Carol and Cathal Miller
Sharavogue
Birr, Co Offaly
R42WR50

30-06-26

An Coimisiun Pleanala
32 Marlbough Street
Dublin 1
D01V902

**Re: Objection – Planning Application PAX92.324279**
**Ballincor Wind Farm, Co Offaly/Co Tipperary**

To Whom It May Concern

We, Cathal & Carol Miller, wish to formally and strongly object to the proposed Ballincor Wind Farm Development. PAX92.324279. We are Receptor 261, as allocated in the above planning application.

We are living on the eastern arc of the proposed wind farm site and our lives will be profoundly affected by much of what RWE have submitted for planning permission, shadow flicker, noise, visual impact and road safety.

We have been living in this rural community since April 2002. We chose the location, after viewing many other areas, because of the community, the peace, tranquility and fantastic views offered.

We built our home by direct labour. As Cathal works in the construction industry, he completed much of the work himself, a labour of love.

During the recession and austerity years, the construction industry was one of the worst areas affected. We lived with the constant prospect of having to immigrate. We worked all hours to pay the mortgage and keep our home. We know the value of our home. We love our home.

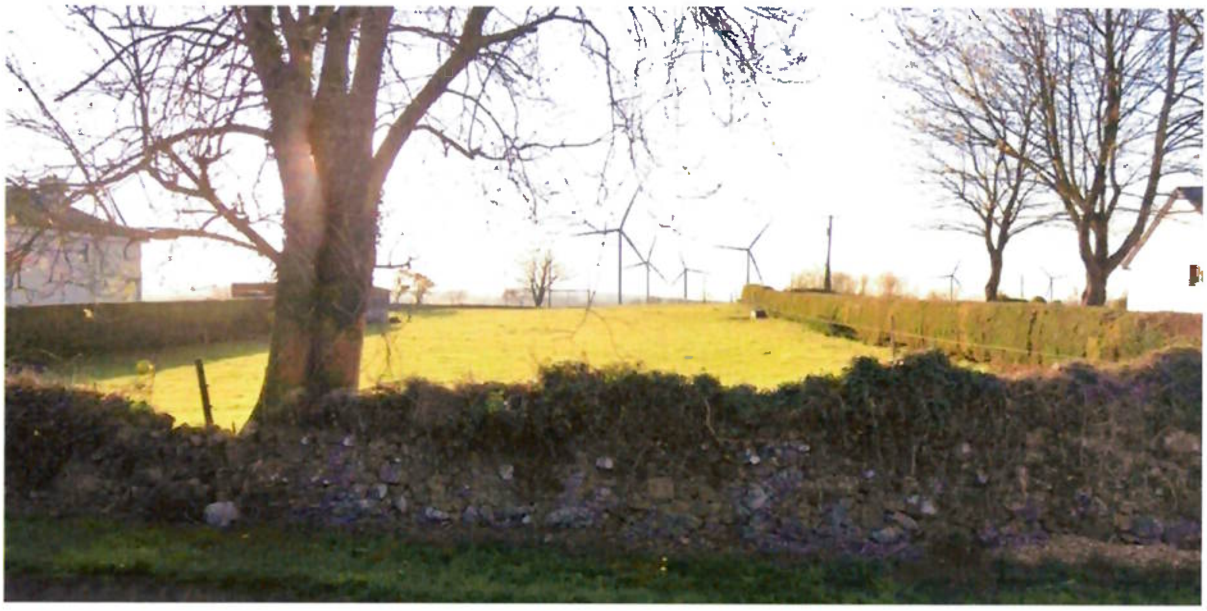
The panoramic views offered, include luscious greenery, distant mountain views and from the back kitchen and bedrooms we get the most beautiful views of the Little Brosna River and environs. Each morning, when opening our blinds we are greeted with breathtaking views which often include fog bog and river fog, and the different hues from the rising sun. The sun moves to the back of our house by mid-afternoon and is then directly behind our kitchen and bedrooms. At sunset we are lucky to experience the magnificent colours that are thrown across the sky. This is the optimal time for our family to sit out and enjoy the evening chorus from the many birds species and watch the setting sun.

Unfortunately, our views also include the 8 turbines in Knockshegowna.

As mentioned above, we are receptor 261, as per the RWE submission. This allocated number means we are 1040m from the nearest turbine. This number, receptor 261,means that, if this development is permitted, our family's lives will never be the same again.

## Visual Impact

From my home on the eastern arc of the Ballincor site, I have a clear and unobstructed view across the proposed development area. The community group conducted its own Visual Impact assessment and provided me with images from my next door neighbours home. We share the same view from the back of our house.



The view above represents the view I will have from my home. If this development is permitted, that landscape will be occupied by eleven turbines of 180 metres tip height — nearly twice the height of the structures currently visible in this area. Because my home sits on ground that is higher than the turbine bases on the bog, I will not see these turbines as distant structures against a sky. I will see the rotating blades at or near my eye level, across a flat and open landscape with no intervening high ground. This is not what most people imagine when they picture a wind farm on a distant hilltop. This is eleven rotating structures at eye level across the landscape I look at from my home, for 25 years, with no possibility of screening them out.

Almost every wind farm visual assessment in Ireland assumes the same basic geometry: turbines sit on elevated ground, people view them from lower ground, and the turbines are seen as structures rising above the horizon. Screening from hedgerows, hillsides, and distance reduces their visual presence with distance.
At Ballincor the geometry is reversed. The turbines sit on flat bogland at roughly 50 metres above sea level. My home on the eastern arc sits on higher ground. I am looking across at — and in some respects down into — the rotor sweep, not up at it. At 180 metres tip height, with blade bottoms at roughly 17 metres above the turbine base, a home on higher ground sees the full rotating disc of the rotor against the landscape, not just turbine tops appearing over a horizon.

From my position on the eastern arc of the site, I expect all or the majority of the eleven proposed turbines to be simultaneously visible from my property. There are no intervening hedgerows, hills, or woodland between my home and the proposed turbine locations that would provide meaningful screening for those turbines on my side of the site.

The developer's assessment selected viewpoints that do not represent the most severely affected receptor situations. The most visually severe receptor condition — an elevated home on the rim looking across at full rotor discs at or near eye level, with no screening — was not selected as a viewpoint for detailed photomontage assessment.

The Applicant underplays the cumulative visual impact of the current 8 Turbines at Knockshegowna, the granted 7 Turbines of Carrig and the proposed 11 of Ballincor. From my home I will see all three windfarms, at varying heights, varying distances but collectively they will absorb the full landscape. This is what the planning literature calls visual clutter and visual dominance. Not one turbine on a distant hill. Not a horizon feature. An encirclement.

The view below is taken above Knockshegowna on the West of the windfarm development. This is not my view but captures the dominance and clutter of Ballincor when embedded in the landscape.

The developer's own LVIA assesses most of the closest residential receptors as having 'Medium-low' visual sensitivity on the grounds that the surrounding landscape is 'everyday working agricultural land.' This framing ignores the elevated bowl geometry. It ignores the absence of screening. It ignores the fact that the Offaly County Development Plan's Wind Energy Strategy designates this very area as 'High Scenic Sensitivity' and unsuitable for development of this nature. Clearly the landscape cannot absorb it and the windfarm will be visually dominant and over-bearing.

## Shadow Flicker

We adopt and rely on the full shadow flicker submission made by the Greater Birr Wind Action Group to An Coimisiun Pleanala, as part of this application. That submission is a forensic analysis of Chapter 16, and Appendices 16.1, 16.2 and 16.3 of the EIAR, conducted entirely from the applicant's own documents. What follows, concerns my property specifically, as identified in Case Study 3, of the Greater Birr Wind Action Group's own submission.

Receptor 261, my home, is one of the three properties selected as case studies in the group shadow flicker submission precisely because it illustrates, every failure identified in the applicant's assessment. I am one of the most frequently affected properties in the entire study.

The applicant's own WindPRO Appendix 16-1 records the total number of shadow days for every property assessed. For Receptor 261, that figure is 185 days per year. This data was produced by the applicant's own software. It does not appear anywhere in Chapter 16 or Table 16-1.

Chapter 16 records 65 days on which shadow flicker exceeds 30 minutes at my property. A reader of Chapter 16 would have no idea that shadow flicker is a recurring feature of this home on an additional 120 days of the year on which it occurs but lasts less than 30 minutes. From October through March — on the majority of clear days —

shadow flicker is part of the daily experience of living here. That is not a marginal impact. That is half the calendar year.

The worst-case annual total at Receptor 261 is 75 hours 40 minutes. For comparison, the applicant's own expected figures, which this submission contests for the reasons set out in the group submission, record expected shadow hours that are used to demonstrate compliance. Those figures cannot be verified: the methodology by which they were derived has not been disclosed and the underlying weather data is drawn from the wrong station and is over 20 years old so vastly out-of-date. Chapter 16 does not present the reality.

Additionally at Receptor 261, my home eye level is above every Single Turbine Blade Bottom. The turbines at Ballincor sit on bogland at 43 to 63 metres above sea level. My property sits on higher ground. The applicant's own Appendix 16-1 records the elevation data for every property assessed, from the applicant's own Digital Terrain Model. Using those figures and the blade bottom clearance of 17 metres confirmed in the EIAR, every single one of the four turbines in my assessment zone has its blade bottom below my eye level.
This matters fundamentally because the shadow flicker model assumes the standard geometry: turbines elevated above the observer, shadows cast downward. At my property, that is not the geometry. I am looking across at turbines whose rotors begin below my horizon. Shadow flicker from all four turbines begins when the sun is at near-zero elevation — the very events the model's 3-degree solar cutoff eliminates entirely. The Group submission establishes that 65 of the 129 assessed properties share this elevated geometry. For Receptor 261 it is total: every turbine, not just the nearest. The model cannot capture the most severe shadow events at my property by design. The figures in Table 16-1 are not a slight underestimate. They are systematically and structurally incomplete for my specific property. This is not a property where the model slightly understates exposure. My property is a property, where the model cannot capture the most significant shadow events.

Furthermore, the applicant's shadow flicker assessment treats exposure from multiple turbines as a cumulative annual total, it adds up the hours. This approach misses an entirely different and more serious category of impact: compound shadow flicker, where two turbines simultaneously cast shadow through the same window at the same time.
Using the ITM coordinates from the applicant's own Appendix 16-1, the bearing from Receptor 261 to each of the four turbines in zone has been calculated. Two of the four turbines appear within close angular proximity as seen from this property. The sun moves at approximately 0.25 degrees per minute in azimuth. The geometric analysis confirms a compound overlap window of approximately 29 minutes on every suitable shadow day — a period during which both turbines simultaneously cast shadow through this property's windows at close to double the flicker frequency of a single turbine.
That 29-minute window does not arrive as a predictable, regular pulse from one turbine. It arrives as an irregular, arrhythmic sequence of blade shadows from two machines at slightly different positions, creating a stimulus that the neurological research identifies

as distinctly more potent than single-turbine exposure. This is not described anywhere in Chapter 16. The EIAR never assesses it.

There is a further critical gap in the mitigation description. Chapter 16 describes a shutdown system calibrated to the 30/30 thresholds. It does not specify whether the system tracks cumulative shadow exposure from all turbines combined at each property, or from each turbine individually. For a property receiving compound exposure from two turbines simultaneously, this distinction is fundamental. If the system tracks each turbine separately, a resident could accumulate up to 30 minutes from each before either triggers shutdown — meaning compound exposure of up to the full permitted daily duration from each turbine in turn before any intervention occurs. That question has never been answered.

The 30-hour annual and 30-minute daily thresholds are legacy administrative limits derived from German planning practice in the 1990s, developed for turbines of 50 to 80 metres in height. They have no medical basis. Research by Voicescu et al. (2016) found that the maximum daily duration of shadow flicker was a better predictor of health annoyance than the annual total — yet Ireland's primary metric is annual hours. The same research found that people with migraines, dizziness, and tinnitus have three times higher odds of shadow flicker annoyance.

The 2019 Draft Wind Energy Development Guidelines state that no existing dwelling should experience shadow flicker as a result of a wind energy development. The applicant quotes this in their own EIAR and correctly notes that under the 2019 approach 'no amount of shadow flicker per day or per year would be acceptable.' They then assess the entire development against the 2006 thresholds. An Coimisiún Pleanála is directly addressed by the 2019 guidelines. The Board is invited to impose the zero-flicker standard the guidelines describe and to note that the assessment submitted does not meet it at Receptor 261.

I ask An Coimisiún Pleanála to find, in relation to Receptor 261:

- That shadow flicker occurs at my property on 185 days per year — a figure the applicant produced and did not disclose in Chapter 16.
- That the observer's eye level at my property is above the blade bottom of every turbine in the calculation zone, making the model's standard geometry incorrect for my property in every single turbine pairing.
- That a confirmed compound overlap window of 29 minutes per suitable shadow day exists and has never been assessed.
- That the expected compliance figures cannot be relied upon: the methodology has not been disclosed, the weather data is drawn from the wrong station and ends in 2006, and there is a direct contradiction between the sunshine station cited in the EIAR text and the station used in the model.

## Noise

I adopt and rely upon the full independent noise and vibration assessment review submitted by the Greater Birr Wind Action Group. That review examines Chapter 11 and all eight appendices of the EIAR using a forensic analysis of the developer's own submitted documents. What follows sets out the aspects most directly relevant to my position as a property owner on the eastern arc of the site.

The Institute of Acoustics Good Practice Guide — the methodology the developer adopted as governing their assessment — requires at section 4.3.9 that 3 decibels be added to predicted noise levels wherever the ground dips between a turbine and a receptor, creating a concave propagation path that standard noise modelling does not capture. This is called the valley correction. It is applied using the JOULE formula.

An exhaustive search of all nine Ballincor noise documents — Chapter 11 and all eight appendices — finds no occurrence of this correction, the JOULE formula, or any term indicating it was considered. The correction was never applied. Three other Irish wind farm assessments running concurrently perform it as standard.

The Ballincor site — turbines elevated on bog, receptors on rising ground to the east and west, lower ground between them — is precisely the geometry this correction was written to address. The concave profile between turbine and elevated receptor is not an edge case at this site. It is the dominant condition.

When the JOULE formula is applied to the developer's own predicted levels using only the developer's own coordinates, elevations, criteria, and ground factor, the result is ten confirmed night-time exceedances at non-landowner residential properties.

The noise monitoring instruments used in this survey have a reliable measurement range starting at 25 dB. Below that level, readings are compressed by the instrument's own internal noise. At every one of the six night-time monitoring locations, between 85% and 96% of all recorded data points fall below that 25 dB floor. The vast majority of the survey data is in the unreliable zone.

When the true background is below 25 dB — as it is in a genuinely quiet rural environment such as the area around this site — the instrument cannot record it accurately. Readings are pulled upward toward the floor rather than reflecting the genuinely quiet environment. This means the background noise curves sit higher than the true acoustic environment. Under the BG+5 limit framework, a higher background produces a higher noise limit. The limits are therefore more permissive than the true quiet environment warrants. The developer benefits from data that overstates the background.

The developer's own Table 11-10 independently confirms this: it records derived background values as low as 17.8 and 18.8 dB — values so far below the 25 dB instrument floor that the readings bear no reliable relationship to the true acoustic environment at those levels.

All seven noise monitoring locations were surveyed between July and September 2022 — the season of lowest wind speeds in Ireland. Background levels at the wind speeds where compliance is tightest, 7 to 8 metres per second, were never measured. They were extrapolated from a regression curve. The developer's own compliance tables show values at these wind speeds in parentheses, AWN's own notation for extrapolated rather than measured figures.

This matters because the Nordex N163 reaches its maximum rated sound power at 7 m/s and stays there at 8 m/s and above. Compliance is tightest precisely at these wind speeds and yet the entire compliance case at those wind speeds depends on figures that AWN's own notation flags as projected rather than measured.

The Applicant made a series of legitimate choices in the methodology applied to their Noise study but every choice made was taken in the *most* permissive direction. The Applicant's noise assessment is operating at the outer edge of what the standards allow which leaves nothing to absorb the correction of steps, as identified above, that were required but not taken.

In Webster & Rollo v Meenacloghspar (Wind) Limited [2024] IEHC 136, Ms Justice Emily Egan held that noise from a wind farm amounted to an unreasonable interference with the enjoyment of neighbouring properties and that compliance with specific noise limits in a planning permission is not a complete answer to a nuisance claim where the permission regulated noise only by reference to decibel levels without engaging with the full range of matters that determine whether residents can in fact live in their homes. An Coimisiún Pleanála is asked to apply that standard here.

I ask that no permission be granted on the basis of a noise assessment that has not applied its own adopted mandatory correction, that cannot verify the calibration of its instruments, and that demonstrates compliance at wind speeds where the background data does not exist.

## The R492

My property entrance is on the R492. This road is the primary haul route for this development. It has been described in the developer's own transport assessment as "relatively narrow, with limited hard shoulders and several bends". It is also described as "generally in good condition" and "suitable for heavy goods vehicles". These two descriptions can not both be accurate. I drive this road every day, I have walked this road, I know this road. The first description is the accurate description.

This rural road, serves homes, farms, agricultural movement (including the movement of walking cattle from one field to another). It serves school runs and further community activities, including to the nearest shop, nursing home and church. Because of the increasing volume of traffic on this road, I will no longer walk it. There are too many dips and hollows that a driver may not see a pedestrian in time and the pedestrian can not safely stand in on any hard shoulder.
It is not a road to be used to serve as the primary haul route for the construction of 11 turbines of 180m tip height.

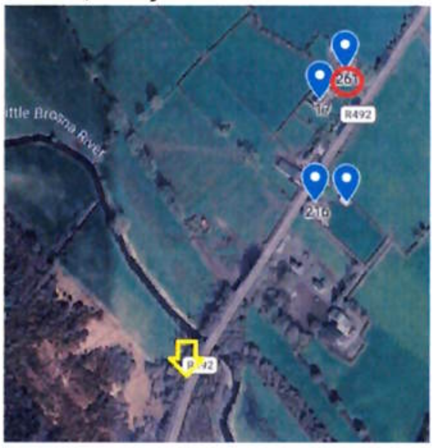
## The Blackbull Junction – Where the N62 meets the R492

This is the proposed junction where the slow-turning construction vehicles and enormous turbine delivery units will block the road, cause back up traffic, on an already very busy, 100km/h national road. The developer's own figures show that this junction handles 747 vehicles in the evening peak. School buses, farm machinery, and ordinary commuters-including the residents of this road will be caught up in these queues. Moreover, any emergency services, doctors and ambulances, needing to access the local Nursing Home, will be caught up in these queues. The developer dismissed this risk by citing 'very low' traffic volumes. This is not the point, however incorrect. The point is this junction was not made for serving a convoy of delivery trucks, slow-moving HGV's or AIL vehicles turning from the high-speed N62 onto the narrow R492, causing back-ups onto the national route, while waiting for the junction to clear.

The Stage 1 Road Safety Audit the developer cites is a preliminary desktop analysis based on initial design layouts. It does not test the reality of a live construction environment – compromised visibility from dust, seasonal glare, the interaction of turbine delivery convoys with farm machinery and school buses on a road that has never carried this scale of traffic. Stage 1 sign-off is not a risk assessment for what actually happens during construction.

## Site Entrance

My house is approx. 400m from the site entrance. See image below, the red circle is my home, the yellow arrow is the site entrance point.




Entering and leaving my own driveway is already, at times, a genuinely dangerous manoeuvre. Since Covid, traffic volumes and speeds on the R492 have increased markedly. What was once a quiet rural road now carries flows and velocities that regularly make ordinary movements hazardous. That is the existing baseline before a single construction vehicle arrives.

My home is situated close to the Double Bridge with a deep hollow in-between before the bend on which the site entrance is proposed. This is the most dangerous point on the road from the Black Bull to Shinrone. I hope the Inspector will consider the physical reality of that location. There is a dip in the ground, a restricted sightline around the bend, and a bridge structure in 57 meters from the proposed site entrance, all combining at precisely the point where slow-turning construction vehicles and concrete trucks are proposed to enter and exit the site. We have had numerous accidents at precisely this location, the hollow on the bridge affects visibility so the bend on the road is often not fully anticipated. I am not raising a theoretical road safety concern.

Person in hi-vis is standing at the site entrance. Image taken on Sharavogue River Bridge **57m from site entrance.** Please note road bend at location.

Image taken 117m on Sharavogue Railway Bridge from site entrance

Image take 182m from site entrance.

Image taken 488m from site entrance. Please note absence of hard shoulder or soft margin. The R492 has a stone wall for most of the road frontage to the site as Sharavogue house and lands is to the left, travelling from the N62 to the site entrance. The R492 will carry heavy axle loads it was not designed for, for two to three years. No independent structural surveys of the bridges has been supplied. The developer has no mechanism to fund emergency repairs to damage caused by the heavy construction traffic other than generic bonding requirements.

Both bridges are listed on the NBHS site, No.s 14938021 and 14938010. The latter, Railway Bridge, dated 1850-1860 is only one of two intact bridges built by the Roscrea and Parsonstown Railway Company that are still remaining. As stated in 'Bridges of Offaly, An Industrial Heritage Review – Fred Hammond" only 3 Brick Arched Bridges are recorded in Co Offaly. One being the defunct Birr Roscrea Railway Bridge. It is an exemplar of the engineering practice of it's day- skew arch with masonry soffit blockwork". Masonry Bridges are found to be more appealing to wild life than modern ones because of the higher frequency of ledges holes and crevices and more varied vegetation which provide shelter for wildlife, especially bats. No such survey was conducted.

I have two children who are inexperienced drivers that use this road. I have observed many elderly people using the road, who are either visiting loved ones in the nearby Nursing Home, Garden Centre or local Shop. How will this cohort of road users be able to safely navigate where to go when the many HGVs and AIL's are trundling towards them with no hard shoulder to use or safe place to pull in?

I am describing the stretch of road I look out at every morning. I want to put on the record how utterly unacceptable and dangerous I believe this proposal is at this specific location.

The developer's transport assessment concludes that the residual effects of this construction on the road network will be "imperceptible / not significant." I reject that conclusion entirely. There is nothing imperceptible about what is being proposed for the N62 Black Bull junction, the R492 access road and site entrance point. For a developer to label impacts of this scale "imperceptible" is to treat the lived reality of every person on these roads as irrelevant and to diminish the genuine safety concerns we all have.

I ask the Inspector to reject that characterisation and to recognise that the transport impacts of this development, at this location, on these roads, are significant, are foreseeable, and have not been adequately assessed or mitigated. I am asking An Coimisiún Pleanála to in particular consider the safety issues at the Site Access point on the R492 and to require binding conditions that protect the road infrastructure, fund emergency repairs, restrict night-time deliveries past residential properties, and give residents genuine protection during a construction operation of this scale on a road network that was never designed for it. I have attached my own photos taken from various distances to prove the visibility and to discredit the developers own submission which is misleading as to where they are proposing the site entrance.

## Sharavogue Bog

My current view extends across Sharavogue Bog SAC, one of the finest remaining Atlantic raised bogs in Ireland, in active State-funded restoration under the EU LIFE Natura Programme. The Wild Nephin National Park model for raised bog restoration is being applied to this very landscape. The ecological and landscape value of this SAC is not a peripheral planning consideration. It is the defining characteristic of the area. Eleven turbines of 180 metres immediately adjacent to this SAC — sited on bog that is itself part of the wider Sharavogue ecosystem will permanently and irreversibly alter the setting of an internationally designated natural heritage site. That alteration cannot be undone. It is not mitigatable. It is not temporary. The developer's LVIA assessed the visual impact on this landscape's setting as 'Moderate-slight.' Here is what it will actually look like. These images use Windplanner software, licensed by the Community group and the actual GPS co-ordinates for the turbines.

Based on the image above and my lived experience beside Sharavogue Bog I do not accept the 'Moderate-slight' assessment from the Developer. I ask An Coimisiún Pleanála to examine it carefully.

## County Development Plan — This Area Is Designated as Unsuitable

The Offaly County Development Plan 2021-2027 Wind Energy Strategy identifies the area in which this development is proposed as unsuitable for wind energy development on grounds of environmental, landscape, and heritage constraints. The Tipperary County Development Plan contains equivalent protections. Both Councils considered the value, the needs and the restoration commitments to the SAC, the adjacent high-sensitivity landscape, the River Brosna as a hydrological corridor of immense importance, the housing density and concluded the area as a whole is unsuitable. The developer's approach of treating the turbine footprint in isolation from its setting is precisely what that designation was designed to prevent.

An Coimisiún Pleanála is asked to note that the planning authority with direct knowledge of this landscape, its heritage, and its ecological constraints has concluded it is unsuitable for this type of development. That conclusion deserves weight.

## Other Observations

I have read through different areas in the RWE submission, I have some observations and discrepancies which I will briefly highlight.

**Biodiversity**

- **Bats** – no survey was carried out from a turbine 180m height. Other than using a '5-metre ladder where necessary'. While passive detectors were deployed at turbine locations, there was no mention of elevated deployment heights, met-mast deployment, hub-height monitoring or vertical stratification surveys.
- 61.3- 14 points of interest are located where vegetation clearance, trimming and tree removal will be necessary. 27 points of interest were identified where facilitation works are required. Potential roost features were also identified within 300m of turbine locations and 4 structures having roost suitability.

- The study site is considered to be of local importance (Higher Value) for bats and their roosts.
- Research has proved that Bats are attracted to turbines. (see attached survey).

**Badgers** – 6.4.4.12 " Although all setts recorded were inactive at the time of survey, the presence of multiple sett types and field signs suggest that Badgers use the proposed wind farm site for resting, foraging and commuting. The local Badge population is therefore assessed to be of Local Importance (Higher Value)"

- The land surrounding the proposed wind farm is agricultural mainly, being beef or dairy led. TB is a huge potential if existing setts are disturbed causing the badgers to move.

**Fisheries**

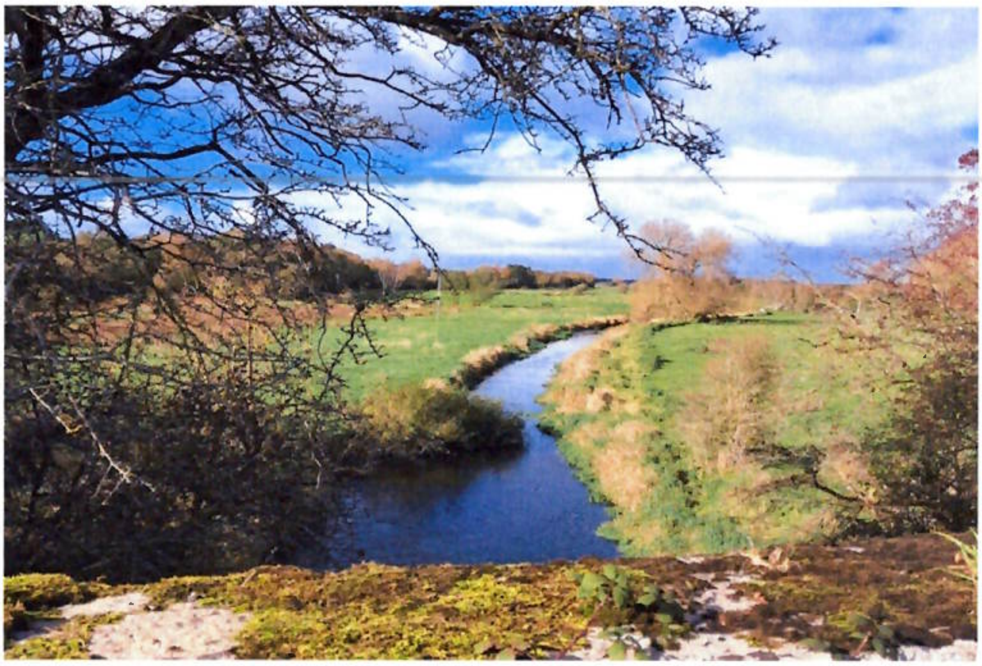
- On the 13th Jan 2026, I spoke in person to two representatives of Inland Fisheries, Gareth Dunphy and Adrian Duffy, who informed me of their local knowledge of the River Little Brosna, especially from Sharavogue Bridge to Riverstown. They confirmed the following fish being present in the water, Croneen Trout, Brown Trout, Lamprey, Eels and had sighting of otters from Sharavogue Bridge.
- Furthermore, having completed my own investigations, Appendix 6-3 Aquatic Report offers no mention of the Croneen Trout being present. However, Queen's University, Belfast, under the supervison of Prof. Paulo Prodohl, completed a study of the population of the Croneen Trout across the Lough Derg catchment, including the Camcor River and the wider Little Brosna system. I attach Prof. Prodohl's email to me confirming the significance of this research in connection with the Little Brosna River.

**Archaeology**

- **Birr Castle Demense** is on the UNESCO Whip Tentative List. Birr Castle Demense is located in a heritage town with many Georgian Houses and other protected architectural features. Birr Castle and surroundings draw thousands of tourists per year.
- I-Lofar plays a huge part of this attraction. If this project goes ahead, Birr will be surrounded by 72 wind turbines, which will be a concern to I-Lofar and it's proposed protected zone and proposed consultation zone. The effectiveness of I-Lofar, will be jeopardised, which may also jeopardise any decision made by UNESCO.

**Hydrology**

- As stated in EIAR Ballincor Wind Farm Volume 1, Non Technical Summary, pg31 Assessment of Effects: The proposed wind farm site is not located in an area susceptible to flooding from rivers. See images below, taken from Sharavogue Bridge, 57m from site entrance.

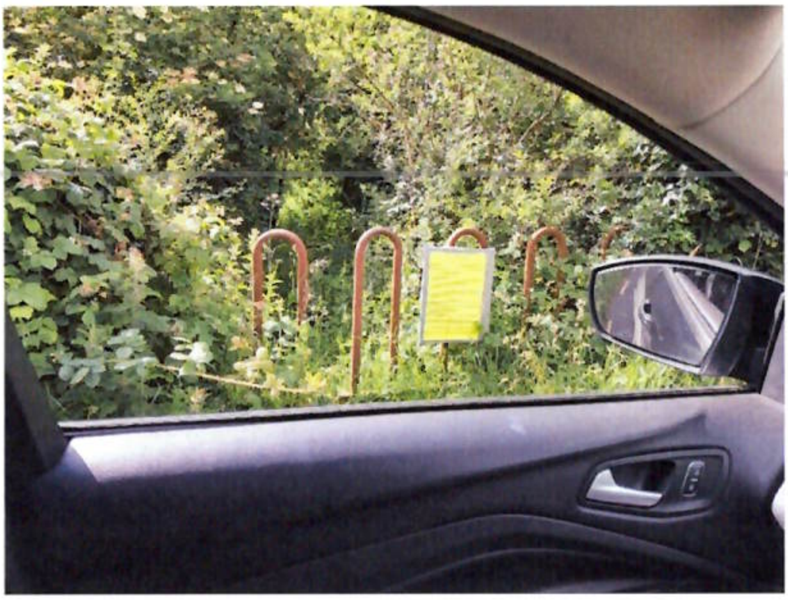


**Sharavogue Bridge(s)**

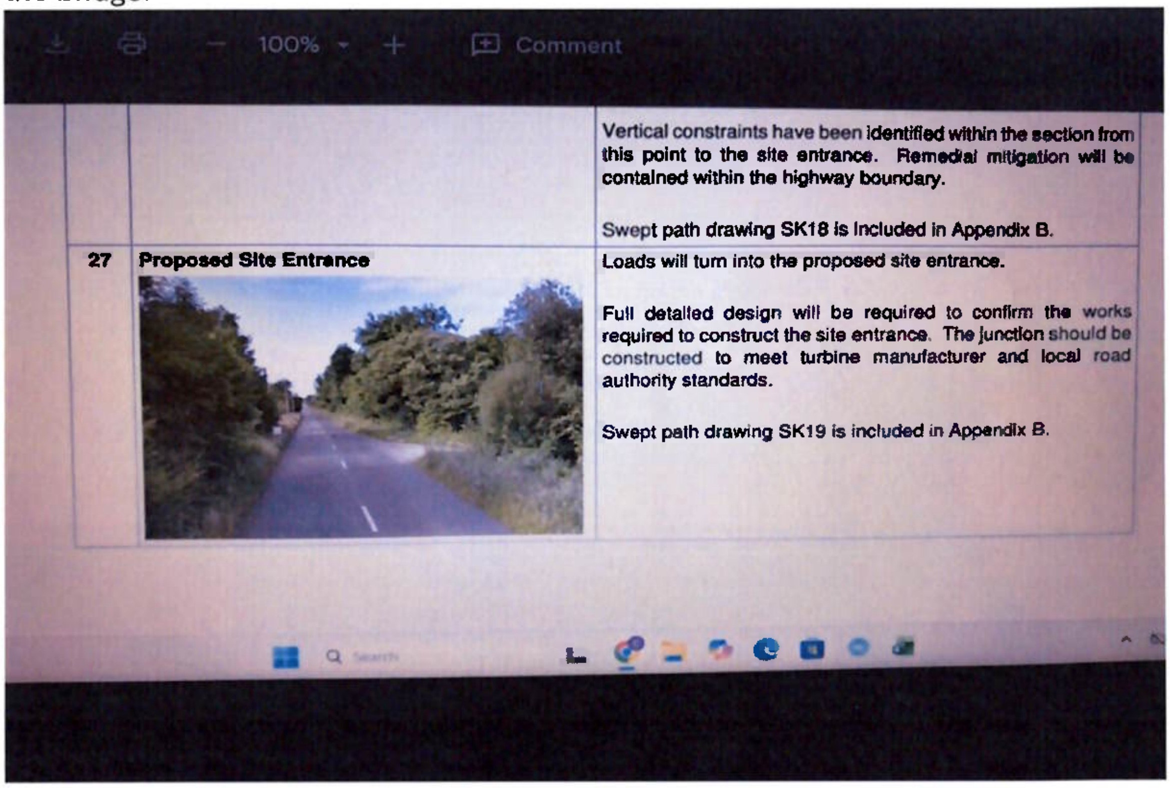
- Stated in Proposed Turbine Delivery Route pg 62: The operation of the proposed TDR will **not** result in any operational impacts on the archaeological, architectural or cultural heritage resource. No survey conducted in relation to bridges.

**Site Entrance**

- As per our consultation with RWE on 11/11/25 at Ballyegan Hall, Sharavogue, Birr Co Offaly. We were advised site entrance was as shown in image below, great details were given of the existing gate as we were incredulous as to where it was to be located



In the applicant's EIAR appendices, Appendix 2-1 Abnormal Indivisible Load Route Summary, the first image below shows the site entrance as misleading, showing a straight road with an exit to the left (which incidentally leads to a bog). The second image shows Drawing SK19, pg62, entrance on the bend coming off the bridge.



100% Comment

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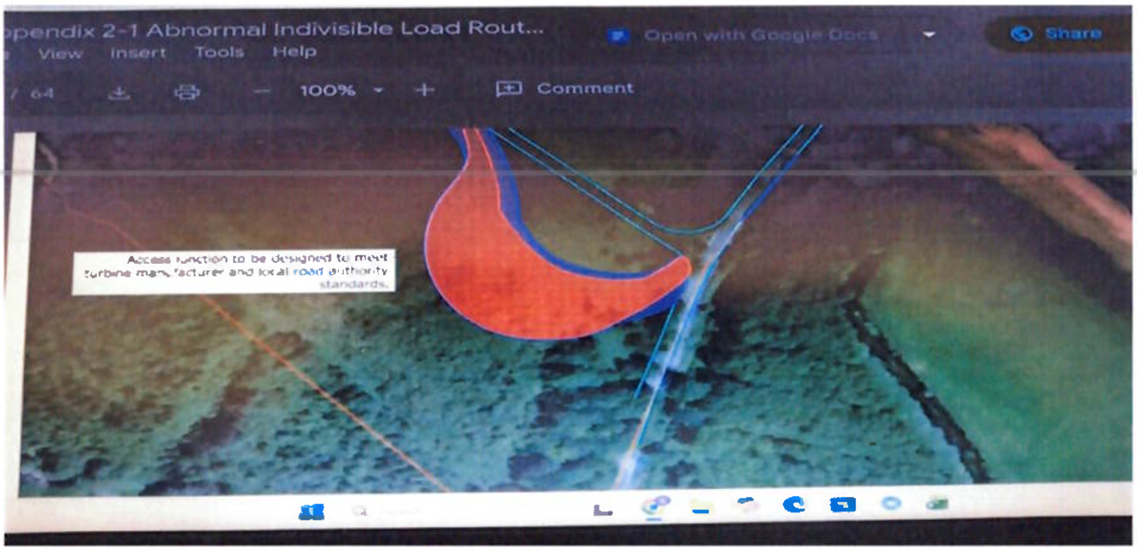
|---|---|---|
| | | Vertical constraints have been identified within the section from this point to the site entrance. Remedial mitigation will be contained within the highway boundary.<br><br>Swept path drawing SK18 is included in Appendix B. |
| 27 | **Proposed Site Entrance** | Loads will turn into the proposed site entrance.<br><br>Full detailed design will be required to confirm the works required to construct the site entrance. The junction should be constructed to meet turbine manufacturer and local road authority standards.<br><br>Swept path drawing SK19 is included in Appendix B. |




- The applicant states on pg2 that Construction upgrades are for two site entrances on the R492 and L1071. This demonstrates to me that there is a third entrance. Two on the R492 ??

**Noise**

- Further to my previous observations on Noise, which offers the technical information, and which I adopted from the Greater Birr Wind Action Group, I want to include a small observation of my own. I am attaching a print out of the wind direction for the month of September 2025 and other random dates (we were informed that the project was going to planning). The wind direction came predominantly from the south, south east, or south west. Which means that all noise will be more profound because of the near location of the wind turbines.

## Public Consultation

- Public Consultation was extremely poor.
- **We are receptor 261, 1040m from nearest turbine.**
- July 2023 an introductory letter and brochure was received, advising us of the proposed wind farm development. RWE stated that they were conducting an 8 week consultation with local residents. The project would be discussed and questions answered. --- When no representatives turned up to answer my questions, I rang Kieran O'Byrne and was quite upset when speaking to him. At this point I did not have the knowledge to ask relevant questions and Mr O'Byrne did not offer to meet me or my husband at a later date. **We did not meet anyone from RWE.**
- September 2025, we received our next letter, outlining some further details of the proposed development. Again, we were advised that door-to-door meetings were in progress, in order to discuss with the residents. **We did not meet anyone from RWE.**
- November 2025 a small number of concerned individuals requested and met with RWE. At that meeting we were given limited information, and they were to

obtain answers to some of the questions which they could/would not provide then. To-date we are still awaiting same:

1) To provide the location of the sound instruments used to take baseline levels
2) To provide the name of the manufacturers of the sound instruments

- RWE would not accept our requests for specific locations for their photo montages. And did not include existing wind turbines in their montages.
- Emails which were sent to RWE requesting information had to be followed up on or remained unanswered.

**House Depreciation**

- My home is 1042m from the nearest turbine. We will be affected by Shadow Flicker from 4 turbines. We will be affected by the noise of all turbines including infrasound. We will have visibility of 11 turbines plus 8 existing turbines in area. Our uninterrupted views of river and bogland will be spoiled.
  Our home will lose value or more realistically become unsellable. Who will want to live here – I won't.

# Boyd

Oxmantown Mall, Birr, Co. Offaly
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**DONAL BOYD AUCTIONEERS LTD**

3rd February 2026

**Re: Proposed Ballincur Wind Farm**

**TO WHOM IT MAY CONCERN**

In our opinion, properties located c.2km from the above proposed windfarm would expect to see their properties devalued by up to 25% of their value on the open market, and more if they are located nearer than 2km.

Yours faithfully,

**Donal Boyd Auctioneers**

## Conclusion

- My home is at the sharp end of every impact this application carries. Shadow flicker will affect it on 185 days per year, a figure the developer produced and did not disclose. (as provided by the Greater Birr Wind Action Group analysis)
- The noise assessment contains omissions and errors that make it entirely unreliable and unacceptable. (as provided by the Greater Birr Wind Action Group analysis)
- The transport assessment describes the R492 as narrow with limited hard shoulders and several bends, then concludes that the impact of years of industrial construction traffic will be "imperceptible." (as stated in the developers own submission)
- The site entrance is proposed at the most dangerous point on the road, beside a bridge hollow and blind bend.
- From my home I will see all or most of the eleven turbines at eye level across an open landscape with no available screening. The proposed development will force an impact the landscape simply cannot absorb. The visual dominance and clutter is ignored in the developers documents. (as provided by the Geater Birr Wind Action Group in their submission).
- My property value will decrease by at least 25%, with the very real possiblity of never being able to sell because we are Receptor 261, and will be seriously affected by all the issues raised above. (see attached letter)

Every assessment submitted with this application moves in the same direction, towards understating the impact on the River, the SAC, the Birds, the Species, the flora and fauna and the people who will live with this decision for thirty-five years. The Offaly County Development Plan designates this area as unsuitable for wind energy development. That was a considered judgment by the authority that knows this landscape and engaged in a rigorous and independent process to come to that conclusion. I ask An Coimisiún Pleanála to respect that designation and to refuse planning permission for the Ballincor Wind Farm.

Signed Carol Miller
Carol Miller

Cathal Miller
Cathal Miller

Bat Survey

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Research

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# Bats flying through a Y-maze are visually attracted to wind turbine surfaces

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Wind energy's rapid expansion has led to unintended consequences for wildlife, with migratory bats among the species most at risk. The behavioural mechanisms underlying collisions remain poorly understood, but one hypothesis is that bats are attracted to wind turbine structures. Vision is important to bat orientation and obstacle avoidance, yet it has been relatively understudied in the context of bat–turbine interactions. We hypothesize that light reflected off turbine surfaces could attract bats, acting as a sensory pollutant that may increase collision risk. To test whether reflective turbine surfaces elicit attraction, we flew 242 *Lasiurus cinereus* and 154 *Lasionycteris noctivagans* through Y-maze assays. Bats were at least twice as likely to fly towards white turbine blade sections compared to less reflective black ones. This attraction intensified when the alternative exit was a dark, empty flyway, with 74% of *L. cinereus* and 97% of *L. noctivagans* flying towards the white turbine blade. These findings provide evidence that visual sensory pollutants could underlie bat–turbine interactions, and if so, wind turbines could be ecological traps.

## 1. Introduction

The expansion of human activities into the aerosphere has led to unexpected interactions with wildlife [1]. Among these, collisions with industrial wind turbines have emerged as a threat to bat populations [2–5]. There is widespread speculation that bats are drawn to turbines, perceiving them as potential roosting, foraging or lekking sites [6,7], or that turbine stimuli may disrupt orientation [8]. Evidence of attraction remains correlative, with higher bat activity near turbines [9] and after construction of some wind energy facilities [10]. Support for the attraction hypothesis comes from video of bats that seem to linger in turbines' airspace, repeatedly approaching the structures—flying up the monopole while 'skimming' its surface or 'chasing' blades [11–14]. Such interactions may lead to fatal collisions [11,13,14]. In addition to generating power, turbines produce stimuli perceptible to bats: acoustic noise, turbulent airflow and visual cues from structures and lighting [8]. These sensory pollutants may interfere with animal perception and behaviour by misleading, distracting or masking natural cues [15,16]. Ecological traps occur when animals' responses to cues, once adaptive or neutral, lead to higher mortality in human-modified landscapes [17,18]. If bats are attracted to wind turbines and experience higher mortality as a result, then wind turbines may act as ecological traps.

Visual stimuli are strong candidates for attractants given their importance to bat orientation [19,20], navigation [21–28] and obstacle avoidance [29,30]. Further, sight often takes precedence over other senses (i.e. touch and echolocation) in decisions of where bats fly [19,31–33]. Attraction to artificial light at night (ALAN) is a widespread behaviour, creating ecological traps for insects [34], fishes [35], reptiles [36] and birds [37,38]. Bat responses to ALAN vary by species and are influenced by morphology and flight behaviour. Fast-flying, open-air foragers appear more susceptible to collisions with turbines [39] and bats with these attributes are generally tolerant of ALAN [40]. Although some bats are known to forage on insect aggregations around ALAN [40], increased bat activity near ALAN can occur without evidence of elevated feeding [41,42]. ALAN may also disrupt bat orientation and navigation, as suggested by collisions of migratory bats with tall, lit structures [43–45]. Research has explored bat attraction to red obstruction lights equipped on some turbines (reviewed in [8]), but the potential for turbine surfaces themselves to act as attractants has not been examined.

We hypothesized that ambient light reflected off white turbine surfaces may elicit behavioural responses in bats, given the sensitivity of bat vision to dim light [46,47] and the high reflectivity of these surfaces [48]. White surfaces can disrupt bat flight behaviour and obstacle avoidance, occasionally resulting in collisions [49,50]. Where humans see the distinct shape of turbines, bats have less visual acuity and might perceive these exceptionally large, white structures as brighter regions of the sky [8]. Bats are thought to perceive brighter areas in their visual field as the direction of the open sky [19,32,51], which may result in bats mistaking turbines for unobstructed airspace. Videography of bats closely approaching turbine surfaces (<5 m), sometimes repeatedly [11–13], resembles behaviours described in early studies on the use of vision by bats, which established that attempts to fly through backlit windows were vision-mediated [31,32]. Although collisions with stationary turbine components (i.e. monopoles, nacelles) are unlikely to harm bats, approaching them brings them into close proximity of the rotor-swept zone where blade strikes occur. This is concerning given that close approaches to stationary turbine components occur more frequently than all other flight behaviours combined (e.g. blade approaches, hovering, pass) [12,13]. To test our hypothesis, we used a Y-maze experiment to determine whether dimly lit turbine surfaces can attract two of the migratory bat species most impacted by wind energy in North America—hoary bats (*Lasiurus cinereus*) and silver-haired bats (*Lasionycteris noctivagans*).

## 2. Material and methods

### (a) Capture and Y-maze assays

We captured bats in mist nets along the Bull Creek riparian corridor in Humboldt Redwoods State Park, California, USA, between 15 September and 13 October 2024. Bats were processed, marked with PIT tags (*L. cinereus*) or forearm bands (*L. noctivagans*), held in individually numbered cloth bags within a cooler, and transported <3 km to the Y-maze. Bat capture and handling were conducted under California Department of Fish and Wildlife scientific collections permit (no. S-230490001-23057-001) and approved by the USDA Forest Service Research and Development Institutional Animal Care and Use Committee (no. 2024-010). Once in the Y-maze, bats were removed from holding bags in darkness and allowed to fly off a gloved hand when ready. Most individuals flew within 5 s. Their choices were scored in real time by an observer watching the live feed of an infrared video system (described below) and later independently verified by a second observer in the lab watching slowed-down videos. Bats chose between a high- and low-reflectivity treatment in each of three Y-maze assays (figure 1). In all assays, one arm featured a high-reflectivity treatment: a section of a decommissioned white turbine blade lit with artificial moonlight. The other arm presented one of the following progressively lower reflectivity treatments: a black turbine blade lit with artificial moonlight (*assay 1: black lit*), an unlit black turbine blade (*assay 2: black unlit*) or an unlit arm with no turbine blade (*assay 3: empty unlit*). After exiting the Y-maze, bats flew away into the environment. To avoid directional bias, we switched the treatment condition between the right and left Y-maze arms such that no more than 10 *L. cinereus* or 10 *L. noctivagans* completed the assay before the switch. Upon trial completion, the holding bag number was read to identify each bat. As bats have been PIT-tagged at this site over several years, it would have been logistically challenging to identify and exclude bats that had flown the Y-maze previously. Of the 25 *L. cinereus* flown more than once, 21 participated in two assays and four participated in all three assays; no bat flew the same assay more than once. Bats that flew in multiple assays were tested on average 12 days apart (min = 5 days, max = 28 days). Bats that flew in more than one assay did not differ statistically in the preference within the Y-maze compared to bats being run through an assay for the first time (Fisher's exact test, $p = 0.21$).

### (b) Apparatus

We constructed the Y-maze by custom-fabricating a steel frame caterpillar tunnel hoop house (Farmers Friend, Centerville, TN, USA) (figure 1). We lined the structure with 90% shade cloth (Tunnel Vision Hoops LLC, Shaker Heights, OH, USA) to reduce the intensity of echoes and covered the exterior with silage tarp to black out ambient light. We placed sections of 90% shade cloth on the ground between the turbine blade section and the Y-maze arm exits to minimize light reflecting off the ground. Two turbine blade sections of identical size and shape (1.8 m height, 1.0 m base width and 0.8 m top width) were cut from the rotor of a Northwind 100C turbine (Northern Power Systems, VT, USA). We selected turbine blades as experimental surfaces because they are the largest structures logistically feasible for use in our assay. At a distance of 10 m, the turbine blade subtended an angular width of 5°, equivalent to the width of a 7 m diameter turbine monopole viewed from 80 m away. The high-reflectance surfaces were coated with industry-standard glossy white paint, while low-reflectance surfaces were painted with exterior latex matte black (ACRI-SHIELD® MAX). Turbine blades were indirectly illuminated with Telelumen Octa Light Players (Telelumen LLC, CA, USA), set to replicate moonlight spectra (electronic supplementary material, figure S1). We measured reflected light intensities at the maze exit using a light meter (Extech LT300; Industrial Electronics Inc., Knoxville, TN,

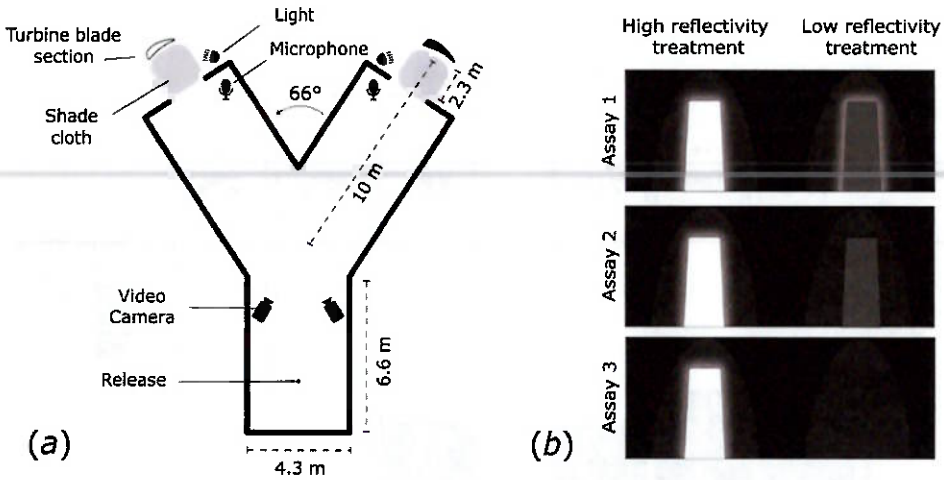


**Figure 1.** (*a*) Experimental Y-maze apparatus, used to test the orientation preferences of *Lasiurus cinereus* and *Lasionycteris noctivagans* for sections of decommissioned wind turbine surfaces with varying reflectance. The height of the apparatus was 2.35 m throughout. (*b*) Point-of-view of the choices presented to bats during the assays. High-reflectivity treatment: a white turbine blade lit with artificial moonlight; low-reflectivity treatments: a black turbine blade lit with artificial moonlight (assay 1: black lit), an unlit black turbine blade (assay 2: black unlit) or an unlit exit with no turbine blade (assay 3: empty unlit).

USA) held perpendicular to the reflective surface (white lit: 0.10 lx; black lit: 0.06 lx; black unlit: 0.03 lx; empty unlit: <0.01 lx). We filmed bats in the Y-maze using two Ace acA2000-50gc infrared video cameras (Basler, Highland, IL, USA) recording at 30 frames per second and $1024 \times 524$ pixel resolution. Infrared illumination was provided by two Raymax 200 infrared illuminators (Raytec, Ashington, UK). Video was captured on a laptop computer running custom acquisition software coded in MATLAB v. 2024 (MathWorks, Natick, MA, USA). Ultrasound was recorded using a two-channel USGH 416 h recording unit (Avisoft Bioacoustics, Glienicke, Germany) and Avisoft CM16/CMPA microphones. We placed cameras to view the two exit arms of the Y-maze and microphones were placed just inside the exits.

### (c) Acoustic analysis

We processed all audio files automatically using custom MATLAB v. 2024 (MathWorks) scripts to extract the first series of echolocation calls after each bat release from the microphone on the side where the bat flew. We followed the protocols described in a previous study of *L. cinereus* echolocation [52] to extract call duration, pulse interval and peak frequency. In some cases, call intensities were not sufficiently high in the recordings to be extracted automatically but were instead reviewed manually. These recordings were not included in our descriptive statistics of bat echolocation parameters but were used to confirm whether bats were echolocating.

### (d) Statistical analysis

We tested for a right-side/left-side bias using Fisher's exact test on the proportion of bats that flew towards the high-reflectivity treatment when it was on the right versus when it was on the left. This, and all other tests, was repeated for each assay and species. We used binomial tests to determine if bats flew towards the high- or low-reflectivity treatment more often than chance for each of the three assays. We tested for species differences among assays using Fisher's exact test. All statistics were conducted in R Studio v. 2024.04.2 [53] using an alpha value of 0.05.

## 3. Results

*Lasiurus cinereus* and *L. noctivagans* both showed a preference to fly towards the high-reflectivity treatment (white turbine) over the less-reflective alternative in all three assays (figure 2; table 1; electronic supplementary material, video S1). As the brightness of the less reflective alternative decreased from experiments one through three, the proportion of bats exiting towards the white, dimly illuminated turbine surface increased. In assays 1 and 2, *L. noctivagans* were more likely to approach the black turbine surface when it was dimly lit versus unlit (Fisher's exact test, $p = 0.01$), whereas *L. cinereus* did not respond differently to these two treatments (Fisher's exact test, $p = 1$). *L. noctivagans* had a stronger response than *L. cinereus* in assays 2 and 3, but not in assay 1 (Fisher's exact test, assay 1, odds ratio = 0.68, $p = 0.26$; assay 2, odds ratio = 0.18, $p = 0.001$; assay 3, odds ratio = 0.10, $p = 0.01$).

We observed no collisions between bats and turbine surfaces during our trials. We did not observe a left–right side bias in the Y-maze for either *L. cinereus* (Fisher's exact test; $n = 251$ trials; odds ratio = 0.90; $p = 0.78$) or *L. noctivagans* ($n = 168$; odds ratio = 0.72; $p = 0.5$). In all trials, bats emitted echolocation calls typical of a cluttered environment (*L. cinereus*: $n = 192$ trials, mean ±

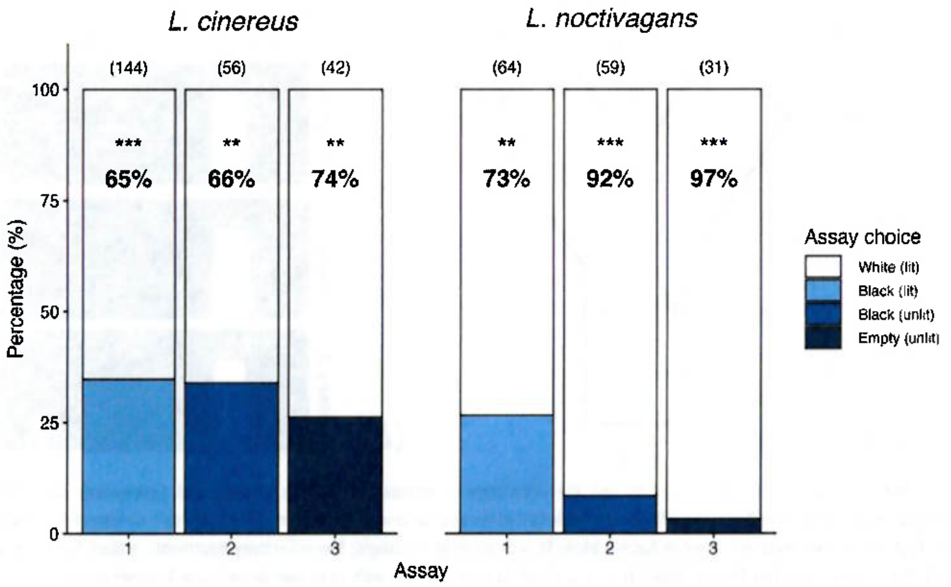


**Figure 2.** Percentage of *Lasiurus cinereus* and *Lasionycteris noctivagans* selecting the high-reflectivity (white) turbine blade dimly lit with artificial moonlight versus the low-reflectivity (black) turbine blade or empty runway in a Y-maze. Sample size shown in parentheses. $^{**}p < 0.01$ and $^{***}p < 0.001$ indicate significant differences from 50% (no preference).

**Table 1.** Percentage of *Lasiurus cinereus* and *Lasionycteris noctivagans* selecting the high-reflectivity (white) turbine blade dimly lit with artificial moonlight versus the low-reflectivity (black) turbine blade or empty runway in a Y-maze. Proportions >50% indicate a preference for the high-reflectivity treatment.

| Y-maze choices | | | *Lasiurus cinereus* | | | | *Lasionycteris noctivagans* | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| assay | high-reflectivity | low-reflectivity | % | *N* | ratio | *p*-value | % | *N* | ratio | *p*-value |
| 1 | white lit/obstructed | black lit/obstructed | 65 | 144 | 1.88 | <0.0001 | 73 | 64 | 2.09 | 0.002 |
| 2 | white lit/obstructed | black unlit/obstructed | 66 | 56 | 1.95 | 0.011 | 92 | 59 | 6.11 | <0.0001 |
| 3 | white lit/obstructed | empty unlit/open | 74 | 42 | 2.82 | 0.001 | 97 | 31 | 15.5 | <0.0001 |
| total | | | 67 | 242 | 2.03 | <0.0001 | 85 | 154 | 3.94 | <0.0001 |

standard deviation, pulse interval = 41 ± 15 ms; peak frequency = 41.5 ± 28.8 kHz; pulse duration = 1.99 ± 0.5 ms; *L. noctivagans*: $n$ = 97 trials, pulse interval = 37.9 ± 17.3 ms; peak frequency = 37.5 ± 31.1 kHz; pulse duration = 1.96 ± 0.64 ms). No statistical differences in any call parameter were observed for either species approaching the dim-lit white turbine surface versus any of the other three treatments (ANOVA, $p > 0.05$).

## 4. Discussion

Our experiments demonstrate that both *L. cinereus* and *L. noctivagans* are attracted to ambient light reflected from wind turbine surfaces. We found that bats selected the exit with the white turbine surfaces at least twice as often as the less reflective exit. Bats showed the strongest preference for the white turbine exit when the alternative was an opening with no turbine blade (*L. cinereus* 2.9 × more, *L. noctivagans* 15.5 × more), as would be expected if bats prioritized vision over echolocation. The hypothesis that bats are attracted to some aspect of turbines has been widely speculated [6–8,12], and our study provides evidence for a visual mechanism of attraction. Our work identifies a link between a sensory pollutant—reflective turbine surfaces—and a risky behaviour: approaching these surfaces. Approaching turbine surfaces is not inherently dangerous—bat fatalities are absent at non-operational turbines [54,55], but near operating turbines, bats risk collision with fast-moving blades. We predict that bats may be visually attracted to turbines when they occupy 5° of their visual field, which corresponds to 80 m away for many industrial turbines. Bats in our study flew through a confined testing arena with a binary choice, whereas bats in the aerosphere have more time and more options for considering whether to approach wind turbines. Turbine monopoles could have a stronger attractive effect as they are very large, and as bats approach, turbine surfaces will reflect greater amounts of ambient light and comprise a relatively larger proportion of their visual field. Whether the attraction observed in the Y-maze extends to free-flying bats interacting with full-scale wind turbines in open air remains unknown and will require further studies.

Our study was not designed to distinguish bats' motivations for selecting the exit with the highly reflective cue. Rigorously testing the mechanisms of attraction to ALAN is challenging and has only recently been resolved for flying insects [56]. A proclivity to orient towards light when seeking an exit is likely an ancestral trait, occurring in at least five major families of bats, and is thought to be useful in exiting caves [19,57]. Most studies of this behaviour have tested cavity-roosting bats crawling through a small Y-maze [19,51,57,58]. Until now, it was unclear whether flying, foliage-roosting bats like *L. cinereus* would exhibit similar attraction to light as cavity-roosting bats or if light reflected off turbine surfaces would be sufficient to elicit this behaviour. We hypothesize that bats in our study and those interacting with turbine structures [11–14] may be exploring areas that they perceive as more open to the sky. Two potential criticisms warrant consideration. First, wind turbines are not located in caves. There is no reason why bats' use of dim light as an orientation cue should be limited to roost scenarios. This is exemplified by instances of free-ranging bats colliding with artificially lit surfaces, e.g. white trailers, backlit windows and lighthouses [43,45,50]. Second, some early publications use the term 'visual escape response,' [19,32,51] to describe this behaviour, which implies a physiological state of fear or stress, but bats are not necessarily trying to 'escape' when in the vicinity of turbines. However, movement towards lit surfaces is still observed in less stressful scenarios, i.e. long-term captive bats tested in familiar spaces [19]. Further, it is not expected that stress is necessary to integrate information from a neutral orientation cue routinely used to depart roosts. Consequently, neither restricted airspace nor stress is required for this mechanism of attraction. Our study does not preclude the alternative hypothesis that bats approaching turbines from greater distances ($\gtrsim$100 m) mistake light reflected from turbine surfaces for celestial orientation cues [20]. We consider it unlikely that bats were selecting the white turbine treatment for prospective foraging. Although insects can aggregate around turbines [59], migratory bats at this site and time of year produce relatively little guano [60] and do not appear to be foraging intensely.

Our Y-maze experiment provides insight into patterns of bat behaviour and mortality at wind facilities. Cryan *et al.* [12] detected bats within the rotor-swept zone of turbines more frequently during periods of bright moon illumination and suggested that vision plays an important role in bat attraction to turbines. Smallwood & Bell [61] linked increased bat fatalities on nights with greater moon illumination with increases in risky flight behaviours (3.6×) and near misses (8×). To our knowledge, only one study has examined the effect of lunar illumination on nightly mortality at the species level; Baerwald & Barclay [62] found *L. noctivagans* mortality was significantly higher on nights with greater moon illumination, whereas *L. cinereus* mortality showed no such pattern. This does not negate the potential role of vision in bat attraction to turbines. Instead, it suggests that variation in moonlight intensity may not significantly affect the strength of attraction for some species. Although our study did not explicitly replicate light intensities associated with different moon phases, our low-reflectivity treatments progressively reduced the amount of reflected light. Although both species were attracted to white turbine surfaces, reducing light intensity of the alternative exit had no effect on *L. cinereus* but significantly decreased *L. noctivagans* selection of black surfaces. Nevertheless, we do not over-interpret the relative strength of *L. cinereus* versus *L. noctivagans* attraction to higher-reflectance treatments, as the smaller size and lower wing loading of *L. noctivagans* may have made them more capable of manoeuvring and exerting stronger choice within the Y-maze.

Several factors might elevate bat susceptibility to wind turbines as potential ecological traps. Visual cues are likely given more weight than echolocation when flying in the open airspace of wind facilities as vision has greater range and field of view and is not masked by wind noise. The airspace near turbines is likely a challenging sensory environment where distracting stimuli could impair decision-making [8]. Finally, bats buffeted or tumbled by the wake of moving blades could be momentarily disoriented [14]. To human observers, sensory ecological traps can produce baffling behavioural mismatches (e.g. [18,63,64]). Robertson *et al.* [18] proposed that novel cues are especially likely to trap animals when they resemble historically good choices that are reliable indicators of option quality, and there is low risk to investigating poor options. Light reflected off turbine surfaces meets these criteria: large reflective surfaces could resemble cues associated with open sky (discussed above); historically, light at night was likely a reliable indicator of the sky; and the cost of investigating lit surfaces is typically low as bats can veer away or recover from collisions [31,50] without injury [63]. Our study provides support for the hypothesis that light reflected from wind turbine surfaces may underlie bats maladaptive behaviours near wind turbines. Further research is needed to fully understand the effects of reflective turbine surface on bats and should include (i) quantifying the spatial scales at which visual cues from turbines influence behaviour of free-flying bats; (ii) identifying which wavelengths of light elicit the strongest response in bats; and (iii) re-examining datasets of nightly bat fatalities at wind facilities for species-specific responses to changes in ambient light levels. These insights could inform the development of mitigation strategies to reduce bat attraction and mortality at wind energy facilities.

Ethics. Bat capture and handling were conducted under California Department of Fish and Wildlife scientific collections permit (no. S-230490001-23057-001) and approved by the USDA Forest Service Research and Development Institutional Animal Care and Use Committee (no. 2024-010).

Data accessibility. Data and analysis code supporting this study are available in the electronic supplementary material.

Supplementary material is available online [65].

Declaration of AI use. We have not used AI-assisted technologies in creating this article.

Authors' contributions. K.A.J.: conceptualization, funding acquisition, investigation, methodology, visualization, writing—original draft, writing—review and editing; A.J.C.: conceptualization, formal analysis, funding acquisition, investigation, methodology, resources, software, writing—review and editing; L.D.: conceptualization, funding acquisition, investigation, methodology, project administration, writing—review and editing; T.J.W.: conceptualization, funding acquisition, investigation, methodology, resources, writing—review and editing; J.C.: conceptualization, funding acquisition, investigation, methodology, project administration, writing—review and editing.

All authors gave final approval for publication and agreed to be held accountable for the work performed therein.

Conflict of interest declaration. We declare we have no competing interests.

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Fisheries

Gmail

Carol Power <carolbpower@gmail.com>

## Croneen trout genetics

5 messages

**Paulo Prodohl** <P.Prodohl@qub.ac.uk> Wed, Jan 21, 2026 at 2:55 PM
To: "carolbpower@gmail.com" <carolbpower@gmail.com>

Dear Carol,

Please accept my apologies for my slow response to your earlier message and for missing your call earlier today. Thank you for getting in touch and for outlining your concerns regarding the proposed Ballincor wind farm development and its proximity to the Little Brosna River and associated floodplains.

The research you refer to on the Croneen trout formed part of a larger PhD study completed by Dr John Magee under my supervision at Queen's University Belfast in 2017. The study examined population genetic structure and genetic stock identification of brown trout (Salmo trutta) across the Lough Derg catchment, including the Camcor River and the wider Little Brosna system.

In simple terms, the research showed that trout tended to return to their home river to spawn. Over time, this behaviour led trout from different rivers to become biologically distinct from one another. This conclusion was based on the analysis of a large genetic dataset (over 3,300 trout screened at 21 microsatellite markers), which demonstrated clear and statistically significant genetic differences among rivers.

Of direct relevance here, the genetic analyses identified that the traditionally recognised "Croneen" trout was primarily linked to the Camcor River, which forms part of the Little Brosna catchment. This finding indicated that the Croneen trout was not simply a lake-derived or environmentally induced form, but represented a locally distinct trout population associated with a specific river system.

Based on these findings, the Croneen trout can reasonably be described as a locally distinct, river-associated component of brown trout biodiversity within the Camcor–Little Brosna system. In fisheries science, such locally adapted trout populations are widely recognised as having elevated conservation relevance because they depend on specific spawning and nursery habitats and may have a limited ability to recover if those habitats are damaged.

The PhD study did not assess the potential impact of wind farm developments or other infrastructure projects directly, and it did not claim that such developments would necessarily harm the Croneen trout. However, the genetic findings did have clear implications when considering works proposed close to the Little Brosna River and its floodplain:

- Dependence on local river habitats: Because the Croneen trout was linked to specific spawning and nursery areas within the Camcor–Little Brosna system, any disturbance or degradation of these habitats had the potential to affect this trout population directly.
- Limited capacity for recovery: The evidence of strong natal fidelity suggested that, if spawning or juvenile habitats within this system were degraded, recovery of the Croneen trout through recolonisation from neighbouring rivers might be limited.
- Sensitivity to changes in water flow and sediment: River-specific trout populations were known to be vulnerable to changes in flow regime, increased fine sediment, and reduced water quality, all of which could reduce egg survival and juvenile recruitment. Works on floodplains, drainage networks, or access roads close to the river channel could therefore pose a risk if they altered natural hydrology or increased sediment entering the river.

While the thesis did not elaborate on any formal conservation designation on the Croneen trout, it provided a clear scientific basis for treating it as a local conservation unit for the purposes of environmental assessment. In particular, it supported the view that impacts affecting the Camcor–Little Brosna system could not be assumed to be offset by trout populations elsewhere in the catchment, and that site-specific assessment was therefore important.

The PhD thesis is a publicly available academic (Queen's University Library) document rather than a planning report, but I would be happy to direct you to the relevant chapters that describe the genetic findings on the Croneen trout and the Camcor–Little Brosna system, should this be helpful.

I hope this information is of helpful.

Yours sincerely,

Paulo

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Paulo A Prodöhl

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WIND DIRECTIONS

## GURTEEN TIPPERARY AWS

**21:30** 29/12/2024

**Summary** Forecast

| | | |
|---|---|---|
| Temperature | **9.1** | °C |
| Humidity | **91** | % |
| Rainfall Accumulation | **0.2** | mm |
| Pressure (at station height) | **1017.2** | hPa |
| Wind Speed | **12.1** | knots |
| Wind Speed | **22** | km/h |
| Wind Direction | **231** | deg |
| Wind Direction | **SW** | compass |
| Dew-Point Temperature | - | °C |

VIEW FULL OBSERVATION

## GURTEEN TIPPERARY AWS

**21:30** 03/01/2025

**Summary** Forecast

| | | |
|---|---|---|
| Temperature | -0.4 | °C |
| Humidity | 93 | % |
| Rainfall Accumulation | - | mm |
| Pressure (at station height) | 1013.7 | hPa |
| Wind Speed | 4.5 | knots |
| Wind Speed | 8 | km/h |
| Wind Direction | 200 | deg |
| Wind Direction | SSW | compass |
| Dew-Point Temperature | - | °C |

## GURTEEN TIPPERARY AWS

**21:30** 11/04/2025

**Summary** | Forecast

| | | |
|---|---|---|
| Temperature | **13.0** | °C |
| Humidity | **57** | % |
| Rainfall Accumulation | - | mm |
| Pressure (at station height) | **1006** | hPa |
| Wind Speed | **8.9** | knots |
| Wind Speed | **16** | km/h |
| Wind Direction | **173** | deg |
| Wind Direction | S | compass |
| Dew-Point Temperature | - | °C |

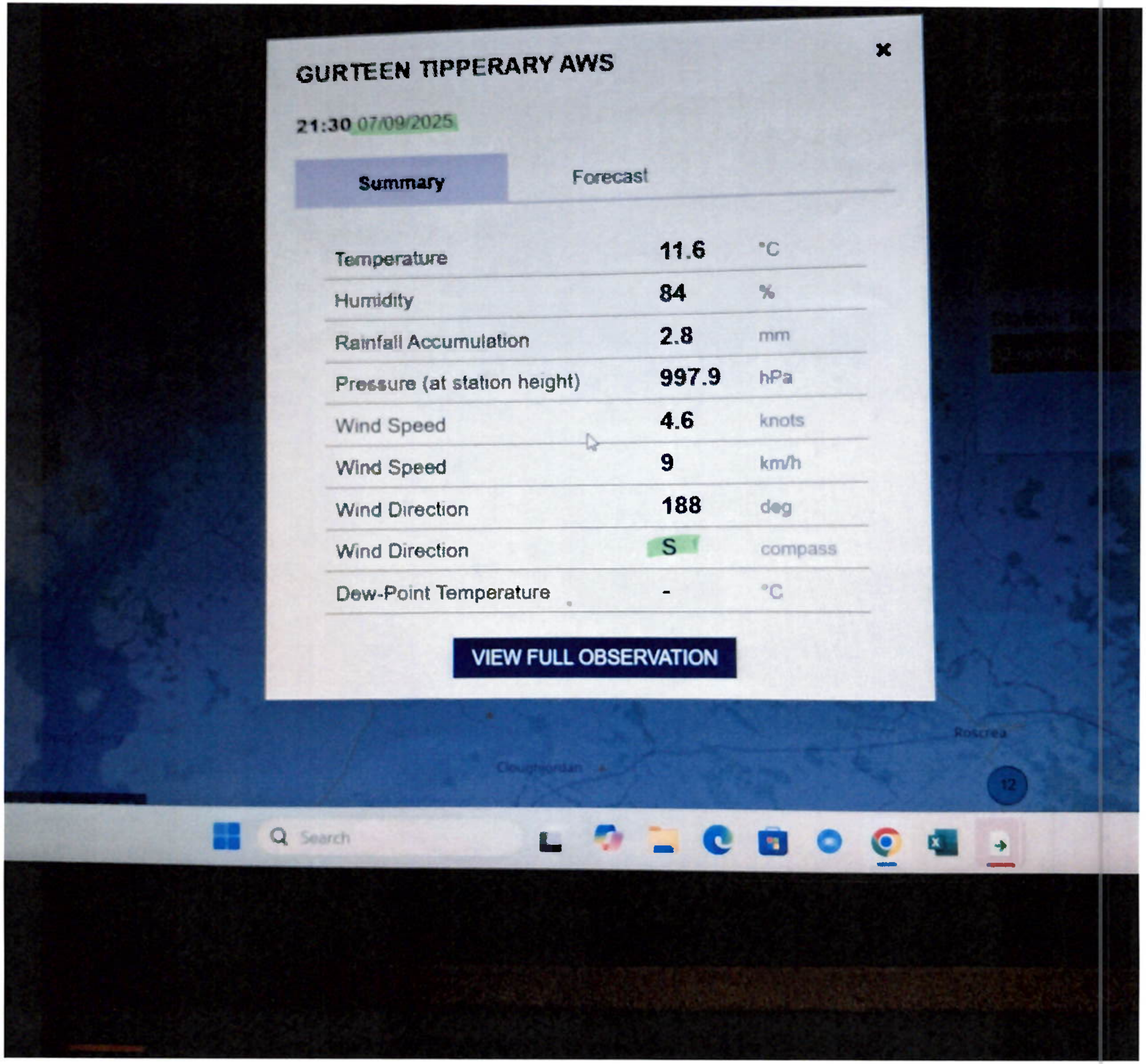
## GURTEEN TIPPERARY AWS

**21:30** 16/07/2025

**Summary** Forecast

| | | |
|---|---|---|
| Temperature | **16.4** | °C |
| Humidity | **84** | % |
| Rainfall Accumulation | **0.8** | mm |
| Pressure (at station height) | **1006.3** | hPa |
| Wind Speed | **4.9** | knots |
| Wind Speed | **9** | km/h |
| Wind Direction | **138** | deg |
| Wind Direction | **SE** | compass |
| Dew-Point Temperature | - | °C |

VIEW FULL OBSERVATION


GURTEEN TIPPERARY AWS
21:30 07/09/2025
Summary
Forecast
Temperature 11.6 °C
Humidity 84 %
Rainfall Accumulation 2.8 mm
Pressure (at station height) 997.9 hPa
Wind Speed 4.6 knots
Wind Speed 9 km/h
Wind Direction 188 deg
Wind Direction S compass
Dew-Point Temperature - °C
VIEW FULL OBSERVATION
Search

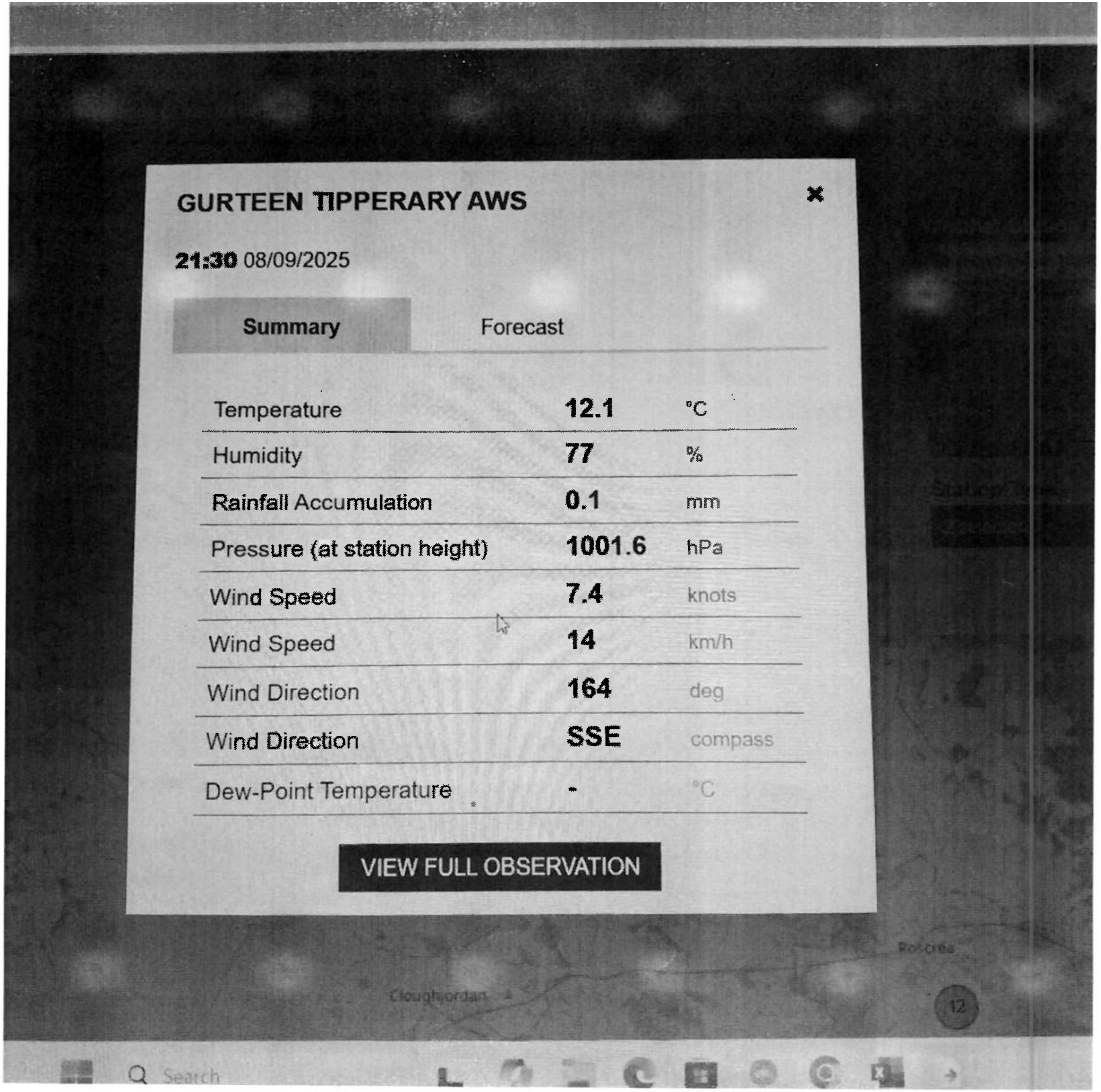
## GURTEEN TIPPERARY AWS

**21:30** 07/09/2025

**Summary** | Forecast

| | | |
|---|---|---|
| Temperature | **11.6** | °C |
| Humidity | **84** | % |
| Rainfall Accumulation | **2.8** | mm |
| Pressure (at station height) | **997.9** | hPa |
| Wind Speed | **4.6** | knots |
| Wind Speed | **9** | km/h |
| Wind Direction | **188** | deg |
| Wind Direction | **S** | compass |
| Dew-Point Temperature | **-** | °C |

**VIEW FULL OBSERVATION**


GURTEEN TIPPERARY AWS
21:30 08/09/2025
Summary
Forecast
Temperature 12.1 °C
Humidity 77 %
Rainfall Accumulation 0.1 mm
Pressure (at station height) 1001.6 hPa
Wind Speed 7.4 knots
Wind Speed 14 km/h
Wind Direction 164 deg
Wind Direction SSE compass
Dew-Point Temperature - °C
VIEW FULL OBSERVATION
Roscrea
Cloughjordan
Search

## GURTEEN TIPPERARY AWS

**21:30** 09/09/2025

**Summary** | Forecast

| | | |
|---|---|---|
| Temperature | 14.4 | °C |
| Humidity | 80 | % |
| Rainfall Accumulation | 2 | mm |
| Pressure (at station height) | 992.9 | hPa |
| Wind Speed | 10.2 | knots |
| Wind Speed | 19 | km/h |
| Wind Direction | 151 | deg |
| Wind Direction | SSE | compass |
| Dew-Point Temperature | - | °C |

VIEW FULL OBSERVATION

## GURTEEN TIPPERARY AWS

**21:30** 10/09/2025

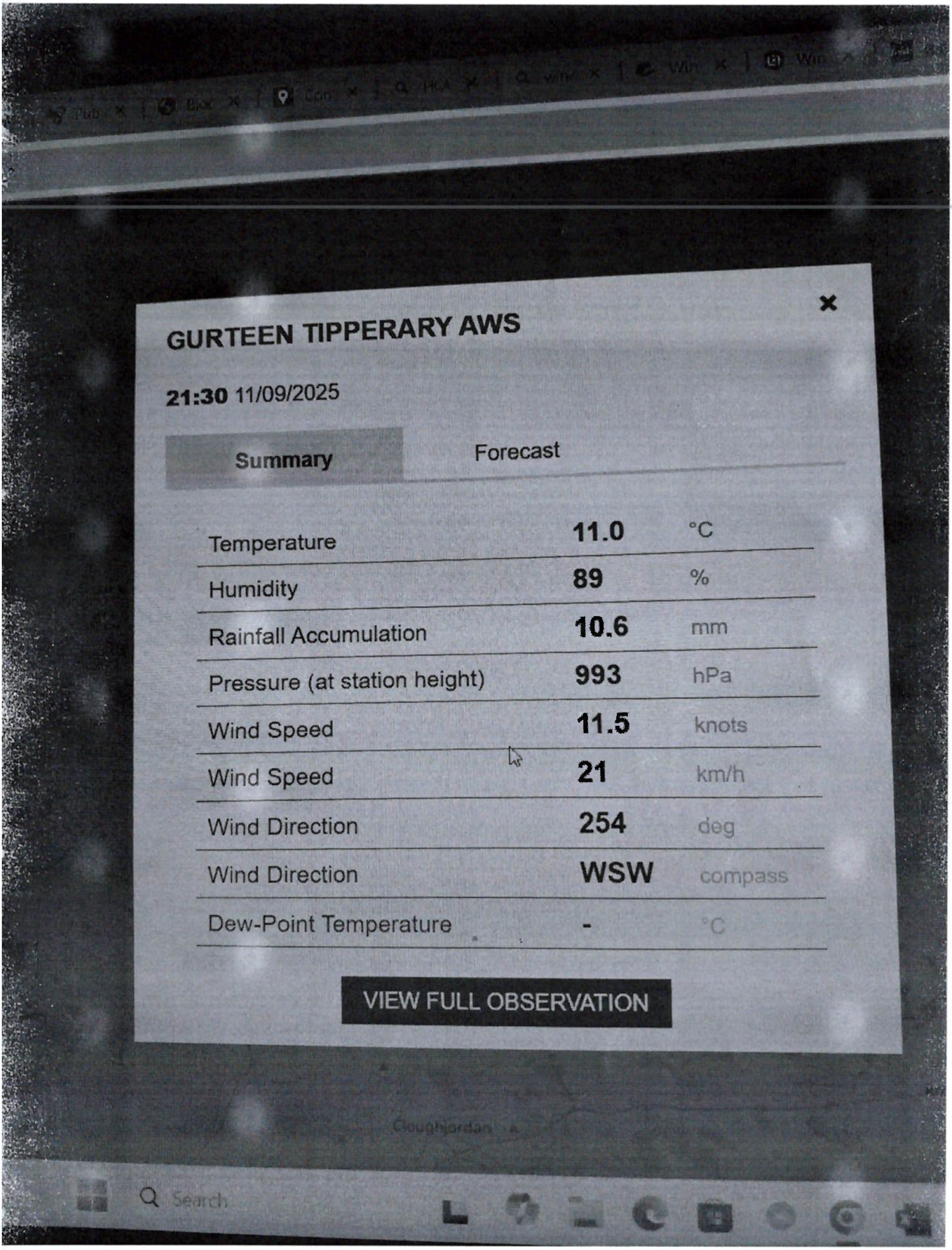
**Summary** | Forecast

| | | |
|---|---|---|
| Temperature | **11.5** | °C |
| Humidity | **85** | % |
| Rainfall Accumulation | **5.7** | mm |
| Pressure (at station height) | **988.1** | hPa |
| Wind Speed | **7.7** | knots |
| Wind Speed | **14** | km/h |
| Wind Direction | **223** | deg |
| Wind Direction | **SW** | compass |
| Dew-Point Temperature | **-** | °C |

VIEW FULL OBSERVATION

Cloughjordan

Search


GURTEEN TIPPERARY AWS
21:30 11/09/2025
Summary
Forecast
Temperature 11.0 °C
Humidity 89 %
Rainfall Accumulation 10.6 mm
Pressure (at station height) 993 hPa
Wind Speed 11.5 knots
Wind Speed 21 km/h
Wind Direction 254 deg
Wind Direction WSW compass
Dew-Point Temperature - °C
VIEW FULL OBSERVATION
Cloughjordan
Search

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## GURTEEN TIPPERARY AWS

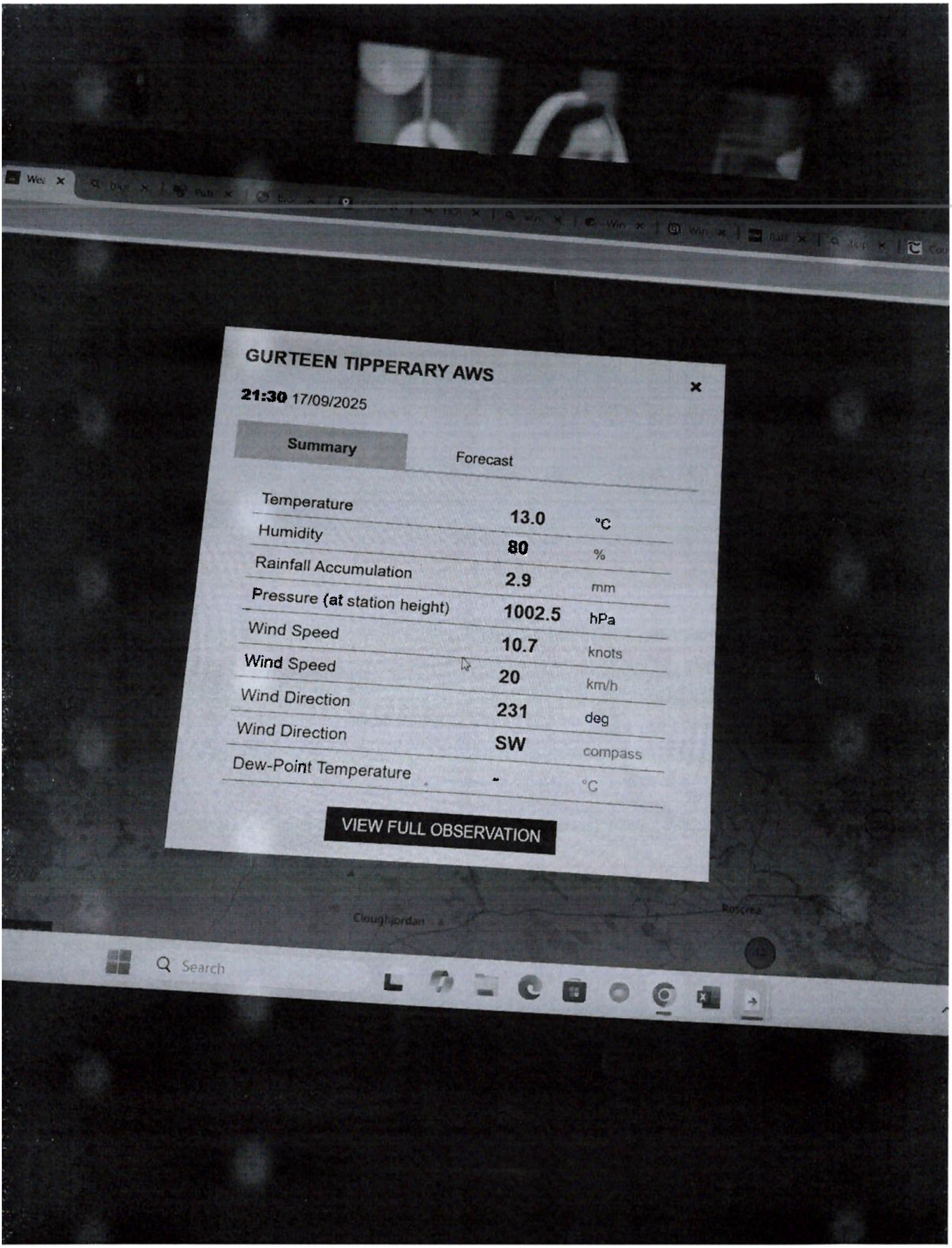
**21:30** 12/09/2025

**Summary** Forecast

| | | |
|---|---|---|
| Temperature | **10.2** | °C |
| Humidity | **87** | % |
| Rainfall Accumulation | **12** | mm |
| Pressure (at station height) | **993.5** | hPa |
| Wind Speed | **7.7** | knots |
| Wind Speed | **14** | km/h |
| Wind Direction | **224** | deg |
| Wind Direction | **SW** | compass |
| Dew-Point Temperature | - | °C |

VIEW FULL OBSERVATION

Cloughjordan



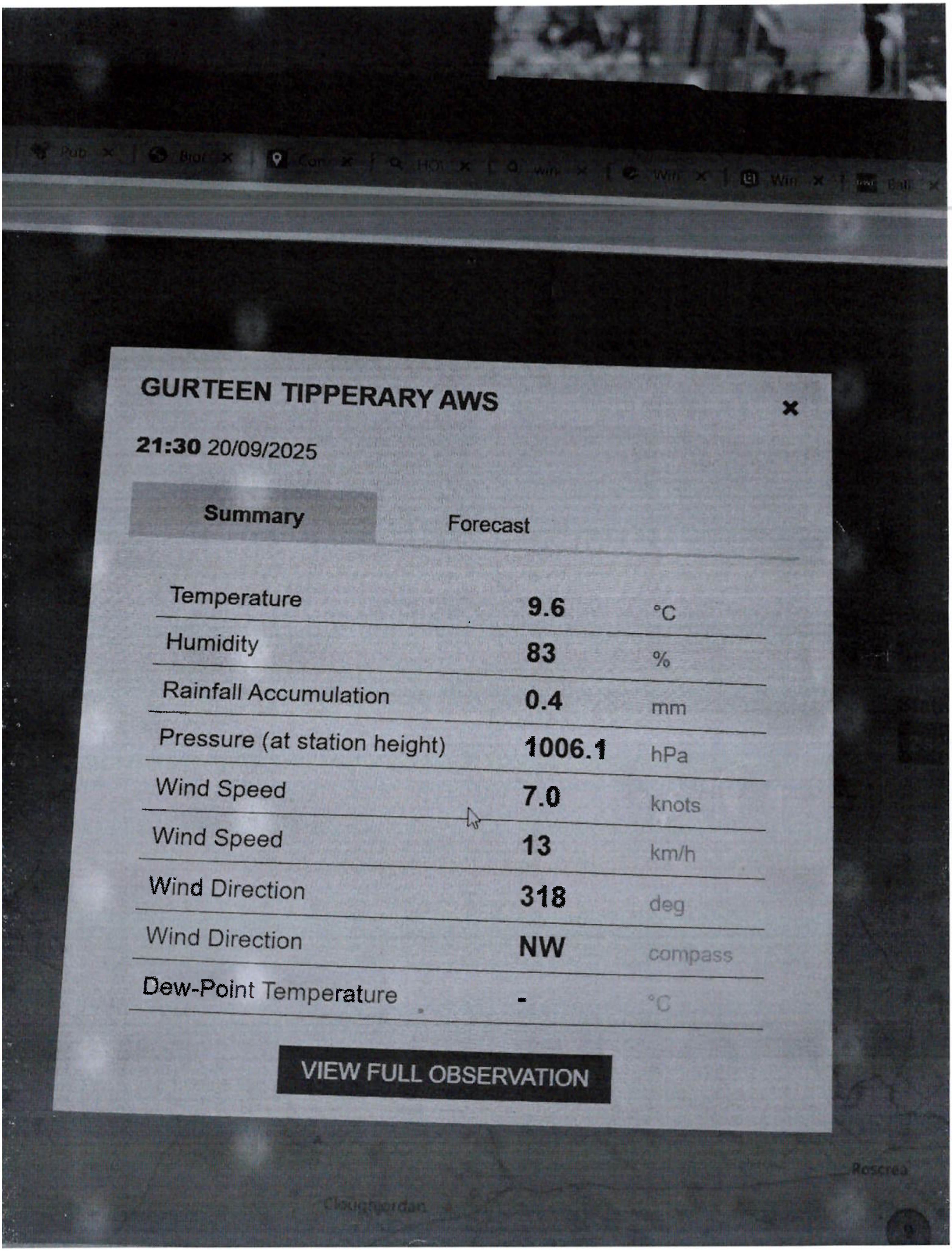
## GURTEEN TIPPERARY AWS

**21:30** 17/09/2025

**Summary** | Forecast

| | | |
|---|---|---|
| Temperature | 13.0 | °C |
| Humidity | 80 | % |
| Rainfall Accumulation | 2.9 | mm |
| Pressure (at station height) | 1002.5 | hPa |
| Wind Speed | 10.7 | knots |
| Wind Speed | 20 | km/h |
| Wind Direction | 231 | deg |
| Wind Direction | SW | compass |
| Dew-Point Temperature | - | °C |

VIEW FULL OBSERVATION



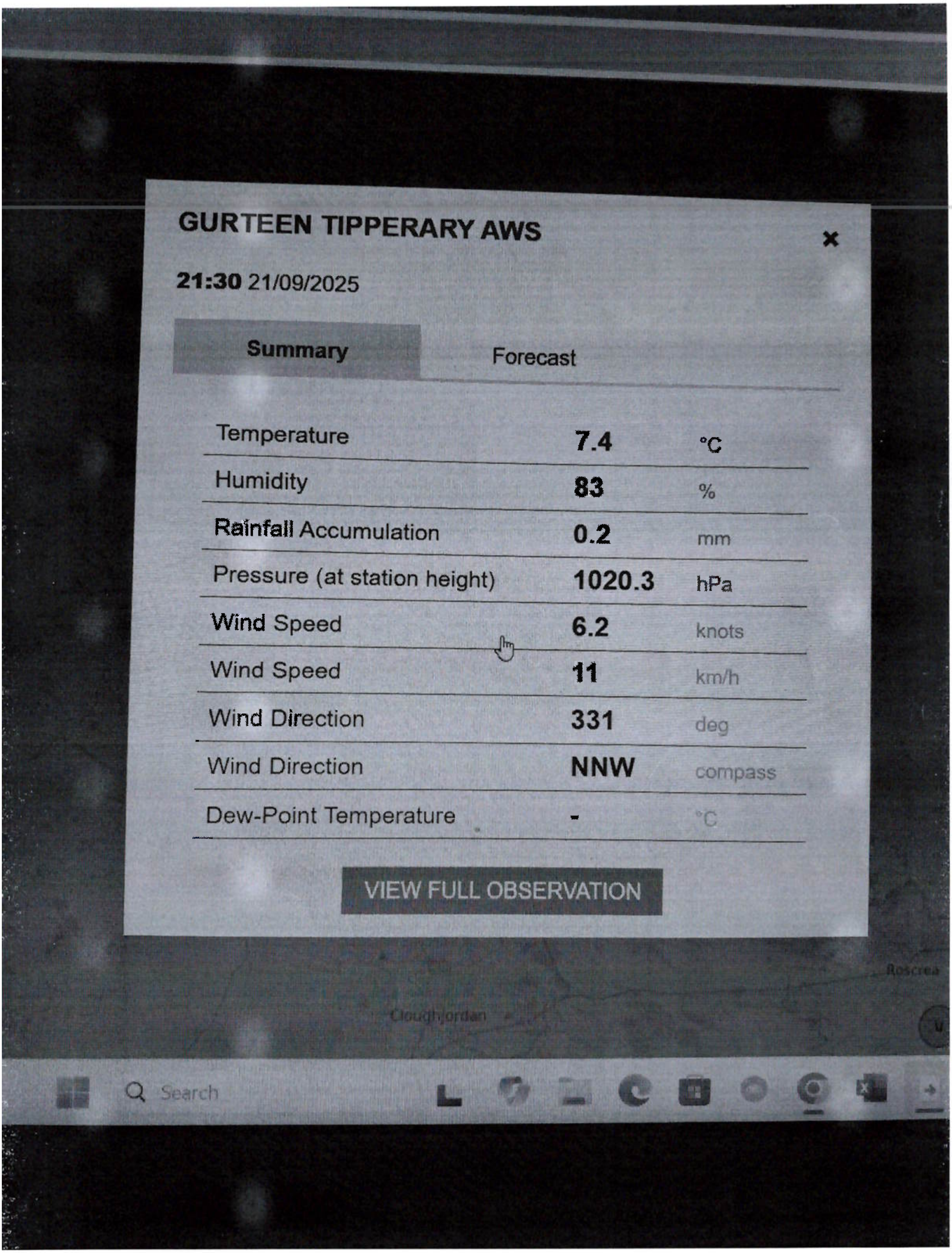
## GURTEEN TIPPERARY AWS

**21:30** 20/09/2025

**Summary** | Forecast

| | | |
|---|---|---|
| Temperature | **9.6** | °C |
| Humidity | **83** | % |
| Rainfall Accumulation | **0.4** | mm |
| Pressure (at station height) | **1006.1** | hPa |
| Wind Speed | **7.0** | knots |
| Wind Speed | **13** | km/h |
| Wind Direction | **318** | deg |
| Wind Direction | **NW** | compass |
| Dew-Point Temperature | **-** | °C |

VIEW FULL OBSERVATION

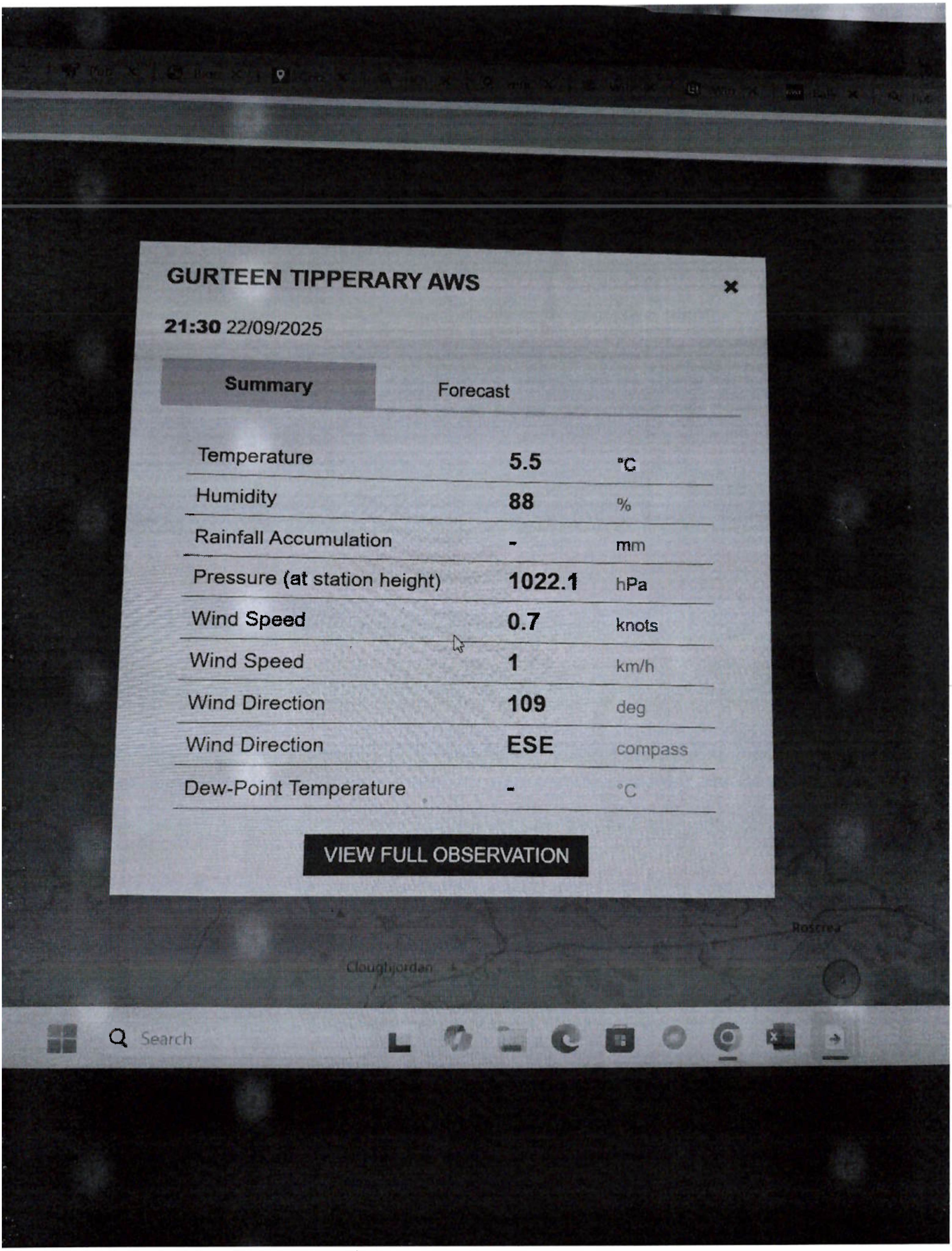

**GURTEEN TIPPERARY AWS** ×

**21:30** 21/09/2025

**Summary** | Forecast

| | | |
|---|---|---|
| Temperature | 7.4 | °C |
| Humidity | 83 | % |
| Rainfall Accumulation | 0.2 | mm |
| Pressure (at station height) | 1020.3 | hPa |
| Wind Speed | 6.2 | knots |
| Wind Speed | 11 | km/h |
| Wind Direction | 331 | deg |
| Wind Direction | NNW | compass |
| Dew-Point Temperature | - | °C |

VIEW FULL OBSERVATION



**GURTEEN TIPPERARY AWS**

**21:30** 22/09/2025

**Summary** Forecast

| | | |
|---|---|---|
| Temperature | 5.5 | °C |
| Humidity | 88 | % |
| Rainfall Accumulation | - | mm |
| Pressure (at station height) | 1022.1 | hPa |
| Wind Speed | 0.7 | knots |
| Wind Speed | 1 | km/h |
| Wind Direction | 109 | deg |
| Wind Direction | ESE | compass |
| Dew-Point Temperature | - | °C |

VIEW FULL OBSERVATION

## GURTEEN TIPPERARY AWS

**21:30** 23/09/2025

**Summary** | Forecast

| | | |
|---|---|---|
| Temperature | **7.8** | °C |
| Humidity | **86** | % |
| Rainfall Accumulation | **-** | mm |
| Pressure (at station height) | **1019.8** | hPa |
| Wind Speed | **2.9** | knots |
| Wind Speed | **5** | km/h |
| Wind Direction | **149** | deg |
| Wind Direction | **SSE** | compass |
| Dew-Point Temperature | **-** | °C |

VIEW FULL OBSERVATION

Cloughjordan

**GURTEEN TIPPERARY AWS**

**21:30** 24/09/2025

**Summary** Forecast

| | | |
|---|---|---|
| Temperature | **10.2** | °C |
| Humidity | **89** | % |
| Rainfall Accumulation | **-** | mm |
| Pressure (at station height) | **1017.6** | hPa |
| Wind Speed | **5.6** | knots |
| Wind Speed | **10** | km/h |
| Wind Direction | **148** | deg |
| Wind Direction | **SSE** | compass |
| Dew-Point Temperature | **-** | °C |

VIEW FULL OBSERVATION

Cloughjordan

Search

**URTEEN TIPPERARY AWS**

**:30** 25/09/2025

**Summary** Forecast

| | | |
|---|---|---|
| Temperature | **11.0** | °C |
| Humidity | **83** | % |
| Rainfall Accumulation | **0.2** | mm |
| Pressure (at station height) | **1014.9** | hPa |
| Wind Speed | **11.0** | knots |
| Wind Speed | **20** | km/h |
| Wind Direction | **144** | deg |
| Wind Direction | **SE** | compass |
| Dew-Point Temperature | **-** | °C |

VIEW FULL OBSERVATION

Roscrea

Cloughjordan

## GURTEEN TIPPERARY AWS

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**21:30** 26/09/2025

**Summary** Forecast

| | | |
|---|---|---|
| Temperature | 12.4 | °C |
| Humidity | 75 | % |
| Rainfall Accumulation | - | mm |
| Pressure (at station height) | 1005.6 | hPa |
| Wind Speed | 13.3 | knots |
| Wind Speed | 25 | km/h |
| Wind Direction | 156 | deg |
| Wind Direction | SSE | compass |
| Dew-Point Temperature | - | °C |

VIEW FULL OBSERVATION

×

## GURTEEN TIPPERARY AWS

**21:30** 27/09/2025

**Summary** | Forecast

| | | |
|---|---|---|
| Temperature | **8.9** | °C |
| Humidity | **87** | % |
| Rainfall Accumulation | **4** | mm |
| Pressure (at station height) | **1007.5** | hPa |
| Wind Speed | **5.3** | knots |
| Wind Speed | **10** | km/h |
| Wind Direction | **242** | deg |
| Wind Direction | **WSW** | compass |
| Dew-Point Temperature | **-** | °C |

VIEW FULL OBSERVATION

## GURTEEN TIPPERARY AWS

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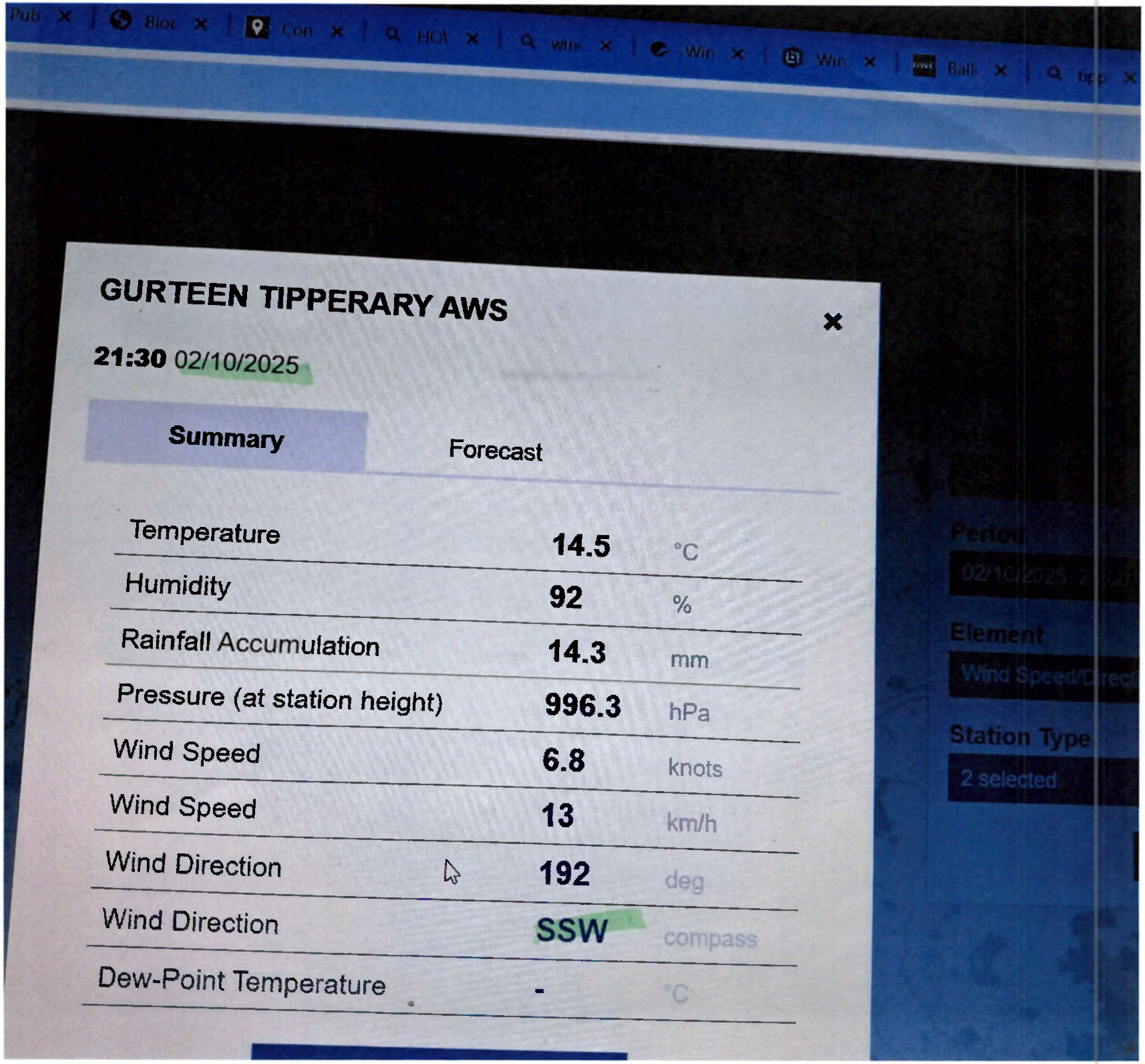
**21:30** 28/09/2025

**Summary** Forecast

| | | |
|---|---|---|
| Temperature | **7.7** | °C |
| Humidity | **91** | % |
| Rainfall Accumulation | **1.1** | mm |
| Pressure (at station height) | **1015.3** | hPa |
| Wind Speed | **3.5** | knots |
| Wind Speed | **6** | km/h |
| Wind Direction | **190** | deg |
| Wind Direction | **S** | compass |
| Dew-Point Temperature | - | °C |

VIEW FULL OBSERVATION



GURTEEN TIPPERARY AWS
21:30 02/10/2025
Summary
Forecast
Temperature 14.5 °C
Humidity 92 %
Rainfall Accumulation 14.3 mm
Pressure (at station height) 996.3 hPa
Wind Speed 6.8 knots
Wind Speed 13 km/h
Wind Direction 192 deg
Wind Direction SSW compass
Dew-Point Temperature - °C
Period
Element
Station Type
2 selected

## GURTEEN TIPPERARY AWS

**21:30** 03/10/2025

Summary | Forecast

| | | |
|---|---|---|
| Temperature | **11.2** | °C |
| Humidity | **75** | % |
| Rainfall Accumulation | **13.9** | mm |
| Pressure (at station height) | **983.5** | hPa |
| Wind Speed | **16.3** | knots |
| Wind Speed | **30** | km/h |
| Wind Direction | **242** | deg |
| Wind Direction | **WSW** | compass |
| Dew-Point Temperature | **-** | °C |

VIEW FULL OBSERVATION