traffic congestion and unfortunately for the number of pedestrian fatalities in the town. The "circular haul route" will have a very serious impact on the people of Charleville. The people of Charleville and their representatives seem to have been forgotten when GGE were "reaching out"

Consistent with the preconceived pejorative view of community GGE demonstrate a total lack of appreciation of what constitutes a community. A community is made up of a diverse range of people, including people who have been residents all their lives, people who have been attracted to the community and invested in homes there, and people both adults and children who have special or additional needs.

GGE do not see people, for example in respect of shadow flicker, GGE refer to receptors ie houses/buildings. But shadow flicker affects people. People live in rural communities by choice; the outdoor life is often the main attraction. With GGEs concentration on receptors it seems to be lost that shadow flicker affects people out and about, part of their daily lifestyle.

- The exclusion or lack of any recognition/consideration for people with additional or special needs is sadly particularly noteworthy and incomprehensible, and not in line with the aforementioned conventions, legislation, etc.
- Appendix 2 is a letter from a mother who lives just outside the 1km zone from a wind turbine. Her family includes two boys with autism and one child with epilepsy. She states that as her children have difficulty sleeping, they are on medication for same and that any sleep disturbance "*will have huge implications"*. She explains her children require structure and routine and she is "*seriously concerned regarding the visual impact, noise and shadow flicker* any one of which *would cause serious side effects …the stress of which would be unthinkable"*.
- Appendix 3 contains correspondence from a lady who is autistic and experiences "*significant sensory processing difficulties"*. She writes "*Wind turbines create particular environmental impacts that may not effect every resident equally, but for people with autism and sensory sensitivities, these impacts can be profound and disabling"*. She lists the points on which her objection is based and refers to legislation as follows: "*Under the Equal Status Acts (Ireland) and the UN Convention on the Rights of Persons with Disabilities (UNCRPD), planning authorities are obliged to consider the impacts of developments on disabled people, including those with hidden disabilities such as autism. …In conclusion, while I recognise the importance of renewable energy, it must not come at the expense of the health, wellbeing and rights of disabled individuals. When I purchased this house, I did so with respect to my autistic sensitivities and assessed the area to make sure that it matched my individual needs"*.
- In a similar vein neighbours recently welcomed into the community have stated that they would not have purchased/invested heavily in their home if they knew a windfarm was being considered for the area.

This is a reality check for the Government/Local Authorities who have *"a whole of government policy for the sustainable development of rural Ireland – Our Rural Future. The government's vision is for a thriving rural Ireland which is integral to our national wellbeing and development…It will bring about a better quality of life for all people to ensure no one is left behind"*.
If this development is imposed, it will ensure that many people are left behind.

The Advertisement. (See GGE Application, Vol. IV, Appendix 1.5 p.14)
GGE published an advertisement re: the proposal in the Limerick Leader dated 26/04/2025.
It includes the following narrative "*Garrane Green Energy is a wind farm project with the potential capacity of up to 9 turbines. The proposed project is located in the townland of Garrane, Co. Limerick"*.
The advertisement is seriously deficient and misleading for the following reasons:

- Three townlands. There are at least three townlands named Garrane in Co. Limerick. The advertisement does not identify which one. How could any reader or potential stakeholder be expected to identify with the proposal?
- It is misleading. Even if a person knew which Garrane the advertisement referred to the text elaborates: "*the proposed project is located in the townlan*d of Garrane". This clearly gives the incorrect impression that all the turbines are located in the townland of Garrane.
- What is GGEs motivation for the above given that GGEs 2024 discussions with ABP from as early as 30/04/2024 clearly referenced the townlands of Garrane, Ballynagoul, Creggane and Charleville, Co. Limerick. The application to ACP refers to address/location as "w*ithin the townlands of Ballynagoul, Creggane and Garrane, Charleville and KIlmallock Co. Limerick".*
- It is unbalanced and lacks transparency. The advertisement highlights the benefits of the proposals but does not mention any impacts/challenges for individuals, families, stakeholders or the community.
- The Senior Planning Inspectors report 6th January 2025 recognises the "*potential for significant effects to arise"* in Charleville town/area. There should have been a proper (ie without the above deficiencies) advertisement in a newspaper focused on informing the people of Charleville
- The responsibility for disseminating open, honest information rests with the holder of such information ie GGE.

Letter end of April 2025 (See GGE, Vol. IV, Appendix 1.5, p.13 and 14)

The letter and the attached glossy brochure received end of April 2025 doubles down on the deficiencies and misleading information in the advertisement.

- *"The proposed project is a 9-turbine wind farm, on a site located in the townland of Garrane, Co. Limerick".* This gives the impression that all turbines are located in Garrane, ie excluding the other areas included in GGE/ABP 2024 discussions
- Garrane is identified as a pin drop on the map in the glossy brochure.
- People are excluded as per the SEAI definition of stakeholder.
- As above what is GGEs motivation for same?

In summary.

Such were the deficiencies and ineffectiveness of GGEs advertisement/letter/glossy brochure that the vast majority of people signing the petition, requesting a public meeting, could not recall seeing either.

In this analysis/appraisal the author has the added benefit of first-hand experience of GGE's approach to, and implementation of, community engagement.

Unannounced Visit.

The decision/motivation to carry out unannounced visits during the working day when many people are at work is highly questionable**.** It is not an effective way of reaching all stakeholders (as defined by the SEAI) or pursuing GGEs commitment "…..*"As part of our community engagement process, we are committed to holding open and meaningful discussions with residents and interested parties. The feedback we receive will help shape and refine this project"*.

It is contrary to the values and principles outlined above, including: community acceptance for the proposal must be "*sought, earned and maintained";* all parties must be "*fully informed of the potential impacts on the surrounding areas",* with the engagement strategy supporting *"inclusion and constructive dialogue, etc"*.

Sorry we missed you. (See GGE, Vol. IV, Appendix 1.5 p.15)

Similarly, the merits of leaving vague/uninformative *Sorry we missed you notes* is also highly questionable given the already weak substructure of the misleading advertisement and misleading posted communication outlined above. It is certainly contra to the above values and principles.

Feedback on unannounced visits

The feedback received is succinctly documented in letter dated October 10th (Appendix 4). In summary, the information provided by GGE to the residents was totally inadequate, unbalanced and contrary to the value and principle of *all* parties must be fully informed "*of the potential impacts on the surrounding areas"*. The correspondence demonstrates the serious deficits in the information provided by GGE. The residents concluded that they were withdrawing any consent indicated to GGE.

It begs the question what information was given to the landowners which will be addressed later.

My own personal experience is that we just happened to be at home when we received the unannounced visit from GGE on 13 May 2025. My academic background coupled with many years practical experience in community services dictate that this was a very dubious and ineffective path ie <u>if</u> the objective was to establish trusting relationships and provide comprehensive information in a respectful manner to the community.

The visit was very unsatisfactory and necessitated us emailing GGE on 8/06/2025 (Appendix 5) expressing our dissatisfaction on many fronts including:

- As information promised by GGE during the unannounced visit was not forthcoming we expressed our concern "*that this is the portent for our and possibly our community's relationship with Garrane Green Energy"*
- We stated…"*we believe that full, open, honest, transparent, communication with us and the community is vital. If the investors/developers firmly believe in the benefits to us and the community etc then there should be no issue whatsoever in communicating this in whatever format the community requests"*
- *"Glossy brochures and unannounced visits do not in any shape or form represent good communications"*
- *People questioning if their views matter at all to Garrane Green Energy or is this "communication" merely a "box ticking" exercise*
- We provided an example where we did not have the knowledge to ask a question re: turbine base height but neither were we informed of same.
- *We stated that (GGE rep.) pointing to the skyline and saying the turbines will be "over there" does not provide any assurance.* In reality, it was not a true reflection of the turbine positioning as it affected us.

People cannot make informed decisions without full information. The email demonstrated that as individuals we did not have the knowledge to ask appropriate questions neither were we provided with full information.

A community forum such as a public information meeting would have provided GGE the facility to provide consistent, comprehensive information as well as harnessing the diverse expertise in the community triggering further questions/information thus increasing the potential for transparency, openness, honesty, trust and respect.

Garranes Green Energy Response. 11/06/2025

GGEs response was less than inspiring and has a much more restrictive definition of what constitutes a "stakeholder" than that of SEAI (see above).

It states inter alia that "*the design and layout works for the proposed wind farm is currently being finalised"*. There is no mention of members of the community being able to influence the design or layout as per the written aspiration of GGE.

In summary it refers to the advertisement in the Limerick Leader and the glossy brochure both of which are referred to above as seriously deficient &/or misleading. It does not say if the people of Charleville or their elected representatives who would be affected by the proposal were informed.

It also, inter alia, stated GGE would be hosting *a community clinic* by appointment and that "*All residents within approximately 1km will also receive a postal invite to this"*.

Sentiment Analysis

GGE's self-administered sentiment analysis carries no weight whatsoever. We have illustrated this through: 1) the ineffectiveness and motivation of carrying out unannounced visits during the working day; 2) vague "sorry we missed you" notes; 3) the weak substructure on which the unannounced visits were made; and 4) the inadequate/ unbalanced information provided.

Clinic.

In the submission to ACP GGE state "*Our community clinics replace the traditional " town hall" meeting. The community team feels the forum presents an opportunity for all voices to be heard, allows for questions, more meaningful engagement and helps to avoid situations where a small cohort of anti-wind voices dominate".*

This is not a situation of either clinics or "town hall" meeting. It is a situation of both clinics and a public forum meeting. Whatever fora the community feels it needs and requests should be granted that is if GGEs objective is as they stated.

We attended the Clinic on July 22nd and forwarded notes of same (Appendix 6) that evening to GGE. The notes detailed GGE commitments as follow:

Provide a map identifying:

- Location of turbines and distances from our house
- Access points off the N20 and L1537
- Position of substation.
- Identify where bridges would be located, if possible, on the map?

GGEs response dated July 29th 2025 informed us of just the nearest and furthest turbine, not all turbines as had been committed to. GGE provided a map (by post) showing a general location of the substation. They informed us that final bridge locations were yet to be determined and a map showing the locations would be available on submission of the planning application. GGE stated they could not create custom maps.

We had to email again as there was some unresolved confusion re: site entrance vis a vis our home and were informed (31/07/2025) that "*a map showing the site entrance location will be available upon the submission of the planning application".* This obviously prohibited "*feedback …. to help shape and refine the project".*

So much for GGEs commitment "…..*As part of our community engagement process, we are committed to holding open and meaningful discussions with residents and interested parties. The feedback we receive will help shape and refine this project".*

Contrary to what we were informed at the meeting we have since been informed by the residents closest to the substation (as per maps submitted by GGE) that they have not been informed of same by GGE.

We were also informed that the turbines would be Vestas V150 6MW and that these had a hub height of 95 metres with 75 metre blades giving a total of 170 metres. Vestas website refer to these models as follows: *" A comprehensive portfolio of standard and site- specific towers allow for application in tip height constraint markets varying from 180m to 244m"*. The smallest hub height listed for this model is 105 metres. We note that in Pre-Application meeting 30/04/2025 that the proposal was *"to install 9No. wind turbines with a tip height of up to 185m, each producing 6-7.2 MW with a combined output of up to 54MW"*. No reason was given for the change. We understand that to be considered a SID that the output must be more than 50MW.

Again, contrary to the statement (in GGE's Community Engagement report) *"All residents who chose to engage during this clinic were provided with a feedback form to review the project and share their opinions"; neither* I nor the other residents that I am aware of who attended the clinic received this feedback form.

People are prevented from participating in the process when they are not provided with relevant information.

Landowners

We learned at the clinic that landowners had been signed up, in effect it was presented to us as a fait accompli. Given the dearth of transparent &/or accurate information at each engagement, advertisement, letter with brochure attached, unannounced visit, we can only wonder if the landowners were given full information as per HSE recommendations in the (1.3) scoping opinion "*All parties affected by the proposed development including those who may benefit financially from the project, must be fully informed of what the proposal entails especially with regard to potential impacts on the surrounding areas"*.

It is noteworthy that one landowner reputedly expressed the view that the windfarm was near nobody and way in the fields.

GGE, Local Action Group

Under the heading Local Action Group, (GGE's EIAR Appendix 1.5) GGE refer to the Facebook page of Bruree Charleville Effin Wind Farm Action Group and states: *"The group h*as not yet *reached out to the Garrane Green Energy* community *team to discuss their concerns* directly. *We would welcome the opportunity to engage in open and constructive dialogue……Our goal is to ensure that the community is fully informed and that local voices are heard as part of the ongoing development"*.

Words, its only words while the reality of the lived experience is a different world as illustrated above. GGE were "reached out to" on several occasions from 8/06/25 to 28/08/25 to hold/attend a public meeting. By way of example on August 14th, the community requested GGE to organise and hold a public meeting as a matter of urgency. *"It is urgent and the only realistic pathway for GGE to address the serious deficit in information, given GGEs intention to apply for planning permission in the coming weeks".*

GGE responded 18th August stating inter alia "*While we fully respect the concerns raised, our considered position remains that large public meetings do not provide a safe or constructive environment for open dialogue".* The response "*fully respect the concerns"* but doing nothing about those concerns represents GGE's cavalier approach to their obligations in respect of engagement with the community. It is totally unacceptable on many fronts as outlined above.

On 28/08/25 GGE were invited to a public meeting organised by our community, but GGE declined to attend.

Perhaps GGE would do best self-reflecting on and learning from SEAI's reference to a *social licence to operate*.....this approval/social acceptance *must be sought from the local community, earned and maintained through out the lifetime of a project".*

On 18/08/2025 some members of the community received a letter and brochure informing them that the planning application had been submitted to ACP. GGE did not provide details of the ACP deadline for observations to be received.
GGE did not advise the community that the application had to be re-submitted, or the new time-line for the submission of observations. So much for the values of transparency, partnership, etc.

In conclusion.

Thank you for reading this submission. In summary the evaluation reflects very poorly on GGEs effort at community engagement. From beginning to end GGE did not put citizens at the heart of any aspect of the engagement. It failed from the perspective of the principles and spirit of Equality legislation, Aarhus convention, Government policy and the industry's own values and principles.
We trust that you now see why we reiterate: the stark conclusion that must be drawn is that from start to finish GGEs communication engagement/strategy is best described as structurally and operationally resistant to inclusive practices.

Appendix 1

Examples of key principles and good practices: Checklist

Respectful? No
Preconceived, pejorative view of the community.

Information at a very early stage in a transparent and accessible way? No
Advertisement seriously deficient and misleading
Letter/glossy brochure end of April 2025 misleading
Information provided in unannounced visits inadequate &/or biased
"Sorry we missed you" note vague
Landowners "signed up" by the time clinic meetings took place
Proposal was confirmed a SID by ACP on February 5th 2025, well before any public knowledge of the proposal.

Build Trust? No
Pre-conceived pejorative view of the community and seriously deficient so called "early" communications created mistrust.

Inclusive? No.
The engagement strategy was structurally and operationally resistant to inclusive practices.
Stakeholders as defined by SEAI excluded.
People with additional needs excluded in any consideration

Ensure that there are no barriers to participation? No
Deficient advertisements, letters, glossy brochure create barriers to participation.
Restrictive definition of stakeholders excludes people from participation.

Spirit of Partnership? No
The attitude and early actions by GGE did not foster a spirit of partnership. The motivation for the misleading information needs to be explained.

Equity. Fairness is essential in any stakeholder engagement process. Use method of engagement that maximises number of voices that are heard? No
Poor misleading communications
Unannounced visits.
GGE continuously refused to host or to attend a public information forum.

Empowerment. *Ensure that decisions you make reflect the views of the participants and stakeholders and you provide feedback to the community on how the engagement process influenced the final decisions*? **No.**
See clinic meeting above as an example, GGE committed to the provision of information but attendees were later informed that it would be available when the planning application was submitted. Too late to influence anything.

[redacted]

Dear Sir/Madam

I am writing a letter of concern on behalf of my children in relation to the proposed erecting of 9 wind turbines on behalf of Garrane Green Energy limited.

My house is just outside the 1km zone from a wind turbine.

I have 2 autistic boys and 1 child with epilepsy. I am seriously concerned regarding the visual impact, noise and shadow flick.

Any of the above 3 would cause serious side effects to my children not to mind all three, the stress from all these would be unthinkable.

My children find it very difficult to sleep and are on medication regarding same.

I Cannot afford any sleep disturbance as it will have huge implications

My children must have structure and routine, and every day must be the same in their home environment.

Please read and understand my fear and worry for my 2 autistic boys and my child with epilepsy and all my family

Uncertainty is something we do not have on our agenda.

Please feel free to contact me regards my serious concern for my family.

Kind regards

[redacted]

Appendix 3

Re: Objection to Proposed Wind Farm Development

Dear Sir/Madam,

I am writing to formally object to the above planning application. I have recently bought a house in Garroose and was worried to hear of this potential development in my area. I am autistic and experience significant sensory processing difficulties.

Wind turbines create particular environmental impacts that may not affect every resident equally, but for people with autism and sensory sensitivities, these impacts can be profound and disabling. My objection is based on the following points:

1. Noise Sensitivity

Wind turbines generate continuous low-frequency noise and infrasound, as well as fluctuating whooshing sounds depending on wind speed. While such noise levels may be deemed acceptable for the general population, they pose a considerable risk to individuals with auditory sensitivities. For an autistic person with heightened sensory perception, this could lead to distress, sleep disturbance, and an inability to feel safe and comfortable in their own home.

2. Shadow Flicker and Visual Disturbance

The movement of turbine blades, particularly during times of shadow flicker, creates a strobe-like effect that can be overwhelming and disorienting. For an autistic person with visual sensitivities, this effect may trigger severe anxiety, sensory overload, or even physical illness.

3. Vibration and Sensory Distress

Some residents report feeling low-level vibrations from turbines within their homes. For a neurotypical individual this may be tolerable, but for someone with autism, even subtle vibrations can be unbearable and lead to chronic stress.

4. Loss of Environmental Consistency

Autistic individuals often rely on stability and predictability in their environment. The sudden introduction of large, moving structures into the landscape represents a

significant sensory and psychological disruption. This could negatively affect my mental health, daily functioning, and overall quality of life.

5. Equality and Human Rights Considerations

Under the Equal Status Acts (Ireland) and the UN Convention on the Rights of Persons with Disabilities (UNCRPD), planning authorities are obliged to consider the impact of developments on disabled people, including those with hidden disabilities such as autism. Approving this wind farm without adequate safeguards would risk discrimination against a vulnerable resident whose sensory needs are not being adequately accounted for.

In conclusion, while I recognise the importance of renewable energy, it must not come at the expense of the health, wellbeing, and rights of disabled individuals. I respectfully request that the planning department reject this application, or at the very least require significantly greater setback distances and mitigation measures to protect residents with sensory vulnerabilities.

When I purchased this house, I did so with respect to my autistic sensitivities and assessed the area to make sure it matched my individual needs.

Thank you for your attention to this objection. I trust that the planning department will uphold its responsibility to safeguard all members of the community, including those with hidden disabilities.

Yours faithfully,

Appendix 4

Garrouse
Bruree
Co Limerick
10/10/2025

Re Garrane Green Energy Wind Farm

To Whom it may concern

This letter is to outline our position since further information has become available concerning the proposed wind farm at Garrane and Ballinagoul adjacent to the town off Charleville and the village of Bruree.

The following was not indicated to us when representatives of Green Energy called to explain their position and obtain our good will.

1.That the Garrouse-Ballinagoul road was to be used as the main route for the haulage of large amounts of stone and cement during the construction phase of the wind farm. This road is classified as L which means it is unsuitable to carry large volumes of traffic especially lorries. The impression given was that the N20 was to be the main route for the transport of materials. The Garrouse-Ballinagoul road is regularly used by local residents for walking and cycling. The proposed volume of heavy traffic would eliminate their enjoyment.

2.We are concerned about the excessive height and distance from local residences. Studies have shown that properties in the vicinity of turbines have been reduced by at least 15% or become unsalable. There are also health issues reported, some caused by sun flicker and constant noise in the form of a hum. Houses in the locality that were sold in the recent past would not now be bought by the new owners if they realised that a wind farm was to be constructed in the locality.

3.Community Groups: It is proposed to give good will money to community groups over a 15 yr period. Who are these community groups? Are they within a 5km radius or a 20km radius? No specific information is available from Green Energy.

4.Why were contracts negotiated or signed prior to public consultation?

5.The townlands of Garrne and Ballinagoul consists of a flat plane of land situated between Charleville and Bruree. It is a rural farming area with dairying and drystock being main enterprise. There are many non-farming families also living in these townlands. The

construction of a wind farm in the area would drastically reduce our peaceful lifestyle and quality of life for a lifetime.

6.Bovine Tuberculosis has been a huge problem for farmers and the State for many years. It is on the rise again with very serious concerns. The townlands of Garrouse and Garrane are currently free of TB and have been so for a long period of time. It is well known that Badgers and other forms of wild life are vectors for the spread of Bovine TB. During the construction phase of the turbines it is very likely that badger sets will be disturbed causing the local badger population to move out. When this happens there is a strong possibility for diseased badgers to move in causing severe hardship for the local farming community.

7.The construction of the wind farm will be source of income for a few but will be a lifetime annoyance for many.

8.With this new information becoming available we withdraw any consent indicated to Garrane Green Energy Wind Farm.

Signed: David Cussen

Helen Cussen

Appendix 5

From: Joe Morrissey
Date: Sun 08/06/2025 12:40
To: info@Garranegreenenergy.ie

FAO: Nadine Walsh

Dear Ms Walsh

We refer to recent communications from Garrane Green Energy, and discussions with us on 13th ult. From that discussion we were to be emailed information the following week. To date we have not received any communication and are concerned that this is the portent for our and possibly our community's relationship with Garrane Green Energy.
It would be extremely naive of us to believe that the primary motivation (as espoused in the glossy brochure etc) of this proposed development, is the provision of green energy and to provide community funding.
This is essentially a financial investment with potential for vast financial returns. The investors/developers may/may not be part of our community or have no past, present or future allegiance to us. Should the proposal go ahead they may potentially have moved to the next investment while we and the community may be left with the remnants of a development which in effect has been imposed on us.
This is the reason we believe that full, open, honest, transparent communication with us and the community is vital. If the investors/developers firmly believe in the benefits to us and the community etc then there should be no issue whatsoever in communicating this in whatever format the community requests.
It is essential that Garrane Green Energy respect the people/community and demonstrate this respect through the provision of full factual information on all aspects of the proposal. This will facilitate people both individually and collectively form an opinion on what is best for our community. All aspects including the history of the project, those involved, details of work to date, current and future plans need to be explained.
The glossy brochure informs us that *We are here* at the *Community Engagement* stage. We take it, therefore, that Garrane Energy must have a communication plan/strategy in place for communicating with individuals and the community. However glossy brochures and unannounced visits alone do not in any shape or form represent good communication.
In fact, this fragmented approach creates more concerns and uncertainty. This in turn can lead to people questioning if their views matter at all to Garrane Energy or is this "communication" merely a "box ticking" exercise. Thorough, open and honest communication can help alleviate some of those concerns.
People hear and interpret information in different ways. By way of example, from your visit we understood that the proposed turbines would be 170 metres high. We learned, in conversation sometime later, that some turbines would be on a base two meters above the ground. We did not have the knowledge to ask that question and neither were we informed of same.
Similarly, pointing to the skyline and saying the turbines will be "over there" does not provide any assurance. If a car salesperson pointed to a forecourt full of cars saying "your car is over there" without providing details of the exact location of the car, its history, current state and future guarantees we doubt you would buy the car. This proposal is much

more serious than that as it effects the lives of a cross section of our community from people/families that have lived here for generations and people who have been attracted to live in the community and invested heavily in same.
In summary a fragmented approach to the provision of information leads to misunderstandings, incomplete information etc, ultimately culminating in mistrust and many unhappy people. We take it in good faith that the above fragmented approach is not your communication strategy.
We would welcome therefore a prompt reply detailing your communication strategy, essentially how (with timelines) you will ensure that we receive full, clear, honest and consistent information.
As previously stated, the history of the proposal, those involved, details of work/progress to date, current and future plans/ path forward are essential elements in this communication.
We believe that we and the community should expect and deserve this respect.
We look forward to a full and prompt response.

Regards
Joe & Sheila Morrissey
Eircode: V35 KC79

Appendix 6

From: Joe Morrissey
Date: Tue 22/07/2025 16:01
To: info@Garranegreenenergy.ie

1 attachment
GGE Clinic meeting 22.7.2025. docx.

Hi Nadine

Please find attached notes of today's meeting for your perusal. GGE undertook the following actions:

1. Provide map identifying

- Location of turbines and distances from our house (V35 KC79).
- Access points off the N20 and L1537
- Position of substation

We would be grateful for both an electronic and hard copy.

b) GGE were also to identify where the bridges would be located, if possible on the map.

Regards
Joe and Sheila Morrissey

Questions and answers - GGE clinic 22/7/2025
GGE's representatives: Nadine, Patrick, Gary

1. How many turbines? *9*
2. Where is nearest turbine to us? *761 mtrs*
3. Is there a cluster? How many? How near to us? *Map to be forwarded to us, with distances indicated.*
4. What is height of turbines? *170 to 172 mtrs – depending on flood plain,*
5. What is make of turbines? *Vestas V150 6MW. Hub 95mtrs + blade 75 mtrs*
6. Have you map to show location of turbines, and how far are each of them from us? *As 3 above.*
7. What are the criteria for the categories of residents:

   Within 1km of turbines *SEAI determine residences within 1km, entitled to fund.*

   Within 2km of turbines ?
8. Where are access points to turbine site for siteworks – (a) N20: *North of Creggane Bridge. For delivery of turbines, and crane. This may require Garda Escort, road closure - at night.*
   (b) L1537: *Approx 1 to 1.5 km south of our house (V35KC79), near substation. All construction site work traffic off L1537. Traffic management system being finalised. Circular system on L1537 will be in operation for site work traffic. Access points (N20 & L1537) will be indicated on map from GGE.*
9. Where will substation be? *In the access road off L1537. To be shown on Map.*
10. How close to houses is the substation? *250/300 mtrs*
11. Have residents nearest substation been advised and received all correspondence, visit etc. *Yes*

12. What is the purpose of the bridge over the Maigue? *Noted there is also a bridge over Charleville Stream. Both are required for access to the full site i.e. join both sides.*

13. Does bridge require separate planning permission from Limerick City & County Council (LCCC)? *LCCC and other public bodies will be notified. Planning for bridges will be part of overall planning application to ACP.*

14. Where will it be? *GGE to inform us of location of both bridges.*

15. When will planning permission be applied for? To ACP? *Within two months.*

16. Will planning applications be required from Cork Co Co/Limerick City & Co Co? *Both will be notified.*

17. If planning permission is granted by ACP, how soon afterwards would construction begin? *Depending on ACP decision – 12months to 3 years.*

18. Duration of Construction? *12-18 months.*

19. What do you mean by Community as in the Community Benefit Fund? *Anyone within 1km. SEAI appointed independent person will form a Committee of local people. Committee will allocate funding. Organisations within 10Km can apply for funding.*

20. How can you guarantee the Community Benefit Fund? Is GGE/Greensource guaranteed an income? *Benefit Fund will depend on power generated. Fund will receive €2 for every mwh generated (mega watt hour). Greensource will bid in RESS (Renewable Electricity Support Scheme) auction. After successful bid, funding is guaranteed for 15 years. GGE only get paid for energy supplied.*

21. How many residences are within 1km? *30 to 50*

22. How many residences are within 2km? *170 approx. Includes 1km residences.*

23. Have you signed up landowners – how many? *Yes all signed up – under 10*

24. Have you signed up any residential landowners? *Don't know.*

25. Has Garrane/Greensource the investment fund to develop this site? And other sites? *Yes. After getting planning permission, Garrane will apply to banks for funding to build project.*

26. Who will the financial backers be? *Banks*

27. What is their long term commitment to the wind farm? *Greensource have a positive history of building and operating projects.*

28. Do GGE/Greensource have to retain ownership for a number of years? *No.*

29. Can they sell it on? At what stage? *Yes. After planning*

30. What is GGE's objection to holding a public meeting. *Health and safety of staff. We pointed to the difficulties of the current communication strategy employed by GGE. There is a complete lack of awareness of the proposed development within the community. We strongly encouraged GGE to host a public meeting so that all in the community would be aware of the proposed development and all would hear the same message from GGE.*

Chapter 2. Objection to Garrane Green Energy on ornithological grounds

Sections

Relevant laws

Directive 2014/52/EU of the European Parliament and of the Council of 16 April 2014 amending Directive 2011/92/EU on the assessment of the effects of certain public and private projects on the environment Text with EEA relevance

Council Directive 92/43/EEC of 21 May 1992 on the conservation of natural habitats and of wild fauna and flora

2.1 Annex I, red-listed and amber-listed wetland birds not surveyed properly and significant effects upon them not assessed

Dr Eugene Costello
Baile na nGall
Cill Mocheallóg
Co. Luimnigh

Statement of competence in birdwatching and ecology

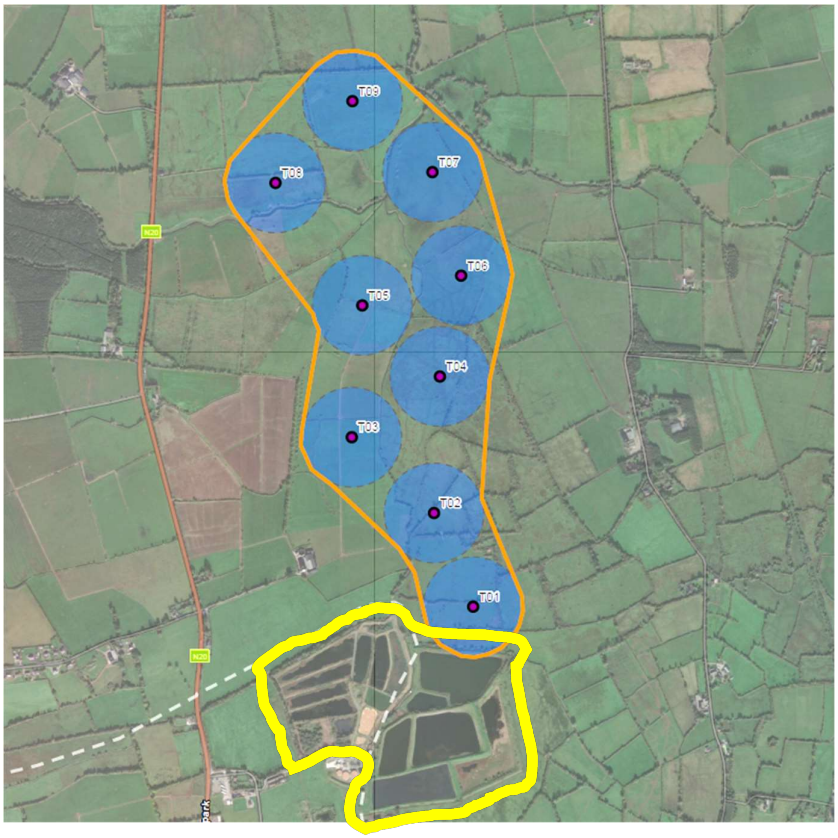
I have been an avid birdwatcher since the mid-2000s. I worked as a volunteer for the BTO Bird Atlas of Britain and Ireland between 2007 and 2011, contributing sightings of just under 60 bird species for the townland of Ballynagoul/Baile na nGall, where much of the windfarm is to be located. Since then I have continued to be a regular contributor of bird, mammal and wildflower sightings to the National Biodiversity Data Centre.

I am also a Lecturer and internationally-recognised researcher in environmental history and landscape archaeology. In my research, I investigate the role of humans in shaping rural landscapes and biodiversity. For example, I have carried out research on the long-term effects of historic farming practices on woodland and pasture, and the consequences of more intensive human activity for wild animal populations. In terms of fieldwork, I have become adept at identifying plant and bird species associated with traditional 'High Nature Value' farming in uplands and lowlands. For my research, I regularly read articles on ecology, zoology and genomics (as well as history and archaeology) and I have recently acted as a peer reviewer for the international journal *Landscape Ecology*. I am extremely familiar with reading and interrogating evidence-based arguments.

Garrane windfarm inappropriately close to Charleville Lagoons waterbird site

Garrane Green Energy wind farm will be located inappropriately close to the important wetland site, 'Charleville Lagoons', primarily in Co. Limerick but also partly in Co. Cork. Charleville Lagoons have been monitored by the Irish Wetland Bird Survey (I-WeBS) for decades due to their very significant populations of ducks, swans and waders. The blade swing of the nearest turbine (Turbine 1) will be only about 90m north of the lagoons, with the blade swing of the next closest (Turbine 2) just over 200m north of the lagoons. Indeed, the collision risk buffer zone of Turbine 1, as depicted in Appendix 8.2 of the EIAR, actually extends into Charleville Lagoons.

Furthermore, wetland birds commute to Charleville Lagoons from the north, i.e. the lower Maigue and Shannon, and from the north east, i.e. Lough Gur. All nine of the proposed turbines lie in the flight path of wetland birds commuting to Charleville Lagoons.



Introduction to wetland birds at Charleville Lagoons

According to I-WeBS data which runs up to 2022/23 (which Birdwatch Ireland sent to me, following a data request; see Appendix A below), the following bird species have been recorded at Charleville Lagoons over the last 30 years: Whooper Swan, Mute Swan, Greylag Goose (resident), Shelduck, Wigeon, Gadwall, Teal, Mallard, Pintail, Shoveler, Pochard, Tufted Duck, Scaup, Goldeneye, Ruddy Duck, Little Grebe, Great Crested Grebe, Cormorant, Little Egret, Grey Heron, Water Rail, Moorhen, Coot, Golden Plover, Lapwing, Knot, Little Stint, Dunlin, Ruff, Snipe, Black-tailed Godwit, Curlew, Redshank, Green Sandpiper, Wood Sandpiper, Common Sandpiper, Black-headed Gull, Common Gull, Lesser Black-backed Gull, Herring Gull, Great Black-backed Gull, Garganey, American Wigeon, and Iceland Gull.

Several of the waterbird species that use Charleville Lagoons are legally protected by Annex I of EU Directive 2009/147/EC and/or are red- or amber-listed birds of conservation concern in Ireland.[1] Some of them, like Shoveler, Wigeon and Teal have clearly been present in very significant numbers at Charleville Lagoons for some time while the population of some wader and swan species is uncertain due to the lack of dedicated survey at the lagoons for Garrane Green Energy's EIA. My two main sources of data are: the (somewhat intermittent) I-WeBS dataset from 1994-95 to 2022-23, and the Ornithology Baseline Report in Garrane's EIAR, which is more detailed but almost entirely focused on the windfam Site and pays little attention to

[1] https://eur-lex.europa.eu/eli/dir/2009/147/oj/eng; Gilbert, G., Stanbury, A. and Lewis, L. 2021. Birds of conservation concern in Ireland 4: 2020–2026. *Irish Birds* 43, 1-22.

Charleville Lagoons.

I discuss the effects of the proposed Garrane windfarm, and the EIAR's inadequate assessment of these effects, for a number of waterbird species below. I have listed them in order of their importance from a broader conservation law point of view, i.e. starting with Annex 1 species.

Golden plover

One of the most important species is the Golden Plover, which is both an Annex I and red-listed species. Significant numbers of Golden Plover have been recorded in and near the proposed development site. In the first place, it should be mentioned that the Irish Wetland Bird Survey recorded thousands of Golden Plover at Charleville Lagoons in the early and mid-2000s (the highest counts were 3500 in 2001/02, and 3500 in 2004/05).[2] The EIAR fails to mention these data. Indeed, it claims that the Irish Wetland Bird Survey dataset only starts in 2011.[3] This is unfortunate as the explicit intention of I-WeBS is to "facilitate informed conservation action".[4]

In Garrane Green Energy's Ornithology Baseline Report, Golden Plover were noted on several occasions. In 2021/21, 42 Golden Plover were seen flying 150-200m over the Site (exactly at the height of the turbines) (Ornithology Baseline Report, Table 14). In 2022/23, there were "eight observations of small (4-16 birds) and large flocks (26–47 birds) flying over grassland frequently outside and occasionally within the Site" (Ornithology Baseline Report, Table 18). Furthermore, in 2023/24, there were "eight observations of between 1-14 individual birds flying over grassland frequently outside and occasionally within the Site" (Table 20). It is not specified where these places "outside the site" were.

In coming to the conclusion that the Site is 'only' of "Local (Higher value) importance" for Golden Plover, the Baseline Ornithology Report says that they recorded none in their 'waterbird survey', i.e. their survey at Charleville Lagoons. This null finding is undermined by the fact that their waterbird survey at Charleville Lagoons only consisted of 22 and a half hours of survey, all carried out between 20 March 2023 and 8 March 2024 (Table 48). Worryingly, when you inspect Table 48 closer, it becomes clear that only 10 hours of survey were carried out in wintertime, and, curiously, there is no report for the 20 March 2023 visit in the summary of results given in Table 89. Ten hours of survey in winter is shockingly low given that it is *wintering* wetland birds that Charleville Lagoons has been known for all along. Such a limited number of hours is simply not enough to make a safe conclusion about the importance of the Site, and its immediate environs, for Golden Plover or indeed any other waterbird. Given that there is a history of Golden Plover at Charleville Lagoons, there should have been more dedicated survey at Charleville Lagoons. The lack of survey at Charleville Lagoons goes against best practice. For example, NatureScot/SNH, whose guidelines on wind turbine collision risk the EIAR uses as a model,[5] make clear that there needs to be a minimum of two years of survey in order to properly assess

[2] Crowe, O. 2005. *Ireland's Wetlands and their Waterbirds: Status and Distribution*. BirdWatch Ireland, Newcastle, Co Wicklow; See also Appendix A below

[3] Garrane Green Energy Ornithology Baseline Report, p.5.

[4] https://birdwatchireland.ie/our-work/surveys-research/research-surveys/irish-wetland-bird-survey/

[5] See Garrane Green Energy EIAR, Appendix 8.2.

the impacts of onshore windfarms on birds.[6]

Turbine 1 will be located extremely close to Charleville Lagoons (its blade swing will be only c.90m from the wetland, in their flight path), while the blade swing of Turbine 2 will be just over 200m from the lagoons, also in their flight path. And yet the EIAR argues that the collision impacts on Golden Plover and other waders will be "not significant". In an attempt to support their argument, the EIAR cites a 2012 review of upland wind farms in the UK, which suggests that effects on Golden Plover were not significant after construction, "especially when there are extensive areas of suitable retained habitat in the wider area".[7] There are a number of major problems with the EIAR 's argument here.

In the first place, the proposed Site in this case is not in an upland context, with extensive blanket bog around it. The Site is a lowland context with most of the surrounding land being intensively farmed. Thus, despite the EIAR's claim, there are in fact very few "extensive areas of suitable retained habitat in the wider area" of Bruree, Effin and Charleville. Recent work carried out by Wetland Surveys and Foss Environmental Consulting makes this clear. As can be seen on their online 'Map of Irish Wetlands', the proposed windfarm Site affects the only significant tracts of wetland in this lowland area, namely, the Ballynagoul Wetland (MIW_LI330) and Charleville Created Wetlands, a.k.a. Charleville Lagoons (MIW_LI74).[8] Together, they form a rare 'island' of wetland habitat in what is otherwise now an intensively-farmed landscape. Garrane windfarm will be located in the middle of this one remaining area of wetland habitat (see Chapter 3 on Ecology in this objection).

Furthermore, the 2012 upland study by Pierce-Higgins et al. is actually more cautious about the risks to Golden Plover than the EIAR makes out. Pierce-Higgins et al. qualify their findings by saying that "given that golden plover is listed on Annex I of the EU Birds Directive, more work is therefore required to understand the extent to which the observed displacement of this species translates into a significant population-level impact."[9] What is more, before and since 2012, there has been plenty of other research across Europe to suggest that wind turbines do indeed have a negative effect on Golden Plover during their operational phase.[10] The EIAR does not engage with the most recent research.

Bearing all of the above in mind, and the very poor survey effort at Charleville Lagoons (the main

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[6] https://www.nature.scot/doc/recommended-bird-survey-methods-inform-impact-assessment-onshore-windfarms#5-duration-of-survey-period

[7] Pearce-Higgins, J.W., Stephen, L., Douse, A. and Langston, R.H. 2012. Greater impacts of wind farms on bird populations during construction than subsequent operation: results of a multi-site and multi-species analysis. *Journal of Applied Ecology* 49(2), 386-394; Garrane Green Energy EIAR, Chapter 8, p.87.

[8] https://wetland.maps.arcgis.com/apps/View/index.html?appid=e13b75c3bcab4932b992aa0169aa4a32&extent=-12.6266,51.3236,-3.2168,55.4102

[9] Pearce-Higgins, J.W., Stephen, L., Douse, A. and Langston, R.H. 2012. Greater impacts of wind farms on bird populations during construction than subsequent operation: results of a multi-site and multi-species analysis. *Journal of Applied Ecology* 49(2), 386-394, p.390.

[10] Pearce-Higgins, J.W., Stephen, L., Langston, R.H.W. and Bright, J.A. 2008. Assessing the cumulative impacts of wind farms on peatland birds: a case study of golden plover Pluvialis apricaria in Scotland. *Mires and Peat* 4(01), 1-13; Bevanger, K., Berntsen, F., Clausen, S., Dahl, E.L., Flagstad, Ø., Follestad, A., Halley, D., Hanssen, F., Johnsen, L., Kvaløy, P. and Lund-Hoel, P. 2011. *Pre-and post-construction studies of conflicts between birds and wind turbines in coastal Norway (BirdWind)*. Norsk Inst. for Naturforskning, Trondheim (Norway); Sansom, A., Pearce-Higgins, J.W. and Douglas, D.J. 2016. Negative impact of wind energy development on a breeding shorebird assessed with a BACI study design. *Ibis* 158(3), 541-555. Grünkorn, T. et al. 2017. A large-scale, multispecies assessment of avian mortality rates at land-based wind turbines in northern Germany. In *Wind Energy and Wildlife Interactions: Presentations from the CWW2015 Conference*. Cham: Springer International, 43-64.

wader habitat in the area), it is impossible to have confidence in the EIAR's conclusion that collision impacts on Golden Plover will be "not significant."

The same criticism can be applied to the EIAR's assessment of other protected wader species at the windfarm Site and at Charleville Lagoons, including Curlew, Dunlin and especially Lapwing. Flocks of lapwing were recorded within the proposed windfarm site as part of the EIAR and they have been recorded in significant numbers at Charleville Lagoons by the Irish Wetland Bird Survey. Lapwing are known to be at high risk of wind turbine collision and they are at very high risk of displacement due to windfarm construction in wet lowlands.[11] Yet the EIAR again dismisses the windfarm's effects on these red-listed species as "not significant".

(It is also odd that Woodcock, a red-listed and Annex II wader, was not recorded in the project site. There are several records of Woodcock in the townland of Ballynagoul according to the National Biodiversity Data Centre; see Appendix B below.)

Whooper Swan

Another notable bird species that uses Charleville Lagoons is the Whooper Swan (Annex 1 EU Birds Directive and amber status in Ireland).[12] In the I-WeBS dataset for Charleville Lagoons, peaks of five Whooper Swans were recorded in 1994/5, three in 1999/2000, and eight in 2010/11. None of these records are mentioned in Garrane Green Energy's EIAR (though two Whooper Swan records in 2011/12 are mentioned). In the EIAR itself, Whooper Swan were recorded on several occasions in the Site and Charleville Lagoons, despite the very low survey effort at the latter:

- Two Whooper Swan were seen on the proposed windfarm Site in Nov 2022, flying towards Charleville Lagoons.
- One Whooper Swan was seen foraging on grassland within the Site in March 2023.
- 10 Whooper Swan were seen in October 2023 flying north of the Site
- One Whooper Swan was seen in November 2023 at Charleville Lagoons.

What is more, as of late 2025, a family of Whooper Swan has been confirmed as using Charleville Lagoons. In a visit to the site on 26 October 2025, the nationally-respected ornithologist, Dr Allan Mee, recorded a family party of six Whooper Swan at Charleville Lagoons. The family consisted of two adults and four juveniles (please see separate observation to ACP by Dr Mee on this windfarm).

Together, these records indicate that Whooper Swan do have a presence in the area, and that they land on Charleville Lagoons and neighbouring grassland within the Site in order to forage. The presence of a Whooper Swan family at the lagoons is very significant given that Whooper Swans tend to only range approximately 5km for foraging and there is no other significant wetland within 5km of the Site and Charleville Lagoons.

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[11] Grünkorn, T. et al. 2017. A large-scale, multispecies assessment of avian mortality rates at land-based wind turbines in northern Germany. In *Wind Energy and Wildlife Interactions: Presentations from the CWW2015 Conference*. Cham: Springer International, 43-64; Reichenbach, M., 2017 Wind Turbines and Birds in Germany—Examples of Current Knowledge, New Insights and Remaining Gaps. In *Wind Energy and Wildlife Interactions: Presentations from the CWW2015 Conference*. Cham: Springer International, 239-252.

[12] https://eur-lex.europa.eu/eli/dir/2009/147/oj/eng; Gilbert, G., Stanbury, A. and Lewis, L. 2021. Birds of conservation concern in Ireland 4: 2020–2026. *Irish Birds* 43, 1-22.

In spite of Charleville Lagoons' suitability for Whooper Swan, the EIA has carried out only 22.5 hours of dedicated survey at Charleville Lagoons, and all in less than one year.[13] Of this, only 10 hours of survey were carried out in winter. This is not enough to get a reliable picture of Whooper Swan presence in the Site and the immediately adjacent Charleville Lagoons. The lack of survey at Charleville Lagoons undermines the EIAR's conclusion that the area is of "negligible importance" for the Whooper Swan and that no further assessment of displacement or collision is needed for the species (see Table 5, Appendix 8.2). Moreover, the finding of "negligible importance" is now directly contradicted by the discovery of a six-strong Whooper Swan family at the site. Charleville Lagoons is clearly of greater significance for the Whooper Swan than the EIAR suggests.

There is a lot at stake here. Research has shown that swans can be displaced by 200–560 m from wind turbines,[14] which would make Charleville Lagoons unusable for the recorded Whooper Swan family (and also for amber-listed Mute Swans, which are present at the lagoons as well).

Furthermore, as stated above, the short amount of survey goes against best practice. The EIAR's Collision Risk Modelling report (Appendix 8.2) persistently refers to NatureScot/SNH's guidelines on bird collision risk. Yet when it comes to duration of survey at Charleville Lagoons the EIAR fails to follow NatureScot's guidelines, which "recommend survey for a minimum of two years to allow for variation in bird use between years."[15] This is all the more important as the I-WeBS data, while very useful, is not available every year and it is unclear how many days and hours of counting took place in the years that there is I-WeBS data.

Shoveler

Shoveler, a red-listed duck, are present in nationally-significant numbers at Charleville Lagoons and commute through the proposed windfarm Site in order to get to the lagoons. The I-WeBS dataset shows that, every survey year since 1994/5, dozens of Shoveler have been recorded in visits to Charleville Lagoons; and it has been rated as a nationally-significant site for Shoveler in an I-WeBS report to the NPWS.[16] Survey data for Charleville Lagoons in Garrane's Ornithology Baseline Report emphasise the site's continuing importance for Shoveler, with a peak of 40 recorded in the 2023 breeding season at Charleville Lagoons (Table 30) and a peak of 63 in the 2023/24 non-breeding season (Table 32). This is despite the aforementioned low survey effort at Charleville Lagoons. Furthermore, in a visit to Charleville Lagoons on 26 October 2025, ornithologist Dr Allan Mee counted 50-60 shoveler (please see Dr Mee's separate observation to ACP on the proposed windfarm). This means that Charleville Lagoons continues to host nationally-significant numbers of Shoveler, i.e. more than 1% of the national population. Table 76 of the Ornithology Baseline Report also makes abundantly clear that Shoveler fly through the

[13] Garrane Green Energy Ornithology Baseline Report, Table 48.
[14] Rees, E.C. 2012. Impacts of wind farms on swans and geese: a review. *Wildfowl* 62(62), 37-72, p.51.
[15] https://www.nature.scot/doc/recommended-bird-survey-methods-inform-impact-assessment-onshore-windfarms#5-duration-of-survey-period
[16] Lewis, L., Burke, B. and Crowe, O. 2016. *Irish Wetland Bird Survey: Results of Waterbird Monitoring in Ireland in 2014/15*. https://birdwatchireland.ie/app/uploads/2019/03/2014_15-iwebs_summary_paper.pdf, p.13; see also Kennedy, J., Burke, B., Fitzgerald, N., Kelly, S.B.A., Walsh, A.J. & Lewis, L.J. 2023. *Irish Wetland Bird Survey: I-WeBS National and Site Trends Report 1994/95 – 2019/20*. BirdWatch Ireland Waterbird Report to the National Parks and Wildlife Service. BirdWatch Ireland, Wicklow.

proposed windfarm Site to get to the lagoons, and often at the same height as the wind turbine blade span.

The assessment of impacts on Shoveler ducks in Garrane Green Energy's EIAR is alarmingly weak and pays little attention to the population in Charleville Lagoons. First of all, Tables 30-32 in Appendix 8.1 claim that Shoveler is only amber-listed, when in fact it is red-listed. This is a worrying inaccuracy and raises questions about the assessment – has the EIAR assessed the Shoveler as if it were an amber-listed species rather than a red-listed species?

More seriously, the EIAR concludes that the Shoveler population is "of negligible importance in the context of the project" (Table 8.20 of Chapter 8). As a result, the species is not taken forward for further risk assessment and is left out of Collision Risk Modelling (see Table 5, Appendix 8.2). This is inappropriate and lacks justification. Charleville Lagoons are only 90 metres south of Turbine 1 and draw highly significant numbers of Shoveler, a red-listed species. How then can Shoveler populations be described as "of negligible importance" in the context of this windfarm? Besides the risk of collision, research suggests that windfarms can have very serious indirect effects on duck populations. A well-known study by Hermann Hötker in 2017 classifies ducks as one of the most severely affected and displaced groups of species, suggesting they can abandon suitable habitat in or near to a wind farm, or use it less than they would without the wind farm.[17] This study was published in a landmark volume on the relationship between windfarms and biodiversity but it isn't even mentioned in this EIAR, raising questions about how aware the authors actually are of the scientific literature. The displacement effect from Garrane Green Energy (especially Turbine 1 and Turbine 2) could make Charleville Lagoons partly or entirely unusable for Shoveler. The proposed windfarm is therefore likely to have significant effects on the Shoveler population in Charleville Lagoons. The EIAR's assessment of these effects is inadequate and largely ignored.

Teal

Charleville Lagoons hosts large numbers of Teal duck, an amber-listed species. The I-WeBS dataset from 1994/95 to 2022/23 has many peak counts in the hundreds, and in the EIAR's limited waterbird survey at Charleville Lagoons there are peak counts of 307 in the 2022/23 non-breeding season and 543 in the 2023/24 non-breeding season.[18] The latter number would make the Teal population at Charleville Lagoons nationally significant. In spite of this obvious significance, the EIAR somehow concludes that Teal is "of Negligible importance in the context of the Project and are not taken forward for further assessment" or collision impact analysis.[19] This is a baffling conclusion given the very large population of Teal only 90 metres south of the windfarm in Charleville Lagoons. The conclusion suggests that the risk to this amber-listed species has been assessed in a spatially-blinkered way, without proper consideration of the wetland immediately beside the windfarm. This is inappropriate. As Hötker's 2017 study shows, duck populations close to windfarms are at high risk of displacement. Displacement effects

[17] Hötker, H. 2017. Birds: displacement, in M. Perrow (ed.). *Wildlife and wind farms: conflicts and solutions*, *vol. 1*, pp.119-154.
[18] Garrane Green Energy EIAR, Appendix 8.1, Table 89.
[19] Garrane Green Energy EIAR, Chp.8, Table 8.20.

from Turbine 1 and Turbine 2 could make Charleville Lagoons partly or entirely unusable for Teal. The windfarm's likely significant effect on the Teal population at Charleville Lagoons has not been assessed in the EIAR, despite the EIAR claiming that it will assess both direct *and indirect* significant effects.[20]

Tufted duck

Another amber-listed duck species at Charleville Lagoons is Tufted duck. Despite counts in the dozens in the I-WeBS data and in the EIAR's limited waterbird survey (Appendix 8.1, Table 89), the effects of the proposed development on the species are not assessed at all. Tufted duck is not even *discussed* as an Ornithological Feature (Chapter 8, Table 8.20). This is a bizarre oversight and means that the EIAR is incomplete.

Not only should Tufted Duck have been assessed as an Ornithological Feature, it should probably have been considered a Key Ornithological Feature. The EIAR's definition of a Key Ornithological Feature is "a species occurring within the Zone of Influence of the Project … which is "both of sufficient value to be material in decision making and likely to be affected significantly". Tufted duck appears to meet these criteria, especially when the precautionary principle is applied. It is present within the windfarm's zone of influence, it is amber-listed (and therefore of sufficient value to be material), and it is likely to be affected significantly on the basis of Hötker's 2017 study on displacement (considering the very close proximity of Turbine 1 and Turbine 2).[21]

Wigeon

Wigeon, another amber-listed species, is present in large numbers at Charleville Lagoons. Peak counts of several hundred are common in the Irish Wetland Bird Survey dataset and in the EIAR's waterbird survey at Charleville Lagoons there was a peak count of 456 in February 2024.[22] Furthermore, Wigeon was recorded flying through the proposed windfarm site on several occasions, usually at the same height as wind turbine blade span. Indeed, there was notable count of 300 wigeon flying through the site.[23] While Wigeon is included in the collision impact analysis, the importance of the population is still classed as "local (lower value) importance", with no further assessment required.[24] This local lower value rating is very difficult to reconcile with the large and growing Wigeon counts at Charleville Lagoons. Again, this suggests a spatially-blinkered approach. Despite acknowledging that the windfarm will have a 'Zone of Influence', the windfarm's significant indirect effects on waterbird populations at Charleville Lagoons are largely ignored in the EIAR. As with shoveler, teal and tufted duck, the likelihood of displacement effects on the Wigeon population at the lagoons has not been considered.

Lack of Vantage Points covering the south and Charleville Lagoons

[20] Garrane Green Energy, Chapter 8, p.24.
[21] Hötker, H. 2017. Birds: displacement, in M. Perrow (ed.). *Wildlife and Wind Farms: Conflicts and Solutions*, *vol. 1*, pp.119-154.
[22] Garrane Green Energy, Appendix 8.1, Table 89.
[23] Garrane Green Energy, Appendix 8.1, Table 83.
[24] Garrane Green Energy, Chapter 8, Table 8.20.

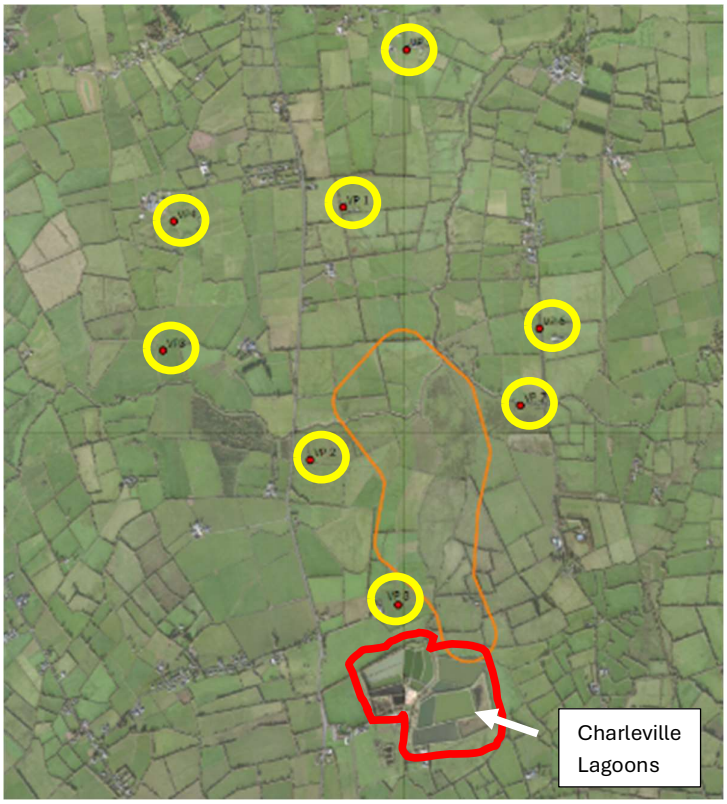
I note with concern that the Ornithology survey for Garrane Green Energy did not involve any Vantage Point to the south, south east and most of the east of the development. This is a major weakness of the EIAR's survey of bird flight activity.

There were eight Vantage Points overall, but the only one which had a view of Charleville Lagoons was Vantage Point 7, albeit at a distance of 1.65km from the nearest point of the lagoons.[25] This is unfortunate as Vantage Point 7 only had 144 hours of observation, compared to Vantage Points 1 and 2, which had 288 hours of observation. For the other Vantage Points, Charleville Lagoons were largely or entirely out of view at the 18m minimum height. There is a contradiction in the EIAR regarding Vantage Point 2's viewshed. Figure 6a shows that flight activity at the 18m minimum height could not be seen at Charleville Lagoons, whereas Figure 6b suggests that it could be seen.[26]

Either way, there is a major bias towards the west, north west and north of the windfarm in the layout of the Vantage Points. Large areas of ground were covered to the north west and west of the wind farm even though they lie up to 3km outside the windfarm.[27] Meanwhile, there was limited coverage of the area east and south east of the windfarm and extremely limited coverage of the area to the south of the windfarm, i.e. Charleville Lagoons. This is extraordinary given that Charleville Lagoons is by far the most well-known bird habitat in the Zone of Influence, with waterbirds approaching it not only from the north but also, crucially, from the east and north east (i.e. commuting from Lough Gur). In order to reach Charleville Lagoons, birds flying from Lough Gur will pass through the location of Turbine 1's blade span. Flight activity in this southern area has not been as well covered compared to the north west of the windfarm. (Indeed, in what may be an attempt to reduce the obviousness of the north-western bias, Figures 6a and 6b have left out the viewsheds for Vantage Points 3, 4 and 5.)

Practically speaking, there was no good reason not to use a Vantage Point to the south or south east of the windfarm. For example, the altitude in this area is several metres higher than at Vantage Points 2 and 7.

[25] Garrane Green Energy EIAR, Appendix 8.2: Ornithology Collision Risk Modelling Report, Fig.3
[26] Garrane Green Energy EIAR, Appendix 8.2: Ornithology Collision Risk Modelling Report, Fig. 6a, 6b.
[27] See Appendix 8.2, Figs. 4.2, 5.1, 5.2



Vantage Points used in Garrane Green Energy EIAR. Please note that VP 8, the closest Vantage Point to Charleville Lagoons, faced to the north, away from Charleville Lagoons.

Incorrect assumption about wind turbine height in Collision Risk Modelling

The Collision Risk Modelling presented in Appendix 8.2 uses an incorrect assumption about wind turbine height. For its analysis, it assumes that the height of all the wind turbines will be 170m.[28] This is incorrect. As Chapter 2 and Chapter 10 state, all turbines within a flood zone (i.e. the majority of turbines in the windfarm) will be placed on plinths.[29] This means that these turbines will in fact be more than 170m tall.

The failure to take this into account in collision risk analysis goes against An Bord Pleanála's instructions at pre-planning meetings. For example, at their second pre-application consultation on 6 September 2024, Garrane Green Energy were told the following by ABP:

> "The Board's representatives also noted that the difference in levels of a number of the proposed turbines, to address flood levels on the site, should be reflected in the consideration of other factors such as visual impact and ornithology"[30]

The difference in levels between the turbines has not been taken into account in the EIAR's consideration of ornithology.

[28] See Appendix 8.2, p.4, 13, 60.
[29] Garrane Green Energy Project EIAR, Chap. 2, p.9, 11; see also Chap. 10, p.91.
[30] https://www.pleanala.ie/anbordpleanala/media/abp/cases/records/319/p319139b.pdf?r=655360794949

Summary of main points

The Ornithological Report for Garrane Green Energy has several major methodological and interpretative shortcomings:

- Inadequate survey of Annex 1, red-listed and amber-listed waterbirds at Charleville Lagoons, an Irish Wetland Bird Survey site only 90 metres south of the windfarm
- No Vantage Point to the south or south east of the windfarm, meaning flight activity around Turbine 1 and Charleville Lagoons not adequately covered
- Assessment of collision impacts on birds assumes turbine height of 170m when in fact the majority of the turbines will be taller than 170m due to plinths
- The Collision impact analysis is narrow and includes only 11 species
- Underestimation of effects on Golden Plover, Lapwing, Dunlin and Whooper Swan due to lack of survey at Charleville Lagoons and lack of Vantage Point in south/south east
- Incorrectly claims that there are "extensive areas of suitable retained habitat in the wider area" for waders. In fact, Charleville Lagoons and the Ballynagoul Wetland, where windfarm will be built, are the last suitable habitat left for them in the wider area (see Chapter 3 on Ecology in this objection)
- Annex 1 Whooper Swan have been recorded at Charleville Lagoons and, as of 2025, a Whooper Swan family with four juveniles uses the site. Yet they are described as being of "negligible importance" in context of windfarm, with no assessment of effects on them
- The red-listed Shoveler is present in nationally-significant numbers at Charleville Lagoons and commutes through the windfarm site. Yet they are described as being of "negligible importance" in context of windfarm, with no assessment of effects on them
- Claims to have taken windfarm's Zone of Influence into account but frequently overlooks importance of large (and protected) duck populations at the immediately-adjacent Charleville Lagoons
- Fails to assess risk of displacing Annex 1, red-listed and amber-listed duck, swan and wader species at immediately adjacent Charleville Lagoons (especially due to Turbines 1, 2 and 3)

We therefore respectfully recommend to An Coimisiún Pleanála that it reject planning permission for the proposed Garrane Green Energy project.

2.2 Disturbance to and Inadequate Survey of Barn Owls and other Raptors

Susan Kerwin
Ballynoe
Bruree
Co Limerick V35Y754
batrehabilitationireland@gmail.com

Dear Sir/Madam,

I have almost 20 years of experience in the care and conservation of Irish raptors. I am on the board of The Barn Owl Project and have been an advisor on raptor related projects with Limerick Co Council, The Agri-Climate Rural Environment scheme and Ballyhoura development. I am also a licenced specialist in the rehabilitation of raptors. Licence granted by the National Parks and Wildlife Services.

I wish to formally object to the Garrane Green Energy wind farm development due to the impacts that it will have on Barn owls and other raptors in the area, primarily the kestrel. In particular, I would like to object to the inadequate nature of the barn owl survey undertaken by RSK Biocensus for the EIAR.

Risks to raptors

Barn owls and Kestrels are protected under the Wildlife Act 1976 (as amended) and are both now red-listed birds of high conservation concern in Ireland. The Hen Harrier is also red-listed and in addition is protect on Annex I of the EU Birds Directive (2009/147/EC). The proposed development poses serious risks to these species in the area due to:

- Displacement of birds from established territories.

- Interruption of hunting patterns, especially in lowland habitats.

- Long-term avoidance of the area, reducing reproductive success.

Failings in Garrane Green Energy barn owl survey

The barn owl survey submitted with the planning application lacks sufficient detail and rigor. It fails to:

- Identify active nesting sites within the affected townlands (Garrane, Ballynagoul, and Creggane).

- Include longitudinal data or cumulative impact analysis, especially considering multiple wind farm proposals in the region.

- Adhere to recommended survey protocols for nocturnal species, particularly owls. According to NatureScot's Recommended Bird Survey Methods to Inform Impact Assessment of Onshore Windfarms (2025), breeding surveys for owls should extend up to 1km beyond the proposed site boundary. Late evening surveys between May and July are essential to detect calling juveniles and signs of successful breeding pairs. These surveys should also include evidence such as moulted feathers and pellets, none of which were documented in the submitted report.

Barn owl roosting and nesting sites in development area

Table 28 in the Baseline Ornithology Report says that no evidence was found of barn owl breeding or roosting activity in or near the development area. Table 46 of the report, however, reveals that barn owl survey efforts for the EIAR were very limited in scope and duration:

- Barn owl survey was only conducted in 2023
- There were only three survey dates across a 1km area, with only the first survey date (on 30 April) covering all seven derelict houses in that area.
- Only one dusk visit during the critical breeding season (May–July). And on this critical visit only four of the seven sites were visited
- No surveys were conducted in June or July, which are essential months for detecting juvenile calling and confirming successful breeding pairs
- The third and fourth visits were both conducted on the same day and only one site was visited
- Weather conditions during some surveys (e.g., light showers and cloud cover) may have reduced visibility and detection rates.

In effect, then, the entire 'barn owl survey' for Garrane windfarm consisted of:

- one survey date to seven sites but outside the key season
- a second survey date in the key season but only to four sites
- two short follow-up visits on one day to just one site, well out of season and in poor visibility

The EIAR's conclusion that there is no evidence for barn owl roosting or breeding in the area is inappropriate given the lack of survey dates and the poor timing of the visits.

What is more, I have confirmed evidence of barn owl roosting and nesting sites in the townlands that will be affected by the proposed windfarm. I have geo-tagged photographs of these sites and can provide this evidence to An Coimisiún Pleanála upon request.

In light of the above, it is also inappropriate that the barn owl has been omitted from the EIAR's Collision Risk Modelling (Appendix 8.2).

High value of site for Kestrel breeding and feeding, and for Peregrine Falcon and Hen Harrier feeding

I note with concern that the windfarm is proposed in a location that is of high value for several other raptors. The kestrel, which is now red listed, was recorded very frequently and evidence was found of at least one breeding pair. This one pair must be regarded as a minimum given the lack of vantage points to the south and south east of the windfarm site. The results of the vantage point survey, spatially biased as it is, suggest that the area is a stronghold of this red-listed species and that a rating of at least "County/district importance" should have been assigned.

The rough grazing and scrub found in the Ballynagoul Wetland (MIW_LI330)[31] is likely to be

[31] https://wetland.maps.arcgis.com/apps/View/index.html?appid=e13b75c3bcab4932b992aa0169aa4a32&extent=-12.6266,51.3236,-3.2168,55.4102

crucial factor in attracting kestrel hunting and breeding to the area. These rich hunting and nesting grounds will be severely and permanently disturbed by windfarm construction, compromising the kestrel's habitat. This effect has not been properly assessed. While the EIAR admits that the resident breeding kestrel population will suffer a loss of nesting habitat, it argues that the effect on the kestrel population will be "not significant" and that "the loss is considered to be negligible in the landscape context". The EIAR fails to mention that the habitat in question – the Ballynagoul Wetland – is one of the richest in south Limerick. The loss is therefore likely to be significant. What is more, the kestrel has one of the lowest wind turbine avoidance rates of all bird species in north-western Europe.[32] Considering the evidence for local breeding, the loss of nesting habitat and rich foraging ground, and the kestrel's relatively low avoidance rate, I believe that the "not significant" assessment of effects on the population is untenable.

Peregrine Falcon and Hen Harrier, both Annex 1 species, were also recorded hunting in the proposed windfarm site in the EIAR. The construction of a windfarm in this location, particularly in the Ballynagoul Wetland, will lead to a loss of foraging grounds for Peregrine Falcon and Hen Harrier in south Limerick. Given that there are so few pairs left in the district, the effects of this may be significant.

Cumulative effects

Furthermore, I am deeply concerned about the cumulative environmental impact of multiple wind farm developments here and in the neighbouring parishes of Athlacca, Dromin, Bruff, as well as a biomethane plant proposed for Cappanihane, Bruree.

The cumulative effects of two large wind farms and a biomethane station concentrated within these communities in such close proximity pose a significant threat to local biodiversity, particularly to sensitive raptor species such as barn owls and kestrels. These developments collectively increase habitat fragmentation, noise disturbance, and disruption of hunting territories. For species that rely on quiet, open lowland areas for foraging and nesting, such as barn owls, the compounded environmental stress can lead to territory abandonment, reduced breeding success, and long-term population decline.

In light of these concerns, I respectfully request that a new and more comprehensive barn owl and raptor study be commissioned.

In conclusion, the proposed development poses a clear and avoidable threat to protected species and the ecological integrity of the Bruree area. I urge An Coimisiún Pleanála to prioritize biodiversity and uphold its obligations under national and EU law.

Yours sincerely,
Susan Kerwin

[32] https://www.nature.scot/doc/wind-farm-impacts-birds-use-avoidance-rates-naturescot-wind-farm-collision-risk-model

APPENDIX A – full I-WeBS dataset for Charleville Lagoons (obtained by request from BirdWatch Ireland)

Species	LatinNameIOC	DisplayOrder	AllIreland_1pc	Flyway_1pc	Peak	1994/95	1995/96	1996/97	1997/98	1998/99	1999/00	2000/01	2001/02	2002/03	2003/04	2004/05	2005/06	2006/07	2007/08	2008/09	2010/11	2011/12	2012/13	2013/14	2018/19	2022/23
Mute Swan	Cygnus olor	100	90	100	34	3	8	9	12	13	29	14	13	15	4	16	12	4	22	32	21	34	10	17		15
Whooper Swan	Cygnus cygnus	300	150	340	8	5					3										8	1				
Greylag Goose (resident)	Anser anser	600	35	980	1					1																
Shelduck	Tadorna tadorna	1000	100	2500	7	4	3	2	6	7	5	2		5		2	4		2	2	6	2	3	2		
Wigeon	Mareca penelope	1100	560	14000	374	133	106	227	300	102	171	70	145	374	246	278	302	164	343	186	225	226	260	274	1	339
Gadwall	Mareca strepera	1200	20	1200	12						4		2								12	6	7			7
Teal	Anas crecca	1300	360	5000	759	276	543	338	407	458	759	530	320	102	180	265	328	30	144	181	59	120	190	166	230	100
Mallard	Anas platyrhynchos	1400	280	53000	247	66	111	137	72	247	192	169	186	94	127	44	110	18	150	76	102	120	60	91	100	69
Pintail	Anas acuta	1500	20	600	6			3	2	2		5				6				2						

Shoveler	Spatula clypeata	1600	20	650	148	83	84	148	54	80	82	37	72	51	105	67	65	23	85	40	50	34	52	50	22	38
Pochard	Aythya ferina	1700	110	2000	71	71	8	45	5	22	6			19	26		10	6				4	4	2		
Tufted Duck	Aythya fuligula	1800	270	8900	56	40	31	10	26	11	13	30	13	42	39	56	29	28	26	20	56	40	28	45		16
Scaup	Aythya marila	1900	25	3100	2				1		2	1														
Goldeneye	Bucephala clangula	2300	40	11400	1				1																	
Ruddy Duck	Oxyura jamaicensis	2700			1	1							1													
Little Grebe	Tachybaptus ruficollis	3100	20	4700	30		2	7		1	3	10	5		7	3	6	2	10	10	30	19	5	19	20	
Great Crested Grebe	Podiceps cristatus	3200	30	6300	2																			2		
Cormorant	Phalacrocorax carbo	3400	110	1200	6	1				6	1		1	6	3							2		2	6	1
Little Egret	Egretta garzetta	3600	20	1100	1											1										

Grey Heron	Ardea cinerea	3700	25	5000	2				1						2							1					
Water Rail	Rallus aquaticus	3800			1				1																		
Moorhen	Gallinula chloropus	3900			11	6	4	1	1	1	8	3	11			3	3					3	2	2		2
Coot	Fulica atra	4000	190	15500	43	43	15	1		2	4		1		40		15	8	12	10	6	5	10	3		4
Golden Plover	Pluvialis apricaria	4300	920	9300	3500						90	500	3500			3500										
Lapwing	Vanellus vanellus	4500	850	72300	2200	280	300	12	400	350	1060	1500	2200		600	1700	50	40			26	44	60	50		
Knot	Calidris canutus	4600	160	5300	1			1																		
Little Stint	Calidris minuta	4800			1				1																	
Dunlin	Calidris alpina	5100	460	13300	274		30	274	10	7	30	154	4		46	135							20		3	
Ruff	Calidris pugnax	5200			20			20		2																

Snipe	Gallinago gallinago	5400			59	5	2		8	6	59	2	5	5	1	6					2	1		1	4	
Black-tailed Godwit	Limosa limosa	5600	200	1100	10				1			1			3										10	
Curlew	Numenius arquata	5900	350	7600	232	150	170	223	200	190	128	232	87	7	80	180	40		3			5				
Redshank	Tringa totanus	6100	240	2400	7	3	2			5	7	2	3	1	3	2	3						1			2
Green Sandpiper	Tringa ochropus	6300			7	4	2	7	3	5	7	4	1		1							2		2		
Wood Sandpiper	Tringa glareola	6400			1						1															
Common Sandpiper	Actitis hypoleucos	6500			4					3				4			2									
Black-headed Gull	Chroicocephalus ridibundus	6800			800	568	788	800	147	436	200	223	50	47	32	15	25	10	41	203	95	11	32	60		170
Common Gull	Larus canus	6900			2		2																			

Lesser Black-backed Gull	Larus fuscus	7000			520	505	384	520	500	492	300	69	6	30	1	32			12	60			15	45		
Herring Gull	Larus argentatus	7100			1							1														
Great Black-backed Gull	Larus marinus	7200			5		5																			
Garganey	Spatula querquedula	104130			2											1								2		
American Wigeon	Mareca americana	104370			1	1		1			1															
Iceland Gull	Larus glaucoides	161480			1						1															

APPENDIX B – Bird records for Ballynagoul townland from National Biodiversity Data Centre

Feature name	Species group	Species name	Record count	Date of last record	Title of dataset	Designation
BALLYNAGOUL	Bird	American Wigeon (Mareca americana)	6	31/12/2001	Irish Wetland Birds Survey (I-WeBS) 1994-2001.	
BALLYNAGOUL	Bird	Barn Owl (Tyto alba)	6	03/12/2023	Birds of Ireland	Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Red List
BALLYNAGOUL	Bird	Bar-tailed Godwit (Limosa lapponica)	1	31/12/2001	Irish Wetland Birds Survey (I-WeBS) 1994-2001.	Protected Species: Wildlife Acts || Protected Species: EU Birds Directive || Protected Species: EU Birds Directive >> Annex I Bird Species || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Red List
BALLYNAGOUL	Bird	Blackbird (Turdus merula)	9	31/12/2011	Bird Atlas 2007 - 2011	
BALLYNAGOUL	Bird	Blackcap (Sylvia atricapilla)	2	31/12/2011	Bird Atlas 2007 - 2011	
BALLYNAGOUL	Bird	Black-headed Gull (Chroicocephalus ridibundus)	8	04/01/2019	Birds of Ireland	Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List
BALLYNAGOUL	Bird	Black-tailed Godwit (Limosa limosa)	1	31/12/2001	Irish Wetland Birds Survey (I-WeBS) 1994-2001.	Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Red List
BALLYNAGOUL	Bird	Blue Tit (Cyanistes caeruleus)	9	31/12/2011	Bird Atlas 2007 - 2011	
BALLYNAGOUL	Bird	Blue-winged Teal (Spatula discors)	1	02/01/1996	Rare birds of Ireland	
BALLYNAGOUL	Bird	Broad-billed Sandpiper (Calidris falcinellus)	2	02/06/1978	Rare birds of Ireland	
BALLYNAGOUL	Bird	Bullfinch (Pyrrhula pyrrhula)	8	31/12/2011	Bird Atlas 2007 - 2011	

BALLYNAGOUL	Bird	Buzzard (Buteo buteo)	5	03/04/2021	Birds of Ireland	
BALLYNAGOUL	Bird	Chaffinch (Fringilla coelebs)	10	04/01/2019	Birds of Ireland	
BALLYNAGOUL	Bird	Chiffchaff (Phylloscopus collybita)	5	08/07/2022	Birds of Ireland	
BALLYNAGOUL	Bird	Coal Tit (Periparus ater)	7	31/12/2011	Bird Atlas 2007 - 2011	
BALLYNAGOUL	Bird	Collared Dove (Streptopelia decaocto)	4	31/12/2011	Bird Atlas 2007 - 2011	
BALLYNAGOUL	Bird	Common Gull (Larus canus)	3	31/12/2011	Bird Atlas 2007 - 2011	Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List
BALLYNAGOUL	Bird	Common Sandpiper (Actitis hypoleucos)	2	04/01/2019	Birds of Ireland	Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List
BALLYNAGOUL	Bird	Coot (Fulica atra)	9	04/01/2019	Birds of Ireland	Protected Species: Wildlife Acts || Protected Species: EU Birds Directive || Protected Species: EU Birds Directive >> Annex II, Section I Bird Species || Protected Species: EU Birds Directive >> Annex III, Section II Bird Species || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List
BALLYNAGOUL	Bird	Cormorant (Phalacrocorax carbo)	6	31/12/2011	Bird Atlas 2007 - 2011	Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List
BALLYNAGOUL	Bird	Crane (Grus grus)	1	17/09/2000	Rare birds of Ireland	
BALLYNAGOUL	Bird	Cuckoo (Cuculus canorus)	3	31/12/2011	Bird Atlas 2007 - 2011	
BALLYNAGOUL	Bird	Curlew (Numenius arquata)	8	31/12/2011	Bird Atlas 2007 - 2011	Protected Species: Wildlife Acts || Protected Species: EU Birds Directive || Protected Species: EU Birds Directive >> Annex II, Section II Bird

						Species || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Red List
BALLYNAGOUL	Bird	Curlew Sandpiper (Calidris ferruginea)	1	31/12/2001	Irish Wetland Birds Survey (I-WeBS) 1994-2001.	Protected Species: Wildlife Acts || Protected Species: EU Birds Directive || Protected Species: EU Birds Directive >> Annex I Bird Species || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Red List
BALLYNAGOUL	Bird	Dipper (Cinclus cinclus)	1	31/07/1972	The First Atlas of Breeding Birds in Britain and Ireland: 1968-1972.	
BALLYNAGOUL	Bird	Dunlin (Calidris alpina)	1	31/12/2001	Irish Wetland Birds Survey (I-WeBS) 1994-2001.	Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Red List
BALLYNAGOUL	Bird	Dunnock (Prunella modularis)	8	31/12/2011	Bird Atlas 2007 - 2011	
BALLYNAGOUL	Bird	Ferruginous Duck (Aythya nyroca)	1	08/03/1992	Rare birds of Ireland	
BALLYNAGOUL	Bird	Fieldfare (Turdus pilaris)	3	31/12/2011	Bird Atlas 2007 - 2011	
BALLYNAGOUL	Bird	Gadwall (Mareca strepera)	1	31/12/2001	Irish Wetland Birds Survey (I-WeBS) 1994-2001.	Protected Species: Wildlife Acts || Protected Species: EU Birds Directive || Protected Species: EU Birds Directive >> Annex II, Section I Bird Species || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List
BALLYNAGOUL	Bird	Garganey (Spatula querquedula)	3	31/12/2011	Bird Atlas 2007 - 2011	Protected Species: Wildlife Acts || Protected Species: EU Birds Directive || Protected Species: EU Birds Directive >> Annex II, Section I Bird Species || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List
BALLYNAGOUL	Bird	Goldcrest (Regulus regulus)	8	31/12/2011	Bird Atlas 2007 - 2011	Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List

BALLYNAGOUL	Bird	Golden Plover (Pluvialis apricaria)	2	31/12/2001	Irish Wetland Birds Survey (I-WeBS) 1994-2001.	Protected Species: Wildlife Acts || Protected Species: EU Birds Directive || Protected Species: EU Birds Directive >> Annex I Bird Species || Protected Species: EU Birds Directive >> Annex II, Section II Bird Species || Protected Species: EU Birds Directive >> Annex III, Section III Bird Species || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Red List
BALLYNAGOUL	Bird	Goldeneye (Bucephala clangula)	1	31/12/2001	Irish Wetland Birds Survey (I-WeBS) 1994-2001.	Protected Species: Wildlife Acts || Protected Species: EU Birds Directive || Protected Species: EU Birds Directive >> Annex II, Section II Bird Species || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Red List
BALLYNAGOUL	Bird	Goldfinch (Carduelis carduelis)	10	24/08/2020	Birds of Ireland	
BALLYNAGOUL	Bird	Great Black-backed Gull (Larus marinus)	3	31/12/2001	Irish Wetland Birds Survey (I-WeBS) 1994-2001.	
BALLYNAGOUL	Bird	Great Crested Grebe (Podiceps cristatus)	1	31/12/2011	Bird Atlas 2007 - 2011	Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List
BALLYNAGOUL	Bird	Great Tit (Parus major)	8	31/12/2011	Bird Atlas 2007 - 2011	
BALLYNAGOUL	Bird	Green Sandpiper (Tringa ochropus)	3	31/12/2011	Bird Atlas 2007 - 2011	
BALLYNAGOUL	Bird	Greenfinch (Chloris chloris)	8	31/12/2011	Bird Atlas 2007 - 2011	Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List
BALLYNAGOUL	Bird	Greenshank (Tringa nebularia)	1	31/12/2001	Irish Wetland Birds Survey (I-WeBS) 1994-2001.	
BALLYNAGOUL	Bird	Green-winged Teal (Anas carolinensis)	1	31/12/2001	Irish Wetland Birds Survey (I-WeBS) 1994-2001.	

BALLYNAGOUL	Bird	Grey Heron (Ardea cinerea)	9	31/12/2011	Bird Atlas 2007 - 2011	
BALLYNAGOUL	Bird	Grey Wagtail (Motacilla cinerea)	9	04/01/2019	Birds of Ireland	Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Red List
BALLYNAGOUL	Bird	Greylag Goose (Anser anser)	1	31/12/2001	Irish Wetland Birds Survey (I-WeBS) 1994-2001.	Invasive Species: Regulation S.I. 477/2011 (Ireland) || Invasive Species: Regulation S.I. 374/2024 (Ireland) || Protected Species: Wildlife Acts || Protected Species: EU Birds Directive || Protected Species: EU Birds Directive >> Annex II, Section I Bird Species || Protected Species: EU Birds Directive >> Annex III, Section II Bird Species || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List
BALLYNAGOUL	Bird	Hen Harrier (Circus cyaneus)	6	14/01/2024	Birds of Ireland	Protected Species: Wildlife Acts || Protected Species: EU Birds Directive || Protected Species: EU Birds Directive >> Annex I Bird Species || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List
BALLYNAGOUL	Bird	Herring Gull (Larus argentatus)	4	31/12/2011	Bird Atlas 2007 - 2011	Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List
BALLYNAGOUL	Bird	Hooded Crow (Corvus cornix)	10	31/12/2011	Bird Atlas 2007 - 2011	
BALLYNAGOUL	Bird	House Martin (Delichon urbicum)	3	31/12/2011	Bird Atlas 2007 - 2011	Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List
BALLYNAGOUL	Bird	House Sparrow (Passer domesticus)	7	31/12/2011	Bird Atlas 2007 - 2011	Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List
BALLYNAGOUL	Bird	Iceland Gull (Larus glaucoides)	1	31/12/2001	Irish Wetland Birds Survey (I-WeBS) 1994-2001.	
BALLYNAGOUL	Bird	Jackdaw (Coloeus monedula)	9	31/12/2011	Bird Atlas 2007 - 2011	

BALLYNAGOUL	Bird	Jay (Garrulus glandarius)	1	29/02/1984	The First Atlas of Wintering Birds in Britain and Ireland: 1981/82-1983/84.	
BALLYNAGOUL	Bird	Kestrel (Falco tinnunculus)	9	16/04/2021	Birds of Ireland	Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Red List
BALLYNAGOUL	Bird	Kingfisher (Alcedo atthis)	6	23/05/2021	Birds of Ireland	Protected Species: Wildlife Acts || Protected Species: EU Birds Directive || Protected Species: EU Birds Directive >> Annex I Bird Species || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List
BALLYNAGOUL	Bird	Knot (Calidris canutus)	3	31/12/2011	Bird Atlas 2007 - 2011	Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Red List
BALLYNAGOUL	Bird	Lapwing (Vanellus vanellus)	6	31/12/2011	Bird Atlas 2007 - 2011	Protected Species: Wildlife Acts || Protected Species: EU Birds Directive || Protected Species: EU Birds Directive >> Annex II, Section II Bird Species || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Red List
BALLYNAGOUL	Bird	Lesser Black-backed Gull (Larus fuscus)	7	04/01/2019	Birds of Ireland	Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List
BALLYNAGOUL	Bird	Lesser Redpoll (Acanthis cabaret)	3	31/12/2011	Bird Atlas 2007 - 2011	
BALLYNAGOUL	Bird	Linnet (Linaria cannabina)	7	31/12/2011	Bird Atlas 2007 - 2011	Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List
BALLYNAGOUL	Bird	Little Egret (Egretta garzetta)	3	24/12/2020	Birds of Ireland	Protected Species: Wildlife Acts || Protected Species: EU Birds Directive || Protected Species: EU Birds Directive >> Annex I Bird Species
BALLYNAGOUL	Bird	Little Grebe (Tachybaptus ruficollis)	7	04/01/2019	Birds of Ireland	Protected Species: Wildlife Acts

BALLYNAGOUL	Bird	Little Stint (Calidris minuta)	1	31/12/2001	Irish Wetland Birds Survey (I-WeBS) 1994-2001.	
BALLYNAGOUL	Bird	Long-eared Owl (Asio otus)	1	31/07/1972	The First Atlas of Breeding Birds in Britain and Ireland: 1968-1972.	
BALLYNAGOUL	Bird	Long-tailed Tit (Aegithalos caudatus)	7	31/12/2011	Bird Atlas 2007 - 2011	
BALLYNAGOUL	Bird	Magpie (Pica pica)	8	31/12/2011	Bird Atlas 2007 - 2011	
BALLYNAGOUL	Bird	Mallard (Anas platyrhynchos)	8	04/01/2019	Birds of Ireland	Protected Species: Wildlife Acts || Protected Species: EU Birds Directive || Protected Species: EU Birds Directive >> Annex II, Section I Bird Species || Protected Species: EU Birds Directive >> Annex III, Section I Bird Species || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List
BALLYNAGOUL	Bird	Meadow Pipit (Anthus pratensis)	6	31/12/2011	Bird Atlas 2007 - 2011	Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Red List
BALLYNAGOUL	Bird	Merlin (Falco columbarius)	1	31/07/1972	The First Atlas of Breeding Birds in Britain and Ireland: 1968-1972.	Protected Species: Wildlife Acts || Protected Species: EU Birds Directive || Protected Species: EU Birds Directive >> Annex I Bird Species || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List
BALLYNAGOUL	Bird	Mistle Thrush (Turdus viscivorus)	5	31/12/2011	Bird Atlas 2007 - 2011	Protected Species: Wildlife Acts
BALLYNAGOUL	Bird	Moorhen (Gallinula chloropus)	10	20/08/2020	Birds of Ireland	
BALLYNAGOUL	Bird	Mute Swan (Cygnus olor)	11	04/01/2019	Birds of Ireland	Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List
BALLYNAGOUL	Bird	Peregrine (Falco peregrinus)	3	31/12/2011	Bird Atlas 2007 - 2011	Protected Species: Wildlife Acts || Protected Species: EU Birds Directive || Protected Species: EU Birds Directive >> Annex I Bird Species

BALLYNAGOUL	Bird	Pheasant (Phasianus colchicus)	7	31/12/2011	Bird Atlas 2007 - 2011	Protected Species: Wildlife Acts || Protected Species: EU Birds Directive || Protected Species: EU Birds Directive >> Annex II, Section I Bird Species || Protected Species: EU Birds Directive >> Annex III, Section I Bird Species
BALLYNAGOUL	Bird	Pied Wagtail (Motacilla alba yarrellii)	1	04/01/2019	Birds of Ireland	
BALLYNAGOUL	Bird	Pied Wagtail (Motacilla alba)	8	31/12/2011	Bird Atlas 2007 - 2011	
BALLYNAGOUL	Bird	Pintail (Anas acuta)	2	04/01/2019	Birds of Ireland	Protected Species: Wildlife Acts || Protected Species: EU Birds Directive || Protected Species: EU Birds Directive >> Annex II, Section I Bird Species || Protected Species: EU Birds Directive >> Annex III, Section II Bird Species || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List
BALLYNAGOUL	Bird	Pochard (Aythya ferina)	2	31/12/2001	Irish Wetland Birds Survey (I-WeBS) 1994-2001.	Protected Species: Wildlife Acts || Protected Species: EU Birds Directive || Protected Species: EU Birds Directive >> Annex II, Section I Bird Species || Protected Species: EU Birds Directive >> Annex III, Section II Bird Species || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Red List
BALLYNAGOUL	Bird	Raven (Corvus corax)	9	21/08/2020	Birds of Ireland	
BALLYNAGOUL	Bird	Red Grouse (Lagopus lagopus)	1	29/02/1984	The First Atlas of Wintering Birds in Britain and Ireland: 1981/82-1983/84.	Protected Species: Wildlife Acts || Protected Species: EU Birds Directive || Protected Species: EU Birds Directive >> Annex II, Section I Bird Species || Protected Species: EU Birds Directive >> Annex III, Section I Bird Species || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Red List
BALLYNAGOUL	Bird	Redshank (Tringa totanus)	3	31/12/2011	Bird Atlas 2007 - 2011	Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Red List
BALLYNAGOUL	Bird	Redwing (Turdus iliacus)	4	31/12/2011	Bird Atlas 2007 - 2011	Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation

						Concern >> Birds of Conservation Concern - Red List
BALLYNAGOUL	Bird	Reed Bunting (Emberiza schoeniclus)	10	14/04/2021	Birds of Ireland	
BALLYNAGOUL	Bird	Ring-necked Duck (Aythya collaris)	1	20/06/1987	Birds of Ireland	
BALLYNAGOUL	Bird	Robin (Erithacus rubecula)	10	08/07/2022	Birds of Ireland	Protected Species: Wildlife Acts
BALLYNAGOUL	Bird	Rock Dove (Columba livia)	4	31/12/2011	Bird Atlas 2007 - 2011	Protected Species: Wildlife Acts || Protected Species: EU Birds Directive || Protected Species: EU Birds Directive >> Annex II, Section I Bird Species
BALLYNAGOUL	Bird	Rook (Corvus frugilegus)	10	31/12/2011	Bird Atlas 2007 - 2011	
BALLYNAGOUL	Bird	Ruddy Duck (Oxyura jamaicensis)	13	30/11/2002	National Invasive Species Database	Invasive Species: EU Invasive Alien Species Regulation No. 1143/2014 || Invasive Species: Regulation S.I. 477/2011 (Ireland) || Invasive Species: High Risk Invasive Species (2013 Report) || Invasive Species: Regulation S.I. 374/2024 (Ireland)
BALLYNAGOUL	Bird	Ruff (Calidris pugnax)	1	31/12/2001	Irish Wetland Birds Survey (I-WeBS) 1994-2001.	Protected Species: Wildlife Acts || Protected Species: EU Birds Directive || Protected Species: EU Birds Directive >> Annex I Bird Species || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List
BALLYNAGOUL	Bird	Sand Martin (Riparia riparia)	2	31/12/2011	Bird Atlas 2007 - 2011	Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List
BALLYNAGOUL	Bird	Scaup (Aythya marila)	1	31/12/2001	Irish Wetland Birds Survey (I-WeBS) 1994-2001.	Protected Species: Wildlife Acts || Protected Species: EU Birds Directive || Protected Species: EU Birds Directive >> Annex II, Section II Bird Species || Protected Species: EU Birds Directive >> Annex III, Section III Bird Species || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Red List
BALLYNAGOUL	Bird	Sedge Warbler (Acrocephalus	5	20/07/2024	Birds of Ireland	

		schoenobaenus)				
BALLYNAGOUL	Bird	Shelduck (Tadorna tadorna)	4	31/12/2011	Bird Atlas 2007 - 2011	Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List
BALLYNAGOUL	Bird	Shoveler (Spatula clypeata)	9	04/01/2019	Birds of Ireland	Protected Species: Wildlife Acts || Protected Species: EU Birds Directive || Protected Species: EU Birds Directive >> Annex II, Section I Bird Species || Protected Species: EU Birds Directive >> Annex III, Section III Bird Species || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Red List
BALLYNAGOUL	Bird	Siskin (Spinus spinus)	1	31/12/2011	Bird Atlas 2007 - 2011	
BALLYNAGOUL	Bird	Skylark (Alauda arvensis)	9	31/12/2011	Bird Atlas 2007 - 2011	Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List
BALLYNAGOUL	Bird	Snipe (Gallinago gallinago)	11	04/01/2019	Birds of Ireland	Protected Species: Wildlife Acts || Protected Species: EU Birds Directive || Protected Species: EU Birds Directive >> Annex II, Section I Bird Species || Protected Species: EU Birds Directive >> Annex III, Section III Bird Species || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Red List
BALLYNAGOUL	Bird	Song Thrush (Turdus philomelos)	8	31/12/2011	Bird Atlas 2007 - 2011	
BALLYNAGOUL	Bird	Sparrowhawk (Accipiter nisus)	8	24/08/2020	Birds of Ireland	Protected Species: Wildlife Acts
BALLYNAGOUL	Bird	Spotted Crake (Porzana porzana)	1	02/09/1969	Rare birds of Ireland	Protected Species: Wildlife Acts || Protected Species: EU Birds Directive || Protected Species: EU Birds Directive >> Annex I Bird Species || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List
BALLYNAGOUL	Bird	Spotted Flycatcher (Muscicapa striata)	2	31/12/2011	Bird Atlas 2007 - 2011	Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List

BALLYNAGOUL	Bird	Starling (Sturnus vulgaris)	9	31/12/2011	Bird Atlas 2007 - 2011	Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List
BALLYNAGOUL	Bird	Stock Dove (Columba oenas)	2	31/07/1991	The Second Atlas of Breeding Birds in Britain and Ireland: 1988-1991	Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Red List
BALLYNAGOUL	Bird	Stonechat (Saxicola rubicola)	12	03/12/2020	Birds of Ireland	Protected Species: Wildlife Acts
BALLYNAGOUL	Bird	Swallow (Hirundo rustica)	5	31/12/2011	Bird Atlas 2007 - 2011	Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List
BALLYNAGOUL	Bird	Swift (Apus apus)	5	31/12/2011	Bird Atlas 2007 - 2011	Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Red List
BALLYNAGOUL	Bird	Teal (Anas crecca)	7	04/01/2019	Birds of Ireland	Protected Species: Wildlife Acts || Protected Species: EU Birds Directive || Protected Species: EU Birds Directive >> Annex II, Section I Bird Species || Protected Species: EU Birds Directive >> Annex III, Section II Bird Species || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List
BALLYNAGOUL	Bird	Tree Sparrow (Passer montanus)	1	29/02/1984	The First Atlas of Wintering Birds in Britain and Ireland: 1981/82-1983/84.	Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List
BALLYNAGOUL	Bird	Treecreeper (Certhia familiaris)	6	31/12/2011	Bird Atlas 2007 - 2011	
BALLYNAGOUL	Bird	Tufted Duck (Aythya fuligula)	9	04/01/2019	Birds of Ireland	Protected Species: Wildlife Acts || Protected Species: EU Birds Directive || Protected Species: EU Birds Directive >> Annex II, Section I Bird Species || Protected Species: EU Birds Directive >> Annex III, Section II Bird Species || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List

BALLYNAGOUL	Bird	Turtle Dove (Streptopelia turtur)	1	31/07/1991	The Second Atlas of Breeding Birds in Britain and Ireland: 1988-1991	Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Red List
BALLYNAGOUL	Bird	Water Rail (Rallus aquaticus)	2	31/12/2001	Irish Wetland Birds Survey (I-WeBS) 1994-2001.	
BALLYNAGOUL	Bird	Wheatear (Oenanthe oenanthe)	2	31/07/1991	The Second Atlas of Breeding Birds in Britain and Ireland: 1988-1991	Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List
BALLYNAGOUL	Bird	Whitethroat (Curruca communis)	1	31/07/1972	The First Atlas of Breeding Birds in Britain and Ireland: 1968-1972.	
BALLYNAGOUL	Bird	White-winged Black Tern (Chlidonias leucopterus)	2	28/10/1990	Rare birds of Ireland	
BALLYNAGOUL	Bird	Whooper Swan (Cygnus cygnus)	1	31/12/2001	Irish Wetland Birds Survey (I-WeBS) 1994-2001.	Protected Species: Wildlife Acts || Protected Species: EU Birds Directive || Protected Species: EU Birds Directive >> Annex I Bird Species || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List
BALLYNAGOUL	Bird	Wigeon (Mareca penelope)	8	03/02/2025	Birds of Ireland	Protected Species: Wildlife Acts || Protected Species: EU Birds Directive || Protected Species: EU Birds Directive >> Annex II, Section I Bird Species || Protected Species: EU Birds Directive >> Annex III, Section II Bird Species || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List
BALLYNAGOUL	Bird	Willow Warbler (Phylloscopus trochilus)	6	31/12/2011	Bird Atlas 2007 - 2011	Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List
BALLYNAGOUL	Bird	Wood Sandpiper (Tringa glareola)	1	31/12/2001	Irish Wetland Birds Survey (I-WeBS) 1994-2001.	Protected Species: Wildlife Acts || Protected Species: EU Birds Directive || Protected Species: EU Birds Directive >> Annex I Bird Species || Threatened Species: Birds of Conservation Concern || Threatened

						Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List
BALLYNAGOUL	Bird	Woodcock (Scolopax rusticola)	4	03/12/2023	Birds of Ireland	Protected Species: Wildlife Acts || Protected Species: EU Birds Directive || Protected Species: EU Birds Directive >> Annex II, Section I Bird Species || Protected Species: EU Birds Directive >> Annex III, Section III Bird Species || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Red List
BALLYNAGOUL	Bird	Woodpigeon (Columba palumbus)	9	31/12/2011	Bird Atlas 2007 - 2011	
BALLYNAGOUL	Bird	Wren (Troglodytes troglodytes)	10	31/12/2011	Bird Atlas 2007 - 2011	

Chapter 3. Objection on ecological and biodiversity grounds

Biodiversity in Ballynagoul Wetland inadequately surveyed; significant effects on plant biodiversity and bird foraging habitat not assessed

Dr Eugene Costello
Baile na nGall
Cill Mocheallóg
Co. Luimnigh

Statement of competence

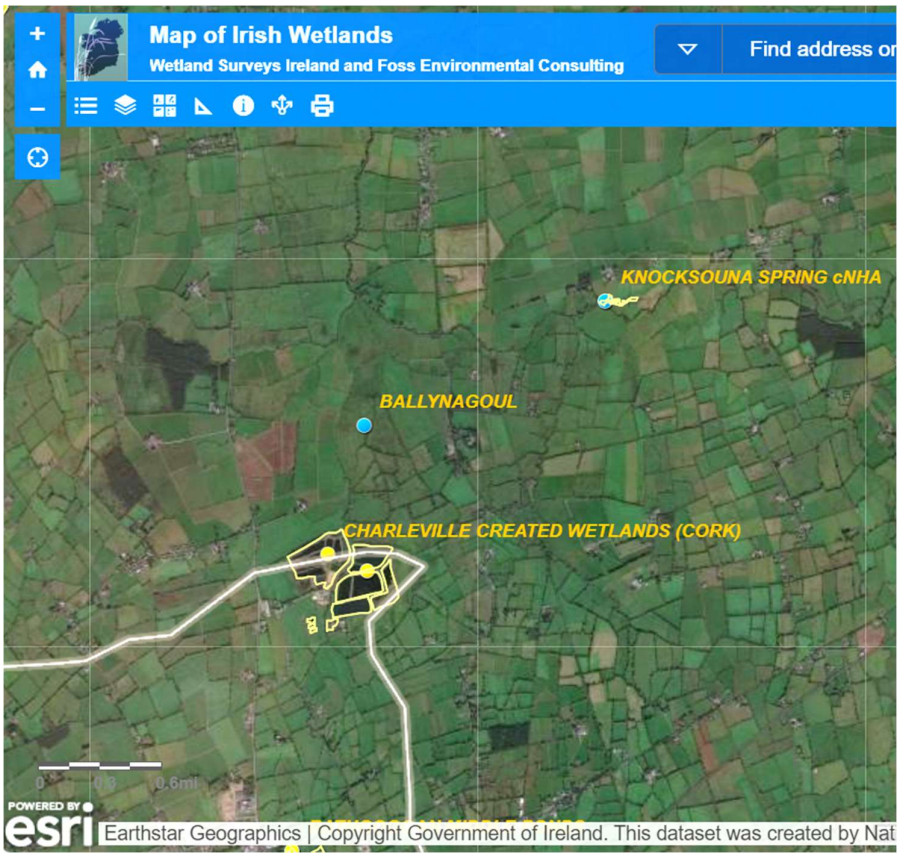
I have been an avid birdwatcher since the mid-2000s. I worked as a volunteer for the BTO Bird Atlas of Britain and Ireland between 2007 and 2011, contributing sightings of just under 60 bird species for the townland of Ballynagoul/Baile na nGall, where much of the windfarm is to be located. Since then I have continued to be a regular contributor of bird, mammal and wildflower sightings to the National Biodiversity Data Centre (See Appendix B at end of this chapter).

I am also a Lecturer and internationally-recognised researcher in environmental history and landscape archaeology. In my research, I investigate the role of humans in shaping rural landscapes and biodiversity. For example, I have carried out research on the long-term effects of historic farming practices on woodland and pasture, and the consequences of more intensive human activity for wild animal populations. In terms of fieldwork, I have become adept at identifying plant and bird species associated with traditional 'High Nature Value' farming in uplands and lowlands. For my research, I regularly read articles on ecology, zoology and genomics (as well as history and archaeology) and I have recently acted as a peer reviewer for the international journal *Landscape Ecology*. I am extremely experienced in reading and interrogating evidence-based arguments.

Introduction to Ballynagoul Wetland (MIW_LI330)

The Map of Irish Wetlands database developed by Wetland Surveys Ltd. and Foss Environmental Consulting Ltd. records an area of wetland in Ballynagoul, which includes land within the redline boundary of the proposed windfarm site. The Map of Irish Wetlands calls this site, 'MIW_LI330', and classifies it as 'Wet Grassland, Marsh, River, Artificial Pond, Scrub'. At the time of writing, the site had an F Rating, meaning 'Unknown value - survey required' and it says 'Description Pending'.

As part of the Limerick Biodiversity Action Plan 2025-2030, Limerick City and County Council procured Wetland Surveys Ltd. to undertake a field survey of the extent, condition and conservation value of this, and other, wetlands across Limerick City and County. Wetland Surveys Ltd. undertook the field survey of MIW_LI330: Ballynagoul in August 2025 and they are currently preparing a report of the results for Limerick City and County Council.



Screenshot from the Map of Irish Wetlands website, showing the Ballynagoul wetland (MIW_LI330) identified as needing further survey. See https://www.wetlandsurveys.ie/miw-intro

Inadequate survey of wet grassland biodiversity in project site

There is no mention of this Ballynagoul wetland area in Chapter 6: Biodiversity. Indeed, the report on habitats in the project site is quite short, with limited assessment of vegetation taking place. The report acknowledges that there is wet grassland in the east of the project site but devotes less than one page of description to it (p.40-41). Survey was undertaken on three days only and there was only one day of systematic field-by-field walkover survey (in June 2022, hours not given). This is inappropriately short given the potential conservation value of the Ballynagoul wetland area, as recognised in the Map of Irish Wetlands and the 2025 Limerick Wetland Survey.

Much of the eastern half of the project site, in Ballynagoul, is only farmed in a very extensive way. This is especially the case in the farm where Turbines 1, 2 and 4 will be located. For at least three decades, this land has had a stocking rate of little more than 0.1 Livestock Unit per hectare. Furthermore, there has never been any sustained use of heavy machinery on the land (silage is never cut there), meaning that the soil has not been affected by compaction (John Banks, Ballynagoul, pers. comm., 2021).[1] This is now very rare in a lowland context in Ireland. What some would regard as 'overgrown' and 'neglected' is in fact a rare and isolated remnant of

[1] See also Bondi, G., O 'Sullivan, L., Fenton, O., Creamer, R., Marongiu, I. and Wall, D.P. 2021. Trafficking intensity index for soil compaction management in grasslands. *Soil Use and Management* 37(3), 504-518.

High-Nature Value lowland pasture.[2] In most calcareous lowland areas in Ireland, an increase in stocking rates, drainage and early silage cutting since the 1960s has led to the disappearance of biodiverse pastures. Much of the west of Ballynagoul has avoided that fate, however, and now ranks as one of the only tracts of traditional *lowland* farmland left in County Limerick. Limerick and neighbouring counties have appreciable amounts of High-Nature Value grassland in acidic blanket bog and raised bog contexts and there is also some High-Nature Value grassland remaining on limestone pavement in Barrigone and further north, in Clare. However, it is far rarer to find a relict area of biodiverse pasture on lowland *gley* soil, as characterises this area. Typically, lowland gleys are drained and/or subjected to high stocking rates. But this did not happen here. This is now one of the reasons why the land in question and some neighbouring lands in Ballynagoul were surveyed by Wetland Surveys Ltd on behalf of Limerick City and County Council in 2025. An in-depth habitat and vegetation survey is needed throughout the project site before any planning decision is made on its future, and the survey presented in Chapter 6 does not meet that standard.

Google Earth satellite image of traditional High-Nature Value farmland where Turbines 1, 2, 4 and more than 1.5km of roadway will be built. Note stark contrast with intensively-farmed fields elsewhere

Examples of biodiversity in Ballynagoul wetland not used in EIAR

There is already some data in the public domain to support this claim of biodiversity, through the National Biodiversity Data Centre. In its methodology statement, Chapter 6 of the EIAR says it used the online web-mapper of the National Biodiversity Data Centre in its ecological assessment. There is little evidence of this in the report, however. As a result they have underestimated the diversity of species that exist in the project site, especially when it comes to

[2] Matin, S., Sullivan, C.A., Finn, J.A., Ó hUallacháin, D., Green, S., Meredith, D. and Moran, J. 2020. Assessing the distribution and extent of High Nature Value farmland in the Republic of Ireland. *Ecological Indicators* 108, 105700.

plant species. Appendix A at the end of this chapter provides a list of all 277 species recorded in Ballynagoul to date.[3] This is only a preliminary list since Ballynagoul has not seen anywhere near as much research as upland and peatland habitats. Nevertheless, it is significantly more than most lowland townlands in the area, which tend to have only 100-200 recorded species. Appendix B provides a list of all recent plant and animal records by me in Ballynagoul, as downloaded from the National Biodiversity Data Centre.

In terms of plant life, grassland in the Ballynagoul wetland area clearly has greater diversity than the surrounding landscape. For example, a number of fields have substantial populations of orchid, particularly common spotted-orchid. These orchids occur in large numbers, to the extent that they are a common feature of the sward in some fields, i.e. not just on margins. While common spotted-orchid is widespread in Ireland, it has become rare to encounter orchids in such numbers in lowland fields, especially on gley soils in Limerick. This is an indicator of High-Nature Value farmland. In the wetter parts of some fields, branched bur-reed is also found, as well as the more common hemp-agrimony and oval sedge. In some drier areas, there is localised yellow-rattle and agrimony. Yellow rattle is also a rare sight in lowland fields in Limerick today. These are only initial data but they emphasise the need for further investigation.

Surprisingly, none of the above species were spotted in the walk-over survey conducted for Garrane Green Energy's EIAR. This highlights the inadequacy of having only one day of systematic field-by-field survey. However, it also raises questions about the standard of the survey undertaken. Notwithstanding its short duration, it is difficult to believe that a qualified ecologist could miss an orchid-rich grassland in a "systematic field-by-field walkover survey of the project site" – all the more so given that they undertook it in the month of June, when orchids are coming into bloom. If rushes, buttercups and thistles were significant enough to be mentioned in the final report (p.40), then surely rarer farmland plants like orchid and yellow rattle would be too.

Please see below for examples of these species in the Ballynagoul wetland area:

[3] https://maps.biodiversityireland.ie/Map

Wet grassland with abundant common spotted-orchid as well as meadowsweet and rush

Close-up of two common spotted-orchid

Yellow rattle, post flowering

Importance of this wet grassland for birds of conservation concern

The value of this and other grassland in the project site, especially that which survives in Ballynagoul, is all the greater considering that it is used for foraging and breeding by birds of conservation concern. Garrane's Ornithology Baseline Report records that Hen Harrier and Peregrine Falcon were seen foraging in the area on numerous occasions, due to the rich hunting that its scrub and wet grassland offers (p.58). The Ornithology report also notes that it offers suitable foraging for Whooper Swan and one Whooper Swan was recorded foraging within the site (p.59). Given that there is a greater Whooper Swan presence at the adjacent Charleville Lagoons than the EIAR has suggested (see Ornithological chapter of this objection), it is possible that there is more Whooper Swan foraging on the wet grassland than assumed. Further survey is needed to ascertain this. Furthermore, several flocks of Golden Plover, another Annex I species, were recorded foraging on the wet grassland, as was Lapwing (p.62). Both Snipe and Kestrel were recorded as breeding and foraging in the wet grassland and adjoining habitat. Barn Owl are also likely to be relying on it for hunting to a greater extent than recognised in the EIAR, especially given that the EIAR has missed active roosting/nesting sites in the area (see Ornithological chapter of this objection).

Chapter 8 of the EIAR claims that there will not be a significant effect on waders and other birds of conservation concern because there "are extensive areas of suitable retained habitat in the wider area" (p.79). As the above has shown, however, the wet grassland found in the project site, and especially in the west of Ballynagoul, is unique in the wider area. The authors of Chapter 8 do not define "the wider area" but if they have the wider south Limerick and Charleville area in mind, it is simply false of them to claim that it contains "extensive areas of suitable retained habitat". The wider *landscape habitat* of lowland south Limerick and lowland north Cork has degraded substantially in the past 20 years due to land-use intensification and the proposed project will be built in one of the few significant areas of extensively-grazed wet grassland left in the district. For example, in the mid- to late-2000s, I regularly recorded

wintering lapwing and curlew in both the west and east of Ballynagoul townland. In the last ten years, however, they have disappeared from the more 'improved' land in the east of the townland and are now only present in the west, that is, in the project site.

Active badger sett missed in EIAR

The Biodiversity Chapter claims on p.55 that there is no badger sett in the project site:

"There was no evidence, such as setts, feeding marks or latrines, of badger Meles meles activity within at least a 100 m distance of any of the main wind farm infrastructure. The absence of any evidence of badger presence within the site is likely to reflect the generally wet ground conditions and susceptibility of much of the site to flooding."

This is incorrect. There is an active badger sett within 100m of the main wind farm infrastructure and I have geo-tagged photos of it. Furthermore, Wetland Surveys Ltd. have confirmed to me that they saw an active badger sett in their field survey in August 2025.

Issue of otter breeding activity

On p.56, "it is concluded that otter utilises the watercourses within the site for feeding purposes but that the watercourses are generally not suitable for breeding locations due both to the flood level heights and the regular maintenance of the channel by OPW."

The author does not have a sound basis for making such a conclusion. First of all, the OPW have not dredged watercourses in the area for at least two decades. Furthermore, two otters have been noted in the last year at Charleville Lagoons and otter cubs have been seen in previous years on the River Loobagh to the north of the project site. Breeding is a strong possibility in the area and further otter survey at the right time of year is required to ascertain this.

Conclusion

Chapter 6 of the EIAR is underestimating the impact of the proposed windfarm when it describes the loss of wet and neutral grassland in the area as a "slight" adverse effect of "local importance" only. Given the short duration of the EIAR's walk-over survey and the fact that it is has missed some quite obvious wildflowers and an active badger sett, it is difficult to take its conclusions about effects seriously. Moreover, it has failed to consider the context of the project site. Degradation of the wider *landscape habitat* in lowland Co. Limerick in recent decades means that the disruption of this remaining tract of biodiverse wet grassland is likely to be of "county/district" level importance. This is one of the reasons why the Map of Irish Wetlands and the Limerick Wetland Field Survey have identified it for further survey. A more detailed habitat and vegetation survey is required before a planning decision can be made regarding the proposed development's effects.

This is crucial as any disruption of this habitat will have a knock-on effect on the usability of the site by several Annex 1 and red/amber-listed bird species, including protected wetland birds associated with the immediately-adjacent Charleville Lagoons. In the absence of a detailed and reliable biodiversity survey, particularly of the site's vegetation, I respectfully request that An Coimisiún Pleanála refuse planning permission.

APPENDIX A – Records for Ballynagoul townland downloaded from National Biodiversity Data Centre

Feature name	Species group	Species name	Record count	Date of last record	Title of dataset	Designation
BALLYNAGOUL	Acarine (Acari)	Mite (Acari)	5	09/09/2017	A national macroinvertebrate dataset collected for the biomonitoring of Ireland's river network, 2007–2018 (EPA)	
BALLYNAGOUL	Annelid	Erpobdella	1	22/09/2011	A national macroinvertebrate dataset collected for the biomonitoring of Ireland's river network, 2007–2018 (EPA)	
BALLYNAGOUL	Annelid	Glossiphonia	6	14/08/2014	A national macroinvertebrate dataset collected for the biomonitoring of Ireland's river network, 2007–2018 (EPA)	
BALLYNAGOUL	Annelid	Glossiphonia complanata	3	30/09/2008	River Biologists' Database (EPA)	
BALLYNAGOUL	Annelid	Lumbricidae	1	21/08/2012	A national macroinvertebrate dataset collected for the biomonitoring of Ireland's river network, 2007–2018 (EPA)	
BALLYNAGOUL	Annelid	Tubificid Worm Sp. (Tubificidae)	5	03/10/2017	A national macroinvertebrate dataset collected for the biomonitoring of Ireland's river network, 2007–2018 (EPA)	
BALLYNAGOUL	Bird	American Wigeon (Mareca americana)	6	31/12/2001	Irish Wetland Birds Survey (I-WeBS) 1994-2001.	
BALLYNAGOUL	Bird	Barn Owl (Tyto alba)	6	03/12/2023	Birds of Ireland	Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern ||

						Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Red List
BALLYNAGOUL	Bird	Bar-tailed Godwit (Limosa lapponica)	1	31/12/2001	Irish Wetland Birds Survey (I-WeBS) 1994-2001.	Protected Species: Wildlife Acts || Protected Species: EU Birds Directive || Protected Species: EU Birds Directive >> Annex I Bird Species || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Red List
BALLYNAGOUL	Bird	Blackbird (Turdus merula)	9	31/12/2011	Bird Atlas 2007 - 2011	
BALLYNAGOUL	Bird	Blackcap (Sylvia atricapilla)	2	31/12/2011	Bird Atlas 2007 - 2011	
BALLYNAGOUL	Bird	Black-headed Gull (Chroicocephalus ridibundus)	8	04/01/2019	Birds of Ireland	Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List
BALLYNAGOUL	Bird	Black-tailed Godwit (Limosa limosa)	1	31/12/2001	Irish Wetland Birds Survey (I-WeBS) 1994-2001.	Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Red List
BALLYNAGOUL	Bird	Blue Tit (Cyanistes caeruleus)	9	31/12/2011	Bird Atlas 2007 - 2011	
BALLYNAGOUL	Bird	Blue-winged Teal (Spatula discors)	1	02/01/1996	Rare birds of Ireland	
BALLYNAGOUL	Bird	Broad-billed Sandpiper (Calidris falcinellus)	2	02/06/1978	Rare birds of Ireland	
BALLYNAGOUL	Bird	Bullfinch (Pyrrhula pyrrhula)	8	31/12/2011	Bird Atlas 2007 - 2011	
BALLYNAGOUL	Bird	Buzzard (Buteo buteo)	5	03/04/2021	Birds of Ireland	
BALLYNAGOUL	Bird	Chaffinch (Fringilla coelebs)	10	04/01/2019	Birds of Ireland	
BALLYNAGOUL	Bird	Chiffchaff (Phylloscopus collybita)	5	08/07/2022	Birds of Ireland	
BALLYNAGOUL	Bird	Coal Tit (Periparus ater)	7	31/12/2011	Bird Atlas 2007 - 2011	

BALLYNAGOUL	Bird	Collared Dove (Streptopelia decaocto)	4	31/12/2011	Bird Atlas 2007 - 2011	
BALLYNAGOUL	Bird	Common Gull (Larus canus)	3	31/12/2011	Bird Atlas 2007 - 2011	Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List
BALLYNAGOUL	Bird	Common Sandpiper (Actitis hypoleucos)	2	04/01/2019	Birds of Ireland	Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List
BALLYNAGOUL	Bird	Coot (Fulica atra)	9	04/01/2019	Birds of Ireland	Protected Species: Wildlife Acts || Protected Species: EU Birds Directive || Protected Species: EU Birds Directive >> Annex II, Section I Bird Species || Protected Species: EU Birds Directive >> Annex III, Section II Bird Species || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List
BALLYNAGOUL	Bird	Cormorant (Phalacrocorax carbo)	6	31/12/2011	Bird Atlas 2007 - 2011	Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List
BALLYNAGOUL	Bird	Crane (Grus grus)	1	17/09/2000	Rare birds of Ireland	
BALLYNAGOUL	Bird	Cuckoo (Cuculus canorus)	3	31/12/2011	Bird Atlas 2007 - 2011	
BALLYNAGOUL	Bird	Curlew (Numenius arquata)	8	31/12/2011	Bird Atlas 2007 - 2011	Protected Species: Wildlife Acts || Protected Species: EU Birds Directive || Protected Species: EU Birds Directive >> Annex II, Section II Bird Species || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Red List
BALLYNAGOUL	Bird	Curlew Sandpiper (Calidris ferruginea)	1	31/12/2001	Irish Wetland Birds Survey (I-WeBS) 1994-2001.	Protected Species: Wildlife Acts || Protected Species: EU Birds Directive || Protected Species: EU Birds Directive >> Annex I Bird Species || Threatened Species: Birds of Conservation

						Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Red List
BALLYNAGOUL	Bird	Dipper (Cinclus cinclus)	1	31/07/1972	The First Atlas of Breeding Birds in Britain and Ireland: 1968-1972.	
BALLYNAGOUL	Bird	Dunlin (Calidris alpina)	1	31/12/2001	Irish Wetland Birds Survey (I-WeBS) 1994-2001.	Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Red List
BALLYNAGOUL	Bird	Dunnock (Prunella modularis)	8	31/12/2011	Bird Atlas 2007 - 2011	
BALLYNAGOUL	Bird	Ferruginous Duck (Aythya nyroca)	1	08/03/1992	Rare birds of Ireland	
BALLYNAGOUL	Bird	Fieldfare (Turdus pilaris)	3	31/12/2011	Bird Atlas 2007 - 2011	
BALLYNAGOUL	Bird	Gadwall (Mareca strepera)	1	31/12/2001	Irish Wetland Birds Survey (I-WeBS) 1994-2001.	Protected Species: Wildlife Acts || Protected Species: EU Birds Directive || Protected Species: EU Birds Directive >> Annex II, Section I Bird Species || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List
BALLYNAGOUL	Bird	Garganey (Spatula querquedula)	3	31/12/2011	Bird Atlas 2007 - 2011	Protected Species: Wildlife Acts || Protected Species: EU Birds Directive || Protected Species: EU Birds Directive >> Annex II, Section I Bird Species || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List
BALLYNAGOUL	Bird	Goldcrest (Regulus regulus)	8	31/12/2011	Bird Atlas 2007 - 2011	Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List
BALLYNAGOUL	Bird	Golden Plover (Pluvialis apricaria)	2	31/12/2001	Irish Wetland Birds Survey (I-WeBS) 1994-2001.	Protected Species: Wildlife Acts || Protected Species: EU Birds Directive || Protected Species: EU Birds Directive >> Annex I Bird Species || Protected Species: EU Birds Directive >> Annex II, Section II Bird Species || Protected Species: EU

						Birds Directive >> Annex III, Section III Bird Species || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Red List
BALLYNAGOUL	Bird	Goldeneye (Bucephala clangula)	1	31/12/2001	Irish Wetland Birds Survey (I-WeBS) 1994-2001.	Protected Species: Wildlife Acts || Protected Species: EU Birds Directive || Protected Species: EU Birds Directive >> Annex II, Section II Bird Species || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Red List
BALLYNAGOUL	Bird	Goldfinch (Carduelis carduelis)	10	24/08/2020	Birds of Ireland	
BALLYNAGOUL	Bird	Great Black-backed Gull (Larus marinus)	3	31/12/2001	Irish Wetland Birds Survey (I-WeBS) 1994-2001.	
BALLYNAGOUL	Bird	Great Crested Grebe (Podiceps cristatus)	1	31/12/2011	Bird Atlas 2007 - 2011	Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List
BALLYNAGOUL	Bird	Great Tit (Parus major)	8	31/12/2011	Bird Atlas 2007 - 2011	
BALLYNAGOUL	Bird	Green Sandpiper (Tringa ochropus)	3	31/12/2011	Bird Atlas 2007 - 2011	
BALLYNAGOUL	Bird	Greenfinch (Chloris chloris)	8	31/12/2011	Bird Atlas 2007 - 2011	Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List
BALLYNAGOUL	Bird	Greenshank (Tringa nebularia)	1	31/12/2001	Irish Wetland Birds Survey (I-WeBS) 1994-2001.	
BALLYNAGOUL	Bird	Green-winged Teal (Anas carolinensis)	1	31/12/2001	Irish Wetland Birds Survey (I-WeBS) 1994-2001.	
BALLYNAGOUL	Bird	Grey Heron (Ardea cinerea)	9	31/12/2011	Bird Atlas 2007 - 2011	
BALLYNAGOUL	Bird	Grey Wagtail (Motacilla cinerea)	9	04/01/2019	Birds of Ireland	Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Red List

BALLYNAGOUL	Bird	Greylag Goose (Anser anser)	1	31/12/2001	Irish Wetland Birds Survey (I-WeBS) 1994-2001.	Invasive Species: Regulation S.I. 477/2011 (Ireland) || Invasive Species: Regulation S.I. 374/2024 (Ireland) || Protected Species: Wildlife Acts || Protected Species: EU Birds Directive || Protected Species: EU Birds Directive >> Annex II, Section I Bird Species || Protected Species: EU Birds Directive >> Annex III, Section II Bird Species || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List
BALLYNAGOUL	Bird	Hen Harrier (Circus cyaneus)	6	14/01/2024	Birds of Ireland	Protected Species: Wildlife Acts || Protected Species: EU Birds Directive || Protected Species: EU Birds Directive >> Annex I Bird Species || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List
BALLYNAGOUL	Bird	Herring Gull (Larus argentatus)	4	31/12/2011	Bird Atlas 2007 - 2011	Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List
BALLYNAGOUL	Bird	Hooded Crow (Corvus cornix)	10	31/12/2011	Bird Atlas 2007 - 2011	
BALLYNAGOUL	Bird	House Martin (Delichon urbicum)	3	31/12/2011	Bird Atlas 2007 - 2011	Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List
BALLYNAGOUL	Bird	House Sparrow (Passer domesticus)	7	31/12/2011	Bird Atlas 2007 - 2011	Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List
BALLYNAGOUL	Bird	Iceland Gull (Larus glaucoides)	1	31/12/2001	Irish Wetland Birds Survey (I-WeBS) 1994-2001.	
BALLYNAGOUL	Bird	Jackdaw (Coloeus monedula)	9	31/12/2011	Bird Atlas 2007 - 2011	
BALLYNAGOUL	Bird	Jay (Garrulus glandarius)	1	29/02/1984	The First Atlas of Wintering Birds in Britain and Ireland: 1981/82-1983/84.	

BALLYNAGOUL	Bird	Kestrel (Falco tinnunculus)	9	16/04/2021	Birds of Ireland	Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Red List
BALLYNAGOUL	Bird	Kingfisher (Alcedo atthis)	6	23/05/2021	Birds of Ireland	Protected Species: Wildlife Acts || Protected Species: EU Birds Directive || Protected Species: EU Birds Directive >> Annex I Bird Species || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List
BALLYNAGOUL	Bird	Knot (Calidris canutus)	3	31/12/2011	Bird Atlas 2007 - 2011	Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Red List
BALLYNAGOUL	Bird	Lapwing (Vanellus vanellus)	6	31/12/2011	Bird Atlas 2007 - 2011	Protected Species: Wildlife Acts || Protected Species: EU Birds Directive || Protected Species: EU Birds Directive >> Annex II, Section II Bird Species || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Red List
BALLYNAGOUL	Bird	Lesser Black-backed Gull (Larus fuscus)	7	04/01/2019	Birds of Ireland	Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List
BALLYNAGOUL	Bird	Lesser Redpoll (Acanthis cabaret)	3	31/12/2011	Bird Atlas 2007 - 2011	
BALLYNAGOUL	Bird	Linnet (Linaria cannabina)	7	31/12/2011	Bird Atlas 2007 - 2011	Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List
BALLYNAGOUL	Bird	Little Egret (Egretta garzetta)	3	24/12/2020	Birds of Ireland	Protected Species: Wildlife Acts || Protected Species: EU Birds Directive || Protected Species: EU Birds Directive >> Annex I Bird Species
BALLYNAGOUL	Bird	Little Grebe (Tachybaptus ruficollis)	7	04/01/2019	Birds of Ireland	Protected Species: Wildlife Acts

BALLYNAGOUL	Bird	Little Stint (Calidris minuta)	1	31/12/2001	Irish Wetland Birds Survey (I-WeBS) 1994-2001.	
BALLYNAGOUL	Bird	Long-eared Owl (Asio otus)	1	31/07/1972	The First Atlas of Breeding Birds in Britain and Ireland: 1968-1972.	
BALLYNAGOUL	Bird	Long-tailed Tit (Aegithalos caudatus)	7	31/12/2011	Bird Atlas 2007 - 2011	
BALLYNAGOUL	Bird	Magpie (Pica pica)	8	31/12/2011	Bird Atlas 2007 - 2011	
BALLYNAGOUL	Bird	Mallard (Anas platyrhynchos)	8	04/01/2019	Birds of Ireland	Protected Species: Wildlife Acts || Protected Species: EU Birds Directive || Protected Species: EU Birds Directive >> Annex II, Section I Bird Species || Protected Species: EU Birds Directive >> Annex III, Section I Bird Species || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List
BALLYNAGOUL	Bird	Meadow Pipit (Anthus pratensis)	6	31/12/2011	Bird Atlas 2007 - 2011	Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Red List
BALLYNAGOUL	Bird	Merlin (Falco columbarius)	1	31/07/1972	The First Atlas of Breeding Birds in Britain and Ireland: 1968-1972.	Protected Species: Wildlife Acts || Protected Species: EU Birds Directive || Protected Species: EU Birds Directive >> Annex I Bird Species || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List
BALLYNAGOUL	Bird	Mistle Thrush (Turdus viscivorus)	5	31/12/2011	Bird Atlas 2007 - 2011	Protected Species: Wildlife Acts
BALLYNAGOUL	Bird	Moorhen (Gallinula chloropus)	10	20/08/2020	Birds of Ireland	
BALLYNAGOUL	Bird	Mute Swan (Cygnus olor)	11	04/01/2019	Birds of Ireland	Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List

BALLYNAGOUL	Bird	Peregrine (Falco peregrinus)	3	31/12/2011	Bird Atlas 2007 - 2011	Protected Species: Wildlife Acts || Protected Species: EU Birds Directive || Protected Species: EU Birds Directive >> Annex I Bird Species
BALLYNAGOUL	Bird	Pheasant (Phasianus colchicus)	7	31/12/2011	Bird Atlas 2007 - 2011	Protected Species: Wildlife Acts || Protected Species: EU Birds Directive || Protected Species: EU Birds Directive >> Annex II, Section I Bird Species || Protected Species: EU Birds Directive >> Annex III, Section I Bird Species
BALLYNAGOUL	Bird	Pied Wagtail (Motacilla alba yarrellii)	1	04/01/2019	Birds of Ireland	
BALLYNAGOUL	Bird	Pied Wagtail (Motacilla alba)	8	31/12/2011	Bird Atlas 2007 - 2011	
BALLYNAGOUL	Bird	Pintail (Anas acuta)	2	04/01/2019	Birds of Ireland	Protected Species: Wildlife Acts || Protected Species: EU Birds Directive || Protected Species: EU Birds Directive >> Annex II, Section I Bird Species || Protected Species: EU Birds Directive >> Annex III, Section II Bird Species || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List
BALLYNAGOUL	Bird	Pochard (Aythya ferina)	2	31/12/2001	Irish Wetland Birds Survey (I-WeBS) 1994-2001.	Protected Species: Wildlife Acts || Protected Species: EU Birds Directive || Protected Species: EU Birds Directive >> Annex II, Section I Bird Species || Protected Species: EU Birds Directive >> Annex III, Section II Bird Species || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Red List
BALLYNAGOUL	Bird	Raven (Corvus corax)	9	21/08/2020	Birds of Ireland	
BALLYNAGOUL	Bird	Red Grouse (Lagopus lagopus)	1	29/02/1984	The First Atlas of Wintering Birds in Britain and Ireland: 1981/82-1983/84.	Protected Species: Wildlife Acts || Protected Species: EU Birds Directive || Protected Species: EU Birds Directive >> Annex II, Section I Bird Species || Protected Species: EU Birds Directive >> Annex III, Section I Bird Species || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Red List

BALLYNAGOUL	Bird	Redshank (Tringa totanus)	3	31/12/2011	Bird Atlas 2007 - 2011	Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Red List
BALLYNAGOUL	Bird	Redwing (Turdus iliacus)	4	31/12/2011	Bird Atlas 2007 - 2011	Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Red List
BALLYNAGOUL	Bird	Reed Bunting (Emberiza schoeniclus)	10	14/04/2021	Birds of Ireland	
BALLYNAGOUL	Bird	Ring-necked Duck (Aythya collaris)	1	20/06/1987	Birds of Ireland	
BALLYNAGOUL	Bird	Robin (Erithacus rubecula)	10	08/07/2022	Birds of Ireland	Protected Species: Wildlife Acts
BALLYNAGOUL	Bird	Rock Dove (Columba livia)	4	31/12/2011	Bird Atlas 2007 - 2011	Protected Species: Wildlife Acts || Protected Species: EU Birds Directive || Protected Species: EU Birds Directive >> Annex II, Section I Bird Species
BALLYNAGOUL	Bird	Rook (Corvus frugilegus)	10	31/12/2011	Bird Atlas 2007 - 2011	
BALLYNAGOUL	Bird	Ruddy Duck (Oxyura jamaicensis)	13	30/11/2002	National Invasive Species Database	Invasive Species: EU Invasive Alien Species Regulation No. 1143/2014 || Invasive Species: Regulation S.I. 477/2011 (Ireland) || Invasive Species: High Risk Invasive Species (2013 Report) || Invasive Species: Regulation S.I. 374/2024 (Ireland)
BALLYNAGOUL	Bird	Ruff (Calidris pugnax)	1	31/12/2001	Irish Wetland Birds Survey (I-WeBS) 1994-2001.	Protected Species: Wildlife Acts || Protected Species: EU Birds Directive || Protected Species: EU Birds Directive >> Annex I Bird Species || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List
BALLYNAGOUL	Bird	Sand Martin (Riparia riparia)	2	31/12/2011	Bird Atlas 2007 - 2011	Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List

BALLYNAGOUL	Bird	Scaup (Aythya marila)	1	31/12/2001	Irish Wetland Birds Survey (I-WeBS) 1994-2001.	Protected Species: Wildlife Acts || Protected Species: EU Birds Directive || Protected Species: EU Birds Directive >> Annex II, Section II Bird Species || Protected Species: EU Birds Directive >> Annex III, Section III Bird Species || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Red List
BALLYNAGOUL	Bird	Sedge Warbler (Acrocephalus schoenobaenus)	5	20/07/2024	Birds of Ireland	
BALLYNAGOUL	Bird	Shelduck (Tadorna tadorna)	4	31/12/2011	Bird Atlas 2007 - 2011	Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List
BALLYNAGOUL	Bird	Shoveler (Spatula clypeata)	9	04/01/2019	Birds of Ireland	Protected Species: Wildlife Acts || Protected Species: EU Birds Directive || Protected Species: EU Birds Directive >> Annex II, Section I Bird Species || Protected Species: EU Birds Directive >> Annex III, Section III Bird Species || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Red List
BALLYNAGOUL	Bird	Siskin (Spinus spinus)	1	31/12/2011	Bird Atlas 2007 - 2011	
BALLYNAGOUL	Bird	Skylark (Alauda arvensis)	9	31/12/2011	Bird Atlas 2007 - 2011	Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List
BALLYNAGOUL	Bird	Snipe (Gallinago gallinago)	11	04/01/2019	Birds of Ireland	Protected Species: Wildlife Acts || Protected Species: EU Birds Directive || Protected Species: EU Birds Directive >> Annex II, Section I Bird Species || Protected Species: EU Birds Directive >> Annex III, Section III Bird Species || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of

						Conservation Concern >> Birds of Conservation Concern - Red List
BALLYNAGOUL	Bird	Song Thrush (Turdus philomelos)	8	31/12/2011	Bird Atlas 2007 - 2011	
BALLYNAGOUL	Bird	Sparrowhawk (Accipiter nisus)	8	24/08/2020	Birds of Ireland	Protected Species: Wildlife Acts
BALLYNAGOUL	Bird	Spotted Crake (Porzana porzana)	1	02/09/1969	Rare birds of Ireland	Protected Species: Wildlife Acts || Protected Species: EU Birds Directive || Protected Species: EU Birds Directive >> Annex I Bird Species || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List
BALLYNAGOUL	Bird	Spotted Flycatcher (Muscicapa striata)	2	31/12/2011	Bird Atlas 2007 - 2011	Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List
BALLYNAGOUL	Bird	Starling (Sturnus vulgaris)	9	31/12/2011	Bird Atlas 2007 - 2011	Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List
BALLYNAGOUL	Bird	Stock Dove (Columba oenas)	2	31/07/1991	The Second Atlas of Breeding Birds in Britain and Ireland: 1988-1991	Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Red List
BALLYNAGOUL	Bird	Stonechat (Saxicola rubicola)	12	03/12/2020	Birds of Ireland	Protected Species: Wildlife Acts
BALLYNAGOUL	Bird	Swallow (Hirundo rustica)	5	31/12/2011	Bird Atlas 2007 - 2011	Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List
BALLYNAGOUL	Bird	Swift (Apus apus)	5	31/12/2011	Bird Atlas 2007 - 2011	Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Red List
BALLYNAGOUL	Bird	Teal (Anas crecca)	7	04/01/2019	Birds of Ireland	Protected Species: Wildlife Acts || Protected Species: EU Birds Directive || Protected Species:

						EU Birds Directive >> Annex II, Section I Bird Species || Protected Species: EU Birds Directive >> Annex III, Section II Bird Species || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List
BALLYNAGOUL	Bird	Tree Sparrow (Passer montanus)	1	29/02/1984	The First Atlas of Wintering Birds in Britain and Ireland: 1981/82-1983/84.	Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List
BALLYNAGOUL	Bird	Treecreeper (Certhia familiaris)	6	31/12/2011	Bird Atlas 2007 - 2011	
BALLYNAGOUL	Bird	Tufted Duck (Aythya fuligula)	9	04/01/2019	Birds of Ireland	Protected Species: Wildlife Acts || Protected Species: EU Birds Directive || Protected Species: EU Birds Directive >> Annex II, Section I Bird Species || Protected Species: EU Birds Directive >> Annex III, Section II Bird Species || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List
BALLYNAGOUL	Bird	Turtle Dove (Streptopelia turtur)	1	31/07/1991	The Second Atlas of Breeding Birds in Britain and Ireland: 1988-1991	Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Red List
BALLYNAGOUL	Bird	Water Rail (Rallus aquaticus)	2	31/12/2001	Irish Wetland Birds Survey (I-WeBS) 1994-2001.	
BALLYNAGOUL	Bird	Wheatear (Oenanthe oenanthe)	2	31/07/1991	The Second Atlas of Breeding Birds in Britain and Ireland: 1988-1991	Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List
BALLYNAGOUL	Bird	Whitethroat (Curruca communis)	1	31/07/1972	The First Atlas of Breeding Birds in Britain and Ireland: 1968-1972.	
BALLYNAGOUL	Bird	White-winged Black Tern (Chlidonias leucopterus)	2	28/10/1990	Rare birds of Ireland	

BALLYNAGOUL	Bird	Whooper Swan (Cygnus cygnus)	1	31/12/2001	Irish Wetland Birds Survey (I-WeBS) 1994-2001.	Protected Species: Wildlife Acts || Protected Species: EU Birds Directive || Protected Species: EU Birds Directive >> Annex I Bird Species || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List
BALLYNAGOUL	Bird	Wigeon (Mareca penelope)	8	03/02/2025	Birds of Ireland	Protected Species: Wildlife Acts || Protected Species: EU Birds Directive || Protected Species: EU Birds Directive >> Annex II, Section I Bird Species || Protected Species: EU Birds Directive >> Annex III, Section II Bird Species || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List
BALLYNAGOUL	Bird	Willow Warbler (Phylloscopus trochilus)	6	31/12/2011	Bird Atlas 2007 - 2011	Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List
BALLYNAGOUL	Bird	Wood Sandpiper (Tringa glareola)	1	31/12/2001	Irish Wetland Birds Survey (I-WeBS) 1994-2001.	Protected Species: Wildlife Acts || Protected Species: EU Birds Directive || Protected Species: EU Birds Directive >> Annex I Bird Species || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List
BALLYNAGOUL	Bird	Woodcock (Scolopax rusticola)	4	03/12/2023	Birds of Ireland	Protected Species: Wildlife Acts || Protected Species: EU Birds Directive || Protected Species: EU Birds Directive >> Annex II, Section I Bird Species || Protected Species: EU Birds Directive >> Annex III, Section III Bird Species || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Red List
BALLYNAGOUL	Bird	Woodpigeon (Columba palumbus)	9	31/12/2011	Bird Atlas 2007 - 2011	
BALLYNAGOUL	Bird	Wren (Troglodytes troglodytes)	10	31/12/2011	Bird Atlas 2007 - 2011	

BALLYNAGOUL	Bony fish (Actinopterygii)	Stone Loach (Barbatula barbatula)	1	30/09/2008	River Biologists' Database (EPA)	
BALLYNAGOUL	Crustacean	Freshwater Shrimp (Gammarus) (Gammarus)	3	21/08/2012	A national macroinvertebrate dataset collected for the biomonitoring of Ireland's river network, 2007–2018 (EPA)	
BALLYNAGOUL	Crustacean	Gammarus duebeni	8	03/10/2017	A national macroinvertebrate dataset collected for the biomonitoring of Ireland's river network, 2007–2018 (EPA)	
BALLYNAGOUL	Crustacean	Indet. Waterlouse (Asellus)	3	22/09/2011	A national macroinvertebrate dataset collected for the biomonitoring of Ireland's river network, 2007–2018 (EPA)	
BALLYNAGOUL	Crustacean	Water hog lice/slaters (Asellus (Asellus) aquaticus)	1	03/10/2017	A national macroinvertebrate dataset collected for the biomonitoring of Ireland's river network, 2007–2018 (EPA)	
BALLYNAGOUL	Crustacean	White-clawed Crayfish (Austropotamobius pallipes)	16	31/12/2021	General Biodiversity Records from Ireland	Protected Species: EU Habitats Directive || Protected Species: EU Habitats Directive >> Annex II || Protected Species: EU Habitats Directive >> Annex V || Protected Species: Wildlife Acts
BALLYNAGOUL	Flatworm (Turbellaria)	Planaria	1	30/09/2008	A national macroinvertebrate dataset collected for the biomonitoring of Ireland's river network, 2007–2018 (EPA)	
BALLYNAGOUL	Flatworm (Turbellaria)	Polycelis	1	22/09/2011	A national macroinvertebrate dataset collected for the biomonitoring of Ireland's	

					river network, 2007–2018 (EPA)	
BALLYNAGOUL	Flowering plant	Branched Bur-reed (Sparganium erectum)	2	29/09/2008	River Biologists' Database (EPA)	
BALLYNAGOUL	Flowering plant	Canadian Waterweed (Elodea canadensis)	2	29/09/2008	River Biologists' Database (EPA)	Invasive Species: Regulation S.I. 477/2011 (Ireland) || Invasive Species: High Risk Invasive Species (2013 Report) || Invasive Species: The Wildlife (Northern Ireland) Order 1985
BALLYNAGOUL	Flowering plant	Common Duckweed (Lemna minor)	1	27/09/2006	River Biologists' Database (EPA)	
BALLYNAGOUL	Flowering plant	Common Reed (Phragmites australis)	1	27/09/2006	River Biologists' Database (EPA)	
BALLYNAGOUL	Flowering plant	Common Spotted-orchid (Dactylorhiza fuchsii)	15	29/06/2025	Vascular plants: Online Atlas of Vascular Plants 2012 Onwards	
BALLYNAGOUL	Flowering plant	Creeping Thistle (Cirsium arvense)	1	10/09/2014	Vascular plants: Online Atlas of Vascular Plants 2012 Onwards	
BALLYNAGOUL	Flowering plant	Cuckooflower (Cardamine pratensis)	1	10/06/2023	Vascular plants: Online Atlas of Vascular Plants 2012 Onwards	
BALLYNAGOUL	Flowering plant	Curled Pondweed (Potamogeton crispus)	2	29/09/2008	River Biologists' Database (EPA)	
BALLYNAGOUL	Flowering plant	Giant Hogweed (Heracleum mantegazzianum)	1	05/04/2017	National Invasive Species Database	Invasive Species: EU Invasive Alien Species Regulation No. 1143/2014 || Invasive Species: Regulation S.I. 477/2011 (Ireland) || Invasive Species: High Risk Invasive Species (2013 Report) || Invasive Species: Regulation S.I. 374/2024 (Ireland)
BALLYNAGOUL	Flowering plant	Hawthorn (Crataegus monogyna)	2	30/09/2008	River Biologists' Database (EPA)	
BALLYNAGOUL	Flowering plant	Hemp-agrimony (Eupatorium cannabinum)	2	04/07/2024	Vascular plants: Online Atlas of Vascular Plants 2012 Onwards	
BALLYNAGOUL	Flowering plant	Holly (Ilex aquifolium)	1	10/06/2023	Vascular plants: Online Atlas of Vascular Plants 2012 Onwards	
BALLYNAGOUL	Flowering plant	Marsh Ragwort (Jacobaea aquatica)	1	10/09/2014	Vascular plants: Online Atlas of Vascular Plants 2012 Onwards	

BALLYNAGOUL	Flowering plant	Oval Sedge (Carex leporina)	1	10/06/2023	Vascular plants: Online Atlas of Vascular Plants 2012 Onwards	
BALLYNAGOUL	Flowering plant	Pyramidal Orchid (Anacamptis pyramidalis)	1	23/06/2023	Vascular plants: Online Atlas of Vascular Plants 2012 Onwards	
BALLYNAGOUL	Flowering plant	Ragged-Robin (Silene flos-cuculi)	1	10/06/2023	Vascular plants: Online Atlas of Vascular Plants 2012 Onwards	
BALLYNAGOUL	Flowering plant	Reed Canary-grass (Phalaris arundinacea)	6	30/09/2008	River Biologists' Database (EPA)	
BALLYNAGOUL	Flowering plant	Silverweed (Potentilla anserina)	1	10/06/2023	Vascular plants: Online Atlas of Vascular Plants 2012 Onwards	
BALLYNAGOUL	Flowering plant	Sycamore (Acer pseudoplatanus)	2	29/09/2008	River Biologists' Database (EPA)	Invasive Species: Medium Risk Invasive Species (2013 Report)
BALLYNAGOUL	Flowering plant	Water Mint (Mentha aquatica)	1	10/09/2014	Vascular plants: Online Atlas of Vascular Plants 2012 Onwards	
BALLYNAGOUL	Flowering plant	Water-cress (Rorippa nasturtium-aquaticum)	3	29/09/2008	River Biologists' Database (EPA)	
BALLYNAGOUL	Flowering plant	Yellow Iris (Iris pseudacorus)	2	10/06/2023	Vascular plants: Online Atlas of Vascular Plants 2012 Onwards	
BALLYNAGOUL	Flowering plant	Yellow-rattle (Rhinanthus minor)	3	29/06/2025	Vascular plants: Online Atlas of Vascular Plants 2012 Onwards	
BALLYNAGOUL	Fungoid	Aphanomyces astaci	3	31/12/2022	National Invasive Species Database	Invasive Species: High Risk Invasive Species (2013 Report)
BALLYNAGOUL	Horsetail	Water Horsetail (Equisetum fluviatile)	1	10/06/2023	Vascular plants: Online Atlas of Vascular Plants 2012 Onwards	
BALLYNAGOUL	Insect - beetle (Coleoptera)	Elmidae	5	03/10/2017	A national macroinvertebrate dataset collected for the biomonitoring of Ireland's river network, 2007–2018 (EPA)	
BALLYNAGOUL	Insect - beetle (Coleoptera)	Elmis aenea	2	29/09/2008	A national macroinvertebrate dataset	

					collected for the biomonitoring of Ireland's river network, 2007–2018 (EPA)	
BALLYNAGOUL	Insect - beetle (Coleoptera)	Haliplidae	2	09/09/2017	A national macroinvertebrate dataset collected for the biomonitoring of Ireland's river network, 2007–2018 (EPA)	
BALLYNAGOUL	Insect - butterfly	Green-veined White (Pieris napi)	1	31/07/1975	Distribution Atlas of Butterflies in Ireland 1979 (An Foras Forbartha)	
BALLYNAGOUL	Insect - butterfly	Meadow Brown (Maniola jurtina)	1	31/07/1975	Distribution Atlas of Butterflies in Ireland 1979 (An Foras Forbartha)	
BALLYNAGOUL	Insect - butterfly	Orange-tip (Anthocharis cardamines)	1	01/05/2004	Butterflies of Ireland pre-2022	
BALLYNAGOUL	Insect - butterfly	Ringlet (Aphantopus hyperantus)	1	31/07/1975	Distribution Atlas of Butterflies in Ireland 1979 (An Foras Forbartha)	
BALLYNAGOUL	Insect - butterfly	Small Tortoiseshell (Aglais urticae)	2	31/07/1975	Distribution Atlas of Butterflies in Ireland 1979 (An Foras Forbartha)	
BALLYNAGOUL	Insect - butterfly	Small White (Pieris rapae)	1	22/08/2013	Butterflies of Ireland pre-2022	
BALLYNAGOUL	Insect - butterfly	Speckled Wood (Pararge aegeria)	1	31/07/1975	Distribution Atlas of Butterflies in Ireland 1979 (An Foras Forbartha)	
BALLYNAGOUL	Insect - caddis fly (Trichoptera)	Glossosomatidae	5	21/08/2012	A national macroinvertebrate dataset collected for the biomonitoring of Ireland's river network, 2007–2018 (EPA)	
BALLYNAGOUL	Insect - caddis fly (Trichoptera)	Hydropsyche	6	09/09/2017	A national macroinvertebrate dataset collected for the biomonitoring of Ireland's	

					river network, 2007–2018 (EPA)	
BALLYNAGOUL	Insect - caddis fly (Trichoptera)	Hydropsyche pellucidula	1	07/05/2018	Caddisflies (Trichoptera) of Ireland	
BALLYNAGOUL	Insect - caddis fly (Trichoptera)	Limnephilidae	2	21/08/2012	A national macroinvertebrate dataset collected for the biomonitoring of Ireland's river network, 2007–2018 (EPA)	
BALLYNAGOUL	Insect - caddis fly (Trichoptera)	Limnephilus rhombicus	1	07/05/2018	Caddisflies (Trichoptera) of Ireland	
BALLYNAGOUL	Insect - caddis fly (Trichoptera)	Plectrocnemia geniculata	1	07/05/2018	Caddisflies (Trichoptera) of Ireland	
BALLYNAGOUL	Insect - caddis fly (Trichoptera)	Polycentropus	2	09/09/2017	A national macroinvertebrate dataset collected for the biomonitoring of Ireland's river network, 2007–2018 (EPA)	
BALLYNAGOUL	Insect - caddis fly (Trichoptera)	Rhyacophila	5	06/08/2014	A national macroinvertebrate dataset collected for the biomonitoring of Ireland's river network, 2007–2018 (EPA)	
BALLYNAGOUL	Insect - caddis fly (Trichoptera)	Sericostoma	5	21/08/2012	A national macroinvertebrate dataset collected for the biomonitoring of Ireland's river network, 2007–2018 (EPA)	
BALLYNAGOUL	Insect - caddis fly (Trichoptera)	Sericostoma personatum	1	07/05/2018	Caddisflies (Trichoptera) of Ireland	
BALLYNAGOUL	Insect - dragonfly (Odonata)	Azure Damselfly (Coenagrion puella)	2	18/06/2023	Dragonfly Ireland 2019 to 2024	
BALLYNAGOUL	Insect - dragonfly (Odonata)	Banded Demoiselle (Calopteryx splendens)	2	30/08/2012	Dragonfly Records	
BALLYNAGOUL	Insect - dragonfly (Odonata)	Blue-tailed Damselfly (Ischnura elegans)	2	01/08/2002	Dragonfly Ireland	

BALLYNAGOUL	Insect - dragonfly (Odonata)	Brown Hawker (Aeshna grandis)	2	10/06/2023	Dragonfly Ireland 2019 to 2024	
BALLYNAGOUL	Insect - dragonfly (Odonata)	Calopterygidae	1	14/08/2014	A national macroinvertebrate dataset collected for the biomonitoring of Ireland's river network, 2007–2018 (EPA)	
BALLYNAGOUL	Insect - dragonfly (Odonata)	Common Blue Damselfly (Enallagma cyathigerum)	3	31/08/2012	Dragonfly Records	
BALLYNAGOUL	Insect - dragonfly (Odonata)	Common Darter (Sympetrum striolatum)	3	18/09/2009	Dragonfly Records	
BALLYNAGOUL	Insect - dragonfly (Odonata)	Emerald Damselfly (Lestes sponsa)	1	01/08/2002	Dragonfly Ireland	
BALLYNAGOUL	Insect - mayfly (Ephemeroptera)	Baetis	8	03/10/2017	A national macroinvertebrate dataset collected for the biomonitoring of Ireland's river network, 2007–2018 (EPA)	
BALLYNAGOUL	Insect - mayfly (Ephemeroptera)	Blue-winged Olive (Serratella ignita)	6	14/08/2014	A national macroinvertebrate dataset collected for the biomonitoring of Ireland's river network, 2007–2018 (EPA)	
BALLYNAGOUL	Insect - mayfly (Ephemeroptera)	Ecdyonurus	3	09/09/2017	A national macroinvertebrate dataset collected for the biomonitoring of Ireland's river network, 2007–2018 (EPA)	
BALLYNAGOUL	Insect - mayfly (Ephemeroptera)	Green Drake (Ephemera danica)	5	09/09/2017	A national macroinvertebrate dataset collected for the biomonitoring of Ireland's river network, 2007–2018 (EPA)	

BALLYNAGOUL	Insect - mayfly (Ephemeroptera)	Heptagenia	2	06/08/2014	A national macroinvertebrate dataset collected for the biomonitoring of Ireland's river network, 2007–2018 (EPA)	
BALLYNAGOUL	Insect - mayfly (Ephemeroptera)	Iron Blue Mayfly (Baetis muticus)	1	09/09/2017	A national macroinvertebrate dataset collected for the biomonitoring of Ireland's river network, 2007–2018 (EPA)	
BALLYNAGOUL	Insect - moth	Canary-grass Miner (Elachista maculicerusella)	2	22/08/2013	Moths Ireland	
BALLYNAGOUL	Insect - moth	Clouded Drab (Orthosia incerta)	1	02/04/2015	Moths Ireland	
BALLYNAGOUL	Insect - moth	Common Carpet (Epirrhoe alternata)	1	22/08/2013	Moths Ireland	
BALLYNAGOUL	Insect - moth	Common Grass-veneer (Agriphila tristella)	1	22/08/2013	Moths Ireland	
BALLYNAGOUL	Insect - moth	Common Lance (Bactra lancealana)	1	22/08/2013	Moths Ireland	
BALLYNAGOUL	Insect - moth	Common Marble (Celypha lacunana)	1	22/08/2013	Moths Ireland	
BALLYNAGOUL	Insect - moth	Common Marbled Carpet (Dysstroma truncata)	1	31/08/2012	Moths Ireland	
BALLYNAGOUL	Insect - moth	Common Wave (Cabera exanthemata)	1	22/08/2013	Moths Ireland	
BALLYNAGOUL	Insect - moth	Common/Lesser Rustic (Mesapamea secalis agg.)	1	22/08/2013	Moths Ireland	
BALLYNAGOUL	Insect - moth	Crescent (Helotropha leucostigma)	1	22/08/2013	Moths Ireland	
BALLYNAGOUL	Insect - moth	Dark-marked Tortrix (Acleris laterana)	1	31/08/2012	Moths Ireland	
BALLYNAGOUL	Insect - moth	Death's-head Hawk-moth (Acherontia atropos)	2	28/08/1989	Moths Ireland	

BALLYNAGOUL	Insect - moth	Dusky Pearl (Udea prunalis)	1	22/08/2013	Moths Ireland	
BALLYNAGOUL	Insect - moth	Flame Carpet (Xanthorhoe designata)	1	22/08/2013	Moths Ireland	
BALLYNAGOUL	Insect - moth	Flame Shoulder (Ochropleura plecta)	1	22/08/2013	Moths Ireland	
BALLYNAGOUL	Insect - moth	Flounced Rustic (Luperina testacea)	1	22/08/2013	Moths Ireland	
BALLYNAGOUL	Insect - moth	Frosted Orange (Gortyna flavago)	1	22/08/2013	Moths Ireland	
BALLYNAGOUL	Insect - moth	Garden Rose Tortrix (Acleris variegana)	1	22/08/2013	Moths Ireland	
BALLYNAGOUL	Insect - moth	Gold Spot (Plusia festucae)	2	22/08/2013	Moths Ireland	
BALLYNAGOUL	Insect - moth	Hebrew Character (Orthosia gothica)	1	02/04/2015	Moths Ireland	
BALLYNAGOUL	Insect - moth	Hoary Plume (Platyptilia isodactylus)	1	22/08/2013	Moths Ireland	
BALLYNAGOUL	Insect - moth	Large Yellow Underwing (Noctua pronuba)	2	22/08/2013	Moths Ireland	
BALLYNAGOUL	Insect - moth	Lesser Broad-bordered Yellow Underwing (Noctua janthe)	1	22/08/2013	Moths Ireland	
BALLYNAGOUL	Insect - moth	Lesser Common Rustic (Mesapamea didyma)	1	22/08/2013	Moths Ireland	
BALLYNAGOUL	Insect - moth	Lesser Yellow Underwing (Noctua comes)	2	22/08/2013	Moths Ireland	
BALLYNAGOUL	Insect - moth	Mother of Pearl (Patania ruralis)	1	22/08/2013	Moths Ireland	
BALLYNAGOUL	Insect - moth	Pale-streaked Grass-moth (Agriphila selasella)	1	22/08/2013	Moths Ireland	
BALLYNAGOUL	Insect - moth	Red Twin-spot Carpet (Xanthorhoe spadicearia)	1	22/08/2013	Moths Ireland	
BALLYNAGOUL	Insect - moth	Rosy Rustic (Hydraecia micacea)	2	22/08/2013	Moths Ireland	

BALLYNAGOUL	Insect - moth	Silver Y (Autographa gamma)	1	31/12/2006	Moths Ireland	
BALLYNAGOUL	Insect - moth	Single-dotted Wave (Idaea dimidiata)	1	31/08/2012	Moths Ireland	
BALLYNAGOUL	Insect - moth	Small Square-spot (Diarsia rubi)	2	22/08/2013	Moths Ireland	
BALLYNAGOUL	Insect - moth	Small Wainscot (Denticucullus pygmina)	2	22/08/2013	Moths Ireland	
BALLYNAGOUL	Insect - moth	Square-spot Rustic (Xestia xanthographa)	2	22/08/2013	Moths Ireland	
BALLYNAGOUL	Insect - moth	White-shouldered House-moth (Endrosis sarcitrella)	1	31/08/2012	Moths Ireland	
BALLYNAGOUL	Insect - true fly (Diptera)	Black flies (Simuliidae)	8	03/10/2017	A national macroinvertebrate dataset collected for the biomonitoring of Ireland's river network, 2007–2018 (EPA)	
BALLYNAGOUL	Insect - true fly (Diptera)	Limnophora	1	22/09/2011	A national macroinvertebrate dataset collected for the biomonitoring of Ireland's river network, 2007–2018 (EPA)	
BALLYNAGOUL	Insect - true fly (Diptera)	Non-biting midges (Chironomidae)	9	03/10/2017	A national macroinvertebrate dataset collected for the biomonitoring of Ireland's river network, 2007–2018 (EPA)	
BALLYNAGOUL	Insect - true fly (Diptera)	Pediciidae	1	06/08/2014	A national macroinvertebrate dataset collected for the biomonitoring of Ireland's river network, 2007–2018 (EPA)	
BALLYNAGOUL	Insect - true fly (Diptera)	Platycheirus angustatus	1	10/09/2014	Hoverflies (Syrphidae) of Ireland	

BALLYNAGOUL	Insect - true fly (Diptera)	Platycheirus granditarsus	1	10/09/2014	Hoverflies (Syrphidae) of Ireland	
BALLYNAGOUL	Insect - true fly (Diptera)	Rhingia campestris	1	10/09/2014	Hoverflies (Syrphidae) of Ireland	
BALLYNAGOUL	Millipede	Polydesmus coriaceus	1	31/12/1976	Millipedes of Ireland	
BALLYNAGOUL	Mollusc	Arion (Arion)	1	10/07/1968	All Ireland Non-Marine Molluscan Database	
BALLYNAGOUL	Mollusc	Arion (Kobeltia)	1	10/07/1968	All Ireland Non-Marine Molluscan Database	
BALLYNAGOUL	Mollusc	Brown-lipped Snail (Cepaea (Cepaea) nemoralis)	1	10/07/1968	All Ireland Non-Marine Molluscan Database	
BALLYNAGOUL	Mollusc	Cellar Snail (Oxychilus (Oxychilus) cellarius)	1	10/07/1968	All Ireland Non-Marine Molluscan Database	
BALLYNAGOUL	Mollusc	Clear Glass Snail (Aegopinella pura)	1	10/07/1968	All Ireland Non-Marine Molluscan Database	
BALLYNAGOUL	Mollusc	Common Chrysalis Snail (Lauria (Lauria) cylindracea)	1	10/07/1968	All Ireland Non-Marine Molluscan Database	
BALLYNAGOUL	Mollusc	Common Garden Snail (Cornu aspersum)	1	10/07/1968	All Ireland Non-Marine Molluscan Database	Invasive Species: Medium Risk Invasive Species (2013 Report)
BALLYNAGOUL	Mollusc	Crystal Snail (Vitrea crystallina)	1	10/07/1968	All Ireland Non-Marine Molluscan Database	
BALLYNAGOUL	Mollusc	Dusky Slug (Arion (Mesarion) subfuscus)	1	10/07/1968	All Ireland Non-Marine Molluscan Database	
BALLYNAGOUL	Mollusc	Freshwater Nerite (Theodoxus fluviatilis)	7	09/09/2017	A national macroinvertebrate dataset collected for the biomonitoring of Ireland's river network, 2007–2018 (EPA)	
BALLYNAGOUL	Mollusc	Garlic Snail (Oxychilus (Oxychilus) alliarius)	1	10/07/1968	All Ireland Non-Marine Molluscan Database	
BALLYNAGOUL	Mollusc	Hairy Snail (Trochulus hispidus)	1	10/07/1968	All Ireland Non-Marine Molluscan Database	
BALLYNAGOUL	Mollusc	Heath Snail (Helicella itala)	1	10/07/1968	All Ireland Non-Marine Molluscan Database	Threatened Species: Vulnerable

BALLYNAGOUL	Mollusc	Jenkins' Spire Snail (Potamopyrgus antipodarum)	8	09/09/2017	A national macroinvertebrate dataset collected for the biomonitoring of Ireland's river network, 2007–2018 (EPA)	Invasive Species: Medium Risk Invasive Species (2013 Report)
BALLYNAGOUL	Mollusc	Least Slippery Snail (Cochlicopa cf. lubricella sensu Anderson 2008)	1	10/07/1968	All Ireland Non-Marine Molluscan Database	
BALLYNAGOUL	Mollusc	Long-toothed Herald Snail (Carychium tridentatum)	1	10/07/1968	All Ireland Non-Marine Molluscan Database	
BALLYNAGOUL	Mollusc	Lymnaea (Stagnicola)	1	10/07/1968	All Ireland Non-Marine Molluscan Database	
BALLYNAGOUL	Mollusc	Marsh Slug (Deroceras (Deroceras) laeve)	1	10/07/1968	All Ireland Non-Marine Molluscan Database	
BALLYNAGOUL	Mollusc	Netted Field Slug (Deroceras (Deroceras) reticulatum)	1	10/07/1968	All Ireland Non-Marine Molluscan Database	
BALLYNAGOUL	Mollusc	Rayed Glass Snail (Nesovitrea (Perpolita) hammonis)	1	10/07/1968	All Ireland Non-Marine Molluscan Database	
BALLYNAGOUL	Mollusc	River limpets (Ancylus fluviatilis)	12	14/08/2014	A national macroinvertebrate dataset collected for the biomonitoring of Ireland's river network, 2007–2018 (EPA)	
BALLYNAGOUL	Mollusc	Rock Snail (Pyramidula umbilicata)	1	10/07/1968	All Ireland Non-Marine Molluscan Database	
BALLYNAGOUL	Mollusc	Rosy Pea Shell (Euglesa milium)	1	10/07/1968	All Ireland Non-Marine Molluscan Database	
BALLYNAGOUL	Mollusc	Shining Pea Mussel (Euglesa nitida)	1	10/07/1968	All Ireland Non-Marine Molluscan Database	
BALLYNAGOUL	Mollusc	Short-ended Pea Mussel (Euglesa subtruncata)	1	10/07/1968	All Ireland Non-Marine Molluscan Database	

BALLYNAGOUL	Mollusc	Slippery Moss Snail (Cochlicopa cf. lubrica sensu Anderson 2008)	1	10/07/1968	All Ireland Non-Marine Molluscan Database	
BALLYNAGOUL	Mollusc	Smooth Glass Snail (Aegopinella nitidula)	1	10/07/1968	All Ireland Non-Marine Molluscan Database	
BALLYNAGOUL	Mollusc	Sphaerium	1	14/08/2014	A national macroinvertebrate dataset collected for the biomonitoring of Ireland's river network, 2007–2018 (EPA)	
BALLYNAGOUL	Mollusc	Strawberry Snail (Trochulus (Trochulus) striolatus)	1	10/07/1968	All Ireland Non-Marine Molluscan Database	
BALLYNAGOUL	Mollusc	Theodoxus	1	06/08/2014	A national macroinvertebrate dataset collected for the biomonitoring of Ireland's river network, 2007–2018 (EPA)	
BALLYNAGOUL	Mollusc	Wrinkled Snail (Xeroplexa intersecta)	1	10/07/1968	All Ireland Non-Marine Molluscan Database	Invasive Species: Medium Risk Invasive Species (2013 Report)
BALLYNAGOUL	Terrestrial mammal	Badger (Meles meles)	5	31/12/2007	Badger Setts of Ireland Database	Protected Species: Wildlife Acts
BALLYNAGOUL	Terrestrial mammal	Bank Vole (Myodes glareolus)	1	12/07/2012	Atlas of Mammals in Ireland 2010-2015	Invasive Species: Medium Risk Invasive Species (2013 Report)
BALLYNAGOUL	Terrestrial mammal	Common Pipistrelle (Pipistrellus pipistrellus sensu stricto)	1	17/10/2009	National Bat Database of Ireland	Protected Species: EU Habitats Directive || Protected Species: EU Habitats Directive >> Annex IV || Protected Species: Wildlife Acts
BALLYNAGOUL	Terrestrial mammal	Fallow Deer (Dama dama)	1	31/12/2008	Deer of Ireland Database	Invasive Species: Regulation S.I. 477/2011 (Ireland) || Invasive Species: High Risk Invasive Species (2013 Report) || Invasive Species: Regulation S.I. 374/2024 (Ireland) || Protected Species: Wildlife Acts
BALLYNAGOUL	Terrestrial mammal	Grey Squirrel (Sciurus carolinensis)	1	15/06/2018	Mammals of Ireland 2016-2025	Invasive Species: EU Invasive Alien Species Regulation No. 1143/2014 || Invasive Species: Regulation S.I. 477/2011 (Ireland) || Invasive Species: High Risk Invasive Species (2013 Report) || Invasive Species: Regulation S.I. 374/2024 (Ireland)

BALLYNAGOUL	Terrestrial mammal	Irish Hare (Lepus timidus subsp. hibernicus)	2	22/08/2020	Mammals of Ireland 2016-2025	
BALLYNAGOUL	Terrestrial mammal	Pipistrelle (Pipistrellus pipistrellus sensu lato)	1	17/11/2020	National Bat Database of Ireland	Protected Species: EU Habitats Directive || Protected Species: EU Habitats Directive >> Annex IV || Protected Species: Wildlife Acts
BALLYNAGOUL	Terrestrial mammal	Soprano Pipistrelle (Pipistrellus pygmaeus)	1	17/10/2009	National Bat Database of Ireland	Protected Species: EU Habitats Directive || Protected Species: EU Habitats Directive >> Annex IV || Protected Species: Wildlife Acts

APPENDIX B – Recent records submitted by me to National Biodiversity Data Centre

TaxonName	Common name	PreferredTaxonName	PreferredCommonName	RecordDate	SiteName	Recorder	Abundance
Circus cyaneus	Hen Harrier	Circus cyaneus	Hen Harrier	8/1/2020	Ballynagoul	Eugene Costello	1
Circus cyaneus	Hen Harrier	Circus cyaneus	Hen Harrier	8/19/2020	Ballynagoul	Eugene Costello	1
Gallinula chloropus	Common Moorhen	Gallinula chloropus	Common Moorhen	8/20/2020	Ballynagoul	Eugene Costello	2
Lepus timidus subsp. hibernicus	Irish Hare	Lepus timidus subsp. hibernicus	Irish Hare	8/22/2020	Ballynagoul	Eugene Costello	1
Saxicola torquata	Stonechat	Saxicola torquata	Stonechat	8/5/2020	Ballynagoul	Eugene Costello	2
Corvus corax	Common Raven	Corvus corax	Common Raven	8/21/2020	Ballynagoul	Eugene Costello	1
Buteo buteo	Common Buzzard	Buteo buteo	Common Buzzard	11/10/2020	Ballynagoul	Eugene Costello	1
Saxicola torquata	Stonechat	Saxicola torquata	Stonechat	12/3/2020	Ballynagoul	Eugene Costello	2
Accipiter nisus	Eurasian Sparrowhawk	Accipiter nisus	Eurasian Sparrowhawk	8/24/2020	Ballynagoul	Eugene Costello	1
Carduelis carduelis	European Goldfinch	Carduelis carduelis	European Goldfinch	8/24/2020	Ballynagoul	Eugene Costello	100
Scolopax rusticola	Eurasian Woodcock	Scolopax rusticola	Eurasian Woodcock	12/19/2020	Ballynagoul	Eugene Costello	1
Scolopax rusticola	Eurasian Woodcock	Scolopax rusticola	Eurasian Woodcock	12/23/2020	Ballynagoul	Eugene Costello	1
Egretta garzetta	Little Egret	Egretta garzetta	Little Egret	12/24/2020	Ballynagoul	Eugene Costello	3
Pipistrellus pipistrellus		Pipistrellus pipistrellus sensu lato	Pipistrelle	11/17/2020	Ballynagoul	Eugene Costello	8
Buteo buteo	Common Buzzard	Buteo buteo	Common Buzzard	3/22/2021	Ballynagoul	Eugene Costello	1
Buteo buteo	Common Buzzard	Buteo buteo	Common Buzzard	3/23/2021	Ballynagoul	Eugene Costello	2

Buteo buteo	Common Buzzard	Buteo buteo	Common Buzzard	3/24/2021	Ballynagoul	Eugene Costello	1
Emberiza schoeniclus	Reed Bunting	Emberiza schoeniclus	Reed Bunting	4/14/2021	Ballynagoul	Eugene Costello	1
Falco tinnunculus	Common Kestrel	Falco tinnunculus	Common Kestrel	4/16/2021	Ballynagoul	Eugene Costello	1
Buteo buteo	Common Buzzard	Buteo buteo	Common Buzzard	4/3/2021	Ballynagoul	Eugene Costello	2
Alcedo atthis	Common Kingfisher	Alcedo atthis	Common Kingfisher	5/23/2021	Ballynagoul	Eugene Costello	2
Crocidura russula	Greater White-toothed Shrew	Crocidura russula	Greater White-toothed Shrew	3/23/2022	Ballynagoul	Eugene Costello	1
Tyto alba	Barn Owl	Tyto alba	Barn Owl	9/28/2022	Ballynagoul	Eugene Costello	1
Arion (Arion) vulgaris		Arion (Arion) vulgaris		10/5/2022	Ballynagoul	Eugene Costello	1
Dactylorhiza fuchsii	Common Spotted-orchid	Dactylorhiza fuchsii	Common Spotted-orchid	6/10/2023	Ballynagoul	Dr Eugene Costello	6
Dactylorhiza fuchsii	Common Spotted-orchid	Dactylorhiza fuchsii	Common Spotted-orchid	6/10/2023	Ballynagoul	Dr Eugene Costello	8
Dactylorhiza fuchsii	Common Spotted-orchid	Dactylorhiza fuchsii	Common Spotted-orchid	6/10/2023	Ballynagoul	Dr Eugene Costello	50
Dactylorhiza fuchsii	Common Spotted-orchid	Dactylorhiza fuchsii	Common Spotted-orchid	6/10/2023	Ballynagoul	Dr Eugene Costello	50
Rhinanthus minor	Yellow-rattle	Rhinanthus minor	Yellow-rattle	6/10/2023	Ballynagoul	Dr Eugene Costello	4
Cardamine pratensis	Cuckooflower	Cardamine pratensis	Cuckooflower	6/10/2023	Ballynagoul	Dr Eugene Costello	1
Silene flos-cuculi		Lychnis flos-cuculi	Ragged-Robin	6/10/2023	Ballynagoul	Dr Eugene Costello	300
Dactylorhiza fuchsii	Common Spotted-orchid	Dactylorhiza fuchsii	Common Spotted-orchid	6/10/2023	Ballynagoul	Dr Eugene Costello	200
Carex ovalis	Oval Sedge	Carex ovalis	Oval Sedge	6/10/2023	Ballynagoul	Dr Eugene Costello	300

Equisetum fluviatile	Water Horsetail	Equisetum fluviatile	Water Horsetail	6/10/2023	Ballynagoul	Dr Eugene Costello	400
Iris pseudacorus	Yellow Iris	Iris pseudacorus	Yellow Iris	6/10/2023	Ballynagoul	Dr Eugene Costello	50
Potentilla anserina	Silverweed	Potentilla anserina	Silverweed	6/10/2023	Ballynagoul	Dr Eugene Costello	400
Dactylorhiza fuchsii	Common Spotted-orchid	Dactylorhiza fuchsii	Common Spotted-orchid	6/10/2023	Ballynagoul	Dr Eugene Costello	15
Iris pseudacorus	Yellow Iris	Iris pseudacorus	Yellow Iris	6/10/2023	Ballynagoul	Dr Eugene Costello	200
Ilex aquifolium	Holly	Ilex aquifolium	Holly	6/10/2023	Ballynagoul	Dr Eugene Costello	1
Dactylorhiza fuchsii	Common Spotted-orchid	Dactylorhiza fuchsii	Common Spotted-orchid	6/10/2023	Ballynagoul	Dr Eugene Costello	100
Pisaura mirabilis	Nursery Web Spider	Pisaura mirabilis	Nursery Web Spider	6/10/2023	Ballynagoul	Dr Eugene Costello	1
Aeshna grandis	Brown Hawker	Aeshna grandis	Brown Hawker	6/10/2023	Ballynagoul	Dr Eugene Costello	1
Coenagrion pulchellum	Variable Damselfly	Coenagrion pulchellum	Variable Damselfly	6/18/2023	Ballynagoul	Eugene Costello	1
Anacamptis pyramidalis	Pyramidal Orchid	Anacamptis pyramidalis	Pyramidal Orchid	6/23/2023	Ballynagoul	Dr Eugene Costello	1
Tyto alba	Barn Owl	Tyto alba	Barn Owl	12/3/2023	Ballynagoul	Eugene Costello	1
Scolopax rusticola	Eurasian Woodcock	Scolopax rusticola	Eurasian Woodcock	12/3/2023	Ballynagoul	Eugene Costello	1
Circus cyaneus	Hen Harrier	Circus cyaneus	Hen Harrier	1/14/2024	Ballynagoul	Eugene Costello	1
Dactylorhiza fuchsii	Common Spotted-orchid	Dactylorhiza fuchsii	Common Spotted-orchid	7/4/2024	Ballynagoul	Eugene Costello	10
Dactylorhiza fuchsii	Common Spotted-orchid	Dactylorhiza fuchsii	Common Spotted-orchid	7/4/2024	Ballynagoul	Eugene Costello	6
Dactylorhiza fuchsii	Common Spotted-orchid	Dactylorhiza fuchsii	Common Spotted-orchid	7/4/2024	Ballynagoul	Eugene Costello	10

Sparganium erectum	Branched Bur-reed	Sparganium erectum	Branched Bur-reed	7/4/2024	Ballynagoul	Eugene Costello	20
Eupatorium cannabinum	Hemp-agrimony	Eupatorium cannabinum	Hemp-agrimony	7/4/2024	Ballynagoul	Eugene Costello	50
Dactylorhiza fuchsii	Common Spotted-orchid	Dactylorhiza fuchsii	Common Spotted-orchid	7/4/2024	Ballynagoul	Eugene Costello	100
Rhinanthus minor	Yellow-rattle	Rhinanthus minor	Yellow-rattle	7/4/2024	Ballynagoul	Eugene Costello	5
Dactylorhiza fuchsii	Common Spotted-orchid	Dactylorhiza fuchsii	Common Spotted-orchid	7/4/2024	Ballynagoul	Eugene Costello	90
Eupatorium cannabinum	Hemp-agrimony	Eupatorium cannabinum	Hemp-agrimony	7/4/2024	Ballynagoul	Eugene Costello	25
Dactylorhiza fuchsii	Common Spotted-orchid	Dactylorhiza fuchsii	Common Spotted-orchid	7/4/2024	Ballynagoul	Eugene Costello	130
Acrocephalus schoenobaenus	Sedge Warbler	Acrocephalus schoenobaenus	Sedge Warbler	7/20/2024	Ballynagoul	Eugene Costello	2
Lepus timidus subsp. hibernicus	Irish Hare	Lepus timidus subsp. hibernicus	Irish Hare	12/1/2024	Ballynagoul	Eugene Costello	1
Anas crecca	Eurasian Teal	Anas crecca	Eurasian Teal	12/28/2024	Ballynagoul	Eugene Costello	2
Saxicola torquata	Stonechat	Saxicola torquata	Stonechat	12/7/2024	Ballynagoul	Eugene Costello	2
Gallinula chloropus	Common Moorhen	Gallinula chloropus	Common Moorhen	12/26/2024	Ballynagoul	Eugene Costello	1
Zootoca vivipara	Common Lizard	Zootoca vivipara	Common Lizard	1/1/2025	Ballynagoul	Eugene Costello	
Carduelis chloris	European Greenfinch	Carduelis chloris	European Greenfinch	12/6/2024	Ballynagoul	Eugene Costello	1
Lutra lutra	European Otter	Lutra lutra	European Otter	2/15/2025	Ballynagoul	Eugene Costello	1
Emberiza schoeniclus	Reed Bunting	Emberiza schoeniclus	Reed Bunting	2/15/2025	Ballynagoul	Eugene Costello	1
Anas penelope	Eurasian Wigeon	Anas penelope	Eurasian Wigeon	2/15/2025	Ballynagoul	Eugene Costello	30

Anas crecca	Eurasian Teal	Anas crecca	Eurasian Teal	2/15/2025	Ballynagoul	Eugene Costello	35
Anas platyrhynchos	Mallard	Anas platyrhynchos	Mallard	2/15/2025	Ballynagoul	Eugene Costello	20
Tyto alba	Barn Owl	Tyto alba	Barn Owl	3/2/2025	Ballynagoul	Eugene Costello	1
Locustella naevia	Common Grasshopper Warbler	Locustella naevia	Common Grasshopper Warbler	3/16/2025	Ballynagoul	Eugene Costello	1
Egretta garzetta	Little Egret	Egretta garzetta	Little Egret	3/16/2025	Ballynagoul	Eugene Costello	2
Ardea cinerea	Grey Heron	Ardea cinerea	Grey Heron	3/8/2025	Ballynagoul	Eugene Costello	2
Corvus corax	Common Raven	Corvus corax	Common Raven	3/17/2025	Ballynagoul	Eugene Costello	1
Locustella naevia	Common Grasshopper Warbler	Locustella naevia	Common Grasshopper Warbler	4/21/2025	Ballynagoul	Eugene Costello	1
Tyto alba	Barn Owl	Tyto alba	Barn Owl	3/15/2025	Ballynagoul	Eugene Costello	1
Anas penelope	Eurasian Wigeon	Anas penelope	Eurasian Wigeon	2/3/2025	Ballynagoul	Eugene Costello	25
Meles meles	Eurasian Badger	Meles meles	Eurasian Badger	6/29/2025	Ballynagoul	Eugene Costello	
Macroglossum stellatarum	Humming-bird Hawk-moth	Macroglossum stellatarum	Humming-bird Hawk-moth	6/27/2025	Ballynagoul	Eugene Costello	1
Dactylorhiza fuchsii	Common Spotted-orchid	Dactylorhiza fuchsii	Common Spotted-orchid	6/29/2025	Ballynagoul	Eugene Costello	
Agrimonia eupatoria	Agrimony	Agrimonia eupatoria	Agrimony	6/29/2025	Ballynagoul	Eugene Costello	5
Dactylorhiza fuchsii	Common Spotted-orchid	Dactylorhiza fuchsii	Common Spotted-orchid	6/29/2025	Ballynagoul	Eugene Costello	3
Dactylorhiza fuchsii	Common Spotted-orchid	Dactylorhiza fuchsii	Common Spotted-orchid	6/29/2025	Ballynagoul	Eugene Costello	5

Dactylorhiza fuchsii	Common Spotted-orchid	Dactylorhiza fuchsii	Common Spotted-orchid	6/29/2025	Ballynagoul	Eugene Costello	6
Dactylorhiza fuchsii	Common Spotted-orchid	Dactylorhiza fuchsii	Common Spotted-orchid	6/29/2025	Ballynagoul	Eugene Costello	200
Dactylorhiza fuchsii	Common Spotted-orchid	Dactylorhiza fuchsii	Common Spotted-orchid	6/29/2025	Ballynagoul	Eugene Costello	100
Rhinanthus minor	Yellow-rattle	Rhinanthus minor	Yellow-rattle	6/29/2025	Ballynagoul	Eugene Costello	7
Plecotus auritus	Brown Long-eared Bat	Plecotus auritus	Brown Long-eared Bat	8/29/2025	Ballynagoul	Eugene Costello	1
Tyto alba	Barn Owl	Tyto alba	Barn Owl	9/7/2025	Ballynagoul	Eugene Costello	

Chapter 4. Objection on grounds of inadequate Bat survey and impacts on Bat population

Susan Kerwin
Ballynoe
Bruree
Co Limerick V35Y754

batrehabilitationireland@gmail.com

Personal Background

With over 10 years of experience in bat surveying, rehabilitation, and identification, I am a licensed bat ringer under the National Parks and Wildlife Services. I am authorised to implement and develop mitigation measures for derogation licensing, ensuring the welfare and safety of bats during renovation projects. In 2019, I founded Bat Rehabilitation Ireland, a wildlife rescue organisation based in County Limerick that specialises in the treatment and care of all native bat species. In 2020, I co-developed an accredited wildlife treatment course in collaboration with the Veterinary Council of Ireland. This course enables us to visit veterinary practices and teach veterinarians and veterinary nurses effective methods for diagnosing and treating wildlife cases.

Since our inception, we have cared for over 2,000 bats from across the country, averaging more than 350 bats per year. We currently receive bats from other major rescues, and we maintain a 65% rehabilitation success rate with these animals.

Today, I advise and share treatment methods with wildlife rescues worldwide, contributing to the improvement of bat care and rehabilitation on a global scale. In addition to our rehabilitation work, Bat Rehabilitation Ireland is involved in several unrelated projects in collaboration with third-level institutions and other scientific organizations. These initiatives focus on maximizing the research potential of the diverse bat species that come into our care. Our current projects include:

- Studying the roost preferences of vesper species in relation to artificially created sites in living trees.
- Ringing all bats prior to release to monitor their longevity and distribution. Before release, all ringed bats are observed for one week in a flight cage to ensure that no issues or injuries arise from the ring.
- Monitoring Nathusius' Pipistrelle by recording locations and ringing individuals for distribution and tracking purposes.
- Contributing to the Darwin Tree of Life project by providing DNA biopsy samples from Leisler's bats for inclusion in the database.
- Investigating the healing abilities of bat wings and tail membranes.
- Monitoring bat fecal samples for Lyssavirus.
- Conducting DNA monitoring of cat catches to assess potential impacts on bat populations.

Through these endeavors, we aim to enhance our understanding of bats and contribute valuable knowledge to the field of wildlife conservation.

Analysis of Bat Survey

The bat fauna surveying and reporting produced for the proposed Garrane Green Energy Project, near Bruree, Co. Limerick, identified that the area is used by a significant number of bats, with eight species were recorded on the site. The results of the study show that, without mitigation, there will be a high level of impact at all nine proposed turbine locations for Leisler's Nyctalus leisleri, common Pipistrellus pipistrellus and/or soprano pipistrelle P. pygmaeus bats (the main species known to be impacted by collisions with wind turbines).

Nathusius' pipistrelle

The bat study report concludes that impacts on Nathusius' pipistrelle P. nathusii will be low. It is not evident how such a conclusion was reached for this species, however. Information available on Nathusius' pipistrelle from the most recently available reporting (NPWS Article 17 in 2019) shows that we know very little about where this species roosts and its short-term trend in Ireland is uncertain.[1] There are no dedicated surveys for this highly migratory species in Ireland and therefore data is very limited. The species is considered widespread but rare and it is rarely recorded during extensive, widespread national surveys. The Article 17 reporting states that it is unclear what range extent is required to provide for the long-term survival of the species and consequently the Favourable Reference Range is unknown. Recommendations are made for survey work to continue, and it is hoped that a clearer picture of the status of this species in Ireland will emerge in the coming years.

Given the lack of reliable baseline data for this species in Ireland, it is not safe to conclude that the proposed windfarm is unlikely to have a significant effect on this species. To date, no roosts of the species have been identified in the Republic, so there is no knowledge of the species' local roost preferences or how many may be in the country. Nathusius' pipistrelle echolocation calls were repeatedly recorded at nearly every static detector location in the bat survey for Garrane Green Energy. This would indicate that this species uses the local area year-round. Nathusius' pipistrelle is considered to be at high risk of collision with wind turbines. Table 5.1 of the bat report concludes that the potential risk to this species, with no mitigation applied, is high. Without more accurate national data, however, it cannot be determined with certainty how this species will be affected by a wind farm where it is present.

Lesser Horseshoe bat

A lesser horseshoe Rhinolophus hipposideros bat call was recorded in October 2022. The author of the report concludes that this call was from a 'vagrant', recorded as an individual was moving between summer and winter roosts. It is highly significant that a call from this species was recorded at this location given that the nearest known lesser horseshoe bat roost is located c20Km distant and lesser horseshoe bats are known to not travel far from roosting sites. The bat survey should have concluded, using the precautionary principle, that there is likely to be a lesser horseshoe bat roost within 2.5km of the project site.

In this regard, I note that the bat survey report identified a number of potential roost structures within 2.5km of the project site, including some that would be considered suitable for the Lesser Horsehoe. The report identified that some structures which did not show evidence of any bats in 2022 were in use as roosts in 2023. As the Derelict Housing Grant reduces the availability of suitable buildings for lesser horseshoe bats, it is likely that the species will come under more

[1] https://www.npws.ie/sites/default/files/publications/pdf/NPWS_2019_Vol3_Species_Article17.pdf , p.480

pressure, utilising sub-optimal roosts on the edge of their current ranges. More recent surveys were conducted on potential roosts in 2024 but none of these were conducted on structures that may be suitable for lesser horseshoe bats.

Furthermore, the static detection survey ended too early to determine if the Lesser Horseshoe bat was indeed a 'vagrant'. The methodology for the bat report states that static detection was carried out between April and October in 2022, but only between April and September in 2023. This is quite problematic. Having recorded a Lesser Horseshoe in October 2022, the bat survey should have continued into October the following year to determine if there is a trend of Lesser Horseshoe using the windfarm site in October. Given the time of year, there is a possibility that Lesser Horseshoe bats use the project site as a commuting route to reach winter roosts in the area. As it is, however, the static detection ended in September 2023, making it impossible to determine whether the October 2022 recording was an outlier or part of a trend. Clarification is required as to why the static detection survey did not continue into October 2023, and further survey should be carried out in the project site in late autumn to resolve the issue.

It is important that this is resolved as the lesser horseshoe is a Habitats Directive Annex II species and the project could have a significant effect on a population in the area. While lesser horseshoe bats are considered a low collision risk, the loss of more than 1.65km of mature hedgerows during construction (see below) would severely disrupt the lesser horseshoe and other bats' use of the site for commuting and foraging. It is also unclear in the report how Natterer's bat Myotis nattereri will not be significantly impacted by loss of connectivity and loss of roosting sites.

Discussion:

It is not surprising that commonly found bat species make up a significant percentage of the overall number of recorded bat calls, as shown in Table 4-4 of the bat survey report – not all bat species have the same ecology or are under as much threat as others.

It is extremely surprising that lesser horseshoe bat and Nathusius' pipistrelle were identified within the project site. These bats are locally rare and have not been identified in this area previously. This may be due to there not having been any dedicated studies in the local area and so this negative historic result may be due to the lack of survey and not species absence. Now that these two species have been identified as being present in the area, more studies are needed to identify roost locations and commuting routes in order to determine more appropriately what may or may not be significant impacts to their conservation.

The dismissal of the lesser horseshoe record as insignificant in inappropriate and goes against the precautionary principle. The presence of lesser horseshoe so far outside its normal range at this time of year is significant and may indicate that there is a hibernation roost nearby. There is potential that lesser horseshoe bats are using this site in late autumn commuting and winter roosting. This has not been considered in the EIAR, however.

It is imperative that further investigation of the lesser horseshoe bat is undertaken in the project site, before any planning decision is made. In a 2022 report, the National Parks and Wildlife Service and Vincent Wildlife Trust highlighted Co. Limerick as being of national importance to the genetic integrity of the lesser horseshoe bat in Ireland. With northern populations in Clare, Galway and Mayo cut off from the southern population in Kerry and Cork, Co. Limerick forms a crucial bridge between the two and needs to be protected and developed to

allow gene flow within the species.[2] In recent years, for example, the Vincent Wildlife Trust has undertaken the Mulkear lesser Horseshoe Bat Project within the catchment of the Mulkear River to provide lesser horseshoe bats with dedicated roosts specifically in Limerick to enhance the connectivity and roosting opportunities in the area for the species.

What is more, a recent study of lesser horseshoe connectivity has identified the Bruree area in south Limerick as a key potential corridor of connectivity between roosts in Limerick and Kerry.[3] The lesser horseshoe recording in the bat survey for Garrane, which is in Bruree, could therefore be much more significant than the EIAR suggests. More static detection survey, especially in October, needs to be undertaken before any planning decision is made on this project.

Assessment of mitigation measures

The mitigation measures described are weak and are open to subjectivity. Further detail and change is required if they are to be appropriate.

7.1.4 Habitat retention, replacement and landscaping, incl. creation of 0.67ha woodland
This new woodland is proposed as one of the main mitigation measures. However, it will be of very little use in mitigating habitat loss because it will be planted immediately north east of the windfarm's substation. Substations require a significant amount of artificial light at night and this will deter bats. As the bat report itself says, "artificial light creates a barrier to bats so lighting should be avoided where possible." Furthermore, substations emit a lot of noise and it is well known that bats are distracted and displaced by artificial noise.[4]

Another key mitigation measure is the planting of 1.65km of new hedgerows, to replace the 1.65km total they claim is being lost. Even if these new hedgerows are planted on day one of construction, however, it will take decades for them to mature and match the biomass and biodiversity of the hedgerows currently on site, especially the high, dense hedgerows around Turbines 1, 2, 8 and 9. Furthermore, there is no mention in this report of the loss of close to 200m of hedgerow in and around the substation, and how that will be mitigated (Figure 7-1).

The project therefore cannot guarantee that "compensatory planting will ensure no net loss of feeding or commuting features." Over what timescale are they claiming no net loss? It is unlikely to be achieved within the operational period of the windfarm given that decades are required for hedgerows and woodlands to mature, and given that the new woodland will be in a near-

[2] NPWS & VWT 2022. *Lesser Horseshoe Bat Species Action Plan 2022- 2026*. National Parks and Wildlife Service, Department of Housing, Local Government and Heritage, Ireland; Lenihan, P., Flaherty, M., Finch, D. and McAney, K. 2021. Modelling connectivity pathways between Lesser Horseshoe Bat (Rhinolophus hipposideros (Bechstein)) maternity roosts in Ireland. *The Irish Naturalists' Journal* 38, pp.14-19.
[3] See Figure 3 in Lenihan, P., Flaherty, M., Finch, D. and McAney, K. 2021. Modelling connectivity pathways between Lesser Horseshoe Bat (Rhinolophus hipposideros (Bechstein)) maternity roosts in Ireland. *The Irish Naturalists' Journal* 38, pp.14-19.
[4] Schaub, A., Ostwald, J. and Siemers, B.M., 2008. Foraging bats avoid noise. *Journal of Experimental Biology*, *211*(19), pp.3174-3180; Bunkley, J.P., McClure, C.J., Kleist, N.J., Francis, C.D. and Barber, J.R., 2015. Anthropogenic noise alters bat activity levels and echolocation calls. *Global Ecology and Conservation*, *3*, pp.62-71; Allen, L.C., Hristov, N.I., Rubin, J.J., Lightsey, J.T. and Barber, J.R., 2021. Noise distracts foraging bats. *Proceedings of the Royal Society B*, 288(1944), 20202689.

unusable location for bats.

7.1.5 Lighting

Lighting restrictions are to apply to some sensitive features e.g., mature tree lines. These measures could lead to subjectivity. All sensitive features must be described and mapped prior to granting of planning permission. No nighttime works are to occur in these areas, and no lighting is to be placed in these areas.

7.2.2 Pre-felling survey of trees

These measures are not appropriate. Mature trees with roosting potential should be identified and recorded and should not be removed. If required following the survey, a derogation license application should be made prior to the granting of planning permission. This will prevent unnecessary delays to works at a later stage should a derogation license be required.

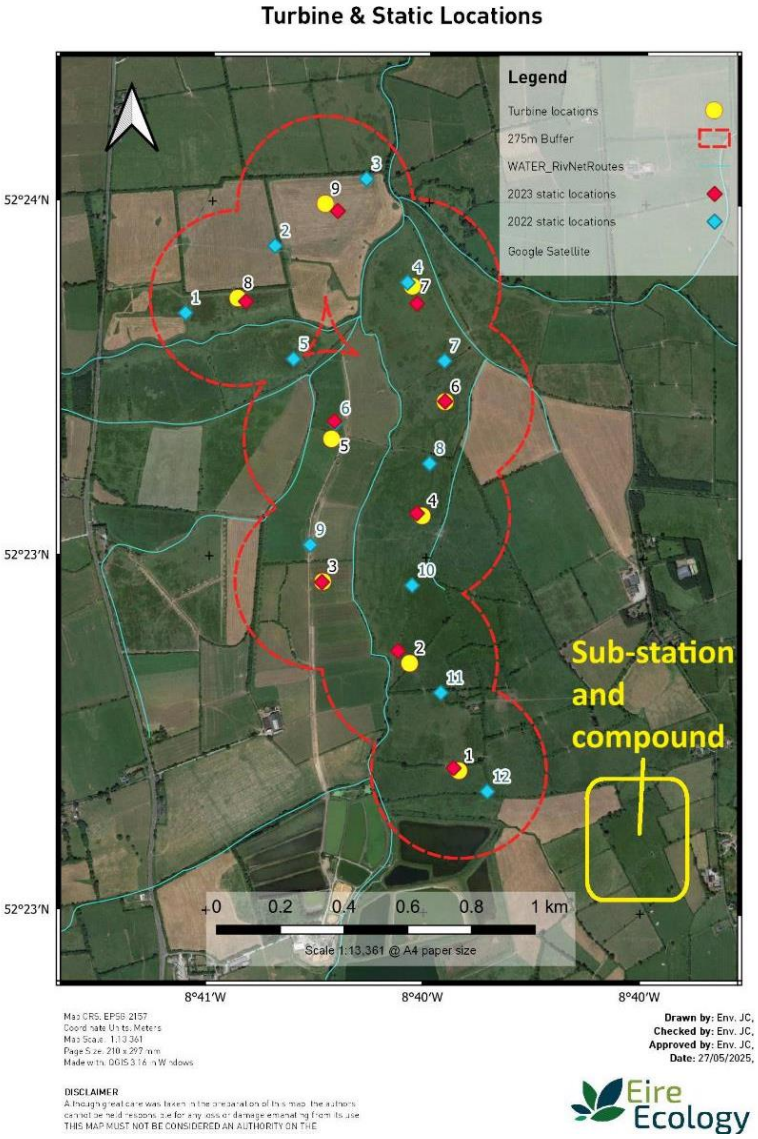
7.3.3 Buffer zones

How will the proposed buffer zones be managed and maintained during the operation of the development? The impact assessment of this cannot be determined without a method statement.

Additional Concerns

No static detector survey was conducted anywhere in the south-eastern part of the development area, where the sub-station and temporary construction compound are proposed (see map next page). This area spans approximately 2 hectares and, together with tracks to and from the substation, will require the removal of an additional 200 meters of mature hedgerows, beyond the 1.65km total claimed in the bat survey. These corridors are critical for bat commuting and foraging. The lack of bat recording in the south east of the project is very strange. Several mature trees in this area were identified as needing further assessment as potential bat roosting sites (see Table 1.2 on p.63 of Garrane bat report). However, this further assessment appears not to have taken place.

The report also fails to mention Charleville Lagoons, a nearby wetland habitat known to support bat activity. Wetlands offer rich foraging opportunities and serve as key navigational features. Indeed, the highest number of bat passes per hour in spring and summer was detected next to Charleville Lagoons (pp.73-77). The omission of this site raises concerns about the completeness of the ecological assessment.



Furthermore, I would like to refer An Coimisiún Pleanála to Planning Application No. 2460766 submitted to Louth County Council, and specifically to the points raised by Fred Logue regarding the impact on bats. These points are accessible via the following link: https://www.eplanning.ie/LouthCC/AppFileRefDetails/2460766/0

I believe the concerns outlined in that submission are directly relevant to the current case, particularly in relation to the likelihood of collision and barotrauma affecting bat populations.

Under the EU Habitats Directive, the deliberate killing of individual bat specimens is strictly prohibited. Therefore, any development that risks such outcomes constitutes a significant effect on the environment, as it involves an impact explicitly prohibited by Article 12 of the Directive.

The bat fauna survey and reporting conducted for the Garrane Green Energy Project indicates a high level of impact at all nine proposed turbine locations. The species most at risk include:

- Leisler's bat (Nyctalus leisleri)
- Common pipistrelle (Pipistrellus pipistrellus)

• Soprano pipistrelle (Pipistrellus pygmaeus)

• Nathusius' pipistrelle (Pipistrellus nathusii)

These species are known to be particularly vulnerable to collisions with wind turbines, as well as barotrauma caused by sudden changes in air pressure near turbine blades.

Given these findings, I respectfully urge the Planning Authority to carefully consider the ecological implications of the proposed development, especially in light of the legal protections afforded to bat species under European environmental law.

Summary of Key Issues

- Lack of reliable data on Nathusius' pipistrelle and questionable conclusions about its impact.
- Presence of lesser horseshoe bat far outside known range suggesting roosts nearby.
- Inconsistency between 2022 and 2023 in terms of months covered, i.e. static detection in October 2022 but not in October 2023, preventing proper evaluation of lesser horseshoe presence
- No static detector survey where significant construction is planned in south east of project site, i.e. around proposed substation.
- Removal of close to 200m of mature hedgerows in and near substation not mentioned.
- No mention of Charleville Lagoons, major nearby wetland habitat known to support bat activity.
- Weak and subjective mitigation measures lacking details, implementation plans.
- Failure to address potential impacts on Natterers Bat and inconsistencies in survey methodology.
- Breach of article 12 of the EU habitats directive.

Why These Oversights Matter:

- - Hedgerows and wetlands are vital bat habitats.
- - Incomplete surveys undermine licensing and mitigation strategies.
- - Scientific integrity is compromised by missing data.

Final conclusion

The Garrane Green Energy Project poses significant risks to local bat populations, including rare and migratory species. The survey methodology is inconsistent from year to year in terms of months covered and omits important habitats in the south east of the project site. Mitigation measures proposed are also unconvincing and insufficient.

We respectively request that no planning permission be issued on the above grounds.

Chapter 5. Flood and Water Risk

Contents

5.0 Water

5.1 Introduction

Dr. Pamela Bartley (Hydro-G) was commissioned by a community group named the 'Bruree Charleville Effin Wind Farm Action Group' to independently assess water and flooding related details of a development proposal in their area. This community group was formed when a SID application was lodged with The Commission in relation to the proposed erection of 9 Turbines in the area. The proposed development is called the Garrane Wind Farm. A separate SID application was lodged in the same month for 17 Turbines in Ballinlee, 4km west of Bruff, which places the residents of Bruree in a difficult situation to come to terms with: 17 Turbines to the north east and 9 to the south west.

Hydro-G's evaluation of case details presented here relates to the proposed **Garrane Wind Farm, grid connection and all associated works – ACP Case File PAX91.323635.**

For the purposes of the inspector's own Cumulative Impact potential assessment, the adjacent proposed Ballinlee Wind Farm investment project, their case file is PC91.320745

In the course of Hydro-G's evaluation of the application documents relating to the proposed Garrane Wind Turbine Project, water related matters became apparent in the subject areas of

1) Inappropriate Site Selection – contrary to the law of EIA in terms of Consideration of Alternatives,
2) Historic and local experiences, and omitted, evidence of flooding,
3) Unacknowledged and unassessed Construction Impacts arising from soil compaction in a flood zone and wetland,
4) Unacknowledged Wastewater Infrastructure,
5) Incompletely assessed risks posed to downstream Public Water Supplies,
6) WFD Status & Risk.

In this Hydro-G body of work there is a separate subsection for each of the water related matters.

5.2 Statement of Expertise

Dr. Pamela Bartley is a water focussed civil engineer and is considered an Expert Service Provider (ESP) in service to engineering consultants, planning authorities, the legal profession, Environment Sections of County Councils, Uisce Eireann, The National Federation of Group Water Schemes and nationally important limestone quarries. She is now called upon by community groups to provide expert, reasoned and justified independent assessment of renewable energy projects conducted in their habitats that seem to be lacking true representation of the local understanding of water systems and associated water dependent ecosystems in existence in the vicinity of the proposed construction sites. She has almost 30 years of experience in field-based practice working on construction sites, supervising borehole drilling, completing impact assessments, groundwater monitoring, modelling and abstraction point management. She is considered a specialist in hydrology, hydrogeology, Public Water Supply and extractive industries (quarries).

Pamela is qualified and IOSH certified to act as PSDP (Project Supervisor Design Phase) & PSCS (Project Supervisor Construction Stage) as defined by the Health and Safety at Work (Construction) Regulations. Pamela's limited company is a registered Uisce Eireann Supplier (no. 1855) and Pamela Bartley is HSQE approved within Uisce Eireann as one of their Hydrogeologist Framework service providers. She has advised on some projects advancing Uisce Eireann's NWRP's resultant Supply Demand Programme. Upon completion of a Diploma in Water and Wastewater Technology at Sligo RTC she completed a degree in Civil Engineering at Queens University, Belfast and then completed a Master of Science in Environmental Engineering, which was followed by a hydrogeologically

focussed Ph.D. on Groundwater Impact: both postgraduate degrees were completed within the school of Civil Engineering at Trinity College, Dublin.

Her key work areas are the assessment of potential impact to groundwater and surface water arising from large scale rock extraction and groundwater use for PWS. She specialises in the engineering of groundwater and large-scale water supply boreholes for PWS, GWS, Motorway Service Stations & Hotels. Part of her work requires the assessment of Zones of Contribution to Groundwater and Spring Abstraction Points. Other work areas include evaluation of discharges to groundwater and surface waters for compliance with Irish Regulations and the hydrological and hydrogeological assessments required for EIA. She has a skillset in the assessment of groundwater quality for water treatment process parameters and working in collaboration with water treatment plant designers. She is responsible for the successful, legally compliant, attainment of large-scale Section 4 Discharge Licences.

As a result of work in evaluating planning appeals, Pamela has become specialist in planning evaluations in the context of enacted Irish Regulation and EU Directives concerning the water environment such as the Groundwater Regulations (S.I. No. 9 of 2010 & Amendment Regulations S.I. No. 366/2016), Surface Water Regulations (S.I. No. 272 of 2009 & Amendment Regulations S.I. No. 386 of 2015), Water Framework and Habitats' Directives. She has been an invited guest speaker at An Bord Pleanála, The Irish Concrete Federation, The Health Service Executive, Environmental Health Officers National Conference, The Irish Planning Institute's National Conference, The International Association of Hydrogeologist's National Conference (Irish Branch) and has delivered hydrogeological lectures to the public during Science Week. In the past, she has held full time lecturing positions in third level institutions (WIT & CIT, 1996 – 1999), delivered practical laboratory instruction in the assessment of subsoils for the FETAC Site Assessor programme and also demonstrated hydraulics laboratory and practical field survey tutorial modules at Trinity College Dublin (1996). Pamela is a qualified and certified 'Site Assessor' and has been an interviewer for examination candidates in respect of eligibility for the Site Suitability FETAC Qualification. Pamela Bartley's company is Bartley Hydrogeology ltd., registered to trade as Hydro-G. The company holds the requisite professional indemnity insurance and employers, public and products liability insurances.

5.3 Inappropriate Site Selection

The proposed wind farm at Garrane, Co. Limerick is an example of where not to propose large scale construction or a wind farm for many reasons, including the following:

a. the project is in an OPW mapped 'Flood Zone A' site, which has a very frequent ACTUAL return period of flooding,

b. the proposed site is adjacent to the N20 at a zone that is prone to flooding the national route; the loss of floodplain storage resulting from the development will increase that risk

c. the proposed site has underground infrastructure conveying treated wastewater, under EPA IE Licence, from Kerry Ingredients in north Charleville to the River Maigue in the immediate vicinity of proposed turbines where abnormally large cranes and loadings will be applied to flood plain and wetland soils.

d. None of the rivers in the proposed development site are meeting their WFD Objectives and the EPA published deadline is 2027 – just over one year away. The rivers are all mapped as 3rd Cycle At Risk and Moderate Status. Whilst construction is not a reported pressure or issue at the moment, that does not mean that construction is viable either.

5.4 Inappropriate Site Selection - Flooding

In relation to flooding, as extracted from page 17 of the proposed Garrane Wind Farm's Site Specific Flood Risk Assessment no. P1605-0_FRA_F0.

> *"Based on the CFRAM River Flood Extents (Present Day) mapping, 3 no. turbines in the east of the Site are (T4, T6, T7) are located in the 100-year fluvial flood zone (Flood Zone A)."*

Furthermore, attention is drawn to the conclusion on page 38 of Garrane's Flood Risk Assessment:

> *"Based on the site specific flood modelling (which includes climate change factors in design flows), turbines T4, T5, T6, T7, and T8 are located in a 100-year modelled flood zone (Flood Zone A)."*

Hydro-G offers that the OPW's definition of Flood Zone A is **"Flood Zone A is a designation by the Office of Public Works (OPW) for areas with the highest probability of flooding from rivers and the sea. In this zone, the chance of flooding in any given year is greater than 1% (or 1 in 100 for river flooding).**" The nuances of the actual definition rather than the applicant's agent's text is critically important in terms of risk assessment and planning feasibility. Of particular note is that:

- Flood Zone A is primarily defined as the highest risk area.
- The probability is NOT 1 in 100 year BUT GREATER than 1% IN ANY GIVEN YEAR.

On p.73 of its Planning Statement, Garrane Green Energy cites two approved cases elsewhere in the country as 'precedent' for building wind farms in flood zones, namely, Cushaling (PL19.306924) and Borris Beg (ABP-318704-23). Neither of these wind farms involve significant construction in a Flood Zone A, however.

The Commission is well aware that development in Flood Zone A is subject to strict planning controls to manage the flood risk. Planning authorities consider the potential impact of new development on flood risk to both the area and surrounding locations.

Why would anyone propose building turbines in a Flood Zone A, and adjacent to the N20 national primary route from Limerick to Cork city? The Limerick City and County Development Plan makes clear that it is "not appropriate" to build 'highly vulnerable developments' in Flood Zones A or B (Volume 4, p.25).

Furthermore, the 2009 *Planning System and Flood Risk Management – Guidelines for Planning Authorities* by the Department of Environment and the OPW has this to say about development in Flood Zone A:

> Most types of development would be considered inappropriate in this zone. Development in this zone should be avoided and/or only considered in exceptional circumstances, such as in city and town centres, or in the case of essential infrastructure that cannot be located elsewhere, and where the Justification Test has been applied. Only water-compatible development, such as docks and marinas, dockside activities that require a waterside location, amenity open space, outdoor sports and recreation, would be considered appropriate in this zone. - section 3.5, p.24

A Justification Test is therefore not sufficient on its own. It must also be demonstrated that the infrastructure "cannot be located elsewhere". This argument cannot be made here. Looking at the OPW's Flood Maps, it is clear the vast majority of of Ireland's Southern Region is not a Flood risk. The area chosen by Garrane Green Energy is one of few high-risk flood areas in mid-Munster, the nearest other one being 25km away to the NW, and the others 40-50km or more away. The relatively recent study by MKO (April 2025) commissioned by Wind Energy Ireland called, 'Protecting Consumers: Our onshore wind energy opportunity' suggested that more than 1,300 km^2 of the Republic of Ireland is suitable for future wind farms. That available area would enable exceedance of the national

target of 9GW onshore wind. Why then propose an SID farm in a Flood Zone A? MKO did not assign suitability to Flood Zone A lands, surely.

The proposed development area is immediately east of the N20 national primary road, which is critical infrastructure and a highly vulnerable development to flooding. Any potential increase in flood risk to it, even if only a slight increase, is unacceptable. There is no guarantee that the M20 motorway will be built so the consequences for Cork-Limerick interconnectivity could be quite significant. Whilst climate change mitigation is obviously important, in this case it runs counter to climate change adaptation. The siting of solutions cannot be in areas where it would make climate adaptation more difficult for the local community (in this case, adaptation to high and increasing flood risk). Indeed, the *regional* economy would suffer if the N20 were put at greater risk of flooding. As it says on p.11 of the *Planning System and Flood Risk Management Guidelines*, "Flooding of primary roads or railways can deny access to large areas beyond those directly affected by the flooding for the duration of the flood event."

Permitting this development beside the N20 would fall under 'maladaptation', as defined in Ireland's National Adaptation Framework (2024, section 1.1.1). Maladaptation refers to actions or strategies that, while intended to address the challenges posed by climate change, inadvertently exacerbate the problem, or create new vulnerabilities. This can occur when adaptation measures are poorly planned, misaligned with the local conditions, or fail to account for long- term consequences. The National Adaptation Framework is clear that maladaptation should be avoided and says that climate mitigation and adaptation planning should be considered alongside one another (p.42). Ireland's Climate Change Advisory Council has also noted in its 2023 review "the need to accelerate the integration of the just transition principles across all mitigation and adaptation policy development and implementation".

In relation to the details presented in the Flood Risk Assessment on behalf of the applicant, there are particulars that require careful consideration, as follows:

- p.37 - "... these potential increases in water level will be absorbed across the wider floodplain without any measurable downstream effect."

  What about in-situ and upstream effects? The assessment fails to mention here that the "wider floodplain" includes the N20 Cork-Limerick primary route, not just farmland.

- p.38 - "The River Maigue channel floodplain is constrained downstream of the Site by adjacent local topography. This is observed as the flood zones in the CFRAM flood maps do not extend significantly east or west of the river channel alignment. This natural geometry limits the potential for local downstream water levels effects. Also, as outlined above the modelling demonstrates there is no significant change in modelled water levels downstream of the site after including the proposed wind farm. As there are no effects downstream (within the modelled area) there can be no further transfer of effects downstream."

  Indeed, there is a chokepoint downstream on the Maigue at Bruree village. But what they neglect to mention is that this constraining of the river *downstream* increases the chances of *upstream* flooding. Upstream flooding has always been the main risk, and this is the very aspect of flooding which the FRA does not address. Hydro-G presents the application area in the context of CFRAM mapping for flooding (actual) as Figure 1 below. It will be obvious from this that in-situ and upstream flooding is the main issue here.

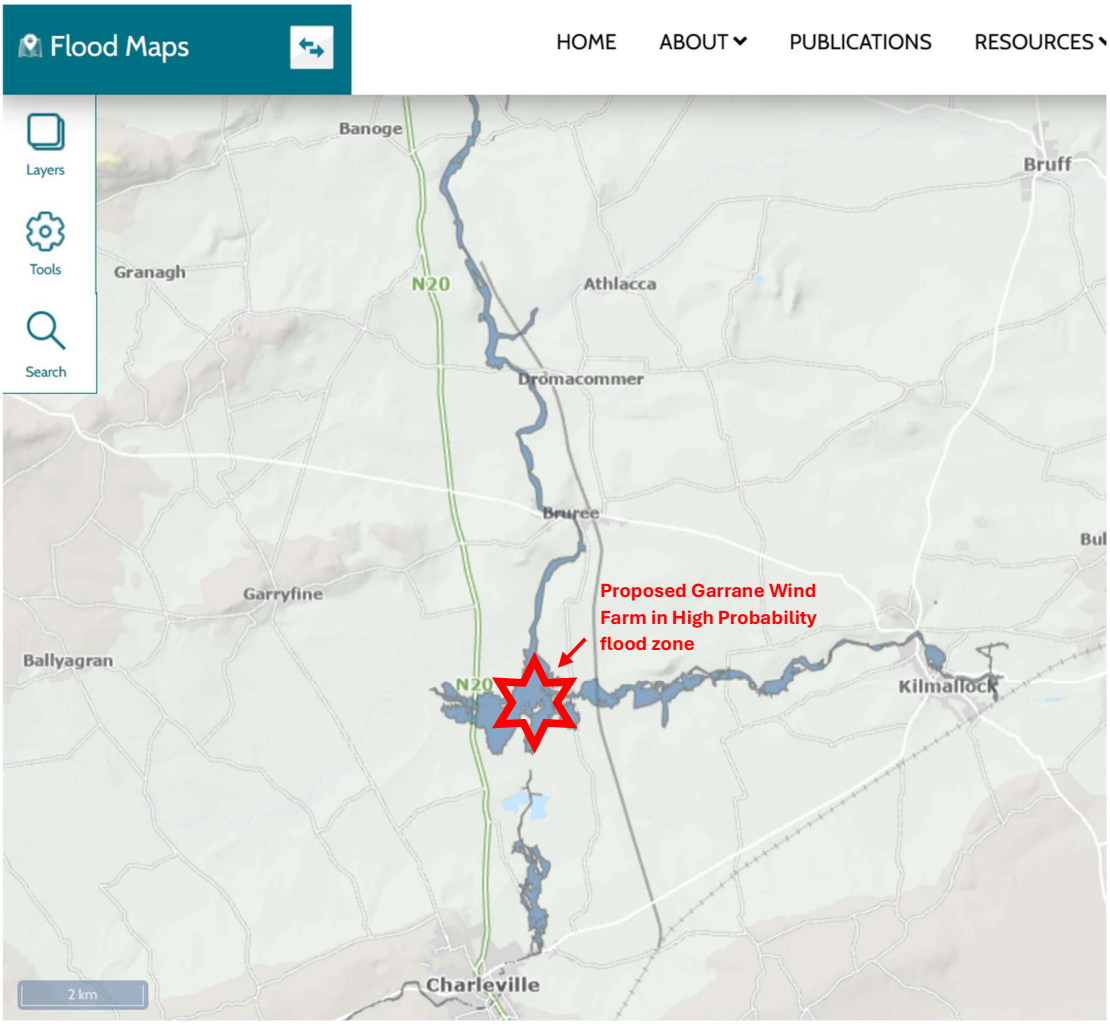


Figure 1 Garrane Green Energy's proposed development in **CFRAM High Probability Current Day Scenario Flood Extent, i.e. "1-in-a-10 chance of occurring or being exceeded in any given year."** (OPW. https://www.floodinfo.ie/map/floodmaps/).

The Flood Risk Assessment has very little to say about potential increases to flood risk on the N20, a piece of critical national infrastructure forming the western boundary of the site (and located in the same Flood Zone A as the proposed windfarm). The risk to the N20 is already significant. The OPW's PFRA report in 2012 recorded three past floods at Creggane Bridge on the N20 and puts it in Historic Hazard Category 2 (out of 4), meaning 1-9 properties have been flooded.[1] Furthermore, section 5.5.3 below presents a long list of additional flood events in the project site in recent decades, several of which have affected the N20. This evidence does not feature in the 'Site Specific' Flood Risk Assessment.

Furthermore, the Flood Risk Assessment fails to mention that upstream flooding often occurs to the east of the development site in the town of Kilmallock. Two notable examples of flooding in Kilmallock town, in

[1] OPW. 2012. *The National Preliminary Flood Risk Assessment (PFRA): Overview Report*, Appendix C.1 & Table 3.2. https://www.floodinfo.ie/publications/?t=30

which numerous properties were badly damaged, include August 2020[2] and December 1998.[3] There is not a single mention of flood risk in Kilmallock town in the Flood Risk Assessment.

The failure to examine present and future upstream flood risk on the N20 road and the town of Kilmallock presents a difficult situation for The Commission in the context of proper planning. The village of Bruree, and its bridge, act as a natural pinchpoint in the landscape and the primary flood risk in this area has always been *upstream*, not downstream. Yet the authors of the Flood Risk Assessment have overlooked this, focusing their attention instead on the less-relevant question of downstream flooding in Croom and Adare.

Given what is at stake for national transport infrastructure, settlement and agricultural land, The Commission is requested to Refuse the development proposal in full.

In relation to the details presented in Chapter 10, Hydrology & Hydrogeology: it is stated that

- "The total volume of displaced floodwater is estimated to be 7,025m3 during the construction phase and 9,555m3 during the operational phase. However, there are no receptors located in the immediately upstream or downstream of the Site which may be at risk from any increased flood levels." The inspector is advised to consider that the quotation negates potential impact on the N20. This a key receptor but ignored. Table 4.1 of TII's National Roads 2040 Strategic Flood Risk Assessment clearly includes "road infrastructure" as a 'receptor' when it comes to flood risk.

- "The flood risk assessment concludes that the Project will not result in any significant increase to the downstream flood risk." (And on p.109, chapter 10). There is no mention of upstream risk to N20.

The amount of loss of floodplain storage is a crucial issue but it is unclear how it was calculated - a "Proposed Infill Volume" of 9,555 m3 for operational phase is given in Table I on p.37 of Appendix 10.1. It is not clear what a "proposed" volume refers to. It carries uncertainty. Furthermore, there is no breakdown of how this crucial figure was calculated, e.g. hardstands, access roads (both new and re-built existing), other impermeable surfaces. Without a breakdown, it is difficult to have confidence in the information presented.

- p.47 of Chp. 10. "The best practice design approach to wind farm layouts in existing agricultural areas is to utilise and integrate with the existing infrastructure where possible, whether it be existing Access Tracks or the existing drainage network. Utilising the existing infrastructure means that there will be less requirement for new construction/excavations, which have the potential to impact on downstream watercourses in terms of suspended solid input in runoff (unless managed appropriately)."

This gives the impression that the wind farm will utilise an extensive existing network of farm tracks. In fact, Flood Zone A in this site has almost no existing tracks or roads. Over 1.2km of new access roads will have to be built (see p.33 pf Appendix 10.1) and the short stretches of existing track will have to be re-built as impermeable surfaces.

It is noted and advised that Appendix E of the Flood Risk Management Plan for Shannon Estuary South, under the heading of 'Risk to the Economy', states that 50% AEP Flood Extent is a "Risk to Transport Infrastructure" of the N20 national primary route within the Charleville AFA.[4]

Not assessing risk to the N20 contravenes law, which says that "material assets" and "landscape" must be taken into account in EIAR Flood Risk Management plans (see S.I. No. 470/2012 - European Union (Environmental Impact

[2] https://www.limerickleader.ie/news/home/567387/flooded-homeowners-in-limerick-town-are-devastated-and-demoralised.html
[3] https://www.floodinfo.ie/map/pf_addinfo_press/747/
[4] FRMP_Final2018_RiverBasin_24.pdf, p.16

Assessment) (Flood Risk) Regulations 2012). Material assets include "Roads and Traffic". Plus, "Material assets can now be taken to mean built services and infrastructure. Traffic is included because in effect traffic consumes transport infrastructure." [Source: Guidelines on the information to be contained in Environmental Impact Assessment Reports (EIAR), EPA, 2022].

In overall conclusion, "Maintaining objectivity" is one the fundamental principles of EIA and EIA reporting (EPA, 2020) yet the tone of the hydrological and flood risk components of the applicant's details for the Garrane windfarm presents the proposal in the best possible light so that the development has the best chance of succeeding in the planning process. The negative impacts of built, or partially built, Irish windfarms that have made the national/international news is testament to the outcome of such practices. The proposed Garrane Wind Farm's Chapter on Hydrology & Hydrogeology is very well written and presented. However, its omissions regarding upstream flooding and loss of floodplain storage present a risk of actual effects on the N20 and local lands and farms that should preclude The Commission from Granting Permission.

5.5 Historic and local experiences, and omitted, evidence of flooding.

In the matter of Hydro-G's evaluation of the actual return period and evidence of flooding in the vicinity of the proposed Garrane Wind Farm site, local information was available from an experienced environmental historian and archaeologist. Dr. Pamela Bartley was assisted and informed by Dr. Eugene Costello, who is native to the area. In his professional life, Dr. Costello is a Lecturer in environmental history and archaeology in University College Cork. However, he is contributing to this report in a personal capacity. He has expertise in the analysis of historic maps and records, oral history, landscape archaeology and palaeo-environmental change in Ireland and Europe. As part of this research, Dr. Costello regularly encounters evidence of past environmental disasters (climate events, floods, landslides) and examines their impacts on landscapes, society and economic infrastructure. Dr. Costello has published in numerous peer-reviewed international journals and is an active member of the Environmental Society for Environmental History. Furthermore, he has been undertaking local history research on the Bruree/Effin area since the mid-2000s and more intensively since 2019. This research has included collecting local information on past flooding. This is significant as rural areas such as this do not have consistent written records and we must therefore rely on local sources to properly understand flood frequency. The inspector and The Commission now have the benefit of an academic researcher's information for the proposed developmental area.

5.5.1 Significance of Omissions of Flood Frequency

The Flood Risk Assessment has underestimated the frequency of flood events in the townlands of Creggane, Ballynagoul and Garrane. Examination of Geological Survey of Ireland Seasonal Flood Maps, historic OS maps, newspaper reports and local information reveals that there have been far more flood events in recent years and in history than the Flood Risk Assessment admits. The area is therefore significantly more flood prone than the Flood Risk Assessment for the proposed development has portrayed it to be.

The fact that that the area's flood frequency has been greatly under-estimated supports a conclusion of no confidence in the Flood Risk Assessment's claim that the development "does not have the potential to significantly increase upstream or downstream flood risk." The under-estimation of present flood frequency means that post-construction flood risk is likely to be higher than claimed. This is concerning as the development is immediately adjacent to the N20 Cork-Limerick road, and located in the same river catchment as a number of important settlements (Kilmallock, Bruree, Croom and Adare).

The misrepresentation of the absorption capacity of the natural environment in the development area amounts to a breach of Annex III of DIRECTIVE 2011/92/EU. The proposed development should be refused on this basis.

5.5.2 Misrepresentation of flood risk on historic OS maps

P.19 of the EIAR's Flood Risk Assessment (Appendix 10.1) says that the historic maps do not contain the text, "prone to flooding" and, based on this, it makes the **claim that "historic mapping does not record flooding as an issue"**. The conclusion of the Flood Risk Assessment doubles down on this claim, saying that, "No reference to historical flooding were [*sic*] identified on historic OS maps". This is inaccurate. The maps, in fact, offer strong evidence for historical flooding both inside and outside the proposed windfarm site. Both the second edition 6 inch OS map and the first edition 25 inch OS map clearly state, "Liable to Floods". On the maps, this term is stretched across a large area of land in the north of Creggane and the north west of Ballynagoul, within the proposed development area (Indeed, the term is also shown further east in Ballynagoul, along the same river). Screenshots of these maps are shown below. "Liable to Floods" is the standard terminology on historic OS maps. To claim that they don't say "prone to flooding" is to misrepresent these maps: historic OS maps for Ireland *never* use that phrase. **"Liable to floods"** is the standard term.[5]

An Coimisiún needs to consider why the authors of the Flood Risk Assessment would omit the fact that historic maps mark the area as, "Liable to Floods".

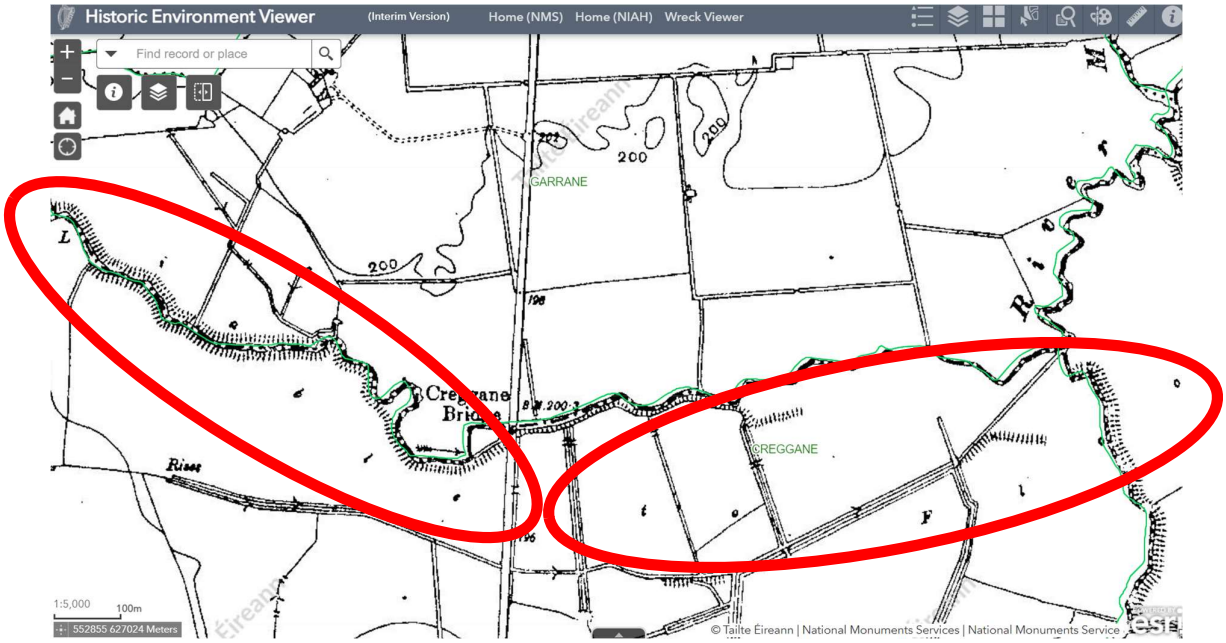


Figure 2 Detail from second edition 6 inch Ordnance Survey map, covering area where Turbines 7, 8 and 9 will be located, east of Creggane Bridge on the N20. Author's annotation and highlighted "Liable to Floo .."

[5] See Table A4 of the Government of Ireland's 2009 *Planning System and Flood Risk Management Guidelines for Planning Authorities. Technical Appendices*. the-planning-system-and-flood-risk-management-guidelines-for-planning-authorities-tech.pdf

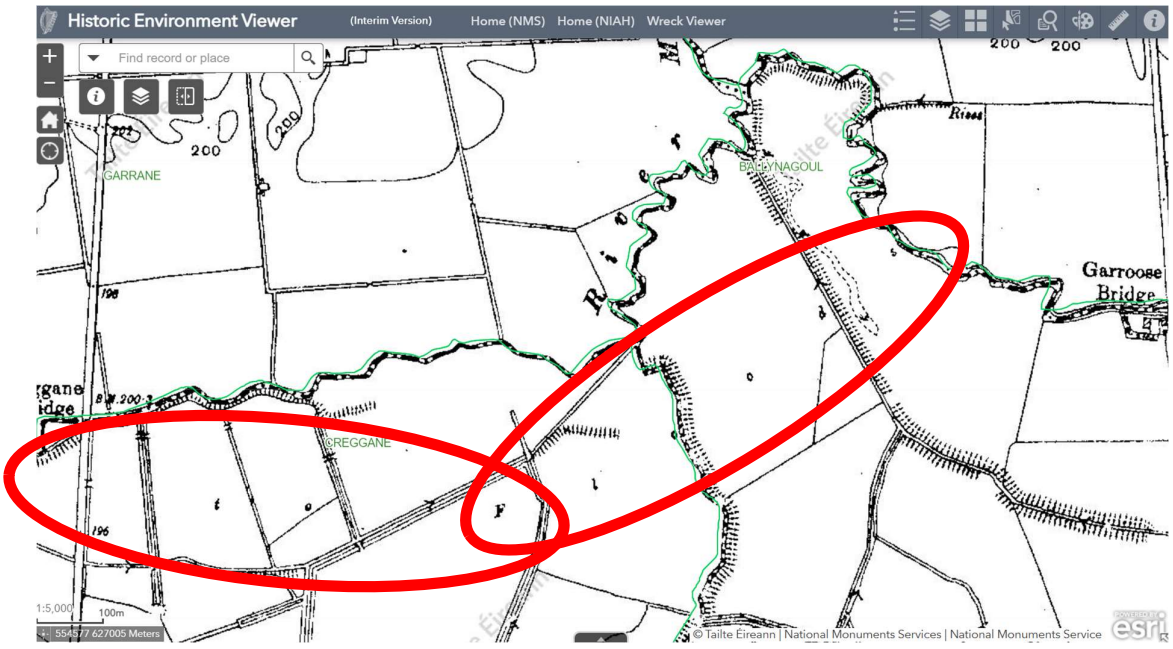


Figure 2 *Detail from second edition 6 inch Ordnance Survey map, covering area where Turbines 5, 6, 7, 8 and 9 will be located, west of Garroose Bridge. Author's annotation and highlighted text: " … to Floods"*

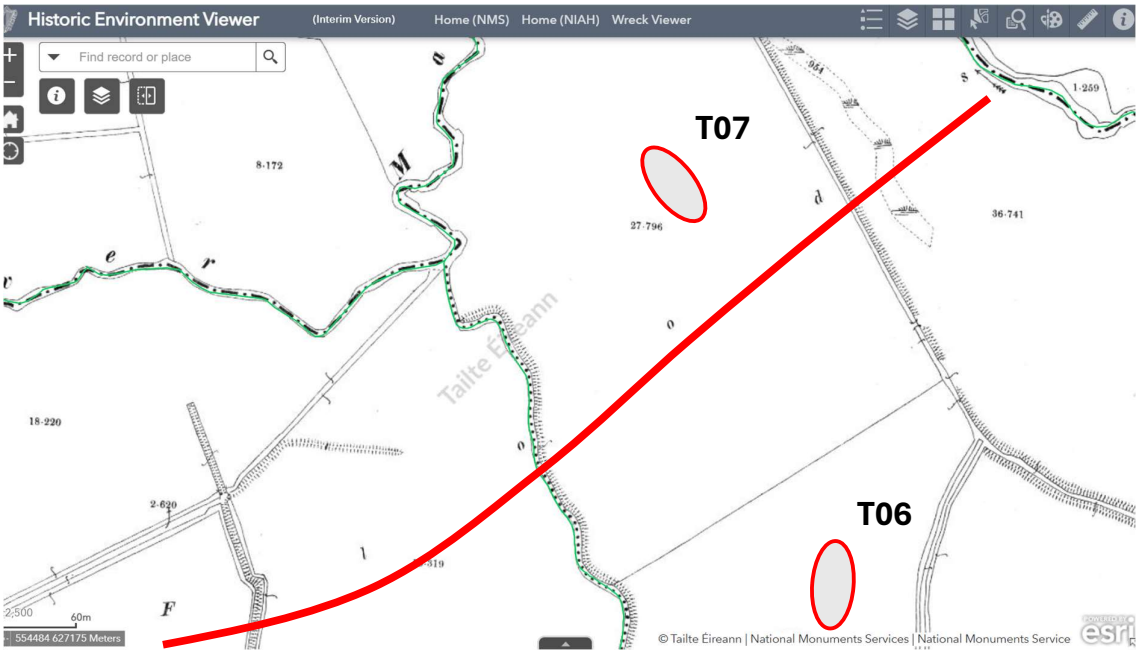


Figure 4 Detail from first edition 25 inch Ordnance Survey map, covering area where Turbines 6 and 7 and a bridge will be built. Text clearly says, "Floods"

5.5.3 Underestimation of frequency of flood events

The Flood Risk Assessment for Garrane Green Energy presents an incomplete picture of past flood events in the area, and therefore greatly underestimates the frequency of flood events. This appears to be because the authors have relied solely on the National Flood Database on www.floodinfo.ie. This flood database is well known to be incomplete. The Office of Public Works, which created the database, makes this clear on their website. They say that "the National Flood Data Archive is not a comprehensive catalogue of all past (fluvial/tidal) flood events in Ireland; material was presented for inclusion by source bodies from their available records at their discretion."[6] The incompleteness of the National Flood Data Archive is especially noticeable outside towns and cities, where there are fewer records of flood events.

The developer's **Flood Risk Assessment reliance on the OPW Floodmaps portal is evidenced by reference to *only* three past flood events** in the development site, i.e. two at Creggane Bridge on the N20 (November **1982**, August **1986**) and Winter **2015/16** flooding recorded as covering much of the north east of Creggane townland and parts of Garrane and Ballynagoul.[7] These are reported by the OPW.

In fact, there have been dozens of flood events over the last century. Drawing on a range of sources (Geological Survey of Ireland SAR Seasonal Flood Maps, newspaper reports, and local information), a more comprehensive, but still incomplete, list of past flooding events within the proposed Garrane Green Energy site are presented here for the inspector's consideration. The data and mapping sources are by no means unusual – they are quite standard. The Technical Appendices of the *Planning System and Flood Risk Management Guidelines for Planning Authorities* provide a long list of sources that should be used in Flood Risk Assessments, and it includes GSI maps, "newspaper reports" and "interviews with local people, local history/natural history societies etc."[8] The applicant and their agents for Garrane Green Energy' development proposal have not informed their own business viability and associated risks correctly. Here is a list of SOME OF THE attested flood events within the development area (note this is not intended to be ALL flood events):

1) **2020/21** winter flooding in north-west Ballynagoul, south-east Garrane and north-east Creggane, covering windfarm roadway, Turbine 6, Turbine 7 and part of Turbine 4 (Source: GSI Groundwater Flooding Data Viewer, SAR Seasonal Flood Maps; **Figure 5** below).

2) **2018/19** winter flooding in north-west Ballynagoul, south-east Garrane and north-east Creggane, covering windfarm roadway and Turbine 6 (Source: GSI Groundwater Flooding Data Viewer, SAR Seasonal Flood Maps; **Figure 5** below)

3) **2017/18** winter flooding in north-west Ballynagoul, south-east Garrane and north-east Creggane, covering windfarm roadway, Turbine 6 and part of Turbine 4 (Source: GSI Groundwater Flooding Data Viewer, SAR Seasonal Flood Maps; **Figure 5** below).

4) Winter **2015/16** (Source: Geological Survey Ireland (GSI) Winter 2015/2016 Surface Water Flooding. www.floodinfo.ie). This flooding took place not only in Creggane but in Ballynagoul and Garroose as well.

5) November **2009**. River Loobagh overflowed its banks, flooding land in north west of Ballynagoul and Garroose (Michael Costello, farmer, Ballinagoul, pers. comm.)

[6] https://www.floodinfo.ie/past-flood-events/
[7] Garrane Green Energy Stage III Site Specific Flood Risk Assessment, p.20-21.
[8] Government of Ireland. 2009. *The Planning System and Flood Risk Management Guidelines for Planning Authorities. Technical Appendices*, Table A4. the-planning-system-and-flood-risk-management-guidelines-for-planning-authorities-tech.pdf

6) **2005**. “N20 at Creggane … Road is rendered impassable and major traffic chaos is caused on average once every 5 years. Last time this occurred was in October 2004. About 150m metres of roadway is affected and the maximum depth of water on roadway is c. 500mm. There is about 200 – 300 acres of land flooded at each side of the road” ( )

7) October **2004**. “Flooding on the N20 between O’Rourke’s Cross and Charleville this Thursday” (Limerick Leader, 30 October 2004, p.5 – https://www.irishnewsarchive.com/)

8) December **1998**. River Loobagh overflowed its banks, flooding farmland in north and north west of Ballynagoul (Michael Costello, farmer, Ballinagoul, pers. comm.)

9) August **1986**. “Extensive flooding of lands near Creggane Br. … and the main road was flooded for a short period.” (OPW Review August 1986. www.floodinfo.ie). Also, "repeated flooding", “300 acres is seriously affected”, Ballinagoul to Mount Blakeney (Limerick Leader, 9 August 1986, p.36).

10) November **1982**. Maigue Creggane Bridge Limerick Nov 1982 (ID-503). www.floodinfo.ie

11) **1960s/early 1970s**, recurrent flooding of the River Loobagh from Cloonlogue townland westwards to ‘The Gob’, which is the local name for where the Loobagh meets the Maigue (John Banks, farmer, Ballinagoul, pers. comm., December 2018)

12) September **1956**. “The main road from Cork to Limerick, some two miles outside the town of Charleville, was heavily flooded this morning following last night's rain. The water from the River Maigue … covered the road in parts to a depth of three feet.” (*The Evening Echo*, 26 September 1956, p.1 – https://www.irishnewsarchive.com/)

13) December **1948**. "The Lubagh at Kilmallock flooded Wolfe Tone Street, and low-lying lands are under water. The road between Rathluirc [Charleville] and Bruree was impassable, and the Cork-Limerick buses had to make a detour from Rathluirc by Kilmallock to reach Bruree.” (*The Irish Press*, 7 December 1948, p.1 – https://www.irishnewsarchive.com/)

14) August **1946**. “The Limerick-Cork bus, whose usual route is through Bruree, Charleville, Buttevant and Mallow, was diverted at Bruree due to the flooding of the roads, and came through Kilmallock.” (*Cork Examiner*, 13 August 1946, p.7 – https://www.irishnewsarchive.com/)

15) December **1929**. “considerable flooding in the country districts, especially in the lowlands contiguous to the River Maigue, which overflowed its banks. At Garrouse, near Bruree, the public road was completely impassable, owing to the floods” (*The Kerryman*, 14 December, p.13, Charleville Notes – https://www.irishnewsarchive.com/)

16) February **1927**. “… a considerable portion of land was and is still under water, especially the lowlands. Between Charleville and Bruree extensive flooding took place, and the Maigue overflowed its banks in several places.” (Limerick Leader, 5 February 1927, p.6 – https://www.irishnewsarchive.com/)

17) August **1912**. “… the townlands of Ballinagoul, Cregane, Garrouse, and others, in the county of Limerick … subject to flooding; whether he is aware that the hay crop there is entirely lost this season.” Source: Hansard (British Parliamentary Papers), https://api.parliament.uk/historic-hansard/written-answers/1912/aug/07/land-purchase-ireland

18) February **1910**. "The River Maigue has overflowed its banks and inundated the adjacent lands for a great distance on both sides. From outside the town of Charleville it presents the appearance of a great lake." (*The Evening Echo*, 21 February 1910, p.3, Weather in North Cork – https://www.irishnewsarchive.com/)

19) **1813**, flooding of Hackmys graveyard site in Creggane, 200m south of Turbine 3 (Gerald Quain, farmer, Creggane, pers. comm., March 2010)

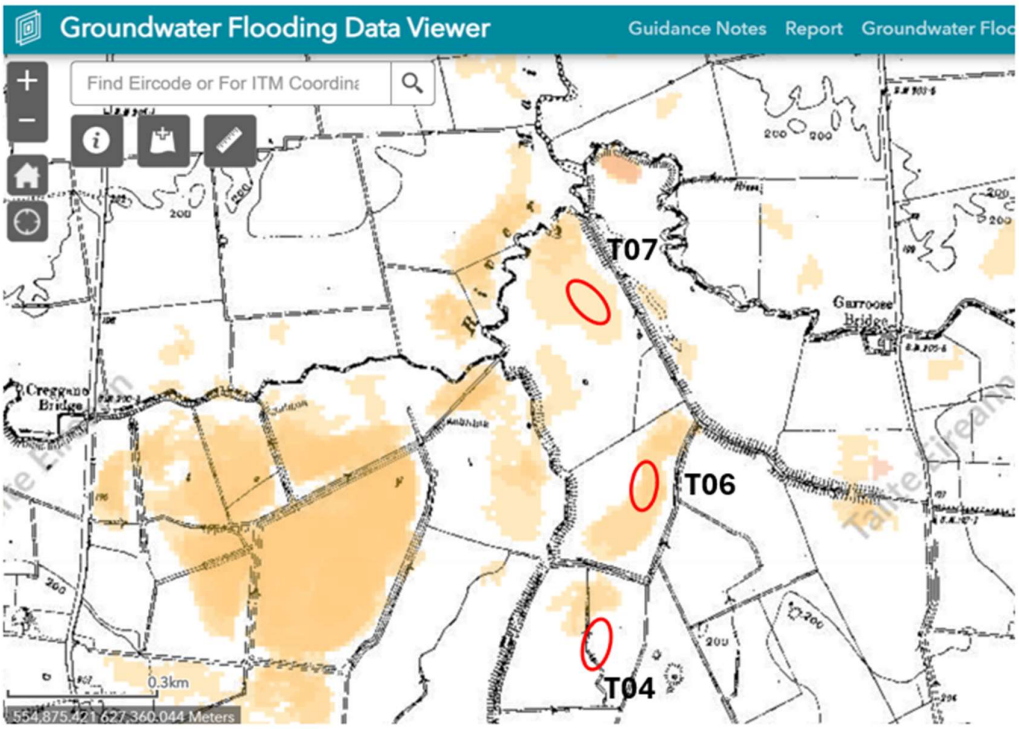


Figure 5 *SAR Seasonal Flood Maps, 2015-2021. Geological Survey of Ireland, Groundwater Flooding Data Viewer.* *https://dcenr.maps.arcgis.com/apps/webappviewer/index.html?id=848f83c85799436b808652f9c735b1cc*

5.5.4 Evidential Frequency of Flooding at the site.

Thus, it can be said that **some form of flooding occurs within the proposed development site every 4-5 years, with major widespread flooding occurring every 10-15 years and sometimes making the N20 impassable**. The historical data shows that the Flood Risk Assessment has underestimated flood frequency in the past and this feeds forward into an underestimation of flood risk in the future. The majority of the wind turbines will be located in CFRAM Flood Zone A. The Assessment portrays Flood Zone A as a "100-year fluvial flood zone".[9] As previously stated, this is incorrect. It in fact means *greater than* 1 in 100 risk of flooding in a given year. As the OPW itself says, the Annual Exceedance Probability (AEP) in its maps "represents the probability of an event of this, or greater, severity occurring in any given year."[10]

The above evidence confirms that the flood risk is not just greater, but *much greater* than 1 in 100 in a given year. It is at least 1 in 15 over most of the north of the wind farm site, and at least 1 in 5 in parts of the north

[9] E.g. Garrane Green Energy Flood Risk Assessment, p.27.
[10] https://www.floodinfo.ie/map/general_map_user_guidance_notes/

of the wind farm site.

5.5.5 Frequency of OPW Maintenance – Inaccurate Information presented

The Flood Risk Assessment states that, "all watercourses in the vicinity of the Site are mapped as ADS channels and are maintained by the OPW, with periodic dredging being completed as a control measure for flooding." (page 25, FRA Garrane). The phrase "periodic dredging" might lead the inspector to believe that dredging happens every few years. The claim has presumably been made in an attempt to assuage fears about flooding, giving the impression that flood risk in the area is being actively managed on a regular basis. However, no dredging of the river bed has taken place on this part of the River Loobagh or Charleville Stream since the early 1980s, and is remembered by local farmers (John Banks, farmer, Ballynagoul, pers. comm.; Michael Costello, farmer, Ballynagoul, pers. comm.). The most recent work carried out by the OPW was the clearing back of vegetation on the banks of the River Loobagh in the mid-2000s (John Banks, farmer, Ballynagoul, pers. comm.; Michael Costello, farmer, Ballynagoul, pers. comm.).

5.5.6 Conclusions and Significance of Lacunae, Flood Plains & Wetlands

The **misrepresentation of past flooding** in this area amounts to a breach of Annex III of DIRECTIVE 2011/92/EU on the assessment of the effects of certain public and private projects on the environment. With reference to wind energy projects, Point 2 in Annex III clearly states that, "**The environmental sensitivity of geographical areas likely to be affected by projects must be considered, having regard, in particular, to:**

(a) the existing land use;
(b) the relative abundance, quality and regenerative capacity of natural resources in the area;
(c) **the absorption capacity of the natural environment**, paying particular attention to the following areas:
    (i) **wetlands;** … "

Attention is drawn here to the *legal obligation* to consider "the absorption capacity of the natural environment". The misrepresentation of flood risk on historic OS maps and the failure to recognise the true frequency of past flood events means that the natural environment's absorption capacity has not been given proper consideration. The omission of obtainable evidence for past flooding results in a Flood Risk Assessment that could be perceived to be based on a perception that land's absorption capacity is greater than it actually is.

It should also be stressed that the onus to consider absorption capacity is even greater in **wetlands**, as laid down by Annex III of DIRECTIVE 2011/92/EU. Much of the land on which the turbines are proposed is a wetland. The west and north west of Ballynagoul townland has been classed as a wetland site by Wetland Surveys Ireland's 2025 'Map of Irish Wetlands' (Site Code: MIW_LI330), with a survey being carried out in August 2025.[11] Furthermore, wetland-indicating alluvium and lacustrine sediments cover the majority of the proposed development site.[12] Indeed, a large number of winding palaeochannels, most which are still waterlogged in winter, are clearly visible on satellite imagery for the west and north west of Ballynagoul.

Professor Paul Johnston of Trinity College Dublin is on government record in stating that "Beyond all scientific doubt, building turbines in peat will negatively affect biodiversity and increase carbon loss from this habitat through the required drainage, foundations and infrastructure. Damage arising from construction releases more carbon from the peatland. The long-term sustainable approach is the restoration of bog wetlands. A strategy of restoration, rather than any construction whatsoever, will provide a reduction in carbon emissions from the peatland in perpetuity. The societal benefits will be better water quality, reduction in flood events, a reversal of

[11] https://wetland.maps.arcgis.com/apps/View/index.html?appid=e13b75c3bcab4932b992aa0169aa4a32&extent=-8.2467,53.7516,-7.7533,53.9208
[12] https://wetland.maps.arcgis.com/apps/View/index.html?appid=e13b75c3bcab4932b992aa0169aa4a32&extent=-8.2467,53.7516,-7.7533,53.9208

biodiversity loss and more opportunities for people to connect with nature resulting in better physical/mental health outcomes, as recognised in the Climate Action Plan, a derivative of the Paris Agreement. Moreover, since 1987, Ireland has been a signatory of the international Ramsar convention which provides for the protection and promotion of wetlands including peatlands. The case that windfarms in peatlands are incompatible with these requirements is rarely even considered appropriately in EIARs. The existing and growing resistance to terrestrial windfarms due to their environmental impact is frequently justified and exacerbated by inadequate EIARs which result in extra delays and costs as well as in poor planning decisions. This conflict between the requirements of environmental legislation and the need for increased wind power is unsustainable. When it comes to protecting our environment and its increasingly important ecosystem services on which the human race depends".

5.6 Unacknowledged and unassessed Construction Impacts arising from soil compaction in a wetland and flood zone

The proposal to bring large cranes into this wetland and high-probability flood zone presents real risks of increasing the already frequent flood experiences. Hydro-G will document the actual flood frequency in a later section of this Observation. The Commission is requested to compare and contrast the baseline information used to inform the 'no risk' conclusion of the applicant's agents with this independent assessment commissioned by residents of the area. The actual flood experience to date and the frequency of flooding cannot be mitigated by proposing additional heavy load construction at this location. The risks are presented by virtue of applying mass loads to a wet soil and thereby destroying what small pore space there may have been. Pore space allows some waters to be absorbed in the soils of a flood zone, which this is. When abnormal loads are applied to large areas of the flood plain, for the purposes of creating hardstanding for cranes and turbine component part, the characteristic of the soils, porosity and runoff characteristic change. This has neither been acknowledged nor evaluated by the agents for the applicant. This presents increased risk of flooding to the River Maigue and the N20 road from Limerick to Charleville. Cranes are required to lift the masts and turbine blades.

Counter weights are required to stabilise the cranes. The cranes and counter weights require enabling roads and land surfaces with the ability to carry 750 tonne weight of a crane itself plus the likely 200 tonne counter weight and the chain and hoist infrastructure. The pressure of the weight of the crane and counter weight results in destruction of the permeability and pore space of subsoils in the proposed construction areas, which are lands mapped on historic 6" OSI maps as 'liable to flood' and on OPW Flood Maps as High Probability flood extents in this particular river bank setting. The potential for increased flood risk arising from the change in soil and subsoil structure is not acknowledged by those employed by renewable energy investment firms. The Commission is requested to use their own resources to fact check potential mass loadings arising from the enabling works that would be required to erect turbines in a flood plain wetland such as at the proposed Garrane Wind Farm site. Hydro-G's forays into this realm of AI and civil engineering infrastructure suggest, as follows:

e. crane weights (ballast/counterweights) and base loadings required for erecting a 3-blade wind turbine with a **95 m hub height** and **75 m rotor diameter** in a wetland flood zone is complex and requires a full engineering lift study.

f. When erecting a large wind turbine in a challenging site (wetland, flood-zone) you must account for:

- The crane capacity (lift weight + reach) and corresponding ballast/counterweight.
- Ground support / crane hardstanding and pad design (especially for soft or wet ground).
- Water/flood risk, settlement, high water table, reduced bearing capacity.
- Wind loads during erection (significant for tall hub height & large rotor).
- Transport, crane mobilisation, boom length, luffing or fixed jib, outrigger spread.

- Safety factors, crane manufacturer load charts, method statements, lifting plans.

g. Main Lifting cranes can have a lifting capacity of up to 850 tonnes and a tail crane up to 500 tonnes.

h. The ground pressure under a crane lifting a tower up to 105 m, "Every square metre under the heavy crawler chains must be able to withstand a ground pressure of 26 tonnes." theconstructtionindex.co.uk

i. For each of the 9 turbines proposed for Garrane Wid Fram, (95 m hub, 75 m rotor) a crane of higher higher-capacity range would be required (up to 1000tonne) class cranes depending on component weights and reach).

j. In a wetland/flood zone, additional measures are required:

    - Ground bearing capacity will be lower, so you may need piled support, mats, heavier crane pad substructure, larger footprint.

    - Hardstanding for the crane likely needs thicker crushed stone, possibly geotextile, maybe timber/steel mats to distribute loads.

    - The crane's outriggers and tracks (if crawler) will impose high ground pressure; you must check ground pressure limits of the site.

    - Flood risk means you must ensure crane set-up does not risk stability if water rises or softens ground.

    - The lift plan must assume possible higher wind/gust profiles due to exposure in open wetland.

The facts of how crane and ballast weights will impact the drainage systems are not assessed and the omissions presents a health hazard and risk to the public and the WFD's Objectives for waterbodies in the catchment. The inspector and The Commission are requested to investigate and provide detail in their reporting and discussions/voting on this matter.

With respect to the stated 'loss of floodplain storage' in the proposed Garrane Wind Farm's Flood Risk Assessment (p.37), there is no scientific evidence or mathematical detail to support the conclusion of 'not significant' loss of floodplain storage. No details are provided as to whether the applicant has calculated 'back of the envelope' ground surface area only or has the subsurface porosity degradation across all roads and crane hardstanding also been calculated. The N20 immediately west of the proposed development area is known to flood. As is the case with many renewable energy projects, the FRA is SITE SPECIFIC in the sense that it considers risk posed to their own critical infrastructure but do not categorically assess flood risk to the critical *national* infrastructure adjacent.

5.7 Unacknowledged Wastewater Infrastructure – Lacunae in Cumulative Impact Potential

The same authors of the proposed Garrane Wind Farm Flood Risk Assessment completed a Flood Risk Assessment in 2017 for Kerry Ingredients (Ireland) site at Charleville with respect to a proposed pipeline discharging to the River Maigue. The wastewater discharge pipeline route proposed from the Kerry Ingredient's Charleville site's WWTP was presented as Figure 1 in the HES 2017 report entitled 'WWTP FLOOD RISK ASSESSMENT RATHGOGGAN NORTH SITE'. The Commission is advised that the pipeline route traverses the proposed Garrane Wind Farm site and might discharge treated effluent to the River

Maigue in the wind farm site. The Commission is requested to assess this issue. Does it Matter? Yes, it does. Why does it matter: pollution potential, tipping point pressure potential, in combination pressures, omissions in EIA, incomplete application details. Figure 1 of the HES (2017) report is shown here as Figure 6.

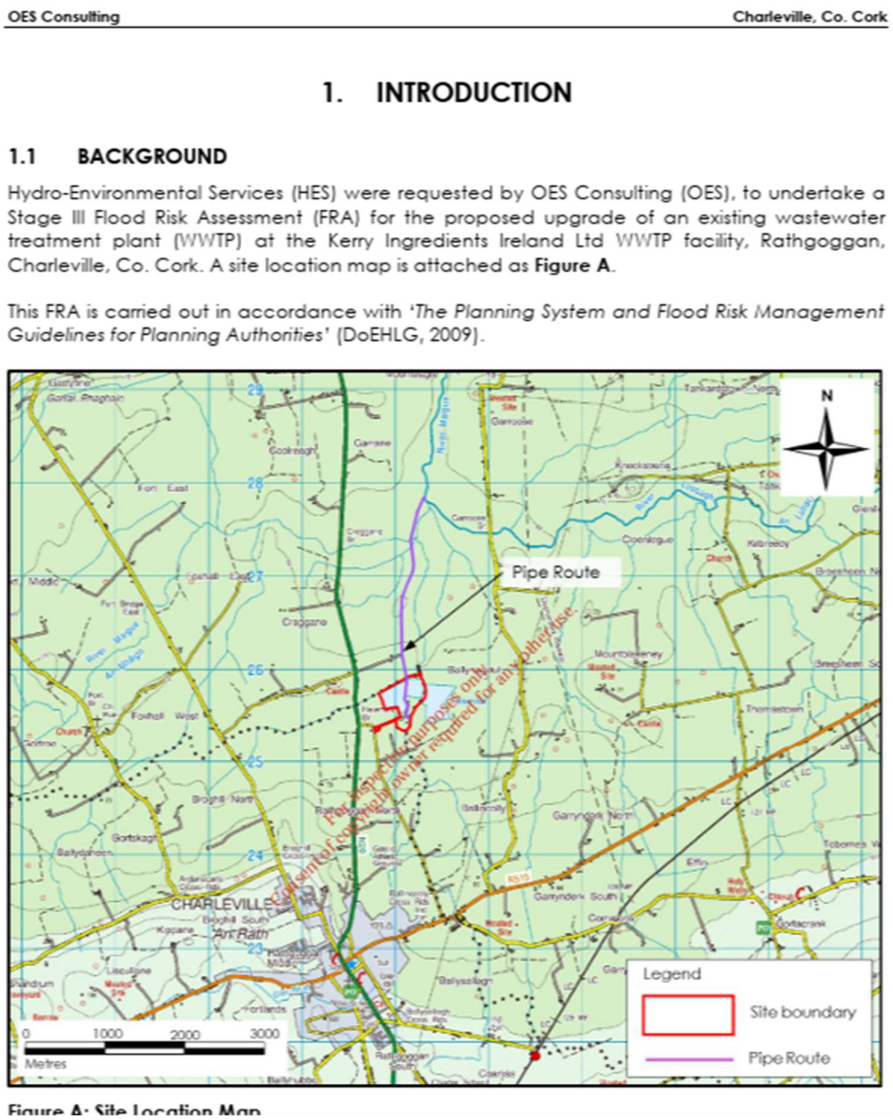


Figure 6 HES (2017)'s Figure 1 proposed pipe route conveying wastewater from Kerry Ingredients WWTP for discharge to the River Maigue at the proposed Garrane Wind Farm.

The details of the two planning references associated with the developments resulting in a wastewater pipeline through the proposed Garrane Wind Farm site are as follows:

- *Cork County Council PL 174645: The development will consist of an upgrade to existing waste water treatment plant. The upgrade works shall include installation of 1 no. anoxic tank, 2 no. aerobic tanks, 1 no. clarifier tank, a cooling tower, chemical dosing tank, splitter tank, polymer dosing kiosk and control room container together with associated plant and pumping systems and all associated site works including earthen berm screening and fencing. The works shall also include the installation of an underground pumped outfall pipeline for the conveyance of treated waste water from the upgraded*

treatment plant to a discharge point on the River Maigue located approximately 2km north of the waste water treatment plant site. The outfall pipeline shall be routed from a new outfall pump sump within the treatment plant site, extending northwards across agricultural lands in the townlands of Creggane and Garrane in Co. Limerick to the discharge point also located in Garrane, Co. Limerick. (The outfall pipeline installation within Co. Limerick shall be subject to approval of a separate application for planning permission to Limerick City and County Council). The development works relate to an activity for which a revised Industrial Emissions Directive Licence is required.

- *Limerick County Council PL 17270: the installation of an underground pumped outfall pipeline for the conveyance of treated waste water from our waste water treatment plant at Rathgoggan North, County Cork to a discharge point on the river located approximately 2km north of the waste water treatment plant site. The outfall pipeline installation, which is proposed as part of an upgrade of the existing waste water treatment plant at Rathgoggan North shall be routed across agricultural lands in the townlands of Creggane and Garrane in County Limerick to a discharge point on the River Maigue. The upgrade of the existing waste water treatment plant at Rathgoggan North including a section of the new outfall pipeline within the waste water treatment plant site shall be subject to approval of a separate application for planning permission to Cork County Council. The development works relate to an activity for which a revised Industrial Emissions Directive Licence is required*.

The Commission is requested to enquire with the EPA as to the status / functionality of the wastewater discharge pipeline discharging from the Kerry Ingredients Plant at Charleville to the River Maigue at Creggane and Garrane. Extracts from the Industrial Emissions Licence for the Kerry Ingredients facility seem to detail that the discharge is operational. Extract from the IE Licence is provided as shown in Plates A & B. The referenced Charleville Stream and Maigue Rivers are shown in Figures 7 & 8.

B.2 Emissions to Water

Emission Point Reference No:	SW17 (previously SWEP1) [Note 1]
Name of Receiving Waters:	Charleville Stream (SH_24_119)
Location of emission point:	154310E, 125720N
Location of monitoring point:	154310E, 125720N (post lagoons)
Volume to be emitted:	Maximum in any one day: 18,000 m^3
	Maximum in any one hour: 750 m^3

Time of emission: Must be a minimum of 6 dilutions available in receiving waters at all times

Parameter	Emission Limit Value
Temperature	25 °C (max)
pH	6 – 9
Toxicity	1.5 TU
	mg/l
BOD	25
COD	125
Suspended Solids	35
Total Nitrogen	15
Ammonia (as N)	5
Orthophosphate (as P)	0.5
Total Phosphorus	2
Oils, fats and grease	10

Note 1: The discharge to the Charleville Stream at SW17 shall cease by 31st October 2018 or on commencement of the discharge to the River Maigue, whichever is the sooner.

Environmental Protection Agency *Licence Reg. No. P0386-04*

Emission Point Reference No:	SW1
Name of Receiving Waters:	River Maigue
Location of emission point:	154150E, 125443N (final effluent chamber at WWTP)
Location of monitoring point:	154150E, 125443N (as above)
Final discharge location:	154328E, 127950N (River Maigue)
Volume to be emitted:	Maximum in any one day: 5,000 m^3
	Maximum in any one hour: 250 m^3

Parameter	Emission Limit Value	
Temperature	25 °C (max)	
pH	6 – 9	
Toxicity	1.5 TU	
	mg/l	**kg/day**
BOD	20	45
COD	75	375
Suspended Solids	35	175
Total Nitrogen	15	75
Ammonia (as N)	3	3.15
Orthophosphate (as P)	0.5	1.32
Total Phosphorus	2	-
Oils, fats and grease	10	50

Plate A Extracts from the current IE Licence (P0386-04) for Kerry Ingredients (Charleville). Note Grid Reference for the Discharge to the River Maigue is in the vicinity of the proposed Garrane Windfarm.

5.8 Incompletely assessed risks posed to downstream Public Water Supplies

With respect to the Bruree PWS, text in Chapter 10 states that "Whilst, the Project would have no potential to effect water quality in the bedrock aquifers which feed the well, any deterioration in surface water quality at the Site could affect water quality in the River Maigue which could enter the well which supplies the Bruree PWS. However, at the distances involved the potential for effects is limited." Hydro-G advises The Commission that there are a number of PWSs in County Kerry that were affected by wind farm failings at similar distances to the 3.3km involved here.

With respect to the Adare PWS, the details presented regarding the source are not current. Further, the PWS and new sources for the Ryder Cup should have been evaluated.

Although text specific to the piled foundations, Chapter 10 Hydrology & Hydrogeology states, as follows:

However, with respect to these pathways required for inclusion in the assessment, no upward or downward pathways were observed during the site investigations. Regional groundwater flow is the dominant groundwater flow pathway at this site and no upward or downward groundwater flowpaths exist as would occur in a bog setting.

a. Hydro-G suggests that the Site Investigations referred to relate to trial pits excavated in subsoil only. Therefore, no upward or downward or groundwater were investigated by the team.

b. Whilst regional groundwater flow will dominate groundwater flow at the site, the actual dominant flow is surface water runoff and wetland/floodplain impacts. Constructing in this setting upgradient of the PWSs for two significant towns creates the potential for mobilisation of material that have potential to increase THMs in the PWSs. This has not been acknowledged or assessed in the applicant's documents submitted.

5.9 WFD Status & Risk

As previously stated, none of the rivers in the proposed development site are meeting their WFD Objectives and the EPA published deadline is 2027 – just over one year away. The rivers are all mapped as 3rd Cycle At Risk and Moderate Status (2019 – 2025). Whilst construction is not a reported pressure or issue at the moment, that does not mean that construction is viable or defensible either.

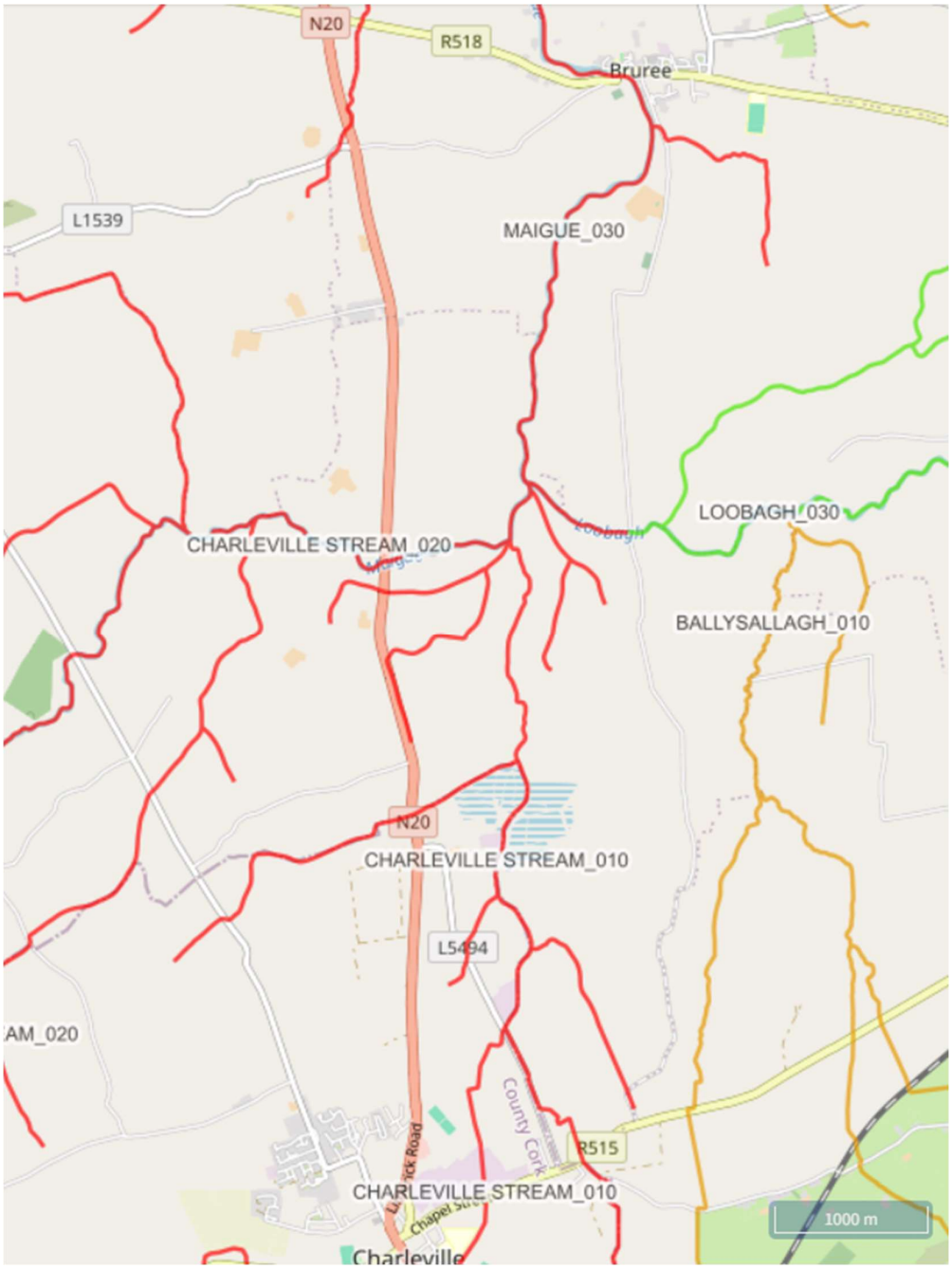


Figure 7 EPA Envision 3rd Cycle At Risk mapping for the Charleville Stream and Maigue River in the vicinity of the proposed Garrane Windfarm.

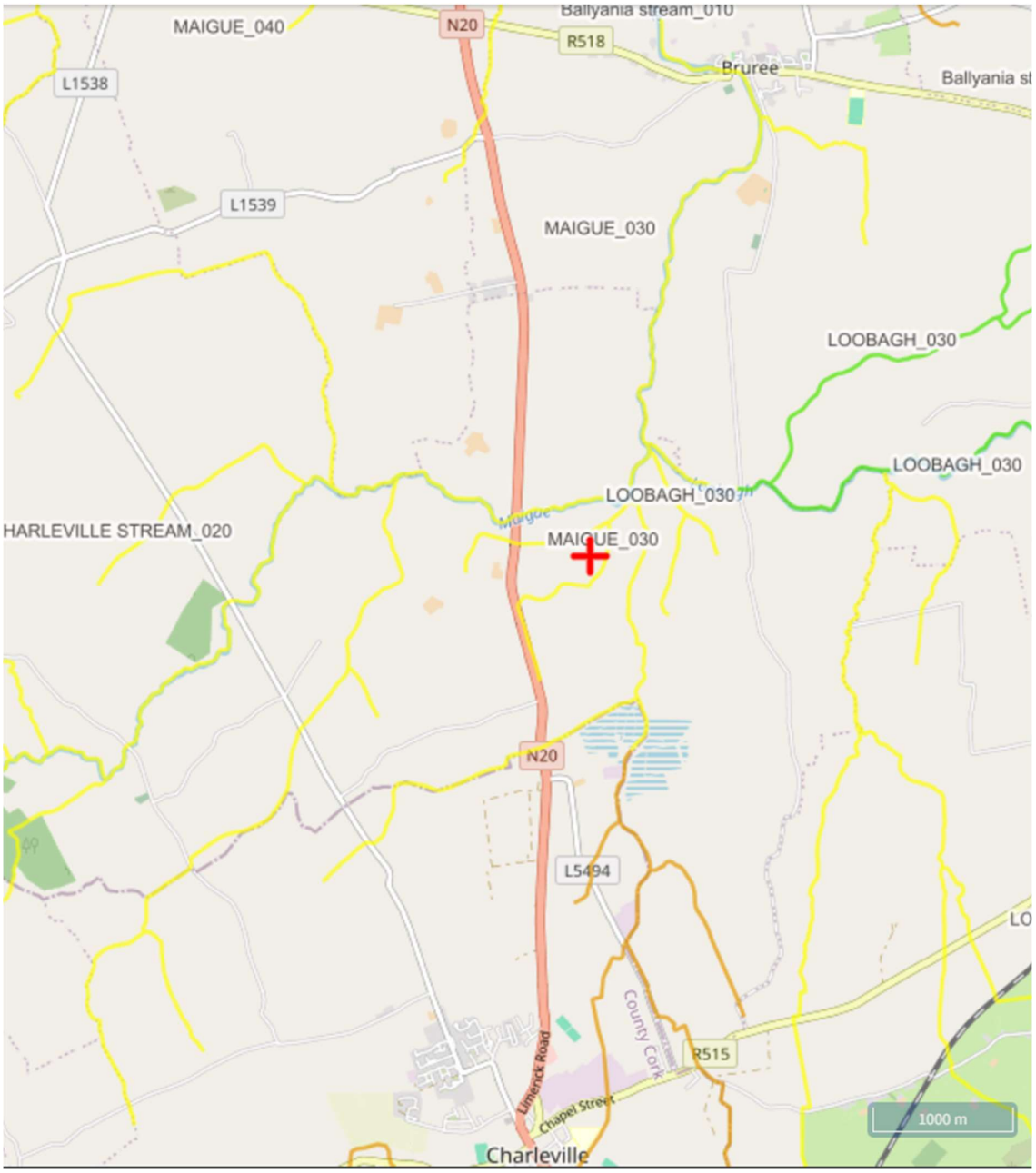


Figure 8 EPA Envision Status (2019 – 2024) MODERATE Status mapping for the Charleville Stream and Maigue River in the vicinity of the proposed Garrane Windfarm.

5.10 Recommendation

On the basis of the proposed development within a Flood Zone A, beside the already flood-prone N20, and in the catchments of rivers failing to achieve their WFD Objectives, it is recommended that The Commission Refuse the application on the grounds of an inappropriate landscape position.

Chapter 6. Objection on archaeological and cultural heritage grounds

RE: FAILURE TO ASSESS EFFECTS ON RECORDED ARCHAEOLOGICAL SITES AND CULTURAL HERITAGE IN THE DEVELOPMENT AREA

Eugene Costello BA MA PhD MIAI

Baile na nGall
Cill Mocheallóg
Co. Luimnigh

Statement of expertise

I am an archaeologist and historian. I have a BA in Archaeology and History (UCC), an MA in Landscape Archaeology (University of Sheffield), and a PhD in Archaeology from University of Galway. I am a Member of the Institute of Archaeologists of Ireland.

I am an international authority in landscape archaeology and rural history. I have published two books, several book chapters, and articles in numerous international peer-reviewed journals, including the *Journal of Field Archaeology*, *World Archaeology*, *Post-medieval Archaeology* and *Landscape History*. My research has been cited hundreds of times by international scholars. I have given talks at dozens of international conferences in the field, including the European Association of Archaeologists, the Society of American Archaeologists, the International Landscape Archaeology Conference, the Society for Post-medieval Archaeology and the European Society for Environmental History. Furthermore, I have given invited lectures on the subjects of archaeology and history at numerous universities, including University of Oxford, University of Cambridge, University of Amsterdam, Uppsala University, University of Sheffield, University of Glasgow, Trinity College Dublin and University College Dublin.

I have worked at prestigious institutions both inside and outside Ireland, including University of Notre Dame in the US, and Stockholm University and Uppsala University in Sweden. I now work as a Lecturer in University College Cork, where I lecture and research in landscape history, environmental history and archaeology.

At the same time, I also have experience of working in commercial archaeology (a.k.a. development-led archaeology). In 2017 and 2018, I worked as an archaeologist in the construction phase of two wind farms in Co. Kerry. I am therefore familiar with the archaeological risk assessment and mitigation procedures that need to be followed in advance of and during any developments.

In total, I have over 15 years of experience in archaeological fieldwork, including remote sensing, walk-over survey, Total Station survey, excavation and palaeo-environmental coring. I have worked on excavations of late prehistoric, medieval, early modern and 19th century sites in

Ireland, England and France. Since 2020, I have also co-directed three excavations in south Kerry.

My particular area of expertise in archaeological fieldwork lies in the discovery and survey of previously-unrecorded sites, especially small rural settlements and monuments that are easily missed in rapid assessments. My expertise in the discovery of such archaeological sites is evidenced, for example, by my award-winning research on historic livestock farming between 2012 and 2016, when I identified over 100 previously-unknown hut sites and enclosures in upland areas across four counties (Tipperary, Limerick, Galway, Donegal). I have continued survey and reconnaissance work on marginal rural landscapes, and extended my research into lowlands, since 2018, working in Scotland and Sweden as well as Ireland. In Ireland, I have been looking in detail at the mountains of south Kerry and the lowlands of east and south Limerick, where many new archaeological sites have come to light in recent years.

I am adept in the use of satellite imagery and aerial photography, the mapping of archaeological landscapes in Geographic Information Systems, and 'ground-truthing' of archaeological sites and features through careful walk-over survey. The results of my survey work up to 2023 can be seen on the National Monuments Service's Historic Environment Viewer (www.archaeology.ie). Dozens of new archaeological sites in Tipperary, Limerick, Donegal and Kerry have been added to the Sites and Monuments Record as a result of my surveys.

Relevant law and convention:
Directive 2014/52/EU of the European Parliament and of the Council of 16 April 2014 amending Directive 2011/92/EU on the assessment of the effects of certain public and private projects on the environment Text with EEA relevance

European Convention on the Protection of the Archaeological Heritage (Revised). Valetta, 16.I.1992

Contents:

6.1. EIAR has failed to assess effects of development on known archaeological sites within the proposed Site

Chapter 15 of the Environmental Impact Assessment Report, which deals with archaeology and cultural heritage, has missed a significant number of *known archaeological sites* within the redline boundary of the proposed windfarm site. Chapter 15 identifies 53 "known archaeological sites located within the 2km Study Area", with eleven of these located within the redline boundary of the site.[1] It identifies a further seven "potential archaeological sites" to the south west of Turbine 5, based on examination of developer-provided LiDAR imagery for that part of site.[2] Chapter 15 identified the "known archaeological sites" by examining the National Monuments Service's Historic Environment Viewer, an online tool which according to the author "collates current SMR datasets".[3]

What Chapter 15 of the EIAR fails to mention, however, is that the Historic Environment Viewer has been frozen due to an IT problem in late 2023. This IT problem means that it has not been possible for the National Monuments Service to upload newly-recorded archaeological sites to the Historic Environment Viewer. The Historic Environment Viewer is therefore not current – it presents a view of Ireland's Sites and Monuments Record as it was in late 2023.

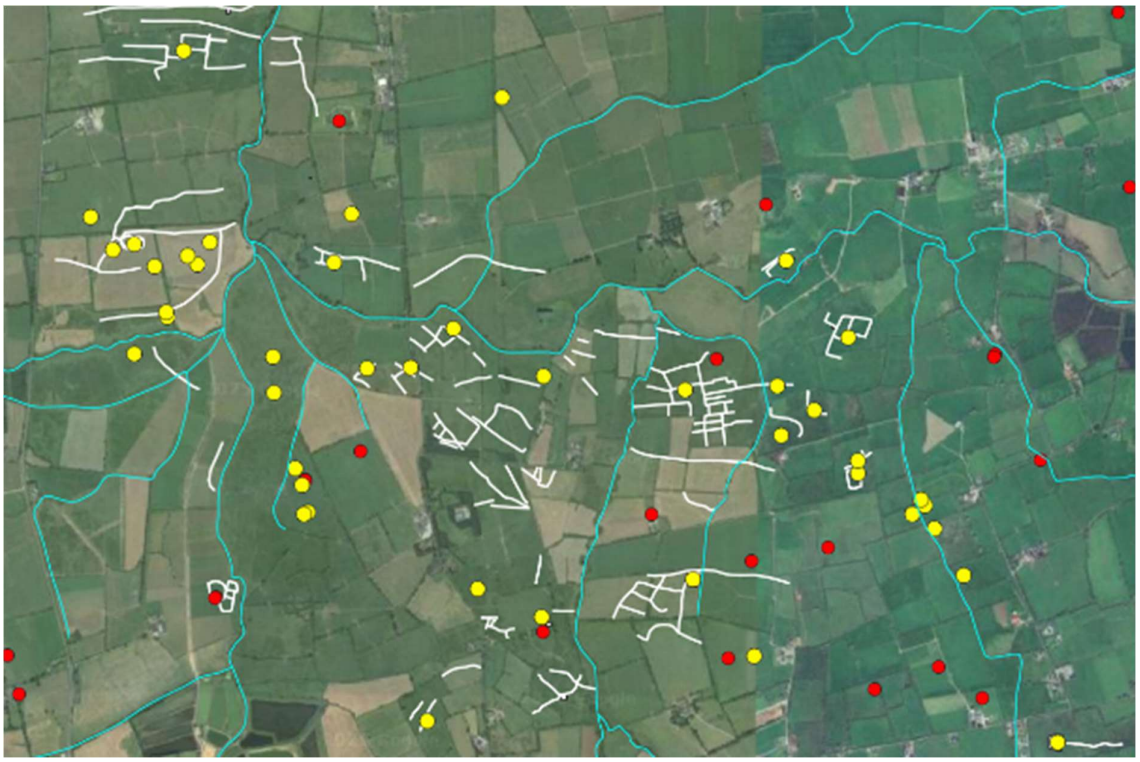
This is an extremely important point where County Limerick is concerned. As Chapter 15 of the EIAR alludes to,[4] the archaeological inventory work for Limerick in the 1990s was never finished and published. This means that the Record of Monuments and Places (RMP) and the Sites and Monuments Record (SMR) for Limerick are relatively incomplete compared to other counties whose surveys were completed. This is particularly noticeable if the low density of archaeological sites in south Limerick is compared with the high density of sites in north Cork. The low density on the Limerick side is a 'false negative', the result of poor survey coverage. For parts of east Limerick, the situation has been remedied thanks to an aerial survey by Martin Doody.[5] This survey did not cover lands in Bruree, Effin and Colmanswell in south Limerick, however. Thus the RMP and SMR remain inadequate for these areas.

On-going recording of new archaeological sites in south Limerick

To bring the SMR for Limerick up to the standard of other counties, I have been undertaking badly-needed new archaeological surveys in rural south Limerick. I first started this work in 2005 and have resumed it since 2019, taking advantage of new, high-resolution satellite imagery.[6] A whole archaeological landscape has opened up as a result of this work and below I provide an overview map of previously-unknown archaeological sites located by me to date

[1] Garrane Green Energy EIAR, Chapter 15 Figures, Figure 15.2
[2] Garrane Green Energy EIAR, Chapter 15 Figures, Figure 15.5, see Sites A-G, likely ring-ditches
[3] Garrane Green Energy EIAR, Chapter 15, pp. 6, 12, 31, 49, 62.
[4] Garrane Green Energy EIAR, Chapter 15, p.12.
[5] e.g. Doody, M. 2001. Medium altitude aerial photographic survey in East Limerick and West Tipperary. *The Journal of Irish Archaeology* 10, 13-24; Doody, M. 2008. *The Ballyhoura Hills Project*. Wordwell, Dublin.
[6] Trinks, I., Neubauer, W. and Doneus, M. 2012. Prospecting archaeological landscapes. In *Euro-Mediterranean Conference* (pp. 21-29). Berlin, Heidelberg: Springer Berlin Heidelberg; Luo, L. et al. 2018. Google Earth as a powerful tool for archaeological and cultural heritage applications: a review. *Remote Sensing* 10(10), 1558.

from Bruree to Garrienderk and Knocksouna. They include late prehistoric ritual monuments, medieval settlements and relict field systems. As survey progresses, it is becoming apparent that this archaeological landscape is equivalent in extent and importance to the extraordinary multi-period landscapes of Caherguillamore near Lough Gur, Mitchelstowndown in east Limerick, and potentially Rathcroghan in North Roscommon (a nominee for UNESCO World Heritage status).[7] Garrane Green Energy's proposed development would cut through the multi-period landscape that is coming to light in south Limerick before we have even begun to appreciate it.



Screenshot of preliminary findings, showing newly-discovered sites and pre-modern field systems in south Bruree, north Effin and west of Kilmallock parish. (red dots indicate RMP sites)

Gradually, I have been reporting these new discoveries to the National Monuments Service, as is expected of any archaeologist who has made a discovery.[8] Four of the new sites that I have recorded in Garrane and Ballynagoul townlands are already up on the Historic Environment Viewer, having been reported to the National Monuments Service in 2022 and early 2023, before the aforementioned IT problem occurred. These are: LI047-109, LI047-114, LI047-115, LI047-116. Another four monuments in Garrane and Ballynagoul townlands were added around the

[7] Ó Ríordáin, S.P. and Hunt, J. 1942. Mediæval Dwellings at Caherguillamore, Co. Limerick. *The Journal of the Royal Society of Antiquaries of Ireland* 12(2), pp.37-63; Doody, M. 2001. Medium altitude aerial photographic survey in East Limerick and West Tipperary. *The Journal of Irish Archaeology* 10, 13-24; Grogan, E. 2005. *The North Munster Project, vol. 2. The prehistoric landscape of North Munster*. Wordwell, Bray; Brady, N., McNeary, R., Shanahan, B. and Shaw, R. 2011. Unravelling medieval landscapes from the air. *Peritia* 22, 295-316.

[8] https://www.archaeology.ie/advice-and-support/locate-a-monument-or-wreck/report-a-new-discovery/; see also *European Convention on the Protection of the Archaeological Heritage (Revised)*. Valetta, 16.I.1992. Article 2. https://rm.coe.int/168007bd25

same time, in 2022/23, by a Jean-Charles Caillère, who was undertaking his own survey work in the area (LI047-110, LI047-111, LI047-112 and LI047-113). The fact that two separate archaeologists had zoned in on the same area for their research underlines its status as a place that is rich in previously-unrecorded archaeological sites.

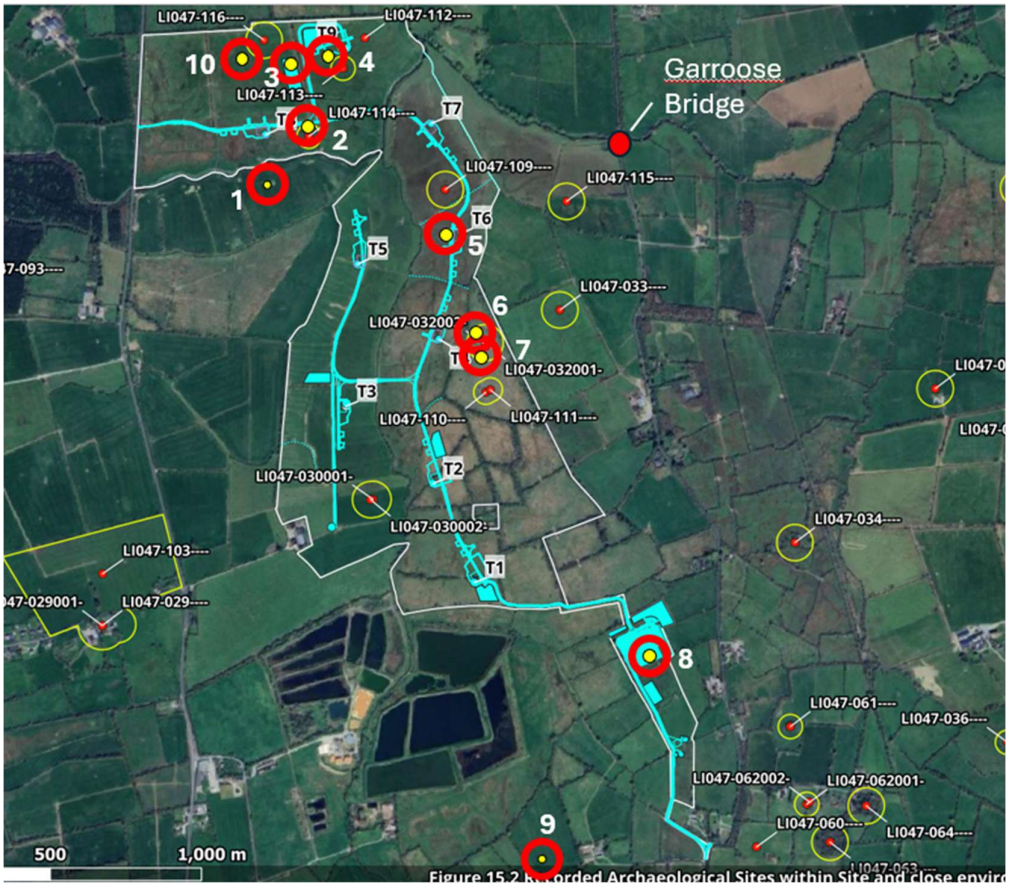
Between the end of 2023 and spring 2025, I recorded an additional ten previously-unrecorded archaeological sites in the area, deliberately focusing on tracts of marginal farmland that have seen little disturbance in recent times. These newly-discovered sites include enclosures, ring ditches, a barrow and a ringfort. As before, I filled up an official Monument Report Form for each site and submitted them to the Archaeological Survey unit of the National Monuments Service (see Appendix starting p.206 for the Monument Report Forms for Sites 1-10, given in abbreviated form). These monument report forms were accepted by the Archaeological Survey unit but I was told that the new monuments could not be uploaded to the Historic Environment Viewer until after "essential maintenance/restructuring" had been completed. Given that this restructuring has persisted for roughly two years, this is now a relatively well-known issue amongst archaeologists, at least amongst those who are actively engaged in the recording and reporting of new archaeological discoveries.

Crucially, this IT issue does not mean that archaeological sites reported to the National Monuments Service since late 2023 are invalid and to be ignored. It just means that they are not visible to the public on the Historic Environment Viewer. To quote a National Monuments Service email to me in January 2024, "we are continuing to process information forwarded to us on new discoveries as well as information on existing records. Please be assured that, following the maintenance/restructuring programme, we will create/update records as necessary." A further email from the National Monuments Service to me in March 2024 stated, "Unfortunately our capacity to add to database is still not functioning, I have saved all new additions and will update when I am told by the powers that be."

New sites missed in EIAR and will be directly impacted by development – effects of development on them not identified or assessed in EIAR

Having examined Chapter 15 of the EIAR, it is clear that none of these recently-recorded archaeological sites have been included in the EIAR. This is a very serious omission given their location. Eight out of the ten archaeological sites reported by me to the National Monuments Service since late 2023 lie within the redline boundary of the site.

Below I have reproduced Figure 15.2 from the EIAR, which shows the proposed development in relation to sites currently visible on the Historic Environment Viewer. Over this map I have superimposed red circles, marking the locations of the more recently-recorded sites that are not yet visible on the Historic Environment Viewer. I have numbered these 1-10.

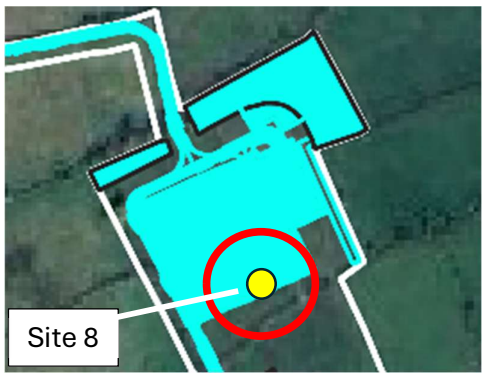


Yellow circles with LI047- numbers denote archaeological sites on Historic Environment Viewer. Red circles numbered 1-10 denote recently-discovered archaeological sites left out of EIAR.

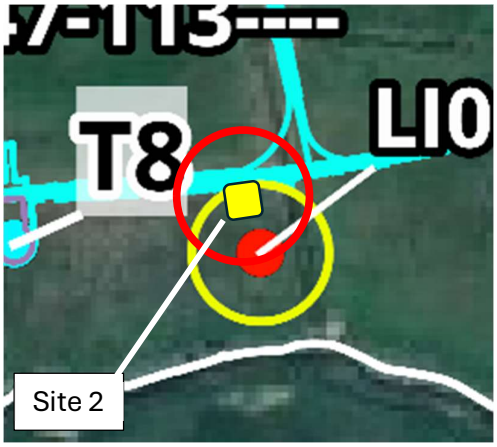
As can be seen on the above map, eight of the ten sites (2-8, 10) are located within the development boundary. Three of these eight sites (no.'s 6, 7 and 8) are not directly in the way of the proposed site works shown in light blue. This does not mean, however, that the three sites will be unaffected. Mitigation is still required and there is no mention of this in the EIAR.

More seriously, sites 2, 3, 5, 8 and possibly also site 4 will be directly adversely impacted by the proposed site works. There is no mention whatsoever of these known sites in the EIAR. The locations of turbines, roadways and the substation have clearly been planned and laid out without any regard for these sites. For example:

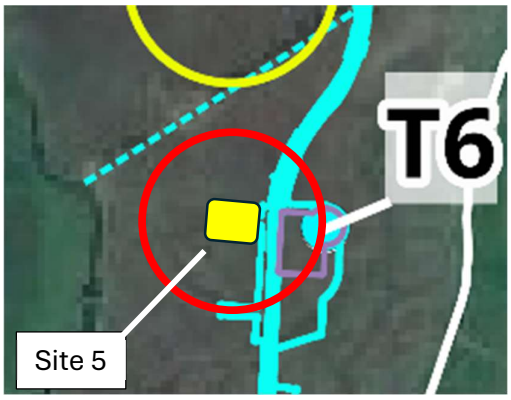
- Sub-station is planned on top of site no. 8 (a ring-ditch):



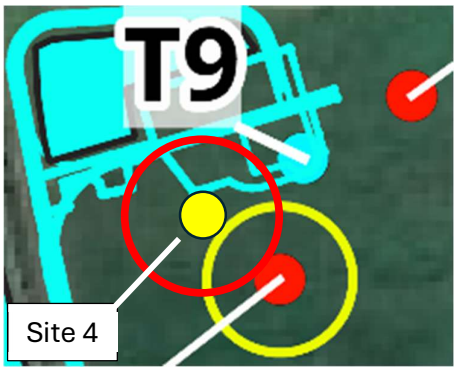
- Roadway between T8 and T7 will impact the northern part of site no. 2 (an enclosure):



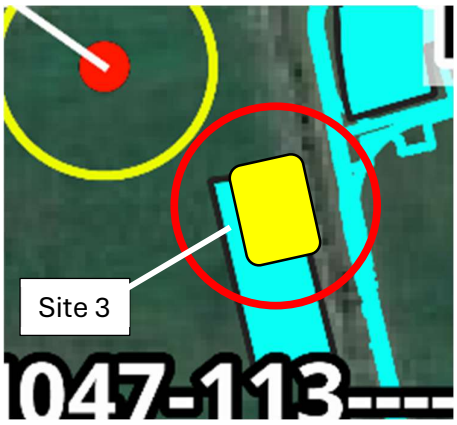
- Roadway and T6 hardstand will impact the east of site no. 5 (an enclosure)



- Works around T9 hardstand will impact site no. 4 (a ring-ditch)



- Soil storage location will impact site no. 3 (an enclosure)



The EIAR is therefore incorrect in concluding that, "The Project will not result in any direct adverse effects to any known archaeological sites, designated architectural heritage structures or undesignated cultural heritage constraints."[9]

Consequent failure of EIAR to fulfil legal requirements of Directive 2014/52/EU

Article 3 (Point 1) of **Directive 2014/52/EU** legally requires that an "environmental impact assessment shall identify, describe and assess in an appropriate manner, in the light of each individual case, the direct and indirect significant effects of a project on … material assets, cultural heritage and the landscape". Annex IV (Point 5) of the same Directive specifies that "cultural heritage" includes "architectural and archaeological aspects".[10]

With Garrane Green Energy proposing construction on top of and very close to sites 2, 3, 4, 5 and 8, the project will clearly have "direct significant effects" on these archaeological sites. By failing to "identify, describe and assess" the project's "significant effects" upon these known archaeological sites, Chapter 15 of the EIAR for Garrane Green Energy has failed to comply with Directive 2014/52/EU.

New sites and effects upon them should have been identified in EIAR

Directive 2014/52/EU requires environmental impact assessments to "identify, describe and assess [them] in an appropriate manner, in the light of each individual case …" Chapter 15's failure to identify these sites and the significant effects upon them cannot be considered "appropriate" in this case.

First of all, the issue with the Historic Environment Viewer, whereby sites reported since late 2023 cannot be put up online, is well known amongst archaeologists who regularly discover new sites *and report them, as they are required to do,* to the Archaeological Survey unit of the National Monuments Service. In light of this known problem, it would be surprising if the author of Chapter 15 did not check with the Archaeological Survey officer responsible for Limerick if

[9] Garrane Green Energy EIAR, Chapter 15, p.62.
[10] https://eur-lex.europa.eu/eli/dir/2014/52/oj/eng

any new sites had been reported for the area since the IT problem occurred. They certainly had ample time to do this; the EIAR is dated "August 2025" – almost two years after the issue with the Historic Environment Viewer emerged. Checking in with the Archaeological Survey unit for recent records would not have been excessive at EIAR stage, either. Section 15.2.5 lists off numerous other archives inspected by the author for the EIAR, including an inspection of the National Museum's Topographical File archive in Kildare Street, Dublin, and even the UNESCO World Heritage Sites and Tentative List.

The failure to look into the possibility of sites that might not yet have appeared on the Historic Environment Viewer (due to the known IT issue with it) is very surprising given that it would have been clear from site descriptions already on the Historic Environment Viewer that research was on-going in the area. The more recent site descriptions include the date that the site was reported and the name of the person who discovered it. The author of Chapter 15 would therefore have seen that Jean-Charles Caillère and I were contributing new sites for the area in 2022 and 2023, at the very same time that the author of Chapter 15 appears to have been undertaking their archaeological impact assessment for Garrane.[11] It is strange that the author of Chapter 15 did not reach out to us when compiling their list of sites, to enquire if we had encountered any other work in our clearly on-going reconnaissance work.

Other inadequacies in field survey and presentation of survey results in EIAR

I note, furthermore, that the author of Chapter 15 conducted their field visits to some parts of the site when it was summertime with heavy vegetation (wild iris and tall grass).[12] This is extremely inadvisable given the likelihood of such vegetation obscuring surface traces of archaeological sites.[13] Any landscape archaeologist who is practised in the reconnaissance of surface archaeology knows that November-March is by far the best time to conduct such survey. Time constraints can be an issue on some jobs but this cannot be an excuse here. I note that the whole archaeological assessment took place over several years – return wintertime visits could and should have been arranged, especially when it became evident that there was quite high seasonal vegetation on parts of the site.

It is also an omission of the EIAR that LiDAR survey results for the entire site were not presented. As it is, LiDAR is only presented for parts of the west of the site. This partial presentation of the data is unacceptable. In the EIAR for Tullacondra Green Energy, LiDAR survey data for the whole site was shown.[14] Why not for Garrane Green Energy? In addition, the LiDAR survey should have been conducted in late winter. Again, this is to ensure that surface traces of archaeological sites were not obscured by vegetation. Post-processing of LiDAR data can remove trees but it is more difficult to remove ground vegetation such as high grass, wild iris and rushes. The LiDAR excerpt presented on p.41 of Chapter 15 appears to show high grass and the tracks of a tractor through it, which suggests that the LiDAR survey was conducted at a sub-optimal time from the point of

[11] Appendix 15.2 of the EIAR has omitted these names and dates.
[12] See Garrane Green Energy EIAR, Appendix 15.1, p.1. See also Chapter 15, p.42.
[13] Indeed, on p.42 of Chapter 15 it is stated that, "The presence of tall grass within the field at the time of inspection may have obscured traces of this scarp feature."
[14] Tullacondra Green Energy EIAR, Chapter 15, Figure 15.11

view of archaeological prospection.

Conclusion

I would like to emphasise that the sites which the EIAR has ignored are not isolated archaeological features. They form part of a wider archaeological landscape in the area south of Bruree village that is gradually coming to light thanks to modern survey techniques – badly needed given the failure to complete a proper inventory of sites in the area in the 1990s. This extensive multi-period landscape is of a comparable scale to the well-known archaeological complexes of Mitchelstowndown and Caherguillamore in east Limerick. A development on the scale of what Garrane Green Energy are proposing would inappropriate in the middle of such a rich archaeological landscape, especially when there is still more to be revealed.

It is true that there would have to be testing and monitoring during any eventual construction, to watch out for as-yet *unknown* archaeological sites, especially sub-surface sites that are invisible on the surface (I am familiar this having been involved in testing and monitoring on two windfarms in Kerry).

However, the archaeological sites numbered 1-10 above are very different in that they are *known* sites, visible on the surface. They have already been recorded and reported to the National Monuments Service – it is just a question of their visibility on an online database (the 'Historic Environment Viewer') that is temporarily 'frozen' due to an IT issue.

As known archaeological sites, they, and the development's effects upon them, have to be identified and assessed in the EIAR stage, before a planning decision is made. It is a fundamental failing of Chapter 15 in the EIAR that it has not done so and this failure amounts to a breach of Directive 2014/52/EU.

The Valetta Convention requires "that environmental impact assessments *and the resulting decisions* involve full consideration of archaeological sites and their settings [my emphasis]".[15] Chapter 15 of this EIAR does not allow An Coimisiún Pleanála to give "*full consideration*" to the development's effects on the area's archaeology and cultural heritage. It is a defective assessment which ignores direct adverse effects on several known archaeological sites. An informed decision cannot be made about Garrane Green Energy's application on the basis of this EIAR. The application should be rejected on this basis.

[15] *European Convention on the Protection of the Archaeological Heritage (Revised).* Valetta, 16.I.1992. Article 4.

6.2. Effects of construction traffic on cultural heritage sites Garroose Bridge and Bruree Bridge not assessed in planning application

The development poses a major risk to the National Inventory of Architectural Heritage site, Garroose Bridge (NIAH 21904703), located on the Local Primary road (L-1537). During windfarm construction, all construction traffic will have to travel over Garroose bridge, and since the bridge is in poor condition, it will be at serious risk of collapse. This would be an issue for public safety and the local economy as well as cultural heritage. This risk has not been properly assessed or mitigated in the EIAR. Heavy construction traffic also poses a significant risk to Bruree Bridge, which is on the List of Protected Structures (RPS 1039) as well as the National Inventory of Architectural Heritage (21804008). This risk has not been assessed in the planning application.

Archaeological and historical significance of Garroose Bridge

Garroose Bridge is a three-arch masonry bridge and is at least 200 years old. It has a rating of 'Regional' importance on the National Inventory of Architectural Heritage (site 21904703). Furthermore, Garroose Bridge and the ruined farmhouse immediately southwest of it have recently been identified as a significant archaeological site associated with the Irish Civil War (1922-23). Both the bridge and the house were surveyed and recorded in 2024 by archaeologist Aidan Harte, as part of University College Dublin's *Archaeology of the Irish Revolution* project (funded by the Irish Research Council). The bridge saw a multi-day battle between Free State and IRA forces late July/early August 1922, with the IRA taking shelter in the house, with traces of the fighting still visible. At the end of the battle, the central arch was blown up and was not repaired until 1926.[16] I am aware of all of this because I collected a significant amount of local history about the battle and shared it with the UCD project. They have called it 'Engagement No. 62' and details of our findings have been published online by UCD.[17]

The Garroose Bridge battle site and other sites discovered in the Archaeology of the Irish Revolution project are now in the process of being classified as 'prescribed monuments' under the *Historic and Archaeological Heritage and Miscellaneous Provisions Act 2023*.[18]

Poor condition of Garroose Bridge – serious cracks emerging in recent years

As part of my research on the archaeology and history of south Limerick, I have been undertaking site visits to Garroose Bridge over the past 15 years. In this time, it has become clear that cracks have been emerging in two of its arch barrels. In the last three years, more systematic architectural surveys have been undertaken by myself and fellow archaeologist, Aidan Harte. We undertook these surveys in order to better understand the architectural history of the bridge, both before and after the Civil War. In the course of these surveys, however, a

[16] Bureau of Military History, WS.1049; *The Limerick Leader*, 19 April 1926, p.2.
[17] See 'Engagement No. 62', https://storymaps.arcgis.com/stories/d98825730c934386ac0ba9bb366b4022; see also, Harte, A. and Bruck, J. 2025 (in press). The archaeology of conflict in east Limerick, 1917–23. *Journal of Irish Archaeology* 34. (this article highlights Garroose Bridge as an archaeological remnant of the Civil War)
[18] https://www.irishstatutebook.ie/eli/2023/act/26/enacted/en/print#part2-chap2

number of serious structural issues have become apparent.

Firstly, in surveys in late 2023 and 29 June 2024, Aidan Harte identified what section of Garroose Bridge had been blown up and repaired in the 1920s, namely, the middle arch. The two side arches – obscured by vegetation in the photo – do not show any signs of being blown up or re-built in the 20th century.

In June 2025, I carried out a more detailed survey of Garroose Bridge to look more closely into its architectural history and to inspect the two original side arches. This confirmed that the central arch barrel had been re-built in the late 1920s with a different masonry style and faced with concrete (See Chapter 6 of this objection).

The two original side arches were found to have serious longitudinal cracks. Chapter 6 presents a detailed engineering assessment of these issues; here I present the results of my survey from my point of view as an archaeologist with years of experience of examining historic masonry structures and their architectural integrity.

The most serious cracks in Garroose Bridge are evident in the left (i.e. southern) arch barrel and indicate a widening of the bridge in recent years. These cracks are long (up to 1.5m) and there are now at least three more than when I first visited the bridge. What is more, the cracks are clearly getting bigger because small stones and chunks of lime mortar have been falling down from the top of the arch barrels as the spaces between the stones widen (due to the sides of the bridge being pushed apart). Most of these fallen stones and chunks of plaster get washed away in winter when the river level is high but in summer they remain on the ground and indeed one chunk of mortar was visible under the southern arch barrel during my visit in June 2025 (see photo C2).

Most serious structural problems in Garroose Bridge:

1. In the left (i.e. southern) side arch, the upstream **arch ring is separating from the main arch barrel** (see below photo A1; A2). This type of crack is considered very serious and is highlighted as a risk factor in Transport Infrastructure Ireland's official standards for the *Assessment of Road Bridges and Structures* (2014):

   > "The studies showed that ring separation in the barrel of the arch bridges can lead to a considerable reduction in load carrying capacity."[19]

   The same standards document includes images of bridges whose arch rings are separating from the main arch barrel and that have longitudinal cracking towards the outer edges of the arch barrel, suggesting a condition score of just 0.3 for one of them.[20] Furthermore, **the *Bridge Asset Management System for Regional and Local Roads* (2019) gives a Red maintenance rating to cases of arch ring separation**, meaning that it is a "serious defect … which left unchecked could result in the failure of the

[19] Transport Infrastructure Ireland. 2014. *The Assessment of Road Bridges and Structures: Standards*, Annex G, G/1. https://cdn.tii.ie/publications/AM-STR-06002-02.pdf
[20] Transport Infrastructure Ireland. 2014. *The Assessment of Road Bridges and Structures: Standards*, Plate 4, Plate 5, Plate 10.

element."[21]

2. In addition to these cracks, a historical divide or 'joint' in Garroose Bridge's masonry towards the downstream end of the left and right arch barrels is widening. This masonry divide is the result of the bridge being widened on the downstream side in the 19th century, something which occurred in many old masonry bridges.

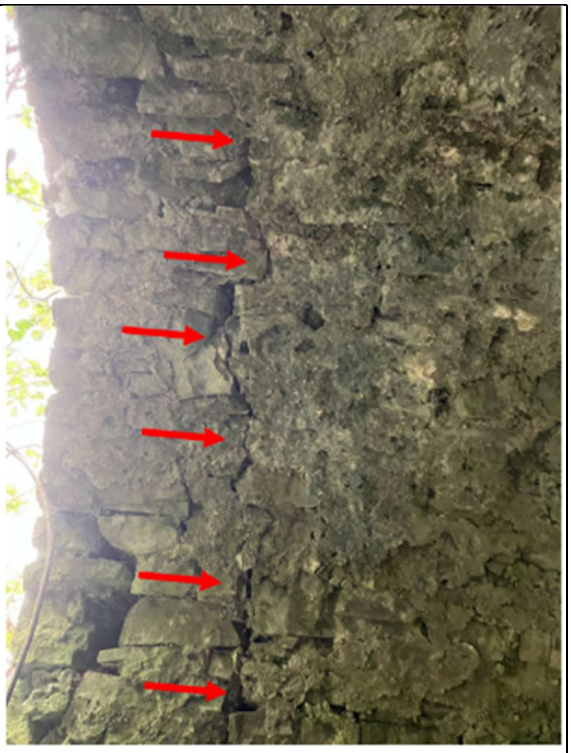
   In Garroose Bridge, however, the **gap between the old and 'new' sections of masonry has widened** in recent years as the sides of the bridge are pushed outwards, to the extent that it is now possible to comfortably fit one's hand into this void in the left arch barrel (see photo B1). As a result, there is now significant **percolation of water** through the bridge, which is gradually **leaching out bridge fill** – another risk factor for masonry bridges.[22]

   Furthermore, in the left arch barrel, the joint between the old and new sections has become quite uneven. There is now significant **radial displacement and bulging of stones** near the highest point of the arch barrel (see photo B2). This indicates that the **load is not well distributed**, with this point likely experiencing greater pressure. Radial displacement of stone near or at the top of an arch barrel should be "particularly noted", according to TII's *Assessment of Road Bridges and Structures*.[23]

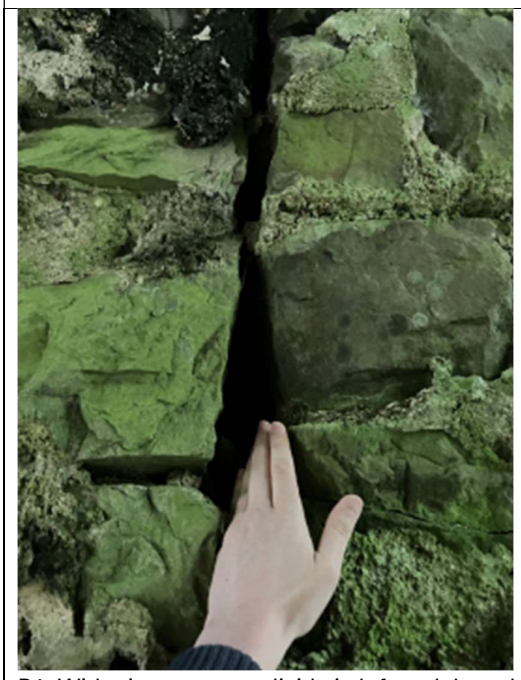
3. Both of the side arches in Garroose Bridge have **longitudinal cracks that go through stones** (see photo C1). Longitudinal cracks that pass though individual stones, rather than going around them, are regarded as "very serious" in the internationally-respected *Bridge Inspector's Handbook*.[24]

[21] Department of Transport. 2019. *Bridge Asset Management System for Regional and Local Roads*, p.56, 71. https://www.roadguidelines.ie/road-guidelines/bridge-asset-management-project/
[22] Transport Infrastructure Ireland. 2014. *The Assessment of Road Bridges and Structures: Standards*, p.18.
[23] Transport Infrastructure Ireland. 2014. *The Assessment of Road Bridges and Structures: Standards*, p.16, Plate 8.
[24] Parry, J.D. 1988. *Bridge Inspector's Handbook*. Transport Research Laboratory, p.68. https://www.gov.uk/research-for-development-outputs/orn7-volume-2-bridge-inspector-s-handbook

A1. Cracking, separation of arch ring, left arch

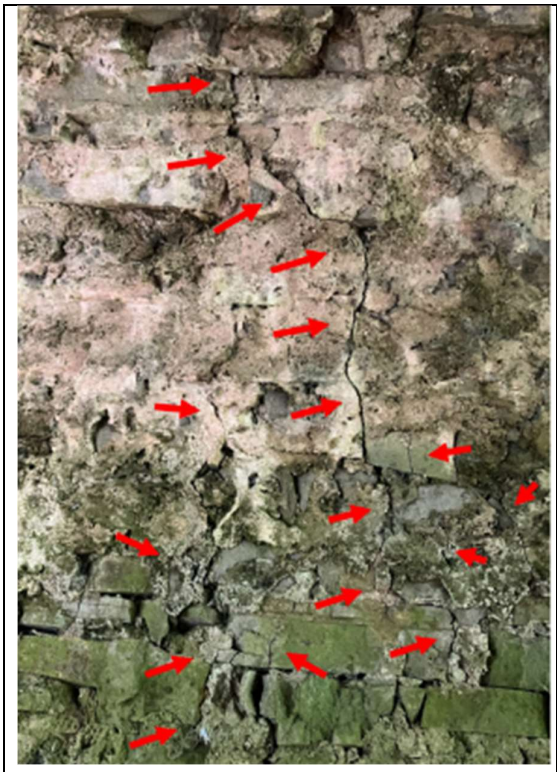


A2. Cracking, separation of arch ring (close up)



B1. Widening masonry divide in left arch barrel

B2. Bulging and radial displacement, left arch barrel



C1. Cracking in right arch barrel, incl. cracks through stones

Stones that have fallen recently from bridge structure

Example of lime mortar fallen from arch barrel (has to have fallen since spring 2025, as these get washed away in winter)

C2. Fallen stones and mortar, under left arch barrel

Garroose Bridge not properly assessed in Bridge Inspection Report

The above structural risks are inadequately considered in the Bridge Inspection Report commissioned by Garrane Green Energy (EIAR Appendix 17.7). Indeed, many of the above risks have not even been spotted. According to Appendix 17.7, a visual **inspection was only carried out of the right side arch and middle arch. No inspection was carried out on the left side arch.** The authors claim that, "safe access was not available to carry out a detailed inspection of the left hand side arch."[25] This is a little difficult to believe given that Photo No. 4.5 of their report shows that they waded across the river and stood in front of the left side arch, from which point they would have been able to look up into the arch barrel. Heavy vegetation is mentioned as a factor in not inspecting the left side arch. The only vegetation I noted in my visits were a few bramble branches, easily moved aside.

Despite not inspecting the left side arch, the authors of the Bridge Inspection Report have **"assumed that its condition is similar to that of the right hand side arch."**[26] This is a rather reckless assumption given that Garroose Bridge will be expected to take close to 8,000 extra vehicles (including HGVs) during the windfarm construction phase. Indeed, as it turns out, it is an incorrect assumption. My inspections have shown that **the most serious structural weaknesses are in fact located in the left side arch, i.e. cracking and separation of upstream arch ring from arch barrel**, widening of masonry divide and radial displacement of

[25] Appendix 17.7. Garrane Wind Farm Bridge Inspection Report, p.4.
[26] Ibid.

stones near crown of arch barrel.

Furthermore, a modified **MEXE load analysis was only carried out on the main arch and right side arch, not on the left arch**. It cannot therefore be assumed that Garroose Bridge would be able to take the 12.5 tonne axle weight that the Bridge Inspection Report claims it can.[27] **Given that the right arch was given a condition score of only 0.5, with its few cracks, it is highly likely that the left arch, which is in a poorer state, would have achieved an even lower condition score.** This is highly significant. If a modified MEXE load analysis were carried out on the left arch, giving it a condition score of, say, 0.4, then the **resulting axle load capacity for that arch and by extension Garroose Bridge would be only 8.15 tonnes**. This capacity would be too low to support many of the HGVs that Garrane Green Energy proposes to send over Garroose Bridge as part of its circular traffic management plan. For example, an empty cement lorry would be over 10 tonnes in weight.

It is impossible to have confidence in the conclusions of the Bridge Inspection Report regarding Garroose Bridge given that it inspected only two of its three arches, leaving out the arch that is actually in the poorest condition. Garrane Green Energy's windfarm application should therefore be rejected pending a full analysis of the axle load capacity of Garroose Bridge.

No assessment of effects on Garroose Bridge in Cultural Heritage Chapter

Given that close to 8000 vehicles, including HGVs, will have to travel over Garroose Bridge during the construction phase of the project, there is clearly high potential for effects on this piece of cultural heritage. As a Regionally-Important entry on the National Inventory of Architectural Heritage, these effects should have been assessed in the cultural heritage section of the EIAR. However, Chapter 15 of the EIAR, which deals with Cultural Heritage and Archaeology, does not mention or consider any risks to Garroose Bridge. It notes that it lies within the 2km Study Area but no site visit was undertaken and no consideration was given to how it may be affected by the sustained heavy construction traffic that is proposed to go over it.

This is a strange omission given that Chapter 15 is at pains to consider the effects of the Turbine Delivery Route. If cultural heritage along the Turbine Delivery Route was analysed, then why was cultural heritage along the construction traffic route not considered? Chapter 15 sets out to assess "potential direct and indirect effects of potential medium-high magnitude on the locations and settings of known cultural heritage constraints within this area."[28] By neglecting the effects of the construction traffic route, the EIAR has failed to properly assess the effects of the development on the area's known cultural heritage.

Directive 2014/52/EU mandates that environmental impact assessments consider the "likely significant effects" of a development on "material assets, cultural heritage, including architectural and archaeological aspects … ."[29] Given that Garroose Bridge will see thousands of extra vehicles going over it every day for up to 18 months, the effects on it are likely to be "significant" and therefore in need of assessment. The effects of the proposed windfarm

[27] Ibid., p.20.
[28] P.2-3.
[29] Annex IV, https://eur-lex.europa.eu/eli/dir/2014/52/oj/eng

on this architectural aspect of the area's cultural heritage has not been assessed.

Effects on Protected Structure Bruree Bridge not assessed in Cultural Heritage Chapter or Bridge Inspection Report

What is more, **Chapter 15 has failed to consider the effects of construction traffic on Bruree Bridge, which is on the List of Protected Structures (RPS 1039)** as well as the National Inventory of Architectural Heritage (21804008). As Figures 17.4 and 17.5 in Chapter 17 of the EIAR make clear, construction traffic for the windfarm will also be travelling through Bruree village and over Bruree bridge. However, **this bridge is not mentioned anywhere in Chapter 15. Indeed, it is not mentioned anywhere in the Bridge Inspection Report (Appendix 17.1) either.** This is extraordinary given that Bruree Bridge is on the List of Protected Structures. Effects on this Protected Structure due to increased HGV traffic and vibration are completely unknown and completely unassessed in this EIAR. **This is a clear breach of Directive 2014/52/EU, which says that environmental impact assessments must contain "a description of the likely significant effects of the project" on, amongst other things, "cultural heritage, including architectural and archaeological aspects."**[30]

Conclusion

Garroose Bridge has numerous structural weaknesses and is at risk of collapse due to construction traffic associated with the windfarm. These structural weaknesses were not identified in the developer's Bridge Inspection Report because its authors neglected to inspect the bridge's left side arch, which has the most serious cracks. The EIAR's cultural heritage chapter has also neglected to assess likely effects on it due to construction traffic. Bruree Bridge, meanwhile, has not been assessed from either an engineering or a cultural heritage point of view. This is alarming given that it is also on the construction traffic route and is on the List of Protected Structures as well as the NIAH.

Garrane Green Energy's application should be rejected pending full assessments of the effects of heavy construction traffic on all NIAH sites and Protected Structures along the construction traffic route outlined in Chapter 17 of their EIAR. These assessments should ideally have the input of a qualified conservation architect as well as chartered engineers.

[30] Annex IV, https://eur-lex.europa.eu/eli/dir/2014/52/oj/eng

Chapter 7. Engineering Review into Garrane Green Energy Planning Submission Documents

Brian Morrissey
CEng MIEI MStructE

Contents

1. Introduction

The purpose of this document is to highlight the findings of a review carried out by Brian Morrissey, Chartered Engineer, [BM] into the planning documents submitted by Garrane Green Energy [GGE] in seeking to construct a 9-turbine windfarm and associated works in the townlands of Ballinagoul & Garrane, Co. Limerick and Creggane, Co. Cork.

The review was undertaken on documents completed by Jennings O'Donvoan & Partners [JOD] & CST Group [CST] on behalf of GGE, with a specific focus on the transportation documents.

This report will highlight perceived shortcomings in the application documents as regards the extent of the reviews carried out by JOD as well as inadequacies in the published findings and conclusions. The shortcomings include, but are not limited to:

- No review undertaken of the road structure of the proposed one-way haul route.
- Only one bridge review completed out of several potential structures.
- The bridge review is considered to be a high level non-conclusive review.
- No review of minor road structures.
- No review of critical road junctions that form part of the proposed haul routes.
- No road safety audit completed on the proposed one-way haul road.

2. Road/transport Review

2.1 Traffic Volume Background

Chapter 17 of JOD's planning documents deals with the Traffic and Transport details of the planning submission. Within this, the following haul routes are proposed for the project:

1. Turbine delivery route from Galway Port to Site Entrance 1 on the N20
2. Turbine delivery route from Foynes Port to Site Entrance 1 on the N20
3. General construction traffic haul route - a one-way loop system originating/terminating at site entrance 2 on local road L1538.

JOD have given estimates of the expected construction traffic volumes in Table 17.9 of the submission. It is estimated that 7,965no journeys will take place. 140no of these deliveries are associated with the turbine erection and therefore will be moved through Site Entrance 1 which, resulting in 7,845no estimated through Site Entrance 2.

Table 17.11 of Chapter 17 of the planning application shows expected working times for HGVs – 7am to 7pm (12hrs). JOD estimate in Table 17.10 of the same document that there will be 120no HGVs required to cast each turbine base. This results in 10no HGVs arriving/departing the site every hour, or 1no HGV every 6 minutes.

2.2 Transport Route Review

JOD have proposed a one-way system for the general construction traffic (Figure 17.5 on JOD submission reprinted as Figure 1 below). It proposed that all traffic entering the site will travel north along the L1537 to site entrance 2, whereas departing traffic will travel north from site entrance 2 along the L1537 to Bruree village.

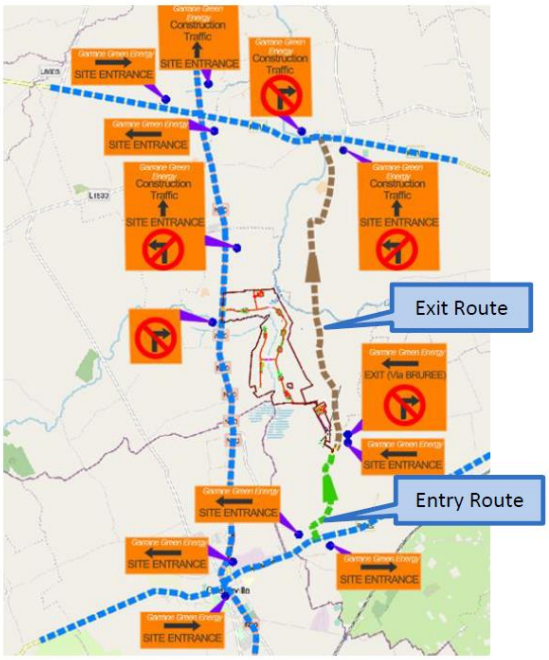


Figure 17.5: One Way System

Figure 1 - JOD one-way proposal

The submission documents do not propose a methodology of how this one-way system will be enforced. Section 17.2.6 of JODs submission has stated that the L1537, is a "*3.0m wide single carriageway*". As noted in Section 2.1, an estimated 7,845no deliveries, the vast majority of which will be HGV's, will be routed along this 3.0m carriageway. Section 17.2.6 gives a basic description of the road section but does not give a full description of the route itself, which should take account of the several sharp (almost 90deg), blind bends that are noted along the route, as these would have a significant impact on the safety of the route.

In Figure 17.6 of JOD's report, 12 local construction suppliers have been identified, 5 to the north of the site, and 7 to the south. Whatever suppliers (local or distant) are chosen for the project, will have a significantly extended delivery distance due to the proposed one-way system. Given this extended delivery distance, human nature may dictate individual decisions, resulting in the one-way system being ignored.

If the one-way system is not followed, then there would be significant concerns over the volumes of HGVs passing on a 3.0m carriageway from both a road structure point of view and more importantly a road safety point of view. It is expected that enforcement of the one-way system will be designated as the responsibility of the construction contractor, however, it is deemed a severe oversight that the safety of this 3.0m carriageway and enforcement methodology of the one-way system was not considered as part of the planning submission.

2.3 Road safety review

A Stage 1 road safety audit was completed by CST on behalf of JOD. This focuses on Entrance 1 on the N20. As part of the submission, JOB issued a Traffic Management Plan (Appendix 17.2), which gives a description of the route and expected traffic flows but does not consider the safety of the route. Site entrance 2, which will see an estimated 7,845no vehicles, is located on the L1537 - a 7.5km section of road, which contains several ~90degree bends none of which have been audited from a safety point of view. This would be deemed an oversight given the expected volumes of construction traffic.

The L1537 is located in a rural area and is predominately a residential area, wherein locals can be seen taking advantage of the rural amenity – a young mother pushing stroller was noted on the route. Given that this is typical of the residential nature of the road, it is incumbent on the developer and its partners to consider the safety of the entire construction route and prove that the safety of the local road users is not affected.

2.4 Junction Assessment Review

Chapter 17 appendices in JOD's planning submission detail traffic assessments undertaken. In these assessments, 4 junctions were reviewed:

- Proposed Junction 1 on the N20 (including traffic counts at the junction of the R518 and N20 "O' Rourke's Cross")
- Proposed Junction 2 on L1537
- Junction between L1537 and R518 in Bruree Village
- Junction between L1537 and R515

In review of the Traffic and Transportation sections of JOD's submission the following inadequacies were highlighted:

- Traffic counts were undertaken at O' Rourke's cross as part of the assessment and design of Junction 1 on the N20. No assessment of the O' Rourke's cross junction was undertaken. This would be deemed a significant oversight given the fact that the junction forms a key part of the proposed project one-way system.
  Furthermore, O' Rourke's Cross has been determined by Limerick CCC to be an inadequate junction and the compulsory purchase process of land (An Coimisiún Pleanála - Case reference: CH91.319545) is underway to allow the construction of a proposed roundabout.

- An assessment of the junction between L1537 and R518 in Bruree Village was undertaken (Figure 4 of JOD, APPENDIX 17.1). However, since completion of the assessment, this junction has been upgraded by Limerick CCC which has significantly altered the south-east corner of the junction. Whilst this may not affect the PICADY junction assessments, it has significantly affected the sightlines, usability and safety of the junction which has not been reviewed in the submission.
- The proposed one-way system requires that incoming traffic to Junction 2, is directed along the N20 into the centre of Charleville town, turning east along the R515. Charleville town is already a traffic and accident blackspot, as highlighted in the Irish Examiner article of June 23, 2025, "*10* [pedestrians] *have been killed in little over a decade"*. No assessment has been undertaken, as part of the submission, on this 90 degree turn on the main street of Charleville.
- Section 3.1 of JOD's Appendix 17.6 states "*Specific safety data for this location is not currently available on the RSA Website. Data from the National Road Risk Rating published by TII show that the location has a collision rate threshold of 3 corresponding to a "Below Expected Rate" collision threshold.".* This is deemed to be an inadequate and misleading statement as, the threshold may apply to the proposed location of Junction 1, but the submission does not consider the N20 as an entirety - A N/M20 Project office press release states "*the proportion of fatal collisions to all personal injury collisions on the N20 is four times higher than the national average*"

2.5 Road structure review

Section 17.2.6 of JOD's submission has stated that the L1537, is a "*3.0m wide single carriageway*". This immediately raises concerns over the structural adequacy of such a minor road to carry the expected 7,845no vehicles coming to and from Entrance 2. No road condition survey was carried out by the developer or JOD as part of the submission. The only reference made to the road condition is a stipulation stating that:

"A pre-construction road condition survey shall be carried out prior to any works commencing on site. A post-construction condition survey shall be carried out following the completion of the works in consultation with the relevant authority. Reinstatement of defects on the public road network resulting from construction traffic shall be made good to a specification agreed with the relevant local authority / TII. The scope of the road condition survey shall be agreed relevant local authority / TII."

As will be shown in Section 3, below, a bridge inspection report on Garrouse Bridge was issued by JOD as part of the planning submission. BM carried out an independent review of the bridge and as part of this review, a visual inspection of the L1537 was undertaken. The survey was completed along a section of road for 500m to the North and South of Garrouse Bridge (Figure 2).

Figure 2 - Road survey location

At the 500m point to the south of Garrouse Bridge, significant depressions were noted in the road surface, particularly along the western edge. This edge of the road is located close to an adjacent open land drain, and the road subbase appears to be settling/collapsing outward toward this drain (Figure 3). Discussions with local residents have indicated that this settling/collapse of the road at this location has been getting progressively worse over the previous several years, despite maintenance/repair work been carried out on the road surface. The previous surface dressing repairs are in poor conditions and have started to unravel (Figure 4).

Figure 3 - Collapse of road along western edge

Figure 4 - Unravelling of road surface

Approximately 350m south of Garrouse Bridge a minor pipe culvert structure was noted crossing the L1537. Significant settlement of the road to the approach to either side of this pipe culvert was evident. The presence of this solid structure beneath the road surface is causing a “hard edge” to be formed along the road surface (Figure 5). As with the previous sections of the road surveyed, the settlement is most significant along the western edge of the road on the approach to the culvert. Collapse of the ground behind the culvert approach wall is evident from the mouth of the culvert (Figure 6), which was eliminated any “buttressing effect” to the road subbase allowing for the settlement and movement of the western edge.

Figure 5 - Settlement of road on southern approach to culvert

Figure 6 - loss of ground to culvert approach wall

The 500m section to the north of the Garrouse Bridge is a straight, tree lined section of road. Given the existing width of the road, the overhanging nature of the adjacent trees (Figure 7) forces vehicles to straddle the middle of the lane when driving in normal conditions and not passing other traffic.

Figure 7 - Southern approach to Garrouse Bridge

Deterioration of the road is visible following this straddling pattern. Settlement of the road is visible either side of the "crown" of the road resulting in cracking along the crown. This cracking is up to 50mm is sections and has opened so as to expose the subbase, which will lead to increasing rates of degradation of the road (Figure 8).

Further to this, given the straddling behaviour of vehicles the outer edges of the road are settling and are being "pushed out" laterally into open roadside drains (Figure 9).

The settlement and movement cracks noted along the crown and edges of the road above are indicative of the condition of the full 500m northern section of the road reviewed.

Figure 8 - Cracking along crown of road

Figure 9 - Adjacent open drain

The L1537 is a 7.5km section of road linking the R515 outside Charleville to the R518 in Bruree Village and it forms a key part of the proposed windfarm site access route. The visual survey carried out by BM only covered a 1km section of this road and yet found multiple areas of road deterioration.

As previously stated, the only discussion on the road condition survey in the planning files is for the contractor to carry out pre and post construction surveys of the road and remediate any issues that were caused by the construction traffic. However, the lack of a full road condition survey as part of the planning submission is deemed a significant oversight. Given the expected volume of construction traffic on the road, and given the noted condition of the road, it is incumbent on all stakeholders to prove that the road, in its given condition is structurally adequate and capable of carrying the expected volumes of traffic. This exercise should form an integral part of the planning decision – if the road is inadequate then the windfarm construction traffic should not be allowed to use this route.

3. Bridge Structure Review

Appendix_17.7 of the planning application, documents the findings of a bridge inspection caried out by JOD on Garrouse [Garroose] Bridge, which is located on the L1537, approximately 2km North of Site Entrance 2.

The next sections of this report will document the following:

1. A review of JOD's report on Garrouse Bridge
2. An independent visual condition survey carried out by BM.

3.1 Garrouse Bridge Inspection Report Review

A visual inspection of the bridge was carried out by JOD on 17th of April 2024. Garrouse bridge is a 3 arch masonry structure, however only 2 of the arches (north and central) were reviewed. The southern arch was not reviewed as "Safe access was not available to carry out a detailed inspection". The visual inspection was taken from northern bank of the river therefore only the northern arch could be fully accessed - from the published photographs, the visual inspection of the central arch appears to have taken place from the northern arch and therefore a close-up inspection was not completed.

The bridge inspection report by JOD would be deemed only a high-level review and not an in-depth review of the structure itself. The report findings and its "Engineering inspection notes" have only noted that a series of "open joints" are visible between the masonry elements. There is no review of how these open joints came to be, nor is there any discussion on the size, locations and density of these open joints. Furthermore, JOD have stated in section 3 of the report that *"It is assumed that its* [southern arch] *condition is similar to that of the right-hand side arch"*. Given the age of the structure, the omission of a review of the southern arch and assumption of its condition is deemed an oversight.

Section 4.2 of JOD's report details a Modified MEXE analysis of the central and "side arches" of the bridge. This analysis has determined that the bridge has an axle capacity of 12.5T (assuming no axle lift-off). Again, this would be deemed a high-level conclusion and not a detailed estimation. The report only gives an axle capacity of the bridge based on the assumption that there will be no axle lift off, without any analysis undertaken on the likelihood of axle lift off occurring in multi-axle HGVs.

The Modified Mexe analysis is a limited engineering tool, which as described in section 1.5 of TII document 'AM-STR-06002-02 - The Assessment of Road Bridges and Structures':

> "*The modified MEXE method for arch assessment given in this document is a comprehensive method for determining the carrying capacity of single span brick and masonry arches in terms of allowable axle weights. The method as such is*

concerned solely with the strength of the arch barrel and takes account of the materials, various defects and geometric proportions which affect the strength of the arch. Factors are also given to take account of the effects of multiple axle bogies. The method is quick and simple to use and should be tried before more sophisticated methods of analysis are attempted."

The key points to note from this description are:

1. The modified Mexe analysis is to be used for single arch bridges – Garrouse bridge is a 3-arch bridge
2. The analysis method assesses the strength of the arch barrel only – it does not take account of the condition of spandrel walls, wingwalls, abutments, foundations etc.
3. TII recommend that this is a quick tool to use before more sophisticated analysis methods are utilised – this has not been carried out by JOD.

JOD's Engineering Inspection Notes, highlight a circumferential joint is visible through the arch which "may be a result of an historic widening of the bridge". Annex G of AM-STR-06002-02 describes when longitudinal cracks are observed that "worst case is that of a heavy wheel load located completely on a narrow barrel section which is separated from the bridge". The JOD report does not appear to take into account the influence of the 2 separate sections of the arch barrel.

JOD conclude their report by stating that "The Modified MEXE Method concludes an axle load capacity of 12.5 tonnes for the bridge in its current state." However, this is not a complete assessment as according to TII, "The strength of the bridge may be affected by the strength of the spandrel walls, wing walls, foundations" – none of which had a detailed review completed on them by JOD - as acknowledged in the body of its report.

JOD also conclude that "Our assessment indicates that the bridge is capable carrying the loads exerted on it by standard roadworthy vehicles." However, there's is no definition of what a standard roadworthy vehicle is. Local knowledge of the bridge that the "standard" traffic crossing the bridge are mainly cars, with some occasional agricultural vehicles and HGVs. However, during the lifetime of this project an estimated 7,845no vehicles (predominantly HGVs) will cross this bridge. This would be exacerbated on days when turbine bases are being cast when it is expected a HGV will cross the bridge every 6 minutes.

3.2 Garrouse Bridge independent review

The National Built Heritage Service [NBHS] has noted Garroose (Garrouse) Bridge is approximately 200 years old (estimated construction date: 1810-1830). It is a protected structure on the National Inventory of Architectural Heritage (site 21904703) and has a rating of 'Regional Importance'. The bridge is a 3 arch masonry structure which was widened to the downstream (western side) in the 19th century. Joints between the original structure and the bridge extension are visible along the arch barrel soffits. Repair work was carried out on the middle arch soffit as well as scour protection works in the 1920s. 2no masonry cutwaters are located between the Northern/Central arches and Central/Northern arches on the upstream (eastern side) of the bridge.

A visual survey of the bridge was carried out by BM, which included visual inspections of all 3 arches from within the riverbed and arches themselves (which was not completed by JOD). The findings of the visual survey are summarised below:

Northern Arch

The joint between the original bridge section and the extended section is visible along the arch (Figure 10). There is significant absence of mortar noted from between the arch stonework, particularly on the crown of the original bridge section. The magnitude of this missing mortar from the joints has led to severe degradation of the crown of the arch, to the extent that stones from the crown have fallen and been washed away, while other stone work was visibly loose and beginning to slide away from the crown (Figure 11).

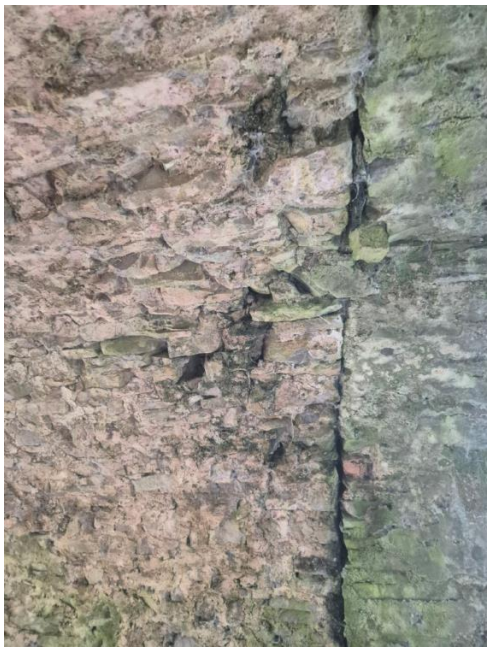


Figure 10 - Joint between arch sections

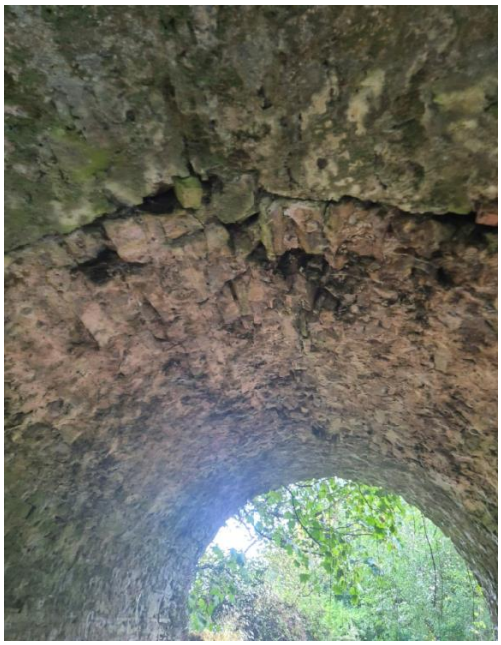


Figure 11 - Crown of Northern Arch

Mortar between the voussoirs on the downstream (western) elevation of the arch is missing and expected to have been washed out (Figure 12). The depth and full extent of the mortar loss is unknown at this stage; therefore, it is recommended that a full, in-depth review be carried out to determine the correct repair regime.

Figure 12 - Northern arch - western voussoirs

An absence of mortar was noted between the joints of the masonry units on the cutwater located between the central and northern arches. The extent of missing mortar was led to the opening of joints especially at the joint between cutwater and the spandrel walls. It is unknown whether the cutwater is positively connected to the spandrel walls and so the stability of the cutwaters should be reviewed fully.

Figure 13 - North/Central arch cutwater

Scour protection works (concrete lining) were added to the base of all arches in the 1920s (estimated). There is cracking visible on the scour protection works on the eastern edge of the North abutment (Figure 14). There is a small tree noted growing out of the base of the abutment, which according to local residents, has been growing for several years. It is expected that the cracking of the concrete lining has occurred due to the expansion of the growing tree roots.

Behind the tree, mortar was noted as missing from the voussoirs and adjacent stonework. There has been visible movement of this stonework, and it is expected that the movement has also been caused by the expansion of tree roots (Figure 15). Longitudinal cracking is also visible approximately 1m from the effected stonework. The development of tree roots can cause significant damage to structures, and it is unknown from the visual inspection what the extent of this tree root growth is. Given the structural importance of an arch's abutments, it is recommended that a full review of the tree and the damage it has potentially caused is investigated.

Figure 14 – Cracking of scour works

Figure 15 - Northeastern abutment

There is bulging of the stonework evident in the northeastern spandrel panel adjacent to the northern approach ramp. It is unclear whether this bulging was due to poor workmanship at the time of construction or due to spreading of the approach ramp. The cause and extent of this bulging should be investigated fully to determine its effect on the bridge and approach road.

Figure 16 - Bulging of northeastern spandrel wall panel

Central Arch

Visual review of the central arch (Figure 17) highlighted the previously discussed repair works which included:

1. Concrete lining to the soffit of the arch
2. Concrete scour protection works to the arch abutments

Figure 17 - Central Arch (facing North)

From the visual inspections, there is a joint in the repair lining located along the centreline of the barrel suggesting that the lining was formed in 2 sections (the joint does not align to the historical joint in the bridge structure). There are patches of degradation in concrete lining and along the joint, wherein the sand/cement matrix has been “washed out” leaving only stone aggregate visible (Figure 18).

Figure 18 - Concrete lining degradation

There is cracking evident in the concrete lining that aligns with the joint in the bridge structure. At the crown of the arch the crack is showing evidence of degradation to the extent that a hole has formed (Figure 19). It was not possible to investigate the hole fully at the time of review, so the full depth/extent of the hole is unknown. There is evidence of water egress through the hole, therefore full investigation of this should take place to the determine the extent of damage that may have occurred due to this water movement.

Figure 19 - Hole in concrete lining

Southern Arch

There is significant damage to the voussoirs at the south-eastern corner of the arch barrel. The masonry units have been dislodged, and a large crack has developed behind the stones. This crack propagates further up along the arch barrel, along the line of the spandrel wall. The river is known to flood regularly and carry debris through the arches during these occasions. It is possible the damage has occurred due to an impact caused by flood carried debris.

This type of damage could significantly weaken the edge of the arch and spandrel wall behind it and should be investigated fully to determine the extent of the damage and its effect on the structural adequacy of the northern arch.

Figure 20 - Southern arch voussoirs

Throughout the barrel of the arch there is evidence of degradation of the mortar in the stonework. In certain sections the degradation is to such an extent that stones are missing from the barrel.

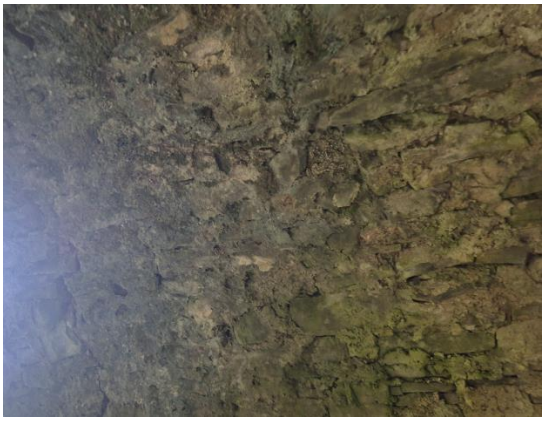


Figure 21 - Northen Arch barrel

Conclusion of bridge reviews

The independent visual inspection undertaken on the bridge highlighted several areas of significant deterioration and/or damage to bridge sections. Using the "Component Condition Rating System" as displayed in JOD's bridge inspection report, the independent review would deem the bridge to be a minimum "*Rating 3 – Significant Damage – Repair Needed Very Soon*".

Some significant /damage was noted on the southern arch of the bridge, an arch that was not inspected by JOD, but its report stated, "*It is assumed that its condition is similar to that of the right-hand* [Northern] *side arch*."

The JOD inspection consisted of:

1. a visual review of the northern arch,
2. a distant visual review of part of the central arch
3. no review of the southern arch
4. Modified Mexe analysis of the arches

This inspection is deemed a high-level and inadequate inspection and given the lack of in-depth analysis into major structural components of the bridge and assumptions on the bridge sections, a conclusion that the bridge is adequate cannot be drawn.

3.3 Bruree Bridge

Garrouse Bridge is the only structure that was reviewed as part of the planning submission. However, a desktop study shows that Bruree bridge is located along the route of the proposed one-way system from Entrance 2. As discussed above, in Figure 17.6 of JOD's report, 12 local construction suppliers have been identified. If the one-way system is to be fully adopted, HGVs to any of the 12no suppliers would have to cross the Bruree Bridge. The omission of a condition survey of the bridge is deemed a significant oversight given the fact that Limerick County and City Council [LCCC] have already submitted planning applications (Case reference: JP91.322242) to carry out much needed repair works on the bridge.

Bruree Bridge crosses the River Maigue to west of Bruree village. The river Maigue is a tributary of the River Shannon and flows directly into the Lower River Shannon SAC, a subject which has also been overseen.

Further to the road safety issues highlighted in Section 2 of this report, no road safety audit was undertaken as part of the submission on Bruree bridge on which the 2 approach roads are aligned to the bridge at 96^{O} & 99^{O} respectively (Figure 22).

Figure 22 - Bruree Bridge

3.4 Local Pipe Culvert

As noted in Section 2.5, a minor pipe culvert structure is located 350m to the south of Garrouse Bridge. No condition survey was carried out on this culvert as part of the planning submission. No condition survey was completed as part of this independent review however, it is noted in Section 2.5 that the road over and adjacent to the culvert is in poor condition.

The lack of a condition survey into this or the expected other minor structures along the proposed one-way route is deemed an oversight. While minor, these structures form a vital part of this link road and so should be surveyed as part of the submission to prove their adequacy in carrying the expected volumes of construction traffic.

4. Conclusion

A one-way haul route system has been proposed as part of the planning submission file, to carry the project's estimated 7,845no "normal" construction vehicles. The construction traffic is to access the site through Site Entrance 2 which is located on the L1537 – a "*3.0m wide single carriageway*".

BM would consider that the adequacy of this haul route cannot be positively determined from the submission due to the lack of in-depth interrogation of the route. The submission and proposed haul route are deemed inadequate due to the following:

- There is no indication of how that one-way system is to be enforced. It is expected that enforcement of the one-way system will be designated as the responsibility of the construction contractor, however, it is deemed a severe oversight that the safety of this 3.0m carriageway and enforcement methodology of the one-way system was not considered as part of the planning submission.

- No road structure review undertaken of the proposed one-way haul route. An independent review was undertaken as part of this report on a 1km section of the L1537 which noted several sections of settling, cracking and collapsing road structure. It is incumbent on GGE and its partners to prove that the road is structurally adequate and capable of carrying the expected volumes of traffic – if the road is inadequate then the windfarm construction traffic should not be allowed to use this route.

- Only one bridge review completed out of several potential structures. This was carried out on Garrouse bridge, a 200-year-old masonry arch structure, whereas no inspection was carried on Bruree bridge, another historic masonry bridge which has been noted for repair work by Limerick LCCC. Furthermore, no condition surveys were carried out on any minor structures on the route – it was noted during the independent road review that there was severe road degradation around a minor culvert structure. GGE should prove that all structures along the proposed haul route are adequate to carry the almost 8,000 expected constructed vehicles.

- JOD conclude the Garrouse bridge assessment by stating *"Our assessment indicates that the bridge is capable carrying the loads exerted on it by standard roadworthy vehicles"*. However, the JOD inspection of Garrouse Bridge consisted of a visual review of the northern arch, a distant visual review of part of the central arch, no review of the southern arch and a Modified Mexe analysis of the arches. According to TII, "The strength of the bridge may be affected by the strength of the spandrel walls, wing walls, foundations" – none of which had a detailed review

completed on them by JOD, and therefore it is not possible to draw a conclusion of the condition and adequacy of the bridge.

BM noted in an independent visual review of the bridge that there were significant areas of damage and/or deterioration of the bridge structure and, using the "Component Condition Rating System" as displayed in JOD's bridge inspection report, would deem the bridge to be a minimum "Rating 3 – Significant Damage – Repair Needed Very Soon". GGE should prove, following an in-depth assessment of the bridge, that the bridge is structurally adequate to carry the proposed construction traffic.

- A review of the junctions between the L1537 and R518 in Bruree Village and between L1537 and R515 were undertaken by JOD. However, the review of the junction between the L1537 and R518 was undertaken on an old junction layout. No review was undertaken on further critical junctions such as O' Rourke's Cross and Charleville main street. The omission of these junctions is considered a severe oversight given their significance on the N20:
    - There are plans in replace to replace the O Rourke's cross junction with a roundabout
    - A N/M20 Project office press release states "*the proportion of fatal collisions to all personal injury collisions on the N20 is four times higher than the national average*"

  GGE and its partners should prove that all junctions are adequate from both a junction turning aspect and a road safety aspect to allow the estimated almost 8,000 construction vehicles to use the junctions safely.

- No road safety audit completed on the proposed one-way haul road – even though a desktop study of the route highlights a series of sharp bends along the L1537. This is considered a significant oversight as the road is noted as a "*3.0m wide single carriageway*", which is in a predominantly residential and agricultural area. It is incumbent on GGE and its partners to consider the safety of the entire construction route and prove that the safety of the local road users is not affected. If this cannot be proven, then the road should not be adopted as a haul route.

Chapter 8. Noise, Vibration and Wind Regime

Prepared by:

Owen Culhane**:** Employed in the Process Engineering sector with fifty years' experience specifying and commissioning mechanical & process equipment for the Dairy, Brewery & Pharmaceutical industries

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The now outdated 2006 Guidelines, provided guidance on daytime and night-time noise limits, with separate noise limits for each period. the proposed approach adapts more stringent noise limits: it provides a relative rated noise limit of 5 dB(A)above above existing background noise within the range of 35 dB(A)to a maximum of 43 dB(A). Noise limits will be applicable for both daytime and night-time periods The noise limits are described as a 'rated 'limit and they will take account of certain noise characteristics specified to wind turbines (e.g.tonal,low frequency and amplitude modulation). Where these characteristics are identified, the noise limit permitted will be further reduced to mitigate for these noise characteristics.

Therefore, the predicted data provided on GGE submissions should reflect the true nature of the effect on Noise & Vibration on the sensitive receptors.

Section 11.6 Baseline Descriptions- Table 11.10: Baseline Noise Survey

In terms of baseline monitoring undertaken we consider that the location of the four monitoring locations as outlined in Appendix 11.1 of the EIS is unreasonable, not in accordance with best practice and does not correspond with the noise sensitive receptors. Two of noise monitors NML1/NML4 are located near the N20 (West) with MNL1 at the complying Landowner H28 farm. The other two MLS/ML4 are at the Eastern side, one at Garrouse bridge behind a derelict building (not a dwelling) and the other in Ballinagoul. therefore, they are considered to be unrepresented for the overall assessment of predicted noise levels – assessments should be based on the prevailing wind direction (mentioned only for H9) which is predominately from South West in Ireland. Locations to the Northwest of wind farms are more sensitive to noise impact.

In Garrane's Green Energy EIAR – section 11 – Noise and Vibration 11.2.3.7 they reference the IOA as the professional body in Ireland and the UK. in respect of Wind Farm Noise. In fact, the Association of Acoustic Consultants of Ireland (AACI) is the professional body for Environmental Noise Guidance in Ireland.

Due to repeated inconsistencies in its interpretation, the IOA UK was commissioned to produce updated guidance in how ETSH-R-97 should be applied. So, the IOA UK document *A good practice guide to the application of ETSU-R-97 for the assessment and rating of wind turbine noise (2013)* and the original ETSU document, represent current best practice.

Therefore, all current regulations are based on criteria derived from ETSU-R-97. This document has been undergoing a protracted review process for several years.

The current guidelines propose a setback distance for visual amenity purposes of four times the tip height between the nearest point of the curtilage of any residential property in the vicinity of the proposed development. Example a wind turbine with a tip height of say 170 mtr (172 within identified flood zone) will have to be at least 688 meters from the nearest dwelling (excluding H28). From their site map titled Sensitive Receptors within 2 km of the Site – scale 1:20 000 their example of H28 is 529 mtr from the construction site boundary, seems to be incorrect, so this would question the accuracy of H12,13 from T01: H6,7,9,10,11 from T02.

Interesting that their Operational Noise Assessment section 11.7.3 only mentions H28 (Landowner) and H9 as two noise sensitive receptors even though there are 21 other dwellings in same area are conveniently < 43 dBA.

Note1: GGE advise that the Hub Height selected for their V150-6.0 is 95 mtr, which they seem to have selected for EIA purposes, whereas the Vestas Web page gives the Hub heigh for this machine @105/125/155 m (see data sheet)

Note:2 Table 11:3 The specified dB rating for the V150-6.0 @ a wind speed of 8ms is 102.7dB - how is it possible with mitigation etc. to attenuate the predicted dB rating for example at sensitive receptor H13 @ 40.4dB which is 780 mtr. approx. from T1.

An interesting fact is an external fire alert alarm located at Charleville Fire Brigade Station with similar dB output to the V150 can be heard by the Sensitive Receptors within the 2 km area of the site

In the section **11.2.8 -Infrasound and Low Frequency Noise & Vibration** They state that Infrasound noise is always present in sources such as road traffic, water flow and household appliances etc and vibration in elements of structures e.g. climbing stairs walking on floors, closing doors etc ….

But to us all these sounds are transitory in nature and not intrusive, even the passing overhead of an Aeroplane at 35,000 ft….so how can the Turbine Industry insist that a Turbine Hub @ 95mtr.emitting 104.9 dB cannot be experienced downstream! Ref 11.1.2 "*Sound is simply the pressure oscillations that reach our ears"*

It seems that the sound power ratios of this machine (104.9 dB measured at 150mtr and 12m/s) are never considered and generally removed from any assessments, and concentrating only on tonal noise from blade sweep etc…

The current guidelines of minimum distance and dBA regulations are totally inadequate as demonstrated in recent debates on legislation like the Wind Turbine Regulation Bill 2025 which is currently before the Dail. This is one of the many recent attempts to update & regulate the onshore wind industry since the last version published in 2006, when turbines were significantly

smaller. Previously a revised draft was published in 2019, but never finalised due unresolved issues over noise levels, set back distances. shadow flicker control, mandatory community consultation amongst other guidelines, but was not acted on, due to lengthy and complexed public consultation!!

The negative health effects of wind turbines on local residents have been well documented all around the country. The current Wind Energy Development Guidelines were introduced in 2006 at a time when the average wind turbine was approximately 50 - 65 metres high. They also suggest a setback distance of 500 metres from a proposed turbine. These guidelines are no longer fit for purpose given that a huge proportion of turbines being erected now are between 150 - 190 metres in height.

Vibrations:11.7.4 GGE state "*Vibration from operational wind farms has been measured by extremely sensitive measurement equipment such as seismic arrays, but in terms of human perception, measured vibrations levels are well below perception thresholds even on the actual wind turbine sites. There is, therefore no need to access vibration affecting people from operational wind turbines developments " …***We beg to differ**

The rotational frequency of the rotor and its harmonics can contribute to vibrations that might lead to ultrasonic emissions., also from the electronic machinery in the nacelle section. There is evidence from people living and working near wind farms, (ref ABO Wind Energy V Byrne/Moorhead Wexford court case on "nuisance" issues caused by Gibbet Hill windfarm) that vibration of the rotating turbine blades produces infrasound noise that affects the body like the beat of a base drum. This can cause disturbed sleep, raised stress levels, heart palpitations and tinnitus not to mention the local farmers who are expected to carry out their daily duties in this agricultural area of the Golden Vale. We have visited the turbines in the Ballyhoura region and have experienced this phenomenon.

The maximum predicted construction noise levels **Table 11.14** are predominately centred around H28 (Landowner) for most of the construction activity. There is no account for the required pile driving required for the hardstands of T4,5,6,7 & 8 or the construction of the electrical substation two fields behind receptors H15 & H17 also for the construction traffic noise to be endured by receptor H 87 at the site 2 entrance

The low-frequency, "swishing," or "thumping" noises from turbine blades are more likely to cause annoyance and affect sleep. This effect is known as amplitude modulation (AM) caused by blade passing frequency (BPF) which is the turbine rotational speed for a typical three-bladed machine. While regular AM is a natural characteristic of a wind turbine sound, excessive amplitude modulation (EAM) can be more annoying to nearby residents with its sound pulses occurring three times for every rotation - its cause and effects being a focus of ongoing research and measures.

Delays in updating guidelines for wind farm development have now led to suspicion and distrust regarding the planning process.

The interaction of blade tips with the wind can generate high-frequency noise, including ultrasound, especially with certain blade designs or defects. Generally, the guideline distance between wind turbines is calculated at between 5 – 8 times (depending on wind direction) the rotor diameter to avoid downstream turbulence. Generally, some the Garrane Turbines are less than 400 mtr. apart! This poor positioning of the turbines - due to limited space available will also introduce a WAKE effect. See note

Note: This wake also contributes to "amplitude modulation" (AM), a characteristic of wind turbine noise where the sound pressure level fluctuates periodically. This can happen because the wake eddies cause periodic variations in aerodynamic noise generation and can modulate the sound from upwind turbines, potentially increasing noise annoyance. The wake effect can significantly reduce the overall efficiency of a wind farm. Turbines located in the wake of others produce less power due to the reduced wind speed and increased turbulence. This not only lowers the energy output but can also increase the wear and tear on these downstream turbines, leading to higher maintenance costs and shorter lifespans. To quantify the losses, wind farms may experience a major reduction in power output due to wake effects

Turbine Positioning in a major factor -

The calculated distance between many of these turbines is between 300 and 500 metres. This represents a multiple of 2.2 and 3.3 of the diameters of the turbine. All the industry literature recommends spacing of 3.5 to 5 times turbine diameter for rows of turbines facing the wind and 6 to 10 times the diameter spacing for turbines in the wind direction. The 2006 and 2019 guidelines recommend a 7 times diameter spacing downwind and a minimum 3 diameter spacing crosswind. The enclosed spreadsheet identifies 6 violations downwind and 5 violations crosswind of even the minimum spacing industry guidelines or 4 violations of the 2006 guidelines. Given that there are only 9 turbines in the array, 10 serious violations attest to the fact that these turbines are far too close together and no effort has been made by the developer to conform to recommended industry practice or the 2006 guidelines. (See matrix of turbine array distance calculation attached)

The percentages indicated in the spreadsheet are the % distances of what is recommended by the industry. The wind rose for the Ballinagoul Creggane and Garrane areas indicates that approaching two thirds of the wind is from the west to the south but regardless of the wind direction the turbines are so close together that they will always be waking each other and mostly downwind. There are two impacts from crowding the turbines as the developer has done:

- Loss of energy generation due to turbulence and reduced energy and:
- Significantly increased noise.

It is apparent the developer does not seem to care about low energy yield from the turbines as he has located the wind farm in a calm low wind location but crowding such as has been done here will further reduce energy yield from the array of between 30% and 40%. Industry literature indicates crowding array losses of between 20% and 40% but this intense crowding is at the higher end of the array losses. There is much controversy regarding the issue of noise emitted by wind turbines and the developer has committed to do everything possible to avoid noise impacts while contrarily stating that he will adhere to the unpublished 2019 setback guidelines of 4 times the height of an individual turbine, in this case 700 metres which in any event is widely perceived to be an insufficient setback distance. Turbines to the side or behind a leading wind turbine will experience the turbulent wind beside and behind it and the airflow being disrupted will create uneven mass striking the turbine and causing vibration and turbulent flow on the second turbine. The effect worsens as the air flow continues through the array. The noise signature from each individual turbine will be significantly increased by this irregular airflow and of course a receptor is going to experience noise from each turbine in the array that is close. This increased noise will include vibration and turbulent noise. Amplitude modulation in particular will be significantly increased with these array arrangements. The IOA method for measuring amplitude modulation, as suggested in IEC61400-11 will give results for a single turbine but is not fit for purpose for an array of turbines and the developer cannot say what the amplitude modulation increased noise will be. We only can be sure that the AM noise will increase and for this closely packed array significantly so. The noise guidelines will be breached very significantly by this array effect.

Turbine Array Distance Calculation

	Turbine Locations												
Turbine No.	Address per Application												
1	554494.1	626040.2		1	-	354.4	728.0	812.2	1,121.2	1,156.9	1,524.5	1,633.1	1,815.4
2	554357.5	626367.2		2	354.4	-	390.7	477.2	767.3	834.5	1,190.8	1,279.1	1,466.7
3	554070.3	626632.1		3	728.0	390.7	-	373.5	461.8	681.2	967.7	927.3	1,173.9
4	554377.9	626844		4	812.2	477.2	373.5	-	367.6	360.0	714.5	887.0	1,009.3
5	554106.9	627092.4		5	1,121.2	767.3	461.8	367.6	-	360.5	526.1	524.3	714.4
6	554452.1	627196.3		6	1,156.9	834.5	681.2	360.0	360.5	-	375.3	724.7	718.2
7	554351.8	627558		7	1,524.5	1,190.8	967.7	714.5	526.1	375.3	-	549.2	373.4
8	553803.9	627520.3		8	1,633.1	1,279.1	927.3	887.0	524.3	724.7	549.2	-	392.2
9	554072.6	627806		9	1,815.4	1,466.7	1,173.9	1,009.3	714.4	718.2	373.4	392.2	-

	Downwind Violations						Crosswind Violations					
	Turbine Number Downwind	Turbine Number Upwind		6 Times Diameter 900	7 Times Diameter 1050	10 Times diameter 1500		Turbine Number Crosswind	Turbine Number Crosswind	3 Times Diameter 450	3.5 Times Diameter 525	5 Times diameter 750
Violation	9	8	392.2	44%	37%	26%	Violation	6	7	375.3	83%	71%	50%
Violation	6	5	360	40%	34%	24%	Violation	2	3	390.7	87%	74%	52%
Violation	7	5	526.1	58%	50%	35%	Violation	3	5	461.8	103%	88%	62%
Violation	4	3	373.5	42%	36%	25%	Violation	4	5	367.6	82%	70%	49%
Violation	4	2	477.2	53%	45%	32%	Violation	7	9	373.4	83%	71%	50%
Violation	2	1	354.4	39%	34%	24%							

Ref 11.10 State of Significance states "*this section has assessed the significance of the potential effects of the project during operation, construction and decommissioning"* and concludes with *"Noise during construction of the Project and decommissioning will be managed to comply with best practice, legislating and guidelines current at the time so that effects are not significant* " - but with the absence of proper Legislating, this is an empty statement… for instance – as a noise survey effected by L.Huson & Associates & completed between 12th Sept and 30th Sept 2025, at receptor /dwelling R42 D274, demonstrated that the Cloghan Wind Farm was **not** compliant with the permitted noise emissions as the 43dB$A_{L90(10min)}$ was exceeded in the morning of the 15th Sept 2025.

Poor wind regime in proposed location

There has rightly been a sharp focus on the health dangers posed by proximity to wind turbines and this submission questions why a community should be exposed to these serious risks to life and health for so little return.

In the preamble to the Limerick County Development Plan the Chief Executive states "The Submission by the Irish Wind energy Association recommend that the SEAI wind atlas or any similar general wind resource data not be used as a constraint when developing and zoning areas for renewable energy development"

Thus, the LCCC development map that is the basis for wind development locating in Ballinagoul , Creggane and Garrane (B C G) townlands, ignored science-based data that clearly indicates that this area has a poor wind regime for wind energy generation and is altogether unsuitable for a wind plant. This recommendation to LCCC was provided by a lobby group who's sole interests in getting wind turbines into the ground. When the atlas (or any similar reference atlas) is consulted it is immediately apparent that the wind regime is weak. A copy of the wind atlas for the limerick area is appended to this submission. For reference bright colours indicate higher wind speeds and the darker colours (blue) indicate lower wind speeds. Examination of the Limerick area on the atlas reveals two things:

The BCG Townlands area is in the dark zone of the atlas showing wind speeds at 100 mtr.height above ground of 7 to 7.2 metres per second. (Fig 2)

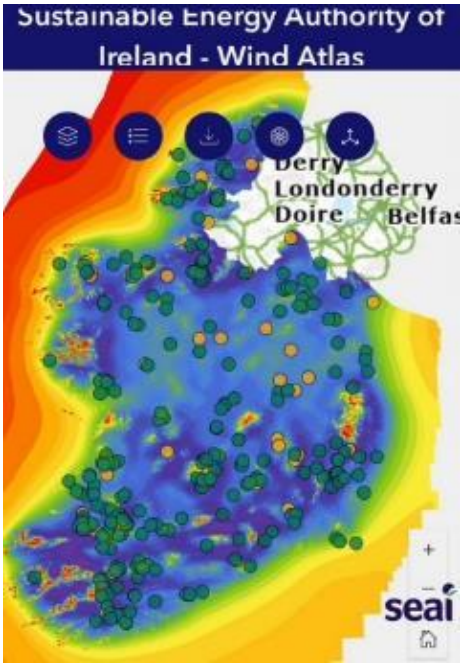
Existing wind farms in the region are located in the brighter faster wind location with wind speeds typically in the 8.5 to 8.7 metres per second speed. (Fig 3)

Accordingly, BCG Townlands area wind is 82.5% of the average for the other fleet of wind farms. Under the turbine energy capture formula, the energy generated by a windmill is a function of the cube of the wind speed and

therefore the BCG area generation will be 56.1% of the average for the fleet of windfarms. Publicly available information on wind energy in Ireland put the Irish wind fleet national capacity factor, which is the amount of energy produced by a wind turbine as a percentage of the theoretical maximum at 23.5%., This suggests that the capacity factor of the Garrane Wing farm will be a measly 13.18% . BCG Townlands area wind has other disadvantages in its prospects for wind energy capture.

In an effort to capture SID treatment by exceeding 50 Mega Watts of capacity the turbines are too close together and will “wake” each other. That is to say the wind will be disturbed on striking the first turbine and will be turbulent when striking the following turbines behind and beside. This array wake effect will further reduce the capacity factor at Garrane Wind Farm. Again, in an effort to capture SID treatment the developer is utilising 6.0 Mega Watt turbines. Huge, with more inertia and requiring higher wind speeds for cut in and operations and thus again reducing capacity factor. The blade sweep from top to bottom is 150 metres. The wind speed will be different from the bottom to the top of the capture area further reducing the performance of the turbine. This is an issue for all wind turbines but is especially so for turbines of the size where the vertical sweep is such a large distance.

The onus is on An Coimisiún Pleanála to reject the planning application for the Garrane Wind Farm on the grounds that it is based on flawed science and of no benefit to the local community or the Irish consumer while greatly increasing health risks for the local community.



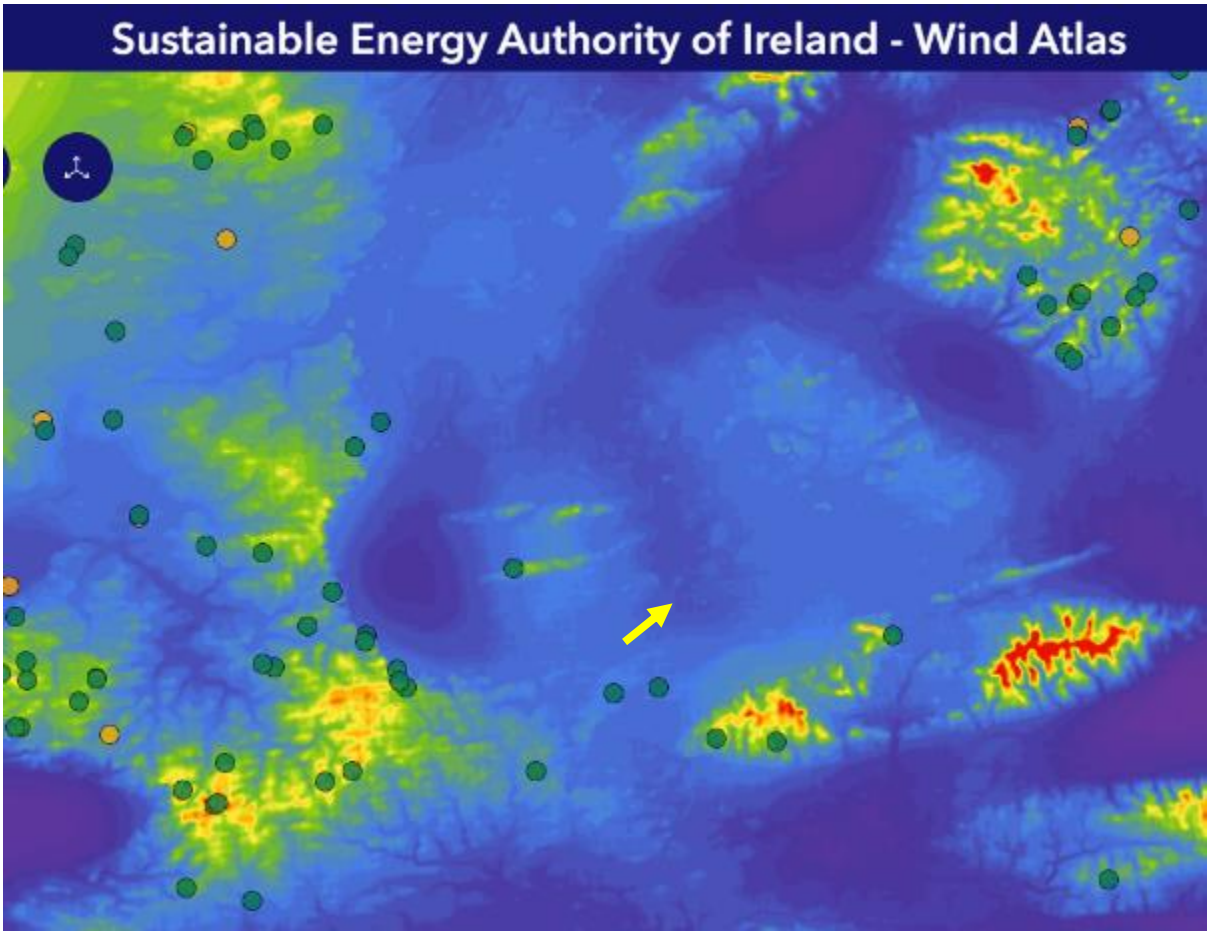


Fig 2 - Co. Limerick area, arrow showing Garrane. Dots indicate windfarms as of 2024

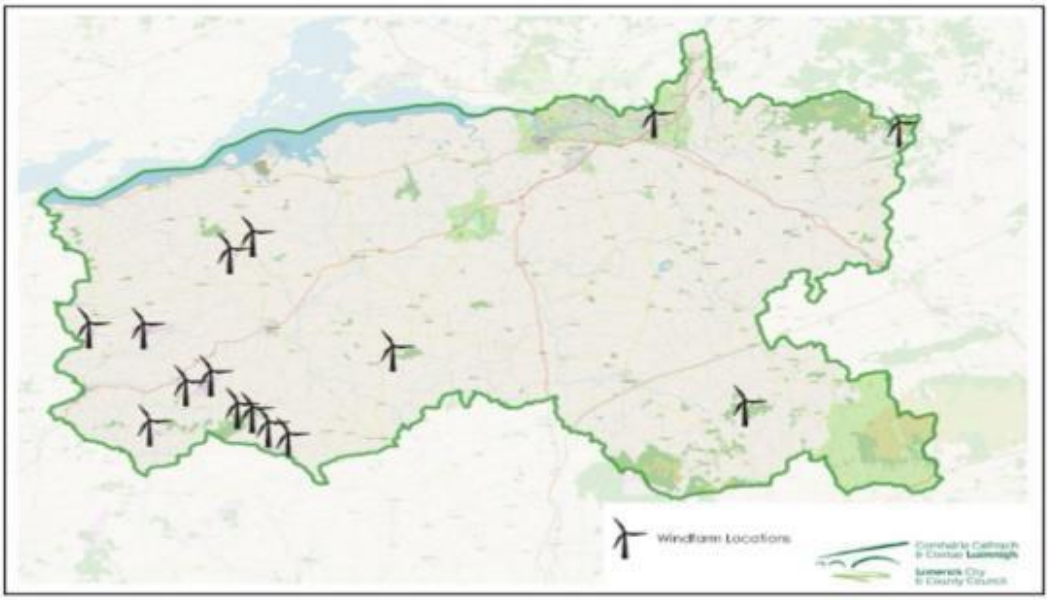


Figure 3 – Location of Windfarms in Limerick

Technical specifications Vestas V150 – 6.0 MW

Power regulation operational data

Pitch regulated with variable speed

Rated power 6,000kW

Cut-out wind speed3m/s

Cut-out wind speed25m/s

Wind class IEC S

Standard operating temperature ranges from -20°C* to +45°C

>>SOUND POWER - Maximum 104.9dB(A)**

ROTOR

>>Rotor diameter150m

Swept area17,672m2

Aerodynamic brake

full blade feathering with 3 pitch cylinders

ELECTRICAL Frequency 50/60 Hz

>>TOWER Hub heights: -105 m (IEC S), 125 m (IEC S/DIBt S), 148 m (DIBt S), 155 m (IEC S) and 166 m (DIBt S)

Chapter 9. Shadow Flicker analysis

9.1. Introduction

We formally object to the proposed **Garrane Green Energy Project** (GGE) on the grounds of **significant adverse impacts caused by shadow flicker**, as identified in the Environmental Impact Assessment Report (EIAR), *Chapter 14: Shadow Flicker* (August 2025).

9.2. Grounds for Objection

9.2.1 Breach of 2006 Wind Energy Development Guidelines

According to the **2006 Guidelines** issued by the Department of the Environment, Heritage and Local Government, "Careful site selection, design and planning, and good use of relevant software, can help avoid the possibility of shadow flicker in the first instance. It is recommended that shadow flicker at neighbouring offices and dwellings within 500m **"should not exceed 30 hours per year or 30 minutes per day"**

At distances greater than 10 rotor diameters from a turbine, the potential for shadow flicker is very low. *(Page 33, 5.12 Shadow Flicker Para 3 & 4) Wind Energy Development Guidelines 2006* .

However, the EIAR's own modelling shows that:

- **40 sensitive receptors** (38.28%) within the **1.5 km study area (10 rotor diameters from a turbine)** are predicted to **exceed 30 minutes of shadow flicker per day** *(Page 14, Para 3)*.
- **5 sensitive receptors** (4.42%) (**H6, H7, H8, H9, and H28**) are predicted to **exceed 30 hours of shadow flicker per year** *(Page 14, para 3)*.
- **6 sensitive receptors are predicted to reach or exceed one hour per day.**

This represents a **direct breach** of established national planning guidelines.

9.2.2 Failure to Align with 2019 Draft Revised Guidelines

The **2019 Draft Revised Wind Energy Development Guidelines** aim to **eliminate** negative shadow flicker entirely. Where this cannot be achieved, they require:

"Automated turbine shut-down to eliminate shadow flicker should be required as a condition of a grant of permission" *(Page 7, Para 1)*.

The EIAR shows that **73 out of 113 sensitive receptors** will still experience shadow flicker, despite proposed mitigation *(Page 20, Para 2)*. This demonstrates a **failure to comply** with modern best-practice standards.

9.2.3 Flawed Calculation Method

The WTG table in Appendix 14.1 (p.1) fails to take into account that the wind turbines will be different heights. As pages 9 and 11 of Chapter 2 and page 91 of Chapter 10 state, **all turbines within the flood zone (i.e. the majority of turbines in Garrane windfarm) will be placed on plinths. This means that these turbines will be more than 170m tall. This is not factored into the WTG table.** The hub heights for all nine turbines are given as 95m and the altitude values (Z values) have not allowed for the plinths that they will be placed on; the Z values given are simply the altitude of the land as it is.

The failure to take this height variation into account in the shadow flicker calculation conflicts with An Bord Pleanála's instructions at pre-planning meetings. The minutes of Garrane Green Energy's second pre-application consultation on 6 September 2024 include the following important point:

> ***"The Board's representatives also noted that the difference in levels of a number of the proposed turbines, to address flood levels on the site, should be reflected in the consideration of other factors such as visual impact and ornithology"***
> (https://www.pleanala.ie/anbordpleanala/media/abp/cases/records/319/p319139b.pdf?r=655360794949).

Shadow flicker can be considered an aspect of the "visual impact" of wind turbines, and if it is not it would certainly fall under "other factors". It is obvious why the Board would have made the above stipulation: if one wind turbine is higher than another, then it will throw a longer shadow than the other. The failure to factor this difference into the calculation of shadow flicker is a fundamental mistake. It invalidates the calculation of shadow flicker for all turbines in the floodzone, i.e. the majority of wind turbines in the windfarm.

Separately, the EIAR states the limitations of its own modelling based on averages "The expected daily shadow flicker cannot be predicted as this depends on multiple variable factors such as wind direction, wind speed, cloud cover and sunshine. These factors cannot be accurately predicted to give an expected minutes of shadow flicker per day. The maximum scenario in this assessment is based on the average sunshine and average wind direction for the site" (14.2.6 Page 14, para 3)

Appendix 14.1 Shadow Flicker Analysis **(page 5**) of the EIAR shows the worst and best case scenarios for the total annual number of hours of shadow flicker produced by each turbine.

Total amount of flickering on the shadow receptors caused by each WTG

No.	Name	Worst case [h/year]	Expected [h/year]
1	T01	405:17	76:50
2	T02	357:03	70:49
3	T03	192:45	37:38
4	T04	256:06	54:39
5	T05	253:04	51:41
6	T06	204:32	39:30
7	T07	269:39	46:30
8	T08	196:10	32:52
9	T09	289:20	48:23

The variance between the two is huge in the worst case the wind farm produces 2424 hours of shadow flicker annually, in the best case it produces 458 hours annually.

9.2.4 High Impact on Closest Properties

- Sensitive receptor **H28**, located **529 m** from turbine **T03**, is expected to experience **up to 1 hour and 6 minutes of shadow flicker per day** *(Page 20, Para 2)*.
- Sensitive receptors **H6**, **H7**, **H8**, and **H9** will also experience **between 33 and 41 hours of shadow flicker annually** *(Table 14.4, Pages 15–20)*.

These exceedances significantly affect **residential amenity** and **contradict national policy thresholds**.

9.2.5 Amenity and Wellbeing Concerns

The EIAR acknowledges that shadow flicker may cause **"disturbance and annoyance to residents"** *(Page 5, Para 1)*.
Furthermore:

- Although the report claims turbine flicker frequencies (<1 Hz) are below thresholds for photosensitive epilepsy, **residents with heightened sensitivity to light** remain at risk. E.g. visually induced vertigo
- Prolonged exposure could **impact mental wellbeing, quality of life, and property enjoyment**.

There has been no mention in the report of any possible impact on those driving on the N20, the area from Rourke's Cross to Charleville is a known accident black spot with multiple side roads, farm access points and private dwellings exiting and entering the N20. Residents of receptors H24 – H35 all access and exit their homes directly from the N20 all 12 of these receptors exceed the 30 minute daily allowance. The added distraction of shadow flicker as the residents/users try to turn out of or into these receptors could increase the number of road collisions on this stretch of road. Similarly on the L1537 residents/users of 19 receptors H1-H18 and H85 all exceed the 30 minute allowance and could face increased risk of distraction by shadow flicker when trying to enter or exit their homes.

While 5 farms have signed up to the wind farm and will be compensated for any inconvenience suffered. There are numerous working farms along both the N20 side and L1537 side of the proposed wind farm. These farms will be affected by shadow flicker throughout the day as they move from field to field operating heavy machinery while stationary or very slow moving.

The development of the wind farm in such a densely populated area disrupts the quite enjoyment of the of homes of residents with health concerns or sensor issues. Several families along the L1537 have children or adults with sensory issues, they have chosen to live in a rural area to ensure limited sensory exposure. Exposure to shadow flicker both in the home and outside will decrease their quality of life. Residents in the area with visually induced vertigo may find the area unliveable.

Residents living in rural areas tend to spend considerably more time outdoors then their urban counterparts. Shadow Flicker especially in the summer months will impact residents ability to enjoy outdoor dinning, sun bathing, etc. The L1537 is used daily by residents for leisure and exercise, there is are significant number of bird watchers and fishing enthusiasts on the road whose experiences will be impacted by shadow flicker.

9.2.6 Impact on Sustainable Development

There are 5 derelict houses within 1 km of the proposed Wind Farm H178, H179, H128, H29 and H30, there is a housing shortage in the Charleville Bruree area and planning in the area has been very restrictive to new builds to preserve the existing rural aesthetic.

The current government is providing grants to encourage the refurbishment of derelict homes, the development of the wind farm and the impact on these homes being affected by shadow flicker will further hinder redevelopment.

Farm families who want to give land to their children for home building will now have to contend with the impact of shadow flicker as well as other wind farm nuisances preventing families from staying in the area.

9.2.7 Overreliance on Mitigation Measures

The proposal relies on **automated turbine shutdown systems** to control shadow flicker *(Pages 21-22 14.2.9.3)*.
This raises concerns because:

- If the systems malfunction or are **not properly maintained**, significant breaches of guideline thresholds **will occur**.
- No independent monitoring framework is proposed to ensure compliance.

Given the **high number of receptors affected**, reliance on mitigation introduces **substantial uncertainty**.

The EIAR states in 14.2.9.3 (page 22 para 1) When the control system detects that the sunlight is strong enough to cast a shadow, and the shadow falls on a sensitive receptor or sensitive receptors, **then the turbine will automatically shut down; and will restart when the potential for shadow flicker ceases at the effected sensitive receptors**. However in (page 22, para 2) it further states The proposed method of mitigation will be implemented to mitigate shadow flicker effects at all sensitive receptors within the study area, **allowing for a short period of time for the rotor to come to a stop.** Appendix 14.1 contains all calculated potential shadow flicker periods for each turbine. The relevant data will be input into the turbine control software. In the event that complaints of shadow flicker are received by the Developer / site operator or by Limerick City and County Council, **the Developer will conduct an investigation and the complaints frequency, duration and time of complaints will be considered and specialist modelling software will be used to confirm the occurrence(s). Should the complaint persist, a shadow flicker survey involving the collection of light data will also be carried out at the sensitive receptor in which the complaint was made.** Further refinement of the blade shadow control system will be conducted to mitigate negative shadow flicker occurrence.

This is very much dependent of the good will of the **GGE** to fully implement the control systems, the potential difference in hours of shadow flicker produced by turbine T01 alone is 329 hours between the calculated worst case scenario 405.17 and the expected 76:50. Having that 1 turbine shut off, for up to an additional 329 hours would have a significant impact on the companies profitability. The worst case scenario for one year of shadow flicker at the wind farm is 2424 hours.

Byrne & Anor V ABO Energy Ireland Limited & Ors, The court has ordered the shut down three turbines of a 6 turbine wind farm, due to the impact of noise nuisance and shadow flicker on the plaintiffs home 1050m from the nearest turbine. Initial planning permission was granted on the basis mitigation measures being put in place. However the defendant

did not implement mitigation measures despite the residents and local council's numerous reports to them of both noise nuisance and shadow flicker they had refused to engage.

Under the EIA Directive (2011/92/EU as amended by 2014/52/EU), the applicant is required to provide a detailed mitigation plan for any identified significant environmental effect. In this case, where shadow flicker has been identified as an impact, the mitigation must include full elimination of shadow flicker in accordance with both HSE guidance and An Coimisiún Pleanála precedent in case reference 321285 (Lackareagh Wind Farm, decision dated 11 July 2025).

No where in the submission by Garrane Green Energy Ltd have they shown despite having calculations showing the month, day, hour and minute each turbine will produce shadow flicker they will not programme the turbines to shut off but will rely solely on the control system to detect sunlight strong enough to cast a shadow. They have also not provided any detailed information on the software model they will be using. Again under the EIA Directive (2011/92/EU as amended by 2014/52/EU), to ensure that mitigation is both effective and enforceable, the applicant must provide accurate and transparent details of the shadow flicker control system, including the specific calendar dates, times, and turbine shutdown periods required to achieve compliance. Without such detailed information, the mitigation cannot be considered robust or verifiable under the requirements of the EIA Directive.

9.3. Legal and Planning Considerations

Guideline	Requirement	EIAR Findings	Result
2006 Guidelines	≤ 30 mins/day, ≤ 30 hrs/year	40 receptors exceed daily limits; 5 exceed annual limits *(Table 14.4)*	**Non-compliant**
2019 Draft Guidelines	Zero negative shadow flicker	73 receptors affected	**Non-compliant**
Health & Amenity	Avoid material adverse effects on residents	1+ hr/day flicker for H28, 40+ hrs/year for H8	**Negative impact**

9.4. Request for Refusal of Permission

We contend that **Garrane Green Energy** have not carried out "Careful site selection, design and planning," as per the 2006 guidelines in selecting this site. 73 receptors of 113 will be negatively impacted failing to align with the 2019 Draft Revised Guidelines and 40 will exceed daily allowances with 5 exceeding annual allowances per the 2006 Guidelines. They

have not complied with EIA Directive (2011/92/EU as amended by 2014/52/EU), in providing a detailed information of the shadow flicker control system.

Moreover, the shadow flicker calculation for all turbines located in the floodzone are likely to be underestimates. As Garrane Green Energy itself has said, all turbines within the floodzone will be placed on a plinth, meaning that their overall height will in fact be greater than 170m. This has not been factored into the shadow flicker calculation. This goes against An Bord Pleanála's direction in the second pre-planning meetings that this height variation needs to be taken into account when assessing the visual impact of the turbines. As such, the calculations for wind turbines in the floodzone cannot be considered valid.

Given the above findings, we respectfully request that **An Coimisiún Pleanála**, r**efuse permission** for the Garrane Green Energy Project **as currently proposed**

9.5. Supporting References

- EIAR, *Chapter 14: Shadow Flicker* (August 2025)
- Table 14.4, Pages **15–20**
- Section **14.2.6** *(Pages 13-14)*
- Section **14.2.9** *(Pages 21–23)*
- Appendix *14.1*

Appendix A — Sensitive Receptors Affected by Shadow Flicker

Supporting Document for Objection Letter
Source: EIAR, Chapter 14: Shadow Flicker (August 2025), Table 14.4 (Pages 15–20)

This appendix lists:

1. **Receptors exceeding 30 hours per year** (breach of 2006 guidelines).
2. **Receptors exceeding 30 minutes per day** (breach of both 2006 and 2019 draft guidelines).

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1. Receptors Exceeding 30 Hours/Year

(Direct breach of 2006 & 2019 Draft Guidelines)

Receptor ID	Distance to Nearest Turbine	Turbine ID	Expected Annual Shadow Flicker	Guideline Limit	Exceedance	Page & Table Ref
H6	727 m	T4	**33 hrs 03 mins**	30 hrs/year	+3 hrs 03 mins	p.15, Table 14.4
H7	709 m	T4	**34 hrs 00 mins**	30 hrs/year	+4 hrs 00 mins	p.15, Table 14.4
H8 *(agricultural sheds)*	708 m	T4	**40 hrs 57 mins**	30 hrs/year	+10 hrs 57 mins	p.15, Table 14.4
H9	704 m	T2	**37 hrs 38 mins**	30 hrs/year	+7 hrs 38 mins	p.15, Table 14.4
H28	529 m	T3	**30 hrs 38 mins**	30 hrs/year	+38 mins	p.16, Table 14.4

These five receptors **breach both existing and draft regulatory thresholds**.

H8 are working farm sheds

2.Receptors **Exceeding** 30 Minutes/Day

This appendix lists all sensitive receptors predicted to experience more than 30 minutes/day of shadow flicker exposure, representing a breach of the 2006 Wind Energy Development Guidelines. Data extracted from EIAR Chapter 14, Table 14.4 (Pages 15–20).

Receptor ID	Distance (m)	Turbine	Max Daily Flicker (mins)	Limit (mins)	Exceedance
H1	893	T7	42	30	+12
H2	792	T7	47	30	+17
H3	761	T7	49	30	+19
H4	781	T7	57	30	+27
H5	797	T6	47	30	+17
H6	727	T4	57	30	+27
H7	709	T4	64	30	+34
H8*	708	T4	70	30	+40
H9	704	T2	65	30	+35
H10	722	T1	53	30	+23
H11	795	T1	52	30	+22
H12	839	T1	42	30	+12
H13	757	T1	48	30	+18

H14	867	T1	41	30	+11
H15	891	T1	41	30	+11
H16	956	T1	38	30	+08
H24	884	T3	41	30	+11
H25	804	T3	42	30	+12
H26	811	T3	41	30	+11
H27	883	T3	37	30	+07
H28	529	T3	66	30	+36
H29**	735	T3	42	30	+12
H30**	703	T3	50	30	+20
H31	807	T8	44	30	+14
H32	774	T8	49	30	+19
H33	702	T8	63	30	+33
H34	709	T9	60	30	+30
H35	722	T9	53	30	+23
H75	1198	T9	31	30	+01
H76	1172	T9	32	30	+02
H78	1192	T9	31	30	+01
H79	1171	T9	31	30	+01
H80	1107	T9	34	30	+04
H81	1159	T9	31	30	+01
H82	1137	T9	32	30	+02
H83	1096	T6	31	30	+01

Notes:
*H8 is an agricultural shed.
**H29 and H30 are derelict.
All values sourced directly from EIAR Chapter 14, Table 14.4 (Pages 15–20).

Chapter 10. Population and Human Health

Prepared by:

Catherine Selley
RNID - Registered nurse for people with Intellectual Disabilities.
BSc - Health Care Studies.
PGDip - Care Services Management
MSc - Nursing Dementia Care.

39 years working in clinical care and various management roles. Currently working as a Service Manager and Person in Charge under HIQA (Health Act 2007). 7 years managing residential and community services for people with physical, sensory and neurological disabilities.

&

Niamh Kelleher
BCL - Bachelor of Civil Law
LLM - Master of Laws (Criminal Justice)

19 years working as an advocate for people with disabilities, legal research and as a policy manager pertaining to health inequalities policy.

We wish to formally object to the planning application for the proposed wind farm of Garrane Green Energy (Coimisiún Pleanála - Case reference: PAX91.323635) on the grounds outlined below pertaining to population and human health grounds.

Our concerns relate specifically to the impact the proposed development will have on the health of the local population, the local environment and the cumulative impacts on the local community, heritage, tourism and landscape.

We believe this application lacks sufficient assessment or mitigation of impacts on the population, on tourism and will create severe visual intrusion in a rural landscape of significant amenity value.

The scale and height of turbines proposed (170+ m) and associated heavy traffic routes through Bruree, and adjacent roads will add further harm and disruption for local residents, particularly residents with additional needs.

Furthermore, in light of ABP-317809-23 (Coolglass), where An Bord Pleanála refused permission due to conflicts with landscape/ecology, we submit this proposal should likewise be refused because the applicant does not demonstrate that the environmental and heritage harms are outweighed by verifiable overall public benefit.

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1) Public Health Impacts

We wish to begin with reference to the HSE recommendations in chapter 5 as part of their pre-planning consultation on population and human health. The HSE made a number of recommendations, amongst them:

- No dwelling should be exposed to shadow flicker." (ch.5 p 12)
- All parties affected by the proposed development must be fully informed of what the proposal entails especially with regard to potential impacts on surrounding areas.
- That the EIAR should clearly demonstrate the link between public consultation and how these consultations have influenced the decision-making process in the EIA.
- The EIAR must consider the potential impacts for noise and vibration and of all proposed mitigation measures to minimise noise and vibration.
- The Cumulative impacts - any existing or proposed wind farm developments in the vicinity should be clearly identified in the EIAR.

In response to these recommendations, we suggest that the applicant **has not met the criteria as laid out by the HSE in a number of areas and therefore argue that the proposed development does not meet the standards required under a full and accurate EIAR** as required under the EU Environmental Impact Assessment (EIA) Directive. Nor has the applicant demonstrated adequate mitigation or a clear, material climate or community benefit that would outweigh these local impacts.

- In relation to **cumulative impacts** the HSE note that existing and proposed wind farm developments should be included in the EIAR. In FIGURE 2.1 the applicant appears to omit he proposed wind farm development in Balinsky which is within 20km of the proposed site for the Garrane Green Energy (GGE) farm. The applicant also notes that the construction of an anaerobic digestion facility to produce renewable biomethane has been refused but it is important to note that this application is currently under appeal.

  The applicant therefore does not give a full assessment of the cumulative effect of proposed and existing wind farm developments. In so doing the application, we believe, fails to meet the standards required by the HSE re cumulative impacts and it lacks sufficient assessment or mitigation of cumulative impacts on the historic landscape vital for local tourism and protected ecological species.

  Furthermore, we contest that the cumulative effect of all existing and proposed developments will create severe visual intrusion in a rural landscape of significant amenity value.

  Under the Planning and Development Act 2000 (as amended) and associated regulations, planning authorities (local councils) must consider: "the proper planning and sustainable development of the area" which includes environmental, social, and economic effects. Full

consideration needs to be given to the overall impact of the number of developments proposed and existing within 20km of the proposed wind farm including in addition 2 large phone masts and 2 solar farms.

There is growing evidence that cumulative exposure from multiple wind projects can in fact increase population health risks.[i]

- **We contest that the shadow flicker** recommendations from the HSE that no dwelling should be exposed to shadow flicker are not adequately addressed by the applicant. As noted in our full review of the shadow flicker chapter, the Garrane Green Energy Project shows extensive shadow flicker exceedances, with 40 receptors above daily limits and 5 above annual limits — directly breaching the 2006 Wind Energy Guidelines (WEG) and failing to meet the 2019 draft requirement for zero flicker and the HSE recommendations. The proposal would significantly impact residential amenity and relies heavily on unverified mitigation systems.

  Of note An Coimisiún Pleanála (case reference 321285 Lackareagh Wind Farm, decision dated 11 July 2025), recently required the elimination of shadow flicker as a condition of permission for a wind farm. This establishes a clear and contemporary standard of expectation in the assessment and regulation of wind energy developments. Accordingly, any proposal that permits the continued occurrence of shadow flicker would represent a departure from emerging national practice and would contravene the HSE's own recommendations as per this application.

  Also, of note and concern to local residents the EIAR does not undertake any assessment of the impact of shadow flicker on the enjoyment of the outdoors by residents, a significant attraction to those who chose rural living, or of the impact on the large number of motorists using the N20 route daily.

- The EIAR does not demonstrate a clear link between **public consultation** and the design of the development, as the public consultation was not sufficient in our opinion. Extensive evidence has been presented on the public consultation process as part of this group's submission, but we note here that GGE's communication strategy falls far short of recognised standards for community and stakeholder engagement, particularly in the context of The United Nations Aarhus Convention 1 Convention on Access to Information, Public Participation in Decision-Making and Access to Justice in Environmental Matters. (1998) The Convention is the only international legally binding instrument giving the public broad and concrete rights of participation in decision-making and access to information and justice regarding the environment and was ratified in Ireland in 2012.

Despite public claims of open dialogue, in our group submission we contend that GGE failed to provide clear, transparent, or inclusive communication- exclusion of affected residents, refusal to attend public meetings, and disregard for people with additional needs. This approach we believe breaches SEAI and Wind Europe principles of respect, transparency, and equality, demonstrating that the project lacks a social licence to operate.

Furthermore An Bord Pleanala's Senior Planning Inspectors report (6th Jan 2025) pertaining to this development states that "the potential arises for significant effects to arise on the area of more than one planning authority as a result of impacts on factors such as traffic, visual and amenity considerations," and yet we contest that the application lacks sufficient evidence of consultation with and considerations of the neighbouring municipal area of Charleville.

- **Noise**. This is also referenced extensively elsewhere in this groups objection, where we set out how the construction traffic and noise, are under-assessed, and outdated under the 2006 WEG and are wholly inadequate for turbines of the scale proposed. We would also like to note that Updated World Health Organisation noise pollution guidance from 2024[ii] considers wind turbines in the context of noise pollution. The Guideline Development Group (GDG) conditionally recommends that average noise exposure from wind turbines be kept below 45 dB Lden at the most exposed façade, outdoor[iii] and this should be reduced if possible.

  While the applicant states that it is 'reasonable to conclude that the annual average noise output from wind turbines in Ireland will be sufficiently lower than the maximum rated sound power to be consistent with the WHO guidelines", we do not believe that this is sufficient, due to the inadequacy of the baseline assessments and modelling undertaken. We would note that in rural areas, the background noise tends to be low; so even modest turbine noise can be more intrusive. The Communities and Environmental Protection Alliance (CEPA) recommend a relative rated noise limit for wind-turbine developments of not more than +5 dB(A) above existing background noise, within the range of 35 to 43 dB(A), with 43 dB(A) identified as the upper permissible limit. CEPA also suggest that there should be ongoing monitoring of noise from wind farms in Ireland, particularly given the many variables that can exist in terms of impact.[iv]

  We reference recent case law below where it was acknowledged by the High Court that noise from turbines can cause significant impacts on residents up to 1km from the nearest turbine and therefore contest that more accurate noise assessments are required to avoid similar impacts on local residents in the area.

In light of all of the above and our evidence across this submission we contest that the applicant has not demonstrated sufficient mitigation measures and consultation

processes within its EIAR, as recommended by the HSE, in order to engage with and protect local residents.

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2) Local Population Health:

2.1 Population Health

In the absence of full pre-planning public consultation and a baseline health assessment, the local population remains significantly concerned about the health impacts of the proposed wind farm development.

Within the planning application, no evidence of a **baseline health assessment** of the local population is presented. Establishing a verifiable record of community health prior to the construction or operation of turbines is important, particularly given concerns of residents who are neurodiverse or have additional needs.

This approach aligns with the precautionary principle emphasised in the WHO Environmental Noise Guidelines (2018) which states “Decision-makers should consider the health impacts of noise in environmental assessments, particularly for vulnerable populations.”

Furthermore, under the EU Environmental Impact Assessment (EIA) Directive (Directive 2011/92/EU, as amended by Directive 2014/52/EU), projects likely to have significant effects on the environment must include an assessment of effects on human health. Article 3(1) of the Directive requires that the EIA identify, describe, and assess the direct and indirect significant effects of a project on: “population and human health; biodiversity; land, soil, water, air and climate; material assets; cultural heritage; and the interaction between these factors.”

Accordingly, we believe the assessment of human health impacts cannot be limited to more basic measurements of noise or shadow flicker. Instead, it must involve a systematic Health Impact Assessment (HIA) that considers both physiological and psychological effects on affected populations.

Accordingly, a robust Environmental Impact Assessment Report (EIAR) for the applicant’s wind farm development should:

- Assess potential impacts on human health in accordance with the EIA Directive; and

- Incorporate, or be supported by, a formal Health Impact Assessment (HIA), informed by the WHO 2018 recommendations.

The applicant’s EIAR, however, relies on more generic data from the CSO rather than providing a more detailed and robust analysis of the health of the local population. We do not believe this to be sufficient to determine likely impacts on the local population.

2.2 Case Law

Recent court cases and reports that people living or working close to industrial wind turbines often report symptoms including decreased quality of life, annoyance, stress, sleep disturbance, headache, anxiety, depression, and cognitive dysfunction further add to our concerns. A research paper from 2014 proposes that annoyance from audible sound is a plausible cause of many of the reported effects.[v]

The developer's own submission notes that "*Some studies have found that audible noise from wind turbines can be annoying to some. Annoyance may be associated with some self-reported health effects (e.g., sleep disturbance).*" (CH. 5 p 39)

It Is important to note that sleep disturbance is of significant concern in terms of population health and again there are a number of scientific studies **that link sleep disturbance with a number of health conditions including increased risk of depression[vi], cardiovascular issues[vii] and dementia.[viii]**

To support our concerns in this regard we note recent **case law** in Ireland where it has been demonstrated that living near a wind farm can cause health impacts, arising from noise in particular:

- **Byrne & Moorhead v. ABO Energy Ltd (2025)**

In June 2025, the High Court ruled in favour of Raymond Byrne and Lorna Moorhead, residents near the Gibbet Hill Wind Farm in County Wexford. The court found that the wind farm's operations caused significant noise, vibration, and shadow flicker, leading to sleep disturbances, anxiety, and a diminished quality of life. The court criticised the wind farm operators for failing to engage meaningfully with the plaintiffs' complaints over 12 years. It is important to note that in this case, the plaintiff's lived well beyond the recommended 500 m setback distance from the wind turbines.

- **Ballyduff Wind Farm (2024)**

In March 2024, the High Court ruled that noise from Ballyduff Wind Farm near Enniscorthy constituted a private nuisance. The plaintiffs, two couples living near the wind farm, experienced sleep deprivation, anxiety, and other health issues due to the erratic and intermittent noise. The court found that the noise levels during night and early morning hours were unreasonably disruptive.

Based on these findings and objections outlined above we respectfully request that the application be refused until such time as more detailed noise assessments and health assessments are undertaken to determine the full impacts of the proposed development.

2.3 Disability Assessments: Local residents with disabilities are concerned about the impact that the proposed development will have on their quality of life and wellbeing. There are a number of core requirements on developers and public bodies to ensure all decisions regarding developments in a locality take into account the specific needs of people with disabilities. These include:

a) **UN Convention on the Rights of Persons with Disabilities (CRPD)** — Ireland has ratified the CRPD (March 2018). Article 9 requires States Parties to take appropriate measures to ensure persons with disabilities access the physical environment and services on an equal basis with others (including urban and rural areas). This creates a clear international standard that planning decisions must be consistent with.

b) **Irish Public Sector Equality & Human Rights Duty (Section 42, IHREC Act 2014)** — public bodies (including local authorities making planning decisions) must have regard to the need to eliminate discrimination, promote equality of opportunity and protect human rights in the performance of their functions. This duty requires assessment of impacts on persons with disabilities when deciding planning applications.

c) **Equal Status Acts 2000–2018** — prohibit discrimination in the provision of goods and services, accommodation and education. Planning decisions and the physical provision of services and facilities must not indirectly discriminate against disabled people.

d) **Irish planning and building policy** — the Planning & Development Act 2024 and associated planning guidance place emphasis on creating sustainable, inclusive places. Local authorities must consider accessibility in development management.

e) **EU law & policy** — the European Accessibility Act (Directive (EU) 2019/882) and related EU policy support accessibility rights across member states and reinforce obligations to remove barriers to participation for disabled people. While the Act focuses on products/services, it shows the EU direction and informs national obligations

Based on the above we note:

1. It is our contention that the application does not include a sufficient disability impact assessment describing how construction, the operational site and associated infrastructure (access tracks, public roads) will permit equal access to the environment, services and emergency routes for persons with disabilities as required by CRPD Article 9 and the Public Sector Duty.

2. We also contend that there is a failure to consider increased barriers during construction and operation Construction traffic, temporary diversions, temporary compound sites and changes to local public transport / community facilities can disproportionately restrict disabled people's access to services—the Equal Status Acts and Section 42 require planning decisions to consider and avoid such indirect discrimination.

3. We also contend that there is insufficient attention to sensory and health impacts that disproportionately affect disabled people with certain disabilities (e.g., neurological conditions, autism) who can be particularly vulnerable to sleep disruption, low-frequency noise and visual flicker. It is our belief that the applicant fails to address these issues based on the needs of local residents and must assess these differential impacts and require sufficient mitigation or elimination for same.

We note that **local residents with autism and neurological conditions** are particularly concerned about this development. Many report their reliance on a safe, familiar and secure environment for their health and wellbeing. This includes minimal changes to their environments, their routines and the information they have to process on a sensory level daily. In particular local neurodiverse residents have reported significant concerns about the impact that the proposed development may have, due to impacts to their daily routines during construction when traffic is anticipated to be significant and the longer-term impacts any changes can have for families. Numerous studies indicate the vital importance that routine and stability have for people with disabilities who are autistic. [ix] and the impacts on those who care for people with autism if distress occurs.[x]

It is also important to note that **noise sensitivity** is common in autism / neurodivergent populations. Reviews and empirical studies report that many autistic people have decreased sound tolerance / atypical responses to environmental sound. This is relevant because background or repetitive environmental noise can be a significant stressor for autistic people[xi] and we as a community have significant concerns about this and do not believe it has been addressed as a factor in the EIAR.

In the UK, Planning Inspectors and Planning Authorities have been sufficiently convinced of the effects of infrasound on those with Autistic Spectrum Disorders that they have refused planning permission for several wind energy facilities on the grounds that there were individuals living nearby with the condition. For example, a wind farm planned for North Lincolnshire was rejected in 2010 because of the serious effect it would have on twin autistic boys living nearby.[xii]

3 Tourism

Tourism is addressed within Chapter 5 and so we will refer to some of our outstanding concerns below:

3.1 Landscape and visual amenity, which are central to tourism and local identity, would be permanently degraded with this wind farm alone and the cumulative impact of existing and proposed developments.

Chapter 5 recognises that the tourism industry is critical to the economy of County Limerick (Ch. 5 P.28). However, the studies the applicant references in terms of the impact that wind farms have on the tourism industry do not a) take into account the increasing size and therefore visual impact of wind turbines and b) the changes in local development plans that allow for a greater concentration of green developments within the one locality**.**

Ch. 5 p.30 references studies from 2007 and in 2012 regarding tourist attitudes to windfarm. It is important to note that these are **outdated studies** when we consider the increasing size of turbines and the increasing density of them. In 2007, the rotor diameter averaged around 57 m, in 2012 78 m and in 2023 117m. [xiii]

It is also important to note that even in 2012, negative responses from tourists had increased with regards to the impact of wind farms on their experiences (an increase of 17% to 30%) **and also of note the type of landscape a wind farm is sited can have a significant impact on attitudes to them. (Ch5 p.31).**

3.2 Tourist Attractions

- The most significant tourist attraction mentioned is **Adare Manor Golf Club.** The N20 serves as the main access route to Adare from Cork Airport, where many tourists will be travelling from for the Ryder Cup in 2027, we see no clear assessment of how this may impact the experience of tourists, given the evidence of the impact of wind farms on tourists to Ireland is outdated.

- The local tourist sites mentioned (p.28) do not **include Eamon De Velera Museum and Cottage**. The former recently received a €50,000 grant in 2022 under the Town Centre First Strategy for its refurbishment and is a significant part of the history of Ireland and of the local area and should not be omitted from this application.

- **Bruree Castle and graveyard** are of historical significance and are again not mentioned in this submission. It was built by the De Laceys, a Norman family. It was owned by the Bishop of Limerick and possibly used as a vicarage in the 15th century.

- **The River Maigue** (the subject of a recent RTE Radio 1 programme on the need to conserve its waters) is of visual beauty and of great importance locally and beyond through its link to the Shannon.

- The wind farm development is also in close proximity to a number of sacred and important sites in the county and we **believe that a proper and proportionate balance needs to be found between renewable energy development and the protection of our heritage and our landscape**. Near this proposed development alone you will find Lough Gur, Grange Stone Circle, Knockfierna and a legally protected standing stone in the townland of Ballynoe, Bruree, Co. Limerick listed as LI04011 — “Ballynoe (Connello Upper By.) and protected under the National Monuments Acts. (We found no reference to this in Chapter 15.)

  These monuments and this heritage is something we need to protect as an essential amenity for Limerick County and beyond and therefore find a greater balance between development and our living heritage.

In conclusion we respectfully request that An Coimisiún Pleanála take full account of these health-related and locality related concerns. The protection of public health and our rural areas must remain a fundamental consideration in the evaluation of this and all similar renewable energy developments.

Endnotes

[i] A GOOD PRACTICE GUIDE TO THE APPLICATION OF ETSU-R-97FOR THE ASSESSMENT AND RATING OF WIND TURBINE NOISE (UK 2013) https://www.ioa.org.uk/sites/default/files/IOA%20Good%20Practice%20Guide%20on%20Wind%20Turbine%20Noise%20-%20May%202013.pdf

[ii] World Health Organization. *Compendium of WHO and other UN guidance in health and environment: 2024 update.* Geneva: WHO; 2024. ISBN 978-92-4-009538-0.

[iii] 4 August 2024 News release WHOhttps://www.who.int/europe/news/item/04-08-2024-how-much-does-environmental-noise-affect-our-health--who-updates-methods-to-assess-health-risks

[iv] CEPA https://www.cepa.ie/#TheNoiseEffect

[v] Adverse health effects of industrial wind turbines — Roy D. Jeffery MD FCFP, Carmen Krogh, Brett Horner CMA" (Can Fam Physician / Canadian Family Physician, May 2013)

[vi]Bidirectional relationship between sleep and depression Shinnosuke Yasugaki, Hibiki Okamura, Ami Kaneko, Yu Hayashi https://www.sciencedirect.com/science/article/pii/S0168010223000871

[vii]Sleep duration predicts cardiovascular outcomes: a systematic review and meta-analysis of prospective studies, Francesco P Cappuccio, Daniel Cooper, Lanfranco D'Elia, Pasquale Strazzullo, Michelle A Miller https://pubmed.ncbi.nlm.nih.gov/21300732/ *Short sleep associated with 48% increased risk of coronary heart disease*

[viii] Sleep Fragmentation and the Risk of Incident Alzheimer's Disease and Cognitive Decline in Older Persons (Lim et al., 2013). sleep fragmentation measured objectively via actigraphy has been associated with ~1.5–2× higher risk of Alzheimer's disease. https://pmc.ncbi.nlm.nih.gov/articles/PMC3669060/

[ix] The relationship between intolerance of uncertainty and anxiety in autism: A systematic literature review and meta-analysis; Jenkinson et al (2013) https://journals.sagepub.com/doi/10.1177/1362361320932437

[x] The Effect of Autism Spectrum Disorder on Family Mental Health: Challenges, Emotional Impact, and Coping Strategies, José Jesús Sánchez Amate & Antonio Luque de la Rosa (2024) https://pmc.ncbi.nlm.nih.gov/articles/PMC11592025/

[xi] A Review of Decreased Sound Tolerance in Autism: Definitions, Phenomenology, and Potential Mechanisms Williams et al (2022) https://pmc.ncbi.nlm.nih.gov/articles/PMC7855558/

[xii] https://mothersagainstwindturbines.com/2015/03/12/our-special-needs-children-are-being-abused-by-noise-from-wind-turbines/

[xiii] EA Wind / NREL — Wind Technology, Cost, and Performance (Task 26 summary / related NREL material, 2015) https://docs.nrel.gov/docs/fy15osti/64332.pdf

EAI (Sustainable Energy Authority of Ireland) Community Toolkit / Onshore Wind (2024) — shows the long-term growth in rotor diameters. https://www.seai.ie/sites/default/files/publications/Community-Toolkit-Onshore-Wind.pdf

APPENDIX of archaeological sites

Monument Report Forms for ten archaeological sites discussed in Chapter 6 (see distribution map on p.140)

(Report Forms given in slightly abbreviated form. Please note also that images have had to be compressed in order to meet the 30mb overall limit on ACP's website. Higher resolution versions available upon request)

Site 1 – Creggane barrow

Site 2 – Garrane enclosure

Site 3 – Garrane enclosure 2

Site 4 – Garrane ring ditch

Site 5 – Ballynagoul enclosure 2

Site 6 – Ballynagoul enclosure

Site 7 – Ballynagoul ring ditch

Site 8 – Ballynagoul ring ditch 2

Site 9 – Ballynagoul ringfort

Site 10 – Garrane plectrum enclosure

APPENDIX. SITE 1

An Roinn Tithíochta, Rialtais Áitiúil agus Oidhreachta
Department of Housing, Local Government and Heritage

NATIONAL MONUMENTS SERVICE

Monument Report Form

The following report form has been designed to assist persons who may wish to supply information on newly discovered monuments. The current operational policy of the National Monuments Service is primarily to record monuments dating from the pre-AD 1700 period. Please check the records of the Archaeological Survey of Ireland on the National Monuments Service website www.archaeology.ie before sending in a report to ensure that the monument has not already been recorded. This Monument Report Form will form part of the Sites and Monuments Record.

County: Limerick

Townland(s): Creggane

Classification: (e.g., ringfort, standing stone, cairn, mound) Barrow – ring-barrow

Irish Transverse Mercator co-ordinates: E: 5 5 3 8 0 9 N: 6 2 7 3 5 4

Irish Grid co-ordinates: E: N:

The Archaeological Survey of Ireland uses mapping provided by OSI: this utilises the Irish Transverse Mercator (ITM) co-ordinate system. This replaces the former Irish Grid referenced mapping. If possible, please supply ITM co-ordinates. These should be determined using a Global Positioning System (GPS) unit that is enabled for the ITM co-ordinate system. A twelve-figure reference should be determined at the centre of the monument (six for easting and six for northing). Alternatively, users may derive the ITM co-ordinates from the mapping component of the National Monuments Service website (www.archaeology.ie).

Source of co-ordinates (please fill one): GPS ☐ Website ■

Name of person compiling report (Block Capitals): DR EUGENE COSTELLO

Address:

Phone no.:

Email address:

Setting of monument: (i.e., situation and land use in and around monument, etc.)
In flat pasture land, 60m south of the River Maigue, on clayey alluvial soil.

Condition of monument: (i.e., whether obscured by trees, scrub, bushes, etc.)
The site has been levelled by ploughing and reseeding very recently.

Local information: (i.e., local name, field name, past history, etc.)

There is no known local information about the site.

References (where relevant): (i.e. publications, web address, etc.)

Other notes: *For example, if the monument has been found as the result of a licensed archaeological investigation then the **licence number** should be given and if the monument has been completely excavated (i.e. there is **NO** surviving archaeology above or below ground surface) this should be noted here. If the monument has been discovered as the result of geophysical investigations then this should be stated. If there is a planning application associated with it, the planning reference number should be given.*

Summary description of monument: (additional details may be supplied on a separate page(s))

A circular ring barrow with a total diameter of 15m, evident on LIDAR and numerous satellite images up to 2022 (after which the site appears to have been levelled by ploughing and reseeding). The ring barrow is defined by a low bank 1.5m in width. The circular space enclosed by this bank measures 9m in diameter. In the very centre of this enclosed space is a small mound 2.5m – 3m in diameter, possibly marking the location of a burial (see McGarry 2009, 416-418; Hawkes 2021, 37, 40-41).

This site is probably best described as a ring-barrow rather than a ring ditch as it is larger than the average ring ditch in Limerick and, more importantly, has an enclosing bank. In terms of morphology, the site is similar to some of the barrows identified in Ballynagranna townland in east Limerick (Doody 1993, Plate 7).

Hawkes, A. 2021. The excavation of two prehistoric ring-ditches and associated burials at Kilbrew, Co. Meath. *The Journal of Irish Archaeology* 30, pp. 25-48.
Doody, M. 1993. The Bruff Aerial Photographic Survey. *Tipperary Historical Journal* 1993, pp. 173-180.
McGarry, T. 2009. Irish late prehistoric burial ring-ditches, in Gabriel Cooney et al. (eds.), *Relics of old decency: archaeological studies in later prehistory*, pp.413-423

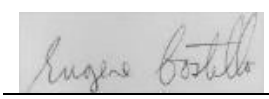
Report accompanied by a sketch plan and/or section, elevation drawings? Yes ☐

■

Report accompanied by a copy of OS map Yes ☐ **and/or aerial photo:** Yes ■

It is important that the report be accompanied by either a map or aerial photograph (web-derived aerial photos are acceptable) with the location and extent of the 'monument' clearly marked on it. The aerial photo or map must be at a scale where field boundaries are clearly visible to enable it be referenced to Ordnance Survey Ireland mapping.

Checked against National Monuments Service website, www.archaeology.ie: Yes ■

Signed:  **Date:** 14 January 2024

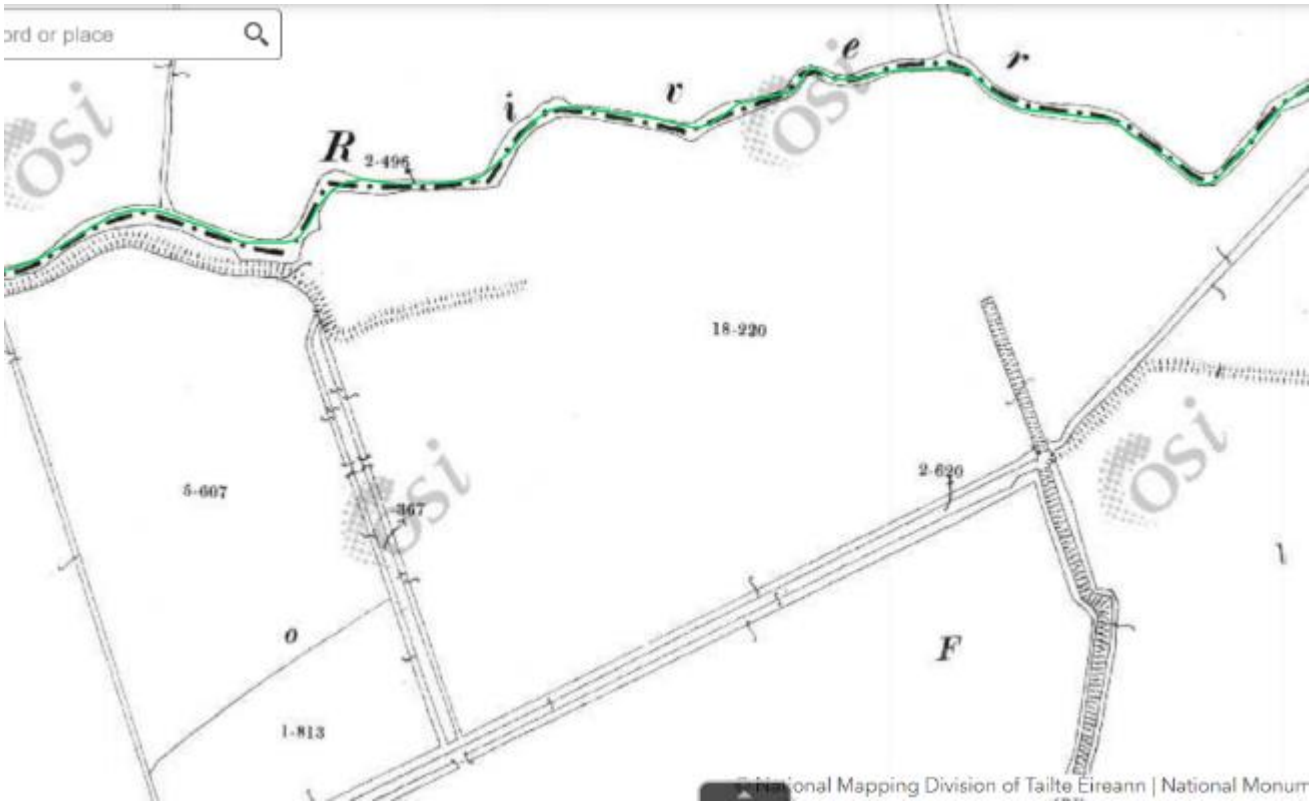
On completion of this form please send it, together with any supporting documentation, to:

Archaeological Survey of Ireland
National Monuments Service
Department of Housing, Local Government and Heritage
The Custom House (Room G50)
Dublin 1
Dublin D01 W6XO

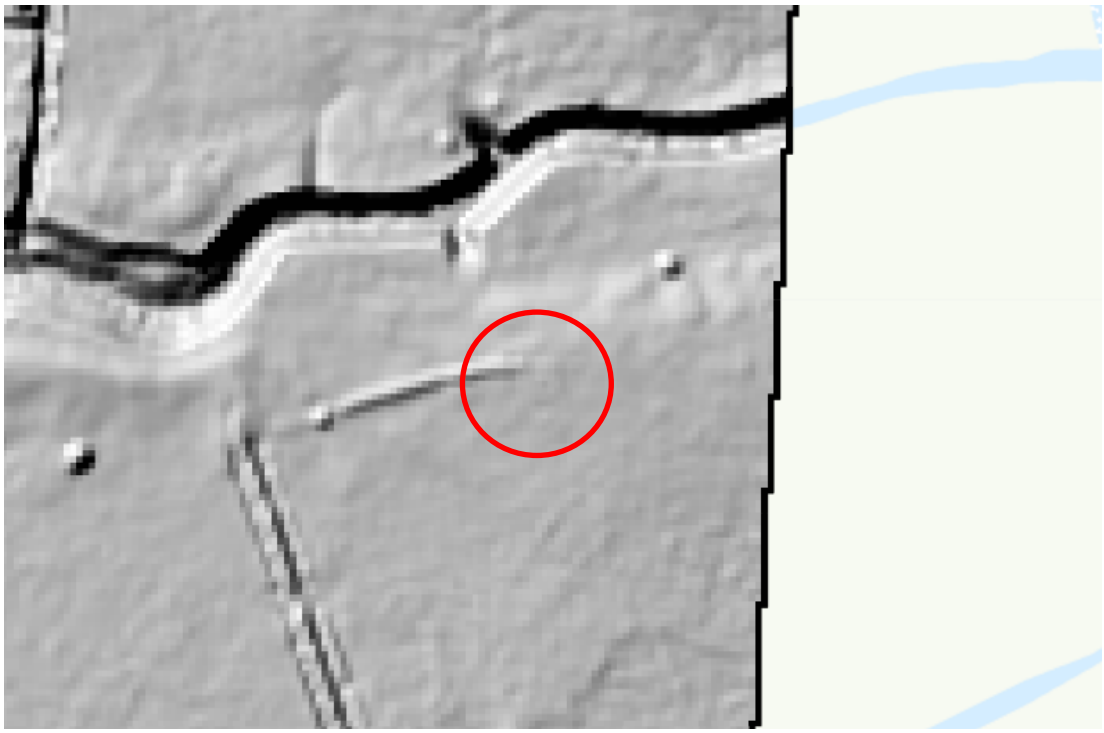
nationalmonuments@housing.gov.ie

PRIVACY STATEMENT

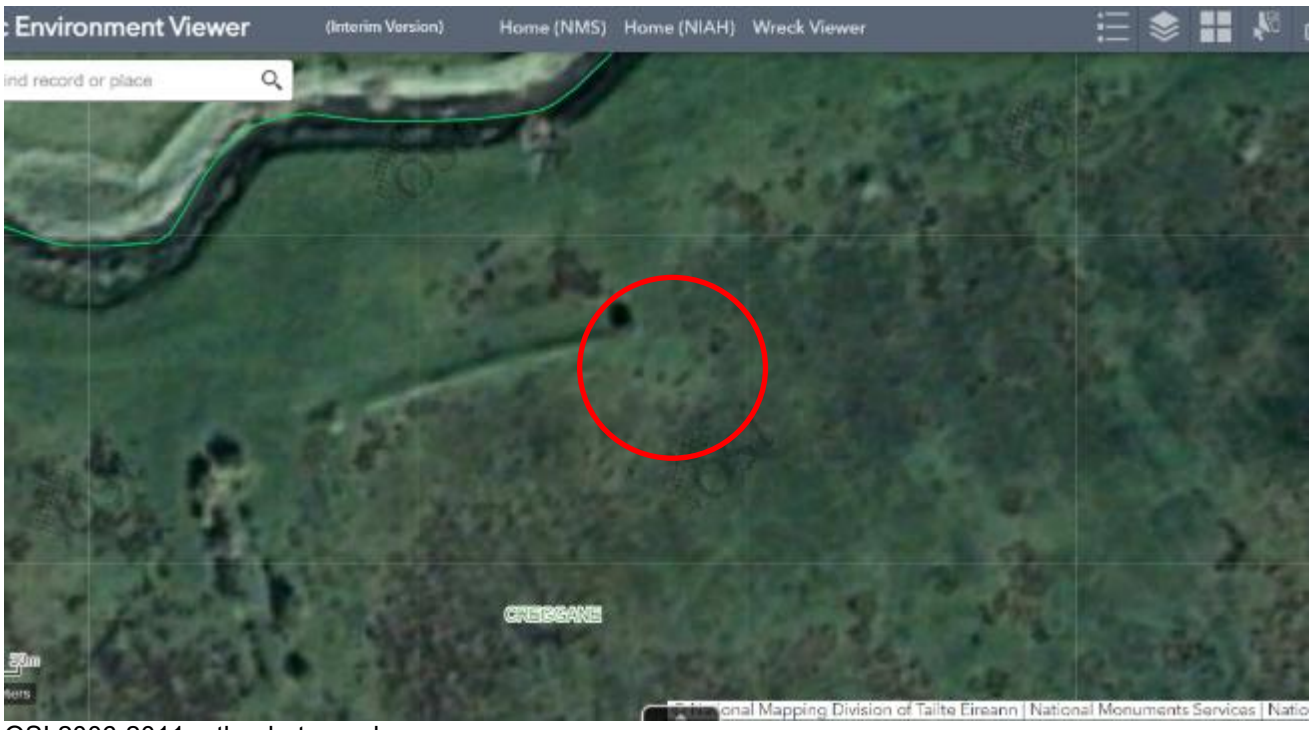
The Department is committed to protecting and respecting your privacy and employs appropriate technical and organisational measures to protect your information from unauthorised access. The Department will not process your personal data for any purpose other than that for which they were collected. Personal data may be exchanged with other Government Departments, local authorities, agencies under the aegis of the Department, or other public bodies, in certain circumstances where this is provided for by law. The Department will only retain your personal data for as long as it is necessary for the purposes for which they were collected and subsequently processed. When the business need to retain this information has expired, it will be examined with a view to destroying the personal data as soon as possible, and in line with Department policy. Further information on Data Protection can be found on our website at: http://www.housing.old.gov.ie/corporate/compliance/data-protection/data-protection



OS First edition 25 inch map (1897)



LIDAR 2012. GSI Open Topographic Data Viewer



OSI 2006-2011 orthophotography

OSI Digital Globe 2013

Google Earth March 2016

Google Earth March 2020

Google Earth April 2021


Apple Maps

An Roinn Tithíochta, Rialtais Áitiúil agus Oidhreachta
Department of Housing, Local Government and Heritage

APPENDIX. SITE 2

NATIONAL MONUMENTS SERVICE

Monument Report Form – Archaeological Survey of Ireland

The following report form has been designed to assist persons who may wish to supply information on possible monuments. Please check the records of the Archaeological Survey of Ireland on the National Monuments Service website www.archaeology.ie before sending in a report to ensure that the monument has not already been recorded. This Monument Report Form may form part of the Archaeological Inventory (Sites and Monuments Record) [1]

County: Limerick

Townland(s): Garrane

Suggested Classification: (e.g., ringfort, standing stone, cairn, mound) Enclosure

Location:
The Archaeological Survey of Ireland uses mapping provided by Tailte Éireann: this utilises the Irish Transverse Mercator (ITM) co-ordinate system. If possible, please supply ITM co-ordinates. Users may derive the 12-figure ITM co-ordinates by taking the reading at the bottom left of the screen on the Historic Environment Viewer on the National Monuments Service website (www.archaeology.ie) while using the Mouse to point at the relevant location.
Alternatively, the co-ordinates should be determined using a Global Positioning System (GPS) unit that is enabled for the ITM co-ordinate system. The 12-figure reference should be determined at the centre of the monument: six for easting (E) and six for northing (N).

Irish Transverse Mercator co-ordinates:	E:	5	5	3	9	4	3	N:	6	2	7	5	3	6

Source of co-ordinates (please indicate which): GPS ☐ NMS Website X

Setting of monument: (i.e., situation and land use in and around monument, etc.)
In rough pasture 80m north of the River Maigue and 10m north of LI047-114.

Condition of monument: (i.e., whether obscured by trees, scrub, bushes, etc.)
Rushes growing in ditch defining enclosure, with some rushes growing in interior of enclosure too

Local information: (i.e., local name, field name, past history, etc.)

No known local information about site

References (where relevant): (i.e. licences, publications, web address, etc.)

Note:
If the monument has been found as the result of a licensed archaeological investigation, please supply the **licence number:** _____
And if the monument has been completely excavated (i.e. there is **NO** surviving archaeology above or below ground surface) this should be clearly stated.

If the monument has been discovered as the result of geophysical investigations, please supply the **R Number:** _____

If associated with a planning application, please supply the **planning reference number**: _____

Summary description of monument: (additional details may be supplied on a separate page(s))

A sub-rectangular enclosure measuring 18m by 17m. It is defined by a ditch 1.3-1.8m in width and 0.3-0.5m in depth. This ditch is deepest and widest along the south and east of the enclosure, where it fills with water in winter. The interior of the enclosure is slightly raised, being 0.3-0.5m higher than the surrounding land, especially on the south. The enclosure is not depicted on the 1840 or 1900 OS maps, and clearly pre-dates the straight field boundaries that were laid out by the Wyse estate after 1750 in Garrane townland.

Please indicate if:

Report is accompanied by a sketch plan and/or section, elevation drawings? Yes ☐

Report is accompanied by a copy of OS map Yes ■

Report is accompanied by an aerial photograph or satellite image: Yes ■

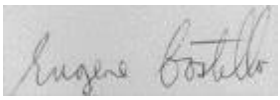
Note. It is important that the report be accompanied by a copy of **either** *a map* **or** *aerial photograph* or *satellite image* with the location of the monument clearly marked on it. The *map* or *aerial photograph* or *satellite image* must be at a scale where field boundaries are clearly visible to enable it be referenced to Tailte Éireann mapping. **The *map* or *photograph* or *satellite image* source (which may be web-derived) should be cited and include date of imagery.**

I have checked against the National Monuments Service website: Yes ■
www.archaeology.ie

Name of person compiling report (Block Capitals): Dr Eugene Costello

Email address: _____

Phone number: _____

Signed:  **Date:** 05-01-2025

On completion of this form please send it, together with any supporting documentation, to:

nationalmonuments@housing.gov.ie

OR

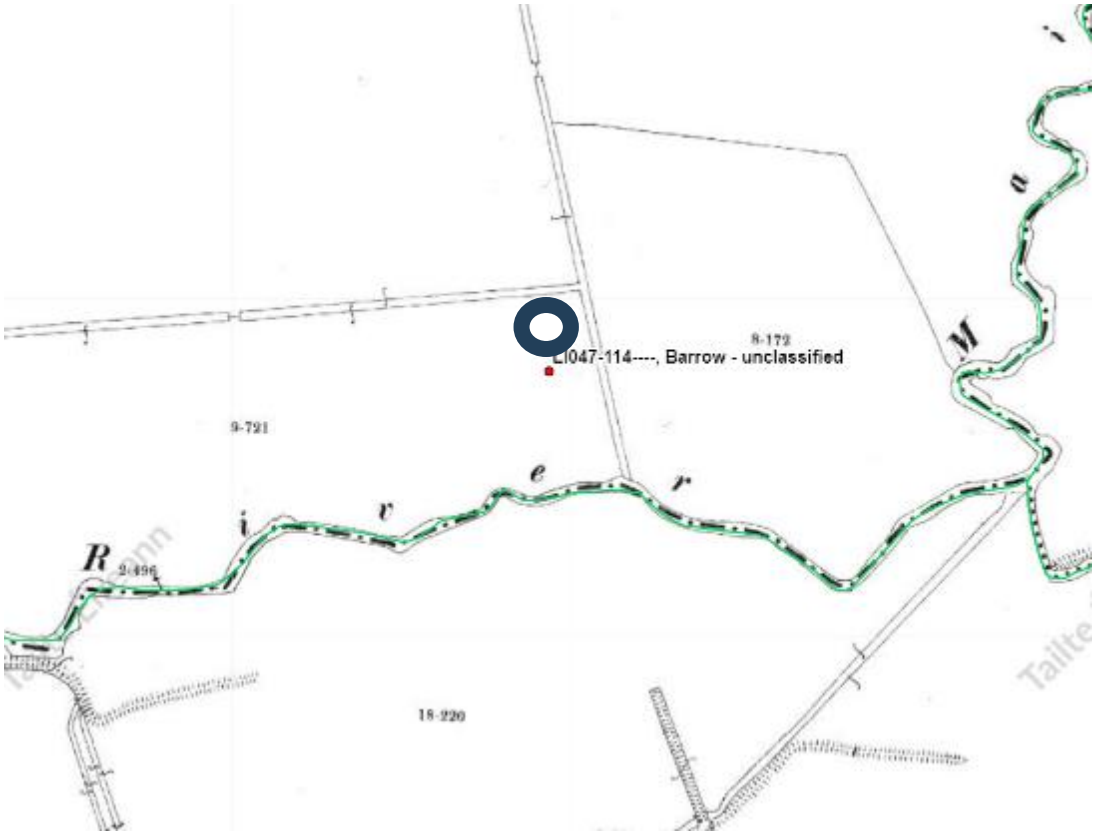
The Archaeological Survey of Ireland,
National Monuments Service,
Department of Housing, Local Government and Heritage,
The Custom House (Room G50).
Dublin 1
D01 W6XO

PRIVACY STATEMENT

The Department is committed to protecting and respecting your privacy and employs appropriate technical and organisational measures to protect your information from unauthorised access. The Department will not process your personal data for any purpose other than that for which they were collected. Personal data may be exchanged with other Government Departments, local authorities, agencies under the aegis of the Department, or other public bodies, in certain circumstances where this is provided for by law. The Department will only retain your personal data for as long as it is necessary for the purposes for which they were collected and subsequently processed. When the business need to retain this information has expired, it will be examined with a view to destroying the personal data as soon as possible, and in line with Department policy.

Further information on Data Protection can be found on our website at: https://www.gov.ie/en/organisation-information/648102-data-protection/

[1] The *Historic and Archaeological Heritage and Miscellaneous Provisions Act (2023)* was signed into law on 14 October 2023. Under *Section 158* of the bill, the Minister is required to make inventories of relevant things of archaeological interest, architectural heritage, and wrecks of archaeological or historic interest.



First Edition OS 25 inch map

First Edition OS 6 inch map

Google Earth 2016


Google Earth 2006

S-facing view of enclosure. Note shaded northern ditch in foreground.

NE-facing view of enclosure (occupying left and middle centreground). Note that interior of enclosure is slightly raised above surrounding land (see ground in right centreground).

W-facing view of enclosure. Note water-filled external ditch in left foreground.

An Roinn Tithíochta, Rialtais Áitiúil agus Oidhreachta
Department of Housing, Local Government and Heritage

APPENDIX. SITE 3

NATIONAL MONUMENTS SERVICE

Monument Report Form – Archaeological Survey of Ireland

The following report form has been designed to assist persons who may wish to supply information on possible monuments. Please check the records of the Archaeological Survey of Ireland on the National Monuments Service website www.archaeology.ie before sending in a report to ensure that the monument has not already been recorded. This Monument Report Form may form part of the Archaeological Inventory (Sites and Monuments Record) [1]

County: Limerick

Townland(s): Garrane

Suggested Classification: (e.g., ringfort, standing stone, cairn, mound) Enclosure

Location:
The Archaeological Survey of Ireland uses mapping provided by Tailte Éireann: this utilises the Irish Transverse Mercator (ITM) co-ordinate system. If possible, please supply ITM co-ordinates. Users may derive the 12-figure ITM co-ordinates by taking the reading at the bottom left of the screen on the Historic Environment Viewer on the National Monuments Service website (www.archaeology.ie) while using the Mouse to point at the relevant location.
Alternatively, the co-ordinates should be determined using a Global Positioning System (GPS) unit that is enabled for the ITM co-ordinate system. The 12-figure reference should be determined at the centre of the monument: six for easting (E) and six for northing (N).

Irish Transverse Mercator co-ordinates:	E:	5	5	3	8	9	0	N:	6	2	7	7	5	5

Source of co-ordinates (please indicate which): GPS ☐ NMS Website X

Setting of monument: (i.e., situation and land use in and around monument, etc.)
In grazing land 290m north of the River Maigue and 500m east of the N20.

Condition of monument: (i.e., whether obscured by trees, scrub, bushes, etc.)

Local information: (i.e., local name, field name, past history, etc.)

No known local information about site

References (where relevant): (i.e. licences, publications, web address, etc.)

Note:
If the monument has been found as the result of a licensed archaeological investigation, please supply the **licence number:** _____
And if the monument has been completely excavated (i.e. there is **NO** surviving archaeology above or below ground surface) this should be clearly stated.

If the monument has been discovered as the result of geophysical investigations, please supply the **R Number:** _____

If associated with a planning application, please supply the **planning reference number**: _____

Summary description of monument: (additional details may be supplied on a separate page(s))

A rectangular enclosure with internal sub-divisions which may be the remains of a historic settlement. The overall dimensions of the enclosure are 48m NW to SE and 33m SW to NE. There is one clear sub-division in the NW of the enclosure, measuring 18m by 10m and aligned NW to SE. This may be the remains of a house foundation. There appears to be another internal sub-division to the south east of this aligned NE to SW. Its dimensions are less clear but it measures roughly 15m x 6.5m. The site is visible on TII LiDAR imagery from 2011 as well as more recent Google Earth imagery. The site is not depicted on either the 1840 or 1900 OS maps. It may be the remains of an early modern settlement that was cleared when this part of Garrane townland was re-arranged by the Wyse estate after 1750.

Please indicate if:

Report is accompanied by a sketch plan and/or section, elevation drawings? Yes ☐

Report is accompanied by a copy of OS map Yes ■

Report is accompanied by an aerial photograph or satellite image: Yes ■

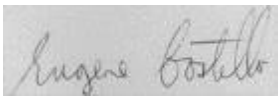
Note. It is important that the report be accompanied by a copy of **either** *a map* **or** *aerial photograph* or *satellite image* with the location of the monument clearly marked on it. The *map* or *aerial photograph* or *satellite image* must be at a scale where field boundaries are clearly visible to enable it be referenced to Tailte Éireann mapping. **The *map* or *photograph* or *satellite image* source (which may be web-derived) should be cited and include date of imagery.**

I have checked against the National Monuments Service website: Yes ■
www.archaeology.ie

Name of person compiling report (Block Capitals): Dr Eugene Costello

Email address: _____

Phone number: _____

Signed:  **Date:** 05-01-2025

On completion of this form please send it, together with any supporting documentation, to:

nationalmonuments@housing.gov.ie

OR

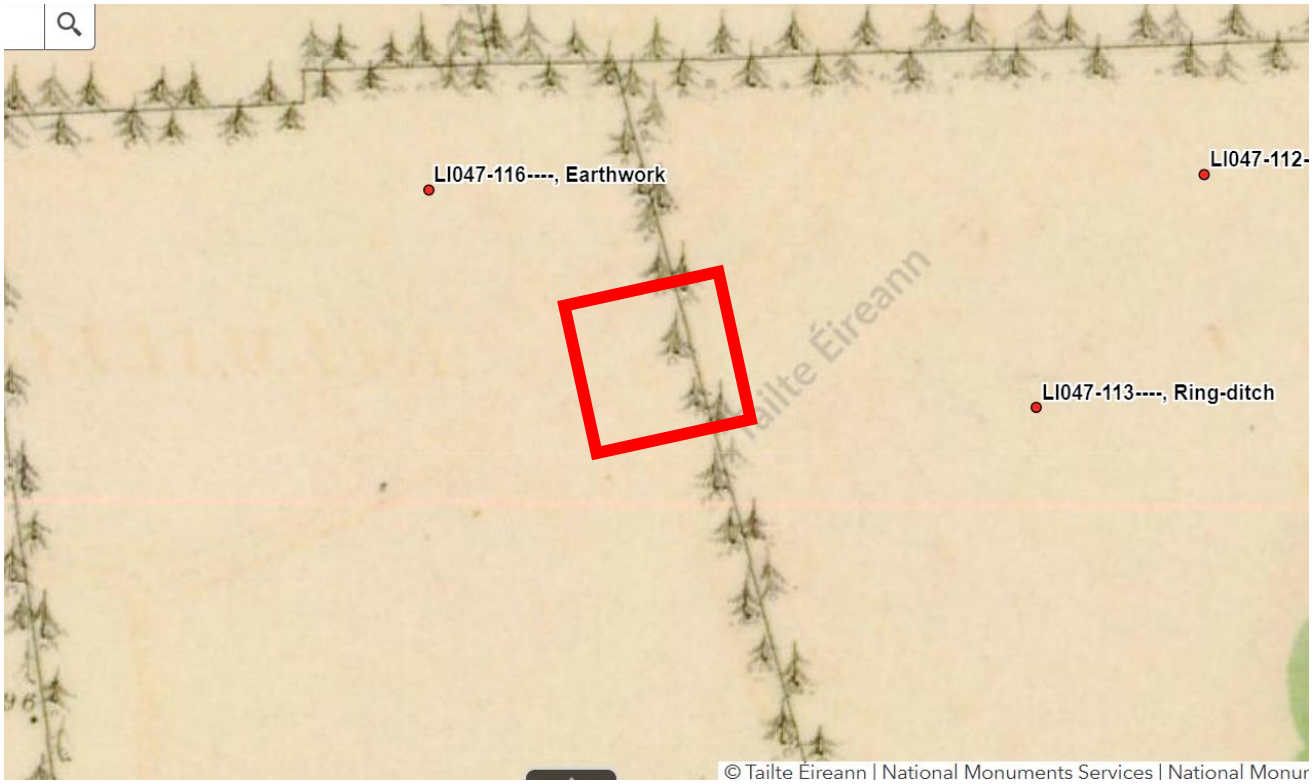
The Archaeological Survey of Ireland,
National Monuments Service,
Department of Housing, Local Government and Heritage,
The Custom House (Room G50).
Dublin 1
D01 W6XO

PRIVACY STATEMENT

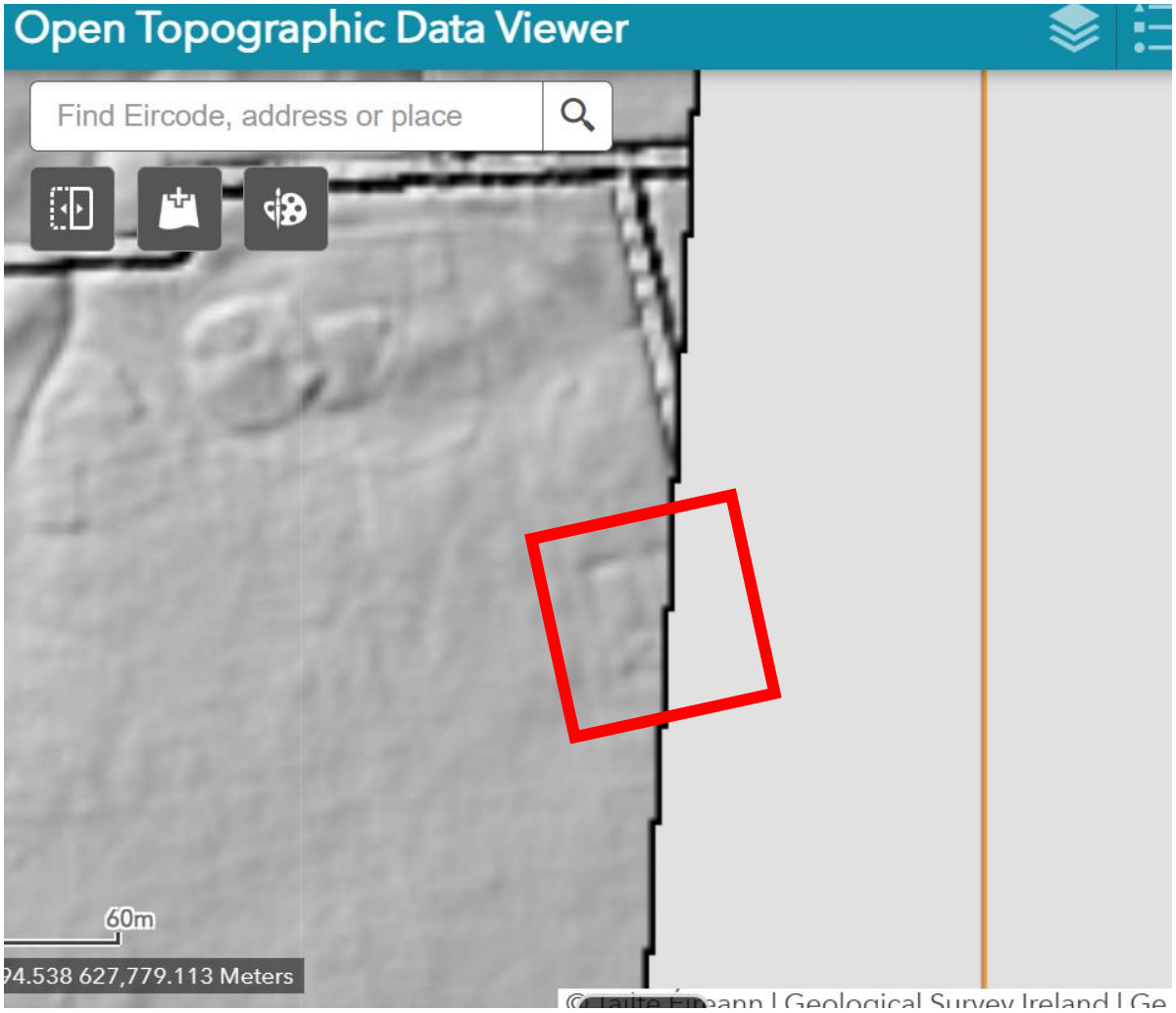
The Department is committed to protecting and respecting your privacy and employs appropriate technical and organisational measures to protect your information from unauthorised access. The Department will not process your personal data for any purpose other than that for which they were collected. Personal data may be exchanged with other Government Departments, local authorities, agencies under the aegis of the Department, or other public bodies, in certain circumstances where this is provided for by law. The Department will only retain your personal data for as long as it is necessary for the purposes for which they were collected and subsequently processed. When the business need to retain this information has expired, it will be examined with a view to destroying the personal data as soon as possible, and in line with Department policy.

Further information on Data Protection can be found on our website at: https://www.gov.ie/en/organisation-information/648102-data-protection/

[1] The *Historic and Archaeological Heritage and Miscellaneous Provisions Act (2023)* was signed into law on 14 October 2023. Under *Section 158* of the bill, the Minister is required to make inventories of relevant things of archaeological interest, architectural heritage, and wrecks of archaeological or historic interest.



First Edition OS 6 inch map



TII LiDAR 2011

ESRI World Imagery 2025

Google Earth January 2021

Google Earth September 2020

An Roinn Tithíochta, Rialtais Áitiúil agus Oidhreachta
Department of Housing, Local Government and Heritage

APPENDIX. SITE 4

NATIONAL MONUMENTS SERVICE

Monument Report Form – Archaeological Survey of Ireland

The following report form has been designed to assist persons who may wish to supply information on possible monuments. Please check the records of the Archaeological Survey of Ireland on the National Monuments Service website www.archaeology.ie before sending in a report to ensure that the monument has not already been recorded. This Monument Report Form may form part of the Archaeological Inventory (Sites and Monuments Record) [1]

County: Limerick

Townland(s): Garrane

Suggested Classification: (e.g., ringfort, standing stone, cairn, mound) Ring-ditch

Location:
The Archaeological Survey of Ireland uses mapping provided by Tailte Éireann: this utilises the Irish Transverse Mercator (ITM) co-ordinate system. If possible, please supply ITM co-ordinates. Users may derive the 12-figure ITM co-ordinates by taking the reading at the bottom left of the screen on the Historic Environment Viewer on the National Monuments Service website (www.archaeology.ie) while using the Mouse to point at the relevant location.
Alternatively, the co-ordinates should be determined using a Global Positioning System (GPS) unit that is enabled for the ITM co-ordinate system. The 12-figure reference should be determined at the centre of the monument: six for easting (E) and six for northing (N).

Irish Transverse Mercator co-ordinates:	E:	5	5	4	0	2	2	N:	6	2	7	7	6	8

Source of co-ordinates (please indicate which): GPS ☐ NMS Website ■

Setting of monument: (i.e., situation and land use in and around monument, etc.)
In flat pasture land, 215m north west of the River Maigue.

Condition of monument: (i.e., whether obscured by trees, scrub, bushes, etc.)
Ring ditch has been somewhat flattened in recent decades

Local information: (i.e., local name, field name, past history, etc.)

There is no known local information about the site.

References (where relevant): (i.e. licences, publications, web address, etc.)

Note:
If the monument has been found as the result of a licensed archaeological investigation, please supply the **licence number:** _____
And if the monument has been completely excavated (i.e. there is **NO** surviving archaeology above or below ground surface) this should be clearly stated.

If the monument has been discovered as the result of geophysical investigations, please supply the **R Number:** _____

If associated with a planning application, please supply the **planning reference number**: _____

Summary description of monument: (additional details may be supplied on a separate page(s))

A circular ring ditch with a total diameter of 9m. The ditch defining the site is approx. 0.75m in width. The ring ditch is visible on Google Earth satellite imagery (see below). There are at least two other ring ditches in this field, one located 38m to the south east (LI047-113), and the other 125m to the north east (LI047-112).

This may be a prehistoric ring ditch given that it has similarities in terms of shape and size to sites found elsewhere in Munster (see Doody 1993; Doody 2001; Doody 2008; Cleary and Hawkes 2015). For example, it is reminiscient of a ring ditch excavated at Knockgraffon in Co. Tipperary (McGarry 2009, Fig. 5).

Cleary, R.M. and Hawkes, A. 2014. Munster ring-ditches, fulachtaí fia and the excavations at Carrigtohill, Co. Cork. *Journal of Irish Archaeology*, *23*, pp.97-121.
Doody, M. 1993. The Bruff Aerial Photographic Survey. Tipperary Historical Journal 1993, pp. 173-180.
Doody, M. 2001. Medium altitude aerial photographic survey in East Limerick and West Tipperary. The Journal of Irish Archaeology 2001, pp.13-24.
Doody, M. 2008. The Ballyhoura Hills Project. Discovery Programme Monograph No. 7. Wordwell, Bray.
McGarry, T. 2009. Irish late prehistoric burial ring-ditches, in Gabriel Cooney et al. (eds.), Relics of old decency: archaeological studies in later prehistory, pp.413-423

Please indicate if:

Report is accompanied by a sketch plan and/or section, elevation drawings?

Yes ☐

Report is accompanied by a copy of OS map Yes ■

Report is accompanied by an aerial photograph or satellite image: Yes ■

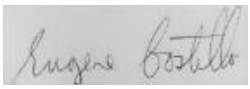
Note. It is important that the report be accompanied by a copy of **either** *a map* **or** *aerial photograph* or *satellite image* with the location of the monument clearly marked on it. The *map* or *aerial photograph* or *satellite image* must be at a scale where field boundaries are clearly visible to enable it be referenced to Tailte Éireann mapping. **The *map* or *photograph* or *satellite image* source (which may be web-derived) should be cited and include date of imagery.**

I have checked against the National Monuments Service website: Yes ■
www.archaeology.ie

Name of person compiling report (Block Capitals): Dr Eugene Costello

Email address: _____

Phone number: _____

Signed:  **Date:** 5 January 2025

On completion of this form please send it, together with any supporting documentation, to:

nationalmonuments@housing.gov.ie

OR

The Archaeological Survey of Ireland,
National Monuments Service,
Department of Housing, Local Government and Heritage,
The Custom House (Room G50).
Dublin 1
D01 W6XO

PRIVACY STATEMENT

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and subsequently processed. When the business need to retain this information has expired, it will be examined with a view to destroying the personal data as soon as possible, and in line with Department policy.

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[1] The *Historic and Archaeological Heritage and Miscellaneous Provisions Act (2023)* was signed into law on 14 October 2023. Under *Section 158* of the bill, the Minister is required to make inventories of relevant things of archaeological interest, architectural heritage, and wrecks of archaeological or historic interest.

Google Earth 2016

Google Earth 2016 (zoomed in)

Google Earth 2015

OSI MapGenie 2018

An Roinn Tithíochta, Rialtais Áitiúil agus Oidhreachta
Department of Housing, Local Government and Heritage

APPENDIX. SITE 5

NATIONAL MONUMENTS SERVICE

Monument Report Form – Archaeological Survey of Ireland

The following report form has been designed to assist persons who may wish to supply information on possible monuments. Please check the records of the Archaeological Survey of Ireland on the National Monuments Service website www.archaeology.ie before sending in a report to ensure that the monument has not already been recorded. This Monument Report Form may form part of the Archaeological Inventory (Sites and Monuments Record) [1]

County: Limerick

Townland(s): Ballynagoul

Suggested Classification: (e.g., ringfort, standing stone, cairn, mound) Enclosure

Location:
The Archaeological Survey of Ireland uses mapping provided by Tailte Éireann: this utilises the Irish Transverse Mercator (ITM) co-ordinate system. If possible, please supply ITM co-ordinates. Users may derive the 12-figure ITM co-ordinates by taking the reading at the bottom left of the screen on the Historic Environment Viewer on the National Monuments Service website (www.archaeology.ie) while using the Mouse to point at the relevant location.
Alternatively, the co-ordinates should be determined using a Global Positioning System (GPS) unit that is enabled for the ITM co-ordinate system. The 12-figure reference should be determined at the centre of the monument: six for easting (E) and six for northing (N).

Irish Transverse Mercator co-ordinates:	E:	5	5	4	4	0	6	N:	6	2	7	1	9	1

Source of co-ordinates (please indicate which): GPS ☐ NMS Website X

Setting of monument: (i.e., situation and land use in and around monument, etc.)
In rough pasture 70m east of the Glen River

Condition of monument: (i.e., whether obscured by trees, scrub, bushes, etc.)
Rushes growing in ditch defining enclosure, with some rushes growing in interior of enclosure too

Local information: (i.e., local name, field name, past history, etc.)

No known local information about site

References (where relevant): (i.e. licences, publications, web address, etc.)

Note:
If the monument has been found as the result of a licensed archaeological investigation, please supply the **licence number:** _____
And if the monument has been completely excavated (i.e. there is **NO** surviving archaeology above or below ground surface) this should be clearly stated.

If the monument has been discovered as the result of geophysical investigations, please supply the **R Number:** _____

If associated with a planning application, please supply the **planning reference number**: _____

Summary description of monument: (additional details may be supplied on a separate page(s))

A rectangular enclosure aligned WNW to ESE. It has a total length of 24.8m and a total width of 20.9m. It is defined by a shallow ditch, 0.2-0.3m in depth and 1.1m in width. A very subtle and poorly-preserved bank (0.2m high) is evident inside this ditch, mainly on the western side of the enclosure. The enclosure is associated a number of relict banks, both straight and curvilinear. Neither the enclosure nor any of these other connected features are depicted on the 1840 or 1900 OS maps, which suggests that they belong to an earlier phase of settlement and farming.

Please indicate if:

Report is accompanied by a sketch plan and/or section, elevation drawings? Yes ☐

Report is accompanied by a copy of OS map Yes ■

Report is accompanied by an aerial photograph or satellite image: Yes ■

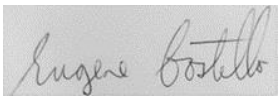
Note. It is important that the report be accompanied by a copy of **either** *a map* **or** *aerial photograph* or *satellite image* with the location of the monument clearly marked on it. The *map* or *aerial photograph* or *satellite image* must be at a scale where field boundaries are clearly visible to enable it be referenced to Tailte Éireann mapping. **The *map* or *photograph* or *satellite image* source (which may be web-derived) should be cited and include date of imagery.**

I have checked against the National Monuments Service website: Yes ■
www.archaeology.ie

Name of person compiling report (Block Capitals): Dr Eugene Costello

Email address: _____

Phone number: _____

Signed:  **Date:** 04-05-2025

On completion of this form please send it, together with any supporting documentation, to:

nationalmonuments@housing.gov.ie

OR

The Archaeological Survey of Ireland,
National Monuments Service,
Department of Housing, Local Government and Heritage,
The Custom House (Room G50).
Dublin 1
D01 W6XO

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Further information on Data Protection can be found on our website at: https://www.gov.ie/en/organisation-information/648102-data-protection/

The *Historic and Archaeological Heritage and Miscellaneous Provisions Act (2023)* was signed into law on 14 October 2023. Under *Section 158* of the bill, the Minister is required to make inventories of relevant things of archaeological interest, architectural heritage, and wrecks of archaeological or historic interest.

First Edition OS 25 inch map

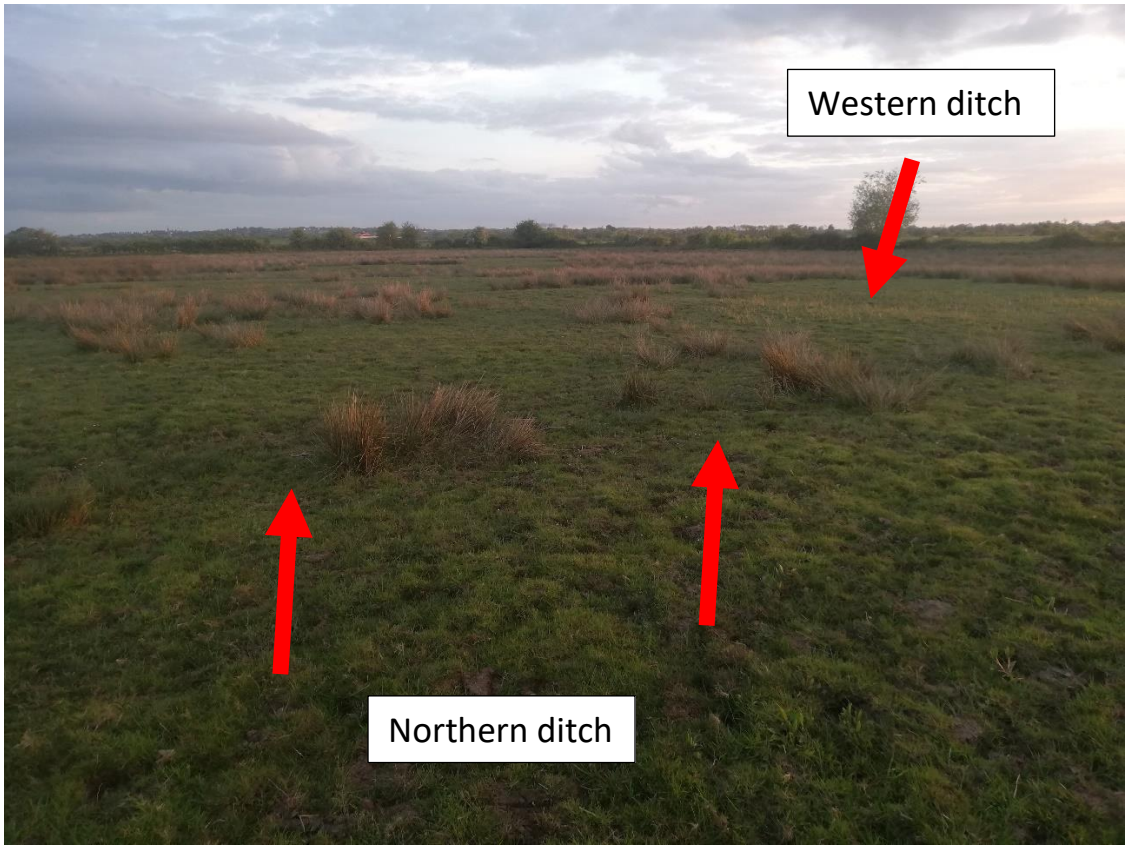
First Edition OS 6 inch map

Google Earth 2020

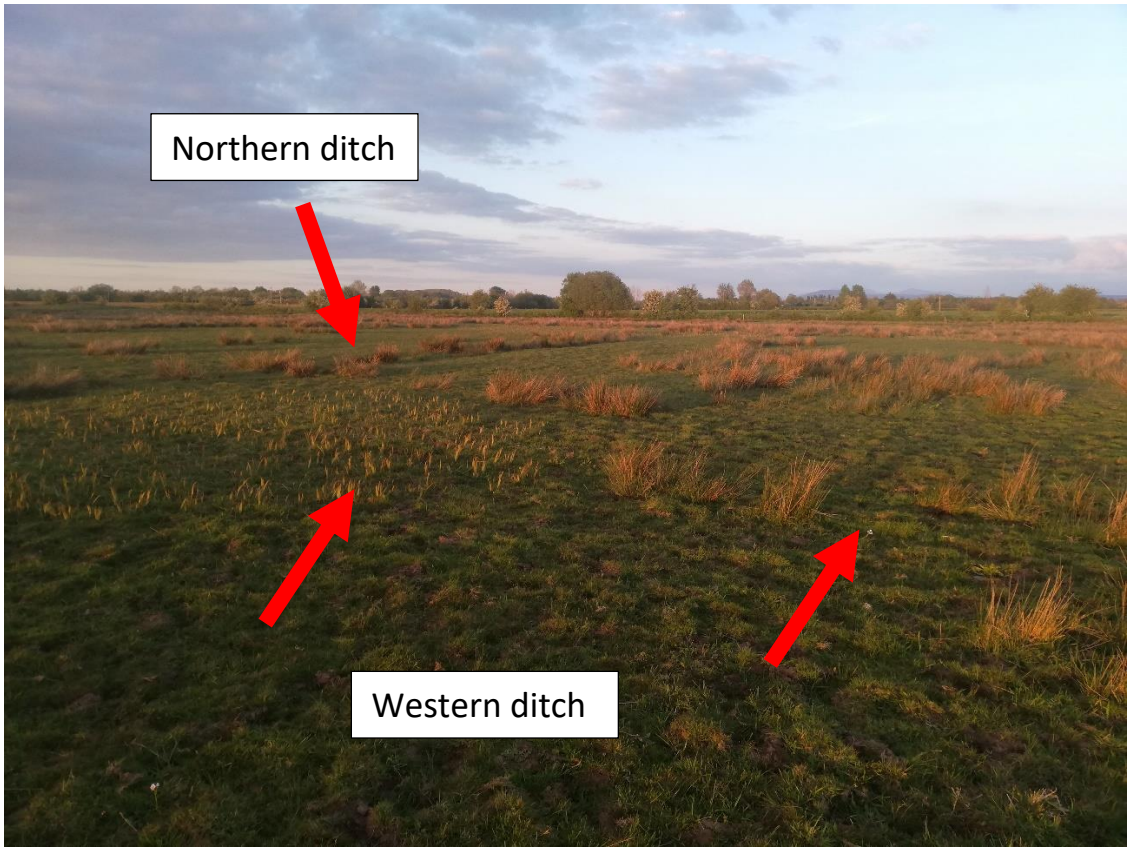
Google Earth 2016

Osi orthophotograph 2006

North-east facing photo of enclosure



South-west facing photo of enclosure



East-facing photo of enclosure

APPENDIX. SITE 6

An Roinn Tithíochta, Rialtais Áitiúil agus Oidhreachta
Department of Housing, Local Government and Heritage

NATIONAL MONUMENTS SERVICE

Monument Report Form

The following report form has been designed to assist persons who may wish to supply information on newly discovered monuments. The current operational policy of the National Monuments Service is primarily to record monuments dating from the pre-AD 1700 period. Please check the records of the Archaeological Survey of Ireland on the National Monuments Service website www.archaeology.ie before sending in a report to ensure that the monument has not already been recorded. This Monument Report Form will form part of the Sites and Monuments Record.

County: Limerick

Townland(s): Ballynagoul

Classification: (e.g., ringfort, standing stone, cairn, mound) Enclosure

Irish Transverse Mercator co-ordinates: E: 5 5 4 4 9 4 N: 6 2 6 8 6 9

Irish Grid co-ordinates: E: N:

The Archaeological Survey of Ireland uses mapping provided by OSI: this utilises the Irish Transverse Mercator (ITM) co-ordinate system. This replaces the former Irish Grid referenced mapping. If possible, please supply ITM co-ordinates. These should be determined using a Global Positioning System (GPS) unit that is enabled for the ITM co-ordinate system. A twelve-figure reference should be determined at the centre of the monument (six for easting and six for northing). Alternatively, users may derive the ITM co-ordinates from the mapping component of the National Monuments Service website (www.archaeology.ie).

Source of co-ordinates (please fill one): GPS ☐ Website ■

Name of person compiling report (Block Capitals): DR EUGENE COSTELLO

Address:

Phone no.:

Email address:

Setting of monument: (i.e., situation and land use in and around monument, etc.)
In flat pasture land, 290m east of the Glen River, on clayey alluvial soil.

Condition of monument: (i.e., whether obscured by trees, scrub, bushes, etc.)
The enclosure is covered by grass, with some wild iris and rushes growing in the ditch that surrounds it.

Local information: (i.e., local name, field name, past history, etc.)

There is no known local information about the site.

References (where relevant): (i.e. publications, web address, etc.)

Other notes: *For example, if the monument has been found as the result of a licensed archaeological investigation then the **licence number** should be given and if the monument has been completely excavated (i.e. there is **NO** surviving archaeology above or below ground surface) this should be noted here. If the monument has been discovered as the result of geophysical investigations then this should be stated. If there is a planning application associated with it, the planning reference number should be given.*

Summary description of monument: (additional details may be supplied on a separate page(s))

A circular enclosure, with a total diameter of 14.5m north to south and 13.5m east to west. The interior of the enclosure is slightly raised above the surrounding ground. The site is defined by a ditch 0.2-0.4m in depth and 1.1-1.4m in width (widest on the east). This ditch is noticeably wetter in winter than the interior of the enclosure and contains wild iris and rushes. The enclosure is visible on several aerial photographs (see below) and is also marked on the first edition twenty five inch OS map from c.1900 (although its size is underestimated on this map).

The enclosure may be the remains of a prehistoric ring ditch given that it has similarities in terms of shape to sites found elsewhere in Limerick and Tipperary (see Doody 1993; Doody 2001; Doody 2008). For example, it is reminiscient of a ring ditch excavated at Knockcommane in Co. Limerick (McGarry 2009, Fig. 5). However, with a diameter of 14.5m, this enclosure may be slightly large for a ring ditch. Thus, the other interpretation is that it is the remains of an enclosure for habitation, e.g. a small early medieval settlement enclosure (O'Sullivan et al. 2014, 48-58).

Just over 20m to the south east is a moated site.

Doody, M. 1993. The Bruff Aerial Photographic Survey. Tipperary Historical Journal 1993, pp. 173-180.
Doody, M. 2001. Medium altitude aerial photographic survey in East Limerick and West Tipperary. The Journal of Irish Archaeology 2001, pp.13-24.
Doody, M. 2008. The Ballyhoura Hills Project. Discovery Programme Monograph No. 7. Wordwell, Bray.
McGarry, T. 2009. Irish late prehistoric burial ring-ditches, in Gabriel Cooney et al. (eds.), Relics of old decency: archaeological studies in later prehistory, pp.413-423
O'Sullivan, A. et al. 2014. Early Medieval Ireland AD 400–1100: The Evidence from Archaeological Excavations. Second Edition. Dublin: Royal Irish Academy.

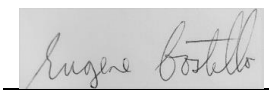
Report accompanied by a sketch plan and/or section, elevation drawings? Yes ☐

■

Report accompanied by a copy of OS map Yes ☐ **and/or aerial photo:** Yes ■

It is important that the report be accompanied by either a map or aerial photograph (web-derived aerial photos are acceptable) with the location and extent of the 'monument' clearly marked on it. The aerial photo or map must be at a scale where field boundaries are clearly visible to enable it be referenced to Ordnance Survey Ireland mapping.

Checked against National Monuments Service website, www.archaeology.ie: Yes ■

Signed:  **Date:** 6 January 2024

On completion of this form please send it, together with any supporting documentation, to:

Archaeological Survey of Ireland
National Monuments Service
Department of Housing, Local Government and Heritage
The Custom House (Room G50)
Dublin 1
Dublin D01 W6XO

nationalmonuments@housing.gov.ie

PRIVACY STATEMENT

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View of enclosure, looking south west

View of enclosure, looking south

View of enclosure, looking south

View of enclosure, looking north west

OSI aerial 2001

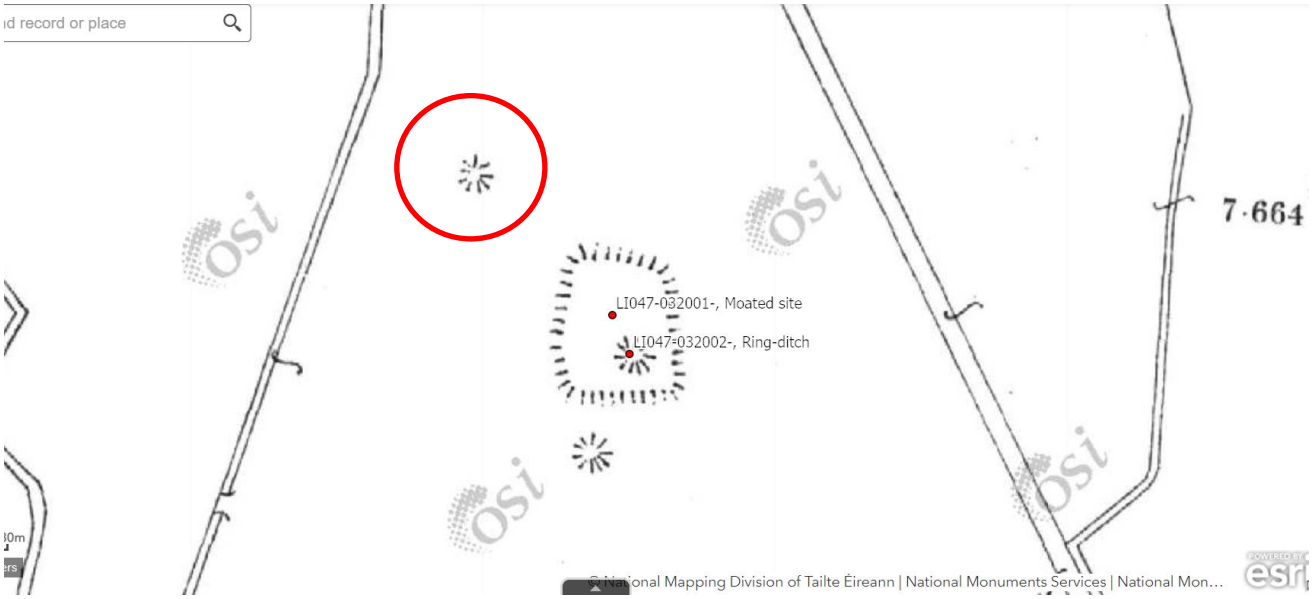
Google Earth 2015

Google Earth 2016

Google Earth 2020

Google Earth 2021

Apple maps satellite



1st ed. Twenty five inch OS map. Note that the symbol used underestimates size of enclosure.

An Roinn Tithíochta, Rialtais Áitiúil agus Oidhreachta
Department of Housing, Local Government and Heritage

APPENDIX. SITE 7

NATIONAL MONUMENTS SERVICE

Monument Report Form

The following report form has been designed to assist persons who may wish to supply information on newly discovered monuments. The current operational policy of the National Monuments Service is primarily to record monuments dating from the pre-AD 1700 period. Please check the records of the Archaeological Survey of Ireland on the National Monuments Service website www.archaeology.ie before sending in a report to ensure that the monument has not already been recorded. This Monument Report Form will form part of the Sites and Monuments Record.

County: Limerick

Townland(s): Ballynagoul

Classification: (e.g., ringfort, standing stone, cairn, mound) Ring-ditch

Irish Transverse Mercator co-ordinates: E: 5 5 4 5 2 6 N: 6 2 6 7 9 7

Irish Grid co-ordinates: E: N:

The Archaeological Survey of Ireland uses mapping provided by OSI: this utilises the Irish Transverse Mercator (ITM) co-ordinate system. This replaces the former Irish Grid referenced mapping. If possible, please supply ITM co-ordinates. These should be determined using a Global Positioning System (GPS) unit that is enabled for the ITM co-ordinate system. A twelve-figure reference should be determined at the centre of the monument (six for easting and six for northing). Alternatively, users may derive the ITM co-ordinates from the mapping component of the National Monuments Service website (www.archaeology.ie).

Source of co-ordinates (please fill one): GPS ☐ Website ■

Name of person compiling report (Block Capitals): DR EUGENE COSTELLO

Address:

Phone no.:

Email address:

Setting of monument: (i.e., situation and land use in and around monument, etc.)
In flat pasture land, 340m east of the Glen River, on clayey alluvial soil.

Condition of monument: (i.e., whether obscured by trees, scrub, bushes, etc.)
The enclosure is covered by grass, with a hawthorn bush growing on its north-western side.

Local information: (i.e., local name, field name, past history, etc.)

There is no known local information about the site.

References (where relevant): (i.e. publications, web address, etc.)

Other notes: *For example, if the monument has been found as the result of a licensed archaeological investigation then the **licence number** should be given and if the monument has been completely excavated (i.e. there is **NO** surviving archaeology above or below ground surface) this should be noted here. If the monument has been discovered as the result of geophysical investigations then this should be stated. If there is a planning application associated with it, the planning reference number should be given.*

Summary description of monument: (additional details may be supplied on a separate page(s))

A circular ring ditch with a total diameter of 8m. The ditch defining the site is 0.2-0.3m in depth and 1m in width. There is no obvious entrance or causeway across the ditch although a hawthorn growing on its north-western may obscure one. The ring ditch is visible on several aerial photographs (see below) and is also marked on the first edition twenty five inch OS map from 1897.

This may be a prehistoric ring ditch given that it has similarities in terms of shape and size to sites found elsewhere in Munster (see Doody 1993; Doody 2001; Doody 2008; Cleary and Hawkes 2015). For example, it is particularly reminiscient of a ring ditch excavated at Knockgraffon in Co. Tipperary (McGarry 2009, Fig. 5).

Other ring ditches are found to the north and south of this one in the same field.

Cleary, R.M. and Hawkes, A. 2014. Munster ring-ditches, fulachtaí fia and the excavations at Carrigtohill, Co. Cork. *Journal of Irish Archaeology*, *23*, pp.97-121.
Doody, M. 1993. The Bruff Aerial Photographic Survey. Tipperary Historical Journal 1993, pp. 173-180.
Doody, M. 2001. Medium altitude aerial photographic survey in East Limerick and West Tipperary. The Journal of Irish Archaeology 2001, pp.13-24.
Doody, M. 2008. The Ballyhoura Hills Project. Discovery Programme Monograph No. 7. Wordwell, Bray.
McGarry, T. 2009. Irish late prehistoric burial ring-ditches, in Gabriel Cooney et al. (eds.), Relics of old decency: archaeological studies in later prehistory, pp.413-423

Report accompanied by a sketch plan and/or section, elevation drawings? Yes ☐ ■

Report accompanied by a copy of OS map Yes ☐ **and/or aerial photo:** Yes ■

It is important that the report be accompanied by either a map or aerial photograph (web-derived aerial photos are acceptable) with the location and extent of the 'monument' clearly marked on it. The aerial photo or map must be at a scale where field boundaries are clearly visible to enable it be referenced to Ordnance Survey Ireland mapping.

Checked against National Monuments Service website, www.archaeology.ie: Yes ■

Signed: Eugene Costello **Date:** 6 January 2024

On completion of this form please send it, together with any supporting documentation, to:

Archaeological Survey of Ireland
National Monuments Service
Department of Housing, Local Government and Heritage
The Custom House (Room G50)
Dublin 1
Dublin D01 W6XO

nationalmonuments@housing.gov.ie

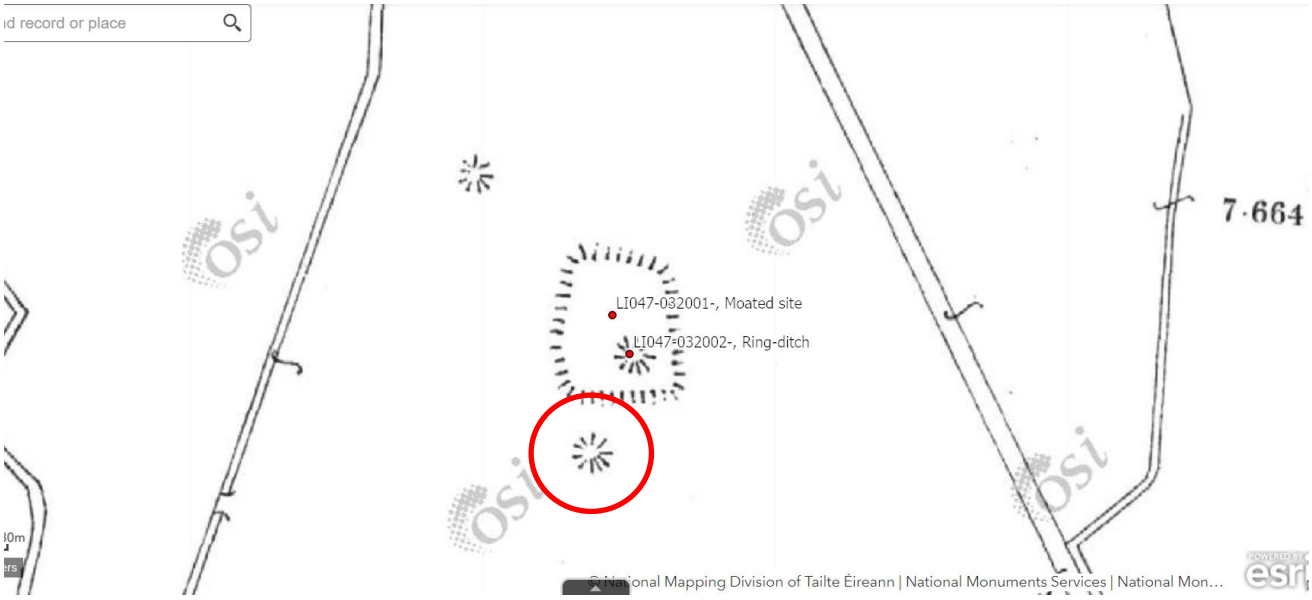
PRIVACY STATEMENT

The Department is committed to protecting and respecting your privacy and employs appropriate technical and organisational measures to protect your information from unauthorised access. The Department will not process your personal data for any purpose other than that for which they were collected. Personal data may be exchanged with other Government Departments, local authorities, agencies under the aegis of the Department, or other public bodies, in certain circumstances where this is provided for by law. The Department will only retain your personal data for as long as it is necessary for the purposes for which they were collected and subsequently processed. When the business need to retain this information has expired, it will be examined with a view to destroying the personal data as soon as possible, and in line with Department policy. Further information on Data Protection can be found on our website at: http://www.housing.old.gov.ie/corporate/compliance/data-protection/data-protection

View of site, looking north east. Ring ditch is under and immediately right of the base of hawthorn.

View of site, looking north east (closer). Ring ditch is under and immediately right of the base of hawthorn.

View of site, looking south-west. Ring ditch is under and immediately left of base of hawthorn.



1st ed. Twenty five inch OS map.

OSI MapGenie 2006-12

Google Earth 2012

Google Earth 2015 (zoomed in)

Google Earth 2016 (zoomed in)

An Roinn Tithíochta, Rialtais Áitiúil agus Oidhreachta
Department of Housing, Local Government and Heritage

APPENDIX. SITE 8

NATIONAL MONUMENTS SERVICE

Monument Report Form

The following report form has been designed to assist persons who may wish to supply information on newly discovered monuments. The current operational policy of the National Monuments Service is primarily to record monuments dating from the pre-AD 1700 period. Please check the records of the Archaeological Survey of Ireland on the National Monuments Service website www.archaeology.ie before sending in a report to ensure that the monument has not already been recorded. This Monument Report Form will form part of the Sites and Monuments Record.

County: Limerick

Townland(s): Ballynagoul

Classification: (e.g., ringfort, standing stone, cairn, mound) Ring-ditch

Irish Transverse Mercator co-ordinates: E: 5 5 5 0 7 2 N: 6 2 5 7 8 6

Irish Grid co-ordinates: E: N:

The Archaeological Survey of Ireland uses mapping provided by OSI: this utilises the Irish Transverse Mercator (ITM) co-ordinate system. This replaces the former Irish Grid referenced mapping. If possible, please supply ITM co-ordinates. These should be determined using a Global Positioning System (GPS) unit that is enabled for the ITM co-ordinate system. A twelve-figure reference should be determined at the centre of the monument (six for easting and six for northing). Alternatively, users may derive the ITM co-ordinates from the mapping component of the National Monuments Service website (www.archaeology.ie).

Source of co-ordinates (please fill one): GPS ☐ Website ■

Name of person compiling report (Block Capitals): DR EUGENE COSTELLO

Address:

Phone no.:

Email address:

Setting of monument: (i.e., situation and land use in and around monument, etc.)
In flat pasture land, 795m east of the Glen river, on clayey soil.

Condition of monument: (i.e., whether obscured by trees, scrub, bushes, etc.)
Several recent machine tracks over the site are visible.

Local information: (i.e., local name, field name, past history, etc.)

There is no known local information about the site.

References (where relevant): (i.e. publications, web address, etc.)

Other notes: *For example, if the monument has been found as the result of a licensed archaeological investigation then the **licence number** should be given and if the monument has been completely excavated (i.e. there is **NO** surviving archaeology above or below ground surface) this should be noted here. If the monument has been discovered as the result of geophysical investigations then this should be stated. If there is a planning application associated with it, the planning reference number should be given.*

Summary description of monument: (additional details may be supplied on a separate page(s))

A circular ring ditch with a total diameter of 7.8m. The ditch defining the site is 0.2m in depth and 1.1m in width. It contains rushes and is partly waterlogged on the south east. There is no obvious entrance or causeway across the ditch. The ring ditch is visible on several aerial photographs as well as in the field (see below).

This may be a prehistoric ring ditch given that it has similarities in terms of shape and size to sites found elsewhere in Munster (see Doody 1993; Doody 2001; Doody 2008; Cleary and Hawkes 2015; McGarry 2009, Fig. 5.

Immediately north west and north of the ring ditch are the remains of a number of relict, pre-19th century field boundaries. These may not be contemporary with the ring ditch but they could be early modern or late medieval in date.

Several other ring ditches are found further north and north west of this site in the same and neighbouring townlands.

Cleary, R.M. and Hawkes, A. 2014. Munster ring-ditches, fulachtaí fia and the excavations at Carrigtohill, Co. Cork. *Journal of Irish Archaeology*, *23*, pp.97-121.
Doody, M. 1993. The Bruff Aerial Photographic Survey. Tipperary Historical Journal 1993, pp. 173-180.
Doody, M. 2001. Medium altitude aerial photographic survey in East Limerick and West Tipperary. The Journal of Irish Archaeology 2001, pp.13-24.
Doody, M. 2008. The Ballyhoura Hills Project. Discovery Programme Monograph No. 7. Wordwell, Bray.
McGarry, T. 2009. Irish late prehistoric burial ring-ditches, in Gabriel Cooney et al. (eds.), Relics of old decency: archaeological studies in later prehistory, pp.413-423

Report accompanied by a sketch plan and/or section, elevation drawings? Yes ☐

■

Report accompanied by a copy of OS map Yes ☐ **and/or aerial photo:** Yes ■

It is important that the report be accompanied by either a map or aerial photograph (web-derived aerial photos are acceptable) with the location and extent of the 'monument' clearly marked on it. The aerial photo or map must be at a scale where field boundaries are clearly visible to enable it be referenced to Ordnance Survey Ireland mapping.

Checked against National Monuments Service website, www.archaeology.ie: Yes ■

Signed: _____ **Date:** 02 March 2024

On completion of this form please send it, together with any supporting documentation, to:

Archaeological Survey of Ireland
National Monuments Service
Department of Housing, Local Government and Heritage
The Custom House (Room G50)
Dublin 1
Dublin D01 W6XO

nationalmonuments@housing.gov.ie

PRIVACY STATEMENT

The Department is committed to protecting and respecting your privacy and employs appropriate technical and organisational measures to protect your information from unauthorised access. The Department will not process your personal data for any purpose other than that for which they were collected. Personal data may be exchanged with other Government Departments, local authorities, agencies under the aegis of the Department, or other public bodies, in certain circumstances where this is provided for by law. The Department will only retain your personal data for as long as it is necessary for the purposes for which they were collected and subsequently processed. When the business need to retain this information has expired, it will be examined with a view to destroying the personal data as soon as possible, and in line with Department policy. Further information on Data Protection can be found on our website at: http://www.housing.old.gov.ie/corporate/compliance/data-protection/data-protection

Google Earth April 2015

Google Earth March 2016

Google Earth March 2017

Google Earth September 2018

Google Earth March 2020

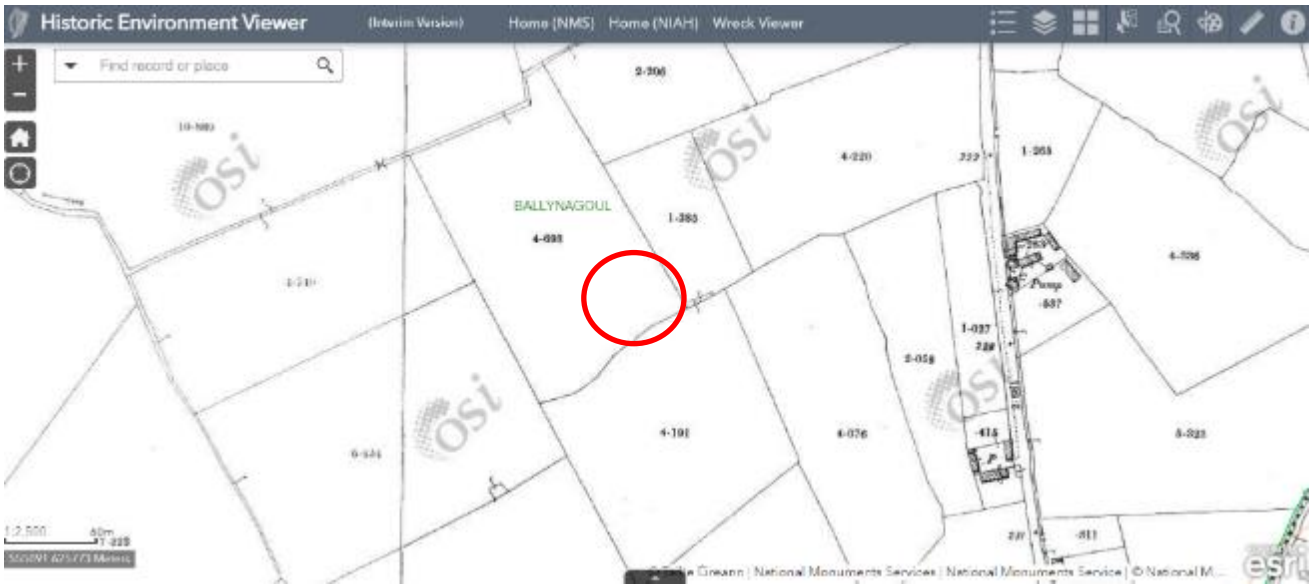
Google Earth April 2021

OSI Digital Globe


N-facing view of ring ditch, located just right of middle centreground. Note relict field boundary in left centreground.

NE-facing view of ring ditch. Young rushes mark the ditch in left centreground and water-filled machine tracks mark the ditch just below right centreground.

ENE-facing view of ring ditch. Again, young rushes mark location of ditch on left and the water-filled machine tracks mark its location on right.



OS First edition 25 inch map (1897)

An Roinn Tithíochta, Rialtais Áitiúil agus Oidhreachta
Department of Housing, Local Government and Heritage

APPENDIX. SITE 9

NATIONAL MONUMENTS SERVICE

Monument Report Form

The following report form has been designed to assist persons who may wish to supply information on newly discovered monuments. The current operational policy of the National Monuments Service is primarily to record monuments dating from the pre-AD 1700 period. Please check the records of the Archaeological Survey of Ireland on the National Monuments Service website www.archaeology.ie before sending in a report to ensure that the monument has not already been recorded. This Monument Report Form will form part of the Sites and Monuments Record.

County: Limerick

Townland(s): Ballynagoul

Classification: (e.g., ringfort, standing stone, cairn, mound) Ringfort - rath

Irish Transverse Mercator co-ordinates: E: 5 5 4 7 2 0 N: 6 2 5 1 2 2

Irish Grid co-ordinates: E: N:

The Archaeological Survey of Ireland uses mapping provided by OSI: this utilises the Irish Transverse Mercator (ITM) co-ordinate system. This replaces the former Irish Grid referenced mapping. If possible, please supply ITM co-ordinates. These should be determined using a Global Positioning System (GPS) unit that is enabled for the ITM co-ordinate system. A twelve-figure reference should be determined at the centre of the monument (six for easting and six for northing). Alternatively, users may derive the ITM co-ordinates from the mapping component of the National Monuments Service website (www.archaeology.ie).

Source of co-ordinates (please fill one): GPS ☐ Website ■

Name of person compiling report (Block Capitals): DR EUGENE COSTELLO

Address:

Phone no.:

Email address:

Setting of monument: (i.e., situation and land use in and around monument, etc.)
In lowland pasture, 150m north of a townland boundary, on clayey soil.

Condition of monument: (i.e., whether obscured by trees, scrub, bushes, etc.)
The enclosure is covered by grass.

Local information: (i.e., local name, field name, past history, etc.)

There is no known local information about the site.

References (where relevant): (i.e. publications, web address, etc.)

Other notes: *For example, if the monument has been found as the result of a licensed archaeological investigation then the **licence number** should be given and if the monument has been completely excavated (i.e. there is **NO** surviving archaeology above or below ground surface) this should be noted here. If the monument has been discovered as the result of geophysical investigations then this should be stated. If there is a planning application associated with it, the planning reference number should be given.*

Summary description of monument: (additional details may be supplied on a separate page(s))

A roughly circular enclosure with a total diameter of 50m north west to south east and 44.5m north east to south west. It is defined externally by one enclosing bank 6m in width. A gap in this bank in the north east may be an entrance-way. Inside this bank is a fosse 2m in width and at the centre of the site is a slightly-raised 27m-wide platform. The site may have been partly levelled by 1840, since it is not depicted on the first edition six-inch map. Nevertheless, the outline of the enclosure is clearly visible on LiDAR and numerous aerial photographs (see below). Based on the site's size and morphology, it is likely to be a ringfort and may fall into the platform ringfort category (O'Sullivan et al. 2014, 50-53).

O'Sullivan, A. et al. 2014. Early Medieval Ireland AD 400–1100: The Evidence from Archaeological Excavations. Second Edition. Dublin: Royal Irish Academy.

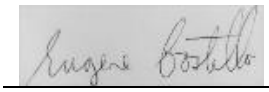
Report accompanied by a sketch plan and/or section, elevation drawings? Yes ☐

☐

Report accompanied by a copy of OS map Yes ■ **and/or aerial photo:** Yes ■

It is important that the report be accompanied by either a map or aerial photograph (web-derived aerial photos are acceptable) with the location and extent of the 'monument' clearly marked on it. The aerial photo or map must be at a scale where field boundaries are clearly visible to enable it be referenced to Ordnance Survey Ireland mapping.

Checked against National Monuments Service website, www.archaeology.ie: Yes ■

Signed:  **Date:** 4 March 2024

On completion of this form please send it, together with any supporting documentation, to:

Archaeological Survey of Ireland
National Monuments Service
Department of Housing, Local Government and Heritage
The Custom House (Room G50)
Dublin 1
Dublin D01 W6XO

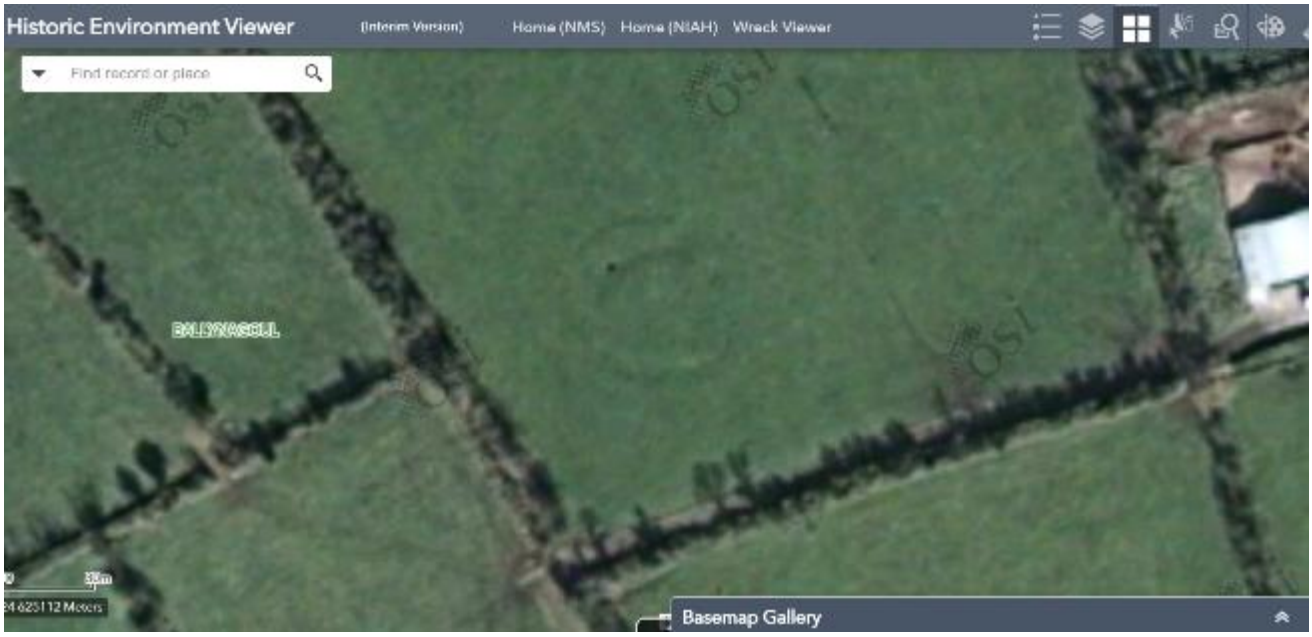
nationalmonuments@housing.gov.ie

PRIVACY STATEMENT

The Department is committed to protecting and respecting your privacy and employs appropriate technical and organisational measures to protect your information from unauthorised access. The Department will not process your personal data for any purpose other than that for which they were collected. Personal data may be exchanged with other Government Departments, local authorities, agencies under the aegis of the Department, or other public bodies, in certain circumstances where this is provided for by law. The Department will only retain your personal data for as long as it is necessary for the purposes for which they were collected and subsequently processed. When the business need to retain this information has expired, it will be examined with a view to destroying the personal data as soon as possible, and in line with Department policy. Further information on Data Protection can be found on our website at: http://www.housing.old.gov.ie/corporate/compliance/data-protection/data-protection

OPW LiDAR survey 2011 (Open Topographic Data Viewer)

OSI 1995 orthophotography



OSI Aerial 2006-12

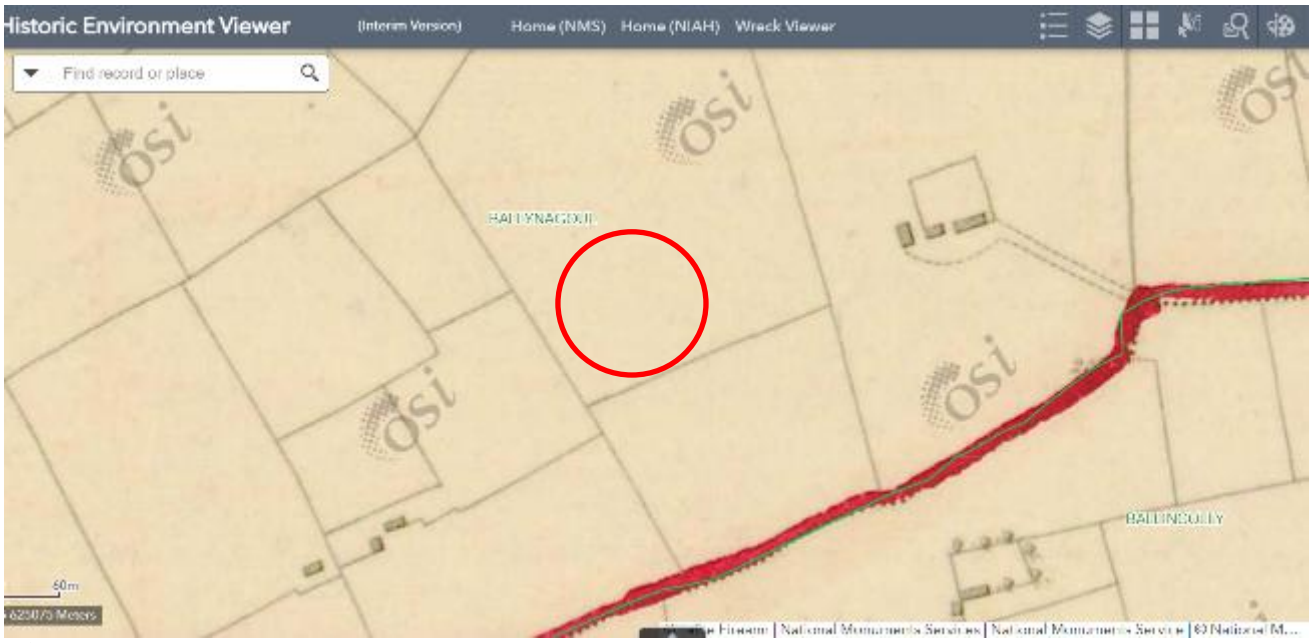
Digital Globe 2011-13

Google Earth March 2012

Google Earth March 2016

Google Earth September 2018

Google Earth March 2020



1st ed. six inch OS map 1840.

An Roinn Tithíochta, Rialtais Áitiúil agus Oidhreachta
Department of Housing, Local Government and Heritage

APPENDIX. SITE 10

NATIONAL MONUMENTS SERVICE

Monument Report Form – Archaeological Survey of Ireland

The following report form has been designed to assist persons who may wish to supply information on possible monuments. Please check the records of the Archaeological Survey of Ireland on the National Monuments Service website www.archaeology.ie before sending in a report to ensure that the monument has not already been recorded. This Monument Report Form may form part of the Archaeological Inventory (Sites and Monuments Record) [1]

County: Limerick

Townland(s): Garrane

Suggested Classification: (e.g., ringfort, standing stone, cairn, mound) Enclosure

Location:
The Archaeological Survey of Ireland uses mapping provided by Tailte Éireann: this utilises the Irish Transverse Mercator (ITM) co-ordinate system. If possible, please supply ITM co-ordinates. Users may derive the 12-figure ITM co-ordinates by taking the reading at the bottom left of the screen on the Historic Environment Viewer on the National Monuments Service website (www.archaeology.ie) while using the Mouse to point at the relevant location.
Alternatively, the co-ordinates should be determined using a Global Positioning System (GPS) unit that is enabled for the ITM co-ordinate system. The 12-figure reference should be determined at the centre of the monument: six for easting (E) and six for northing (N).

Irish Transverse Mercator co-ordinates:	E:	5	5	3	7	2	2	N:	6	2	7	7	8	6

Source of co-ordinates (please indicate which): GPS ☐ NMS Website ■

Setting of monument: (i.e., situation and land use in and around monument, etc.)
In grazing land 300m east of the N20 and 360m north of the River Maigue.

Condition of monument: (i.e., whether obscured by trees, scrub, bushes, etc.)

Local information: (i.e., local name, field name, past history, etc.)

There is no known local information about the site.

References (where relevant): (i.e. licences, publications, web address, etc.)

Note:
If the monument has been found as the result of a licensed archaeological investigation, please supply the **licence number:** _____
And if the monument has been completely excavated (i.e. there is **NO** surviving archaeology above or below ground surface) this should be clearly stated.

If the monument has been discovered as the result of geophysical investigations, please supply the **R Number:** _____

If associated with a planning application, please supply the **planning reference number**: _____

Summary description of monument: (additional details may be supplied on a separate page(s))

A plectrum-shaped enclosure with a maximum length of 60m north to south. The enclosure is widest in the south, measuring 52m east to west, and narrows to a width of 17m, east to west, in the north. The enclosure has three rounded corners, one in the south west, another in the south east and a third in the north. The enclosure is defined on the south and east by a shallow 2.5m wide ditch, now largely infilled. On the western side it is defined by an old stream bed. 12m to the east is a large earthwork, consisting of three conjoined enclosures (LI047-116).

The enclosure is visible on TII LiDAR imagery from 2011 (see below) as well as on several Google Earth satellite images (see below).

The date of this plectrum enclosure is uncertain but in terms of shape it is highly reminiscent of early medieval plectrum-shaped enclosures found elsewhere in Limerick and the country. Many examples of non-circular settlement enclosures have been excavated since the early 2000s (Coyne 2006; Kinsella 2010). The enclosure here in Garrane is of a similar size and shape to Enclosure B at Twomileborris in Tipperary (Ó Droma 2008) and to the largest enclosure at Roestown 2 Rath, Meath (O'Hara 2009).

Coyne, F. 2006. Excavation of an early medieval 'plectrum-shaped' enclosure at Newtown, Co. Limerick. In J. O'Sullivan and M. Stanley (eds), *Settlement, industry and ritual*, 63-72. National Roads Authority Monograph Series 3. Dublin. National Roads Authority/Wordwell

Kinsella, J. 2010. A new Irish early medieval site type? Exploring the 'recent' archaeological evidence for non-circular enclosed settlement and burial sites. *Proceedings of the Royal Irish Academy: Archaeology, Culture, History, Literature*, *110*(1), pp.89-132.

Ó Droma, M. 2008. Archaeological investigations at Twomileborris, Co. Tipperary. In O'Sullivan, J. and Stanley, M. (eds.), *Roads, Rediscovery and Research*, pp.45-58.

O'Hara, R. 2009. Early medieval settlement at Roestown 2. In M. Deevy and D. Murphy (eds), *Places along the way: first findings on the M3*, 57-82. National Roads Authority Scheme Monograph Series 5. Dublin. National Roads Authority/Wordwell

Please indicate if:

Report is accompanied by a sketch plan and/or section, elevation drawings? Yes ☐

Report is accompanied by a copy of OS map Yes ■

Report is accompanied by an aerial photograph or satellite image: Yes ■

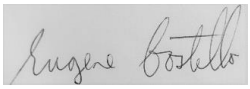
Note. It is important that the report be accompanied by a copy of **either** *a map* **or** *aerial photograph* or *satellite image* with the location of the monument clearly marked on it. The *map* or *aerial photograph* or *satellite image* must be at a scale where field boundaries are clearly visible to enable it be referenced to Tailte Éireann mapping. **The *map* or *photograph* or *satellite image* source (which may be web-derived) should be cited and include date of imagery.**

I have checked against the National Monuments Service website: Yes ■
www.archaeology.ie

Name of person compiling report (Block Capitals): Dr Eugene Costello

Email address: _____

Phone number: _____

Signed:  **Date:** 5 January 2025

On completion of this form please send it, together with any supporting documentation, to:

nationalmonuments@housing.gov.ie

OR

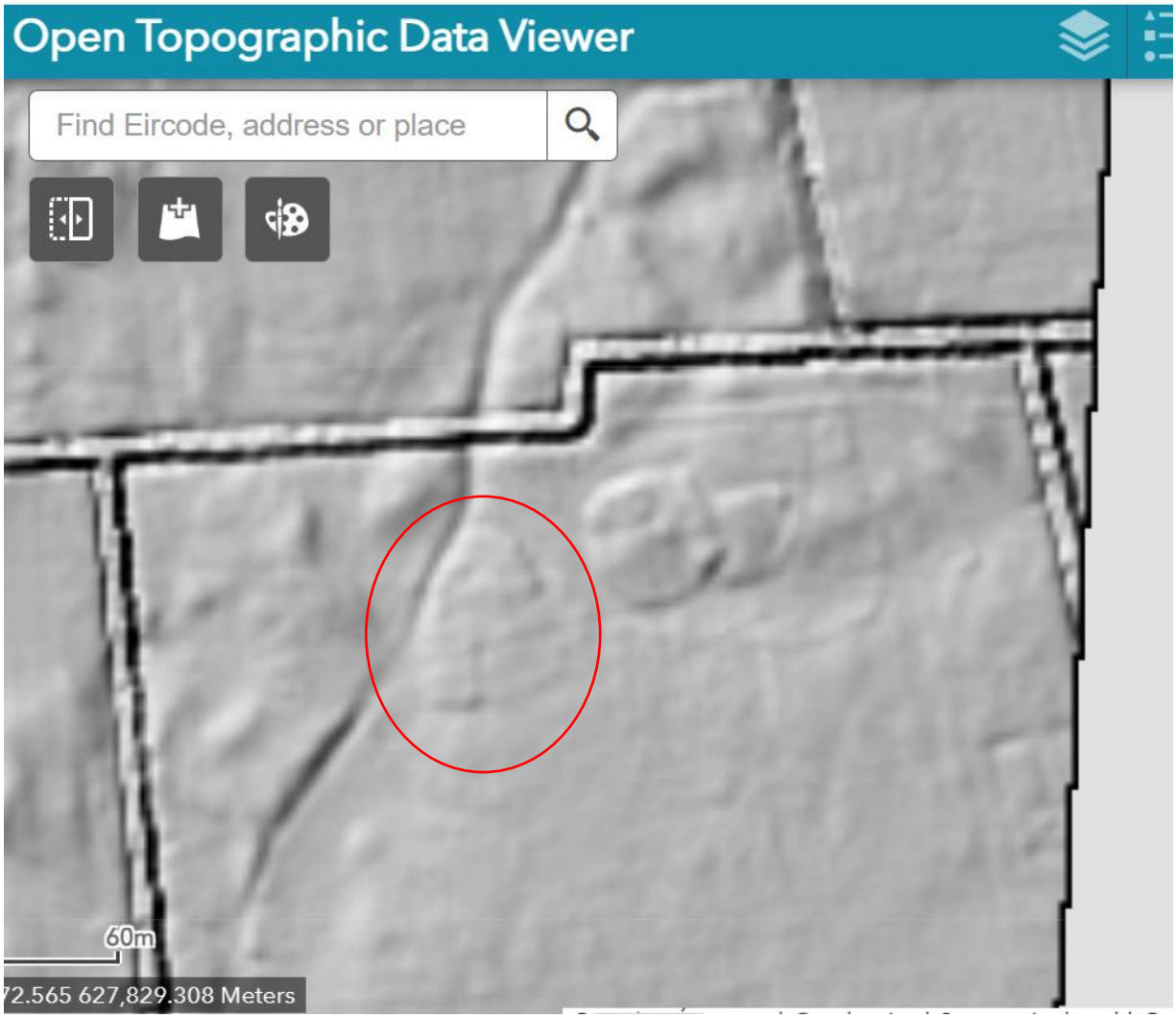
The Archaeological Survey of Ireland,
National Monuments Service,
Department of Housing, Local Government and Heritage,
The Custom House (Room G50).
Dublin 1
D01 W6XO

PRIVACY STATEMENT

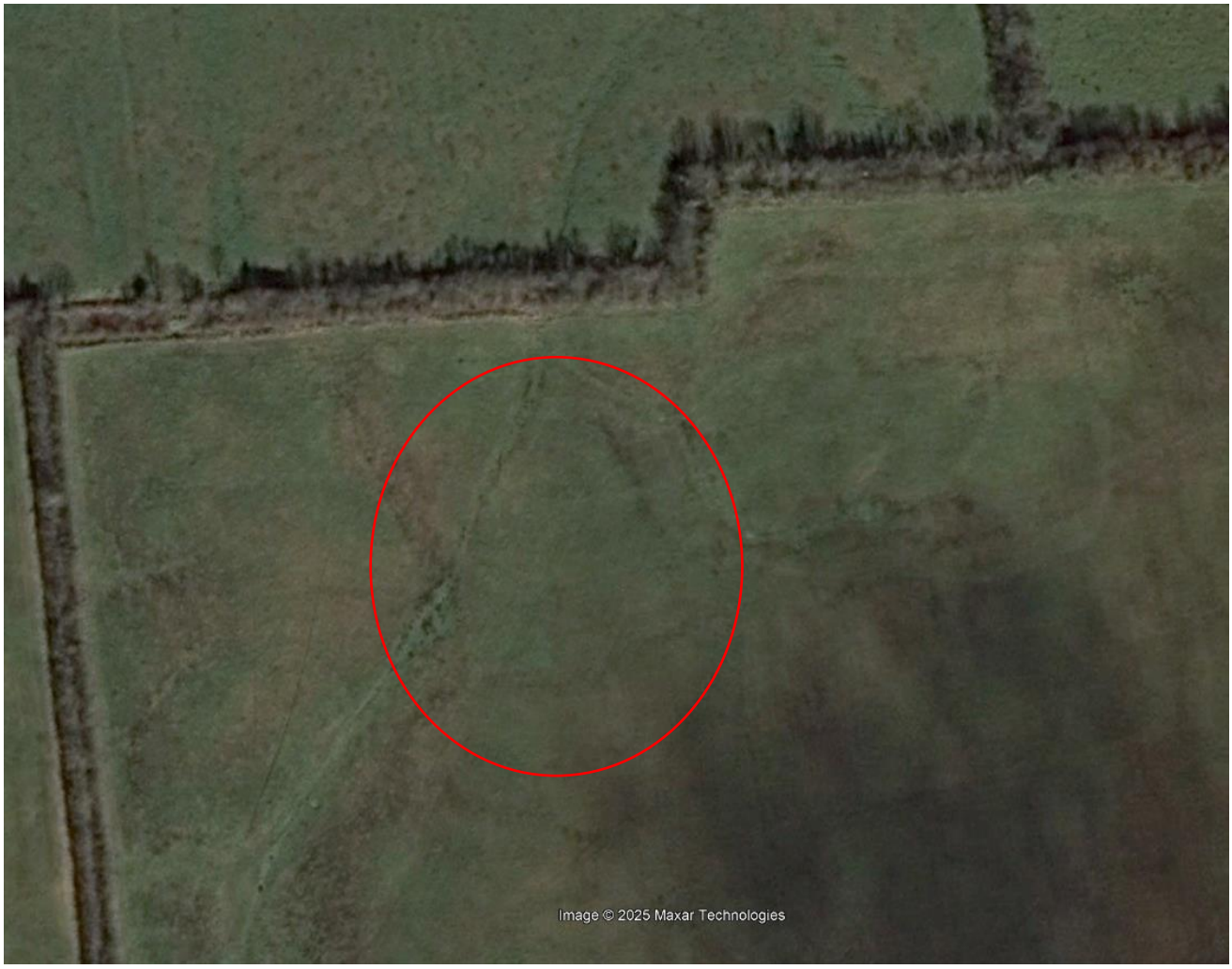
The Department is committed to protecting and respecting your privacy and employs appropriate technical and organisational measures to protect your information from unauthorised access. The Department will not process your personal data for any purpose other than that for which they were collected. Personal data may be exchanged with other Government Departments, local authorities, agencies under the aegis of the Department, or other public bodies, in certain circumstances where this is provided for by law. The Department will only retain your personal data for as long as it is necessary for the purposes for which they were collected and subsequently processed. When the business need to retain this information has expired, it will be examined with a view to destroying the personal data as soon as possible, and in line with Department policy.

Further information on Data Protection can be found on our website at: https://www.gov.ie/en/organisation-information/648102-data-protection/

[1] The *Historic and Archaeological Heritage and Miscellaneous Provisions Act (2023)* was signed into law on 14 October 2023. Under *Section 158* of the bill, the Minister is required to make inventories of relevant things of archaeological interest, architectural heritage, and wrecks of archaeological or historic interest.

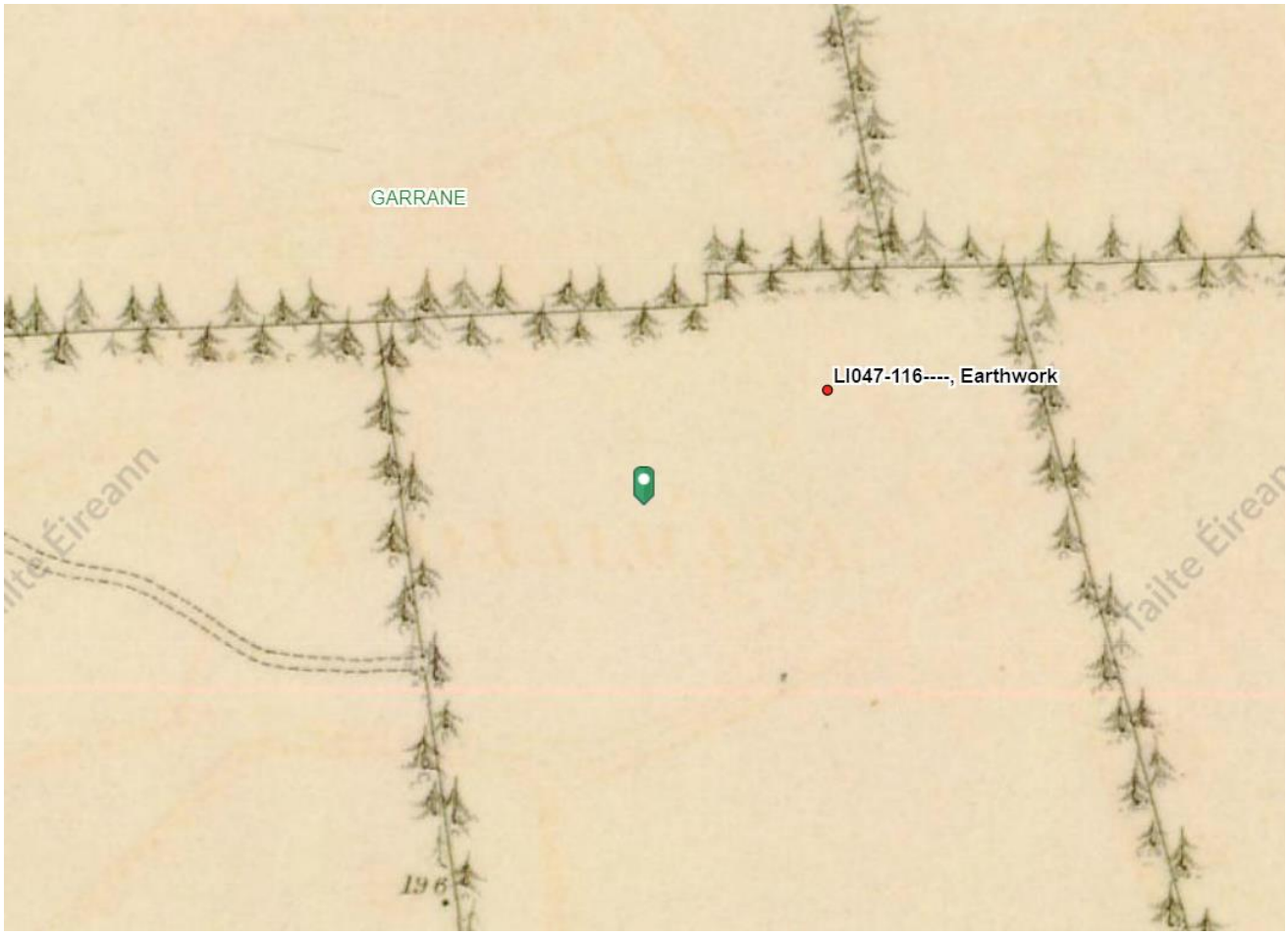


TII 2011 LiDAR imagery.



Google Earth 2016

Google Earth March 2020



First Edition six inch OS