



Technical Appendix 3.1: Outline Construction Environmental Management Plan (CEMP)

Cairnoch Hill Wind Farm

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Acronyms and Abbreviations

AIL	Abnormal Indivisible Load
BPP	Borrow Pit Plan
CDM	Construction (Design and Management) (CDM) Regulations 2015
CEMP	Construction Environmental Management Plan
CIRIA	Construction Industry Research and Information Association
CMS	Construction Method Statement
CMT	Construction Management Team
SC	Stirling Council
EASR Regulations	The Environmental Authorisations (Scotland) Regulations 2018 (SSI 2018/219), as amended (including by the Environmental Authorisations (Scotland) Amendment Regulations 2025).
EIA	Environmental Impact Assessment
EIRP	Environmental Incident Response Plan
ECOW	Ecological Clerk of Works
EPPP	Emergency Pollution Prevention Plan
EQS	Environmental Quality Standards
GPP	Guidance for Pollution Prevention
GWDTE	Groundwater Dependent Terrestrial Ecosystems
HGV	Heavy Goods Vehicle
HMP	Habitat Management Plan
MW	Megawatt
PPE	Personal Protective Equipment
PWs	Private Water Supply
RAMS	Risk Assessment Method Statements
SHPP	Species & Habitat Protection Plan
SPP	Species Protection Plan
SuDS	Sustainable Drainage System
SWMP	Site Waste Management Plan
TCC	Temporary Construction Compound
WQFMP	Water Quality and Fish Monitoring Plan
AOD	Above Ordnance Datum



1.0 Introduction

1.1 Background

This document presents an outline Construction Environmental Management Plan (CEMP) for Cairnoch Hill Wind Farm which sets out the principles and procedures for environmental management during the construction of the Cairnoch Hill Wind Farm (hereafter referred to as the “Proposed Development”). The Proposed Development is located (“the Site”) within the administrative boundary of Stirling Council and is centred on National Grid Reference (NGR) NS 69768 85606.

Should consent be granted, this outline CEMP would be revised and updated to a final CEMP, which would be agreed upon with Stirling Council through consultation and enforced as a planning condition.

The outline CEMP describes the embedded mitigation and good practice measures that are inherent in the Proposed Development and are assumed at the outset of the Environmental Impact Assessment (EIA). The CEMP would be used by the appointed Principal Contractor, to manage environmental risks and ensure appropriate control measures are implemented throughout the construction phase.

The document should be read in conjunction with **Chapter 3: Description of the Development** of the EIA Report and the required mitigation measures set out in **Chapter 16 Schedule of Commitments**.

The CEMP is a fluid document that will evolve during the different phases of the Proposed Development. As such it will be subject to ongoing review in order to:

- Address relevant conditions required in the approved consent;
- Ensure it reflects best practice at the time of construction;
- Ensure it incorporates the findings of pre-construction site investigations;
- Address changes resulting from the construction methods used by the contractor(s); and
- Address unforeseen conditions encountered during construction.

1.2 Aims and Objectives

The CEMP would be maintained and updated on Site and would be augmented by associated design specifications and Construction (Design and Management) Regulations 2015 (CDM 2015) documentation such as the Principal Contractor’s Construction Phase Plan.

Where appropriate, the CEMP, or plans within the CEMP, would form part of the Site induction which will be mandatory for all employees, contractors and visitors attending the Site. All employees and contractors will need to familiarise themselves with the relevant contents of the CEMP and supporting appendices as directed.

Management practices and mitigation measures have been developed for those aspects of the construction works that could potentially affect the environment.

The objectives of the CEMP are to:

- Outline the proposed mechanisms for ensuring the delivery of environmental measures to avoid or reduce environmental effects identified;



- Ensure procedures are in place so that there is a prompt response to effects requiring remediation, including reporting and any additional mitigation measures required to prevent a recurrence;
- Provide an outline of the content that will be supplied in the construction method statements and strategies that will be prepared in order to secure mitigation measures in relation to different design aspects of the Proposed Development;
- Ensure that good construction practices are adopted and maintained throughout the construction of the Proposed Development;
- Ensure compliance with legislation and identify where it will be necessary to obtain authorisation from relevant statutory bodies;
- Ensure that appropriate monitoring and reporting are in place; and
- Provide a framework for reporting, compliance auditing and inspection to ensure environmental aims will be met; and set out the Applicant's expectations to guide contractors on their requirements with regards to environmental commitments and environmental management.

1.3 Site Setting

The Proposed Development is located approximately 1.25km west of the Carron Valley reservoir hamlet and approximately 6km to the east of Fintry. Other nearby towns include Kilsyth, Denny and Stirling, located approximately 5.3km to 8.3km from the Site. The development covers an area of 573 hectares.

The current land use is predominantly commercial forestry. There are no statutory environmental designations within the site boundary.

Numerous small watercourses and tributaries run through the Site with the two named watercourses being "Earl's burn" and "Endrick Water".

The highest elevation within the development is 413m AOD, located on the summit of Cairnoch Hill in the centre of the Site. The lowest elevation in the site is 227m AOD which is located on the southern boundary.

The surrounding area mainly comprises commercial forestry, the Carron Valley reservoir, and operational wind farms. The closest public road is the B818 which borders the southern section of the Site, with the Site entrance located on this road. There are no private residential properties within the Site boundary.

The Site's soil conditions mainly consist of noncalcareous gleys with humic gleys. Brown earth soils and peaty gleyed podzols are also present within the Site. The Site's bedrock is drifts derived from basaltic rocks.

1.4 Proposed Development

The Proposed Development comprises a four-turbine wind farm, with associated infrastructure. The key component parts of the Proposed Development include the following:

- Four wind turbines with a tip height of up to 180m;
- Foundations supporting each turbine with adjacent crane hardstandings;
- A network of new and upgraded onsite access tracks with associated drainage, connecting wind turbines and other infrastructure;
- One substation compound including control building;



- Two temporary construction compounds to support construction activities;
- One permanent anemometry mast;
- Cables linking the wind turbines, installed in underground trenches and generally routed alongside access tracks, with marker posts where cabling crosses open ground;
- Upgrading of existing site entrance on the B818;
- One borrow pit to provide stone for construction, subject to further investigation and design; and
- Ancillary forestry felling to facilitate construction of the Proposed Development.

The Proposed Development has been designed for an operational life of up to 40 years, after which it will be decommissioned, or the project life may be extended or the Site repowered.



2.0 Schedule of Commitments and Implementation

2.1 Schedule of Commitments

The EIA Report outlines various mitigation measures and commitments aimed at offsetting the potential impacts of the Proposed Development. These mitigation measures / commitments are summarised in **Chapter 16: Schedule of Commitments**.

For each mitigation measure / commitment that is identified, it is anticipated that, post consent, details of the specific mechanism by which they are to be adopted, implemented, or enforced, as well as the timeframe within which the mitigation measure is to be carried out, will be agreed. It is anticipated that this would be controlled via an appropriately worded planning condition.

It will be mandatory for these mitigation measures to be reviewed, agreed (likely via an updated Schedule of Commitments) and implemented before, during and after the construction phase of the Proposed Development.

2.2 Implementation and Control

Compliance with the CEMP is the key control measure required during construction to ensure mitigation is appropriately addressed. The CEMP sets out the principles and processes to be followed to implement all relevant agreed environmental mitigation.

The Principal Contractor will be required to prepare a series of method statements in accordance with the Schedule of Commitments. These method statements will detail how the contractor intends to implement the mitigation set out in the CEMP and will be integrated with their detailed Construction Method Statements.

If any significant changes are required to the Schedule of Commitments due to changing environmental sensitivities, results of pre-construction surveys, unforeseen events or for any other reason, these will be discussed and agreed with statutory bodies in advance of any amended works being carried out. The Schedule of Commitments will be revised with any approved changes required resulting from the discussions with the relevant statutory bodies. Any such agreed revisions will require to be submitted to and receive the written approval of the Planning Authority prior to being implemented.



3.0 Roles and Responsibilities

During construction there would be key responsibilities for the Developer, the Principal Contractor and their teams. Establishing roles and responsibilities in relation to construction will be important in order to ensure the successful construction of the Proposed Development, including the implementation of the CEMP.

The personnel responsible for implementing, monitoring and responding to the requirements of this CEMP will comprise the Developer's project and construction management team, supported by the Principal Contractor's site management and environmental staff (including specialist subcontractors as required). These roles will work collaboratively to ensure that environmental risks are appropriately controlled, compliance is maintained, and corrective actions are taken promptly where necessary.

3.1 Health and Safety

The construction works would be undertaken in accordance with primary health and safety legislation, namely:

- Health and Safety at Work Act 1974 [1]; and
- Construction (Design and Management) (CDM) Regulations 2015 [2].

The construction works for the Proposed Development will fall under the CDM Regulations 2015. As such, the Principal Contractor would provide a Construction Phase Health and Safety Plan in accordance with the CDM regulations. This plan would include but not be limited to a construction programme, emergency procedures, Site layouts and fire plans, method statements and details of the proposed induction programme. This induction programme would include both the Principal Contractor's site-specific rules as well as the Developer's requirements and would include instructions to all staff regarding the Emergency Pollution Prevention Plan (EPPP) and relevant procedures.

An induction would be required for all personnel onsite (permanent/temporary / contractor/subcontractor), site visitors, client representatives or other third parties. Inductions will be documented and recorded.

All Site activities will follow a safe system of work, with specific tasks having Risk Assessment Method Statements (RAMS) detailing:

- How the task will be carried out;
- Identifying potential hazards and evaluating the risk on the basis of how likely hazards are to occur and what the consequences there could be in the event of an incident; and
- Mitigation measures to be implemented to reduce the risks of the task, which will follow the Hierarchy of Controls in the following order, with elimination being the most effective and PPE being the least effective:
 - o Elimination – physically remove the hazard.
 - o Substitution – replace the hazard.
 - o Engineering controls – isolate people from the hazard.
 - o Administrative controls – change the way people work.
 - o PPE – protect the worker with equipment.



RAMS would be recorded, monitored and reviewed at appropriate intervals. If work changes in a manner not anticipated by the RAMS, work would be stopped until the risk can be appropriately evaluated.

Plant operators and construction staff would be trained by the Principal Contractor on spill prevention/mitigation measures and procedures, and on the use of relevant mitigation materials (e.g., spill kits).

Staff and subcontractors employed by the Principal Contractor would be suitably trained and must provide certification for any plant, vehicle, or use of specialist equipment, such as electrical and hot works.

3.2 Responsibilities

Table 3-1 outlines the roles and responsibilities of the parties involved in the construction phase of the Proposed Development. Overall responsibility for the delivery of the works and implementation of this CEMP sits with the Principal Contractor through the Contractor Project Manager and Site Manager, supported by the Contractor Environmental Manager, who would maintain the CEMP as a live Site document, deliver environmental inductions and briefings, undertake routine inspections, and coordinate monitoring and corrective actions.

The Developer retains overarching governance and would oversee compliance through the Client Environmental Lead, with independent monitoring and advice provided by the Ecological Clerk of Works (ECoW) to verify that mitigation measures are correctly implemented in sensitive areas and during higher-risk activities.

Table 3-1: Construction Phase Roles and Responsibilities

Position	Areas of Designated Responsibility
Applicant	1. Appoint a competent Principal Contractor and ensure resources are available to deliver the CEMP requirements. 2. Overall environmental governance 3. Ensures contracts require compliance with CEMP 4. Approves appointment of ECoW 5. Ensures adequate resources and time for mitigation
Principal Contractor	6. Overall responsibility for implementing the CEMP and ensuring compliance by all subcontractors and suppliers. 7. Plan, coordinate and supervise works to minimise impacts on local receptors. 8. Implement controls for dust, noise, waste, traffic, spills and drainage protection. 9. Deliver site inductions and toolbox talks covering environmental controls and site rules. 10. Coordinates all contractors and packages (wind, enabling) 11. Prevents pollution and manages incidents/notifications 12. Maintains supervision and site controls
Contractor Project Manager (PM)	13. Manages delivery to programme and consent requirements 14. Integrates environmental constraints into programme 15. Ensures resources for mitigation/monitoring 16. Approves method statements and change control
Contractor Environmental Manager	17. Delivers environmental induction content and briefings



Position	Areas of Designated Responsibility
	18. Undertakes routine inspections and audits 19. Coordinates monitoring and corrective actions 20. Leads environmental incident response and reporting
Site Project Manager	21. Day-to-day site control and supervision 22. Keeps CEMP as a live working document on site 23. Ensures controls are in place before works start 24. Stops or re-sequences non-compliant work 25. Coordinates interfaces (wind)

All subcontractors and operatives remain responsible for complying with the CEMP requirements, attending inductions/toolbox talks, maintaining good housekeeping, and promptly reporting any incidents, spills, or non-compliances to enable timely investigation and close-out.

3.3 Construction Management Team

The Developer would appoint a Construction Management Team (CMT), led by a Construction Manager. The team would include, as a minimum, a Resident Engineer, and a subcontracted Environmental Clerk of Works (ECOW).

Prior to the appointment of a Principal Contractor, the Developer would retain ownership of the CEMP, and the document would become uncontrolled if printed.

It would be the Construction Management Team's responsibility to ensure that the Principal Contractor adheres to and complies with the principles of the CEMP and their Method Statements. This would likely be the responsibility of the Resident Engineer, the ECOW and the Construction Manager. The team is also responsible for:

- Regular liaison with the Principal Contractor's Site Manager;
- Maintaining environmental risk registers;
- Communicating with regulators and consultees such as SEPA, NatureScot and SC regarding any changes that need to be made to the CEMP including the Schedule of Commitments; and
- Ensuring that any required changes are approved and updated within the CEMP.

The Construction Manager, Principal Contractor, Resident Engineer and ECOW would have the power to stop works at any stage should it be deemed necessary, i.e., if there were risks posed to environmental receptors from construction that could not be mitigated immediately.

3.3.1 Ecological Clerk of Works (ECOW)

An Ecological Clerk of Works (ECOW) would be appointed during the period of construction and post-construction restoration. The appointment of the ECOW would be approved by Stirling Council.

The purpose of the ECOW would be to provide environmental advice and monitor compliance, not implement measures. The ECOW would have a number of different tasks to carry out during construction and prior to the outset of each construction phase. They would be required to keep an active register of all issues that arise during the works and report as required to the Construction Manager, Stirling Council, Forestry and Land Scotland (FLS) and SEPA.

The ECOW would have sufficient powers to:



- Oversee construction work and identify where mitigation measures are required;
- Authorise temporary stoppage of works if required; and
- To review working methods and advise whether alternative or more appropriate working methods require to be adopted.

The ECoW would undertake the following activities:

- To work with the Principal Contractor to induct all site personnel with regards to key environmental sensitivities and mitigation measures to be applied during construction. Toolbox talks shall be given by the ECoW throughout the construction period in the event that additional unforeseen issues arise that require alternative working methods;
- Undertaking site walkovers, ensuring implementation of the water management plan with reference to water quality protection and appropriate locations for fuel and oil stores;
- Liaising with contractors during the construction phase;
- Inspecting working areas and ensuring compliance with the CEMP;
- Undertaking water quality monitoring;
- Providing advice on sediment and drainage management;
- Communicating with all site personnel regarding any environmental issues and mitigation measures;
- Oversee the need for all necessary licences regarding protected species are obtained, if required and facilitating with the support of suitably qualified and experienced Ecologists; and
- Documenting and reporting any environmental issues and incidents as required to the Applicant, Stirling Council and other relevant consultees such as FLS and SEPA if required.

3.3.2 Resident Engineer

The Developer would appoint a Resident Engineer for the construction of the Proposed Development. The Resident Engineer will provide support to the Construction Management Team and have day to day responsibility for monitoring the Proposed Development onsite on behalf of the Construction Manager.

The Resident Engineer would have a wide range of duties including but not limited to:

- Overseeing construction works to ensure conformance with the specification, monitoring quality and progress and most importantly ensure that health, safety and the environment is given a high priority at all times. The Resident Engineer will effectively be the Applicant's representative on the site and would report directly to the Construction Manager;
- Authority to stop the construction works in the case of a health and safety, environmental or quality issue. This applies when delays may lead to increased risk or damage;
- Daily visual inspections of working areas to identify possible construction issues from a quality, environmental, programme and safety perspective. Any issues would be raised directly with the Principal Contractor;



- Working closely with the ECoW to ensure that ecological and environmental requirements dictated by the CEMP, best practice and the planning conditions are adhered to by the works contractors;
- Reviewing construction related documents from all contractors – including method statements and risk assessments and providing comments directly onsite to the Principal Contractor; and
- Reporting all environmental or health and safety incidents and near misses to the Construction Manager in a form and timescale required by the Construction Management Team.

3.4 Site Personnel

All Site personnel, including all members of the Developer's and Principal Contractor's teams, all sub-contractors and sub-consultants are required to:

- Attend all inductions and Site-specific training including toolbox talks carried out by the ECoW; and
- Implement control measures throughout the Proposed Development Site, as required.

3.5 Communication

Prior to the commencement of construction, the Developer will set up a community liaison strategy. The objective of the community liaison activity will be to keep the community informed of progress of construction of the Proposed Development. The community liaison strategy would be designed to establish processes to keep the community informed, reviewing incidents that have occurred and how these have been resolved and discussing the forthcoming programme of work. The Developer will start to liaise through the Community Council prior to any construction starting on the Proposed Development Site and communication would be maintained on a regular basis, i.e. monthly, until construction is complete, and the Proposed Development is operational. The Developer would provide contact details to the Community Council of:

- The Resident Engineer;
- The Developer's Construction Project Manager; and
- The Developer's Public Relations Officer.

Any resident who has a question regarding the construction of the Proposed Development would be directed to one of these contacts. All questions would be logged and responded to within a specified number of days.

Once construction has started, the Developer would provide details of any construction activity that would impact on the local community, such as deliveries.

Careful monitoring of any complaints received, including recording details of the location of the affected party, time of the disturbance and nature of the issue would assist with managing the works to reduce the likelihood of further incidents.



4.0 Phasing

4.1 Construction

The construction works are anticipated to be completed within a 16-month period.

Construction working hours are anticipated to be 7:00 AM to 19:00 PM, Monday to Friday, and 7:00 AM to 16:00 PM on Saturdays. While work on Sundays and public holidays is not expected, certain critical activities, such as abnormal load deliveries, concrete pours for turbine foundations, and the lifting of turbine components, may be conducted outside these hours if necessary. Any out of hours working beyond these critical activities will be subject to prior agreement with Stirling Council.

The Principal Contractor will maintain open communication with local residents and stakeholders through the construction period. This will include advance notice of the working schedule, especially for any particularly noisy operations or abnormal deliveries, ensuring that residents are well informed about timings and potential disruptions.

The following phases would be taken into consideration for the construction works:

- Phase 1 – Site set-up:
 - Site preparation, including tree felling and vegetation clearance where necessary;
 - Access road improvements, including widening and drainage adjustments; and
 - Establishment of site compounds, including installation of welfare facilities and temporary storage areas.
- Phase 2 – Civil Works and infrastructure:
 - Construction and upgrade of internal access tracks, including passing places, turning areas and laydown areas;
 - Installation of surface water management measures, including temporary drainage, erosion control and sediment controls;
 - Wind turbine civil works, including turbine foundation excavations, reinforcement placement, concrete pours and crane hardstandings; and
 - Construction of the substation compound and control building civils, together with associated earthworks and drainage.
- Phase 3 – Electrical works, plant installation and commissioning:
 - Cable trenching and installation of underground cabling between turbines and the substation, with progressive reinstatement;
 - Installation of wind turbine components, including delivery and erection; and
 - Commissioning and testing of wind generating equipment and grid compliance testing.
- Phase 4 – Demobilisation:
 - Demobilisation of temporary compounds, temporary hardstandings and temporary works;
 - Reinstatement and restoration of disturbed areas, including reinstatement of temporary storage areas, track edges and working areas, using stored soils/turfs as appropriate; and



- Snagging, final inspections and handover documentation confirming completion of mitigation commitments and CEMP compliance.

An outline construction programme is shown in **Table 4-1** for information. The construction phase of the Proposed Development, which includes civil, electrical, and wind turbine assembly is anticipated to take 16 months. A detailed construction programme would be provided by the Principal Contractor as part of the CEMP and the Construction Phase Plan (CPP).



Table 4-1: Outline Construction Programme

Construction Activity	Month															
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Access Road Improvements																
Site Establishment																
Tree Clearance																
Construction of Tracks, Crane Pads and Compounds																
Turbine Foundation Construction																
Substation - Civil & Electrical Works																
Turbine Delivery and Erection																
Cable Laying & Cable Bedding																
Site Restoration																



4.2 Post Construction Reinstatement

Good practice techniques for vegetation and habitat reinstatement would be adopted and implemented on areas subject to disturbance during construction as soon as practicable.

The following reinstatement works would be considered:

- Re-use of turves;
- Re-use of topsoil/peat where appropriate; and
- Reseeding with appropriate species.

For clarity, the following are definitions for the different plant and peat make-up of the natural ground between the surface and rockhead (from top down):

a) Vegetation:

This is typically plant matter that can be removed/stripped above the ground level (i.e. does not include roots/topsoil). This can vary depending on the nature of the vegetation encountered on site.

b) Turf/Turves:

This is typically a layer of matted earth formed by grass and plant roots. The matted earth layer would normally be 30-50mm thick.

c) Peat:

The near-surface organic ground formed from partially decomposed vegetation. Thickness is highly variable across the Site. The upper peat is typically fibrous with a vegetation mat, underlain by more decomposed, saturated peat. Peat can be excavated as intact turves where reinstatement is required, or otherwise segregated and placed in temporary storage in line with the Peat Management Plan.

d) Topsoil

The upper soil layer usually contains much more organic matter than the layers below. Its thickness can vary but is typically up to about 400mm. This layer may be stripped together with the turf, depending on whether the turf is needed for reuse elsewhere or whether the topsoil is to be stripped without turf.

e) Superficial Soils:

This is a generic term used for all material between topsoil/peat and rockhead. This can vary in depth and content throughout the depth profile at any location.

f) Weathered Rock:

This is a layer that may exist above rockhead that is neither rock nor superficial material but a mixture of both. It can be mostly fractured rockhead as a result of physical and chemical weathering processes. When excavated it may have elements of fractured rock and superficial material as the boundary can be difficult to distinguish.

In some cases, this can provide suitable engineering material for the construction of foundations, embankments, tracks, etc.



g) Rockhead:

This is a naturally occurring solid aggregate of minerals which lies beneath the superficial soils.



5.0 General Construction Good Practice

5.1 Handling of Excavated Materials

The construction of access tracks, service roads, wind turbine foundations, and related facilities will involve stripping, excavation, and the reuse or temporary storage of excavated materials. Excavations are expected to generate materials comprising turves, peat, where present, topsoil, subsoil and rock. A description of the existing land, soils and geological setting is provided in EIA Report **Chapter 10: Hydrology, Hydrogeology, Geology and Soils**

These materials would, where suitable, be retained on Site and reused for reinstatement associated with access tracks, cable trenches, wind turbine foundations, crane hardstandings, the substation compound and temporary working areas. Upper vegetated turves, where available, will be stripped first, stored separately and used to dress infrastructure edges and to reinstate areas that have been temporarily stripped.

Excavated material will be reused as soon as practicable and as close as possible to the area from which it was excavated. Where immediate reuse is not practicable, temporary stockpiling will be required. Stockpiles for materials arising from temporarily occupied areas will, where possible, be located close to the excavation location to minimise double handling, vehicle movements and the risk of cross contamination or mixing of horizons. Progressive reinstatement will be undertaken wherever practicable to reduce the duration that soils and peat, if encountered, remain in stockpiles.

5.2 Material Storage

Granular, non-organic material required to be stored temporarily would be compacted to reduce the potential for erosion and transfer of sediment and stockpiled in designated areas at least 50m from a watercourse. Temporary stockpiles would be appropriately sited away from marshy grassland, bog or heath, where possible, with the locations agreed in advance with the ECoW.

Where excavated material cannot be transferred immediately to an appropriate restoration area, short-term storage would be required. In this case, the following good practice would apply:

- Peat/soils would be stored around the turbine perimeters at a sufficient distance from the cut face of excavations to prevent overburden induced failure;
- Local gullies, diffuse drainage lines (or very wet ground) and locally steep slopes would be avoided for storage;
- Stored upper turves (incorporating vegetation) would be reinstated adjacent to similar habitats as advised by the ECoW;
- Monitoring of stockpiles/excavation areas would occur during and following rainfall events; and
- If material is stockpiled on a slope, silt fences would be utilised to reduce sediment transport in accordance with CIRIA Control of Water Pollution from Construction Sites. Guidance for consultants and contractors guidance C532 [5]. Additional measures may also be necessary to control flow of water and sediment transport on Site in accordance with this guidance.



Material excavated during new and upgraded access track construction would be stored adjacent to the track and granular, non-organic material compacted in order to limit instability and erosion potential. Peat would not be allowed to dry out, through rewetting and monitored irrigation.

Silt fences will be employed in combination with the measures described in contractors guidance C532 [5] where required, to catch and minimise sediment levels in run-off.

All soils stripped from the borrow pit(s) would be retained in clearly demarcated stockpiles of no greater than 3m height in locations immediately around the borrow pit excavation, but a safe distance from any elevated edges.

5.3 The Management and Movement of Concrete

5.3.1 Accidental Spillage

An appropriately sized spill kit(s) would be provided and maintained onsite, consideration would be given to suitable locations across the active areas of the Proposed Development Site and to having vehicles, including plant, carry a spill kit. This kit would contain materials, such as absorbent granules and pads, absorbent booms and collection bags. These are designed to halt the spread of spillages and would be deployed, as necessary, should a spillage occur elsewhere within the construction compounds.

In the event of any spillage or pollution of any watercourse, the emergency spill procedures as described in the Environmental Incident and Emergency Response Plan (EIRP) would be implemented immediately (refer to section 6.1 EIRP).

A speed limit of 15mph would apply for vehicles onsite and would be monitored and enforced by the Principal Contractor. Maximum vehicle load capacities would not be exceeded.

5.3.2 Vehicle Washing

To avoid mud and debris being tracked onto the public road network, all construction vehicles and plant will be subject to appropriate cleaning measures prior to leaving the Site. Where required, a designated wheel wash/vehicle wash facility will be established within the construction compound or at a suitable location near the site access, positioned on an impermeable surface where practicable and away from watercourses and drainage pathways.

Wash water will be managed to prevent pollution. Runoff from vehicle washing will be contained and directed to a suitable treatment arrangement for example, settlement tank/pond, silt trap prior to discharge or collection. Discharges will not be permitted to watercourses or surface water drains without appropriate controls and any required consents. Wash facilities will be inspected routinely, with sediment removed and disposed of appropriately to maintain effectiveness. Where a fixed wheel wash is not practicable, alternative measures such as road sweepers, dry brushing, and on-site cleaning in designated areas will be implemented to achieve the same outcomes. All drivers will be briefed on the vehicle washing requirements through the Site induction and toolbox talks, and compliance will be monitored by the Site Manager and Environmental Manager.



5.3.3 Concrete Pouring for Turbine Foundations

To prevent pollution, it is important that all concrete pours are planned, and specific procedures adopted in accordance with Construction Industry Research and Information Association (CIRIA) C532 Control of water pollution from construction sites: guidance for consultants and contractors [5]. These procedures would include:

- Ensuring that all excavations are sufficiently dewatered before concrete pours begin and that dewatering continues while the concrete cures. Construction good practice would be followed to ensure that fresh concrete is isolated from the dewatering system;
- Ensuring that covers are available for freshly placed concrete to avoid the surface of the concrete washing away during heavy precipitation; and
- Perimeter drains with silt traps.

The excavated area would be back-filled with compacted layers of graded material from the original excavation, where this is suitable, and capped with peat or soil. The finished surface around the base of the turbine, would be capped with crushed aggregate providing a walkway to allow for safe personnel access.

5.4 Surplus Waste Material

5.4.1 Introduction

The Principal Contractor will take all reasonable steps to ensure that all waste from the Site is dealt with in accordance with the requirements under the Environmental Protection Duty of Care Regulations 1991 [6] and amendments and that materials will be handled efficiently and waste managed appropriately.

Appropriate waste management, disposal, and waste carrier documentation and licences will be obtained. This includes complete waste transfer notes prior to waste leaving the Site, ensuring all waste carriers have a valid waste carrier's registration certificate, ensuring wastes are disposed of at a correctly licensed site, and completing notification for hazardous waste to SEPA.

Waste streams will include wastes generated by plant, machinery and construction workers over the period of the works, for example waste oils, sewage, refuse (paper, carton, plastic), wooden pallets, waste batteries, fluorescent tubes and similar.

5.4.2 Peat and Soil

Excavated peat will be carefully lifted, kept intact where practicable, and stored within the Site close to the point of excavation on suitable separation layers to prevent mixing with aggregate. Peat will be segregated by type and moisture condition and maintained in low, stable mounds to preserve structure and hydrology. Re-use will be prioritised for reinstatement of track verges, hardstanding margins, compound perimeter softening, and micro-habitat restoration in accordance with the Soils and Peat Management Plan (PMP). On this basis, off-site disposal of peat is not anticipated.

5.4.3 Hazardous and other Wastes

Table 5-1 lists some of the waste types that may be generated during the construction works. Although some waste types may be generated in locations other than the



construction compounds, such waste materials would be stored within the construction compounds only. Waste materials generated outside the construction compounds would be taken to the compounds on a daily basis to be managed thereafter.

Table 5-1 – Common Construction Wastes

EWC Code	Description
13 01 10*	Used mineral hydraulic oil (non-chlorinated)
13 02 08*	Other waste engine, gear or lube oil
13 02 05*	Waste engine, gear or lube oil (non-chlorinated)
16 01 07*	Oil filters
20 01 23*	Discarded equipment containing CFCs e.g. waste fridges
16 06 01*	Lead batteries
16 07 08*	Oily waste from transport and storage tanks
16 10 01*	Hazardous liquid wastes to be treated off-site
20 01 21*	Fluorescent tubes and other mercury-containing waste
20 01 33*	Hazardous batteries and accumulators that are collected separately
15 02 02*	Absorbents, filter materials, wiping cloths, clothing contaminated by dangerous substances
15 01 01	Cardboard or paper packaging
15 01 02	Plastic packaging e.g. toner and ink cartridges, polythene sheeting
15 01 03	Wooden packaging e.g. timber pallets
15 01 04	Metallic packaging e.g. drink cans, paint tins
16 01 03	Tyres
16 01 15	Antifreeze fluids that do not contain dangerous substances e.g. Coolants
16 01 17	Ferrous metal from vehicles e.g. car parts
16 02 14	Non-hazardous waste electricals e.g. washing machines, power tools
16 05 05	Gases in pressure containers i.e. gas cylinders
17 01 01	Concrete
17 02 01	Wood from construction or demolition e.g. timber trusses, supports, frames, doors
17 04 11	Cables that do not contain dangerous substances e.g. electric cabling
20 01 01	Paper and card similar to that from households e.g. office paper, junk mail
20 01 30	Non-hazardous detergent e.g. flushing agent/universal cleaner
20 01 39	Separately collected plastics e.g. plastic containers, bottles
20 03 01	Mixed waste similar to that from households e.g. mixed office, kitchen and general waste
20 03 04	Septic tank sludge



*Denotes Hazardous Waste, as categorised by the European Waste Catalogue.

Foul water from the onsite facilities at the construction compounds would be removed from the Proposed Development Site by an appropriately licensed contractor (see also Section 7.5).

5.4.4 Regulatory Compliance

Waste would be transferred to a licensed waste management site or site with a waste exemption. The Principal Contractor would check that the site is licensed and that the licence permits the site to take the type and quantity of waste involved. Copies of the waste management licence or waste exemption license would be held on file.

A 'Waste Transfer Note' must be completed by all parties involved and must be retained for a period of two years. Sub-contractors excavating and hauling waste offsite must complete their own Waste Transfer Notes and copy them to the Principal Contractor. It is not necessary to have a Waste Transfer Note for each load of waste, provided that each transfer is covered by either a single WTN or, for regular collections of the same non-hazardous waste between the same parties from the same place, an "annual" or "season ticket". Waste Transfer Note (valid for up to 12 months), supported by a schedule recording each collection date and quantity. It will be the responsibility of the Principal Contractor to ensure that other parties involved in the transport, storage and disposal of waste are legally entitled to carry out their duties.

5.5 Dust Mitigation

Good practice measures as listed in **Table 5-2** would be adopted during construction to control the generation and dispersion of dust such that significant impacts on neighbouring habitats should not occur. The hierarchy for mitigation would be prevention – suppression – containment.

Table 5-2 – Dust Mitigation Measures

Task	Mitigation Measures
Excavation and Earthworks	- Strip vegetation/topsoil only within the active working area and only as required, to minimise the extent and duration of exposed ground; - during excavation works drop heights will be minimised to control the fall of materials reducing dust escape; and - temporary cover may be provided for earthworks if necessary and completed earthworks and other exposed areas will be covered with topsoil and re-vegetated as soon as it is practical in order to stabilise surfaces.



Task	Mitigation Measures
Stockpiling of loose materials	- ensure that stockpiles exist for the shortest possible time; - material stockpiles will be low mounds without steep sides or sharp changes in shape; - material stockpiles will be located away from the site boundary, sensitive receptors, watercourses and surface drains; - material stockpiles will be sited to account for the predominant wind direction and the location of sensitive receptors; and - material likely to cause dust will be sealed or covered where suitable.
Track works/ traffic movements	- water bowsers will be available onsite and utilised for dust suppression where required; - daily visual inspections will be undertaken to assess need for use of water bowsers; - daily visual inspections will be conducted to evaluate the condition of the new access junction with B818; and - vehicle loads to be covered.

5.6 Noise Management

The Principal Contractor will be responsible for managing noise-generating activities and plant to minimise effects on nearby noise sensitive receptors. This will include planning works to remain within the agreed construction working hours, selecting suitably quiet plant where practicable, maintaining plant and equipment in good working order, locating static equipment such as generators and compressors as far from receptors as reasonably practicable, and avoiding unnecessary engine idling and simultaneous high-noise operations where this can be managed through sequencing. Construction noise limits have been derived for the project using the BS 5228 ABC [7] method, and the works will be managed to achieve these limits through appropriate methods of working, supervision and routine checks.

Construction traffic noise and other short-duration noisy activities will be managed through the Construction Traffic Management Plan and proactive community communication, with advance notice provided for activities with a higher potential for disturbance such as concrete pours, abnormal deliveries and turbine erection. Construction and decommissioning noise and vibration have been scoped out of detailed assessment on the basis that activities are generally remote from receptors and can be minimised through working hour controls and good practice, and construction traffic noise can be reduced through traffic management and is expected to be unlikely to be significant relative to baseline conditions. Any requirement for works outside standard hours will be agreed in advance with Stirling Council, and a clear complaints procedure will be in place so that any justified concerns can be investigated promptly and additional mitigation implemented where required.

For all activities, measures will be taken to reduce noise levels with due regard to practicality and cost as per the concept of 'best practicable means' as defined in Section 72 of the Control of Pollution Act 1974 [8].



5.7 Site Lighting

Temporary site lighting may be occasionally required for specific activities to ensure safe working conditions, during periods of limited natural light but would be carried out within the limits of the permissible working hours. It is intended the type of lighting would be non-intrusive and specifically designed to negate or minimise any effect to local properties and any other environmental considerations.

Given the proposed size and scope of the Proposed Development, and location in Scotland, it is most likely that the construction timetable would require elements of the works to be undertaken during periods of the year when natural daylight is limited.

The use of artificial lighting may therefore be required in order to facilitate the works, such as vehicle and plant headlights; construction and compound lighting; office complex lighting; and localised floodlights/mobile lighting units. There would be fewer requirements for artificial lighting in the summer months when natural lighting would be present during normal working hours. There are no known issues with regards to the limit of lighting levels in this area, but lighting would be provided to meet the required lighting levels for the respective works which are being undertaken, especially where there is plant and machinery involved. Any issues identified with regards to limiting the lighting levels, either the lux values, or the time/duration of the lighting would be taken into consideration as part of the developed construction method statement.

5.8 Vehicle Storage

Appropriate areas would be provided adjacent to or within the temporary construction compounds to allow staff and visitor vehicles to be parked. In addition, appropriate provisions would be made for the layover of Heavy Goods Vehicle (HGV) traffic to ensure that the adjacent road always remains clear and available for use. The track design incorporates spurs and crane hardstanding, which, from time to time, could be required to temporarily store vehicles, i.e., as waiting areas.



6.0 Pollution Prevention Measures

6.1 Environmental Incident Response Plan

The Principal Contractor would be responsible for developing and implementing an Environmental Incident and Emergency Response Plan (EIRP). The EIRP would provide reference to procedures to be followed in the event of a specific incident. In general, if an environmental incident was to occur, the following would take place immediately:

- Mitigation would be implemented to stop or reduce impacts from the incident;
- If these were ineffective, work in the area would cease immediately;
- If necessary, monitoring would be undertaken to identify the source of the incident;
- Work would only recommence once it is considered that it would not continue to adversely impact sensitive environmental receptors; and
- Provision of a full report by the Principal Contractor and separately by the ECoW to the Applicant following an incident occurring.

The EIRP would reflect site-specific conditions and issues. The Principal Contractor would submit the detailed Plan to the Applicant for approval prior to any construction works commencing onsite. The plan would provide:

- A summary of local environmental sensitivities, e.g. environmentally designated areas, protected species or habitats and high amenity areas;
- An outline of the construction works and appropriate references to other environmental plans and construction method statements;
- An inventory of stored materials and emergency response spill kits;
- Details on training requirements, including evidence of training of site staff and plant operators in emergency response procedures. This should also cover the incorporation of Environmental Incident and Response training in site inductions and tool box talks; and key staff contacts for environmental management and emergency response;
- Detailed procedures to be taken in the event of an incident or emergency (including procedures for positioning and movement of plant) and identification of relevant personnel who would be responsible for implementing such procedures; and
- Contact telephone numbers for emergency services and the SEPA Pollution Hotline number (0800 80 70 60).

A plan of the Site would also be provided, detailing:

- All areas of potential pollution sources including the locations of car parks, delivery and fuel / chemical storage areas, oil separator equipment, excavations, and any other high risk areas that could give rise to pollution;
- The location of potential sensitive environmental receptors, including sensitive habitats or species, surface watercourses, drains or culverts where pollution may travel to;
- The location of spill kits and other pollution control or emergency response equipment; and



- The procedures for responding to a major pollution incident would be a regular topic at onsite tool box talks and management meetings in order to ensure that the incident response plan is fully understood by all personnel, and that all involved know their role in it. Any lessons learnt from any response to real incidents would be fed back into the plan to ensure that best practice is followed.

The EIRP will be developed referencing relevant guidance, including but not limited to:

- CIRIA (2015) Environmental good practice on-site guide (fourth edition) (C741) [9];
- CIRIA (2006) Control of water pollution from linear construction projects. Site guide (C649) [10];
- DEFRA (2011 as amended in 2018) Code of practice for the sustainable use of soils on construction sites [11];
- SEPA (2021) Sector Specific Guidance: Water Run-Off from Construction Sites Supporting Guidance (WAT-SG-75) [12]; and
- SEPA (2010 Second edition) Engineering in the water environment: good practice guide River crossings [13].

6.2 Refuelling of Vehicles, Plant and Machinery

Generally, re-fuelling of mobile plant and machinery would be carried out at a designated location within the Site in accordance with PPG 7 [14].

Vehicle re-fuelling would take place either within the compounds at a dedicated impermeable refuelling pad or by mobile double-bunded bowsters at their place of work. The refuelling pad will have an impermeable base and bund with a capacity of 110% with sumps provided such that they do not drain directly into the surface water drains. Where practicable, drainage from storage compounds will be passed through oil interceptors prior to discharge. Refuelling would be carried out using an approved mobile fuel bowser with a suitable pump and hose. Absorbent material (spill kits) would be available on-site with dedicated kits adjacent to watercourses and would be deployed to contain drips and small spillages. Waste oil, other contaminants from interceptors and used spill kits will be disposed of in accordance with GPP 8 Safe storage and disposal of used oils [15].

All other fuels, oils and potential contaminants, as well as waste oils, would be stored within the site compounds in secure, fit for purpose containers within bunded containment as appropriate and in accordance with SEPA guidance (GPP 2: Above ground oil storage tanks, January 2018) [16]. All drums and barrels will be fitted with flow control taps. All drums and barrels will be correctly labelled. The bunded containment would have a capacity of 110% of the volume to be stored and would have impervious, secured walls and base. Maintenance of mobile plant would take place within the construction compounds only and would comply with SEPA PPG 7 [14].

There would be no fuel storage outside the compounds. Plant would be maintained in good operational order and any fuel or oil leaks recorded for attention. Absorbent pads or granules in the case of an accidental leak or spillage would be available at the temporary construction compound(s).

Refuelling procedures and risk assessments and method statements will be provided by the Principal Contractor to the Developer for approval prior to work commencing.



6.3 Spillages

In the event of any spillage or pollution of any watercourse the emergency spill procedures as described in the EIRP would be implemented immediately. Procedures will be adhered to for storage of fuels and other potentially contaminative materials in line with the Water Environment Oil Storage Scotland Regulations 2006 [17], to minimise the potential for accidental spillage.

6.4 Other Storage

Stockpiles for stone material for the construction of tracks would generally be limited to within work areas. This material would be transported and deposited directly to the point of use from the borrow pits. Therefore, stone would generally not be stockpiled around the Site. Other aggregates will be stockpiled within the batching plant area.

Stripped topsoil/superficial soil / peat would be stockpiled in a suitable location away from the area of movement of heavy vehicles, machinery and equipment, to minimise compaction of soil. Stockpiling of excavated material would be managed such that the potential contamination of down slope water supplies and/or natural drainage systems is mitigated / minimised in accordance with the Soils and Peat Management Plan (SPMP).

Low mounded stockpiles would be formed from excavated material, adjacent to access tracks, turbine areas and compound areas, away from open drains.

6.5 Prevention of Mud and Debris on Public Roads

Plant and wheel washing facilities and road sweepers would be provided as required to prevent mud and deposits from being transferred from the Site onto the public highway.

Plant and wheel washing, where provided, would be located within a designated hardstanding at least 50m from the nearest watercourse or surface water drain. Runoff from the facilities would be captured within a purpose designed system for recycling and re-use where possible within the Proposed Development Site. Settled solids would be regularly removed and disposed of by an appropriately licensed contractor. This facility would be located and designed in consultation with SEPA and Stirling Council.

Open backed lorries or tippers delivering material to the Site or removing material from the Site would be sheeted where there is a risk of loose or deleterious material being deposited on the local public road network.

6.6 Cement

Where the quality of the in-situ rock is deemed suitable for concrete, then on-site concrete batching would likely be proposed. Cement for concrete production would be appropriately stored in sealed silos and its use controlled as part of the batching process. This would be protected from the elements.

Any bagged cement would be stored within a soil bunded area on pallets above the ground and covered with secured plastic sheeting to minimise the risk of wind-blown cement and uncontrolled washout occurring.

Any spilled cement would be removed by shovelling/excavator and suitably disposed offsite.

If the rock is found to be unsuitable for concrete batching then ready-mixed concrete would be brought onto the construction site from an off-site source for use as required.



6.7 Silt

Silt laden runoff could be expected from any areas of recently exposed soil or rock and from access tracks in regular use. There would be no discharge or disposal of any material directly into any river, stream or drainage ditch. Further detail on the control of silt entrained in surface water runoff will be contained within the Water Management Plan.

6.8 Waste and Litter

Waste storage/recycling materials would be stored at the designated location on site. Section 5 details principles for waste minimisation, recycling and disposal of waste streams. A separate Waste Management Plan would be prepared by the Principal Contractor in order to document waste movement and amounts of different waste streams generated.

With respect to the control of litter on site, all such waste would be collected and stored within sealed containers within the temporary construction compounds and serviced by a registered waste carrier. No disposal of litter would be permitted at other locations. This will be a point of emphasis within the site induction to all Site personnel.

6.9 Hydrocarbon Contamination

6.9.1 Vehicle Maintenance

Plant and machinery will be regularly maintained to ensure that the potential for fuel or oil leaks and spillages are minimised. All maintenance would be conducted on suitable absorbent spill pads to minimise the potential for groundwater and surface water pollution. All machinery would be equipped with drip pans to contain minor fuel spillage or equipment leakages.

6.9.2 Chemical Storage

All fuels, oils and other chemicals would be stored in the construction compound in secure, fit for purpose containers within bunded containment as appropriate. The bunded containment would have a capacity of 110% of the volume to be stored and would have impervious, secured walls and base.

The bunded area would be within one of the temporary construction compounds and would be underlain by an impermeable ground membrane layer to reduce the potential pathways for contaminants to enter watercourses and groundwater.



7.0 Drainage and Surface Water Management

7.1 Introduction

Control of water is of great importance during construction to prevent exposed peat and soils eroding and silting up surrounding drainage channels and watercourses. It is essential that the works have little or no impact on the existing hydrology in order to minimise potential impact on ecology and environmental quality of the surrounding area.

The following principles are intended to demonstrate measures that could be used across the site to adequately protect hydrological, and related, resources. Detailed proposals for such measures would be documented prior to construction, and would provide the same or greater protection for the water environment as those described in this document. The measures are proportionate to the risk and, where greater risk is highlighted at specific locations prior to construction, specific measures would be agreed for those locations.

Legislation and Guidance that have informed the drainage and surface water management proposals includes those listed in Section 6.1, as well as:

- GPP 4 Treatment and Management of Wastewater where there is no connection to the public foul sewer [18].

7.2 Site Introduction and Training

All employees and contractors would undergo a site induction to ensure that they are familiar with the site rules prior to any work commencing on site. In addition, the Principal Contractor would ensure that all operatives and contractors responsible for handling fuel, oil, concrete or cement or other potential pollutants undergo a thorough induction programme with respect to the relevant proposed pollution control measures. The relevant programme would include, as a minimum, the following:

- Waste management;
- Emergency response procedures;
- Materials management;
- Habitat and species protection,
- Surface water management;
- Potential sources of pollution and their effects on the environment;
- Requirements of the contract and legislation with respect to pollution;
- The Principal Contractor's pollution avoidance plan;
- Traffic management and routing, including areas where access is not permitted; and
- Training in the use of pollution control equipment.

7.3 Site Drainage

Construction activities have the potential to generate sediment laden runoff from exposed ground, track formation, foundation excavations, cable trenching, borrow pit works and vehicle movements. During the construction phase of the Proposed Development, measures would be adopted, in order to prevent silt, chemicals and/or other contaminants from being



washed into existing watercourses. Areas exposed due to the removal of vegetation are more susceptible to erosion during heavy rainfall, so areas would be reinstated as soon as possible to minimise this effect.

Measures would include specific guidance in relation to drainage (and control of pollution to the water environment) around the following aspects of Site infrastructure:

- Access tracks;
- Wind turbine foundations;
- Watercourse crossings; and
- Hardstanding areas and buildings (including crane hardstandings, temporary construction compounds and associated infrastructure).

The appropriate methodologies to cover water control and the means of drainage from all hard surfaces and structures within the Site are described in the following sections.

Ditches would remain in place to convey surface water flows during the operational life of the Proposed Development.

7.4 Management of Sediment and Surface Waters

Good practice construction techniques would be adopted for the management of sediment and surface water run-off generated during the construction phase of the Proposed Development. Sustainable Drainage Systems (SuDS) would be used where applicable.

Drainage from the Site would include elements of SuDS design. SuDS replicate natural drainage patterns and have several benefits:

- SuDS would attenuate run-off, thus reducing peak flow and any flooding issues that might arise downstream;
- SuDS would treat run-off, which can reduce sediment and pollutant volumes in run-off before discharging back into the water environment; and
- SuDS measures, such as lagoons or retention ponds, correctly implemented would produce suitable environments for wildlife.

In addition, a wet weather protocol would be developed and implemented by the Principal Contractor to manage activities during periods of heavy and prolonged precipitation. The protocol would be approved by Stirling Council in consultation with SEPA.

Heavy or prolonged rainfall during construction and operation may lead to sediment transport or vegetation causing blockage to infrastructure drainage channels or watercourse crossing structures. Regular monitoring and prompt maintenance of these assets will ensure that the drainage system continues to function as designed.

7.4.1 Sustainable Drainage Systems (SuDS)

During drainage design it is highly encouraged that runoff pollutants, such as silt, are treated within the development, such that the surrounding environment is not harmed, and local drainage connections are not overloaded. SuDS are a sustainable method of reducing the quantity and improving the quality of runoff into local water courses and connecting drainage network systems. They are inspired by natural systems and aim to improve the local amenity and biodiversity.



SuDS are desirable and easily constructible at a large scale for wind farms. Additionally, wind farm sites usually have established vegetation which can act as a form of SuDS, naturally intercepting pollutants and allowing for slow infiltration. Thus, the use of SuDS for wind farm sites can assist in reducing the risk of polluting the local environment and/or overwhelming drainage systems to a non-significant level. There are several forms of SuDS, however the methods mentioned below are those considered more suitable for wind farm developments:

- Permeable surfaces such as gravelled areas, drain water through voids within the gravel, into the layers below. The access tracks to the wind turbines will be constructed using porous materials, encouraging a natural and slow infiltration process;
- Filter strips are a method of source control constructed by sloping a gentle strip of ground for runoff to flow over. Considering wind farms are usually naturally hilly, runoff will flow down the hillside and the vegetation will intercept the pollutants such as silt, whereas the water will infiltrate slowly into the soil/peat layers below. Filter strips are typically constructed between the upland development/access tracks and the watercourses at the bottom of the development. However, it is noted that filter strips are not suitable for use at steep sites; and
- Swales are a source control and a method of deterring runoff from accumulating into one large drainage area. Swales are typically broad but shallow and can be created by excavating a small trench alongside the source of runoff, for example access tracks. Swales assist water into a storage or discharge system to reduce flood risk and encourage slow infiltration.

In addition to SuDS the following construction best practices shall be adopted where required:

- Splash guards and fences at watercourse crossings help to minimize the risk of sediment and pollutants entering watercourses. These measures ensure that water quality is maintained at crossing points, which are often vulnerable to contamination during construction activities;
- Silt fences, which are constructed using a closely woven synthetic geotextile material, are a quick and easy form of SuDS which can be used from the construction stage. They can be established along the leading runoff routes, intercepting high runoff flows and pollutants. Both methods have high capabilities of intercepting the mass of pollutants during the construction stage, with further use of being temporary check dams if required, for example within swales;
- Settlement lagoons are a form of retention ponds except that water is retained permanently. Ponds attract wildlife and can be a form of local amenity. A pond could be constructed down slope of a wind farm site by constructing a depression within the ground where water from the drainage network and runoff collects. Ponds reduce flood risk while encouraging slow infiltration into the ground below; and
- Wetlands are an extended form of ponds - providing further amenity and biodiversity.

7.4.2 Location of Silt Traps

Silt traps would be utilised to trap and filter sediment-laden run-off (in very small quantities) from isolated areas of excavation works at the Proposed Development. They would be



installed to assist in water flow management to minimise the risk of water reaching drainage ditches during times that water is at risk of becoming silt/ sediment laden. They can also be used in a well-designed water control system across slopes where the water is directed to grassy locations and/ or sediment lagoons/ silt busters. The use of silt traps/ fences needs to be carefully planned as they are easily overwhelmed. Management and regular monitoring of the effectiveness of silt trap/ fences is paramount.

Silt traps would be sited to avoid slopes with a gradient greater than 1 in 20. Silt traps would also be installed on the side of tracks adjacent to watercourse crossings to avoid sediment being transferred into the wider hydrological system.

7.4.3 Location of Settlement Lagoons

All settlement lagoons would be actively managed, with regular inspections and removal of silt build up to control water levels and ensure that any run-off is contained, especially during times of rainfall. If required to achieve the necessary quality of the final run-off, further measures could include increasing the number and/ or depth of lagoons, the use of sequential lagoons and the use of silt busters.

7.4.4 Outflow Monitoring from Sediment Lagoons

Settlement lagoon outflow would be regularly inspected, and discharge may be pumped, when required, for maintenance purposes. Any pumping activities would be supervised and authorised by the Principal Contractor and Site ECoW.

Treated water would be discharged with care in accordance with the following principles:

- Water to be discharged in planar sheet flow way rather than as a single point discharge in order to slow and spread the flow and minimise potential scour;
- Use of many small/mid diameters off lets, rather than collecting larger volumes of drainage flows to discharge to a smaller number of larger capacity outlet points;
- Not allowing direct, contaminated ditch discharge into watercourses, lochs and sensitive wetlands or grasslands; and
- Not diverting natural flows, unless under prior agreement with SEPA and Stirling Council.

7.5 Foul Drainage

Effluent and waste from onsite construction personnel would be treated at a package sewage treatment plant or a septic tank and discharged into a properly designed and sized drainage field, in accordance with “Guidance for Pollution Prevention (GPP) 4: Treatment and disposal of wastewater where there is no connection to the public foul sewer” [18]. The system would be designed for approval by SEPA and SC prior to the construction phase of the Proposed Development.

Alternatively, should on-site treatment be deemed unsuitable, effluent and waste will be removed by a licensed waste contractor for off-site disposal at a permitted wastewater treatment facility.



7.6 Measures for Protecting Groundwater Receptors

It is important to note that even if the site area is not sustained by groundwater and does not fall under the potential high and moderate Groundwater Dependent Terrestrial Ecosystems (GWDTE), special measures and safeguards will be required to maintain the existing surface water flow paths. This is crucial to ensure that the incident rainfall can continue to sustain the habitats in the area. Therefore, it is essential to implement safeguards to sustain the existing surface water flow paths, even if the buffers to potential GWDTE specified in SEPA guidance do not apply.



8.0 Water Quality Monitoring and Contingency

8.1 Water Quality Monitoring

Water quality monitoring during the construction phase would be undertaken for the surface water catchments that serve the Proposed Development Site, to ensure that none of the tributaries of the main channels are carrying pollutants or suspended solids. Monitoring would be carried out at a specified frequency on these catchments.

With regard to the protection of the water environment the following risks would be addressed:

- Siltation of watercourses;
- Discolouration of raw water;
- Potential pollution from construction traffic due to diesel spillage or similar;
- Alteration of raw water quality resulting from imported track construction material;
- Excavation and earthworks;
- Use of large quantities of concrete; and
- Construction compound and associated drainage/foul drainage and diesel spill issues.

The Principal Contractor would compile a monitoring and maintenance plan for the drainage system and surface water runs for use by the ECoW which would as a minimum include:

- Visual monitoring/inspections; and
- During Site works, including water crossing construction works, the relevant drainage/surface water runs potentially being impacted by these works would be inspected daily by the ECoW while works are ongoing in this area.

A Water Quality and Fish Monitoring Plan (WQFMP) will be developed to form part of the Construction Method Statement (CMS), which would be submitted to the appropriate planning authorities and bodies prior to construction and development. The WQFMP will be implemented to monitor surface water quality, fish populations and macroinvertebrate community prior to, during and post-construction. A robust baseline of water quality in surface watercourses / drainage channels downstream of construction works will be established prior to construction commencing and used as a benchmark of water quality for the construction phase monitoring.

The purpose of the WQFMP is to:

- Ensure that the commitments put forward in the EIA Report are fulfilled with regards to identified ground and surface water receptors;
- Provide a specification for monitoring prior to, during and after construction;
- Provide a record of water quality across the Proposed Development Site that can be compared to rainfall and site activities;
- Provide reassurance of the effectiveness of pollution prevention measures installed to protect surface watercourses throughout the construction period; and



- Provide data to identify any potential pollution incidents, and to inform a structured approach to manage and control such incidents.

The WQFMP will outline details for the monitoring of surface watercourses down gradient of works areas including watercourse crossings, access tracks, turbine foundations and at control sites (up gradient of works areas), and will include:

- Indicative monitoring locations;
- Frequency of monitoring prior to, during and after construction;
- Parameters for field hydrochemistry testing and laboratory analysis including as a minimum pH, electrical conductivity, suspended solids, dissolved metals, nutrients and hydrocarbons;
- Sampling and analysis protocols;
- Relevant environmental quality standards (EQS);
- Responsibilities for monitoring – it is expected that the ECoW will be responsible for daily monitoring of watercourses particularly around active works areas and watercourse crossings. Further monitoring on a less frequent basis (i.e. monthly) may be done by an external party;
- Procedures to be followed in the event of an environmental incident; and
- Recording and communicating of results.

In the event that a private water supply could potentially be affected by the Proposed Development, a Private Water Supply (PWS) Action Plan would be developed and would include details regarding all water monitoring and reporting, pollution incident reporting and emergency mitigation measures to address a temporary or permanent material change in either the quality or quantity of an existing private water supply. The PWS Action Plan would include as a minimum:

- The provision of an emergency hotline telephone number for householders so that they can contact the project with any concern regarding water quality or quantity;
- The contact details of householders downgradient of work areas to alert in the event of a pollution incident;
- The provision of an alternative water supply, if required, during any periods of PWS disruption; and/or
- To supply affected properties with filters for particulate removal.

8.2 Laboratory Analysis

This monitoring would involve laboratory analysis of water samples taken at agreed locations across the Site and would continue throughout the construction phase and immediately following construction.

8.3 Monitoring

Monitoring would be used to allow a rapid response to any pollution incident as well as to assess the impact of good practice or remedial measures. Monitoring frequency would



increase during the construction phase if remedial measures to improve water quality would be required.

The performance of the good practice measures would be kept under constant review by the water monitoring schedule, based on a comparison of data taken during the construction phase with a baseline data set, sampled prior to the construction period and through the observance of any trends in water quality change over time.

8.4 ECoW WQFMP Duties

In addition to the monitoring and analysis, it is proposed that regular watercourse inspections (frequency depending on nature and proximity of works to the watercourse) would be undertaken by the ECoW in areas selected in the field and where construction is taking place. As daily inspection points, they would be readily accessible points close to infrastructure.

The regular inspections would include, but not be limited to:

- Regular visual inspection of the sediment control structures and oil interceptors;
- Investigation of problem areas (e.g., those causing silty run-off) to try to establish the cause and locate the source;
- Management of the Principal Contractor to comply with method statement activities;
- Development of a clear line of communication with site staff to address issues promptly;
- Prioritisation of issues so that site staff know how to react to incidents; and
- Regular hydrological reporting - daily records and monthly reports.

8.5 Incident Response

Drainage networks provide a conduit for rapid transport of silty water and potential contamination from surface spills of fuels/oils, concrete or chemicals. A pollution incident would include any discharge to the drainage network that could potentially cause environmental damage. Examples of pollution incidents include:

- Fuel drips or spills during refuelling;
- Leaking plant or equipment;
- Leaks from fuel or chemical containers;
- Contaminated water or sediment/silt entering a watercourse or drainage network;
- Windblown dust and waste;
- Excess silt deposition in drainage ditches, channels, culverts following heavy rainfall events;
- Operational failures of pumps and pipelines; and
- Failures of treatment or sediment controls.

The Principal Contractor would be required to prepare an Environmental Incident and Emergency Response Plan (ref Section 6.0) which would provide emergency response



contacts, reporting procedures, and procedures for dealing with all potential pollution incidents during the construction of the Proposed Development.



9.0 Construction Phase

9.1 Introduction

This section outlines the key components of the construction phase and the potential environmental effects related to them.

As the CEMP is developed and implemented during construction, the Principal Contractor must adhere to the conditions of planning consent. This includes following all relevant planning conditions, meeting pre-commencement requirements, and implementing approved plans and method statements. Additionally, the Contractor must apply appropriate environmental management measures to prevent pollution, which includes controls for surface water, silt, concrete washout, fuels, and chemicals.

An outline Access Management Plan is provided in **Technical Appendix 14.2** of the EIA Report. This document sets out the principles for maintaining public access through and around the Site, during construction, as far as possible. A detailed Access Management Plan would be agreed and implemented prior to construction.

9.2 Temporary Compounds

The construction of the Proposed Development will require the establishment of up to two Temporary Construction Compounds (TCC) to support the works. One compound is proposed to be located at the southern end of the development close to the site entrance. This will serve as the main construction compound and will help reduce vehicle journeys and traffic within the development. The second compound is located north of the proposed substation, adjacent to the primary access track. This compound will primarily act as the substation construction compound. Its proximity to the substation will help construct the substation.

The TCC is likely to contain the following:

- Temporary modular building(s) to be used as security and site offices;
- Welfare facilities;
- Parking for construction staff, visitors and construction vehicles;
- Laydown areas for the storage of large items;
- Secure storage for tools, small parts and oils;
- Waste storage facilities;
- A receiving area for incoming vehicles; and
- A sealed bunded area where fuel and oil storage tanks will be situated, to prevent potential contamination.

Welfare facilities would be provided for the duration of the construction period in accordance with CDM Regulations 2015. Facilities for waste management, refuelling, power, water supply and chemical/material storage would be provided.

Where and when compound lighting is required, it would be designed to minimise light pollution to the surrounding area. All lights would face inwards to the compound.



The compound would be built by stripping topsoil/peat, regrading, laying a base geotextile and topped with a specified stone layer. The stripped topsoil/peat would be stored adjacent to the compounds in a linear bund typically no greater than 2m in elevation. Superficial soil would be stripped and stored separately from the topsoil/peat. This would be stored in a similar manner to the topsoil, but would depend on the volume which is required to be excavated.

It is proposed that uncontaminated surface run-off from the compounds is accommodated in a swale or soakaway which would be constructed as a perimeter ditch to avoid contamination of watercourses should there be a spillage and from fines washout. All other run-off from the Site would follow natural drainage patterns and newly installed drainage routes.

The compound areas would be reinstated at the end of the construction period. Reinstatement would involve removal of the imported material and underlying geotextile. The exposed substrate would be gently stripped and the stored superficial soil and topsoil replaced. The surface would be re-seeded as required using the same seed mix as that used for the reinstatement of track verges. (in consultation with NatureScot/SEPA).

Alternatively, if the ground conditions permit, all inert materials, such as the imported stone, could be retained, and the stored superficial soil and topsoil/peat replaced. This area would be kept on record and could be used as the temporary construction compound during the decommissioning phase.

9.3 Transport Routes

During the construction phase, construction staff, plant, materials and turbine components will be transported to the Site using pre agreed routes that prioritise safety, minimise disruption to local communities and reduce effects on the local road network. Construction access would be taken from an existing junction on the south east part of the Site.

Abnormal Indivisible Load (AILs) Vehicle movements for wind turbine components would be planned and managed separately from general HGV movements, with timings and controls agreed with the relevant roads authorities and Police Scotland. The wind turbine delivery feasibility assessment identifies a route from Grangemouth Port via Central Dock Road, A904 Earls Road, M9, A872 and B818. The route is considered feasible using specialist blade lifter vehicles, subject to minor accommodation works and a trial run will be undertaken in advance of deliveries to confirm feasibility.

A Construction Traffic Management Plan (CTMP) will be prepared by the Principal Contractor and agreed with Stirling Council Roads Authority and other relevant stakeholders prior to works commencing. The CTMP will set out the anticipated delivery profile and routing, identify agreed and excluded routes for all vehicle types, and establish measures to prevent vehicle stacking on the public road network and to maintain safety for core path users. It will also include enforcement measures such as driver briefings, a Driver Code of Conduct, route compliance monitoring including GPS tracking for Principal Contractor HGVs, and procedures for addressing noncompliance.

Road condition surveys may be undertaken before and after construction, and the Principal Contractor will liaise with the roads authority regarding any required maintenance, cleaning of public roads affected by mud or debris from construction traffic, and winter maintenance arrangements where relevant. Temporary on-site laydown areas and construction compounds will be used to store materials and manage deliveries efficiently, reducing the need for frequent deliveries and helping to limit traffic related effects such as noise, dust and



disturbance on local roads. Further details on Transport routes can be found in **Chapter 12: Traffic and Transport** of the EIA Report.

9.4 Borrow Pits

The Proposed Development includes one borrow pit search area, which is detailed in **Chapter 3: Description of the Development**. This area may be used to source suitable stone for constructing access tracks and hardstanding areas. This approach aims to reduce the need to import aggregate to the Site, thereby minimising associated HGV movements.

The borrow pit for the Proposed Development would be located within the identified search area. The borrow pit would provide the material required for the construction of the development, subject to confirmation through appropriate geotechnical investigations that the in-situ material meets the required engineering and quality specifications. Should the excavated stone be deemed unsuitable, alternative sourcing and importation of materials would be considered.

The location and size of the borrow pit would be carefully planned to avoid any sensitive ecological areas, such as protected species habitats, watercourses, or areas of high environmental value.

In accordance with the Quarry Regulations 1999, borrow pits that are created for the exclusive purpose of supplying materials to the site are exempt from the usual quarry regulations. However, the development of these borrow pits, along with their subsequent reinstatement, would be subject to approval through the planning process. The detailed design and method of working of each borrow pit would be outlined in the final CEMP, ensuring that environmental safeguards are in place during both excavation and restoration phases.

Monitoring of the borrow pit areas will continue throughout the construction phase.

9.4.1 Material Storage

Prior to the excavation of the borrow pits and following construction of appropriate SuDS measures, vegetation and soils would be removed and stored in overburden stockpiles. Overburden stockpiles would be located adjacent to the borrow pit and compacted in order to limit instability and erosion potential. Silt fences would be employed to minimise sediment levels in runoff from the stockpiles.

Rock stockpiles would be stored in already-worked areas of the borrow pits or, before these are available, stockpiles would be located on safe and stable designated areas approved by a qualified engineer, identified on a plan of the working area of the borrow pit and agreed with the ECoW.

Overburden or rock stockpiles would be stored at least 50m from watercourses in order to reduce the potential for sediment to be transferred into the wider hydrological system.

9.4.2 Surface Water Management

Temporary interception bunds and drainage ditches would be constructed upslope of the borrow pit to prevent surface water runoff from entering the excavation. Swales would also be implemented to convey and attenuate excess surface water flow away from borrow pit(s). These methods would be kept to a minimal depth and gradient, with check dams, silt traps



and buffer strips also utilised where possible to minimise erosion and sedimentation at peak flows.

Infiltration trenches would also be placed downslope of the borrow pit and overburden and rock stockpiles and would be designed to treat run-off before discharging back into the drainage network. Silt fences would be used to intercept sediment-laden surface run-off in addition to infiltration trenches.

9.4.3 Borrow Pit Dewatering

Limited dewatering of the borrow pits may be necessary. Water would be treated by a settlement lagoon and by discharge onto vegetated surfaces.

Outflow from settlement lagoons in proximity to the borrow pit would discharge to surface water drains.

It is unlikely that groundwater ingress would be significant. However, the floors of the borrow pit(s) would have a gravity drain design. All floor water would drain to an adequately sized sump to allow sediment to settle out before discharge to surrounding vegetated surfaces.

Excavation machinery will be regularly maintained to ensure that there is minimal potential for fuel or oil leaks or spillages to occur. All maintenance will be conducted on suitable absorbent spill pads to minimise the potential for groundwater and surface water pollution.

9.5 Access Tracks

A network of new and upgraded on site access tracks will be formed to provide construction and operational access between the new site entrance from the B818, the wind turbine locations, the substation compound, the borrow pit search area and the temporary construction compounds. Approximately 9.7km of new and upgraded access track would be required, comprising approximately 2.3km of new track and approximately 7.4km of upgraded existing track. New tracks will be unpaved and constructed of graded local stone with a typical running width of 6m with local widening on bends and at junctions. The track design includes an allowance of up to 3m either side of the running surface for cabling and potential ditches and banks and includes three turning heads.

Where practicable, existing access routes will be reused and upgraded to provide suitable geometry and running surfaces for construction traffic and turbine component deliveries, with upgrades focused on widening, strengthening of formation, improvement of the running surface and improvement of surface water drainage. New track construction will generally comprise stripping and storing vegetated turves and soils for later reinstatement, placing geosynthetic reinforcement where required on lower bearing capacity ground, then constructing a compacted crushed stone formation with a suitable running surface. It is proposed that a large proportion of the stone required for tracks and hardstandings could be won from the onsite borrow pit search area, supplemented by imported stone where necessary.

Track alignments have been developed to avoid areas of peat >1m. Surface water will be managed using trackside drainage and cross drainage as required, with runoff directed to settlement features where necessary, and erosion and sediment risks controlled through stable embankment gradients and sediment traps in the early period following construction until vegetation regeneration is established. Five existing watercourse crossings are present on the site. The watercourse crossings may require upgrading, this will be determined in the detailed design stage. Access tracks will remain in place to support operation, maintenance



and eventual decommissioning, and at the end of the construction period track edges and disturbed margins will be restored using materials stripped from excavations.

9.5.1 Onsite Vehicle Movements

Access tracks would be designed to be single track, up to 6m wide including the provision of intervisible passing places at appropriate locations taking account of horizontal and vertical track alignments. Additional widening would be provided on bends to facilitate the movement of the large delivery vehicles associated with turbine tower and blade delivery, and these would double as passing places where appropriate.

During the periods of delivery of the large components, the Contractor would use appropriate site communications and access control techniques to enable safe one-way operation of the tracks.

The presence of crane pads within the construction compound would facilitate traffic movement onsite. Internal track junctions would also be used to facilitate multiple options for construction traffic movement. This would allow vehicles to move more directly between construction locations and double as passing places

9.6 Turbine Foundations

Each turbine would be supported on a reinforced concrete gravity foundation designed to suit the final turbine model and the specific ground conditions at each location. Foundation excavation would typically extend to a depth of around 3 to 5 meters below existing ground level to reach suitable bearing strata. The sides of the excavation would be graded back and battered to maintain stability and provide a safe working environment during construction. For the purposes of assessment, circular foundations of up to 27m in diameter have been assumed, although the final dimensions of each foundation would be confirmed following detailed ground investigation at the turbine positions.

9.7 Crane Pads

The turbines will be constructed using a main crane with assistance from an auxiliary crane, both of which will be brought to the site during the construction phase. To ensure safe lifting operations, a permanent crane hardstanding will be created adjacent to each turbine location. Each crane pad will provide a level and sturdy working platform for the main erection crane and assist crane, along with space for component laydown and assembly. The specific footprint and arrangement of each crane pad will be determined by the turbine supplier to align with their preferred erection methodology and the final turbine model. The crane pad dimensions are 35m wide by 99m long with the blade laydowns being up to 22.5m wide and 87m long. The jib assembly area will be project specific based on the crane model chosen and the final candidate turbine selection. The assembly area for planning has been provided with an 11m wide by 86m designated area with supporting auxiliary crane pads.

Where ground conditions allow, the crane hardstandings will typically be constructed using a conventional cut-and-fill formation with a geotextile (where required) and a specified granular stone build-up. Floating hardstandings are not proposed due to the limited extent of peat on site. The permanent crane hardstanding would also function as the primary laydown area adjacent to each turbine, including temporary areas for blade supports or “blade fingers”, which may result in a non-regular overall footprint. These permanent crane hardstanding areas beside the turbine bases would remain in place for the duration of the operational life of the development to facilitate future maintenance activities. Temporary blade laydown



areas will be constructed adjacent to the main crane pad to accommodate turbine blades and components. The blade laydown consists of blade fingers to rest the blades upon until required for installation. These temporary areas would be constructed using similar crushed rock platforms where required and would be fully reinstated following completion of turbine erection. Soils excavated during crane pad construction would be stored separately and reused, where suitable, for backfilling batter slopes around turbine bases and hardstandings, and for forming small bunds or bankings alongside access tracks. In the event peat is encountered, the peat would be excavated and carefully stored in accordance with a Soils and Peat Management Plan (SPMP) until construction is complete, then reused where appropriate as part of the agreed reinstatement strategy.

9.8 Substation and Control Building

The Proposed Development would be connected to the local electricity network via an on-site substation and control building located within a dedicated substation compound. The compound would accommodate High Voltage (HV) equipment, including transformers, circuit breakers and associated switchgear, together with the main control building and an area for staff parking and access. The layout would be designed to ensure safe access for operational and maintenance personnel and to provide adequate separation between equipment in line with relevant standards.

The main control building will be a single-storey structure built on a precast concrete base. It will accommodate the protection, control, and communications equipment necessary for operating and monitoring the wind farm. Currently, it is proposed that the building would feature a rendered external finish, with the final colours and materials to be approved by Stirling Council through a planning condition.

A temporary substation construction compound of 80m x 50m has been proposed to aid the construction of the substation, providing temporary storage for components, work equipment and machinery.

A permanent operation and maintenance compound measuring 100m x 120m has been proposed to host the full-time staff throughout the duration of the wind farm's operational life. This will include a warehouse, storage, parking, operation building and ancillary requirements.

Power generated by each turbine would be exported to the substation via underground cables routed within trenches running broadly parallel to the on-site access tracks. The cable trenches would be excavated to the required depth, with suitable bedding material placed beneath and around the cables, followed by backfilling with selected excavated material and the placement of marker tape and warning tiles as appropriate. On completion of the cabling works, the ground surface would be reinstated as far as practicable to its previous condition, in accordance with the wider reinstatement measures set out in this CEMP.

9.9 Cable Layout

The cable layout for the Proposed Development will involve underground cabling that connects each wind turbine to the on-site substation, facilitating efficient energy transfer to the national grid. Wherever feasible, cables will be installed in trenches alongside the internal access tracks, minimising ground disturbance and reducing the environmental footprint. The trenches will be carefully prepared, with cables laid in protective conduits surrounded by a bedding layer of sand or cement-bound material (CBM) to ensure durability and stability.



The exact cable layout, along with the construction methods, will be detailed within the updated CEMP, ensuring that all necessary precautions are in place to avoid impacts on sensitive areas and habitats. The design will incorporate measures to manage drainage and protect watercourses, particularly in areas where cables need to cross such features.

9.10 Soil Storage

Superficial soils will be excavated and stored temporarily. It is anticipated that most of the soil resources within areas directly affected by construction activities would be able to be stored and reinstated as close as possible to where they were excavated in accordance with best practice; so that the site would be restored with minimal movement of material from its original location.

At turbine foundations topsoil would be stripped keeping the turf intact. This material would be stored adjacent to the base working area and would be limited in height to 3m to minimise the risk of overheating. Superficial soil would then be stripped and stored, keeping this material separate from the topsoil.

Following excavation of the wind turbine foundation area and construction of the foundation the area would be backfilled with spoil. The area would be reinstated using the retained topsoil and turf where appropriate materials are available. A gravel area would be left around the tower base for access. Reinstatement at turbine foundations would begin as soon as possible after foundation and plinth installation and sign off is complete.

The risk of water pollution from excavation works in terms of sediment loss would be prevented and mitigated by the following measures:

- Careful location of turbine bases and track line to minimise excavation where applicable;
- Stripped topsoil and superficial soil would not be stored adjacent or in close proximity to watercourses, where a construction area requiring soil stripping is close to a watercourse the soil would be stored a suitable distance from the watercourse;
- Soil would be stored in accordance with best practice in order to remain intact as the soil would be essential to the site reinstatement;
- Where turf requires excavation for track construction an excavator would lift turf and place it to the side leaving space between the edge of the track and the embankment to be constructed. The excavator would then lift out the soil and would place it to the side of the proposed track. The soil stored by the side of the access track would be graded by an excavator and the turves would be replaced by the excavator over the graded soil beside the track. The timescale for this operation is short and the methodology has been successfully applied at other wind farms; and
- Excavated soil would not be placed where it would block established surface or drainage channels.

9.11 Watercourses

9.11.1 General

As part of the design mitigation, all wind turbines and associated infrastructure have been sited outside the 50m watercourse buffer zone, wherever possible. The aim is to ensure that all Proposed Development remains at a safe distance from nearby watercourses.



Tracks have been routed to minimise any crossing of the watercourses, where possible. However, if track crossings are required, then these would be designed and constructed appropriately.

The Contractor is responsible for liaising with and obtaining from SEPA all relevant consents, licenses and authorisations relating to construction of the watercourse crossing at the site.

All construction works on the Site, and specifically construction works to be undertaken within and in the vicinity of the watercourse, would be completed in compliance with current legislation and best practice as detailed within this document.

The ECoW would be consulted on all watercourse crossing works. Surveys by the ECoW would be carried out immediately prior to construction of the crossing to identify areas of ecological interest and more specifically, mammal and fish activity in watercourses to ensure that adequate mitigation is built into the design.

9.11.2 Design Philosophy

The Environmental Authorisations (Scotland) Regulations (EASR) provide the regulatory framework for controlled activities in Scotland, including water environment activities. River, loch and wetland engineering works, including river crossings and culverting associated with the watercourses shown on the Ordnance Survey 1:50,000 scale mapping, may require an appropriate authorisation from SEPA under EASR. The required level of authorisation is risk-based and may be via General Binding Rules (GBRs), Notification, Registration, or Permit. Where the works are fully compliant with an applicable GBR, the activity is authorised without the need to apply for a separate authorisation and there is no requirement to notify SEPA. If the works cannot comply fully with the relevant GBR requirements, or exceed any GBR limits, the activity will require a higher level of authorisation (Notification, Registration or Permit) and SEPA will be engaged as necessary prior to construction.

General good practice in watercourse crossing design is detailed below:

- Where appropriate, the watercourse would be routed through culverts appropriately sized and designed not to impede the flow of water and would allow safe passage for wildlife, such as fish, water voles, otters etc. (i.e. the crossings would have a capacity well in excess of the design flow);
- When installing culverts, care would be taken to ensure that the construction does not pose a permanent obstruction to migrating species of fish, or riparian mammals (i.e. the crossing would make provision for fish and wildlife migration);
- Culverts would be sized so that they do not interfere with the bed of the stream during construction, (i.e. the crossing would leave the watercourse in as natural condition as possible);
- Culverts with a single orifice would be used in preference to a series of smaller culverts that may be more likely to become blocked with flotsam and create erosion (i.e. the crossing would not constrict the channel);
- Ease and speed of construction are important to minimise disruption to the watercourse and surrounding habitat;
- Culverts would be designed for the life of the project;
- Culverts would be low maintenance; and



- Culverts would be visually in keeping with the surroundings.

Watercourse crossings will be developed on a case-by-case basis, with the crossing type and design proportionate to the characteristics of the watercourse and the local ecological and hydrological conditions, including the overall sensitivity and environmental risk at each location. The selection of the crossing solution and its detailed design will take account of both environmental and engineering considerations, and will be progressed to support compliance with the applicable SEPA authorisation route under EASR (for example General Binding Rules, Notification, Registration or Permit, as appropriate).

Each crossing will be individually sized and designed to suit the specific constraints of its location and to maintain hydraulic capacity, including conveyance of the 1 in 200 year plus climate change flood event. Temporary and permanent pollution prevention measures will be incorporated into the design and construction method, including splash boards and runoff diversion measures, to prevent sediment-laden water entering the watercourse and to minimise the risk of siltation.

9.11.3 Structural Design

Design of a watercourse crossing needs to consider:

- Bearing capacity of foundations (and variability of capacity);
- Design loadings; and
- Design options such as bridges or culverts.

9.11.4 Culverts

Medium to large culverts or large Armco culverts would be used where a culverted solution is desirable or where a small, piped culvert is not appropriate for environmental or capacity reasons.

Depending on size, a natural stone headwall would be provided upstream and downstream to protect the track embankment where necessary. Further protection would be provided to the banks using soft engineering techniques as much as possible.

9.11.5 Relevant Mitigation

The following is a summary of the relevant mitigation measures and general good practice associated with the development of watercourse crossings:

- Appropriate care would be given to the construction of the crossing and all loose materials left from construction would be collected and disposed accordingly;
- Site track crossings would be constructed with granular materials, which would limit the production of surface runoff and the direct discharge of sediment into the watercourse;
- The methods of drainage proposed for the site tracks prevent the significant discharge of surface runoff and suspended solids into the watercourse adjacent to the tracks. This is owing to the runoff being collected within the upslope ditch, the presence of peat dams and culverts at appropriate intervals so as to limit longitudinal flow and the discharging of water to the downslope ground. There would therefore be no long runs of ditches that directly discharge into watercourses;



- The watercourse crossing would be designed to avoid disruption and/or habitat loss to aquatic systems or to affect free passage of fish; and
- Minimum buffer strip of 50m should be kept free from development from the top of the banks of any watercourse/waterbody.

9.11.6 Inspection, monitoring and reporting

Routine inspections will be undertaken by the construction team and ECoW to verify the effectiveness of mitigation and to identify any early signs of pollution or excessive suspended solids downstream of works.

Where required, a water quality monitoring programme will be undertaken in the principal catchments draining the Site (including any downstream sensitive receptors), using pre-construction baseline data and monitoring during construction and immediately post-construction to enable rapid response should trigger levels be exceeded. The scope and frequency will be agreed with the relevant stakeholders as part of detailed design and the final CEMP.



10.0 Pre-Construction Surveys, Protected Species and Monitoring

10.1 Pre-Construction Surveys

Prior to the commencement of the construction of the Proposed Development, detailed Site investigations would be undertaken to inform the designers/engineers of the development components. Preconstruction habitat and protected / notable mammal surveys would be required to inform appropriate management and protection plans. Additional surveys for protected species will be undertaken by the ECoW in tune with the locations and programme of works. Survey outcomes will inform the designers/engineers in selecting appropriate working methods.

10.1.1 Water Quality Monitoring

Prior to the works commencing, baseline water quality monitoring would be undertaken by an appropriately qualified and experienced independent consultant to establish the water quality prior to any interference from the works.

This would be undertaken in accordance with the proposed water quality monitoring developed by the Principal Contractor and as detailed within Section 8.0.

This water quality monitoring is to be agreed and reviewed by the Developer in advance of the works commencing to ensure that the conditions during the monitoring and the testing undertaken are representative and allow a suitable benchmark to be established.

10.1.2 Archaeology

An archaeological and cultural heritage assessment for Cairnoch Hill Wind Farm has been completed and is reported in EIA Report **Chapter 11: Cultural Heritage and Archaeology**. The assessment combined a desk-based review of designated and non-designated heritage assets using Historic Environment Record data held by Stirling Council, supported by review of historic mapping, aerial photography and other sources.

There are no designated heritage assets within the Site boundary. Within 10km of the proposed wind turbine locations there are 209 designated heritage assets. These include listed structures, conservation areas, and scheduled monuments. Mitigation measures will be put in place to protect non-designated assets located within the Site such as remains of a farmstead. This will include appropriate archaeological recording prior to construction as agreed with Stirling Council Archaeology Advisor.

10.1.3 Ecology

An ecological assessment has been completed for Cairnoch Hill Wind Farm and is reported in the EIA Report **Chapter 8: Ecology**. The mitigation and good practice measures identified through the EIA process would be taken forward into the detailed CEMP, with an ECoW appointed to provide advice during construction and to oversee implementation of ecological protection measures, including micro-siting approval where relevant to avoid constraints identified during detailed design and construction.

During construction, ecological risks will be managed by minimising the extent and duration of ground disturbance, keeping all plant and vehicle movements to defined access tracks and working areas, and clearly demarcating any sensitive habitats and exclusion zones prior



to works commencing. Progressive reinstatement will be undertaken as soon as practicable following completion of activities, with stripped turves and soils reused to restore disturbed margins and support rapid vegetation recovery. Where habitat management or restoration measures form part of the project commitments, these will be delivered in accordance with the outline Habitat Management Plan and any planning conditions, with monitoring requirements incorporated into the detailed CEMP and contractor method statements.

Protected species and breeding bird protection will be addressed through a programme of pre works checks in areas where suitable habitat is present and where works could affect sheltering, nesting or commuting features. If active nests, resting places or other evidence of protected species are identified, works will be delayed or micrositied where feasible, and appropriate exclusion zones and working methods will be implemented under the direction of the EnvCoW. Where licences or other authorisations are required, these will be obtained prior to works commencing, and all ecological requirements will be communicated to site staff through inductions and toolbox talks, with compliance monitored throughout the construction period.

10.2 During and Post Construction

10.2.1 Species Protection Plan

A Species Protection Plan (SPP) would be produced, to ensure all reasonable protection measures are undertaken with regard to protected species and the habitat which they rely upon for the Proposed Development.

The aim of the SPP is to ensure all reasonable precautions are taken to safeguard protected species from disturbance, injury and death and to protect any structure, place or habitat, which any such protected species uses for growth, breeding, resting, shelter or protection during the construction and operation of the Proposed Development (with emphasis on the construction phase).

Good practice measures to protect sensitive ecological receptors during the construction phase would be implemented, including the erection of temporary protective fencing demarcating the working footprint, to be monitored and supervised by the ECoW with advice on remedial actions where necessary.

The aim of the SPP would be fulfilled by adopting the following objectives throughout the construction of the Proposed Development:

- Objective A – Implement a monitoring and protection plan for protected species;
- Objective B – Follow an approved procedure if a sensitive ecological receptor is suspected/identified; and
- Objective C – Ensure adequate education and awareness of site personnel.

The ECoW would have the specific remit of monitoring compliance with the SPP during the construction phase and report any breaches to the Construction Project Management Team. The ECoW's role would involve direct monitoring of all activities on the Proposed Development Site to the extent the ECoW considers this to be required, and/or training of nominated personnel to carry these out in a manner likely to minimise the potential for impact on the protected species. The ECoW would also agree changes to construction operations to prevent breaches of the SPP.



10.2.2 Bird Protection Plan

A Bird Protection Plan would be produced, for agreement with NatureScot to ensure that damage to, or disturbance of, nesting Important Ornithological Features and any disturbance to Schedule 1 breeding birds is avoided. The Bird Protection Plan would provide generic and specific measures to be followed.

10.2.3 Habitat Management Plan

A Habitat Management Plan (HMP) would be produced, pre-construction, based on the outline HMP (**Technical Appendix 8.6**) with the aim of enhancing and managing important habitats and habitat quality within the Site. Habitat monitoring, conducted by suitably qualified and experienced ecologists, would evaluate the success of the goals and objectives. Good practice techniques for vegetation and habitat reinstatement would be adopted and implemented on areas subject to disturbance during construction as soon as is practicable.



11.0 Reinstatement

During the construction of the infrastructure elements (as detailed in Section 9), the vegetated topsoil layer will be carefully removed from the excavation area and stored locally with the growing side facing upwards. The remaining organic topsoil and subsoil will be excavated down to the required formation level or to a suitable underlying layer, and will be stored separately near the excavation site. It is important to carefully separate materials to avoid mixing topsoil and subsoil layers, which facilitates effective reuse during the reinstatement process.

Once construction is completed, reinstatement of disturbed areas would begin immediately. This would include the reapplication of stored soils and vegetation in a manner consistent with the original landscape. Immediate aftercare measures will be implemented, including inspections of reinstated areas following completion of works at each location. Regular maintenance visits would be carried out to monitor the success of re-vegetation efforts, and any failures would be addressed promptly. In addition, erosion control measures would be implemented on embankments and cuttings, such as designing appropriate gradients and stabilisation techniques. Sediment traps would be employed during the initial years following construction to control sedimentation until vegetation is fully re-established.

Peat reinstatement would begin promptly after completing works at each wind turbine, crane pad, and access track section, following the finalised SPMP and any biodiversity enhancement plans. Initial reprofiling would use suitable subsoil and peat to restore natural microtopography and prevent erosion. Turves will then be re-laid in their original orientation, aligning with the pre-existing vegetation pattern. In sensitive areas, such as near watercourses or steep slopes, additional stabilisation measures like small peat or stone bunds, shallow contour grips, or biodegradable geotextiles will be implemented to minimise erosion while vegetation re-establishes.

If unforeseen erosion or sedimentation occurs, the affected areas would be regraded to restore stability. Disturbed ground along access tracks would be promptly reinstated to blend with the surrounding landscape, using on-site vegetation and soil through turfing or reseeding with local species like heather. All reinstatement methods will be confirmed in consultation with relevant authorities, including the Principal Contractor and NatureScot, using heather brash or treated seeds for compatibility with the ecosystem.

Monitoring of the vegetation recovery in restored areas would continue throughout the post-construction period. This would ensure the successful establishment of plant cover and allow for early identification of any areas requiring remedial actions.



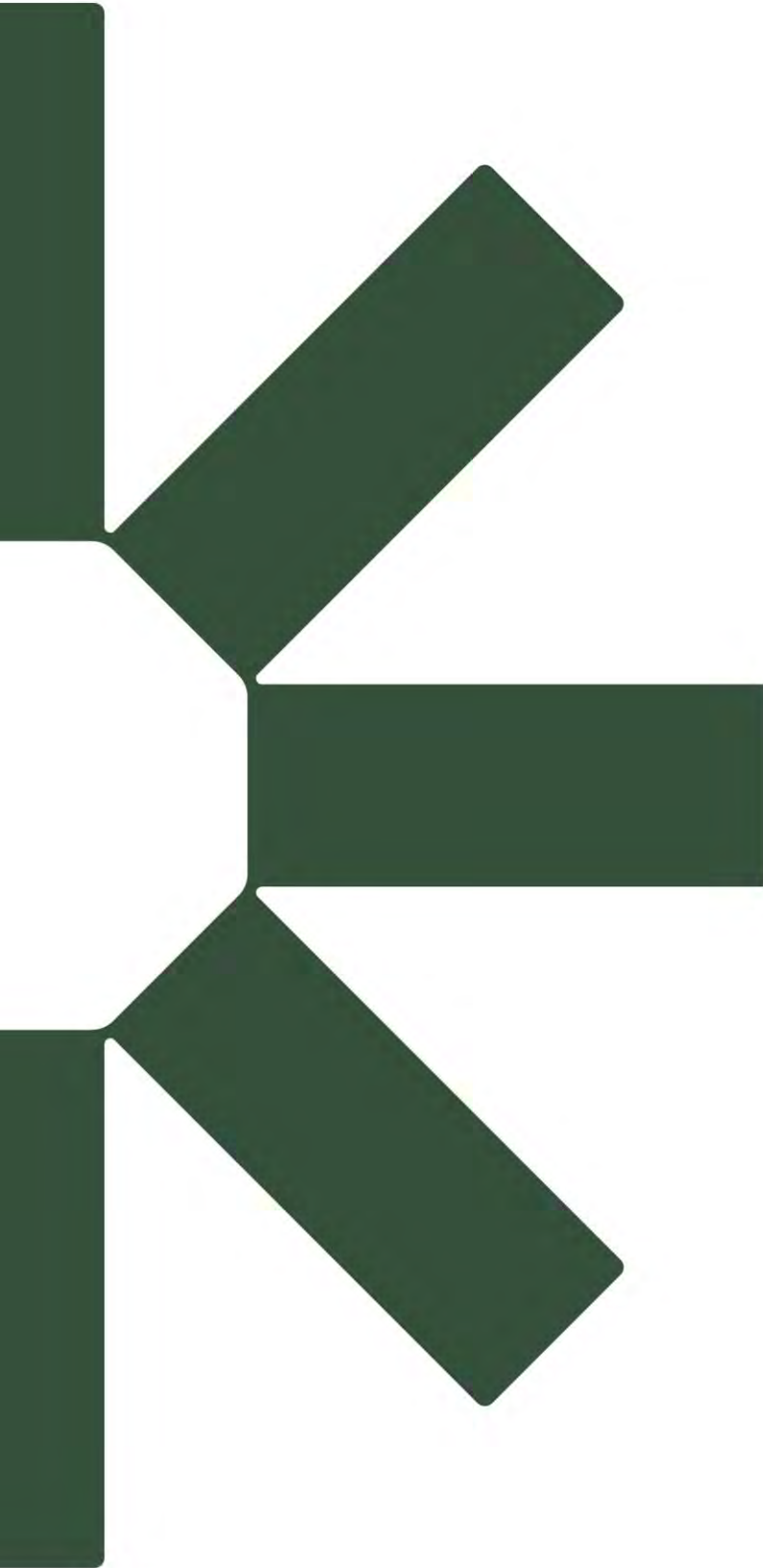
12.0 References

12.1 Reference Documents

Table 12-1: Reference Documents

Doc. Ref.	Reference Documents
1.	UK Government (1974) Health and Safety at Work etc. Act 1974 (c. 37).
2.	UK Government (2015) Construction (Design and Management) Regulations 2015 (SI 2015/51).
3.	NetRegs (n.d.) Guidance for Pollution Prevention (GPP) documents (includes information on former Pollution Prevention Guidelines, PPGs).
4.	Scottish Environment Protection Agency (SEPA) (2006) Prevention of Pollution from Civil Engineering Contracts: Special Requirements (WAT-SG-31), Version 2 (June 2006).
5.	Masters-Williams, H. et al. (2001) Control of water pollution from construction sites: Guidance for consultants and contractors (C532). CIRIA.
6.	UK Government (1991) Environmental Protection (Duty of Care) Regulations 1991 (SI 1991/2839).
7.	British Standards Institution (BSI) (2014) BS 5228-1:2009+A1:2014 Code of practice for noise and vibration control on construction and open sites. Part 1: Noise.
8.	UK Government (1974) Control of Pollution Act 1974 (c. 40).
9.	Charles, P. and Edwards, P. (eds) (2015) Environmental good practice on-site guide (4th edn) (C741). CIRIA.
10.	Murnane, E., Heap, A. and Swain, A. (2006) Control of water pollution from linear construction projects: Site guide (C649). CIRIA.
11.	Department for Environment, Food and Rural Affairs (Defra) (2011) Code of practice for the sustainable use of soils on construction sites.
12.	SEPA (2021) Sector Specific Guidance: Water Run-Off from Construction Sites: Supporting Guidance (WAT-SG-75), Version 3 (September 2021).
13.	SEPA (2010) Engineering in the water environment: Good practice guide, River crossings (WAT-SG-25) (2nd edn).
14.	Environment Agency (2011) <i>Operating refuelling sites, PPG7: prevent pollution</i>
15.	Natural Resources Wales, Northern Ireland Environment Agency and SEPA (2021) Safe storage and disposal of used oils: Guidance for Pollution Prevention (GPP) 8, Version 1.2 (June 2021). NetRegs.
16.	NetRegs (2018) Above ground oil storage tanks: Guidance for Pollution Prevention (GPP) 2 (January 2018).
17.	Scottish Government (2006) Water Environment (Oil Storage) (Scotland) Regulations 2006 (SSI 2006/133).
18.	Natural Resources Wales, Northern Ireland Environment Agency and SEPA (2021) Treatment and disposal of wastewater where there is no connection to the public foul sewer: Guidance for Pollution Prevention (GPP) 4, Version 1.2 (June 2021).





Technical Appendix 3.2: Cairnoch Hill Wind Farm Forestry Assessment DGA Forestry LLP

Forestry

1.1. Introduction

This technical appendix considers the potential implications of the proposed Cairnoch Hill Wind Farm (“the Proposed Development”) on the woodland resource within the Site boundary (the area within the red line planning application boundary as shown on Figure 3.2.1) and its long-term management. This technical appendix was prepared by DGA Forestry LLP.

Forestry is not being regarded as a receptor for Environmental Impact Assessment (EIA) purposes. Commercial forests are a dynamic environment, and their structure continually undergoes change due to:

- normal felling and restocking by the landowner;
- natural events, such as storm damage, pests or diseases; and
- external factors, such as wind farms or other development.

This technical appendix therefore describes:

- the plans as a result of the Proposed Development for felling, restocking and forest management practices;
- the process by which these were derived; and
- the changes to the physical structure of the forestry within the Site boundary.

It further discusses the issue of forestry waste arising from the Proposed Development. The forestry proposals are interrelated with environmental effects, which are assessed separately in other chapters of the EIA Report. This technical appendix should therefore be read in conjunction with other chapters of the EIA Report, notably: Chapter 3: Description of the Development; Chapter 7: Landscape and Visual; Chapter 8: Ecology; Chapter 9: Ornithology; Chapter 10 Hydrology, Hydrogeology, Geology and Soils; and Chapter 12: Traffic and Transport as they are interrelated to the proposed changes in the forest structure.

The responsibility for the management of the remainder of the forest outwith the Site boundary lies with the landowners and therefore the wider felling operations, restocking, and aftercare operations within these areas do not form part of the Proposed Development for which consent is sought.

The majority of the proposed wind turbines and associated infrastructure are located within existing commercial forestry plantations (as shown on Figure 3.2.1). The woodlands are part of the National

Forest Estate and managed by Forestry and Land Scotland. The forestry proposals have been developed to:

- Identify areas of forest to be removed for the construction and operation of the Proposed Development;
- Identify those areas which may or may not be replanted as part of the Proposed Development; and
- Propose management practices for the forestry works.

In general, throughout this appendix data labelled 'baseline' refer to the current crop composition and any existing plans without any modification as a result of the Proposed Development. Data labelled 'wind farm' or 'Proposed Development' refer to the forestry plans incorporating the Proposed Development.

This chapter is structured as follows:

- Consultation;
- Legislation, Policy and Guidance;
- Forestry Study Area;
- Forest Plans;
- Development of the Wind Farm Forest Plan;
- Baseline Conditions;
- Wind Farm Forest Plan;
- Requirement for Compensatory Planting;
- Forestry Waste;
- Forestry Management Practices; and
- Summary.

This chapter is supported by the following figures:

Figure 3.2.1: Forestry Study Area

Figure 3.2.2: Baseline Age Class Composition

Figure 3.2.3: Baseline Species Composition

Figure 3.2.4: Baseline Felling Plan

Figure 3.2.5: Baseline Restocking Plan

Figure 3.2.6: Development Advanced Felling

Figure 3.2.7: Development Felling Plan

Figure 3.2.8: Development Restocking Plan

Figures are referenced in the text where relevant.

1.2. Consultation

Table 1.2.1 summarises the consultation responses received regarding Forestry and provides information on where and/or how they have been addressed in this assessment.

Table 1.2.1: Consultation Responses

Consultee and Date	Scoping/Other consultation	Issue Raised	Response/Action Taken
Neil McFarlane <i>Operations Manager for Perth & Kinross (West), Stirling & Clackmannanshire</i> neil.mcfarlane@forestry.gov.scot 13/02/2025	Scoping	Consultee noted that Compensatory Planting was not included in the initial scoping document.	At the time of scoping, compensatory planting was unknown and had therefore not been included in the Scoping report. Compensatory planting has now been included in this report (Technical Appendix 3.2).

1.3. Legislation, Policy and Guidance

Relevant overarching planning policies for the Proposed Development are detailed within Chapter 4: Environmental Impact Assessment, and the Planning Statement that accompanies the planning application. A desktop study was undertaken drawing upon published National, Regional and Local level publications, assessments and guidance to establish the broad planning and forestry context within which the Proposed Development is located.

Forestry related policies and documents listed below have been considered within the forestry assessment.

Forestry and Land Management (Scotland) Act 2018

Until 1st April 2019, the Scottish Ministers owned the National Forest Estate (NFE), provided funding and had responsibility for forestry strategy and policy, but the management of the NFE and delivery of forestry functions had been the responsibility of the Forestry Commissioners. (Scottish Government, 2018)

The Forestry Commission was a cross-border public authority and a United Kingdom (UK) non-ministerial department with a statutory Board of Commissioners. The Commission was made up of a number of parts, including in Scotland:

- Forest Enterprise Scotland (FES), which carried out forestry operations and managed the NFE on Scottish Ministers' behalf; and
- Forestry Commission Scotland (FCS), which was responsible for the other forestry functions in Scotland.

When full devolution of forestry to the Scottish Government was completed on 1st April 2019, FCS and FES became two new agencies of the Scottish Government:

- Scottish Forestry (SF), responsible for regulatory, policy and support functions; and
- Forestry and Land Scotland (FLS), responsible for the management of the NFE and any other land managed for the purposes of the Forestry and Land Management (Scotland) Act 2018.

Forestry practices in Scotland are controlled under the Forestry and Land Management (Scotland) Act 2018 and its associated Regulations introduced on 1st April 2019.

Anyone wishing to fell trees in Scotland requires a Felling Permission issued by SF, unless an exemption applies or another form of felling approval such as a felling licence (including a forest plan) has previously been issued.

Under the 2019 Regulations, felling which is authorised by planning permission consent continues to be exempt from the Regulations and does not require a Felling Permission issued by SF. (Scottish Government, 2018)

Scotland's Forestry Strategy 2019-2029

Scotland's Forestry Strategy 2019 - 2029 (SFS), was published in 2019 after a consultation period. The Strategy provides an overview of contemporary Scottish forestry; presents the Scottish Government's 50-year vision for Scotland's forests and woodlands; and sets out a 10-year framework for action.

The vision is that "...in 2070, Scotland will have more forests and woodlands, sustainably managed and better integrated with other land uses. These will provide a more resilient, adaptable resource, with greater natural capital value, that supports a strong economy, a thriving environment, and healthy and flourishing communities." (Scottish Government, 2019)

It lists a number of objectives summarised below:

- Increase the contribution of forests and woodlands to Scotland's sustainable and inclusive economic growth;
- Improve the resilience of Scotland's forests and woodlands and increase their contribution to a healthy and high quality environment; and
- Increase the use of Scotland's forest and woodland resources to enable more people to improve their health, well-being and life chances.

It further describes the priorities as:

- Ensuring forests and woodlands are sustainably managed;
- Expanding the area of forests and woodlands, recognising wider land-use objectives;
- Improving efficiency and productivity, and developing markets;
- Increasing the adaptability and resilience of forests and woodlands;
- Enhancing the environmental benefits provided by forests and woodlands; and
- Engaging more people, communities and businesses in the creation, management and use of forests and woodlands.

There were ambitious targets included within the SFS for new woodland creation:

- 10,000 hectares (ha) per year in 2018;
- 12,000 ha per year from 2020/21;
- 14,000 ha per year from 2022/23; and
- 15,000 ha per year from 2024/25.

The stated objective is to increase Scotland's woodland cover from the current 18.5% to 21% by 2032. (Scottish Government, 2019)

Scotland's Third Land Use Strategy 2021-2026

Scotland's Third Land Use Strategy 2021 - 2026 stresses the importance of forestry in the balancing the demands on land use in Scotland and its transition to a net zero economy. It states: *"...there will need to be a significant land use change from current uses to forestry and peatland restoration."* (Scottish Government, 2021)

This will involve rapidly increasing the pace of woodland and forest creation. To support this, the SFS emphasises the continued protection of Scotland's forest resource. (Scottish Government, 2021)

National Planning Framework 4 2023

The Scottish Ministers adopted and published National Planning Framework 4 (NPF4) on February 13th 2023. NPF4 continues the theme of seeking to expand Scotland's woodland resource and the most relevant policy is Policy 6 'Forestry, Woodland and Trees', the intent of which is to "protect and expand forests, woodland and trees" (Scottish Government, 2023).

It states that development proposals involving woodland removal will only be supported where they will achieve significant and clearly defined additional public benefits in accordance with relevant Scottish Government policy on woodland removal and, where woodland is removed, compensatory planting will most likely be expected to be delivered.

It further states that development proposals on sites which include an area of existing woodland or land identified in the relevant Forestry and Woodland Strategy as being suitable for woodland creation will only be supported where the enhancement and improvement of woodlands and the planting of new trees on the site (in accordance with the Forestry and Woodland Strategy) are integrated into the design. (Scottish Government, 2023)

Right Tree in the Right Place 2010

'Right Tree in the Right Place - Planning for Forestry & Woodlands' 2010 (Scottish Government, 2010) sets out detailed guidance to planning authorities when considering development proposals involving forestry and woodland. It advises that planning authorities should:

- Assess the current and likely future public benefits (social, economic and environmental) deriving from the existing woodland;
- Determine whether the development should be modified or the woodland redesigned to avoid or reduce woodland loss (e.g. by accommodating new development within 'open space' within woodlands);
- Where woodland loss cannot be avoided, assess the public benefit of the Proposed Development to see if it would justify the loss of the woodland;
- Consider whether any loss of woodland should be mitigated by compensatory planting; and
- Consider whether any felling consent needs to specify the timing of forestry operations to avoid disturbance to wildlife present on the Site.

If an authority decides that a development proposal involving woodland loss should receive planning permission, it should specify the precise area of felling permitted and ensure that planning conditions and/or agreements would ensure the provision of any compensatory planting which is required. (Scottish Government, 2010)

Control of Woodland Removal Policy 2009

In parallel with the SFS and other national policies on woodland expansion, there is a strong presumption against permanent deforestation unless it addresses other environmental concerns. In Scotland, such deforestation is dealt with under the Scottish Government's 'Control of Woodland Removal Policy' 2009 (Scottish Government, 2009). The guidance relating to the implementation of the policy was revised and updated in 2019.

The purpose of the policy is to provide direction for decisions on woodland removal in Scotland. The policy document lays out the background to the policy, places it into the current policy and regulatory context, and discusses the principles, criteria and process for managing the policy implementation. The following paragraphs summarise the policy relevant to the Proposed Development.

The principal aims of the policy include:

- To provide a strategic framework for appropriate woodland removal; and
- To support climate change mitigation and adaptation in Scotland.

The guiding principles behind the policy include:

- There is a strong presumption in favour of protecting Scotland's woodland resources; and

- Woodland removal should be allowed only where it would achieve significant and clearly defined additional public benefits. In appropriate cases, a proposal for compensatory planting may form part of this balance.

Woodland removal, without a requirement for compensatory planting, is most likely to be appropriate where it would contribute significantly to:

- Enhancing priority habitats and their connectivity;
- Enhancing populations of priority species;
- Enhancing nationally important landscapes, designated historic environments and geological Sites of Special Scientific Interest (SSSI);
- Improving conservation of water or soil resources; or
- Public safety.

Woodland removal, with compensatory planting, is most likely to be appropriate where it would contribute significantly to:

Helping Scotland mitigate and adapt to climate change;

- Enhancing sustainable economic growth or rural/community development;
- Supporting Scotland as a tourist destination;
- Encouraging recreational activities and public enjoyment of the outdoor environment;
- Reducing natural threats to forests or other land; or
- Increasing the social, economic or environmental quality of Scotland's woodland cover.

The consequences of the policy are stated as:

- Minimising the inappropriate loss of woodland cover in Scotland;
- Enabling appropriate woodland removal to proceed with no net loss of woodland -related public benefits other than in those circumstances detailed in the policy; and
- Facilitating achievement of the Scottish Government's woodland expansion ambition in a way that integrates with other policy drivers (such as increasing sustainable economic growth, tackling climate change, rural/community development, renewable energy and biodiversity objectives).

Addressing the policy requirements can be met through changes to forest design, increasing designed open space, changing the woodland type, changing the management intensity, or completing off site compensation planting. (Scottish Government, 2009)

Stirling & Clackmannanshire Forestry and Woodland Strategy

The Stirling & Clackmannanshire Woodland and Forestry Strategy (SCFWS) was published in 2014. (Clackmannanshire Council, 2014)

The vision for the strategy was defined as:

“The trees, woodlands and forests of Stirling & Clackmannanshire contribute greatly to the quality of the landscape, environment, biodiversity, cultural heritage and the local economy... Through their expansion, protection and sustainable management, the forests and woodlands of Stirling and Clackmannanshire will provide a range of benefits for local people and visitors and contribute to economic, environmental and social well-being. Through partnership working and integrated planning, implementation and monitoring, new jobs will be created, opportunities provided for active and passive outdoor recreation, habitats enhanced for wildlife and attractive landscapes protected, so that local people can live and work and visitors enjoy the area's natural and cultural heritage.” (Clackmannanshire Council, 2014)

Section 2. 5 of the Strategy states the current woodland and forest composition of the landscape

“extends to some 21,350 hectares or 17% of total land area, comparing favourably with Scotland’s 17% woodland cover ...8,800 hectares (45%) is classified as ancient and semi-natural woodland (including native woodland, nearly native woodland and plantation on ancient woodland sites.) Cairnoch Hill is within Stirling council which has just under 18% woodland cover.” (Clackmannanshire Council, 2014)

The Strategy was developed as statutory supplementary planning guidance which will be adopted as part of the Clackmannanshire Council Local Development Plan. The Strategy integrates with other local strategies and action plans, including the Biodiversity Action Plan, Economic development framework, Open Space Strategy, Greening Clackmannanshire. It will primarily be used to guide woodland expansion within the region.

The Strategy is based on the following seven themes:

- Climate change;
- Timber;
- Business development;
- Community development;
- Access and health;
- Environmental quality; and
- Biodiversity.

Strategic priorities have been defined for each of the above themes which are translated into detailed priority actions following the below planning policies regarding woodland loss:

- To implement the National Planning Policy requirement to protect existing woodland and to permit removal only where there are 'significant and clearly defined public benefits' Section 2.1 SCFWS (Clackmannanshire Council, 2014)
- To follow Scottish Government's Policy on the Control of Woodland Removal and prevent avoidable woodland loss and establish 'compensatory planting where development proposals necessitate the loss of woodland' Section 2.3 SCFWS SEA (LUC, 2012)
- To plan for the expansion of woodland cover with woodland expansion 'looked upon favourably' in Stirling and Clackmannanshire. Section 4 (Clackmannanshire Council, 2014)

1.4. Forestry Study Area

The Forestry Study Area (FSA), as shown on Figure 3.2.1, extends to approximately 3,114.2 ha, and comprises woodlands on the National Forest Estate which are managed by Forestry and Land Scotland. They form part of the Carron Valley Land Management Plan which runs until 2025 -2035.

The forests contain a limited range of woodland types due to the original planting programme together with areas of unplantable land and open ground. The crops are comprised largely of commercial conifers with small areas of both mixed conifers and mixed broadleaves and open ground. The woodlands are currently within the felling and restocking phase. Further information on the composition of the woodlands in the FSA is provided in the baseline description below.

1.5. Forest Plans

One of the original key objectives of the Forestry Commission was forest expansion, in both state and private forests, to produce a strategic reserve of timber, and consequently, a limited range of species was planted. More recently, greater emphasis has been placed on developing multi-purpose forests, which require a restructuring of age and species in existing woodlands. Restructuring is achieved through the forest planning process.

A Forest Plan relates to individual forests or groups of woodlands. It describes the woodlands, places them in context with the surrounding area, and identifies issues that are relevant to the woodland or forest. Forest Plans describe how the long-term strategy would meet the management objectives of the owner, the criteria of the UK 'Forestry Standard' (UKFS) (Forestry Commission, 2024) and the UK 'Woodland Assurance Standard 4th Edition' (UKWAS) (UKWAS, 2024), under which the woodlands would be managed if certificated.

The development of a Forest Plan involves a scoping exercise whereby the views of Statutory Consultees, neighbours and stakeholders are sought, resulting in an agreed Scoping Report. The results of the scoping exercise are incorporated into the Forest Plan. A Forest Plan covers social and environment aspects, such as conservation, archaeology, landscape and the local community, in addition to forestry and silvicultural considerations.

Restructuring of age class and species are important factors in this process to ensure proposals meet the current standards. A Wind Farm Forest Plan is prepared along the same principles with the relevant information being provided by other members of the project team. A baseline Forest Plan (without wind farm) will typically contain felling and restocking proposals covering a 10 year period in detail, with outline proposals for the remainder of the forest.

Restructuring presents forest managers with many challenges and opportunities, particularly in relation to the management of potential catastrophic windblow due to storm damage. The forest planning process allows forest managers to review and revise proposals in a structured way to take account of such external factors. The inclusion of a wind farm within the forest is an example of one such external factor.

The current guidelines require diversification of species and woodland types as part of the forest planning process, specifically an increase in the proportion of broadleaf woodland, other conifers, and open ground. The incorporation of the Proposed Development into the forest would result in further restructuring of the forest.

1.6. Development of a Wind Farm Forest Plan

Introduction

This Section describes the process by which a typical Wind Farm Forest Plan is prepared. Existing crop information is collated from the landowner including current forestry information on species, planting year and felling and restocking plans where available. This is followed by field surveys, in this case instance undertaken in 2024, and further desk-based assessment as necessary.

Details of wind turbine locations, new tracks, storage compounds, borrow pit, substation compound and other infrastructure are provided by other disciplines within the project team. This data would then be amalgamated with the forestry data to construct the forestry proposals for the Proposed Development.

The location of wind turbines and infrastructure is heavily influenced by environmental constraints and technical considerations (e.g. sensitive habitats, wind resource capture, ground conditions, etc). The final location of wind turbines and infrastructure takes the various site constraints into

consideration. Land management requirements associated with the construction of the Proposed Development would also be incorporated into the forestry proposals, where appropriate.

Within forests and woodlands, areas of crop may require to be felled to accommodate the construction and operation of the Proposed Development. The felling programme for the Proposed Development would largely be driven by technical constraints relating to both forestry and development.

In this case, taking into account the ecological constraints as mentioned in Chapter 8: 'Ecology', a 3.1 ha (100 metre (m) radius) 'keyhole' was adopted around wind turbines. These keyholes are areas that require to be felled for construction, operation and environmental mitigation.

A 10m buffer has been applied around each other item of temporary and permanent infrastructure, in addition to the area required for the infrastructure. An indicative 30m corridor has been applied to all new access tracks and upgraded existing tracks to be used for wind turbine delivery and construction purposes. This would be reviewed at the detailed design stage post consent and prior to construction.

Wind Farm Felling Plan

Felling required for a Proposed Development can be divided into two categories.

- Firstly, that required during the construction phase of the Proposed Development, which for the purposes of this assessment, has been anticipated as commencing in 2028; and
- Secondly, felling required during the operational period of the Proposed Development. In this case there is no felling required outwith that required for the construction phase.

The crops were assessed to identify those areas which would require to be felled for a number of reasons as described above. Due to the crop growth rates and current crop height, it has been assessed that the infrastructure within woodland areas would require a combination of keyholing into younger crops and in the mature crops, clear felling of entire coupes back to either a wind farm edge or management boundaries. Where entire coupes are to be felled, the infrastructure would be incorporated into the Wind Farm Species Restocking Plan as described below.

Additional minor felling would be required for forest management purposes, for example, to reduce the risk of subsequent windblow; to reduce coupe isolation and fragmentation; and to ensure access for future forest operations.

The resultant Wind Farm Felling Plan shows which woodlands within the FSA would be felled as a result of the Proposed Development and when this felling would take place.

Wind Farm Species Restocking Plan

The Wind Farm Species Restocking Plan shows which woodlands would be restocked and with which species. The majority of the areas to be felled for the Proposed Development would be restocked except for the areas detailed below:

- Land required for permanent infrastructure subject to the buffer zones described above; and
- Land to be left unplanted for forest management or forest design purposes.

It has been assumed that, where possible, some temporary infrastructure such as edges of re-profiled borrow pits would be re-instated and available for restocking post construction. To ensure that the forestry establishes successfully, the soil should be restored to a depth of 1m.

In preparing the Wind Farm Species Restocking Plan, a number of points would be considered as detailed below:

- Fragmentation of coupes to be minimised as much as possible;
- Coupe shapes would be modified to ensure that access for future forestry operations, principally harvesting, is maintained; and
- Coupe shapes and edges would be modified to follow good practice.

Species composition was considered taking into account the Proposed Development operational requirements such as separation distances between wind turbines and forest edges, landowner objectives and forestry policies.

The wind farm forestry felling and restocking proposals have been assessed by each of the separate environmental disciplines / consultants as part of the EIA process where required, and the effects are reported in individual chapters of this EIA Report and their supporting technical appendices.

1.7. Baseline Conditions

Baseline Planting Year/Age Class Structure

Many woodlands established in the mid to late 1900's, were planted in large contiguous blocks, often over a limited number of years and with a limited range of species. Such woodlands develop poor structural diversity, especially on upland sites. Restructuring the age class and species of such forests is desirable and would yield both forest management and environmental benefits.

The woodlands within the FSA have just started going through restructuring by felling and restocking and as a result the structural diversity of the woodlands is starting to evolve. Their age class is shown in Figure 3.2.2 and detailed below in Table 1.7.1: 'Baseline Age Class Composition'.

Table 1.7.1 Baseline Age Class Composition

Age Yrs	Area (Ha)	Area (%)
n/a	778.2	25.0
1-10 years	439.9	14.1
11-20 years	463.1	14.9
21-30 years	635.9	20.4
31-40 years	350.1	11.2
41-50 years	233.4	7.5
51-60 years	34.2	1.1
61-70 years	17.6	0.6
71-80 years	73.6	2.4
80+ years	88.2	2.8
Total	3114.2	100.0

* - Rounding errors can occur

The current guidelines contained within the UKFS are that in forests characterised by a lack of diversity due to extensive areas of even-aged trees, stands adjoining felled areas should be retained until the restocking of the first coupe has reached a minimum height of 2m (Forestry Commission, 2024) For planning purposes, this is likely to be between 5 and 15 years depending on establishment success and growth rates. It is recognised that in large even-aged plantations, especially in the uplands, restructuring age class structure to meet this target may take more than one rotation.

Species Composition

The current baseline species composition of the woodlands within the FSA is shown in Figure 3.2.3 and illustrated in Table 1.7.2 below.

Please note there may be minor discrepancies in the totals within the tables contained in this technical appendix. This is due to rounding of the individual values for the different parameters in the database.

Table 1.7.2 Baseline Species Composition

Species	Area (Ha)	Area (%)
Sitka Spruce	1982.5	63.7
Sitka Spruce/Other Conifer	0.0	0.0
Sitka Spruce/ Mixed Broadleaves	0.0	0.0
Mixed Conifer/ Mixed Broadleaves	0.0	0.0
Mixed Broadleaves	154.6	5.0
Other Conifer	198.9	6.4
Open Ground	694.8	22.3
Felled awaiting Restock	83.4	2.7
Total	3114.2	100.0

The main species are commercial conifers, principally Sitka spruce, which in pure or mixed stands, accounts for 63.7% of the total FSA. Other conifers account for 6.4% of the FSA and broadleaf woodland 5% of the FSA. Whilst Open ground accounts for 22.3% of the total FSA.

The species composition reflects the practice and guidance which prevailed at the time the woodlands were established. Restructuring as part of a long-term forest plan would aim to introduce an increased proportion of broadleaves and other conifers into the woodland composition.

Baseline Felling Plan

The Baseline Felling Plan forms part of the current Forest Plans prepared by the forest managers.

The Baseline Felling Plan considers the requirement to restructure the age class of even aged forests as described above. The Baseline Felling Plan is illustrated in Figure 3.2.4 and presented in Table 1.7.3 below. The data is summarised in 5-year bands as per standard practice.

Table 1.7.3 Baseline Felling Plan

Felling Phase	Area (Ha)	Area (%)
No Felling – Open Ground	694.8	22.3
Phase 1: Dates	258.1	8.3
Phase 2: Dates	89.8	2.9
Phase 3: Dates	178.3	5.7
Phase 4: Dates	118.9	3.8
Outside Plan Period	1174.2	37.7
Long Term Retentions	507.0	16.3
LISS	58.6	1.9
Natural Reserves	34.5	1.1
Total	3114.2	100.0

A proportion of the FSA is designated as 'No Felling' due either to open ground, land awaiting restocking or crops with no felling year assigned.

A large area of the FSA is designated as "Outside Plan Period". These areas are generally immature crops whose prospective felling year lies outside of the current Forest Plan period, which covers 10 years of felling and restocking from time of approval. Woodlands not covered by a current forest plan have been assigned to Outside Plan Period unless they have been previously identified as Long Term Retentions (LTR) or Natural Reserves (NR).

Some areas of crop in the baseline felling plan have been assigned a delayed felling age by the forest managers. These areas are Long Term Retentions (LTR), crops to be retained beyond their age of economic or silvicultural maturity for conservation and biodiversity purposes. These woodlands would otherwise be managed as normal and would in due course be felled and replanted. The identification of LTRs is part of the requirements of UKWAS (UKWAS, 2024) and the UKFS (Forestry Commission, 2024).

Other areas within the FSA have been designated as Natural Reserves (NR). These are areas which are considered of higher conservation interest than commercial species and are managed by minimum intervention unless alternative management has higher conservation or biodiversity value. The identification of NRs is part of the requirements of UKWAS (UKWAS, 2024) and the UKFS (Forestry Commission, 2024).

The baseline felling programme is designed to provide the required separation between felling coupes, where possible. This may take more than one rotation to achieve, especially in the uplands where wind firm boundaries between felling coupes are limited

Baseline Restocking Species Composition

The baseline restocking species composition as detailed in the baseline Forest Plans is illustrated in Figure 3.2.5 and outlined in Table 1.7.5 below.

Table 1.7.5 Baseline Restocking Plan Species Composition

Species	Area (Ha)	Area (%)
Sitka Spruce	47.0	1.5
Sitka Spruce/Other Conifer	1660.3	53.3
Sitka Spruce/ Mixed Broadleaves	67.5	2.2
Mixed Conifer/ Mixed Broadleaves	173.2	5.6
Mixed Broadleaves	482.1	15.5
Other Conifer	195.0	6.3
Open Ground	489.1	15.7
Total	3114.2	100.0

The baseline restocking proposals illustrate how the forest would be structured at the end of the Forest Plan period if the entire plans were implemented. Table 1.7.6 below compares the baseline current species composition and the baseline restocking species composition at the end of the Forest Plan period without the implementation of the Proposed Development.

Table 1.7.6 Comparison of Baseline Species Composition

Baseline Species	Baseline Species		Baseline Restock		Variance	
	Area (Ha)	Area (%)	Area (Ha)	Area (%)	Area (Ha)	Area (%)
Sitka Spruce	1982.5	63.7	47.0	1.5	-1935.5	-62.2
Sitka Spruce/Other Conifer	0.0	0.0	1660.3	53.3	1660.3	53.3
Sitka Spruce/ Mixed Broadleaves	0.0	0.0	67.5	2.2	67.5	2.2
Mixed Conifer/ Mixed Broadleaves	0.0	0.0	173.2	5.6	173.2	5.6
Mixed Broadleaves	154.6	5.0	482.1	15.5	327.5	10.5
Other Conifer	198.9	6.4	195.0	6.3	-3.9	-0.1
Open Ground	694.8	22.3	489.1	15.7	-205.7	-6.6
Felled awaiting Restock	83.4	2.7	0.0	0.0	-83.4	-2.7
Total	3114.2	100.0	3114.2	100.0		

The changes between the current baseline current species composition and that contained within the Baseline Restocking Plan are discussed below:

- The proportion of primary conifer crops (Sitka spruce, Sitka spruce/Other Mixed conifer) decreases by 279.1 ha;
- The area of open ground decreases by 205.7 ha; and
- The area of broadleaf woodland increases by 327.5 ha.

The majority of these changes reflect the ongoing proposed restructuring of the first rotation crops to meet current guidelines and the restocking of land felled and awaiting restocking.

1.8. Wind Farm Forest Plan

Introduction

The effect of the Proposed Development on the structure of the woodlands within the FSA has been compared against the Baseline Forest Plan. This has concentrated on changes to the Felling Plan and Restocking Plan required to accommodate the Proposed Development.

Construction has been provisionally programmed for 2028, which falls within Phase 1: 2025-2030 of the Baseline Forest Plan.

Habitat Management Plan (HMP) Felling Proposals

The Outline Habitat Management Plan (Technical Appendix 8.6 of the EIA Report) has been developed to ensure the Proposed Development includes provision for biodiversity improvements and enhancement. In the case of Cairnoch Hill, the Outline HMP has been prepared, taking into account the Carron Valley Land Management plan 2025 - 2035. As the majority of the proposal areas within the Outline HMP are currently inaccessible and impractical to fell specifically for the implementation of a HMP, it is proposed that the timing of HMP related felling and planting would be confirmed, post any consent (as part of a detailed HMP), in agreement with FLS and Scottish Forestry. Whilst the detail of the timings of felling and planting relating to the HMP are currently unknown, it is considered that some areas would be able to be progressed at construction stage and some areas could be progressed under the scope of FLS's normal forestry management cycles. There is a commitment from FLS to facilitate all HMP related felling and planting within 10 years of construction of the Proposed Development.

Proposed Development Felling Plan

The Proposed Development Felling Plan is shown across two figures. Figure 3.2.6 identifies the felling required for construction of the Proposed Development and the advanced felling as a result of the Proposed Development, these data are summarised in Table 1.8.1 below. Figure 3.2.7 shows how this felling relates to the associated Forest Plan, the data is summarised in Table 1.8.2 below.

Table 1.8.1 Felling Required for Construction

Felling Type	Area (Ha)	Area (%)
No Felling – Open ground	694.8	22.3
Infrastructure Felling	37.1	1.2
Advanced Felling	38.7	1.2
No Felling – woodland	2343.5	75.3
Total	3114.2	100.0

The total felling required to accommodate construction of the Proposed Development, including infrastructure and advanced felling, totals 75.8 ha.

Infrastructure felling is felling which is required for the footprint of the Proposed Development.

Proposed Advanced felling is advised felling alongside infrastructure felling, either to consolidate coupe shapes or fell back to a wind firm edge to prevent windblow

Table 1.8.2 Proposed Development Plan

Felling Phase	Area (Ha)	Area (%)
No Felling - Open Ground	694.8	22.3
Phase 1: Dates	333.7	10.7
Phase 2: Dates	89.8	2.9
Phase 3: Dates	178.3	5.7
Phase 4: Dates	96.6	3.1
Outside Plan Period	1141.5	36.7
Long Term Retention	486.4	15.6
LISS	58.6	1.9
Natural Reserves	34.5	1.1
Total	3114.2	100.0

The Baseline and Proposed Development Felling Plans are compared in Table 1.8.3 below.

	Baseline Fell Phase		WF Fell Phase		Variance	
Felling Phase	Area (Ha)	Area (%)	Area (Ha)	Area (%)	Area (Ha)	Area (%)
No Felling - Open Ground	694.8	22.3	694.8	22.3	0.0	0.0
Phase 1: Dates	258.1	8.3	333.7	10.7	75.6	2.4
Phase 2: Dates	89.8	2.9	89.8	2.9	0.0	0.0
Phase 3: Dates	178.3	5.7	178.3	5.7	0.0	0.0
Phase 4: Dates	118.9	3.8	96.6	3.1	-22.3	-0.7
Outside Plan Period	1174.2	37.7	1141.5	36.7	-32.7	-1.0
Long Term Retention	507.0	16.3	486.4	15.6	-20.5	-0.7
LISS	58.6	1.9	58.6	1.9	0.0	0.0
Natural Reserves	34.5	1.1	34.5	1.1	0.0	0.0
Total	3114.2	100.0	3114.2	100.0		

Table 1.8.3 Comparison of Felling Plans

Of the 75.8 ha of felling advised for construction of the Proposed Development, 22.3 ha was scheduled to take place in Phase 4, 20.5 ha was allocated as Long Term Retention and 32.7 ha was advanced from woodland not allocated for felling within the current plan period.

Overall, 0.2 ha was already in Phase 1 and 75.6 ha would be advanced from later phases.

Proposed Development Restocking Plan

The Baseline Restocking Plan has been amended to integrate the Proposed Development infrastructure requirements into the forest design and to take account of the site conditions. The Proposed Development Restocking Plan is shown in Figure 3.2.8 and summarised in Table 1.8.4 below. Wind farm open ground refers to the permanent loss of crop to permanent infrastructure only of the Proposed Development.

Table 1.8.4 Proposed Development Restocking Species Composition

Species	Area (Ha)	Area (%)
Sitka Spruce	46.8	1.5
Sitka Spruce/Other Conifer	1637.1	52.6
Sitka Spruce/ Mixed Broadleaves	66.8	2.1
Mixed Conifer/ Mixed Broadleaves	165.4	5.3
Mixed Broadleaves	480.8	15.4
Other Conifer	193.7	6.2
Open Ground	489.1	15.7
Wind Farm Open Ground	34.4	1.1
Total	3114.2	100.0

The Baseline and Wind Farm Restocking Plans have been compared to assess the changes that construction of the Proposed Development would have on the species composition of the forests. These data are presented in Table 1.8.5

Table 1.8.5 Restocking Species Plan Comparison

Species	Restock Species		Proposed Development Restock		Variance	
	Area (Ha)	Area (%)	Area (Ha)	Area (%)	Area (Ha)	Area (%)
Sitka Spruce	47.0	1.5	46.8	1.5	-0.2	0.0
Sitka Spruce/Other Conifer	1660.3	53.3	1637.1	52.6	-23.3	-0.7
Sitka Spruce/ Mixed Broadleaves	67.5	2.2	66.8	2.1	-0.7	0.0
Mixed Conifer/ Mixed Broadleaves	173.2	5.6	165.4	5.3	-7.7	-0.2
Mixed Broadleaves	482.1	15.5	480.8	15.4	-1.3	0.0
Other Conifer	195.0	6.3	193.7	6.2	-1.3	0.0
Open Ground	489.1	15.7	489.1	15.7	0.0	0.0
Wind Farm Open Ground	0.0	0.0	34.4	1.1	34.4	1.1
Total	3114.2	100.0	3114.2	100.0		

The change in area of stocked woodland in the forests due to the Proposed Development is shown in Table 1.8.6 below.

Table 1.8.6 Stocked Woodland Area Comparison

	Baseline		Wind farm		Variance	
	Area (Ha)	Area (%)	Area (Ha)	Area (%)	Area (Ha)	Area (%)
Stocked	2625.1	84.3	2590.6	83.2	-34.4	-1.1
Unstocked	489.1	15.7	523.5	16.8	34.4	1.1
Total	3114.2	100.0	3114.2	100.0		

The changes in the structure of the woodlands due to the Proposed Development can be summarised as follows:

- There would be a net reduction in the area of Sitka spruce either pure or in mixed stands of 24.1 ha;
- There would be a net reduction in the area of broadleaf woodland of 1.3 ha;
- There would be a net reduction in the area mixed conifer woodland of 1.3 ha;
- There would be a net reduction in the area of mixed woodland of 7.7 ha
- Wind farm permanent open ground would total 34.4 ha; and

- The net reduction in stocked woodland area within the FSA would be 34.4 ha equivalent to 1.1% of the FSA.

1.9. Requirement for Compensatory Planting

As a result of the construction of the Proposed Development, there would be a net loss of woodland area. The area of stocked woodland in the FSA would decrease by 34.4 ha.

In order to comply with the criteria of the Scottish Government's Control of Woodland Removal Policy, compensation planting would be required. Eurowind Energy Limited (The Applicant) is committed to providing appropriate compensatory planting. The extent, location and composition of such planting to be agreed with SF, taking into account any revision to the felling and restocking plans prior to the commencement of construction of the Proposed Development.

1.10. Forestry Waste

The Scottish Environment Protection Agency (SEPA) guidance document WST-G-027, 'Management of Forestry Waste' (SEPA, 2017) highlights that all waste producers have a statutory duty to adopt the waste hierarchy as per the Waste (Scotland) Regulations 2012 (Scottish Government, 2012), which amended Section 34 of the Environmental Protection Act (EPA) 1990 (duty of care) (UK Government, 1990) (UK Government, 1990). This places a specific duty on any person who produces, keeps or manages (controlled) waste to take all such measures available to them to apply the waste hierarchy in Article 4 (1) of the revised Waste Framework Directive (rWFD) (European Union, 2008), which is:

- Prevention;
- Preparing for re-use;
- Recycling;
- Other recovery, including energy recovery; and
- Disposal, in a way which delivers the best overall environmental outcome.

Further guidance is contained in the document LUPS-GU27, 'Use of Trees Clear Felled to Facilitate Proposed Development on Afforested Land' (SEPA, 2014).

A hierarchy of uses for forestry materials is proposed, derived from the waste hierarchy contained within the Regulations, summarised as follows:

- Prevention via the production of timber products and associated materials for use in timber and other markets;
- The re-use of materials on-site for a valid purpose, where such a use exists e.g. track construction including floating tracks;
- There is no valid re-cycling use for forestry residues;

- Other recovery via collection and use as biomass for energy recovery or other markets, where not included above; and
- Where no valid on-site or off-site use can be found for the material, disposal would be in a way that is considered to deliver the best overall environmental outcome.

Where no valid on-site or off-site use, or other disposal method, can be found for the material, it should be regarded as waste and handled accordingly. Disposal of timber residues as waste in or on land requires a landfill permit or a waste exemption licence and should be considered the option of last resort.

As discussed above, the crops will be replanted except where the land is required for infrastructure associated with the Proposed Development. Brash would be left in situ to provide nutrients for the next rotation where the crops are being replanted as per standard forestry practice. Where crops are not being replanted brash would be removed and treated in line with the proposed hierarchy described above.

Stumps would be left in situ as per good practice guidance, except where excavated as part of the construction activities. Excavated stumps would be treated in line with the proposed hierarchy described above.

In areas of lower yielding crops, into which the Proposed Development infrastructure would be keyholed, the objective would be to recover as much merchantable timber as possible. Failing that, they would be treated in line with the hierarchy outlined above. Where suitable, whole trees would be extracted and used in the biomass market. As a result, it is anticipated the forestry waste arising from the works will be minimal.

It is proposed that full consideration and further clarification on this issue would be included in a Forestry Waste Management Plan to form part of the Construction Environmental Management Plan (CEMP) following receipt of planning consent and prior to commencement of construction.

1.11.Forestry Management Practices

Crop Clearance

Areas of crops of sufficient tree size and standing volume would be harvested conventionally. Timber operations would be undertaken with conventional harvesting and forwarding equipment utilising, as required, flotation tracks.

Stemwood down to 7 centimetres (cm) or below would be removed from Site and sold into the timber markets. The harvester would maximise timber recovery wherever possible, this would result in the maximum timber volume being recovered to ensure the volume used in the brash mats

is kept to a minimum. On wetter ground the harvester would build stronger brash mats to ensure there would be minimal damage to the peat and soil structure by the forwarder during extraction. On soft ground, the bottom layers of brash mats become embedded into the soil and removal could result in more environmental damage than leaving the material to naturally degrade.

In areas of young or lower yield class crops, where little or no merchantable timber would be recovered, a number of options could be utilised depending on the factors prevailing at the time of clearance. The methodology used would depend on tree size; site conditions; the availability of suitable equipment; and the markets prevailing at the time of the works being carried out. Where there is suitable access and ground conditions the trees could be whole tree harvested and extracted to roadside for chipping as biomass.

Where trees are very small due to age or poor growth it may be more viable to fell the crop manually using scrub cutters or chainsaws. The end use of the material would depend on the factors mentioned above but in some cases there would be no recoverable material. Where material was recoverable it could potentially be used on-site in the base of floating roads; extracted and processed for biomass; or used for ecological enhancement if applicable.

Stumps would be left in situ as per the guidance contained in the Forestry Commission Research Note "'Environmental effects of stump and root harvesting'" (Forestry Commission, 2011) except where they would be removed for borrow pits, excavated tracks, wind turbine foundations and other infrastructure requiring excavation. Such material would be treated as described above.

Restocking/Planting Methodology

Wind Farm Restocking would be carried out to current standard practice, the forest manager's internal guidance and practices and in accordance with the guidelines contained in the UKFS and UKWAS as a minimum, where applicable. The methodology would vary depending on the type of restocking being carried out. The following information is provided for guidance as to the restocking methodology which may be adopted.

On commercial conifer areas the methodology would normally include:

- Site preparation by machine cultivation and drainage;
- Manual planting;
- Subsequent follow-up establishment operations such as the replacement of failures, weeding and protection measures until the crops are satisfactorily established; and
- Replanting would be carried out with the conifer species identified in the restocking plan at the minimum density of 2,500 trees per ha. (UKWAS, 2024) (Forestry Commission, 2024)

Restocking within the broadleaf woodland areas would be carried out to the same specification with the following changes:

- A lower planting density of 1,600 trees per ha; and
- The principal species would be mixed native broadleaves including, for example, downy and silver birch with small components of other species as appropriate to site such as oak, rowan, hazel, gean, grey willow, goat willow, alder and woody shrubs. (Forestry Commission, 2024) (UKWAS, 2024)

Aftercare Works

Aftercare establishment works would normally include, but are not limited to, the following:

- The woodlands would be beaten up (replacement of failures) to ensure satisfactory stocking levels by year 5, broadleaf woodlands by year 10;
- The woodlands would be weeded as necessary to ensure satisfactory establishment by year 5 / year 10 for broadleaf woodlands;
- The woodlands would be protected against pine weevils by management inspections and remedial treatment as necessary;
- The woodlands would be protected against browsing damage from wild and domestic animals;
- The woodlands would be protected against fire;
- Fertiliser would be applied as necessary to ensure satisfactory establishment and growth; and
- Other works as reasonably required ensuring satisfactory establishment of the woodlands. (Forestry Commission, 2024) (UKWAS, 2024)

1.12. Standards and Guidelines

All forestry operations would be carried out in strict accordance with current good practice and guidelines. This would include, but not be limited to:

- UK Forestry Standard (Forestry Commission, 2024)
- Forest Industry Safety Accord Guides (or equivalent) (FISA, 2014) and
- current relevant legislation including, but not limited to, Health and Safety at Work Act 1974 (UK Government, 2014)

1.13. Summary

The total study area extends to 3114.2 ha and comprises woodlands within the National Forest Estate.

Felling totalling 75.8 ha would be required for construction of the Proposed Development.

The species composition of the forest would change as a result of the Proposed Development forestry proposals. In particular there would be a net reduction in the area of Sitka spruce either pure or in mixed stands of 24.1 ha.

The area of unplanted ground would increase and, as a result, there would be a net loss of woodland area of 34.4 ha.

In order to comply with the Scottish Government's Control of Woodland Removal Policy (Scottish Government, 2009) compensation planting would be required to mitigate for the loss of woodland area. The Applicant is committed to providing appropriate compensatory planting. The extent, location and composition of such planting to be agreed with SF, taking into account any revision to the felling and restocking plans prior to the commencement of construction.

1.14.References

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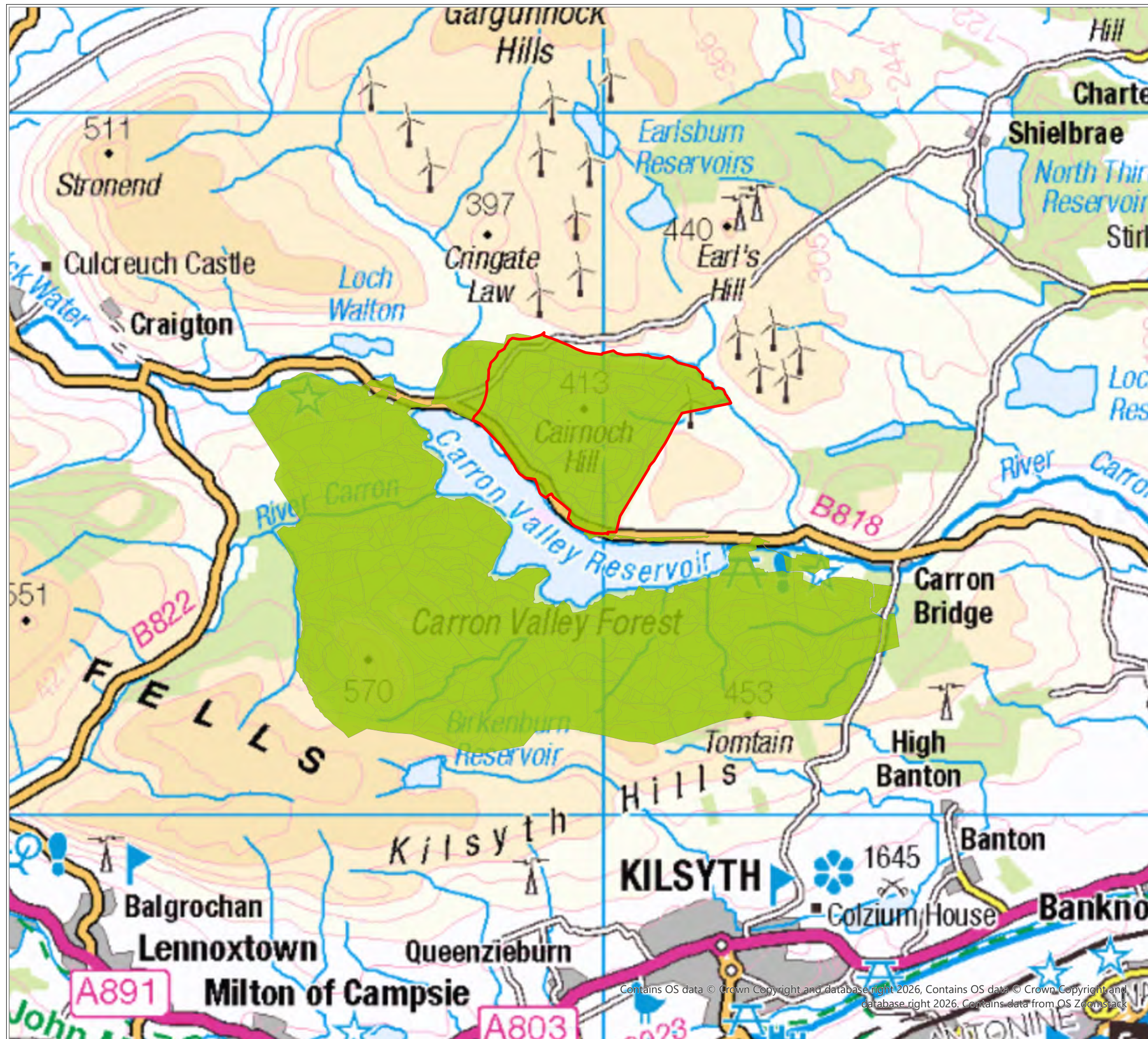
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1.15. Abbreviations

Abbreviations	Definition
CEMP	Construction Environmental Management Plan
EIA	Environmental Impact Assessment
EIAR	Environmental Impact Assessment Report
EPA	Environmental Protection Act
FCS	Forestry Commission Scotland
FES	Forestry Enterprise Scotland
FISA	Forest Industry Safety Accord
FLS	Forestry and Land Scotland
FSA	Forestry Study Area
Ha	Hectares
HMP	Habitat Management Plan
Km	Kilometres
LISS	Low Impact Silvicultural Systems
LTR	Long Term Retentions
LUPS-GU27	Land Use Planning System SEPA Guidance Note
NFE	National Forest Estate
NPF4	National Planning Framework 4
NR	Natural Reserves
OHL	Overhead Line
OOP	Outside Plan Period
PVD	Proposed Varied Development
rWFD	revised Waste Framework Directive
SCFWS	Stirling and Clackmannanshire Forestry and Woodland Strategy
SEA	Strategic Environmental Assessment
SEPA	The Scottish Environment Protection Agency
SF	Scottish Forestry
SFS	Scotland's Forestry Strategy
SNH	Scottish Natural Heritage
SPP	Scottish Planning Policy
SSSI	Site of Special Scientific Interest
UKFS	UK 'Forestry Standard'
UKWAS	UK 'Woodland Assurance Standard 4th Edition'

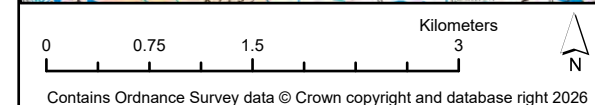
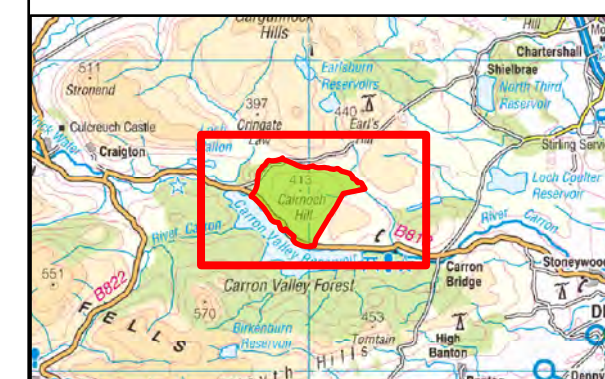


**Figure 3.2.1.
Forestry Study Area**

Author: Kimberly Winter
Date: 08/07/2026
Scale 1:55,000

Legend

- Site Boundary
- Forestry Study Area

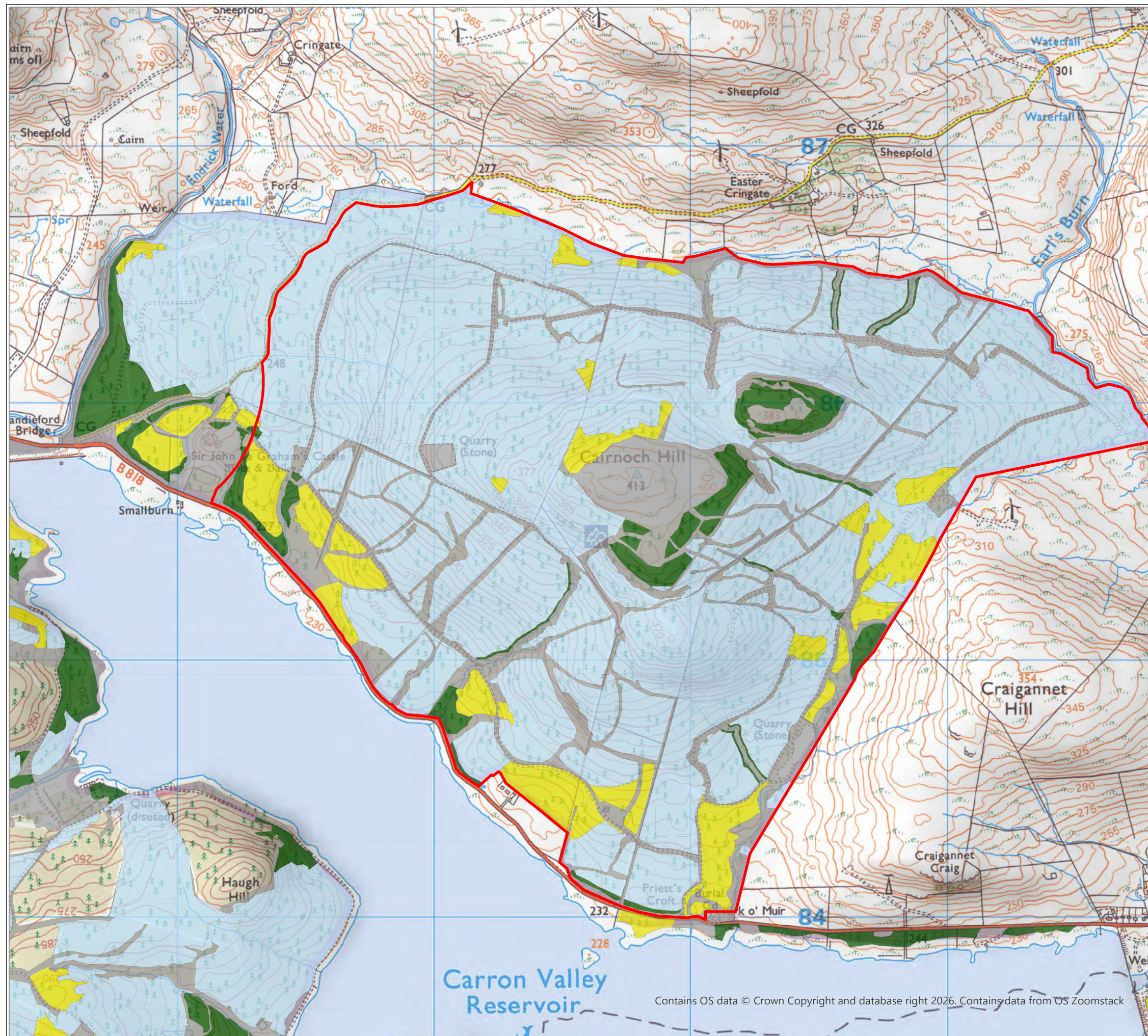


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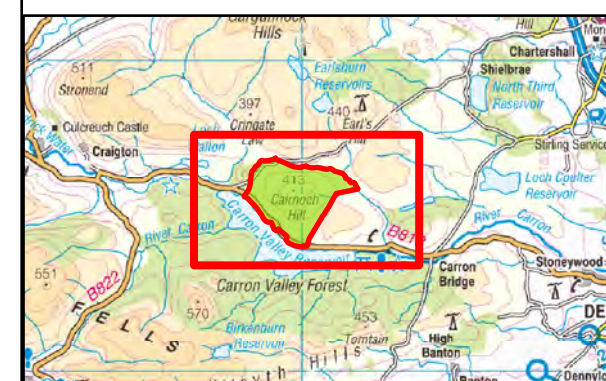


**Figure 3.2.3.
Baseline Species
Composition**

Author: Kimberly Winter
Date: 08/07/2026
Scale 1:15,000

Legend

- Site Boundary
- Open Ground
- Sitka Spruce
- Sitka Spruce/ Other Conifer
- Other Conifer
- Mixed Broadleaves
- Mixed Woodlands



0 0.23 0.45 0.9 Kilometers
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Figure 3.2.4.
Baseline Felling Phase Plan

Author: Kimberly Winter
Date: 08/07/2026
Scale 1:15,000

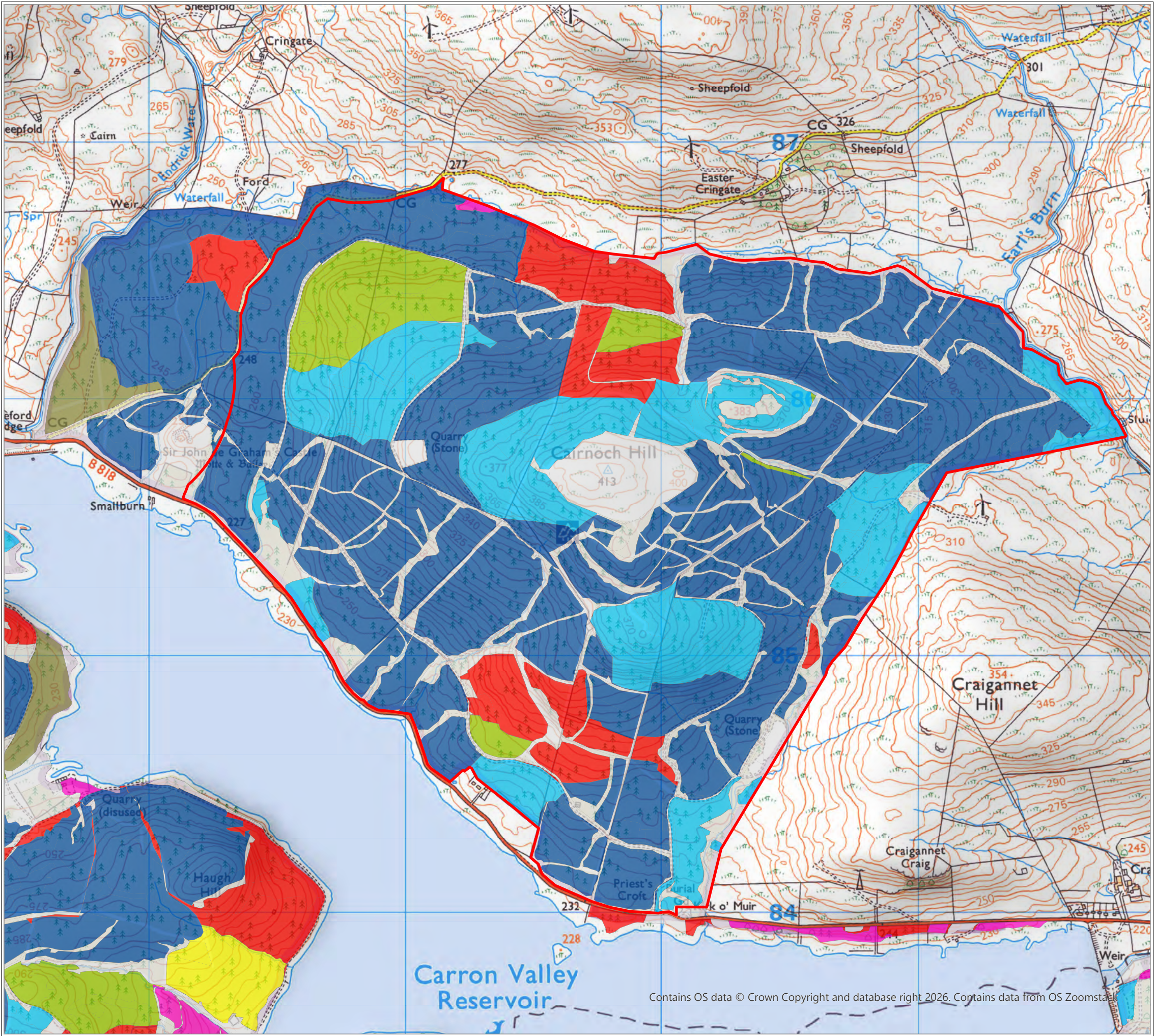
Legend

- Site Boundary
- Open Ground
- Phase 1
- Phase 2
- Phase 3
- Phase 4
- Outside of Plan Period
- LISS
- Long term Retention
- Natural Reserve

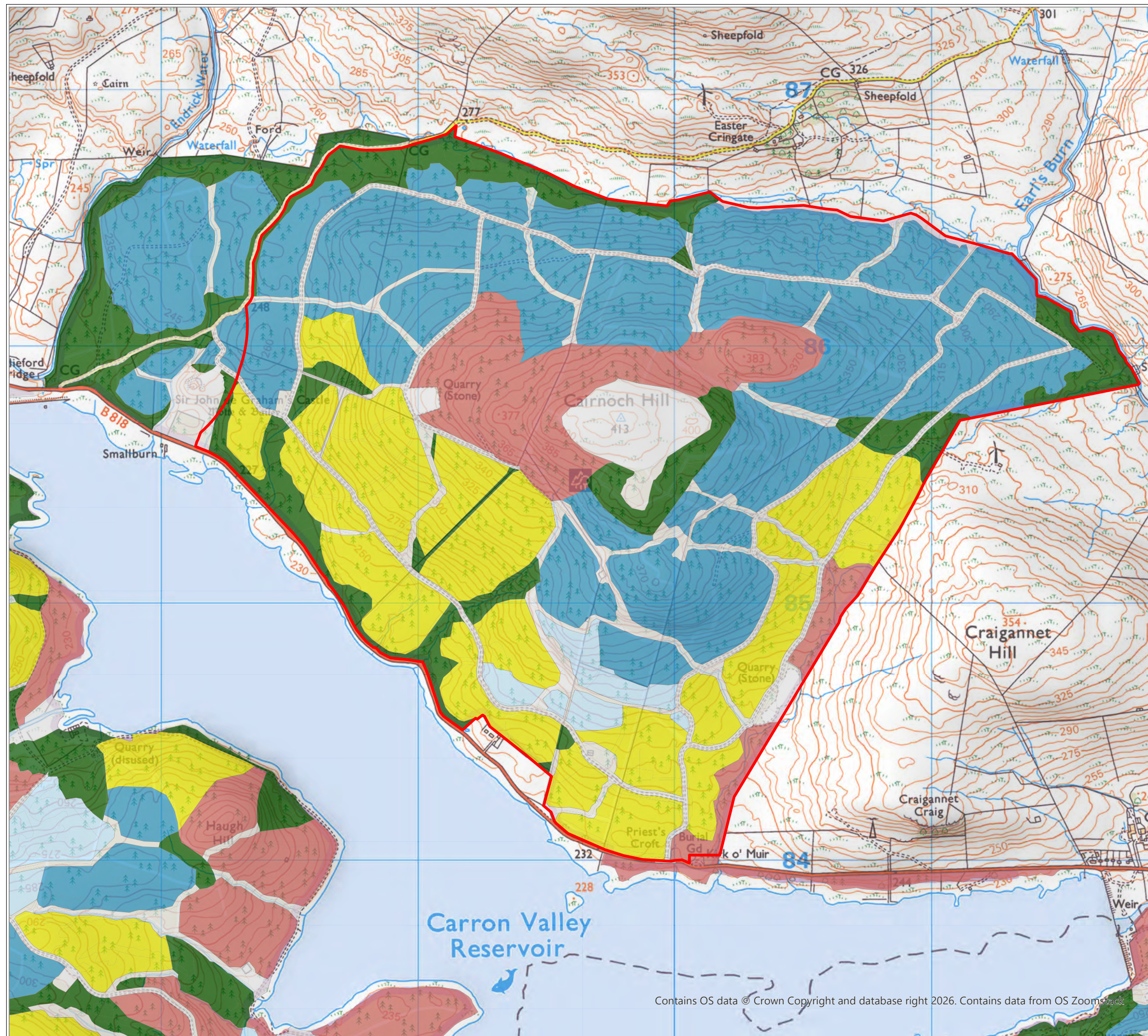


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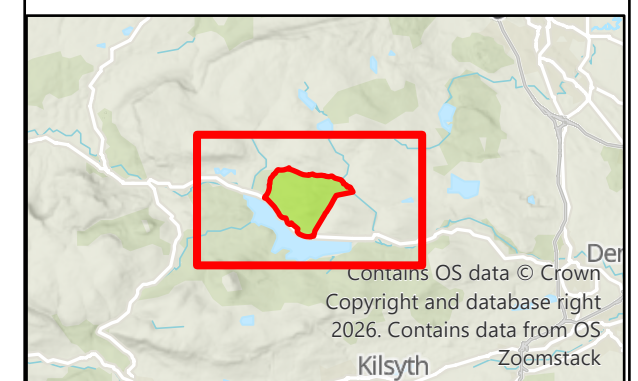


**Figure 3.2.5
Baseline Restock Plan**

Author: Kimberly Winter
Date: 13/08/2026
Scale 1:15,000

Legend

- Site Boundary
- Open Ground
- Sitka Spruce
- Sitka Spruce/ Other Conifer
- Other Conifer
- Mixed Broadleaves
- Mixed Woodland



0 0.23 0.45 0.9 Kilometers
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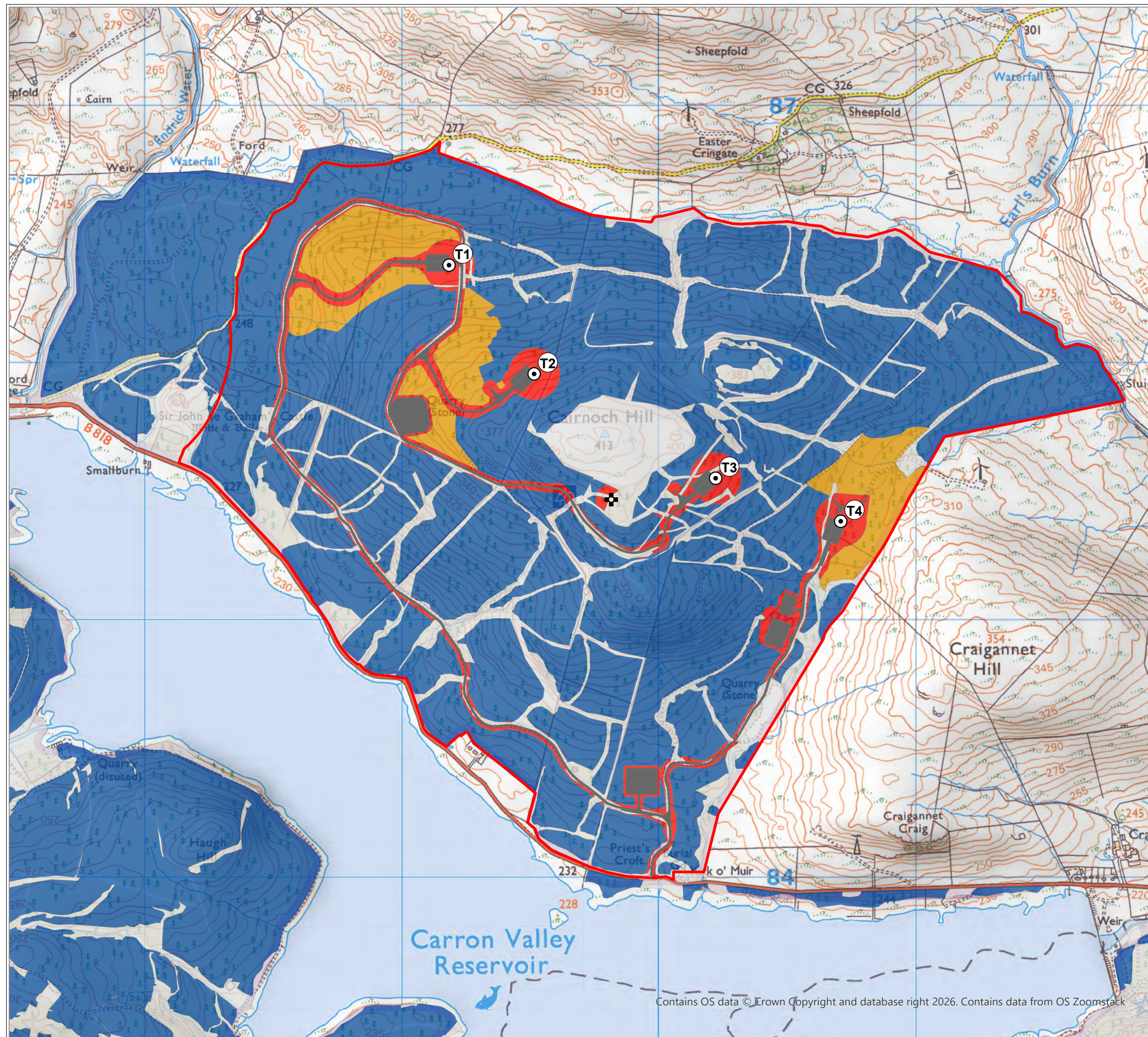
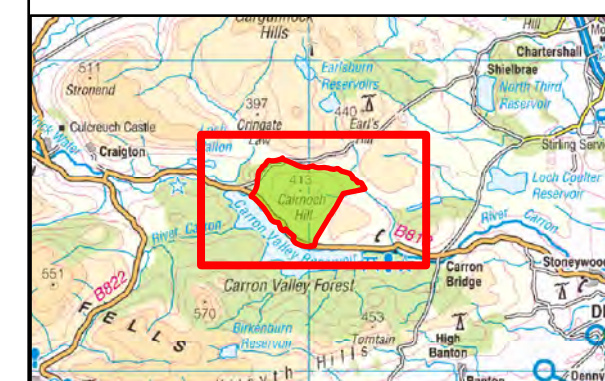


Figure 3.2.6.
Proposed Development
Construction Felling Plan

Author: Kimberly Winter
Date: 08/07/2026
Scale 1:15,000

Legend

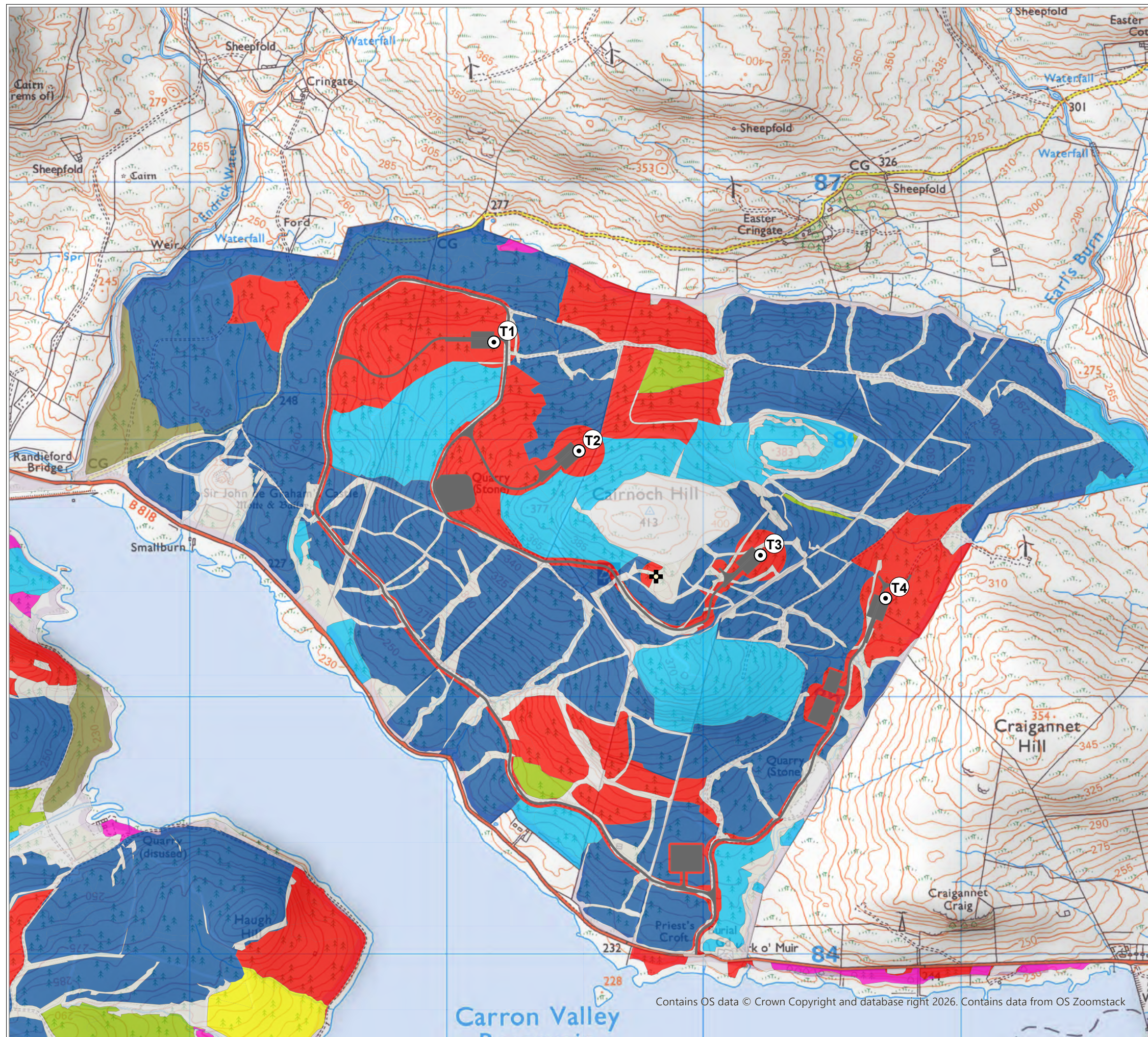
- ⊙ Turbines
- ⊕ Met Mast
- Infrastructure
- Site Boundary
- No Felling - Open Ground
- Infrastructure Felling
- Advanced Felling
- No Felling - Woodland



0 0.23 0.45 0.9 Kilometers
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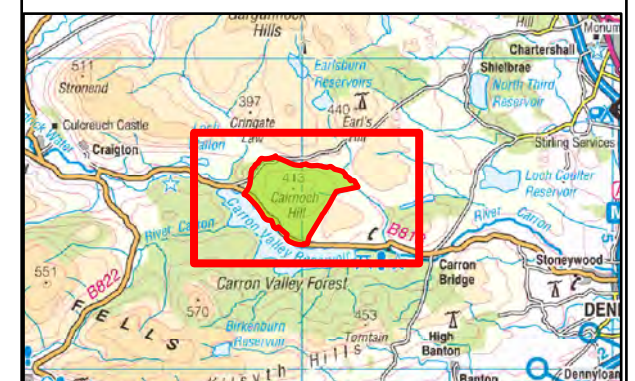


**Figure 3.2.7.
Proposed Development
Felling Phase Plan**

Author: Kimberly Winter
Date: 08/07/2026
Scale 1:15,000

Legend

- ⊙ Turbines
- ⊕ Met Mast
- ▬ Infrastructure
- Open Ground
- Phase 1: 2026: 2030
- Phase 2: 2031-2035
- Phase 3: 2036 - 2040
- Phase 4: 2041 - 2045
- Outside Plan Period
- Natural Reserve
- LISS
- Long Term Retention



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Technical Appendix 3.3: Connection to the Electricity Grid – Raeshaw Farms Judgement

Cairnoch Hill Wind Farm

Eurowind Energy Limited

58 Morrison Street, Edinburgh, Scotland, EH3 8BP

Prepared by:

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The Tun, 4 Jackson's Entry, Edinburgh, EH8 8PJ

SLR Project No.: 428.V12085.00001

3 August 2026

Revision: 1

Revision Record

Revision	Date	Prepared By	Checked By	Authorised By
1	3 August 2026	A. Smith	D. McCaughie	A. Smith

Basis of Report

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1.0 Connection to the Electricity Grid – Raeshaw Farms Judgement

The Court of Session, on 17 February 2026, issued its judgment in *Raeshaw Farms Limited v Scottish Ministers and Energiekontor* [2026] CSIH 10. The Court confirmed that decision makers must evaluate, on a project by project and on a fact-specific basis, whether a wind farm and its grid connection form a single project for the purposes of Environmental Impact Assessment (“EIA”), taking into account various factors.

The Court did not require that all elements of a project be subject to a single consent application. Instead, the Court confirmed that grid connection infrastructure and a wind farm may form part of a single project with regards to EIA, whilst having separate applications for consent and being considered under separate consenting processes.

When it comes to evaluating what constitutes an EIA project, the Court of Session made reference to a non-exhaustive list of relevant factors set out in the case of *R (Wingfield) v Canterbury City Council* [2020] JLP 154. These factors were subsequently endorsed in the Court of Appeal case of *R (Ashchurch Rural Parish Council) v Tewkesbury Borough Council* [2023] EWCA Civ 101; [2023] Env LR 25. These relevant factors are set out in **Table 1** below, alongside commentary relative to the proposed Cairnoch Hill Wind Farm (“the Proposed Development”).



Table 1: Consideration of the Proposed Development against Relevant Factors set out in *R (Wingfield) v Canterbury City Council* [2020] JLP 154

Relevant Factor	Definition ¹	Commentary
Common ownership	Where two sites are owned or promoted by the same person, this may indicate that they constitute a single project.	The Proposed Development and the grid connection are under different ownership; the Proposed Development will be owned by Eurowind Energy Limited and the grid connection would be owned by SP Energy Networks.
Simultaneous determination	Where two applications are considered and determined by the same committee on the same day and subject to reports which cross refer to one another, this may indicate that they constitute a single project.	The Proposed Development and the grid connection will not be brought forward at the same time and are subject to separate consenting processes. There may be an element of information sharing between the Proposed Development and the grid connection applications, however in the absence of an identified grid route and type of asset (overhead line/underground cable), the degree of this information sharing is unknown at this time.
Functional interdependence	Where one part of a development could not function without another, this may indicate that they constitute a single project.	The Proposed Development would not be able to export electricity to the grid without the grid connection and so would not be able to operate. The Proposed Development is therefore functionally interdependent on the grid connection.
Stand-alone projects	Where a development is justified on its own merits and would be pursued independently of another development, this may indicate that it constitutes a single individual project that is not an integral part of a more substantial scheme.	There is no ability to know whether the grid connection for the Proposed Development would only serve the Proposed Development (i.e. the grid connection could serve just the Proposed Development or a number of projects including the Proposed Development).

¹ These definitions are presented as set out in the *Raeshaw Farms* judgement.



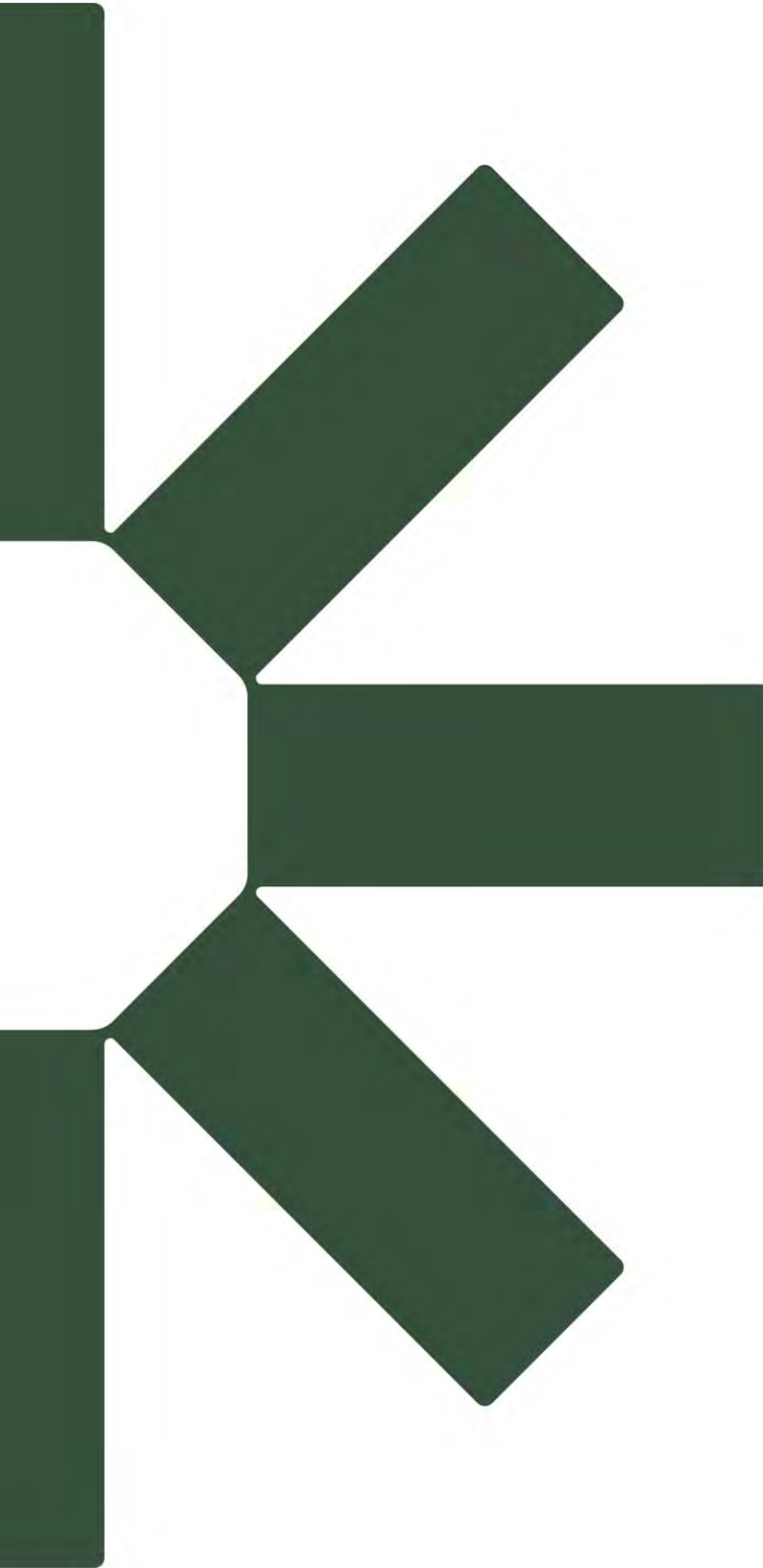
The factors set out in the *Wingfield* case are not intended to be determinative in that the presence of one or more of the factors set out does not automatically confirm that the Proposed Development and the grid connection form one EIA project. Similarly, there is no hierarchy to these tests, and no single factor should be considered determinative.

The absence of common ownership and simultaneous determination suggest the Proposed Development and the grid connection may not constitute one EIA project. The functional interdependence between the Proposed Development and the grid connection indicate that they may constitute one EIA project. The uncertainty as to whether the grid connection would serve multiple projects indicates that no conclusion can be drawn, based on this factor, on whether the Proposed Development and the grid connection should be considered stand-alone projects.

On the basis of the above, there are two conclusions that could be reached by Stirling Council:

- The Proposed Development and grid connection form one EIA project, or
- The Proposed Development and grid connection form separate projects in EIA terms (of which both projects (separately), or just one of the projects are considered to require EIA).





Making Sustainability Happen



Technical Appendix 4.1: Legislation, Planning Policy and Guidance

Cairnoch Hill Wind Farm

Eurowind Energy Limited

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Prepared by:

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SLR Project No.: 428.V12085.00001

3 August 2026

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1.0 Introduction

This Technical Appendix provides a summary of the relevant legislation, planning policy and guidance applicable to each technical discipline assessed within the Environmental Impact Assessment (EIA) Report for the Cairnoch Hill Wind Farm.

The appendix supports the assessment presented within the EIA Report by identifying the legislative and policy framework against which the Proposed Development has been assessed. It is structured to align with the technical chapters of the EIA Report and includes the following topic areas:

- EIA;
- Landscape and Visual Amenity;
- Ecology;
- Ornithology;
- Hydrology, Hydrogeology, Geology and Soils;
- Cultural Heritage and Archaeology;
- Site Access, Traffic and Transport;
- Noise;
- Aviation; and
- Other Environmental Issues.

Planning policy and legislation is also covered in **Chapter 4: Policy Context** of the EIA Report.

2.0 EIA

2.1 Legislation

The assessment is carried out in accordance with the following relevant EIA legislation:

- National Planning Framework 4 2023;
- Town and Country Planning (Scotland) Act 1997; and
- The Town and Country Planning (Environmental Impact Assessment) (Scotland) Regulations 2017.

2.2 Guidance

This assessment is carried out in accordance with the principles contained within the following documents:

- Onshore Wind: Policy Statement 2022;
- National Planning Framework 4 2023;
- Planning Advice Note (PAN) 1/2013 Environmental Impact Assessment (2013);
- Institute of Environmental Management and Assessment (IEMA). Environmental Impact Assessment Guide to Shaping Quality Development (2015);
- Institute of Environmental Management and Assessment (IEMA) Delivering Quality Development (2016);
- Institute of Environmental Management and Assessment (IEMA) Delivering Proportionate EIA: A Collaborative



Strategy for Enhancing UK Environmental Impact Assessment Practice (2017);

- Planning Circular 1/2017: Environmental Impact Assessment regulations; and
- NatureScot / Scottish Natural Heritage (SNH) (2018) Environmental Impact Assessment Handbook: Guidance for Competent Authorities, Consultation bodies and others involved in the Environmental Impact Assessment Process in Scotland (5th Edition).

3.0 Landscape and Visual

3.1 Legislation

The landscape and visual assessment has been undertaken in accordance with the following legislation:

- The Town and Country Planning (Environmental Impact Assessment) (Scotland) Regulations 2017 hereafter referred to as ‘the EIA Regulations’).

3.2 Policy

3.2.1 National Policy

The following planning policy documents that are of particular relevance to the Landscape and Visual Amenity Chapter are:

- Scottish Government, (2023). National Planning Framework 4 (NPF4);
- Scottish Government, (2022). Onshore Wind Policy Statement 2022; and
- Scottish Government, (2017). Scottish Energy Strategy: The future of energy in Scotland.

3.2.2 Local Policy

The following local planning policy documents were relevant to the Landscape and Visual chapter:

- Stirling Council (2018). Stirling Local Development Plan (LDP);



- Stirling Council. (2019) Supplementary Guidance: Wind Energy Developments; and
- Stirling Council. (2019) Draft Supplementary Guidance: Landscape Character Assessment.

3.3 Guidance

Other documents and guidance reviewed and applied in the landscape and visual assessment are outlined below (see also 'References' Section at the end of the Landscape Chapter):

- Landscape Institute and IEMA (2013). Guidelines for Landscape and Visual Impact Assessment. Third Edition ('GLVIA3');
- Landscape Institute (2024). Notes and Clarifications on Aspects of Guidelines for Landscape and Visual Impact Assessment Third Edition (GLVIA3);
- NatureScot (2017). Visual Representation of Wind Farms. Version 2.2;
- NatureScot (2021). Guidance - Assessing the cumulative landscape and visual impact of onshore wind energy developments;
- NatureScot (2017). Siting and Designing of Wind farms in the Landscape: Version 3a;
- NatureScot (2025). Guidance for Assessment of Effects on Special Landscape Qualities (AESLQ);
- Landscape Institute (2019). Technical Guidance Note 2/19 Residential Visual Amenity Assessment;

- NatureScot (2024). Guidance on Aviation Lighting Impact Assessment;
- Landscape Institute (2011). Advice Note 01/11 Photography and Photomontage in Landscape and Visual Impact Assessment; and
- Landscape Institute (2019). Visual representation of development proposals. Technical Guidance Note 06/19.



4.0 Ecology

4.1 Legislation

The ecological assessment has been undertaken with reference to the following legislation:

- The Town and Country Planning (Environmental Impact Assessment) (Scotland) Regulations 2017;
- Conservation (Natural Habitats, &c.) Regulations 1994 (the 'Habitats Regulations');
- Wildlife and Countryside Act 1981 (the 'WCA');
- The Nature Conservation (Scotland) Act 2004;
- The Wildlife and Natural Environment (Scotland) Act 2011 (WANE Act);
- Protection of Badgers Act 1992; and
- Council Regulation (EU) No 1143/2014 on Invasive Alien Species (the Invasive Species Regulation).

4.2 Policy

4.2.1 National Policy

The following national planning policy documents that are of particular relevance to the Ecology Chapter are:

- National Planning Framework (NPF4), February 2023, Scottish Government; and

- The Scottish Biodiversity List (SBL).

4.2.2 Local Policy

The following local planning policy documents that are of relevance to the Ecology Chapter are:

- Stirling Council (2018). Stirling Local Development Plan (LDP);
- Stirling Council. Biodiversity Duty Reports (as applicable); and
- Scottish Biodiversity List. (SBL).

4.3 Guidance

Other documents and guidance reviewed and applied in the ecological assessment are outlined below (see also 'References' Section at the end of the Ecology Chapter):

- Guidelines for Ecological Impact Assessment (EclIA) in the UK and Ireland (CIEEM, 2022);
- Biodiversity Net Gain – Good Practice Principles for Development. A Practical Guide (CIRIA C776a, 2019);
- Advising on Peatland, Carbon-rich Soils and Priority Peatland Habitats in Development Management (NatureScot, 2026);
- Guidance on Assessing the Impacts of Development Proposals on Groundwater Abstractions and Groundwater Dependent Terrestrial Ecosystems (GWDTEs) (SEPA, 2017);



- Bats and onshore wind turbines – survey, assessment and mitigation (NatureScot 2021);
- Planning for development: What to consider and include in deer assessments and management at development sites (SNH, 2016);
- Circular 1/2017: Environmental Impact Assessment Regulations (Scottish Government, 2017);
- NatureScot pre-application guidance for onshore wind farms (NatureScot, 2025); and
- Guidance on Establishing and Managing Local Nature Conservation Site (LNCS) Systems in Scotland – 2023 update (NatureScot, 2024b).

5.0 Ornithology

5.1 Legislation

The ornithology assessment has been undertaken in line with the following European legislation:

- The Wildlife and Countryside Act 1981;
- Conservation (Natural Habitats, &c.) Regulations 1994;
- European Union (EU) Council Directive 79/409/EEC and 2009/147/EC on the Conservation of Wild Birds (the 'Birds Directive');
- EU Council Directive 92/43/EEC on the Conservation of Natural Habitats and of Wild Fauna and Flora (the 'Habitats Directive');
- The Conservation (Natural Habitats, &c.) Amendment (Scotland) Regulations 2004 (as amended), which implements the Birds and Habitats Directives into Scottish Law;
- The Conservation of Habitats and Species (Amendments) Regulations 2017, relating to matters in Scotland;
- Environmental Impact Assessment Directive 85/337/EEC (the EIA Directive);
- The Nature Conservation (Scotland) Act 2004 (as amended);
- The Wildlife and Natural Environment (Scotland) Act 2011; and



- The Town and Country Planning (Environmental Impact Assessment) (Scotland) Regulations 2017.

5.2 Policy

5.2.1 National Policy

The following planning policy documents that are of particular relevance to the Ornithology Chapter are:

- National Planning Framework 4 (NPF4) – sets out the spatial principles, regional priorities, national developments and national planning policy;
- Planning Advice Note (PAN) 1/2013 – Environmental Impact Assessment (Scottish Government 2013); and
- PAN 60: Planning for Natural Heritage (Scottish Government 2000).

5.3 Guidance

The ornithological assessment is carried out in accordance with the principles contained within the following documents:

- Planning Circular 1/2017; Environmental Impact Assessment Regulations. Guidance on The Town and Country Planning (Environmental Impact Assessment) (Scotland) Regulations 2017 (Scottish Government, 2017);
- 'Managing Natura 2000 Sites' (European Communities 2000;

- Guidelines for Ecological Impact Assessment in the UK and Ireland; Terrestrial, Freshwater and Coastal (CIEEM 2024);
- Recommended bird survey methods to inform impact assessment of onshore wind farms (SNH 2017);
- Developing field and analytical methods to assess avian collision risk at wind farms (Band *et al.* 2007);
- NatureScot guidance on using an updated collision risk model to assess bird collision risk at onshore wind farms (Band 2024);
- Avoidance rates for the onshore SNH collision risk model (NatureScot 2025);
- Assessing the significance of impacts on bird populations from onshore wind farms that do not affect protected areas (NatureScot 2025);
- Assessing the cumulative impact of onshore wind farms on birds (NatureScot 2025);
- Assessing connectivity with Special Protection Areas (SPAs) (SNH 2016a);
- Environmental Statements and Annexes of Environmentally Sensitive Bird Information Guidance for Developers, Consultants and Consultees. Version 2 (SNH 2016b);
- Good Practice during Wind Farm Construction (Scottish Renewables *et al.* 2019);



- Birds of Conservation Concern (BoCC) 5: the Population Status of Birds in the United Kingdom, Channel Islands and the Isle of Man (Stanbury *et al.* 2021);
- The Joint Nature Conservation Committee's, The UK Biodiversity Framework 2024;
- The Scottish Biodiversity List (SBL) (NatureScot 2020: <https://www.nature.scot/doc/scottish-biodiversity-list>; and
- Scottish Biodiversity Strategy to 2045 Biodiversity: delivery plan 2024 to 2030.

6.0 Hydrology, Hydrogeology, Geology and Soils

6.1 Legislation

This assessment is carried out in accordance with the principles contained within the following legislation:

- Environmental Authorisations (Scotland) Regulations 2018 (EASR);
- Environmental Protection Act 1990;
- European Union (EU) Drinking Water Directive (98/83/EC);
- EU Water Framework Directive (WFD) (2000/60/EC);
- Private Water Supplies (Scotland) Regulations 2006;
- The Environment Act 1995;
- The Flood Risk Management (Scotland) Act 2009;
- The Water Intended for Human Consumption (Private Supplies) (Scotland) Regulations 2017;
- The Water Supply (Water Quality) (Scotland) Regulation 2001; and
- Water Environment and Water Services (Scotland) Act 2003 (WEWS Act).



6.2 Policy

6.2.1 National Policy

National Planning Framework 4 (NPF4) adopted by the Scottish Government on 13 February 2023 provides planning guidance and policies regarding sustainable development, tackling climate change and achieving net zero. Policies relevant to the Hydrology, Hydrogeology, Geology and Soils Chapter include:

- Policy 5 (Soils);
- Policy 11 (Energy);
- Policy 20 (Blue and Green Infrastructure); and
- Policy 22 (Flood Risk and Water Management).

6.2.2 Local Policy

The Stirling Local Development Plan (LDP) (2018) provides the planning framework for the Stirling Council area and sets out policies relevant to the protection of the water environment, soils and flood risk. The following policies are of relevance to the Hydrology, Hydrogeology, Geology and Soils assessment:

- Primary Policy 5: Flood Risk Management;
- Primary Policy 12: Renewable Energy;
- Primary Policy 13: The Water Environment; and
- Primary Policy 14: Soil Conservation and Agricultural Land.

6.3 Guidance

Other documents and guidance reviewed and applied in the Hydrology, Hydrogeology, Geology and Soils assessment are outlined below (see also 'References' Section at the end of the Hydrology, Hydrogeology, Geology and Soils Chapter):

6.3.1 Planning Advice Notes (PANs), published by the Scottish Government, including;

- PAN 50 Controlling the Environmental Effects of Surface Mineral Workings;
- PAN 61 Planning and Sustainable Urban Drainage Systems; and
- PAN 69 Planning and Building Standards Advice on Flooding.

6.3.2 SEPA Pollution Prevention Guidance Note (PPG) and Guidance for Pollution Prevention (GPP)

- GPP01: Understanding your Environmental Responsibilities – Good Environmental Practices;
- GPP02 Above Ground Oil Storage;
- GPP03 Use and Design of Oil Separators in Surface Water Drainage Systems;
- GPP05 Works and Maintenance in or near Water;
- GPP06 Working on Construction and Demolition Sites;
- GPP08 Safe Storage and Disposal of Used Oils;



- GPP13 Vehicle Washing and Cleaning;
- GPP18 Containing Major Spillages and Firewater at Industrial Sites;
- GPP21 Pollution Incident Response Planning; and
- GPP22 Dealing with Spills.

6.3.3 Construction Industry Research and Information Association (CIRIA) Publications

- C532 Control of Water Pollution from Construction Sites, 2001;
- C811 Environmental Good Practice on Site Guide, 2015;
- R179 Ground Engineering Spoil: Good Management Practice, 1997;
- C753 The Sustainable urban Drainage Systems (SuDS) Manual, 2015; and
- C624 Development and Flood Risk – Guidance for the Construction Industry (2004).

6.3.4 SEPA Publications

- Climate Change Allowances for Flood Risk Assessment in Land Use Planning, Version 6, 2025
- EASR Guidance: Engineering: Activity Guide: Crossings, WAT-G-024, 2025;
- Flood Risk and Land Use Vulnerability Guidance, 2024;

- Groundwater Protection Policy for Scotland, Version 3, 2009;
- Guidance on Assessing the Impacts of Development on Groundwater Abstractions, 2024;
- Guidance on Assessing the Impacts of Development on Groundwater Dependent Terrestrial Ecosystems, 2024;
- Planning Advice Note: Assessing the impact of developments on peatland and carbon rich soils, 2026;
- Recommended Riparian Corridor Layer for use in Land Use Planning, 2024; and
- Standing Advice on peaty soils, 2025.

6.3.5 Other Guidance

- Scottish Government, Proposed Electricity Generation Developments: Peat Landslide Hazard Best Practice Guide, 2017;
- A joint publication by Scottish Renewables, Scottish Natural Heritage (now NatureScot), Scottish Environment Protection Agency, Forestry Commission Scotland and Historic Environment Scotland, Good Practice during Windfarm Construction, 2024;
- NatureScot, Advising on peatland, carbon-rich soils and priority peatland habitats in development management, 2023;
- Scottish Government, Guidance on Development on Peatland, Peatland Survey, 2017; and



- British Standards Institution, Assessing and Managing Flood Risk in Development – Code of Practice, Report BS-8533:2017, 2017.

7.0 Cultural Heritage and Archaeology

7.1 Legislation

The principal relevant legislation comprises:

- The Ancient Monuments and Archaeological Areas Act 1979;
- The Planning (Listed Buildings and Conservation Areas) (Scotland) Act 1997; and
- The Historic Environment (Amendment) (Scotland) Act 2011.

7.2 Policy

7.2.1 National Policy

The Scottish Government and Historic Environment Scotland (HES) have issued several statements of policy with respect to dealing with the historic environment in the planning system:

- National Planning Framework 4;
- Onshore Wind Turbines: Planning Advice (2014);
- Historic Environment Circular, April 2019;
- Our Past, Our Future (2023);
- Historic Environment Policy for Scotland (HEPS) May 2019; and
- Planning Advice Note 2/2011: Planning and archaeology.



7.2.2 Local Policy

The LDP (2018) sets out policies for the protection and management of the historic environment within the Stirling Council area. The following policies are of relevance to the cultural heritage and archaeology assessment:

- Primary Policy 7: Historic Environment; and
- Primary Policy 12: Renewable Energy.

7.3 Guidance

Four relevant pieces of guidance have been published by HES, by HES in conjunction with NatureScot, and by the professional archaeological body the Chartered Institute for Archaeologists. These publications are:

- Historic Environment Scotland guidance on Managing Change in the Historic Environment: Setting 2020;
- A Guide to Climate Change Impact: On Scotland's Historic Environment (2019);
- Chartered Institute for Archaeologists Standard and Guidance for Historic Environment Desk Based Assessment 2020; and
- NatureScot / Scottish National Heritage (SNH) and Historic Environment Scotland Environmental Impact Assessment Handbook: Guidance for competent authorities, consultation bodies, and others involved in the Environmental Impact Assessment Process in Scotland 2019.

8.0 Traffic and Transport

8.1 Legislation

- The Town and Country Planning (Environmental Impact Assessment) (Scotland) Regulations 2017;
- The Road Vehicles (Construction and Use) Regulations (1986); and
- The Road Vehicles (Authorisation of Special Types) (General) Order 2003.

8.2 Policy

8.2.1 National Policy

The National Planning Framework (NPF) is a long-term plan for Scotland that sets out where development and infrastructure is needed in the country. NPF4 sets out the Government's plan looking forward to 2045 that will guide spatial development, set out national planning policies, designate national developments and highlight regional spatial priorities. It is part of the development plan, and so influences planning decisions across Scotland.

Policy 11: Energy within the NPF4 notes that:

Development proposals for all forms of renewable, low-carbon and zero emissions technologies will be supported. These include:

- Wind farms including repowering, extending, expanding and extending the life of existing wind farms;



- Energy storage, such as battery storage and pumped storage hydro.
- In addition, project design and mitigation will demonstrate how the following impacts are addressed;
- Impacts on communities and individual dwellings, including, residential amenity, visual impact, noise and shadow flicker;
- Public access, including impact on long distance walking and cycling routes and scenic routes;
- Impacts on road traffic and on adjacent trunk roads, including during construction; and
- Cumulative impacts.

NPF4 puts the climate and nature crises at the heart of the Scottish planning system and was adopted in February 2023.

8.2.2 Local Policy

The Stirling Local Development Plan (LDP) (2018) sets out policies relevant to transport, infrastructure and access within the Stirling Council area. The following policies are of relevance to the traffic and transport assessment:

- Primary Policy 12: Renewable Energy.

8.3 Guidance

8.3.1 Institute of Environmental Management and Assessment (IEMA) Guidelines: Environmental Assessment of Traffic and Movement (2023)

This document provides “*practitioners with good practice advice on how to carry out the assessment of traffic and movement of people as part of a statutory EIA or non-statutory environmental assessment*”.

8.3.2 Transport Assessment Guidance (2012)

Transport Scotland’s (TS) Transport Assessment Guidance was published in 2012. It aims to assist in the preparation of Transport Assessments (TA) for development proposals in Scotland such that the likely transport impacts can be identified and dealt with as early as possible in the planning process. The document sets out requirements according to the scale of development being proposed.

“Transport Assessment (TA) will assist local planning authorities to appraise the operational implications of a development within the context of the Local Development Plan. The TA report will permit the transport implications of a proposed development to be considered and will identify any measures required to enable a more sustainable and environmentally efficient proposal. The TA will also assist the relevant Roads Authority or Scottish Government to consider any issues relating to transport and traffic operations on the network.”



9.0 Noise

9.1 Legislation

In the UK, noise and vibration and nuisance are controlled using:

- The Environmental Protection Act 1990 (EPA); and
- The Control of Pollution Act 1974 (CoPA).

9.2 Policy

9.2.1 National Policy

9.2.1.1 National Planning Framework (NPF) 4

Adopted in early 2023, NPF4 Policy 11 Energy, part e, states that, “...*project design and mitigation will demonstrate how the following impacts are addressed: (i) impacts on communities and individual dwellings, including, residential amenity, visual impact, noise and shadow flicker....*”.

Policy 23 states that, “*Development proposals that are likely to raise unacceptable noise issues will not be supported. The agent of change principle applies to noise sensitive development. A Noise Impact Assessment may be required where the nature of the proposal or its location suggests that significant effects are likely.*”

9.2.1.2 Planning Advice Note (PAN) 1/2011

PAN 1/2011, ‘Planning and Noise’ (Scottish Government, 2011) states that there are two sources of noise from wind turbines, the mechanical noise from the turbines and the aerodynamic noise from

the blades. The document states that “*good acoustical design and siting of turbines is essential to minimise the potential to generate noise*”.

The document (at paragraph 29) refers to web-based Scottish Government planning advice on renewable technologies for onshore wind turbines; however, no other guidance or reference to wind turbine noise is made within PAN 1/2011.

9.2.2 Local Policy

The Stirling Local Development Plan 2 (LDP2) (2018) sets out policies relevant to environmental protection, including noise and amenity considerations. The following policies are of relevance to the noise assessment:

- Primary Policy 12: Renewable Energy.

9.3 Guidance

9.3.1 Construction Noise Guidance

9.3.1.1 BS5228-1:2009+A1:2014

BS5228-1:2009+A1:2014 sets out a methodology for predicting noise levels arising from a wide variety of construction activities and it contains tables of sound power levels generated by mobile and fixed plant.

Annex E of BS5228-1:2009+A1:2014 gives several examples of acceptable limits for construction noise, the most simplistic being based upon the exceedance of fixed noise limits. In this respect, Section E.2 of the standard states: “*Noise from construction sites*”



should not exceed the level at which conversation in the nearest building would be difficult with the windows shut”.

The assessment of construction noise associated with the proposed development is based on the following fixed limit from BS5228-1:2009+A1:2014, which is applicable for rural areas away from main road traffic and industrial noise and outside living rooms during the daytime period:

- Noise levels, between 07.00 and 19.00 hours, outside the nearest window of the occupied room closest to the site boundary, should not exceed 70dB(A).

9.3.2 Construction Traffic Noise Guidance

9.3.2.1 Design Manual for Roads and Bridges

Noise generated by construction traffic is assessed following the guidance within Part 7 of DMRB. DMRB states that *“a change in noise level of 1dB is equivalent to a 25% increase or 20% decrease in traffic flows, assuming all other factors remain unchanged”*.

DMRB also provides advice on the magnitude of effects associated with increases in total traffic flows and associated noise levels. Paragraph 3.37 of DMRB states that *“a change in road traffic of 1dB LA10,18h in the short term (e.g. when a project is opened) is the smallest that is considered perceptible”*.

9.3.3 Operational and Cumulative Noise Guidance

9.3.3.1 Assessment and Rating of Wind Turbine Noise

Assessment and Rating of Wind Turbine Noise (ARWTN) was published by the UK Government Department of Energy Security and Net Zero (DESNZ) on the 19th of June 2026. The guidance document was developed with advice from a group of wind turbine noise specialists which formed a Technical Advisory Team and was externally peer reviewed by a number of interested parties including, amongst others, Environmental Health professionals, representatives from the UK, Welsh, Scottish and Northern Irish Governments, the Institute of Acoustics, wind farm developers and independent acoustic consultants. The document is an update and replacement of the previous guidance ETSU-R-97 ‘The Assessment and Rating of Noise from Wind Farms.’

The noise assessment criteria contained within ARWTN are *‘consistent with the UK’s statutory commitment to achieve net zero greenhouse gas emissions by 2050, supporting the deployment of renewable energy infrastructure while ensuring that potential adverse impacts on people are appropriately limited.’*

Where wind turbine noise is expected to be below 35 dB LA90, background sound levels do not need to be recorded and a simplified Total Noise Assessment Criteria (TNAC) of 35 dBA up to wind speeds of 10 m/s can be used. In this regard ARWTN states that: *‘a simplified total noise assessment criterion (TNAC) of 35 dB (up to a wind speed of 10 m/s) can be set without relating the assessment criteria to a margin above background sound levels. This applies during both day and night. This would not require the measurement of background sound levels. This criterion is*



particularly suitable for single or smaller scale turbines or cases where a large setback distance exists between turbines and neighbouring properties'

The ARWTN assessment procedure specifies that where wind turbine noise is expected to be above the simplified TNAC of 35 dB LA90, noise limits should be set relative to:

- A Lower Limiting Value (LLV) where background sound levels are low; or
- 5 dBA above the typical background sound levels determined in accordance with ARWTN.

Different LLVs apply during the day and night periods for noise sensitive receptors where the occupiers do not have a financial involvement with the wind farm development:

- For day periods, the LLV is set in the range from 35 to 40 dB; and
- For night periods, the LLV is set to 43 dB.

The choice of daytime LLV in within the range 35-40 dB is determined based on three factors which consider the planning impacts and merits of the wind farm(s) in relation to noise. The three factors are presented below in priority order (i.e. the largest weight should be given to the first factor):

- *The generating capacity of the wind farm and the likely consequence that the choice of LLV would have on the energy generation of the wind farm(s).*

- *The number of dwellings in the neighbourhood of the wind farm(s) and the magnitude of the levels to which these are exposed.*
- *The duration and level of exposure to wind turbine noise of dwellings in the neighbourhood of the wind farm(s).*

The chosen LLV is applicable to all NSRs in the vicinity. The only exception being those NSRs where the occupier is financially involved with the wind farm development or a nearby scheme. In this regard, paragraph 2.29 of ARWTN states:

'The LLV used to define the noise assessment criteria can be increased to 45 dB for both day and night periods where the occupier (whether owner-occupiers or tenants) of the property has a financial involvement in the wind farm.'

The daytime noise assessment criteria is derived from background sound data measured during so-called 'quiet periods of the day', which comprise weekday evenings (18:00 to 23:00), Saturday afternoons and evenings (13:00 to 23:00) and all day and evening on Sundays (07:00 to 23:00).

Multiple samples of 10 minute background sound levels using the LA90,10min measurement index are logged continuously over a range of wind speed conditions. These measured noise levels are then plotted against concurrent wind speed data and a 'best fit' curve is fitted the data to establish the background sound level as a function of wind speed. The TNAC, is then set at a level 5 dBA above the best fit curve over the 0 - 10 m/s wind speed range; subject to an appropriate daytime LLV.

The night-time noise limit is derived from background sound data measured during the night-time periods (23:00 to 07:00), with no



differentiation being made between weekdays and weekends. The 10 minute LA90 noise levels measured over the night-time periods are plotted against concurrent wind speed data and a 'best fit' correlation is established. The night-time TNAC is also based on a level 5 dBA above the best fit curve over the 0 - 10 m/s.

In some instances, it can be appropriate to define daytime and night-time noise limits which are not a function of background sound levels and are simply flat LLV values across the entire wind speed range.

The TNAC is the limit to which all cumulative schemes need to operate within at each assessed receptor. A separate set of Site Specific Noise Limits (SSNLs) specific to a proposed development are also derived based on guidance contained within ARWTN.

9.3.3.2 Institute of Acoustics Good Practice Guide to ETSU-R-97

The Scottish Government has formally endorsed the IOA GPG and the current (web-based) Scottish planning advice recommends that it is used for the assessment of wind turbine noise.

The IOA GPG does not replace the limits within ETSU-R-97, but it does provide good practice guidance on the use of the ETSU document in relation to background noise surveys and on the prediction of wind turbine noise. This is on the proviso that the appropriate input parameters and correction factors are used for the prediction of wind turbine noise, as follows:

- Downwind propagation;
- A receptor height of 4m;

- Atmospheric conditions of 10°C and 70% humidity;
- A ground absorption factor of $G = 0.5$; and
- Turbine noise emission levels which include a margin for uncertainty.

9.3.3.3 ISO 9613-2:2024 Prediction Method

The noise generated by the operation of a wind farm is predicted in accordance with ISO 9613-2:2024 (International Organisation for Standardisation, 2024), as recommended by the IOA GPG and as shown below:

Predicted Octave Band Noise Level = $L_w - A_{div} - A_{atm} - A_{gr} - A_{bar} - A_{misc}$

(Where L_w is the octave band Sound Power Level (SWL) in decibels (dB) and A represents the various attenuation factors, also in dB)

The attenuation factors indicated in the above formula are detailed as follows:

A_{div} is the attenuation due to geometric divergence. This is the reduction in noise levels caused by the spherical spreading of the noise over distance from the point source. The attenuation factor, therefore, increases as the distance from the noise source increases.

A_{atm} is the absorption of the noise by the atmosphere as sound energy is converted to heat. The level of absorption varies depending on the distance from the source and the atmospheric conditions (temperature and humidity). ISO 9613-1:1993 (International Organisation for Standardisation, 1993) provides



appropriate air attenuation factors for differing atmospheric conditions. In line with the IOA GPG, atmospheric conditions of 10°C and 70% humidity are used within the propagation model “to represent a reasonably low level of air absorption”.

Agr is the ground factor and represents the reduction in noise levels due to the absorption of sound energy by ground cover. The level of reduction will vary significantly depending on the absorptive qualities of the ground cover. ISO 9613-1:1993 provides advice on appropriate attenuation factors based on a range of cover from hard ground ($G = 0$) to soft absorbent ground ($G = 1$). A ground factor of 0.5 is assumed in the predictions of operational wind turbine noise. This is in accordance with the IOA GPG (paragraph 4.3.4), which recommends that a ground factor of 0.5 is used for turbines with warranted Sound Power Levels (SWLs) or with emission levels which include a margin for uncertainty.

Abar relates to the attenuation due to the screening and reflection effects provided by obstacles between the source and receiver. The level of attenuation will vary depending on the degree by which the line of sight between source and receiver is affected and the frequency considered. In relation to wind farms, local topography would provide the largest influence on barrier effects; however, within the operational noise model, attenuation attributable to local topography is not included.

The predicted (LA_{eq}) noise levels for all turbines are totalled to provide an overall A-weighted noise level. A further correction of 2dB is subtracted to convert the LA_{eq} level to the LA_{90} as required for by ARWTN. This is reiterated in the IOA GPG (at paragraph 4.25, whereby ARWTN has now superseded ETSU-R-97) which states:

“To obtain the LA_{90} parameter required by ETSU-R-97, it is necessary to apply a correction to the prediction results. Based on recent research, the assumption described in ETSU-R-97 in this regard continues to remain valid. A correction of -2dB is commonly applied.”

9.3.3.4 Institute for Environmental Management and Assessment (IEMA) Guidelines

The noise assessment has also been undertaken with reference to the ‘Guidelines for Environmental Noise Impact Assessment’ (2014), produced by IEMA.



10.0 Aviation

10.1 Policy

10.1.1 National Policy

National Planning Framework 4

Policy 11: Energy, notes that *“project design and mitigation will demonstrate how the following impacts are addressed: (iv) impacts on aviation and defence interests including seismological recording”*.

10.1.2 Local Planning Policy

The Stirling Local Development Plan (LDP) (2018) sets out policies relevant to infrastructure and safeguarding considerations, including aviation. The following policies are of relevance to the aviation assessment:

- Primary Policy 12: Renewable Energy.

10.2 Guidance

- CAA, CAP 393: Air Navigation Order 2016 and Regulations, March 2019;
- CAA, CAP 670: Air Traffic Services Safety Requirements, Part B, Section 4, June 2019;
- CAA, CAP 738: Safeguarding of Aerodromes, 2006;
- CAA, CAP 764: CAA Policy and Guidelines on Wind Turbines, February 2016;

- CAA, Policy Statement: Lighting of Onshore Wind Turbine Generators in the United Kingdom with a maximum blade tip height at or in excess of 150m Above Ground Level, 2017; and
- NATS wind farm assessment criteria.



11.0 Other Environmental Issues

11.1 Policy

The following policy documents have been referred to in undertaking the assessments.

11.1.1 National Planning Framework (NPF4)

National Planning Framework 4 (2023), Policy 11, part e, states that:

“project design and mitigation will demonstrate how the following impacts are addressed:

i. impacts on communities and individual dwellings, including, residential amenity, visual impact, noise and shadow flicker;”

11.1.2 Local Planning Policy

The Stirling LDP (2018) sets out policies relevant to environmental protection, infrastructure and amenity considerations. The following policies are of relevance to other environmental issues:

- Primary Policy 4: Greenhouse Gas Reduction; and
- Primary Policy 12: Renewable Energy.

11.2 Guidance

11.2.1 Scottish Government Guidance

The Scottish Government’s online information on onshore wind turbines, states that *“under certain conditions of geographical*

position, time of day and time of year, the sun may pass behind the rotor and cast a shadow on neighbouring properties. When the blades rotate, the shadow flicks on and off, the effect is known as “shadow flicker”. It occurs only within buildings where the flicker appears through a narrow window opening. The seasonal duration of this effect can be calculated from the geometry of the machine and the latitude of the potential site.”

The Scottish Government’s advice states that where shadow flicker could be a problem, *“developers should provide calculations to quantify the effect. In most cases however, where separation is provided between wind turbines and nearby dwellings (as a general rule 10 rotor diameters) “shadow flicker” should not be a problem. However, there is scope to vary layout/reduce the height of turbines in extreme cases”*.

11.2.2 Planning and Best Practice

Planning guidance in the UK requires developers to investigate the impact of shadow flicker. This guidance does not specify how to assess the impact, or how to assess the significance of the impact. In Scotland current guidance is available in the Scottish Government Specific Renewables Advice Sheet on *“Onshore Wind Turbines”* (last updated May 2014) which replaced Planning Advice Note (PAN) 45, which is now revoked.

Onshore Wind Turbines (2014), states that:

“Under certain combinations of geographical position, time of day and time of year, the sun may pass behind the rotor and cast a shadow over neighbouring properties. When the blades rotate, the shadow flicks on and off; the effect is known as “shadow flicker”. It occurs only within buildings where the flicker appears through a



narrow window opening. The seasonal duration of this effect can be calculated from the geometry of the machine and the latitude of the potential site.

Where this could be a problem, developers should provide calculations to quantify the effect. In most cases however, where separation is provided between wind turbines and nearby dwellings (as a general rule 10 rotor diameters), "shadow flicker" should not be a problem. However, there is scope to vary layout / reduce the height of turbines in extreme cases".

In England, the National Planning Policy Framework (NPPF), Planning Practice Guidance identifies that: *"Only properties within 130 degrees either side of north, relative to the turbines can be affected at these latitudes in the UK – turbines do not cast long shadows on their southern side."*

Guidance from Northern Ireland in Best Practice Guidance to PPS18: Renewable Energy (Department for the Environment, 2009) states that:

"At distance, the blades do not cover the sun but only partly mask it, substantially weakening the shadow. This effect occurs first with the shadow from the blade tip, the tips being thinner in section than the rest of the blade. The shadows from the tips extend the furthest and so only a very weak effect is observed at distance from the turbines.

Problems caused by shadow flicker are rare. At distances greater than 10 rotor diameters from a turbine, the potential for shadow flicker is very low. The seasonal duration of this effect can be calculated from the geometry of the machine and the latitude of the site. Where shadow flicker could be a problem, developers should provide calculations to quantify the effect and where appropriate

take measures to prevent or ameliorate the potential effect, such as by turning off a particular turbine at certain times.

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".

The above criteria are widely accepted in shadow flicker analysis for wind farms. Additionally, the 10 rotor diameter rule has been widely accepted across different European countries, and is deemed to be an appropriate assessment area, although there is potentially a need to take into consideration areas at different latitudes.

11.2.3 Scottish Government Onshore Wind Policy Statement (2022)

Onshore Wind Policy Statement (2022) contains no specific guidance on assessment methodology for shadow flicker.

11.2.4 Department of Energy & Climate Change Guidelines (2011)

A report on shadow flicker from the Department of Energy & Climate Change (DECC) indicates a general rule of ten rotor diameters should be used for separation distance from a wind turbine position to a dwelling.



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Technical Appendix 6.1: Scoping Response Table

Cairnoch Hill Wind Farm

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01	03/08/2026	V. Ramirez	A. Smith	A. Smith



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Table 1-1: Summary of Scoping Responses

Consultee	Summary of Responses	Where Response is Addressed in EIA Report
Stirling Council Archaeologist 13 November 2024	<u>Archaeological Baseline and Fieldwork Requirements</u> The Stirling Council Archaeologist advises that baseline studies should be undertaken in line with Planning Advice Note (PAN) 2/2011, including both desk-based assessment and walkover survey within areas of proposed ground disturbance. These studies should identify known heritage assets and clarify the potential for previously unrecorded archaeological remains. In addition, the assessment should consider visual impacts on neighbouring heritage assets, in accordance with Managing Change in the Historic Environment: Setting guidance published by Historic Environment Scotland. <u>Scope of Assessment</u> The Archaeologist confirms that the assessment should include both designated and undesignated heritage assets, ensuring that the scope reflects the full range of receptors identified within the Historic Environment Record (HER) and aligns with current best practice guidance. <u>Mitigation Measures</u> The Archaeologist outlines a range of mitigation measures expected to be considered within the EIA, including: • Micro-siting of infrastructure to avoid sensitive archaeological features; • Marking or fencing off heritage assets during construction to prevent accidental damage; • Implementation of a programme of archaeological works, such as watching briefs or targeted excavation where required; and • Adoption of a written scheme of investigation (WSI) or working protocol in the event of unexpected archaeological discoveries. Furthermore, it was recommended that physical mitigation may include test-pitting in areas of archaeological potential, particularly where lithic material (e.g. quartz, chert or flint) may be present.	Chapter 11: Cultural Heritage and Archaeology



Consultee	Summary of Responses	Where Response is Addressed in EIA Report
Glasgow Airport 16 October 2024	<u>Aerodrome Safeguarding and Assessment Position</u> Glasgow Airport confirms that, at the current stage, its position on the Proposed Development cannot be finalised until further details are available. In particular, the Airport advises that a full safeguarding assessment will be undertaken once the final turbine specifications and layout are confirmed as part of a planning application. The consultee notes that the Proposed Development lies within the radar and instrument flight procedure safeguarding areas associated with the Airport. As a result, there is potential for impacts on aviation operations that require detailed technical evaluation at application stage. <u>Requirement for Further Assessment</u> Glasgow Airport indicates that a detailed safeguarding impact assessment will be required to determine whether the Proposed Development would have any adverse effects on aviation operations. This assessment will consider factors such as: • Potential impacts on radar systems; • Effects on instrument flight procedures; and • The implications of cumulative wind farm development in the wider area. The Airport advises that, should safeguarding conflicts be identified through this detailed assessment, it may raise an objection to the Proposed Development.	Chapter 14: Aviation
Stirling Council Transport Development Team 13 November 2024	<u>Traffic Assessment and Access Strategy</u> Stirling Council's Transport Development Team confirms that the proposed approach to traffic assessment is appropriate in principle and that the Environmental Impact Assessment (EIA) should include a Transport Assessment supported by relevant baseline traffic data. This assessment should consider the interaction of construction traffic with the surrounding local and strategic road network and clearly identify appropriate mitigation measures where required. The Council advises that construction traffic routes, including those for abnormal loads, should be clearly defined and supported by a detailed route assessment.	Chapter 12: Traffic and Transport Technical Appendix 15.2: Outline Access Management Plan



Consultee	Summary of Responses	Where Response is Addressed in EIA Report
	<u>Traffic Management and Mitigation Measures</u> Based on experience of similar developments, the Council expects that a Traffic Management Plan (TMP) will be required and secured as part of any future consent. This is likely to include: • Measures to manage construction traffic, including potential temporary speed restrictions on constrained sections of the road network; • Provision of mitigation works to accommodate abnormal loads, such as localised widening, passing places, and junction improvements; • Completion of a vehicle route assessment, including swept path analysis for turbine delivery vehicles; and • A road safety audit of any proposed highway mitigation works. The Council also notes that further detailed assessment may be required once turbine specifications and delivery requirements are finalised.	
	<u>Road Condition and Maintenance</u> The Transport Development Team advises that a pre-construction road condition survey should be undertaken, together with arrangements for ongoing monitoring of the public road network during the construction phase. Any deterioration attributable to construction traffic associated with the Proposed Development would require appropriate repair and reinstatement, secured through planning obligations or conditions.	
	<u>Cumulative Development Considerations</u> The Council highlights the need to account for cumulative traffic effects, particularly in relation to other large-scale developments in the area, including Durieshill and South Stirling Gateway, which are either consented or under construction. These developments are likely to increase baseline traffic flows and may place additional pressure on key junctions, including the M9 Junction 9 (Pirnhall Interchange). The cumulative assessment should therefore consider potential overlap in construction programmes and the combined effects of multiple developments on the road network.	



Consultee	Summary of Responses	Where Response is Addressed in EIA Report
	<u>Access and Outdoor Recreation</u> The Council notes that the Proposed Development may interact with core paths and rights of way in the surrounding area. The EIA should therefore assess potential impacts on outdoor access during construction, operation and decommissioning and identify appropriate mitigation where necessary. It is advised that an Access Management Plan (AMP) may be required and should be informed by relevant guidance, including NatureScot's A Brief Guide to Preparing an Outdoor Access Plan (2010). The AMP should address the management of access during all phases of the development, ensuring continued safe use of recreational routes where practicable.	
Historic Environment Scotland 30 September 2024	<u>Potential for Significant Effects on Heritage Assets</u> Historic Environment Scotland (HES) advises that, based on the information presented at the scoping stage, the Proposed Development has the potential to give rise to significant adverse effects on heritage assets within their statutory remit. HES notes that, subject to the findings of the Environmental Impact Assessment (EIA), the magnitude of potential impacts may be such that an objection could be raised. HES emphasises that their final position will be informed by a robust and comprehensive EIA, including appropriate visualisations and supporting analysis. <u>Assessment Methodology and Policy Framework</u> HES raises concerns regarding aspects of the proposed assessment methodology, noting in particular that the use of overlapping terminology (e.g. "cultural heritage significance" and "sensitivity") may reduce clarity. They advise that the methodology should be clear, consistent and aligned with established guidance, including the Historic Environment Policy for Scotland (HEPS). They further recommend that assessment should be undertaken in accordance with the NatureScot Environmental Impact Assessment Handbook and HES guidance on the setting of heritage assets, ensuring that impacts are assessed in a structured and transparent manner. HES also notes that references to policies from other planning authorities should be avoided and that the assessment should instead be clearly aligned with Stirling Council's policy framework.	Chapter 11: Cultural Heritage and Archaeology



Consultee	Summary of Responses	Where Response is Addressed in EIA Report
	<u>Setting, Intervisibility and Key Heritage Receptors</u> HES highlights that the Site forms part of a wider historic landscape, particularly in relation to prehistoric monuments and medieval castles located within the surrounding area. Cairnoch Hill is identified as an important landscape feature contributing to the setting of a number of assets, and the Proposed Development may alter the way in which these assets are experienced, understood and appreciated. Particular reference is made to scheduled monuments such as Sir John de Graham's Castle, as well as cairns and standing stone sites, where intervisibility and sightlines are key components of their cultural significance. HES advises that the assessment should specifically consider how the Proposed Development may alter these relationships. Additional assets have been identified for inclusion within the detailed assessment, including Dundaff Hill (SM6553), and HES recommends that viewpoints be selected to reflect key relationships between assets and the Site.	
	<u>Visualisations and Assessment Requirements</u> HES emphasises the importance of visualisations, including photomontages and wirelines, to support the assessment of setting effects. These should be designed to: • Illustrate views towards and from heritage assets; • Capture key approaches and sightlines; and • Demonstrate how turbines may appear in relation to the asset and its wider landscape setting. They also advise that vegetation and forestry should not be relied upon as permanent screening, given their temporary and dynamic nature.	
	<u>Cumulative Impact Assessment</u> HES highlights the importance of assessing cumulative effects, particularly in a landscape where existing and proposed wind energy developments are present. The assessment should: • Clearly define the baseline environment, including the presence of existing wind farms; • Identify how existing development has influenced the setting of heritage assets; and	



Consultee	Summary of Responses	Where Response is Addressed in EIA Report
	Assess the incremental change resulting from the Proposed Development in combination with other developments. The focus should be on identifying additional cumulative impacts arising specifically from the Proposed Development.	
Cumbernauld Airport / Cormack Aircraft Services Ltd 30 September 2024	<u>Aviation Safety and Operational Concerns</u> Cormack Aircraft Services Ltd, representing Cumbernauld Airport, raises concerns regarding the potential impact of the Proposed Development on aviation safety and operations, particularly for light aircraft. The consultee notes that the presence of wind turbines in the surrounding area may constrain available flight paths, reduce the availability of safe emergency landing locations, and introduce additional operational risk. It is highlighted that Cumbernauld Airport is located between the controlled airspace of Glasgow and Edinburgh Airports, resulting in aircraft operating within relatively constrained corridors. The introduction of additional wind turbines is therefore considered to further restrict these corridors and increase operational complexity for pilots. <u>Turbulence and Wake Effects</u> The consultee emphasises that wind turbines can generate wake turbulence, particularly in the vicinity of large rotor blades, which may pose a hazard to smaller aircraft. It is noted that such turbulence effects can extend beyond the immediate vicinity of turbines and should be considered as part of the aviation assessment. <u>Recommendation for Mitigation and Further Consideration</u> Cormack Aircraft Services Ltd advises that the Proposed Development should be carefully assessed in relation to its potential effects on aviation operations and that appropriate mitigation measures should be considered where necessary. The consultee suggests that development proposals should only proceed where aviation impacts can be appropriately managed and safety risks adequately addressed.	Chapter 14: Aviation



Consultee	Summary of Responses	Where Response is Addressed in EIA Report
NATS Safeguarding October 2024	<u>Potential Impacts on Radar Infrastructure</u> NATS advises that the Proposed Development has the potential to result in significant impacts on air traffic control radar systems within the region. In particular, the development may affect radar installations including Lowther Hill, Kincardine, and Edinburgh Terma radar systems. The consultee highlights that wind turbine structures can generate false radar returns (clutter) and reduce the probability of aircraft detection, which may impact the safe and effective operation of air traffic management systems. <u>Operational Implications for Air Traffic Control</u> NATS notes that these technical impacts could lead to operational challenges for air traffic controllers, including reduced situational awareness and increased complexity in managing aircraft movements. The potential effects on Prestwick Centre Air Traffic Control operations are identified as being of particular concern, with the impacts described as potentially unacceptable without appropriate mitigation. <u>Requirement for Further Assessment and Mitigation</u> While no impacts are anticipated on navigational aids or radio communication systems, NATS concludes that, in its current form, the Proposed Development presents a significant risk to radar performance. As such, further detailed technical assessment and engagement will be required to determine whether appropriate mitigation measures can be implemented to address these effects. The consultee advises that any subsequent application should include sufficient technical information to allow for a full safeguarding assessment and to demonstrate that impacts on aviation infrastructure can be appropriately managed.	Chapter 14: Aviation
Ministry of Defence / Defence Infrastructure Organisation	<u>Low Flying and Aviation Safeguarding</u> The Ministry of Defence (MOD) advises that the Proposed Development is located within a Low Flying Area (LFA 16) used for military training purposes. Within this area, fixed-wing aircraft may operate at altitudes as low as 76.2 metres above ground level, and the presence of wind turbines has the potential to introduce physical obstructions to these low-level flight operations.	Chapter 14: Aviation



Consultee	Summary of Responses	Where Response is Addressed in EIA Report
11 October 2024	The MOD notes that the Proposed Development could therefore pose a potential risk to aviation safety, and appropriate mitigation measures will be required to ensure safe operation within this designated training area. <u>Aviation Lighting Requirements</u> To address aviation safety considerations, the MOD requires that any consent for the Proposed Development should include appropriate aviation safety lighting. This would include the installation of MOD-accredited infra-red (IR) lighting on the turbines, in accordance with the requirements set out in the Air Navigation Order 2016. This lighting is necessary to ensure that turbine structures are visible to military aircraft operating within the area, particularly during low-level and night-time training operations. <u>Aircraft Charting and Safeguarding Information</u> The MOD also requires that sufficient information on the Proposed Development is provided to enable accurate aeronautical charting of the turbine locations and heights. This is necessary to support safe navigation and ensure that the turbines are appropriately reflected in aviation mapping and operational systems. <u>Further Engagement and Mitigation</u> The MOD advises that continued engagement will be required as the Proposed Development progresses, and that final agreement on mitigation measures will be necessary to ensure that impacts on military aviation operations are acceptable and appropriately managed.	
NatureScot 11 October 2024	<u>General Guidance and EIA Expectations</u> NatureScot advises that the Environmental Impact Assessment (EIA) should be undertaken in accordance with its pre-application guidance for onshore wind farms, including the checklist set out within Annex 1. The Environmental Impact Assessment Report (EIAR) should present a clear and proportionate assessment of environmental effects, supported by appropriate survey data and robust methodologies. <u>Designated Sites and Ecological Connectivity</u>	Chapter 7: Landscape and Visual Chapter 8: Ecology Chapter 9: Ornithology Chapter 10: Hydrology, Hydrogeology, Geology and Soils



Consultee	Summary of Responses	Where Response is Addressed in EIA Report
	NatureScot highlights the need to consider potential impacts on designated sites, including Special Areas of Conservation (SACs), Special Protection Areas (SPAs), Ramsar sites and Sites of Special Scientific Interest (SSSIs). The assessment should consider the potential effects of construction, operation and decommissioning on these sites, including indirect effects arising from ecological connectivity, such as hydrological or functional links between the Site and downstream or nearby designations. The EIAR should clearly identify likely significant effects on qualifying features and, where necessary, provide appropriate mitigation and/or compensation measures.	Technical Appendix 8.6: Outline Habitat Management Plan
	<u>Protected Species and Survey Requirements</u> NatureScot advises that surveys for protected species should be undertaken within an appropriate timeframe, typically no more than 18 months prior to submission, to ensure data remains representative of current baseline conditions. The EIAR should present survey results, evaluate potential impacts, and identify appropriate mitigation measures.	
	<u>Ornithology and Collision Risk</u> With respect to ornithology, NatureScot confirms that collision risk modelling (CRM) should be undertaken in accordance with established guidance, forming part of the Ecological Impact Assessment (EclA). They also confirm that two years of baseline survey data is appropriate for informing the ornithological assessment.	
	<u>Landscape and Visual Considerations</u> NatureScot considers the proposed Landscape and Visual Impact Assessment (LVIA) study area to be appropriate but emphasises the need for careful consideration of key design parameters, including turbine height, scale, blade rotation, and layout, to avoid visually complex or incoherent development patterns. They note that aviation lighting associated with the Proposed Development may be visible from elevated locations, including Ben Ledi, nearby upland areas, and potentially the Loch Lomond and The Trossachs National Park, and this should be assessed as part of the LVIA.	
	<u>Peat, Habitats and Hydrological Effects</u>	



Consultee	Summary of Responses	Where Response is Addressed in EIA Report
	NatureScot supports further peat probing and habitat survey work and advises that, where peatland or remnant peat habitats are present, additional assessment should be undertaken to understand peat depth and condition. They highlight that the assessment should consider secondary effects on habitat condition, including hydrological changes and vegetation impacts, with appropriate mitigation measures developed and presented within the EIAR. <u>Biodiversity Enhancement</u> In line with NPF4 Policy 3, NatureScot emphasises that the Proposed Development should not only mitigate impacts but also deliver biodiversity enhancement. They advise that clear and specific commitments to biodiversity enhancement and/or offsetting should be included within the EIAR and supporting documents, including the Habitat Management Plan (HMP).	
Scottish Environment Protection Agency (SEPA) 14 October 2024	<u>General Approach and EIA Requirements</u> SEPA confirms that it has no objection in principle to the Proposed Development, subject to the provision of sufficient information within the Environmental Impact Assessment (EIA). SEPA advises that, to avoid potential delays or objection, the Environmental Impact Assessment Report (EIAR) must clearly demonstrate that the project design has followed the mitigation hierarchy of avoiding, minimising and mitigating environmental impacts. In particular, SEPA requires that the EIAR includes a series of plans and drawings showing environmental sensitivities such as peat depth, peat condition, Groundwater Dependent Terrestrial Ecosystems (GWDTE), and watercourses, overlaid with all proposed infrastructure. This is necessary to demonstrate that site layout has been appropriately informed by environmental constraints. <u>Peat, Carbon-Rich Soils and Peatland Management</u> SEPA emphasises that peatland and carbon-rich soils are nationally important resources that must be protected in accordance with NPF4 Policy 5. The assessment must demonstrate that: • Development avoids areas of deep peat and near-natural peatland where possible; • Infrastructure is located in areas of shallower peat; and	Chapter 10: Hydrology, Hydrogeology, Geology and Soils Chapter 8: Ecology Chapter 3: Description of the Development Technical Appendix 10.2: Outline Soils and Peat Management Plan Technical Appendix 8.6: Outline Habitat Management Plan



Consultee	Summary of Responses	Where Response is Addressed in EIA Report
	- The volume of peat excavation is minimised through careful design. SEPA requires the preparation of a comprehensive Outline Peat Management Plan (PMP), including: - Quantification of excavated peat volumes (acrotelm, catotelm and amorphous peat); - Identification of reuse proposals for excavated peat; and - Clear demonstration that excavated materials will not be treated as waste where possible. SEPA also notes that development proposals should demonstrate that peat excavation has been minimised through both layout design and engineering solutions, such as floating tracks.	
	<u>Water Environment and Hydrological Impacts</u> SEPA requires that the EIAR includes detailed assessment of potential effects on the water environment, including: - Mapping of all infrastructure in relation to watercourses and waterbodies; - Provision of a minimum 50 m buffer around watercourses and lochs, unless justified; and - Identification and justification of any buffer breaches, supported by drawings and site-specific information. Watercourse crossings must be designed to accommodate 1 in 200 year flood events, including an allowance for climate change. SEPA also highlights the need to minimise the number of crossings and to avoid adverse impacts on natural hydrology wherever practicable. SEPA confirms that, where development is appropriately designed, a standalone Flood Risk Assessment (FRA) may not be required. However, this is dependent on the scale and location of infrastructure relative to flood risk constraints.	
	<u>Groundwater and Groundwater-Dependent Terrestrial Ecosystems (GWDTE)</u> SEPA emphasises the importance of protecting groundwater resources and GWDTEs, which are protected under the Water Framework Directive. The Applicant is required to: Undertake a National Vegetation Classification (NVC) survey to identify potential GWDTE;	



Consultee	Summary of Responses	Where Response is Addressed in EIA Report
	• Demonstrate that infrastructure avoids GWDTE areas or maintains appropriate stand-off distances; and • Apply minimum buffer distances (typically 100 m for shallow excavations and 250 m for deeper excavations), unless supported by detailed hydrogeological risk assessment. Similar protections should apply to groundwater abstractions, including private water supplies. <u>Site Layout, Forestry and Land Use</u> SEPA highlights that the layout of the Proposed Development should seek to minimise disturbance to previously undisturbed ground, and maximise the use of existing tracks and infrastructure. Where forestry is present, large-scale felling should be avoided where possible due to the risk of nutrient release and surface water impacts. The EIAR should therefore include clear information on the extent of felling and how timber will be managed in accordance with relevant guidance. <u>Environmental Management and Pollution Prevention</u> SEPA requires the inclusion of a schedule of environmental mitigation measures, supported by best practice guidance, including relevant Guidance for Pollution Prevention (GPP) documents. The EIAR should demonstrate how the following will be managed: • Soil and peat handling; • Surface water run-off during construction; • Prevention of sedimentation and pollution; and • Limiting the extent of exposed soil at any one time. SEPA also emphasises that micro-siting should not compromise environmental protection measures, particularly in relation to sensitive receptors. <u>Biodiversity and Restoration</u> In line with NPF4 Policy 3, SEPA highlights that the Proposed Development should deliver biodiversity enhancement in addition to mitigation. In particular, SEPA identifies opportunities for: • Riparian planting along watercourses; and	



Consultee	Summary of Responses	Where Response is Addressed in EIA Report
	Habitat restoration, particularly in degraded peatland areas. These measures should be set out within the Habitat Management Plan (HMP). <u>Decommissioning and Long-Term Site Restoration</u> SEPA advises that proposals for decommissioning and site restoration should be consistent with current guidance and follow a hierarchical approach to environmental management, prioritising sustainable resource use, risk reduction and ecological restoration.	
Scottish Water 04 October 2024	<u>Drinking Water Protection and Catchments</u> Scottish Water advises that the Proposed Development is located partly within drinking water catchment areas, including those associated with Carron Valley Reservoir, which supplies Carron Valley Water Treatment Works. They emphasise that it is essential to ensure that both water quality and water quantity are protected throughout all phases of the Proposed Development. The consultee highlights that these sources are designated as Drinking Water Protected Areas (DWPA) under the Water Framework Directive, and therefore require careful consideration during design, construction and operation. <u>Protection of Assets and Infrastructure</u> Scottish Water notes that the Applicant must identify any potential interactions with Scottish Water infrastructure and assets. Where potential conflicts are identified, the Applicant is required to engage with Scottish Water's Asset Impact Team to assess the proposals and agree any necessary protection or mitigation measures. They also advise that minimum stand-off distances and restrictions may apply where infrastructure is located in proximity to Scottish Water assets. <u>Construction and Operational Safeguards</u> Scottish Water outlines a number of good practice measures that should be adopted, including: - Notification to Scottish Water in advance of any construction works within the catchment area; - Implementation of measures to prevent contamination of water sources during construction; and	Chapter 10: Hydrology, Hydrogeology, Geology and Soils



Consultee	Summary of Responses	Where Response is Addressed in EIA Report
	Ongoing liaison with Scottish Water during the construction phase, including potential site inspections where necessary. The consultee also advises that any pollution incidents that may affect drinking water sources must be reported immediately. <u>Drainage and Connections</u> Scottish Water confirms that surface water drainage should not be connected to the public combined sewer system, and that alternative drainage solutions should be developed in accordance with best practice. Where any connection to public water or wastewater infrastructure is proposed, a Pre-Development Enquiry (PDE) must be submitted, and appropriate technical approvals obtained prior to construction. <u>Further Engagement</u> Scottish Water advises that continued engagement will be required as the Proposed Development progresses through detailed design stages to ensure that all water environment considerations are appropriately addressed.	
Stirling Council Environmental Health Team 13 November 2024	<u>Assessment Methodology for Noise</u> Stirling Council's Environmental Health Team confirms that the proposed methodologies for assessing both operational and construction noise are appropriate in principle. In particular, they agree with the use of ETSU-R-97 and associated good practice guidance for operational wind turbine noise, and confirm that BS 5228 may be used, where necessary, for the assessment of construction noise. <u>Decommissioning Noise and Vibration</u> The Environmental Health Team indicates that, based on the location and nature of the Proposed Development, they have no significant concerns regarding noise and vibration associated with the decommissioning phase. As such, these aspects are considered unlikely to give rise to significant environmental effects and may be scoped out of detailed assessment, subject to confirmation within the EIA.	Chapter 13: Noise



Consultee	Summary of Responses	Where Response is Addressed in EIA Report
	<u>Low Frequency Noise and Amplitude Modulation</u> The consultee expresses caution regarding the proposed scoping out of low frequency noise and amplitude modulation (AM). They note that these effects are more complex and difficult to assess and may require specialist input to determine their potential significance. The Environmental Health Team advises that these matters should not be excluded prematurely and should remain under consideration within the EIA process, with scope for further review as the assessment progresses and additional data becomes available.	
Stirling Council Planning Team 13 November 2024	<u>Purpose and Scope of the Scoping Opinion</u> Stirling Council confirms that the purpose of the Scoping Opinion is to identify the key environmental issues to be considered within the Environmental Impact Assessment (EIA), ensuring that the Environmental Impact Assessment Report (EIAR) is proportionate, focused, and aligned with statutory requirements under the EIA Regulations. The Council is satisfied that the submitted Scoping Report provides an appropriate framework for identifying potential significant environmental effects and proposed methodologies, subject to the incorporation of consultation responses. <u>Development Description and EIA Scope</u> The Planning Authority confirms that the Proposed Development constitutes a major development, comprising up to four wind turbines and associated infrastructure. The Council is content that the Scoping Report provides a sufficiently clear description of the Proposed Development and identifies the key environmental topics to be assessed. The following topics are confirmed as requiring assessment within the EIAR: • Landscape and Visual; • Ecology; • Ornithology; • Hydrology, Hydrogeology and Soils; • Cultural Heritage and Archaeology;	All Chapters of the EIA Report (Chapters 1–16)



Consultee	Summary of Responses	Where Response is Addressed in EIA Report
	- Noise and Vibration; - Traffic and Transport; - Aviation; - Socio-economics, recreation and land use; and - Other environmental topics (including forestry, telecommunications, shadow flicker, climate and carbon balance)	
	<u>Assessment Methodology and Structure</u> The Planning Authority confirms that the proposed structure and format of the EIAR are appropriate, noting that each topic chapter should include: - Description of consultation undertaken; - Relevant legislation, policy and guidance; - Assessment methodology; - Baseline conditions; - Identification of impacts and significance; - Mitigation measures; - Residual effects; and - Summary of findings. This approach is considered consistent with best practice and suitable to support a robust assessment.	
	<u>Development Plan and Policy Considerations</u> The Council highlights that the assessment must be undertaken with reference to the Stirling Local Development Plan 2 (2018) and relevant policies, including those relating to: - Placemaking and landscape character; - Climate change and renewable energy;	



Consultee	Summary of Responses	Where Response is Addressed in EIA Report
	- Biodiversity and natural heritage; - Flood risk and the water environment; and - Cultural heritage. The Planning Authority advises that the EIAR and associated Planning Statement should clearly demonstrate how the Proposed Development accords with relevant policies.	
	<u>Topic-Specific Expectations</u> The Council identifies specific expectations for key technical topics, including: - Landscape and Visual: The EIAR should assess effects on landscape character and views, particularly given the sensitivity of the Carron Valley landscape and surrounding upland areas; - Population and Human Health: The Applicant should engage with Environmental Health regarding potential noise and air quality impacts; - Socio-economics and Recreation: The assessment should consider impacts on tourism, recreational use of the area and potential economic benefits; - Climate Change: The Planning Statement should clearly set out the Proposed Development's contribution to renewable energy generation targets and greenhouse gas reduction; and - Alternatives: The EIAR should include details of alternative layouts or design options considered and the reasons for selecting the final scheme.	
	<u>Consultation Process and Further Information</u> The Council confirms that the Scoping Opinion has been informed by consultation with statutory and non-statutory consultees, and that all responses should be taken into account in preparing the EIAR. The Applicant is advised to maintain engagement with consultees throughout the development process and ensure that the EIAR responds appropriately to all issues raised during the scoping exercise.	



Consultee	Summary of Responses	Where Response is Addressed in EIA Report
Carron Valley Community Council	<u>Impacts on Cultural Heritage</u> Carron Valley Community Council raises concerns regarding the potential for the Proposed Development to affect the cultural heritage of the local area, including sites associated with John de Graham and Kirk o' Muir. The consultee notes that these heritage features are of local importance and that their setting and significance should be appropriately considered within the Environmental Impact Assessment (EIA). They highlight that certain heritage features may not have been fully identified within the initial scope and should therefore be considered further within the cultural heritage assessment. <u>Water Resources and Drinking Water</u> The Community Council also identifies concerns relating to groundwater and drinking water, noting that Cairnoch Hill contributes to local water resources. They request that the Environmental Impact Assessment (EIA) includes appropriate assessment of potential effects on water quality, particularly in relation to construction activities. The consultee emphasises the need for adequate investigation and mitigation to ensure that local water resources are not adversely affected by the Proposed Development.	Chapter 11: Cultural Heritage and Archaeology Chapter 10: Hydrology, Hydrogeology, Geology and Soils
Gargunnock Community Council	<u>Zone of Theoretical Visibility (ZTV)</u> Gargunnock Community Council requests that the Zone of Theoretical Visibility (ZTV) presented within the Scoping Report is extended to include a wider area, specifically identifying the need for coverage of Gargunnock village and surrounding areas. The consultee indicates that a broader ZTV would assist in understanding the potential visual effects of the Proposed Development on local communities, particularly in relation to visibility from settlements not fully represented within the initial study area.	Chapter 7: Landscape and Visual
Scottish Wildlife Trust Stirling & Clackmannanshire Volunteer Planning Group	<u>Biodiversity Policy and Enhancement Requirements</u> The Scottish Wildlife Trust highlights the requirements of NPF4 Policy 3, noting that developments subject to Environmental Impact Assessment (EIA) must demonstrate that biodiversity will be conserved, restored and enhanced, resulting in a demonstrably improved ecological condition compared to the baseline.	Chapter 8: Ecology Chapter 9: Ornithology



Consultee	Summary of Responses	Where Response is Addressed in EIA Report
25 November 2024	They emphasise that biodiversity enhancement must go beyond mitigation, requiring clear evidence within the EIA that the Proposed Development delivers positive ecological outcomes. <u>Key Environmental Constraints and Sensitive Receptors</u> The Trust identifies a number of ecological receptors and environmental constraints that require careful consideration, including: • Designated sites, in particular Carron Valley Local Nature Conservation Site (LNCS); • Water catchments, including the River Carron, Endrick Water and associated tributaries; • Peatland habitats, which appear to be present across parts of the Site; and • Bird use of the reservoir and surrounding habitats. They also highlight the potential presence of a range of protected and notable species within the Site and surrounding area, including red squirrel, pine marten, otter, bats, and ornithological species of conservation concern. <u>Assessment Scope and Survey Requirements</u> The Trust considers that the scope of the Ecological Impact Assessment (EclA) appears generally appropriate but notes that certain areas should be reviewed and examined in detail, particularly in relation to: • Assessment of protected species; • Habitats of ecological value, including native woodland and regenerating habitat; and • The potential presence of rare or sensitive plant species. They also emphasise the importance of ensuring that survey work adequately captures the baseline ecological conditions, particularly where constraints have been identified through desk study sources such as the National Biodiversity Network (NBN) Atlas. <u>Potential Impacts and Design Considerations</u> The Trust notes that impacts associated with wind farm development may arise from both turbine infrastructure and associated works, particularly access tracks, which can contribute to habitat loss and fragmentation.	Chapter 10: Hydrology, Hydrogeology, Geology and Soils Technical Appendix 8.6: Outline Habitat Management Plan



Consultee	Summary of Responses	Where Response is Addressed in EIA Report
	They advise that cumulative impacts should be carefully considered, particularly where multiple developments are present or proposed in the wider area. In addition, the Trust highlights the importance of considering integrated habitat networks and ensuring that development proposals do not adversely affect habitat connectivity across the Site and surrounding landscape. <u>Monitoring and EIA Importance</u> The Trust concludes that, while the scoping report provides a reasonable starting point, the EIA will be critical in fully understanding the ecological implications of the Proposed Development. They emphasise the importance of robust assessment, clear mitigation, and demonstrable biodiversity enhancement.	
ScotWays 08 January 2025	<u>Site Boundary Clarity and Mapping Consistency</u> ScotWays notes that, at the scoping stage, there appears to be inconsistency in the site boundary shown across different figures within the Scoping Report. They request that, for clarity, all figures submitted as part of any future application should present a consistent and clearly defined red line boundary, to avoid confusion. <u>Public Access and Rights of Way</u> ScotWays confirms that there are no recorded rights of way within or immediately adjacent to the Site based on their review of the National Catalogue of Rights of Way (CROW). However, they highlight that this does not preclude the presence of other forms of access, such as: • Core paths; • Informal routes; and • Other publicly used tracks. They emphasise that rights of way and core paths are legally distinct, although they may overlap in some locations. <u>Access Considerations and Route Protection</u>	Chapter 7: Landscape and Visual Technical Appendix 15.2: Outline Access Management Plan



Consultee	Summary of Responses	Where Response is Addressed in EIA Report
	ScotWays advises that the Proposed Development should take account of public access rights under the Land Reform (Scotland) Act 2003, including the responsibility to avoid unnecessary impacts on access routes. They recommend that development proposals adopt a minimum separation distance between turbines and public routes, suggesting a distance equivalent to the maximum blade tip height as a starting principle. They note that greater separation distances may be appropriate depending on site-specific circumstances, particularly where routes are heavily used or form part of important recreational networks. They further advise that insufficient buffering or reliance on micro-siting which could allow turbines to encroach closer to access routes may give rise to concerns or potential objection. <u>Recreational Amenity and Landscape Experience</u> ScotWays highlights the importance of considering impacts on recreational amenity, including the wider experience of the landscape. They note that the assessment should consider not only direct physical effects on access routes but also the perceptual effects of development on the character and enjoyment of the surrounding environment. They emphasise that cumulative effects should be considered where multiple wind farm developments are proposed within the same area.	
Forth District Salmon Fishery Board 13 January 2025	<u>Fish Survey Methodology and Baseline Data</u> The Forth District Salmon Fishery Board (ForthDSFB) confirms that, based on the information provided at the scoping stage, they have no significant concerns regarding the Proposed Development. They note that the proposed approach to electrofishing surveys within watercourses forming part of the Carron and Forth catchments is appropriate to establish baseline conditions. <u>Survey Requirements and Data Confidence</u> The Board advises that electrofishing surveys should be undertaken by a suitably qualified and licensed operator, and should be designed to ensure that results are representative of the habitats within the study area. The survey results should provide sufficient information to determine the presence of fish species, particularly salmonids, and to assess potential impacts arising from the Proposed Development.	Chapter 8: Ecology Chapter 10: Hydrology, Hydrogeology, Geology and Soils



Consultee	Summary of Responses	Where Response is Addressed in EIA Report
	<u>Assessment and Mitigation</u> ForthDSFB notes that the information obtained from these surveys will be critical in informing the assessment of potential effects on fish populations and aquatic habitats, and in determining whether additional mitigation measures are required.	
British Horse Society Scotland 14 October 2024	<u>Public Access and Equestrian Use</u> The British Horse Society Scotland (BHS) highlights that, although there may be no formally designated routes within the Site, the surrounding area is likely to be used by the public for informal recreational access, including equestrian use. They note that forestry tracks and rural paths within and around the Site may already be used by horse riders, particularly given the proximity to Carron Valley Forest, which is a known recreational resource. The consultee emphasises that the Proposed Development should consider how access for equestrians and other users will be maintained during both construction and operation, ensuring that the development does not unnecessarily restrict or limit access. <u>Opportunities to Enhance Access</u> The BHS highlights that wind farm developments can provide opportunities to enhance recreational access, particularly through the creation or improvement of track networks. They note that, where designed appropriately, such developments can offer multi-use access routes, benefitting a wide range of users including walkers, cyclists and horse riders. They encourage the Applicant to consider opportunities to create circular or linked routes, which would provide additional recreational value for local communities. <u>Track Design and Safety Considerations</u> The consultee raises concerns regarding the design and surfacing of tracks, advising that materials such as loose or sharp stone may present a risk to horse welfare. They recommend that tracks should be surfaced using consolidated materials (such as whin dust) that are suitable for equestrian use. They also highlight the need to avoid access barriers that may restrict equestrian movement, including:	Chapter 12: Traffic and Transport Chapter 15: Other Issues Technical Appendix 15.2: Outline Access Management Plan



Consultee	Summary of Responses	Where Response is Addressed in EIA Report
	• Cattle or deer grids; • Locked gates without suitable side access; and • Other physical obstructions that could limit safe passage. Where such features are necessary, appropriate mitigation measures should be incorporated into the design. <u>Traffic and Interaction with Road Users</u> The BHS also notes that construction traffic associated with the Proposed Development may interact with equestrians using local roads. They recommend that appropriate measures are implemented to: • Raise awareness among drivers of potential equestrian presence; and • Ensure that risks to vulnerable road users are minimised during the construction phase. <u>Access Management</u> The consultee emphasises the importance of considering all types of access users during the design process and recommends early and ongoing engagement to ensure that access considerations are integrated into the development design. This should be reflected in an Access Management Plan, ensuring that impacts are minimised and opportunities for improvement are realised where feasible.	
Scottish Forestry 13 February 2025	Following your email we would like to note our appreciation for the inclusion of a forestry section within the EIA Report and mention of the Scottish Government's The Control of Woodland Removal policy – see link below: Control of Woodland Removal The principle of this policy is to avoid woodland loss. However, where a decision is taken to allow woodland to be removed to facilitate development, the policy states there should be compensatory planting stipulated as a condition planning consent. In this case, it appears that there will be woodland loss, as such we would require that suitable compensatory planting is included as a condition of the approval.	Technical Appendix 3.2: Forestry



Consultee	Summary of Responses	Where Response is Addressed in EIA Report
	We did not note any details of compensatory planting within the report and we are happy to advise on what compensatory planting is suitable in this case. The survey and assessment proposals are acceptable to detail the proposed permanent woodland loss and therefore the requirement for compensatory planting.	
BT Group 17 December 2024	We have studied the co-ordinates attached with respect to EMC and related problems to BT point-to-point microwave radio links. The conclusion is that this proposal should not cause interference to BT's current and presently planned radio network. BT requires 100m minimum clearance from any structure to the radio link path. It there are any changes to this location please let us know and we will reassess this for you. Please note this refers to BT Radio Links only, you will need to contact other providers separately for information relating to other supplier links / equipment.	Chapter 15: Other Issues







Technical Appendix 7.1: LVIA Methodology

Cairnoch Hill Wind Farm

Eurowind Energy Limited

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Revision Record

Revision	Date	Prepared By	Checked By	Authorised By
01	3 August 2026	A. Elder	A. Smith	A. Smith

Basis of Report

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Acronyms and Abbreviations

AGL	Above Ground Level
AESLQ	Assessment of Effects on Special Landscape Qualities
ANO	Air Navigation Order
AOD	Above Ordnance Datum
CAA	Civil Aviation Authority
CAP	Civil Aviation Publication
CIA	Cumulative Impact Assessment
CLVIA	Cumulative Landscape and Visual Impact Assessment
CMOS	Complementary Metal Oxide Semiconductor
DTM	Digital Terrain Model
EIA	Environmental Impact Assessment
EIA Report	Environmental Impact Assessment Report
EIS	Environmental Impact Statement
GIS	Geographic Information System
GLVIA3	Guidelines for Landscape and Visual Impact Assessment, Third Edition
GPS	Global Positioning System
HFOV	Horizontal Field of View
ICAO	International Civil Aviation Organisation
IEMA	Institute of Environmental Management and Assessment
ILP	Institute of Lighting Professionals
LI	Landscape Institute
LITGN	Landscape Institute Technical Guidance Note
LVIA	Landscape and Visual Impact Assessment
OS	Ordnance Survey
OWF	Operational Wind Farm
RVAA	Residential Visual Amenity Assessment
SLR	SLR Consulting Limited
TCA	The Countryside Agency
WTG	Wind Turbine Generator
ZTV	Zone of Theoretical Visibility



1.0 Introduction

1.1.1 This Technical Appendix has been prepared to accompany the Landscape and Visual Impact Assessment of the Cairnoch Hill Wind Farm (“the Proposed Development”), contained within **Chapter 7: Landscape and Visual** of the Environmental Impact Assessment (EIA) Report. This methodology has been prepared by Chartered Members of the Landscape Institute at SLR Consulting Limited and describes in detail the methodology that has been used to carry out the Landscape and Visual Impact Assessment (LVIA). The LVIA identifies and assesses the significance of changes resulting from the Proposed Development on both the landscape as an environmental resource and on people's views and visual amenity.

1.2 Key Guidance Documents

1.2.1 The LVIA methodology is devised specifically for the assessment of wind farm developments which is in line with the 'Guidelines for Landscape and Visual Impact Assessment: Third Edition' ('GLVIA3'), the key source of guidance for LVIA (including the clarifications set out by the Landscape Institute ('LI') in 2024¹). Other sources of guidance used and referenced in the LVIA include the following:

- Landscape Institute and Institute for Environmental Management and Assessment (2013) 'Guidelines for Landscape and Visual Impact Assessment: Third Edition' ('GLVIA3');
- Landscape Institute (2019). Visual Representation of Development Proposals: Landscape Institute Technical Guidance Note 06/19;
- Landscape Institute (2019). Technical Guidance Note 2/19 Residential Visual Amenity Assessment;
- Landscape Institute (2024) Technical Guidance Note LITGN-2024-01;
- NatureScot and The Countryside Agency (TCA) (2002). Landscape Character Assessment Guidance for England and Scotland;
- NatureScot (2017). Visual Representation of Wind Farms Version 2.2;
- NatureScot (2017). Siting and Designing of Windfarms in the Landscape: Version 3a;
- NatureScot (2020). Assessing Impacts on Wild Land Areas Technical Guidance;
- NatureScot (2021). Assessing the Cumulative Impact of Onshore Wind Energy Developments;
- NatureScot (2024). NatureScot pre-application guidance for onshore wind farms;
- NatureScot (2025). Guidance for Assessment of Effects on Special Landscape Qualities (AESLQ); and
- NatureScot (2024) Guidance on Aviation Lighting Impact Assessment.

¹ Landscape Institute, Technical Guidance Note LITGN – 2024-01, Published August 2024.



1.3 Information and Data Sources

- 1.3.1 The LVIA study area covers a radius of 45km from the Proposed Development, as illustrated in **Figure 7.1**. The LVIA study area is defined to extend far enough to include all areas within which significant effects could occur, informed by the ZTV and professional judgement. It is an outer limit to where significant effects could occur.
- 1.3.2 IEMA Guidance (IEMA, 2015 and 2017) recommends a proportionate Environmental Impact Statement (EIS) focused on the significant effects and a proportionate EIS topic chapter. An overly large LVIA study area may be considered disproportionate if it makes the understanding the key impacts of the Proposed Development more difficult.
- 1.3.3 This is supported by LVIA Guidance produced by the Landscape Institute (GLVIA3) (Landscape Institute, 2013) (para 3.16), which recommends that *“The level of detail provided should be that which is reasonably required to assess the likely significant effects”*. Para 5.2 and p70 also states that *“The study area should include the site itself and the full extent of the wider landscape around it which the Proposed Development may influence in a significant manner”*.
- 1.3.4 Guidance developed by NatureScot (Visual Representation of Windfarms Version 2.2, February 2017) indicates that an area with a radius of 45km from the nearest wind turbine is appropriate for the wind turbines of the size proposed in the Proposed Development.
- 1.3.5 Based on the Proposed Development scoping layout, Stirling Council and NatureScot agreed through scoping consultation, that the LVIA study area should be a 45km radius.

1.4 Field Survey

- 1.4.1 To inform the LVIA and layout design process, field survey was undertaken between June 2024 and April 2026. Viewpoint photography was captured during field survey visits in periods of good visibility. Field surveys were primarily carried out throughout the 20km detailed study area and further afield, although surveys were concentrated within the areas shown on the ZTV to gain theoretical visibility of the Proposed Development.
- 1.4.2 Field survey included visits to viewpoints as well as travel around the study area to consider potential effects (including cumulative) on landscape character and on the experience of views seen from travel routes through the landscape. These visits have allowed the landscape character and the visual amenity of the study area to be experienced in a range of different conditions and seasonal variation. The field survey allows the assessors to judge the likely scale, distance, extent and prominence of the Proposed Development directly.
- 1.4.3 The landscape of the Proposed Development location (“the Site”) was assessed for any particular features that contribute to the landscape character of the Site or are important to the wider landscape setting. In particular, the form and pattern of the land was assessed from the Site and surrounding area to better understand its character and to take these qualities into account in the siting and design of the Proposed Development. The landscape character types for the study area were reviewed and the key characteristics of the landscape were identified. The field surveys provided an experience of the character types of the study area and verification of how these areas might be affected by the Proposed Development. Visual amenity was surveyed including both static and sequential views, from receptors representative of the range of views and viewer types likely to



experience the Proposed Development. Views from a variety of distances, aspects, elevations and extents were included. Receptor types include settlement; transport routes; visitor locations; areas of cultural significance; the range of landscape character types within the study area; and the cumulative effects of the Proposed Development in combination with other existing or proposed wind farms in the study area.



2.0 Types of Landscape and Visual Effects

2.1 Categories of Effect

2.1.1 The LVIA is intended to determine the effects that the Proposed Development would have on the landscape and visual resource. For the purpose of assessment, the potential effects on the landscape and visual resource are grouped into three categories: landscape effects, visual effects and cumulative landscape and visual effects, each of which is briefly described as follows.

2.1.2 Landscape Effects

2.1.3 The LVIA considers the effects of the Proposed Development on the landscape as a resource. Landscape effects are either direct effects on the physical fabric of the Site, or effects on landscape character. The assessment of landscape effects is carried out as follows:

- Assessment of physical effects: physical effects are direct effects on the physical fabric of the site, such as the removal of trees and alteration to ground cover. This category of effects is made up of landscape elements, which are the components of the landscape such as hedgerows or woodland that may be physically affected by the Proposed Development; and
- Assessment of effects on landscape character: landscape character is the distinct and recognisable pattern of elements that occurs consistently in a particular type of landscape, and the way that this pattern is perceived. Effects on landscape character arise either through the introduction of new elements that alter this pattern of elements, or through visibility of the Proposed Development, which may alter the way in which the pattern of elements is perceived. This category of effects is considered in terms of landscape character receptors, which fall into two groups: landscape character types/areas and landscape designations.

2.1.4 Visual Effects

2.1.5 The LVIA considers the effect of the Proposed Development on views and visual amenity. Visual effects include effects on visual receptors, i.e. groups of people that may experience an effect, and views (viewpoints). The visual assessment is carried out as follows:

- An assessment of the effects of the Proposed Development on views from principal visual receptors, including residents of settlements, motorists using roads, people using recreational routes, features and attractions throughout the study area (as ascertained through the baseline study); and
- An assessment of the effects of the Proposed Development on representative viewpoints that have been selected to assess the effect on locations relevant to these visual receptors and from specific viewpoints, chosen because they are key or promoted viewpoints in the landscape.

2.1.6 Cumulative Effects

2.1.7 Cumulative landscape and visual effects arise where the study areas for two or more wind farms overlap so that both are experienced at proximity where they



may have a greater incremental effect, or where wind energy developments may combine to have a sequential effect, irrespective of any overlap in study areas. This means that the addition of the Proposed Development to a situation where other wind farms are apparent in the baseline, or a potential future baseline landscape and visual context may result in a greater effect than where the Proposed Development is seen in isolation. The main assessment of the effects of the Proposed Development takes into account its addition to a baseline landscape that contains the operational/under construction wind farms.

2.2 Significance of Effects

- 2.2.1 The objective in assessing the effects of the Proposed Development is to predict the significant effects on the landscape and visual resource. The Town and Country Planning (Environmental Impact Assessment) (Scotland) Regulations 2017 ("EIA Regulations") require that the direct and indirect significant effects of the Proposed Development are identified, described and assessed, and therefore the LVIA effects are assessed to be either significant or not significant. The LVIA does not define intermediate levels of significance as the EIA Regulations do not provide for these. GLVIA3 also provides guidance on this, noting that (paragraphs 3.32 and 3.33): *"LVIA should always distinguish clearly between what are considered to be the significant and non-significant effects...it is not essential to establish a series of thresholds for different levels of significance of landscape and visual effects, provided that it is made clear whether or not they are considered significant."*
- 2.2.2 The significance of effects is assessed through a combination of the sensitivity of the landscape receptor or view and the magnitude of change that would result from the addition of the Proposed Development. While this methodology is not reliant on the use of a matrix to determine the conclusion of a significant or not significant effect, a matrix is included in **Table 1** to illustrate how combinations of sensitivity and magnitude of change ratings can give rise to significant effects. On this basis potential impacts are assessed as of Negligible, Minor, Moderate-Minor, Moderate, Major-Moderate and Major. In those instances where the magnitude has been assessed as 'no change', the level of effect is recorded as 'no effect'.
- 2.2.3 For the purposes of this assessment, any effects with a significance level of Major and Major-Moderate have been deemed significant. Moderate levels of effect have the potential, subject to the assessor's professional judgement, to be considered as significant or not significant, depending on the sensitivity and magnitude of change factors evaluated. GLVIA3 clarification note 3(5) supports this approach and states that *"moderate effects may or may not be significant and justification would be needed in the methodology or receptor assessment as to whether a moderate effect is significant or not"*. The assessments of significance for Moderate levels of effect are therefore explained as part of the assessment, where they occur.
- 2.2.4 Significance thresholds can therefore vary depending on the sensitivity and magnitude, however in all cases, a significant effect is considered more likely to occur where a combination of the variables results in the Proposed Development having a defining effect on the landscape character or view. Definitions are not provided for the individual categories of significance shown in the matrix and the reader should refer to the detailed definitions provided for the factors that combine to inform sensitivity and magnitude. Effects assessed as being either Moderate-



Minor, Minor or Negligible level are deemed as not significant (white boxes in **Table 1**).

- 2.2.5 In line with the emphasis placed in GLVIA3 upon the application of professional judgement, an overly mechanistic reliance upon a matrix is avoided through the provision of clear and accessible narrative explanations of the rationale underlying the assessment made for each landscape and visual receptor.

Table 1: Matrix used to guide determination of effect significance

	Magnitude of Change						
		High	High-Medium	Medium	Medium-Low	Low	Negligible
Sensitivity	High	Major Significant	Major Significant	Major/moderate Significant	Moderate Significant or Not Significant	Moderate/minor Not Significant	Minor Not Significant
	High-Medium	Major Significant	Major/moderate Significant	Moderate Significant or Not Significant	Moderate Significant or Not Significant	Moderate/minor Not Significant	Minor Not Significant
	Medium	Major/moderate Significant	Moderate Significant or Not Significant	Moderate Significant or Not Significant	Moderate/minor Not Significant	Minor Not Significant	Minor Not Significant
	Medium-Low	Moderate Significant or Not Significant	Moderate Significant or Not Significant	Moderate/minor Not Significant	Minor Not Significant	Minor Not Significant	Negligible Not Significant
	Low	Moderate Significant or Not Significant	Moderate/minor Not Significant	Minor Not Significant	Minor Not Significant	Negligible Not Significant	Negligible Not Significant

- 2.2.6 A significant effect occurs where the Proposed Development would provide one of the defining influences on a landscape element, landscape character receptor or view; or where changes of a lower magnitude occur on a landscape element, landscape character receptor or view that is of particularly high sensitivity. A not significant effect occurs where the effect of the Proposed Development is not material, whereby the baseline characteristics of the landscape element, landscape character receptor or view continue to provide the definitive influence, or where the small scale of change experienced by a high sensitivity receptor is such as to be considered not significant.

- 2.2.7 Significant cumulative effects occur where the addition of the Proposed Development to various scenarios of other relevant existing and proposed wind farms would lead to wind farm development becoming one of the prevailing characteristics of a view or landscape or where the Proposed Development



adversely contrasts with the scale or design of an existing or Proposed Development.



3.0 Landscape Assessment

3.1.1 Landscape character is the distinct and recognisable pattern of elements that occurs consistently in a particular type of landscape, and the way that this pattern is perceived. Effects on landscape character arise either through the introduction of new elements that physically alter this pattern of elements, or through visibility of the Proposed Development, which may alter the way in which the pattern of elements is perceived. This category of effects is made up of physical effects and effects on landscape character (landscape character types and designated areas).

3.2 Assessment of Physical Landscape Effects

3.2.1 The physical effects of the Proposed Development are restricted to the area within the site boundary where existing landscape elements may be changed. Physical effects are the direct effects as a result of the Proposed Development on the fabric of the area within the site boundary, such as the removal of trees and alteration to ground cover. The objective of the assessment of physical effects is to determine what the likely physical effects of the Proposed Development would be, which landscape elements would be affected, and whether these effects would be significant or not significant. The variables considered in the sensitivity of landscape elements and the magnitude of change that the Proposed Development would have on them, are described as follows.

3.2.2 Sensitivity of Landscape Elements

3.2.3 The sensitivity of a landscape element is an expression of its value and quality, and susceptibility to change.

- The value of a landscape element is a reflection of its importance in the pattern of elements which constitute the landscape character of the area. For example, the value of woodland is likely to be increased if it provides an important component of the local landscape character. If a landscape element is particularly rare, as a remnant of an historic landscape layout for example, or a particular combination of landscape elements in a locale presents particular qualities, its value is likely to be increased; and
- The susceptibility of a landscape element to change is a reflection of the degree to which landscape elements are vulnerable to change and the extent to which they can be restored, replaced or substituted.

3.2.4 The evaluation of sensitivity is described for each receptor in the assessment. Levels of sensitivity: high, high-medium, medium, medium-low and low, are applied.

3.2.5 Magnitude of Change on Landscape Elements

3.2.6 The magnitude of change on landscape elements is quantifiable and is expressed in terms of the degree to which a landscape element would be removed or altered by the Proposed Development, the extent of existing landscape elements that would be lost and the contribution of that element to the character of the landscape. Definitions of magnitude of change are applied in order that the process of assessment is made clear. These are:

- High: where the Proposed Development would result in the complete removal or substantial alteration of a key landscape element;



- Medium: where the Proposed Development would result in the removal of a notable part of a landscape element or a notable alteration to a key landscape element;
- Low: where the Proposed Development would result in the removal of a minor part of a landscape element or a minor alteration to a key landscape element;
- Negligible: where the Proposed Development would result in the removal of a negligible amount of a landscape element or is barely discernible; and
- None: where the Proposed Development would result in no change to the landscape element.

3.2.7 There may also be intermediate levels of magnitude of change, such as high-medium or medium-low, where the change falls between definitions.

3.2.8 Significance of Effects on Landscape Elements

3.2.9 The assessment of effect on landscape elements, is dependent on all of the factors considered for the sensitivity of the receptor and the magnitude of change upon it, and by applying professional judgement to assess whether or not the Proposed Development would have an effect that is significant or not significant.

3.2.10 A significant effect would occur where the degree of removal or alteration of the landscape element is such that the landscape element would be redefined (although the landscape character may not necessarily be redefined). If the landscape element is of a high sensitivity, a significant effect can occur with a limited degree of removal or alteration. A not significant effect would occur where the form of the landscape element is not redefined, as a result of the particular characteristics of the Proposed Development. If the landscape element is of lower sensitivity, it could undergo a higher level of removal or alteration yet remain as a not significant effect.

3.3 Assessment of Effects on Landscape Character

3.3.1 The objective of the assessment of effects on landscape character is to determine what the likely effects of the Proposed Development could introduce, which landscape character receptors would be affected, and whether these effects would be significant or not significant. The methodology for the assessment of effects on landscape character involves the undertaking of a baseline study, evaluation of sensitivity, magnitude of change and an assessment of significance.

3.3.2 Landscape Baseline and Scope of Assessment

3.3.3 The landscape baseline provides an understanding of the landscape in the area that may be affected - its constituent elements, its character, distinctiveness, condition, value and qualities, and the way this varies spatially. The landscape baseline describes aspects of the landscape that may be significantly affected. Establishing the landscape baseline will, when reviewed alongside the description of the Proposed Development, form the basis for the identification and description of the effects of the Proposed Development on that baseline. The baseline description of the landscape that may be affected is primarily determined by the physical footprint of the Proposed Development components and their ZTV.

3.3.4 An overview of the landscape baseline is described, and a preliminary assessment identifies landscape receptors that may experience significant effects,



which require to be assessed in full. A detailed description of the baseline is provided for each landscape receptor that may experience significant effects. Those receptors for which significant effects and significant cumulative effects are not predicted are scoped out of the subsequent detailed assessment but are noted with reasons given for their exclusion.

3.3.5 The baseline study of each landscape character receptor collates and presents information relevant to the assessment drawn from a combination of desk study and fieldwork. The baseline study covers the following issues:

- The description of the landscape character receptor drawn from the relevant documentation such as the Landscape Character Assessment or citations in respect of landscape designations;
- A description of the landscape character receptor based on field work to determine the strength of character displayed and how typical or not the landscape character receptor is in relation to documented descriptions;
- Those features and patterns of the landform, land-cover and land use which make the landscape character receptor distinctive, or individually or in combination can be judged to have particular qualities worth considering further;
- The visual and sensory experience of the landscape and how it associates with other landscapes including, in particular, the landscape character receptor where the Proposed Development is located; and
- How change in this landscape character receptor, either through natural or human processes, is presently affecting character and how they are predicted to affect character in the future. This may include operational wind farms where they are a feature of the baseline landscape context

3.3.6 The landscape baseline also describes current pressures that may cause change in the landscape in the future, for example with respect to renewable energy, drawing on information for wind energy developments that are not yet present in the landscape but are at other stages in the Proposed Development and consenting process. Operational and under construction wind energy developments are regarded as part of the baseline landscape character of the area. Any changes resulting from the Proposed Development are assessed within this context in the assessment of landscape and visual effects.

3.3.7 Sensitivity of Landscape Character Receptors

3.3.8 The sensitivity of a landscape character receptor is an expression of the combination of the judgements made about the susceptibility of the receptor to the type or nature of change proposed and the value related to that receptor.

3.3.8.1 Value of the Landscape Receptor

3.3.9 The value of a landscape character receptor is classified as high, high-medium, medium, medium-low or low and the basis for this assessment is made clear using evidence and professional judgement, based on the following range of factors:

- Landscape designations: A receptor that lies within the boundary of a recognised landscape related planning designation will be of increased value, depending on the proportion of the receptor that is covered and the level of



importance of the designation; international, national, regional or local. It is important to note that the absence of designations does not preclude local resource value, as an undesignated landscape character receptor may be important as a resource in the local or immediate environment, particularly when experienced in comparison with other nearby landscapes;

- **Landscape quality:** The quality of a landscape character receptor is a reflection of its attributes, such as scenic quality, sense of place and distinctiveness, rarity and representativeness and the extent to which these attributes have remained intact. A landscape with consistent, intact and well-defined, distinctive attributes is generally considered to be of higher quality and in turn, higher value than a landscape where the introduction of uncharacteristic elements has detracted from its inherent attributes; and
- **Landscape experience:** The experience of the landscape character receptor can add to its value and relates to a number of factors including the perceptual responses it evokes, the cultural associations that may exist in literature or history, or the iconic status of the landscape in its own right, the recreational value of the landscape for outdoor pursuits, and the contribution of other values relating to the nature conservation or archaeology of the area.

3.3.9.1 Susceptibility to Change

3.3.10 The susceptibility of a landscape character receptor to change is a reflection of its ability to accommodate the changes that would occur as a result of the type or nature of change proposed. The assessment of the susceptibility of the landscape receptor to change is classified as high, high-medium, medium, medium-low or low and the basis for this assessment is made clear using evidence and professional judgement, based on the following criteria:

- **The type or nature of change proposed:** The susceptibility of landscape receptors is assessed in relation to change arising from the specific type and nature of development proposed;
- **Landscape character:** The key characteristics of the existing landscape is considered in the evaluation of susceptibility as the degree to which the receptor may accommodate the influence of the type or nature of change proposed is determined. For example, a landscape that is of a particularly wild and remote character may have a higher susceptibility to the influence of the type or nature of change proposed due to the contrast that it would have with the landscape, whereas a developed, industrial landscape, where built elements and structures are already part of the landscape character, may have a lower susceptibility. However, there are instances when the quality of a landscape may have been degraded to an extent whereby it is considered to be in a fragile state and therefore a degraded landscape may have a higher susceptibility to the type or nature of change proposed; and
- **Landscape association:** The extent to which the type or nature of change proposed would influence the character of the landscape receptors across the study area, relates to the associations that exist between the landscape receptor where the Proposed Development is located and the landscape receptor from which the type or nature of change is being experienced. In some situations, this association would be strong where the landscapes are directly related, for example the influence on a valley landscape by an enclosing upland landscape where the Proposed Development is set along the



skyline, and in other situations weak where the landscape association is less important; for example, where the Proposed Development lies inland of a coastal landscape that has its main focus outwards over the sea.

3.3.10.1 Sensitivity Rating

- 3.3.11 An overall sensitivity assessment of the landscape receptor is made by combining the assessment of the value of the landscape character receptor and its susceptibility to change. An overall level of sensitivity is applied for each landscape receptor: high, high-medium, medium, medium-low and low; by combining individual assessments of the value of the receptor and its susceptibility to change. The basis for the assessments is made clear using evidence and professional judgement in the evaluation of sensitivity for each receptor. Criteria that tend towards higher or lower sensitivity are set out in **Table 2**.

Table 2: Sensitivity to change – landscape receptors

Criteria tending towards higher or lower sensitivity		
	High Low	Medium
Value	Designated landscapes with national policy level protection or defined for their natural beauty. Higher quality landscapes with consistent, intact and well-defined, distinctive attributes. Rare or unique landscape character types or features. Aesthetic or perceptual aspects of designated wildlife, ecological, geological or cultural heritage features that contribute to landscape character and local / regional identity. Evidence that the landscape is valued or used substantially for recreational activity. Landscape with perceptual qualities of wildness, remoteness or tranquillity. Landscape with strong cultural associations that contribute to perceptions of scenic quality.	Landscapes without formal designation. Despoiled or degraded landscape with little or no evidence of being valued by the community. Lower quality landscapes with indistinct elements or features that detract from its inherent attributes. Widespread or 'common' landscape character types or features. Limited or no wildlife, ecological, geological or cultural heritage features, or limited contribution to landscape character and identity. No evidence that the landscape is used for recreational activity. Landscape with inherent character has been changed by human activity. Landscape with few cultural associations.
Susceptibility to Change	Landscape key characteristics which are likely or liable to be influenced by the type or nature of change proposed. Landscape vulnerable or fragile to change through the loss or addition of	Landscape characteristics which are unlikely or not liable to be influenced by the type or nature of change proposed. Robust landscape, able to accommodate change or loss of features without altering key characteristics.



	features that would alter key landscape characteristics. Landscape which lacks the ability to resist/accommodate the change that is likely to occur as a result of the type or nature of change proposed. Landscape of high quality/in good condition. Aesthetic or perceptual aspects of landscape are susceptible to changes associated with the type or nature of change proposed. Strong or direct association between Proposed Development and the landscape receptor. Landscape which is directly exposed to the type or nature of change proposed and has highest degree of exposure.	Landscape which has the ability to resist/accommodate the change that is likely to occur as a result of the type or nature of change proposed. Landscape of low quality/in poor condition. Aesthetic or perceptual aspects of landscape may accommodate changes associated with features of type or nature of change proposed. Weak and indirect association between the landscape receptor and the type or nature of change proposed. Landscape which is not directly exposed to the type or nature of change proposed and has degree of concealment/screening.
Sensitivity to Change	High Low —————→	Medium —————→

3.3.12 Magnitude of Change on Landscape Character Receptors

3.3.13 The magnitude of change on views is primarily an expression of the scale of the change that would result from the Proposed Development and is dependent on a number of variables regarding the size or scale of the change. An assessment is also made of the geographical extent of the area over which this would occur and the duration and reversibility of such changes. The basis for this assessment is made clear using evidence and professional judgement, based on the following criteria.

3.3.13.1 Size or Scale of Change

3.3.14 This criterion relates to the size or scale of change to the landscape that would arise as a result of the Proposed Development, based on the following factors:

- The degree to which the pattern of elements that makes up the landscape character would be altered by the Proposed Development, through removal or addition of elements in the landscape, in this instance. The magnitude of change would generally be higher if key features that make up the landscape character are extensively removed or altered, and if many new components are added to the landscape;
- The extent to which the Proposed Development would change, physically or perceptually, the characteristics and any qualities identified that may be important in the creation of the distinctive character of the landscape. This may include the scale of the landform, its relative simplicity or irregularity, the nature of the landscape context, the grain or orientation of the landscape, the degree to which the receptor is influenced by external features and the juxtaposition of the Proposed Development with these key characteristics;
- The degree to which landscape character receptors would be changed by the addition of the Proposed Development, in place of or in addition to, baseline



wind energy developments that are already present in the landscape. If the Proposed Development is located in a landscape receptor that is already affected by wind energy development, this may reduce the magnitude of change, particularly if there is a high level of integration and the developments form a unified and cohesive feature in the landscape. The converse could also be applicable;

- The landscape context in which the Proposed Development and other wind energy development are located. If the Proposed Development is located in a similar landscape context, the magnitude of change is likely to be lower as they relate consistently to key landscape characteristics. If developments are located in different landscape settings, this can lead to a perception that wind energy development is unplanned and uncoordinated, affecting a wide range of landscape characters and blurring the distinction between them;
- In relation to designated landscapes, the degree of change is considered against the special landscape qualities, which underpin the designation and the impact on the integrity of the designation. All landscapes change over time and much of that change is managed or planned. Often landscapes will have management objectives for 'protection' or 'accommodation' of development. The scale of change may be localised, or occurring over parts of an area, or more widespread affecting whole landscape receptors and their overall integrity;
- The scale of the landscape, landform and patterns of the landscape. A large-scale landscape can provide a more appropriate receiving environment than a more intimate, small-scale setting where development may result in uncomfortable scale comparisons and increase the magnitude of change;
- The distance between the landscape character receptor and the Proposed Development. Generally, the greater the distance, the lower the scale of change as the Proposed Development would constitute a less apparent influence on the landscape character; and
- The extent of the Proposed Development that would be seen from the landscape receptor. Visibility of the Proposed Development may range from one turbine blade tip to all of the turbines, and generally the greater the extent of the Proposed Development that can be seen, the greater the change.

3.3.14.1 Geographical Extent

- 3.3.15 The geographical extent over which the landscape effects would be experienced is also assessed as a modifier of the magnitude of change, which is distinct from the size or scale of effect. The extent of the effects varies depending on the specific nature of the Proposed Development and is principally assessed through analysis of the extent of physical change to the landscape or the extent to which the experience of that landscape character would change through visibility of the Proposed Development. This evaluation expresses the extent of the receptor that would experience a particular magnitude of change and can affect the geographical extents of the significant and non-significant effects.

3.3.15.1 Duration and Reversibility

- 3.3.16 The duration and reversibility of landscape effects are based on the period over which the Proposed Development is likely to exist and the extent to which the



Proposed Development would be removed, and its effects reversed at the end of that period. Where relevant, duration and reversibility are stated separately in relation to the assessed effects.

3.3.16.1 Magnitude of Change Rating

3.3.17 An overall assessment of the magnitude of change resulting from the Proposed Development on the landscape receptor is made by combining the assessments of size or scale of change and geographical extent. The basis for the assessment of magnitude for each receptor is made clear using evidence and professional judgement. The levels of magnitude of change that can occur are defined as follows:

- High: the Proposed Development would result in a major alteration to the baseline characteristics of the landscape, providing the prevailing influence and/or introducing elements that are uncharacteristic in the receiving landscape;
- High-medium: intermediate rating with combination of criteria from high magnitude (described above) and medium magnitude (described below);
- Medium: the Proposed Development would result in a moderate alteration to the baseline characteristics of the landscape, providing a readily apparent influence and/or introducing elements potentially uncharacteristic in the receiving landscape;
- Medium-low: intermediate rating with combination of criteria from medium magnitude (described above) and low magnitude (described below);
- Low: the Proposed Development would result in a minor alteration to the baseline characteristics of the landscape, providing a slightly apparent influence and/or introducing elements that are characteristic in the receiving landscape;
- Negligible: the Proposed Development would result in a negligible alteration to the baseline characteristics of the landscape, providing a barely discernible influence and/or introducing elements that are substantially characteristic in the receiving landscape; and
- None: the Proposed Development would result in no change to the baseline characteristics of the landscape.

3.3.18 There may also be intermediate levels of magnitude of change, such as high-medium and medium-low, where the change falls between definitions. Criteria that tend towards higher or lower magnitude of change are set out in **Table 3**.



Table 3: Magnitude to Change Criteria – Landscape Receptors

Criteria tending towards higher or lower magnitude			
	High Negligible	Medium	Low
Size or scale of change	Major loss of existing landscape elements which contribute to the landscape character.	Minor or negligible loss of existing landscape elements.	
	Major alteration to pattern of elements, or perception of landscape pattern, through removal or addition of landscape elements.	Minor alteration to pattern of elements, or perception of landscape pattern.	
	Major change to key characteristics which define the distinctive character of the landscape.	Minor change to key characteristics, or changes to characteristics which are not part of inherent distinctiveness.	
	Proposed Development located within or close to landscape receptor and results in large scale change to its landscape character.	Proposed Development located at long distance outside landscape receptor and result in small scale change to its landscape character.	
	Large amount of Proposed Development visible resulting in higher scale of change.	Small amount of Proposed Development visible resulting in lower scale of change.	
	Proposed Development contrasts with other existing wind farms in pattern, scale and relationship to key characteristics, creating a confusing or inconsistent image or relationship to key characteristics.	Proposed Development consolidates existing wind farms, relates consistently to a key characteristic of the landscape and/or has a high level of integration forming a unified and cohesive feature in the landscape.	
Geographic extent	Wide extent of physical change to the landscape.	Limited extent of physical change to the landscape.	
	Proposed Development is visible over long distances.	Proposed Development is visible only at short range.	
	Proposed Development is visible from widespread areas/extensive parts of seascape/ landscape receptor.	Proposed Development is visible from restricted areas/limited parts of seascape/ landscape receptor.	
	Visibility/views of Proposed Development occur over a wider area represented by multiple seascape/ landscape receptors.	Visibility/view of Proposed Development is unique to a particular location of seascape/ landscape.	
Magnitude of Change	High Negligible	Medium	Low

3.3.18.1 Significance of Effects on Landscape Character Receptors

3.3.19 The effect on each landscape character receptor is dependent on all of the factors considered in the sensitivity of the receptor, and the magnitude of change resulting from the Proposed Development. These judgements on sensitivity and magnitude are then combined to arrive at an overall assessment as to whether the Proposed Development would have an effect that is significant or not significant on the landscape character receptor. An assessment of the factors considered in the evaluation of the sensitivity of each landscape character receptor and the magnitude of the change resulting from the Proposed Development are presented



in the assessment in order that the relevant considerations which have informed the significance can be considered transparently. The matrix shown in **Table 1** helps to inform the threshold of significance when combining sensitivity and magnitude to assess significance.

- 3.3.20 A significant effect would occur where the combination of the variables results in the Proposed Development having a defining effect on the landscape character receptor, or where changes of a lower magnitude occur on a landscape character receptor that is of particularly high sensitivity. A not significant effect would occur where the effect of the Proposed Development is not definitive, and the landscape character of the receptor continues to be characterised principally by its baseline characteristics, or where the small scale of change experienced by a high sensitivity receptor is such as to be considered not significant. A major loss or irreversible effect over an extensive area, on elements and/or perceptual aspects that are key to the character of nationally valued landscapes are likely to be of greatest significance. Reversible effects, over a restricted area, on elements and/or perceptual aspects that contribute to but are not key characteristics of the character of landscapes that are of lower value, are likely to be of least significance.



4.0 Visual Assessment

- 4.1.1 The assessment of visual effects is an assessment of how the introduction of the Proposed Development would affect the views available to people and their visual amenity. The assessment of visual effects is carried out in two parts:
- An assessment of the effects that the Proposed Development would have on a series of viewpoints that have been selected to represent the views available to people from representative or specific locations within the study area; and
 - An assessment of the effects that the Proposed Development would have from principal visual receptors, including residents of settlements, motorists using roads and people using recreational routes, features and attractions throughout the study area.
- 4.1.2 The objective of the assessment of effects on visual receptors is to determine what the likely effects of the Proposed Development would be on the people experiencing views across the study area, and whether these effects would be significant or not significant. The methodology for the assessment of visual effects involves the undertaking of a baseline study, evaluation of sensitivity, magnitude of change and an assessment of significance.

4.2 Visual Baseline and Preliminary Assessment

- 4.2.1 The visual baseline establishes the area in which the Proposed Development may be visible, the different groups of people who may experience views of the Proposed Development, the viewpoints where they would be affected and the nature of the views at those points. The baseline description of the groups of people (referred to as visual receptors) and viewpoints that may be affected is primarily determined by the ZTV. An overview of the visual baseline is described, and a preliminary assessment identifies visual receptors that may experience significant effects, which require to be assessed in full. A full description of the baseline is provided for each visual receptor that may experience significant effects. Those receptors for which likely significant effects which are not predicted are scoped out of further detailed assessment but are noted with reasons given for their exclusion. The baseline study establishes the visual baseline in relation to the following matters:
- The area from which the Proposed Development may be visible, that is land from which it may potentially be seen, is established and mapped using an initial ZTV of the Proposed Development;
 - The location, type and number of visual receptors experiencing visibility of the Proposed Development, the likely views experienced and the activity / occupation they are engaged in;
 - Selection of viewpoints from within the ZTV, including representative viewpoints selected to represent the experience of different types of visual receptor and specific viewpoints selected because they are key/promoted viewpoints in the landscape;
 - The location, character and type of each viewpoint with an indication of the type of visual receptor likely to be experiencing the view from each viewpoint;
 - The nature of the view in terms of both the direction of view towards the Proposed Development as well as the wider available view, making reference



to the principal orientation, focal features, and visible extents in terms of both horizontal degrees and distance;

- The character of the view in terms of its content and composition, its horizontal and vertical scale as well as depth and sense of perspective, important attributes such as prominent skylines and focal points and ultimately identifying the defining patterns and features which characterise the view;
- Scenic qualities of the view in terms of an individual or combination of characteristics, in the view that contribute to distinctiveness and identify; and
- The influence of human intervention and how the addition of artefacts and modification through land use affect the baseline situation. This may include operational wind farms where they are a feature of the baseline visual context.

4.2.2 The visual baseline also describes current pressures that may cause change to the visual amenity of the area in the future, in particular drawing on information for wind energy developments that are not yet present in the landscape but are at other stages in the project and consenting process. Operational and under construction wind energy developments are regarded as part of the baseline visual context. Any changes resulting from the Proposed Development are assessed within this context in the assessment of landscape and visual effects.

4.3 Assessment of Visual Effects

4.3.1 Sensitivity of Visual Receptors

4.3.2 The sensitivity of visual receptors is determined by a combination of the value of the view and the susceptibility of the visual receptors to the change in views and visual amenity.

4.3.2.1 Value of the View

4.3.3 The value of a view or series of views is a reflection of the recognition and the importance attached either formally through identification on mapping or being subject to planning designations, or informally through the value which society attaches to the view(s) the high strength of which is assessed and verified through field work. The value of a view is classified as high, high-medium, medium, medium-low or low and the basis for this assessment is made clear using evidence and professional judgement, based on the following criteria:

- Formal recognition: The value of views can be formally recognised through their identification on OS or tourist maps as formal viewpoints, sign-posted and with facilities provided to add to the enjoyment of the viewpoint such as parking, seating and interpretation boards. Specific views may be afforded protection in local planning policy and recognised as valued views. Specific views can also be cited as being of importance in relation to landscape or heritage planning designations, for example the value of a view would be increased if it presents an important vista from a designed landscape, lies within or overlooks a designated landscape area such as a National Scenic Area, or an area of scenic quality which implies a greater value to the visible landscape; and
- Informal recognition: Views that are well-known at a local level can have an increased value, even if there is no formal recognition or designation. Views or



viewpoints are sometimes informally recognised through references in art or literature, and this can also add to their value. A viewpoint that is visited or used by a large number of people would tend to have greater importance than one gained by very few people, although this is not always the case. Specific or sequential views that from a particular combination of key landscape characteristics, have a defined scenic quality or qualities can also add to the value assessed.

4.3.3.1 Susceptibility to Change

4.3.4 Visual susceptibility is a function of:

- The occupation or activity of people (visual receptors) experiencing the view. The occupation or activity which receptors are engaged in is described for viewpoints and principal visual receptors. The most common groups of receptors considered in the visual assessment include residents, road-users, workers and walkers;
- The extent to which their attention or interest may be focused on views. Viewers whose attention is focused on the surrounding landscape, walkers, for example are likely to have a higher sensitivity, as would residents of properties who have a heightened appreciation of surrounding views. Viewers travelling in cars or on trains would tend to have a lower sensitivity as their view is transient and moving. The least susceptible receptors are usually people at their place of work as they are less susceptible to changes in the view; and
- The visual amenity they experience. The experience of the visual receptor relates to the extent to which the viewer's attention or interest may be focused on the view and the visual amenity they experience at a particular location. The susceptibility to change of the viewer may be influenced by the viewer's attention or interest in the view, which may be focused in a particular direction, from a static or transitory position and over a long or short duration. For example, if the outlook from a route is open and unobstructed the experience of the visual receptor would be altered more notably than if the experience related to a glimpsed view from a car travelling at high speed. The visual amenity experienced by the viewer also varies depending on the presence and relationship of visible elements, features or patterns experienced in the view.

4.3.5 In line with the LI GLVIA3 clarifications, visual susceptibility is not influenced by the type of development proposed, which is assessed as part of magnitude of change.

4.3.5.1 Sensitivity Rating

4.3.6 An overall level of sensitivity is applied for each visual receptor or view: high, high-medium, medium, medium-low, low; by combining individual assessments of the value of the receptor and its susceptibility to change. Each visual receptor, meaning the person or group of people likely to be affected is assessed in terms of their sensitivity. The basis for the assessments is made clear using evidence and professional judgement in the evaluation of each receptor. Criteria that tend towards higher or lower sensitivity are set out in **Table 4**.



Table 4: Sensitivity to change – visual receptors

Criteria tending towards higher or lower sensitivity		
	High Low	Medium
Value	Specific viewpoint identified in OS maps and/or tourist information and signage. Facilities provided at viewpoint to aid the enjoyment of the view. View afforded protection in planning policy. View is within or overlooks a designated landscape or has high scenic quality, which implies a higher value to the visible landscape. View has informal recognition and well-known at a local level. View or viewpoint is recognised through references in art or literature.	Viewpoint not identified in OS maps or tourist information and signage. No facilities provided at viewpoint to aid enjoyment of the view. View is not afforded protection in planning policy. View is not within, nor does it or overlook, a designated landscape or have high scenic quality. View has no informal recognition. View or viewpoint is not characteristic through references in art or literature.
Susceptibility to Change	People, whether residents or visitors, who are engaged in outdoor recreation whose attention and interest is likely to be focused on the landscape or on particular views. Visitors to heritage assets, or to other attractions, where views of the surroundings are an important contributor to the experience. Residents that gain static, long-term views of the surrounding landscape in their principal outlook or communities where views contribute to the landscape setting enjoyed by residents. A view that is focused in a specific directional vista, with notable features of interest in a particular part of the view. Viewers experience a high level of visual amenity at the location. A view of an undeveloped landscape with little or no built development and/or human influence.	Viewers whose main attention is not focused on the landscape or on particular views, such as people at work whose attention is likely to be focused on their work, or specific forms of recreation that do not involve or depend upon appreciation of views of the landscape. Viewers whose main attention is not focused on their surroundings, particular assets or attractions. Travellers on road, rail or other transport routes, where the view is of short duration, transient and dynamic. Where travel involves recognised scenic routes, awareness of views and susceptibility to change is likely to be higher. Open views with no specific point of interest. Viewers experience a low level of visual amenity at the location. A view of a developed, industrial landscape where built elements and structures are present.
Sensitivity to Change	High Low	Medium

4.3.7 Magnitude of Change on Views

4.3.8 The magnitude of change on views is primarily an expression of the scale of the change that would result from the Proposed Development and is dependent on a



number of variables regarding the size or scale of the change. An assessment is also made of the geographical extent of the area over which this would occur and the duration and reversibility of such changes.

4.3.8.1 Size or Scale

4.3.9 An assessment is made about the size or scale of change in the view that is likely to be experienced as a result of the Proposed Development, based on the following criteria:

- The distance between the visual receptor or viewpoint and the Proposed Development. Generally, the greater the distance, the lower the magnitude of change, as the Proposed Development would constitute a smaller scale component of the view;
- The amount and size of the Proposed Development that would be seen. Visibility may range from one blade tip to all of the turbines. Generally, the larger the Proposed Development appears in the view, and the more of the Proposed Development that can be seen, the higher the magnitude of change;
- The scale of the change in the view, with respect to the loss or addition of features in the view and changes in its composition. The Proposed Development may appear in a similar part of the view to that which includes an operational wind farm, or it may appear close to or as an extension to an existing wind farm and its scale of change is assessed in the context of these existing views;
- The field of view available and the proportion of the view that is affected by the Proposed Development. Generally, the more of a view that is affected, the higher the magnitude of change would be. If the Proposed Development extends across the whole of the open part of the outlook, the magnitude of change would generally be higher as the full view would be affected; Conversely, if the Proposed Development covers just a part of an open, expansive and wide view, the magnitude of change is likely to be reduced as the Proposed Development would not affect the whole open part of the outlook;
- The scale and character of the context within which the Proposed Development would be seen and the degree of contrast or integration of any new features with existing landscape elements, in terms of scale, form, mass, line, height, colour and motion. Contrasts and changes may arise particularly as a result of the more notable rotation movement of the wind turbine blades, as a characteristic that gives rise to effects of the Proposed Development;
- The consistency of image of the Proposed Development in relation to other developments. The magnitude of change of the Proposed Development is likely to be lower if its wind turbine height, arrangement and layout design are broadly similar to other wind farm developments in the views, as they are more likely to appear as relatively simple and logical components of the landscape;
- The uniformity of appearance of the Proposed Development in different views. If the Proposed Development appears relatively uniform and consistent in appearance from different viewpoints and viewing angles, in a similar setting and familiar form, this tends to reduce the magnitude of change. If, on the other hand, it appears inconsistent in image, scale and appearance, or from a variety of different angles, and is seen in a different form and setting, the



magnitude of change is likely to be higher as it would be a variable and less familiar component of views;

- The extent of the wind energy developed skyline. If the Proposed Development would add notably to the wind energy developed skyline in a view, extending the lateral spread of development or increasing the perceived connection between other wind farms, the magnitude of change would tend to be higher;
- Where a particular scenic quality or combined scenic qualities are strongly expressed, the extent to which the Proposed Development would erode or detract from the appreciation of those qualities;
- The number and scale of developments seen simultaneously or sequentially. Generally, the greater the number of clearly separate developments that are visible, the higher the magnitude of change would be, whereas an extension to an existing wind farm would tend to result in a lower magnitude of change than a separate, new wind farm; and
- The scale and form comparison between developments. If the Proposed Development is of a similar scale and form to other visible developments, particularly those seen in closest proximity to it, the magnitude of change would generally be lower as it would have more integration with the other wind farm projects and would be less apparent as an addition.

4.3.9.1 Geographical Extent

4.3.10 The geographic area over which the visual effects would be experienced is also assessed as a modifier of the magnitude of change, which is distinct from the size or scale of effect. The extent of the effects would vary depending on the specific nature of the Proposed Development and is principally assessed through analysis of the extent of visibility of the Proposed Development from visual receptors. For example - the extent of the visual receptor (a road, footpath or settlement for example) that would experience changes through visibility of the Proposed Development; and / or the extent to which the change would affect views, whether this is unique to a particular viewpoint or if similar visual changes occur over a wider area represented by the viewpoint. If the Proposed Development is visible from extensive areas, the overall change is likely to be higher than if it is visible from a limited part of a receptor.

- High: the Proposed Development would result in a high level of alteration to the baseline view, providing the prevailing influence and/or introducing elements that are substantially uncharacteristic in the receiving view;
- High-medium: Intermediate rating with combination of criteria from high magnitude (described above) and medium magnitude (described below);
- Medium: the Proposed Development would result in a moderate alteration to the baseline view, providing a readily apparent influence and/or introducing elements potentially uncharacteristic in the receiving view;
- Medium-low: Intermediate rating with combination of criteria from medium magnitude (described above) and low magnitude (described below);



- Low: the Proposed Development would result in a minor alteration to the baseline view, providing a slightly apparent influence and/or introducing elements that are characteristic in the receiving view;
- Negligible: the Proposed Development would result in a negligible alteration to the baseline view, providing a barely discernible influence and/or introducing elements that are substantially characteristic in the receiving view; and
- None: the Proposed Development would in no way change to the baseline characteristics of the view.

4.3.11 There may also be intermediate levels of magnitude of change, such as high-medium or medium-low, which is an intermediate rating with a combination of criteria from high or medium magnitude of change category. Criteria that tend towards higher or lower magnitude of change are set out in **Table 5**.

Table 5: Magnitude of Change Criteria – Visual Receptors

Criteria tending towards higher or lower magnitude			
	High Negligible	Medium	Low
Size or scale of change	Large scale change in the view resulting from loss and/or addition of features and changes in its composition.		Small scale change in the view resulting from loss and/or addition of features and changes in its composition.
	Proposed Development located in close proximity to the viewpoint and would form large scale component of the view.		Proposed Development located at long distance from the viewpoint and would form small scale component of the view.
	All or majority of the Proposed Development would be visible in the view e.g. full towers and rotor sweep.		Limited amount of the Proposed Development would be visible in the view e.g. extremity of blade tips.
	Proposed Development effects large proportion of available field of view.		Proposed Development effects small proportion of available field of view.
	Proposed Development has high degree of contrast/low degree of integration with existing landscape elements, in terms of scale, form, mass, line, height, colour and texture.		Proposed Development has low degree of contrast/high degree of integration with existing landscape elements, in terms of scale, form, mass, line, height, colour and texture.
	Proposed Development appears inconsistently, in a different setting and/or form each time it is visible.		Proposed Development appears consistent, in a similar setting and/or form each time it is visible.
	Proposed Development contrasts with other existing wind farms in pattern, scale and relationship to key characteristics, creating a confusing or inconsistent image or relationship to key characteristics.		Proposed Development consolidates existing wind farms, relates consistently to a key characteristic of the landscape and/or has a high level of integration forming a unified and cohesive feature in the landscape.
Geographic Extent	Extensive / long distance	Scattered / mid-range	Limited / short



	Proposed Development is visible over long distances. Proposed Development is visible from widespread areas/extensive parts of visual receptor. Visibility/views of Proposed Development occur over a wider area represented by multiple viewpoints.	Proposed Development is visible only at short range. Proposed Development is visible from restricted areas/limited parts of visual receptor. Visibility/view of Proposed Development is unique to a particular location or viewpoint.
Magnitude of Change	High —————> Medium —————> Low —————> Negligible	

4.3.12 Significance of Effects on Views

4.3.13 The significance of the effect on each view is dependent on all of the factors considered in the sensitivity of the view, and the magnitude of change resulting from the Proposed Development. These judgements on sensitivity and magnitude are combined to arrive at an overall assessment as to whether the Proposed Development would have an effect that is significant or not significant on the visual receptor.

4.3.14 **Table 1** helps to inform the threshold of significance when combining sensitivity and magnitude to assess the significance of effect. A significant effect would occur where the combination of the variables results in the Proposed Development having a defining effect on the view or where changes of a lower magnitude occur on a view or visual receptor that is of particularly high sensitivity. A not significant effect would occur where the appearance of the Proposed Development is not definitive, and the view continues to be defined principally by its baseline characteristics; or where the small scale of change is experienced by a high sensitivity receptor. Irreversible, long-term effects on people who are particularly sensitive to changes in views and visual amenity are more likely to be significant, as are effects on people at recognised viewpoints or views judged to have high scenic quality. Large-scale changes which introduce new, non-characteristic or discordant elements into the view are also more likely to be significant than small changes or changes involving features already present within the view.

4.3.15 The assessment of visual effects assumes clear weather and optimum viewing conditions. This means that effects that are assessed to be significant may be not significant under different, less clear conditions. Viewing conditions and visibility tend to vary considerably and therefore the likelihood of effects resulting from the Proposed Development would vary greatly dependent according to the prevailing viewing conditions.



5.0 Nature of Effects

- 5.1.1 The nature of effects refers to whether the landscape and/or visual effect of the Proposed Development is positive or negative (herein referred to as 'beneficial' and 'adverse'). Guidance provided by the Landscape Institute on the nature of effect in GLVIA3 states that 'in the LVIA, thought must be given to whether the likely significant landscape and visual effects are judged to be positive (beneficial) or negative (adverse) in their consequences for landscape or for views and visual amenity', but it does not provide guidance as to how that may be established in practice. The nature of effect is therefore one that requires interpretation and, where applied, this involves reasoned professional opinion.
- 5.1.2 In relation to many forms of development, the LVIA will identify 'beneficial' and 'adverse' effects by assessing these under the term 'Nature of Effect'. The landscape and visual effects of wind farms are difficult to categorise in either of these brackets as, unlike other disciplines, there are no definitive criteria by which the effects of wind farms can be measured as being categorically 'beneficial' or 'adverse'. In some disciplines, such as noise or ecology, it is possible to quantify the effect of a wind farm in numeric terms, by objectively identifying or quantifying the proportion of a receptor that is affected by the Proposed Development and assessing the nature of that effect in justifiable terms. However, this is not the case in relation to landscape and visual effects where the approach combines quantitative and qualitative assessment.
- 5.1.3 Generally, in the development of 'new' wind farms, a precautionary approach is adopted, which assumes that significant landscape and visual effects will be weighed on the adverse side of the planning balance. Unless it is stated otherwise, the effects considered in this assessment are considered to be adverse. Beneficial or neutral effects may, however, arise in certain situations and are stated in the assessment where relevant, based on the following definitions:
- Beneficial effects contribute to the landscape and visual resource through the enhancement of desirable characteristics or the introduction of new, beneficial attributes. The Proposed Development contributes to the landscape by virtue of good design, even if it contrasts with the existing character. The removal of undesirable existing elements or characteristics can also be beneficial, as can their replacement with more appropriate components;
 - Neutral effects occur where the Proposed Development fits with the existing landscape character or visual amenity. The Proposed Development neither contributes to nor detracts from the landscape and visual resource and can be accommodated with neither beneficial or adverse effects, or where the effects are so limited that the change is hardly noticeable. A change to the landscape and visual resource is not considered to be adverse simply because it constitutes an alteration to the existing situation; and
 - Adverse effects are those that detract from the landscape character or quality of visual attributes experienced, through the introduction of elements that contrast, in a detrimental way, with the existing characteristics of the landscape and visual resource, or through the removal of elements that are key in its characterisation.



6.0 Duration and Reversibility

- 6.1.1 The EIA Regulations require a description of the likely significant effects on factors including (among other things) “*short-term, medium-term and long-term, permanent and temporary effects*”.
- 6.1.2 Duration (short, medium or long-term) and reversibility (permanent or temporary) are separate but linked considerations. Duration of effects are judged on a scale as long-term, medium-term and short-term effects, defined in this methodology as follows:
- Long-term – more than 10 years;
 - Medium-term – 5 to 10 years; and
 - Short-term – 1 to 4 years.
- 6.1.3 Reversibility is a judgement about the degree of permanence or temporary nature of an effect, determined by the prospects and the practicality of the particular effect being reversed and the time period over which this may occur. Some forms of development can be considered permanent, while others can be considered temporary or reversible since they have a limited operational life and would be removed and/or the land reinstated.
- 6.1.4 The effect of the Proposed Development is considered to be long term and reversible, in that the wind turbines and infrastructure can be removed and their effects largely reversed at the end of the 40 year operational period. The effect of the construction of the Proposed Development is assessed as temporary and short-term in this LVIA. Other infrastructure and operations such as the construction processes and plant (including tall cranes and heavy machinery for wind turbine erection) and construction and storage compounds would be apparent only during the initial construction period of the Proposed Development and are assessed as short-term and reversible effects. Should decommissioning of any part of the Proposed Development be required e.g. failure of a wind turbine beyond economic repair, it is considered that any effects would be less than those resulting from construction of the Proposed Development, and as such this potential for decommissioning has been scoped out of further assessment.



7.0 Assessment of Cumulative Effects

7.1 Introduction

- 7.1.1 The Cumulative Impact Assessment (CIA) takes into account the impact associated with the Proposed Development together with other relevant plans, projects and activities. Cumulative effects are therefore the additional or combined effect of the Proposed Development in combination with the effects from a number of different projects, on the same receptor or resource.
- 7.1.2 GLVIA3 (Landscape Institute and IEMA 2013, para 7.8) defines cumulative landscape and visual effects as those that “*may result from an individual project that is being assessed interacting with the effects of other Proposed Developments in the area*” and that cumulative effects (para 3.22) “*are additional effects caused by the Proposed Development when considered with other Proposed Developments of the same or different types*”.
- 7.1.3 NatureScot's guidance, 'Assessing the Cumulative Impact of Onshore Wind Energy Developments' (2021) is widely used to inform the specific assessment of the cumulative effects of wind farms. This guidance states that “*The purpose of a Cumulative Landscape and Visual Impact Assessment (CLVIA) is to describe, visually represent and assess the ways in which a proposed wind farm would have additional impacts when considered with other consented or proposed wind farms*” (NatureScot, 2021). The guidance also defines cumulative landscape effects and cumulative visual effects as follows:
- “*Cumulative impacts can change either the physical fabric of character of the landscape, or any special values attached to it*” (NatureScot 2021, p7).
 - “*Cumulative impacts on visual amenity can be caused by ‘combined visibility’ and/or ‘sequential impacts’*”. (NatureScot 2021, p7).
- 7.1.4 Cumulative effects are assessed in this SLVIA as the additional changes caused by the Proposed Development in conjunction with other similar developments arising in a number of relevant cumulative development scenarios (and not the combined totality of the cumulative effect of all past, present and future proposals together with the Proposed Development).
- 7.1.5 The degree to which cumulative effects occur, or may occur, as a result of more than one wind farm/development being constructed/becoming operational are a result of:
- The distance between individual wind farms/relevant developments;
 - The interrelationship between their ZTVs;
 - The overall character of the landscape and its sensitivity to wind farms/other relevant development;
 - The siting, scale and design of the wind farms/developments themselves; and
 - The way in which the landscape is experienced.

7.2 Scope of the Cumulative Assessment

- 7.2.1 NatureScot's guidance highlights that “*the focus of the cumulative assessment will be on the additional effect of the project in conjunction with other developments of*



the same type (as for example, in the case of wind farms)”. In accordance with this guidance, the cumulative assessment focuses on the addition of the Proposed Development to other wind farm development. Wind energy development data was sourced directly from relevant local authorities, a range of wind energy developer web sites and local authority online planning application portals.

- 7.2.2 NatureScot guidance also highlights that *“The assessment should be proportionate to the likely impacts and all CLVIA should accord with the guidelines within GLVIA3. The emphasis should be on the production of relevant and useful information, highlighting why the proposals assessed have been included and why others have been excluded, rather than the provision of a large volume of information.”* (NatureScot 2021, p8).
- 7.2.3 The cumulative assessment therefore focuses on identifying cumulative effects which are likely to be a key consideration in determining the application, rather than an assessment of every potential cumulative effect. The outcome of the cumulative assessment is the identification of any significant cumulative effects that may arise from the addition of the Proposed Development to the cumulative situation, in accordance with NatureScot guidance, which states that cumulative assessment should *“focus on the likely significant impacts and those which are likely to influence the outcome of the consenting process”*.
- 7.2.4 A review of the broad wind farm context within 45km radius has been undertaken including all wind turbine developments that are operational, under construction, consented or at planning application stage and are over 50m to tip in height. It is considered that turbines below 50m in height are unlikely to result in significant cumulative effects with the Proposed Development. The cumulative situation changes frequently as applications are made or withdrawn, and the layouts of submitted application wind farms are changed. It is therefore necessary to decide on a cut-off date when the sites and layouts to be included are fixed, which for the LVIA is 21 April 2026. Any changes in the cumulative wind farm situation after this date are not incorporated in the assessment. Scoping stage sites are also included on the cumulative baseline map for reference.

7.3 Cumulative Development Scenarios

- 7.3.1 In line with GLVIA3 (Landscape Institute and IEMA 2013, para 3.3 and 7.8) and NatureScot (2021), the cumulative LVIA focuses on the cumulative effects arising from the Proposed Development interacting with the effects of other Proposed Developments under the ‘consented’ and ‘application stage’ scenarios described below.
- 7.3.2 GLVIA3 (para 7.13) advises in relation to the baseline, that *“taking ‘the Project’ to mean the main proposal that is being assessed, it is considered that existing schemes and those which are under construction should be included in the baseline for both landscape and visual effects assessments (the LVIA baseline). The baseline for assessing cumulative landscape and visual effects should then include those schemes considered in the LVIA and in addition potential schemes that are not yet present in the landscape but are at various stages in the development and consenting process”*.
- 7.3.3 The LVIA follows this approach and the cumulative effects that would potentially arise from the addition of the Proposed Development into a context that includes existing or under construction wind farms are assessed, with the effects considered against the landscape and visual baseline.



- 7.3.4 The CLVIA separately assesses the cumulative effects of the Proposed Development arising from each of the following relevant scenarios:
- The consented scenario: the cumulative assessment assesses the effect of the Proposed Development in addition to wind farms already present in the landscape (operational/under construction wind farms) and wind farms that are likely to soon be present (consented wind farms) ('the consented scenario'). The cumulative assessment in the consented scenario identifies the magnitude of change that would arise due to the contribution of the Proposed Development, when considered with operational, under construction and consented wind energy developments in the landscape. The effects identified are considered as having some likelihood to arise, on the assumption that consented wind farms will be built and become operational, however, it is sometimes the case that consented wind farms are not ultimately built, which reduces the likelihood of consented scenario effects arising; and
 - The application stage scenario: a further hypothetical scenario is also assessed, that not only takes into the account the operational, under construction and consented wind farms, but also those that have valid (but as yet undetermined) planning applications ('the application stage scenario'). The cumulative assessment in the application stage scenario identifies the magnitude of additional cumulative change that would arise due to the contribution of the Proposed Development, when considered with operational, consented and application stage wind energy developments in the landscape. The effects identified are considered as being less likely to arise, as it is unlikely that all application stage wind farms will gain consent.
- 7.3.5 In line with GLVIA3 and NatureScot guidance, scoping stage sites are generally not considered in detailed assessment due to layout and design uncertainties at the pre-application stages meaning that their potential cumulative impacts are generally not reasonably foreseeable or too uncertain due to a lack of data confidence.

7.4 Types of Cumulative Effect

- 7.4.1 The aim of the cumulative assessment is to identify the additional changes which would be brought about by the Proposed Development when considered in conjunction with other wind farms. In accordance with guidance (NatureScot, 2021), the LVIA for each receptor considered assesses the effect arising from the addition of the Proposed Development to the cumulative situation, and not the overall effect of multiple wind farms. Adjacent developments may complement one another, or may be discordant with one another, and it is the increased or reduced level of significance of effects which arises as a result of this change that is assessed in the cumulative assessment.
- 7.4.2 However, in considering the detailed cumulative effects described within the LVIA, a broad statement relating to the combined cumulative effect of multiple wind farms in the area has also been provided in the LVIA summary.
- 7.4.3 Cumulative Landscape Effects**
- 7.4.4 The cumulative development of wind farms within a particular area may build up to create different types of landscape. Significant cumulative landscape effects may arise where a 'Landscape with wind farms' is created, as a result of the addition of the Proposed Development to other existing or proposed wind farms, which



- results in wind turbines becoming sufficiently prolific that they become a prevailing or key landscape and visual characteristic.
- 7.4.5 The significance of the cumulative landscape effect from the addition of the Proposed Development reflects the intensification of wind farms within the landscape, which is assessed as follows:
- 7.4.6 The Proposed Development forms a separate isolated feature from other wind farms within the landscape, too infrequent and of insufficient influence to be perceived as a characteristic of the area. The cumulative landscape effect of the Proposed Development is unlikely to be significant;
- 7.4.7 The addition of the Proposed Development results in wind farms forming a key characteristic of the landscape, exerting sufficient presence as to establish or increase the extent of a 'landscape with wind farms', but not of sufficient dominance to be a defining characteristic of the area. The cumulative landscape effect of the Proposed Development may be significant or not significant, depending on the sensitivity of the receptor, magnitude of the change and specific effects arising from the Proposed Development; and
- 7.4.8 The addition of the Proposed Development results in wind farms forming the prevailing characteristic of the landscape, seeming to define the landscape as a 'wind farm landscape' character type. The cumulative landscape effect of the Proposed Development is likely to be significant.
- 7.4.9 These effects can occur at varying scales, for example, effecting a local character type, or at a regional level, which is assessed as part of the geographic extent assessment in the LVIA.

7.4.10 Cumulative Visual Effects

- 7.4.11 Cumulative visual effects consist of combined and sequential effects:
- 7.4.12 Combined visibility occurs where the observer is able to see two or more developments from one viewpoint. Combined visibility may either be 'in combination', where several wind farms are within the observer's main angle of view at the same time, or 'in succession', where the observer has to turn to see the various wind farms. The cumulative visual effect of the Proposed Development may be significant or not significant depending on factors influencing the cumulative magnitude of change, such as the degree of integration and consistency of image with other wind farms in combined views; and the position of the development relative to other wind farms and the landscape context in successive views; and
- 7.4.13 Sequential visibility occurs when the observer has to move to another viewpoint to see different developments. Sequential effects are assessed along regularly used routes such as major roads, railway lines and footpaths. The occurrence of sequential effects range from 'frequently sequential' (the features appear regularly and with short time lapses between, depending on speed of travel and distance between the viewpoints) to 'occasionally sequential' (long time lapses between appearances, because the observer is moving slowly and/or there are large distances between the viewpoints). The cumulative visual effect of the Proposed Development is more likely to be significant when frequently sequential.
- 7.4.14 The methodology for the assessment of cumulative landscape and visual effects involves the undertaking of a baseline study of the existing and potential future



wind farm/other relevant development influence, an evaluation of sensitivity, magnitude of change and the resulting significance of cumulative effects.

7.5 Cumulative Sensitivity of Landscape and Visual Receptors

- 7.5.1 In evaluating cumulative sensitivity, the value component of the assessments of sensitivity would not change, however, in an evolving wind farm/other relevant development context, the susceptibility of a landscape and visual receptor to the introduction of the Proposed Development may increase or decrease. This is therefore re-evaluated based on the criteria contained in the landscape and visual susceptibility criteria sections of this methodology.

7.6 Cumulative Magnitude of Change

- 7.6.1 The cumulative magnitude of change is an expression of the degree to which landscape character receptors and visual receptors/views would be changed by the addition of the Proposed Development to wind farms/other relevant developments that are already operational, consented or at application stage. Where required, scoping stage wind farms and other early stage developments may exceptionally be included. The cumulative magnitude of change is assessed according to a number of criteria, described as follows:
- The location of the Proposed Development in relation to other wind farm developments. If the Proposed Development is seen in a part of the view or setting to a landscape receptor that is not affected by other development, this would generally increase the cumulative magnitude of change as it would extend influence into an area that is currently unaffected by development. Conversely, if the Proposed Development is seen in the context of other sites, the cumulative magnitude of change may be lower as development is not being extended to otherwise undeveloped parts of the outlook or setting. This is particularly true where the scale and layout of the Proposed Development is similar to that of the other sites as where there is a high level of integration and cohesion with an existing site, the various developments may appear as a single site;
 - The extent of the developed skyline. If the Proposed Development would add notably to the developed skyline in a view, the cumulative magnitude of change would tend to be higher as skyline development can have a particular influence on both views and landscape receptors;
 - The number and scale of developments seen simultaneously or sequentially. Generally, the greater the number of clearly separate developments that are visible, the higher the cumulative magnitude of change would be. The addition of the Proposed Development to a view or landscape where a number of smaller developments are apparent would usually have a higher cumulative magnitude of change than one or two large developments as this can lead to the impression of a less co-ordinated or strategic approach;
 - The scale comparison between developments. If the Proposed Development is of a similar scale to other visible developments, particularly those seen in closest proximity to it, the cumulative magnitude of change would generally be lower as it would have more integration with the other sites and would be less apparent as an addition to the cumulative situation;



- The consistency of image of the Proposed Development in relation to other developments. The cumulative magnitude of change of the Proposed Development is likely to be lower if its turbine height, arrangement and layout design are broadly similar to other developments in the landscape, as they are more likely to appear as relatively simple and logical components of the landscape;
- The context in which the developments are seen. If developments are seen in a similar landscape context, the cumulative magnitude of change is likely to be lower due to visual integration and cohesion between the sites. If developments are seen in a variety of different landscape settings, this can lead to a perception that wind farm development is unplanned and uncoordinated, affecting a wide range of landscape characters and blurring the distinction between them; and
- The magnitude of change of the Proposed Development as assessed in the main assessment. The lower this is assessed to be, the lower the cumulative magnitude of change is likely to be. Where the Proposed Development itself is assessed to have a negligible magnitude of change on a view or receptor there would not be a cumulative effect as the contribution of the Proposed Development would equate to the 'no change' situation.

7.6.2 Definitions of cumulative magnitude of change are applied in order that the process of assessment is made clear. These are:

- High: where the addition of the Proposed Development to the landscape or view would result in a high incremental change, loss or addition to the cumulative situation;
- Medium: where the addition of the Proposed Development would result in a medium incremental change, loss or addition to the cumulative situation;
- Low: where the addition of the Proposed Development would result in a low incremental change, loss or addition to the cumulative situation;
- Negligible: where the addition of the Proposed Development to other wind energy developments in the landscape or view would result in a negligible incremental change, loss or addition to the cumulative situation; and
- None: where the addition of the Proposed Development to other wind energy developments in the landscape or view would have no change to the cumulative wind farm situation and its addition equates to a 'no change' situation.

7.6.3 There may also be intermediate levels of cumulative magnitude of change: high-medium and medium-low; where the change falls between two of the definitions.

7.7 Significance of Cumulative Effects

7.7.1 The objective of the cumulative assessment is to determine whether any effects that the Proposed Development would have on landscape receptors and visual receptors, when seen or perceived in combination with other existing and proposed sites, would be significant or not significant. Significant cumulative landscape and visual effects arise where the addition of the proposed wind turbines or other similar/large scale development to a specific baseline, leads to wind farms becoming a prevailing landscape and visual characteristic of a



receptor that is sensitive to such change. Cumulative effects may evolve as follows:

- A small scale, single wind farm would often be perceived as a new or 'one-off' landscape feature or landmark within the landscape. Except at a local site level, it usually cannot change the overall existing landscape character, or become a new characteristic element of a landscape;
- With the addition of further wind farm development, wind farms can become a characteristic element of the landscape, as they appear as landscape elements or components that are repeated. Providing there was sufficient 'space' or undeveloped landscape/skyline between each wind farm, or the overlapping of several wind farms was not too dense; the Proposed Developments or other similar/large scale developments would appear as a series of developments within the landscape and would not necessarily become the dominant or defining characteristic of the landscape nor have significant cumulative effects; and
- The next stage would be to consider larger commercial wind farms/developments and/or an increase in the number of wind farms/developments within an area that either overlap or coalesce and/or 'join-up' along the skyline. The effect is to create a landscape where the wind farm element is a prevailing characteristic of the landscape. The result would be to materially change the existing landscape character of a landscape type, or the landscape in a view and resulting in a significant cumulative effect. A landscape characterised by wind farm development may already exist as part of the baseline landscape context.

7.7.2 In relation to the significance of cumulative landscape effects, GLVIA3 notes (paragraph 7.28) that *"the most significant cumulative landscape effects are likely to be those that would give rise to changes in the landscape character of the study area of such an extent as to have major effects on its key characteristics and even, in some cases, to transform it into a different landscape type. This may be the case where the project being considered itself tips the balance through its additional effects."*

7.7.3 GLVIA3 (paragraph 7.38) goes on to state the following in relation to the significance of cumulative visual effects:

"Higher levels of significance may arise from cumulative visual effects related to:

- *developments that are in closer proximity to the main project and are clearly visible together in views from the elected viewpoints.*
- *developments that are highly inter-visible, with overlapping ZTVs – even though the individual developments may be at some distance from the main project and from individual viewpoints, and when viewed individually not particularly significant, the overall combined cumulative effect on a viewer at a particular viewpoint may be more significant."*

7.7.4 It should be noted that if the Proposed Development itself is assessed to have a significant effect, it does not necessarily follow that the cumulative effect would also be significant.

7.7.5 Less extensive, but nevertheless significant cumulative landscape and visual effects may also arise as a result of the addition of the Proposed Development



where it results in a landscape or view becoming defined by the presence of more than one wind farm or similar/large scale development, so that other patterns and components are no longer definitive, or where the Proposed Development contrasts with the scale or design of an existing or Proposed Development. Higher levels of significance may arise from cumulative landscape and visual effects related to the Proposed Development being in close proximity to other wind farms when they are clearly visible together in views, however provided that the Proposed Development is designed to achieve a high level of visual integration, with few notable visual differences between wind farms, these effects may not necessarily be significant. In particular, the effects of a wind farm extension are often less likely to be significant, where the effect is concentrated, providing that the design of the wind farms are compatible, and that the capability of the landscape to accommodate the change is not exceeded.

- 7.7.6 The capability of the landscape or view to accommodate the change proposed may be assessed as being exceeded where the landscape or visual receptor becomes defined by wind farm development, or if the Proposed Development extends across landscape character types or clear visual/topographic thresholds in a view. More substantial cumulative effects may result from wind farms that have some geographical separation, but remain highly inter-visible, potentially resulting in extending effects into new areas, such as an increased presence of wind farm development on a skyline, or the creation of multiple, separate wind farm defined landscapes.
- 7.7.7 In accordance with guidance (NatureScot, 2021), the LVIA for each receptor considered assesses the effect arising from the addition of the Proposed Development to the cumulative situation, and not the overall effect of multiple wind farms. However, in considering the detailed cumulative effects described within the LVIA, a broad statement relating to the combined cumulative effect of multiple wind farms in the area has also been provided in the LVIA summary.



8.0 Assessment of Lighting Effects

8.1 Introduction and guidance

- 8.1.1 The Civil Aviation Authority (CAA) requires that 'en-route obstacles' at or above 150m above ground level are lit with visible lighting to assist their detection by aircraft. As such, there is potential that lighting of the Proposed Development may be visible at night.
- 8.1.2 A night-time Aviation Lighting Impact Assessment has been undertaken, which evaluates the potential impact on the qualities of the landscape (as an environmental resource in its own right), and the views and visual amenity of visual receptors (people) from the introduction of visible aviation lighting.
- 8.1.3 The assessment of visible aviation lighting has been undertaken in accordance with Guidance on Aviation Lighting Impact Assessment (NatureScot, 2024), in distinct steps:
- Step 1: Defining the lighting proposal;
 - Step 2: Understanding the baseline; and
 - Step 3: Assessing the effects of the lighting.
- 8.1.4 The assessment of effects of the lighting of the Proposed Development has also been undertaken in accordance with other relevant regulations and guidance contained in the following:
- Annex 14 to the Convention on International Civil Aviation (Volume 1 - Aerodrome Design and Operations) (Eighth Edition) (International Civil Aviation Organisation, 2018);
 - Civil Aviation Publication (CAP) 764 Civil Aviation Authority (CAA) Policy and Guidance on Wind Turbines Version 6 (CAA, 2016);
 - CAP 764 Version 7 (Draft) issued for comment in (CAA, 2020);
 - CAA Policy Statement: Lighting of Onshore Wind Turbine Generators in the United Kingdom with a maximum blade tip height at, or in excess of, 150m Above Ground Level (CAA, 2017);
 - General pre-application and scoping advice for onshore wind farms (NatureScot, September 2020);
 - Guidance Note 1 for the Reduction of Obtrusive Light (Institute of Lighting Professionals (ILP), 2021); and
 - Statutory Instruments 2016 no. 275 The Air Navigation Order 2016 Air Navigation Order (ANO) (Article 222).
- 8.1.5 GLVIA3 (page 103) provides the following guidance on the assessment of lighting effects: *"For some types of development the visual effects of lighting may be an issue. In these cases it may be important to carry out night-time 'darkness' surveys of the existing conditions in order to assess the potential effects of lighting and these effects need to be taken into account in generating the 3D model of the scheme. Quantitative assessment of illumination levels, and incorporation into models relevant to visual effects assessment, will require input from lighting*



- engineers, but the visual effects assessment will also need to include qualitative assessments of the effects of the predicted light levels on night-time visibility.”.*
- 8.1.6 GLVIA3 (page 60) also provides the following guidance with regards to mitigation of obtrusive light: ‘lighting for safety or security purposes may be unavoidable and may give rise to significant adverse effects; in such cases, consideration should be given to different ways of minimising light pollution and reference should be made to appropriate guidance, such as that provided by the Institution of Lighting Professionals (ILP, 2011)’.
- 8.1.7 Guidance produced by the Institute of Lighting Professionals (ILP) (2011) (GN01:2011) is useful in setting out some key terminology that is used in this visual assessment of WTG lighting:
- *“Obtrusive light - whether it keeps you awake through a bedroom window or impedes your view of the night sky, is a form of pollution, which may also be a nuisance in law and which can be substantially reduced without detriment to the lighting task.*
 - *Skyglow – the brightening of the night sky;*
 - *Glare – the uncomfortable brightness of a light source when viewed against a darker background;*
 - *Light intrusion – the spilling of light beyond the boundary of the property or area being lit, are all forms of obtrusive light which may cause nuisance to others”.*
- 8.1.8 CPRE also identifies these same broad terms as the three types of light pollution:
- *“Skyglow – the pink or orange glow we see for miles around towns and cities, spreading deep into the countryside, caused by a scattering of artificial light by airborne dust and water droplets.*
 - *Glare – the uncomfortable brightness of a light source.*
 - *Light intrusion – light spilling beyond the boundary of the property on which a light is located, sometimes shining through windows and curtains”.*

8.1.9 Types of effect at night

- The effect of the visible lights will be dependent on a range of factors, including the intensity of lights used, the clarity of atmospheric visibility, the degree of negative/positive vertical angle of view from the light to the receptor and vary with the time of year and geographic location.
- The assessment of the lighting of the Proposed Development is primarily intended to determine the likely significant effects on the visual resource, i.e. it is primarily an assessment of the visual effects of aviation lighting on views experienced by people at night. The matter of visible aviation and marine navigation lighting assessment is primarily a visual matter and the assessment presented focusses on that premise.
- As landscape features become less distinct in low light conditions, at twilight, during the night and at dawn, perceptions of darkness and remoteness may become heightened as constituent elements of landscapes, where they are uninterrupted by artificial light. The assessment therefore also considers effects of the aviation lighting on perceived character, focusing on how distinctive landforms and enclosing skylines, which remain perceptible at dusk and during hours of darkness, add to the perception of night-time character and how these may be affected. With respect to landscape character, the assessment focuses on effects on perceived landscape sensitivities, in particular where



qualities of wildness, remoteness and lack of man-made elements are features of the landscape; and on areas where a particularly distinctive landform or characteristic may be perceived at night with lights on the skyline (i.e. where a perceived character effect may occur as a component of visual effects); and for designations where dark skies are a specific 'special quality' defined in their citation.

- Annex 14 to the Convention on International Civil Aviation (ICAO, 2018) (Table 6-1) indicates a requirement for medium-intensity (type C) lighting to be switched on when 'night' has been reached (below 50 cd/m²). It does not require aviation lighting to be on during 'day' (above 500 cd/m²) or during 'twilight' (50-500cd/m²), which is the period when landscape character may be most discernible.
- Schedule 1 of the Air Navigation Order 2016 also defines night as *"the time from half an hour after sunset until half an hour before sunrise (both times inclusive), sunset and sunrise being determined at surface level"*. This equates to approximately to the end of civil twilight and beginning of nautical twilight.
- In order to consider a possible worst-case, it is assumed that aviation lighting may be seen for a short time towards the end of the twilight period (during nautical and astronomical twilight) when some recognition of landscape features/profiles/shapes and patterns may be possible. It is considered, however, that a level of recognition after the end of civil twilight, when it is technically 'night' (and aviation lighting is switched on), does not amount to an ability to appreciate in any detailed landscape character differences and subtleties, nor does it provide sufficient natural light conditions to undertake a full landscape character assessment.

8.1.10 Defining the lighting proposal

- 8.1.11 The assessment of effects arising from visible lighting requirements (aviation lighting) of the Proposed Development are based on the project design parameters set out in **Chapter 3: Description of the Development** of the EIA Report for the Proposed Development.
- 8.1.12 Under 222(1) The Air Navigation Order 2016 requires en-route obstacles to be *"fitted with medium intensity steady red lights positioned as close as possible to the top of the obstacle and at intermediate levels spaced so far as practicable equally between the top lights and ground level with an interval of not more than 52 metres"*. Schedule 1 clarifies that medium intensity steady red light should comply with the characteristics described for a Type C light as specified in Annex 14 to the Convention on International Civil Aviation (Volume 1 - Aerodrome Design and Operations) (ICAO, 2018). The intensity of fixed red lights of medium intensity is defined as 2000 candela (cd) in Table 6-1.
- 8.1.13 The lowest permissible lighting intensity for onshore wind turbines is further defined in The 2017 CAA Policy Statement (CAA, 2017), which states that *"If the horizontal meteorological visibility in all directions from every wind turbine generator in a group is more than 5 km, the intensity for the light positioned as close as practicable to the top of the fixed structure required to be fitted to any generator in the wind farm and displayed may be reduced to not less than 10% of the minimum peak intensity specified for a light of this type"*.
- 8.1.14 Based on the relevant regulations, guidance and project description, the visual assessment of wind turbine aviation lighting is therefore based on the following key parameters:



- Red, medium intensity aviation warning lights (2,000cd) would be located on top of the nacelle of all of the four wind turbines (see **Figure 7.15**). These warning lights would conform to the ICAO specification as set out in Annex 14 Table 6-3 (ICAO, 2018);
- The red, medium intensity aviation warning lights would be controlled with sensor-controlled dimming, such that when the visibility is greater than 5km in horizontal direction from all turbine hubs, the brightness of the lights would be reduced from 2000cd to 200cd (10% of the minimum peak intensity). As dimming is included as embedded mitigation, the assessments (and photomontage visualisations) are based on reduced 200cd intensity aviation lights only, rather than 2000cd intensity in line with guidance (NatureScot, 2024, para 82);
- Vertical directional intensity mitigation is proposed, which could also give rise to reduced lighting intensities depending on the viewpoint location (however these vertical intensity reductions are not factored into the worst-case assessed or photomontages presented). The 'lighting intensity ZTV' in **Figure 7.16** helps to illustrate the reduced lighting intensity within different parts of the study area. The figure refers to the vertical directional intensity reductions that would be experienced by one specific light model (CEL-WT-MIC) provided by the manufacturer Contarnex, but it is important to note that they are an illustrative example, and the applicant has not committed to using this specific light, as this choice is normally made at turbine procurement stage;
- The CAA have provisionally agreed that low intensity mid tower mast lights would not be required. The CAA have agreed in earlier consultation that intermediate lighting is not required;
- The Proposed Development would also require infra-red lighting, which would not be visible to the human eye. The focus of the night-time visual assessment in this assessment is on the visible lighting requirements of the Proposed Development, and as a result infra-red lighting is not included in the scope of the detailed assessment.
- In accordance with CAA requirements, the lights would be switched on 30 minutes after official sunset and switched off again 30 minutes before sunrise;
- The CAA requires that a secondary light is fitted for use only when the primary light fails, and these would not be lit concurrently; and
- The steady red medium intensity lighting fixed to the top of the nacelles may appear to flicker on and off with blade rotation when the turbine blades pass between the lights and the observer, dependent on wind direction and the position of the observer.

8.2 Understanding the baseline

- 8.2.1 The night-time lighting baseline of the study area presented in the LVIA establishes the baseline lighting environment, selection of proposed viewpoints, identifies the key features / characteristics of the landscape that are sensitive to introduction of lighting, and identifies the sensitivity of people who perceive the landscape at night.
- 8.2.2 Satellite imagery provides an understanding of existing light conditions across the study area at night (**Figure 7.14**) and is described in the baseline.



- 8.2.3 An aviation lighting ZTV (**Figure 7.15**) identifies the likely geographical extent of theoretical visibility of the medium-intensity aviation lights. The aviation lighting ZTV has been reviewed to inform relevant representative viewpoints. Viewpoints that represent night-time impacts were discussed and agreed with the relevant planning/ consenting authority and refined during the EIA process. Representative viewpoints are accompanied by night-time photomontage visualisations to represent the key impacts and enable detailed assessment at these locations.
- 8.2.4 Desk based surveys have been conducted as part of the baseline. To inform both the study area and viewpoint selection, aspects of the landscape which increase or decrease its sensitivity to the introduction of visible lighting are identified and described, including those landscapes that are identified as displaying dark sky qualities, such as identified Dark Sky Parks, or where particular special qualities related to dark night skies are referred to in the citations for designated landscapes. Baseline information related to landscape character and designated landscapes (where relevant) has been reviewed and any qualities or characteristics that may be susceptible to lighting are identified.
- 8.2.5 Fieldwork has been undertaken as a component of the baseline evaluation. Relevant parts of the study area have been visited at night to gain an appreciation of aspects of the landscape which may become less perceptible or imperceptible, or more perceptible (i.e. the appreciation of dark skies) during hours of darkness. The presence of existing baseline visible lighting (both permanent and temporary) in the landscape has been recorded and described, particularly where it may influence the appreciation of susceptible characteristics and/ or receptors.

8.3 Night-time sensitivity

- 8.3.1 The sensitivity of the baseline environment and receptors, as experienced by people at night, is established, applying principles set out in GLVIA3 (Landscape Institute, 2013) and the LVIA Methodology set out earlier in this Technical Appendix. The sensitivity of landscapes varies depending on the susceptibility of their underpinning characteristics. Where an area has been recognised on the basis of its night sky or darkness qualities, such as Dark Sky Parks, susceptibility and value are likely to be elevated.
- 8.3.2 In relation to the sensitivity of visual receptors, this is defined through the application of professional judgement in relation to the interaction between the 'value' of the view experienced by the visual receptor and the 'susceptibility' of the visual receptor (or 'viewer', not the view) to the particular form of change likely to result from the Proposed Development.

8.3.3 Susceptibility

- 8.3.4 For designated landscapes, which have recognised special qualities, the degree to which the special qualities might be expressed or enhanced after dark is considered. Susceptibility is judged based on the degree to which they are currently characterised by darkness.
- 8.3.5 The susceptibility of visual receptors also differs at night reflecting the different activities people undertake during the hours of darkness. For example, drivers using roads at night tend to be more focused on the road and the area illuminated by headlights than during the day and may have oncoming headlights or other reflective signage and dashboard lighting drawing their attention, resulting in lower susceptibility. On the other hand, people taking part in activities where darkness is



essential, such as stargazing, are of higher susceptibility. Viewpoints are identified which represent these different categories of receptor.

- 8.3.6 Examples of the relative susceptibility of different receptors at night are provided in Guidance on Aviation Lighting Impact Assessment (NatureScot, 2014) (Table 1). The susceptibility of people experiencing night-time views will depend on the degree to which their perception is affected by existing baseline lighting. In brightly lit areas, or when travelling on roads from where sequential experience of lighting may be experienced, the susceptibility of receptors is likely to be lower than from within areas where the baseline contains no, or limited, existing lighting.

8.3.7 Value

- 8.3.8 Value is judged the same as for the day-time assessment unless specific factors suggest otherwise – for example identification as a Dark Sky Park which would increase value at night; or where factors that contribute to value during daytime are irrelevant or imperceptible at night – which may reduce value at night.
- 8.3.9 The factors weighed in reaching a decision on ‘value’ of the view in the daytime are not all applicable at night-time, in the same way they may be during the day. It is not appropriate, for example, to attribute value to views at night when the detail of the view, or of elements that add value to it within a landscape, cannot readily be discerned at night. Furthermore, the popularity of a viewpoint during the day may be different to its use at night. Value factors assessed for day-time viewpoints may, therefore, be of less relevance to the value judgement for night-time viewpoints, which is factored into the following assessments.
- 8.3.10 Dark Sky Discover Sites as defined in supporting publications for Dark Sky Parks are especially valued as people are encouraged to use them to appreciate dark skies at night.

8.4 Assessing the effects of the lighting

8.4.1 Night-time Magnitude of Change

- 8.4.2 The magnitude of change arising from the visible aviation lights is established so that conclusions around the significance of the lighting effects can be drawn.
- 8.4.3 As dimming is included as embedded mitigation, the assessments (and photomontage visualisations) are based on reduced 200 cd intensity aviation lights only, rather than 2000 cd intensity in line with guidance (NatureScot, 2024, para 82).
- 8.4.4 The definitions used to describe the magnitude of change that may arise at night as a consequence of the appearance of visible lights are set out below.
- **High**, where the addition of aviation lighting results in large scale of change/large intrusion to the existing night-time baseline conditions/darkness in the view, due to a full and/or close-range view of visible aviation lighting and/or a high degree of contrast/low degree of integration with level of baseline lighting in the view. Results in obtrusive light which compromises or diminishes the view of the night sky;
 - **Medium**, where the addition of aviation lighting results in moderate scale of change/moderate intrusion to the existing night-time baseline conditions/darkness in the view, due to partial and/or middle-distance view of



visible aviation lighting and/or moderate level of contrast/integration with level of baseline lighting in the view. Results in light that may partially compromise or diminish the view of the night sky, but which is not considered obtrusive;

- **Low**, where the addition of aviation lighting results in small scale of change/minor intrusion to the existing night-time baseline conditions/darkness in the view, due to limited and/or distant view of aviation lighting and/or low degree of contrast/high degree of integration with level of baseline lighting in the view. Results in light that does not compromise or diminish the view of the night sky, nor is it considered obtrusive; and
- **Negligible**, where the addition of aviation lighting results in a largely indiscernible change/negligible intrusion to the existing night-time baseline conditions/darkness in the view, due to glimpsed view of lighting and/or slight degree of contrast/very high degree of integration with level of baseline lighting in the view. Results in light that does not compromise or diminish the view of the night sky, nor is it considered obtrusive.

8.4.5 Intermediate levels of effect may be identified between these levels where, on the application of professional judgement, a level of change lies between two definitions.

8.4.6 Significance of effects

8.4.7 The significance of effects reflects the degree of change to the prevailing baseline lighting conditions and involves the application of professional judgement in reaching decisions around the sensitivity of receptors and magnitude of change (effect).

8.4.8 The significance of effects of aviation lighting is assessed through a combination of the sensitivity of the visual receptor and the magnitude of change that would result from the visible aviation lighting, taking into account the considerations described above, and informed by the matrix in **Table 1**, which gives an understanding of the threshold at which significant effects may arise.

8.4.9 Significant effects relate to all those effects that result in a 'Major' or a 'Major / Moderate' level of effect. Moderate levels of effect may be significant or not significant subject to the assessor's professional judgement. A significant effect occurs where the aviation lighting would provide a defining influence on a view or visual receptor. A not significant effect would occur where the effect of the aviation and marine navigation lighting is not material, and the baseline characteristics of the view or visual receptor continue to provide the definitive influence. In this instance, the aviation lighting may have an influence, but this influence would not be definitive.

8.4.10 In determining significance, particular attention is paid to the potential for 'Obtrusive Light', i.e. whether the lighting impedes a particular view of the night sky; creates sky glow, glare or light intrusion (Institute of Lighting Professionals, 2021) in a prominent, incongruous, or intrusive way.

8.4.11 The following assessments of significance are provided in the night-time aviation lighting impact assessment:

- Assessment of night-time effects for each relevant receptor, in particular where qualities of wildness, darkness, remoteness and lack of man-made elements are features or characteristics of the landscape;



- An appraisal of all viewpoints within the study area where there may be significant effects, informed by wireline visualisations; and
 - Detailed assessment of key representative viewpoints accompanied by photomontage visualisations.
- 8.4.12 A proportionate approach, with a focus on likely significant effects, is undertaken focusing on the relevant landscape and visual receptors and how they may be affected.



9.0 Visual Representations

9.1.1 Zones of Theoretical Visibility (ZTVs) and visualisations, including wirelines and photomontages, are graphical images produced to assist and illustrate the LVIA and the cumulative assessment. Viewpoint photography and photomontages have been produced in accordance with the NatureScot guidance on 'Visual Representation of Wind Farms - Version 2.2' (SNH, 2017), GLVIA 3 (Landscape Institute and IEMA, 2013) and the Landscape Institute Technical Guidance Note on Visual Representation of Development Proposals (Landscape Institute, 2019).

9.2 Zone of Theoretical Visibility (ZTV)

9.2.1 The ZTVs have been generated using Geographic Information System (GIS) software to demonstrate the number of turbines that may theoretically be seen from any point in the study area. The ZTVs, show the number of turbines (blade tips) that are theoretically visible around the study area. The Hub Height ZTVs, show the number of turbine hubs theoretically visible in the study area. When used in conjunction with the Blade Tip ZTV, the Hub Height ZTV provides an indication of the degree to which the wind turbines may be visible.

9.2.2 There are limitations in this theoretical production, and these should be considered in the interpretation and use of the ZTVs:

- The ZTVs illustrate the 'bare ground' situation, and do not take into account the screening effects of vegetation, buildings, or other local features that may prevent or reduce visibility;
- The ZTVs are based on theoretical visibility from 2m above ground level;
- The ZTVs are based on a 5m data grid (OS Terrain 5), therefore relatively small changes in elevation may not be accounted for;
- The Blade Tip ZTV does not indicate the decrease in visibility that occurs with increased distance from the Proposed Development. The nature of what is visible from 3 km away would differ markedly from what is visible from 10km away, although both are indicated on the Blade Tip ZTV as having the same level of visibility; and
- There is a wide range of variation within the visibility shown on the ZTV, for example, an area shown on the Blade Tip ZTV as having visibility of large numbers of turbines may gain views of the smallest extremity of blade tips, or of many full turbines. This can make a considerable difference in the effects of the Proposed Development on that area. The Hub Height ZTV should be used in conjunction with the Blade Tip ZTV to provide an indication of the degree to which the wind turbines are visible.

9.2.3 These limitations mean that while the ZTV is used as a starting point in the assessment, providing an indication of where the Proposed Development would theoretically be visible, the information drawn from the ZTV is checked in the field, to ensure that the assessment conclusions represent the visibility of the Proposed Development reasonably accurately. The Horizontal Angle ZTV shows the horizontal field of view (in degrees) that may be affected by views of the turbines.



9.3 Methodology for Baseline Photography

9.3.1 The following photographic information is recorded in line with NatureScot guidance:

- Date, time, weather conditions and visual range;
- GPS recorded 12 figure grid reference;
- GPS recorded Above Ordnance Datum (AOD) height data;
- Use of a fixed 50mm focal length lens is confirmed;
- Horizontal field of view (in degrees); and
- Bearing to target site.

9.3.2 The photographs used to produce the photomontages are taken at the agreed locations using Canon EOS 5D and 6D Digital SLR cameras, with a fixed lens and a full-frame (35mm negative size) complementary metal oxide semiconductor (CMOS) sensor. The photographs are taken on a tripod with a pano-head at a height of approximately 1.5m above ground.

9.3.3 GLVIA3 para 8.22 states – *“In preparing photomontages, weather conditions shown in the photographs should (with justification provided for the choice) be either: representative of those generally prevailing in the area; or taken in good visibility, seeking to represent a maximum visibility scenario when the development may be highly visible”.*

9.3.4 In preparing photomontages for the LVIA, baseline photographs have been taken in favourable weather conditions. Weather conditions shown in the photographs for all viewpoints have, where possible, been taken during periods of ‘very good’ or ‘excellent’ visibility conditions seeking to represent a maximum visibility scenario when the developments may be highly visible.

9.4 Supporting Visualisation and Graphics Materials

9.4.1 Photographs and other graphic material such as wirelines and photomontages used in the assessment are for illustrative purposes only and, whilst useful tools in the assessment, are not considered to be completely representative of what would be apparent to the human eye. A photomontage is a visualisation which superimposes an image of the Proposed Development upon a photograph or series of photographs. Photomontage is a widespread and popular visualisation technique, which allows changes in views and visual amenity to be illustrated and assessed, within known views of the ‘real’ landscape.

9.4.2 NatureScot provides the following information on the limitations of visualisations that are produced according to the NatureScot guidance ‘Visual Representation of Windfarms’ (February 2017): *“Visualisations of wind farms have a number of limitations which you should be aware of when using them to form a judgement on a wind farm proposal. These include:*

- *a visualisation can never show exactly what the wind farm will look like in reality due to factors such as: different lighting, weather and seasonal conditions which vary through time and the resolution of the image.*
- *the images provided give a reasonable impression of the scale of the turbines and the distance to the turbines but can never be 100% accurate.*



- *a static image cannot convey turbine movement, or flicker or reflection from the sun on the turbine blades as they move.*
- *the viewpoints illustrated are representative of views in the area but cannot represent visibility at all locations.*
- *to form the best impression of the impacts of the wind farm proposal these images are best viewed at the viewpoint location shown.*
- *the images must be printed at the right size to be viewed properly (260mm by 820mm); and*
- *you should hold the images flat at a comfortable arm's length. If viewing these images on a wall or board at an exhibition, you should stand at arm's length from the image presented to gain the best impression."*

- 9.4.3 To create the baseline panorama, the frames are individually cylindrically projected and then digitally joined to create a fully cylindrically projected panorama using Adobe Photoshop or PTGui software. This process avoids the wide-angle effect that would result should these frames be arranged in a perspective projection, whereby the image is not faceted to allow for the cylindrical nature of the full 360-degree Horizontal Field of View (HFOV) but appears essentially as a flat plane. Tonal alterations are made using Adobe software to create an even range of tones across the photographs once joined.
- 9.4.4 The photographs are also joined to create planar projection panoramas using PTGui software. These are used in the creation of the 53.5-degree field of view NatureScot photomontages.
- 9.4.5 Wireline representations that illustrate the Proposed Development model set within a computer-generated image of the landform are used in the assessment to predict the theoretical appearance of the turbines. These are produced with Resoft WindFarm software and are based on OS Terrain 5 terrain model. There are limitations in the accuracy of DTM data so that landform may not be picked up precisely and may result in turbines being more or less visible than is shown, however, the use of OS Terrain 5 minimises these limitations. Where descriptions within the assessment identify the numbers of turbines visible this refers to the illustrations generated and therefore the reality may differ to a degree from these impressions.
- 9.4.6 Photomontages have been produced for the majority of views, again using ReSoft WindFarm software, to provide a more realistic image of the appearance of the Proposed Development. In most views these include the introduction of the turbines only as these are the elements that create the greatest change in views and are likely to be most visible from the surrounding area. Where there is notable visibility of site infrastructure (within 5km), this is shown in the photomontages and is generated using a combination of 3D software such as Topos, Visual Nature Studio, Sketchup and 3D Studio Max.
- 9.4.7 The baseline photographs and cumulative wireline visualisations shown for each viewpoint cover a 90-degree HFOV (or in some cases, up to 360-degree), which accords with NatureScot guidance. These are cylindrically projected images and should be viewed flat at a comfortable arm's length.
- 9.4.8 In the wirelines, the turbines are shown with the central turbines facing the viewer directly, with the full rotor diameter visible at its tallest extent. In the photomontages, the turbine rotors are shown with a random appearance with the



central turbines facing the viewer directly. In the night-time photomontages, lights are shown as visible and without obstruction from turbine blades.

- 9.4.9 The photographs and other graphic material such as wirelines and photomontages used in this assessment are for illustrative purposes only and, whilst useful tools in the assessment, are not considered to be completely representative of what would be apparent to the human eye. The assessments are carried out from observations in the field and therefore may include elements that are not visible in the photographs.
- 9.4.10 The 53.5-degree field of view NatureScot photomontages are prepared using a planar projected image and should also be viewed flat at a comfortable arm's length. These planar photomontage views do not always include a view of key existing wind farms in the view, and it is important therefore that the NatureScot 90 degree baseline panoramas provided are reviewed alongside these visualisations so that these existing wind farms are properly taken into account.

9.5 Visual and Graphic Materials for Night-time Lighting Impact Assessment

- 9.5.1 In line with guidance (NatureScot, 2024), the following plans and ZTV maps have been produced to inform the assessment of aviation lighting:
- Plan showing the wind farm layout with numbered turbines and a corresponding schedule of visible lights;
 - Plan showing the extent of the night time study area;
 - A hub height Zone of Theoretical Visibility (ZTV) map which shows the areas from which the nacelle lights are theoretically visible; and
 - Lighting intensity ZTV to indicate where vertical directional intensity mitigation may be effective and the different lighting intensities that may be experienced at different elevations relative to the lights.
- 9.5.2 The following wireline and photomontage visualisations have also been produced to inform the assessment of aviation lighting:
- Wireline visualisations with an identification of turbine lighting as a separate note at the foot of the wirelines. This applies to all the LVIA 53.5° (degree) wirelines;
 - Night-time photomontage visualisations from several key representative viewpoints, selected based on sensitivity of potential receptors and frequency of visitors at night or dusk/dawn, and as agreed with the Planning Authority (in consultation with NatureScot); and
 - Photomontage visualisations illustrate the maximum case lighting intensity scenario (e.g. 200 cd where dimming of aviation lights proposed as embedded mitigation, and 2000 cd only where this mitigation is not proposed).
- 9.5.3 The limitations of night-time lighting visualisations are described in Appendix 4 of Guidance on Aviation Lighting Impact Assessment (NatureScot, 2024).
- 9.5.4 Night-time visualisations are produced from key viewpoints, to visually represent visible aviation lighting at night. Visualisations produced in support of the Aviation Lighting Impact Assessment provide a reasonable indicative illustration of the lighting effects. Digital visualisations cannot however, replicate the additional



- variable influence which distance (between the light and the viewpoint/observer) or atmospheric attenuation can have on the observed illuminance (brightness or brilliance) of the lights. Visualisations seek to represent a reasonable maximum case effects likely to arise so that these can be considered as part of the Environmental Impact Assessment (EIA) process (where such assessment is necessary).
- 9.5.5 Where possible, baseline photography for night-time viewpoints has been undertaken approximately 30 minutes after sunset around the end of civil twilight (start of nautical twilight), to represent a worst-case when ICAO/ CAA regulations require the lights to be switched on and landscape features (such as distinctive landforms and enclosing skylines) may be appreciable during twilight.
- 9.5.6 The appearance of baseline lighting in the night-time photomontages may have a slight 'halo' (or bokeh) around it due to the way a camera lens renders out-of-focus points of light. This is not the way lights are seen, as they tend to be much more defined as point sources.
- 9.5.7 Night-time visualisations are produced using a combination of using Resoft's WindFarm software's aviation module software for positioning of the lights, 3D modelling software that can simulate lighting conditions, referencing existing lighting from the baseline photographs and professional judgement using photoshop. The lighting represented in the viewpoint visualisations has been calibrated using examples of existing, equivalent, turbine lighting observed in the field in other parts of the UK, during similar periods of dusk / darkness.
- 9.5.8 The turbine blades, when they intermittently pass in front of the aviation lights may cause flickering when the lights are switched 'on'. The turbines used in the night-time visualisations have been positioned so that their blades face away from the viewpoint so that all the lights are visible and on within the visualisations, representing a worst-case scenario.

9.6 Technical Methodology - Visualisations

- 9.6.1 In accordance with the requirements of Landscape Institute (2019) Technical Guidance Note 06/19, **Table 6** below sets out the technical information for the preparation of the photomontage visualisation figures.

Table 6: Technical methodology - visualisations

Category	Details
Photography	
Visualisation type	Type 4 – where survey of viewpoint locations is not required
Camera location	Established via hand-held Garmin GPS
Level of accuracy of location	1-3m (depending on satellites)
Camera	Canon EOS 5D Mark II and Canon EOS 6D Digital SLR. Full-frame (35mm negative size) CMOS sensor.



Lens	50 mm fixed f1.4 lens
Tripod	Set to approximately 1.5m. Nodal Ninja panoramic head with Adjust Leveller. Nodal Ninja panoramic head set to take photographs at 20 degree increments. Photographs of tripod positions are shown where available.
Photography process	Camera used on fully manual settings. Photographs taken in RAW image format. Bracketed exposures are taken for each view and those depicting the clearest images are selected to prepare the panoramic image
Preparation of panoramic photographs	PTGUI v12.8 is used to join and cylindrically project the images. Adobe Photoshop 2021 used to correct tonal alterations and create an even range of exposure across the photographs so that the individual photographs are not apparent. Planar panoramic images are prepared using Resoft Windfarm software or Hugin Panorama Stitcher
3D Model/Visualisations	
Topographic height data	Ordnance Survey Terrain 5 (5m resolution). Ordnance Survey Terrain 50 (50m resolution)
Use of coordinates in software	Coordinates are brought in from the surveyed GPS coordinates. Positions checked using aerial photography.
Markers for horizontal alignment	Existing OWF WTGs and their known coordinates.
Markers for vertical alignment	Existing OWF WTGs and their known coordinates.
Rendering software	Resoft Windfarm v.5.2.5.3 (WTGs in wirelines and photomontages). Sketchup or AutoCAD Map 3D 2018 (OSPs, Met Mast and jacket foundations). Autodesk 3ds Max 2018. Visual Nature Studio V 3.10.
Limitations	
Terrain data	There may therefore be local, small-scale landform that is not reflected in the data and subsequently the visualisation but may alter the real visibility of the VE array areas, either by screening theoretical visibility or revealing parts of the VE array areas that are not theoretically visible.
Movement	Static images are unable to capture the movement within the view or of the WTGs



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Making Sustainability Happen



Technical Appendix 7.2 Residential Visual Amenity Assessment

Cairnoch Hill Wind Farm

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1.0 Residential Visual Amenity Assessment

1.1 Introduction

In accordance with the third edition of 'Guidelines for Landscape and Visual Impact Assessment' (GLVIA3), the Landscape and Visual Impact Assessment (LVIA) contained in **Environmental Impact Assessment (EIA) Report Chapter 7**, assesses the visual impact of the proposed Cairnoch Hill Wind Farm ("the Proposed Development") on public views and public visual amenity. This Residential Visual Amenity Assessment (RVAA) goes a stage beyond the LVIA by assessing the visual impact of the Proposed Development on residential visual amenity in accordance with Technical Guidance Note 2/19 'Residential Visual Amenity Assessment' (Landscape Institute, 2019). This guidance sets out the steps to be followed when undertaking an RVAA and highlights how it should be informed by the principles and processes of GLVIA3. The purpose of the RVAA is to identify those properties where the effect of the Proposed Development leads to the 'Residential Visual Amenity Threshold' being reached or, in other words, where the effect is of such a nature and/or magnitude that it potentially affects living conditions. In relation to a wind farm development, this may occur as a result of the wind turbines giving rise to an 'overbearing' or 'overwhelming' magnitude of effect.

This assessment is carried out largely on site in order to observe and assess baseline factors such as the orientation of the property, the baseline views that may be gained, screening by vegetation and so on.

This RVAA assesses the likely effects of the Proposed Development on the visual component of residential amenity relating to individual properties within a localised study area. The term 'residential amenity' refers to the living conditions at a house, including its gardens and domestic curtilage, which are commonly interpreted to include visual amenity, noise amenity and other factors such as shadow flicker. In a RVAA, SLR Consulting Ltd ('SLR') addresses only the visual amenity aspect of residential amenity, as this is its area of expertise.

The purpose of the RVAA is to inform the planning process, as noted in guidance (Landscape Institute, 2019).

"It is not uncommon for significant adverse effects on views and visual amenity to be experienced by people at their place of residence as a result of introducing a new development into the landscape. In itself this does not necessarily cause particular planning concern. However, there are situations where the effect on the outlook/visual amenity of a residential property is so great that it is not generally considered to be in the public interest to permit such conditions to occur where they did not exist before."

Unless stated otherwise, in this assessment where distances are stated they relate to the distance between the receptor and the closest proposed wind turbine associated with the Proposed Development.

1.2 Approach

The approach to RVAA set out in guidance (Landscape Institute, 2019) is based on four steps:

- Step 1: Definition of the study area and scope of the assessment, informed by the description of the Proposed Development, defining the study area extent and scope of the assessment with respect to the properties to be included.



- Step 2: Evaluation of baseline visual amenity at properties to be included, having regard to the landscape and visual context and the potential influence of the Proposed Development.
- Step 3: Assessment of likely change to visual amenity of included properties in accordance with GLVIA3 principles and processes.
- Step 4: Further assessment of predicted change to the visual amenity of properties where a judgement in relation to the Residential Visual Amenity Threshold is required.

1.2.1 Step 1

Step 1 involves defining the extent of the study area and establishing the scope of the assessment. In respect of defining the extent of the study area, Technical Guidance gives the following advice (Paragraphs 4.6 and 4.7):

“Over the last few years a large number of RVAAs have been prepared, especially relating to wind energy proposals. Local Planning Authorities (LPA) have frequently requested ‘study areas’ of up to 3 or even 5 km. The logic for these (exceptionally) large study areas was based on certain findings of LVIA’s which identified significant visual effects from ‘settlements’ or from clusters of residential properties within this range. This fails to recognise that RVAA is a stage beyond LVIA. Consequently, many RVAAs, including those of windfarms with large turbines (150m and taller), have included disproportionately extensive study areas incorporating too many properties. This appears to largely be based on the misconception that if a significant effect has been identified in the LVIA adjacent to a property at 2.5 km it will also potentially lead to reaching the Residential Visual Amenity Threshold.

When assessing relatively conspicuous structures such as wind turbines, and depending on local landscape characteristics, a preliminary study area of approximately 1.5 to 2 km radius may initially be appropriate in order to begin identifying properties to include in a RVAA...”

In line with this guidance, the study area for the Proposed Development has been drawn out to the larger 2km radius recommended, as shown on **Figure 7.2.1** of this Technical Appendix. All residential properties within the 2km study area have been identified using AddressBase Plus data, and they are mapped in **Figure 7.2.1** and listed in **Table 1** below. This includes residential properties that have potential to be occupied as dwelling houses or as holiday accommodation. Where residential properties are located close together and would potentially experience similar effects, they are typically grouped together with any differences in their existing visual amenity detailed in the assessment.

Table 1: Residential properties within 2km study area

Reference (see Figure 7.2.1)	Address	Distance (km)
1	Cairnoch Lodge	1.2
2	Easter Cringate	1.4
3-4	Cairnoch Farm and Cairnoch Bothy	1.4
5-11 and 13-17	No. 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, and 18 Carron Valley	1.6
12	Craigannet Farm	1.6
18	Todholes Farm	1.9



1.2.2 Step 2

Step 2 involves carrying out an evaluation of the baseline visual amenity at the properties through a combination of desk study and field work. The key considerations of this evaluation are set out in the Technical Guidance as follows:

“The nature and extent of all potentially available existing views from the property and its garden/ domestic curtilage, including the proximity and relationship of the property to surrounding landform/ landcover and visual foci. This may include primary/main views from the property or domestic curtilage as well as secondary/peripheral views; and...Views as experienced when arriving or leaving the property, for example from private driveways/access tracks.”

There are eighteen residential properties that lie within the 2km radius study area for the Proposed Development. RVAA sheets have been prepared for these properties, each incorporating an OS map and aerial photograph of the property that shows the viewshed towards the Proposed Development, and a description of baseline views. Wireline views that illustrate the theoretical visibility of the Proposed Development from the properties that are included within the 2km radius study area are presented in **Figures 7.2.2a-r** of this Technical Appendix.

1.2.3 Step 3

10. Step 3 involves carrying out an assessment of the likely change to the visual amenity of properties by applying the process of assessment described in GLVIA3, in which the sensitivity of the receptor is combined with the magnitude of change that will arise as a result of the Proposed Development to determine whether the effect will be significant or not significant. The aim of Step 3 is to identify those properties with potential to reach Residential Visual Amenity Threshold and therefore require further assessment in Step 4. This will generally only occur where a high magnitude of change is assessed for a property, as the threshold reflects those effects that are at the extreme where they may become overwhelming or overbearing. The key considerations of this assessment are set out in the Technical Guidance as follows:

- *“Distance of property from the proposed development having regard to its size/scale and location relative to the property (e.g. on higher or lower ground);*
- *Type and nature of the available views (e.g. panoramic, open, framed, enclosed, focused etc.) and how they may be affected, having regard to seasonal and diurnal variations;*
- *Direction of view / aspect of property affected, having regard to both the main/primary and peripheral/ secondary views from the property;*
- *Extent to which development/landscape changes would be visible from the property (or parts of) having regard to views from principal rooms, the domestic curtilage (i.e. garden) and the private access route, taking into account seasonal and diurnal variations;*
- *Scale of change in views having regard to such factors as the loss or addition of features and compositional changes including the proportion of view occupied by the development, taking account of seasonal and diurnal variations;*
- *Degree of contrast or integration of new features or changes in the landscape compared to the existing situation in terms of form, scale and mass, line, height, colour and texture, having regard to seasonal and diurnal variations;*
- *Duration and nature of the changes, whether temporary or permanent, intermittent or continuous, reversible or irreversible etc.; and*



- *Mitigation opportunities - consider implications of both embedded and potential further mitigation.”*

SLR’s methodology assumes that all occupiers of local residential properties within the RVAA will have a high sensitivity. The significance of the effect on residential visual amenity experienced at each property is dependent on the factors considered in the sensitivity and the magnitude of change resulting from the Proposed Development. These judgements on sensitivity and magnitude are combined to arrive at an overall assessment as to whether the Proposed Development will have an effect on residential visual amenity that is significant or not significant.

The assessment process - the evaluation of magnitude of change and the significance of the effect - is described on the RVAA sheets in this Technical Appendix. Where properties are assessed as having a high magnitude of change, a Step 4 assessment is required to determine whether or not the Residential Visual Amenity Threshold has been reached.

1.2.4 Step 4

Step 4 of the RVAA is described as follows in Technical Guidance (Paragraphs 4.17 to 4.20):

“The final step of RVAA involves a more detailed examination of the predicted effects on the visual amenity at those properties identified for further assessment in the previous step.

There is an important distinction between this concluding step of RVAA and the preceding one. In Step 3 the assessor has reached a conclusion with respect to magnitude and (EIA) significance of visual effect, and the change in visual amenity at the property. In this final step, and only for those properties where the largest magnitude of effect has been identified, a further judgement is required. This concluding judgement should advise the decision maker whether the predicted effects on visual amenity and views at the property are such that it has reached the Residential Visual Amenity Threshold, therefore potentially becoming a matter of Residential Amenity. This judgement should be explained in narrative setting out why the effects are considered to reach the Residential Visual Amenity Threshold. Equally, judgements should explain why the threshold has not been reached.

The Residential Visual Amenity Threshold judgement should be communicated in a coherent manner, using text with clear descriptions, employing terminology which is commonly understood and descriptors which may have previously been used. Assessors should ensure that their judgements are unambiguous and have a clear, rational conclusion. Some examples of descriptions and descriptors that might be used include: ‘blocking the only available view from a property’, or ‘overwhelming views in all directions’; and ‘unpleasantly encroaching’ or being ‘inescapably dominant from the property’. It may also be useful to employ bespoke graphics such as annotated aerial photographs and wireframe visualisations to aid this further assessment in Step 4.

The key point regarding Step 4 is that the judgement required in this final, concluding step goes beyond the assessment undertaken in Step 3 which is restricted to judging the magnitude and significance of visual effect, typically as a supplement to the accompanying LVIA.”

The Step 4 assessment is included on the RVAA sheets for each of the relevant properties. Where this RVAA identifies any properties at the threshold in Step 4, this does not imply an unacceptable effect, as any finding of acceptability requires to be undertaken as part of the wider planning balance. The ‘threshold’ acts to identify those properties where a predicted change to visual amenity is of such magnitude that it should be weighed in the planning balance, along with other EIA effects.



Table 2: Step 4 Assessment

Property	Location of property	Property description
Cairnoch Lodge (1) Financially involved in Proposed Development.	Located adjacent to the minor road between Randieford Bridge and Shielbrae, approximately 1.2km to the north of the closest proposed turbine.	Single storey detached property with outbuilding and access from the minor road. A kennels is located approximately 70m to the west of the Cottage, and a number of farm buildings are located approximately 50m to the east of the properties.
<i>Step 2: Baseline Visual Amenity</i> The property has not been internally accessed, and the assessment is drawn from roadside views and aerial photography. The property and its short access driveway are located within a small woodland comprising a mixture of deciduous and conifer trees, and as such its setting possesses a strong degree of enclosure. Cairnoch Lodge is an 'L shaped' building with windows oriented to the south east, south west and north west, while a rectangular outbuilding with extensions to its northern and western facades is located close by to the south west. It is likely that views beyond the immediate woodland setting from the windows and curtilage of the property are more likely to be experienced in the winter when there is less foliage on the trees. Nevertheless, views towards the Proposed Development from the windows and the curtilage of the property are likely to be interrupted by the trees to a varying degree throughout the year, which reduces the contribution of the wider landscape to the visual amenity of the properties. For these reasons, while there is theoretical visibility of the wind turbines associated with the nearby Craigengelt and Craigannet Wind Farms to the east and south-east of the properties, they have a relatively limited influence upon their visual amenity.		
<i>Step 3: Assessment of Residential (Visual) Amenity Effects</i> • Magnitude of Change: Medium • Significance of Effect: Major-moderate and Significant visual effect The wireline illustrates theoretical visibility of all four wind turbines on Cairnoch Hill with varying levels of screening from intervening landform. While there would be negligible screening to the tower of Turbine 1, only a single blade of Turbine 4 would be theoretically visible, and approximately one half and one third of the towers of Turbine 3 and Turbine 2 would be screened respectively. The wind turbines would be relatively consistently spaced with no blade overlapping. The sub-station compound would be entirely screened by intervening landform. In reality, visibility of the wind turbines from the property would be screened to a degree by the woodland surrounding the properties and also the conifer forestry present on the northern slopes and ridge of Cairnoch Hill. The foliage of the deciduous woodland in the garden of the property would provide considerable screening for the majority of the year, but less screening in the winter months. As a result, views of the wind turbines from the lodge and its immediate curtilage are likely to be highly constrained during the majority of the year, with some potential for glimpsed views of the turbines during the winter months. Given Turbine 4's limited visibility above the ridgeline, it is likely that it would be relatively indiscernible when the conifer forestry on Cairnoch Hill is at a relatively mature stage though. However, when visibility of the Proposed Development is experienced in the winter months, it is likely		



that views would comprise of glimpses of parts of Turbines 1, 2, and 3, which would be readily apparent due to the movement of the blades, with the turbines appearing as relatively large-scale elements in the landscape beyond the containing woodland due to their relatively close location.

Step 4: Residential Visual Amenity Threshold Assessment

This property does not have potential to reach the RVA Threshold due to the medium magnitude of change on the views (a high magnitude of change is required to trigger potential for the RVA Threshold to be reached).

Easter Cringate (2) Financially involved in Proposed Development.	Located adjacent to the minor road between Randieford Bridge and Shielbrae, approximately 1.3km to the north of the closest proposed wind turbine.	Single storey detached property with access from the minor road. A number of farm buildings are located approximately 90m to the south of the property.
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Step 2: Baseline Visual Amenity

The property and its short access driveway are located on the edge of a small woodland comprising a mixture of deciduous and conifer trees, and as a result its setting possesses some enclosure, particularly from trees situated to the south west, north, and north east of the property. The property's principal views, which can be experienced from windows on the south eastern façade of the property and the garden areas to the south east and east of the building, are to the south east where there is an absence of woodland surrounding the property. Instead, these long-range views encompass livestock farmland and areas of forestry in the foreground and midground respectively, and moorland across Craigengelt Hill and Craigannet Hill in the background where Craigengelt and Craigannet Wind Farms are also visible. The open views also extend further to the south towards the eastern edge of the Site of the Proposed Development, with its western parts screened by woodland and the nearby farm buildings situated to the south of the property, such that the summit and western slopes of Cairnoch Hill are not visible from the property.

The property has not been internally accessed, and the assessment is drawn from roadside views and aerial photography.

Step 3: Assessment of Residential (Visual) Amenity Effects

- Magnitude of Change: **Low**
- Significance of Effect: **Moderate-minor** and **Not Significant** visual effect

The wireline illustrates theoretical visibility of all four wind turbines on Cairnoch Hill with varying levels of screening from intervening landform. Turbine 1 would be nearly entirely screened by intervening landform, with the exception of a short part of one blade, and approximately half of the towers of Turbines 2 and 3 are theoretically visible, while the whole of Turbines 4 would be screened by landform. The turbines would be relatively consistently spaced with no blade overlapping. The sub-station compound would be entirely screened by intervening landform.

In reality, from the house and garden it is likely that Turbines 1, 2, and 3 to the south and south-west of the property would be entirely screened by woodland and farm buildings, with possible views available of Turbine 4. Given the limited extent of the visibility of Turbine 4, the visual effects arising would result in only a small change in the wider visual amenity of the property, with the hub and blades visible above the ridgeline of Cairnoch Hill appearing as medium scale elements in the surrounding landscape. When the conifer forestry on Cairnoch Hill is in a growth cycle, visibility of Turbine 4



would be further reduced as a result of the forestry on the ridgeline. Overall, a low magnitude of change is predicted to arise to the visual amenity of this property.		
<i>Step 4: Residential Visual Amenity Threshold Assessment</i> This property does not have potential to reach the RVA Threshold due to the low magnitude of change on the view (a high magnitude of change is required to trigger potential for the RVA Threshold to be reached).		
Cairnoch Farm and Cairnoch Bothy (3-4) Financially involved in Proposed Development.	Located approximately 70m to the north of the B818 road, approximately 2.4km west of the settlement of Carron Valley, and 1.4km to the south of the closest proposed wind turbine.	1.5 storey detached residential properties accessed by private track from B818 road. A small garden building is located in the garden, approximately 10m to the north of the properties.
<i>Step 2: Baseline Visual Amenity</i> The properties currently possess a relatively open setting given the fairly recent re-planting of the conifer forestry that is situated to the west, north and east of the properties, but views to the south-east are contained by a belt of mature trees that border the access track from the B818 road. Nevertheless, due to the topography of the landform and the surrounding landscape elements, the properties possess a south-westerly aspect, with their principal views encompassing Carron Valley Reservoir, the valley's southern forested slopes and the summits of Little Bin and Meikle Bin beyond. These scenic views can be appreciated from windows on the south-western façades of the properties and their garden areas to the south-west and west of the properties. Short range views of the immediate surrounding landscape can be experienced from windows on the other facades of the buildings and the curtilage of the properties, but these are generally contained by landform and the growing forest. As a consequence, while relatively natural in character, the available western, northern and eastern views have a smaller contribution to the properties overall visual amenity. The property has not been internally accessed, and the assessment is drawn from roadside views and aerial photography.		
<i>Step 3: Assessment of Residential (Visual) Amenity Effects</i> • Magnitude of Change: Medium to Medium-high • Significance of Effect: Major-moderate to Major and Significant visual effect The wireline illustrates theoretical visibility of all four wind turbines above the Cairnoch Hill ridgeline, extending across a horizontal field of view of approximately 61°, with varying levels of screening from intervening landform. Turbines 1 and 4 would be nearly entirely screened by intervening landform, with the exception of small sections of their turbine blades, and approximately just over half of the tower of Turbine 2 is theoretically visible, while the majority of Turbine 3's tower would be screened by landform. There would be no blade overlapping due to the spacing between the wind turbines. The apparent vertical scale of the wind turbines is therefore reduced considerably in views from both properties. The sub-station compound would be entirely screened by intervening forestry. In reality, there would be some additional screening from intervening forestry across Cairnoch Hill which would further moderate the visual impact of the turbines, potentially eliminating visibility of Turbines 1 and 4. The greater visibility and movement of the blades of Turbines 2 and 3 would potentially alter the views available from the rear of the two properties where they are apparent as large scale elements above the surrounding trees, with the principal		



views of the property across the valley remaining unaltered. It is therefore likely that the magnitude of change from views from the northern facades of the buildings and their surrounding curtilage would vary between a medium and medium-high level depending on the height of the surrounding forestry.		
<i>Step 4: Residential Visual Amenity Threshold Assessment</i> This property does not have potential to reach the RVA Threshold due to the medium to medium-high magnitude of change on the view (a high magnitude of change is required to trigger potential for the RVA Threshold to be reached).		
No. 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, and 18 Carron Valley (5-11 and 13-17)	Located in the settlement of Carron Valley, approximately 1.6km south east of the closest proposed wind turbine.	A mixture of 1 and 2 storey detached and semi-detached residential dwellings with front and rear gardens. Some properties have outbuildings of varying sizes situated in their rear gardens.
<i>Step 2: Baseline Visual Amenity</i> The properties are located in a line to the north of the B818 road, situated relatively close to one another, and possessing similar elevations and orientations. The main façades of the properties are oriented to the south, with the properties principal views also in a southern direction overlooking the valley and the eastern reaches of the reservoir. These views to the south are uninterrupted from the majority of the properties front windows and their respective front gardens due to the elevation of the properties above the road. Secondary views in a broadly northern direction, including the direction of the Proposed Development, are available from the rear of the properties including both rear windows and garden areas, encompassing the lowers slopes of Craigannet Hill which are characterised by livestock grazing fields. In some instances, these views are interrupted by the array of garden buildings that are located across the land to the rear of the properties. Views in a west and east direction along Carron Valley can also be experienced on occasion from certain properties where neighbouring buildings do not provide screening. The properties have not been internally accessed, and the assessment is drawn from roadside views and aerial photography.		
<i>Step 3: Assessment of Residential (Visual) Amenity Effects</i> • Magnitude of Change: Medium • Significance of Effect: Major-moderate and Significant visual effect The wireline illustrates visibility of only the blades of Turbines 3 and 4 on Cairnoch Hill with landform screening the entirety of Turbines 1 and 2. The blades would extend across a narrow horizontal field of view (approximately 7°) with no instances of blade overlapping. In reality, where open views can be experienced from some of the rear gardens of the properties, the turbine blades would be apparent above the open hill with no screening from forestry or other vegetation. Given the extent of the turbines visible and the movement of the blades, the two turbines would be clearly discernible, and they would appear as medium scale features within a relatively large-scale hill setting. The turbines would introduce a new characteristic influence to this sector of the view and this would slightly increase the magnitude of change to a medium level. The turbines would not however impact upon the principal views of the properties across and along Carron Valley, which are oriented to the south and south-west and tend to be experienced from around the front façade of the buildings.		



<i>Step 4: Residential Visual Amenity Threshold Assessment</i> These properties do not have potential to reach the RVA Threshold due to the medium magnitude of change on the view (a high magnitude of change is required to trigger potential for the RVA Threshold to be reached).		
Craigannet Farm (12)	Located on the edge of the settlement of Carron Valley, approximately 1.6km south east of the closest proposed wind turbine.	Single storey detached property with front garden and private access track from the B818. A number of farm buildings surround the property to the north.
<i>Step 2: Baseline Visual Amenity</i> The property is situated to the north of the B818 on the edge of the settlement of Carron Valley. The front of the property is oriented to the south, with the principal views received from windows on the front façade of the house and the front garden oriented in a southern direction overlooking the valley. These principal views are generally uninterrupted although there are some mature deciduous trees around the perimeter of the front garden that screen views of parts of the valley floor. Views to the north west, north and north east of the property are interrupted to a degree by the many farm buildings and some trees surrounding the property, which together with the livestock farmland on the slopes of Craigannet Hill surrounding the buildings, characterise these secondary views. Views to the east of the property are also interrupted by the deciduous trees located along the perimeter of the front garden. The property has not been internally accessed, and the assessment is drawn from roadside views and aerial photography.		
<i>Step 3: Assessment of Residential (Visual) Amenity Effects</i> • Magnitude of Change: Low • Significance of Effect: Moderate-minor and Not Significant visual effect The wireline illustrates visibility of only a blade and hub of Turbine 3 and part of a blade of Turbine 4 on Cairnoch Hill with landform screening the entirety of Turbines 1 and 2. The blades would extend across a narrow (7°) horizontal field of view with no instances of blade overlapping. In reality, there is considerable screening from nearby mature trees and farm buildings between the residential property and the wind turbines and as such views of the turbines are likely to be only glimpsed from the western façade of the house, and possibly the front garden. Given the extent of the turbines visible, they are likely to be relatively indiscernible, where visible appearing as small to medium scale features within a relatively large-scale hill setting. The turbines may also be seen in the wider context of some other wind turbine blades associated with Craigengelt Wind Farm, and this would slightly moderate their influence. The turbines would not however impact upon the principal views of the property, which are oriented to the south and experienced from the front façade and garden of the property, nor would it affect the visual amenity experienced from the courtyard at the back of the house.		
<i>Step 4: Residential Visual Amenity Threshold Assessment</i> This property does not have potential to reach the RVA Threshold due to the low magnitude of change on the view (a high magnitude of change is required to trigger potential for the RVA Threshold to be reached).		



Todholes Farm (18)	Located just to the north west of Carron Valley Reservoir, approximately 1.9km west of the closest proposed wind turbine.	1.5 storey detached property with front garden and private access track from B818. A number of farm buildings surround the property to the north west and north east.
<i>Step 2: Baseline Visual Amenity</i> The property is situated to the north of the B818, approximately 300m north west of the western edge of Carron Valley Reservoir. It is accessed by a private access track from the B818, which also serves the Earlsburn Wind Farm, before it diverges to the farmhouse via another short section of track. The property is located centrally within the broader curtilage of the property, with a garden to the south of the property, which is bordered to the east by the access track, and an area of hardstanding to the north that is used for car parking. The house is oriented to the south with views available from the windows on the southern and northern facades of the building. Views to the south are interrupted to a degree by the mature trees lining the perimeter of the garden, while views to the north are more far reaching, encompassing a broad panorama of the Fintry Hills, including parts of Earlsburn Wind Farm. Views to the east and west are relatively unobstructed from the curtilage of the farmhouse, encompassing the Fintry Hills to the west and Cairnoch Hill and Meikle Bin to the east and south east. The property has not been internally accessed, and the assessment is drawn from roadside views and aerial photography.		
<i>Step 3: Assessment of Residential (Visual) Amenity Effects</i> • Magnitude of Change: High • Significance of Effect: Major and Significant visual effect The wireline illustrates visibility of a large proportion of Turbines 1 and 2, while intervening landform screens visibility of the majority of Turbine 3's tower and most of Turbine 4. The operational Earlsburn Wind Farm is also apparent to the north of the Proposed Development. In reality, there would be limited screening between the property and the wind turbines, such that visibility of Turbines 1, 2, and 3 are likely to be apparent. There are limited instances though where these views would be experienced with no windows located on the eastern façade of the house, and some vegetation interrupting views from the front porch and front garden areas. Nevertheless, there are locations around the curtilage of the house, for example from the access track and the courtyard to the rear of the property where the large scale and movement of Turbines 1 and 2 in particular would be readily apparent, and this would have an effect on the visual amenity of the residents. In some of these views, the Proposed Development would be seen within the context of the existing Earlsburn Wind Farm, which appears to be slightly smaller in scale due in part to its greater distance and lower turbine height, but this would still slightly moderate the introduction of the Proposed Development into the wider landscape.		
<i>Step 4: Residential Visual Amenity Threshold Assessment</i> Step 4 involves making a judgement as to whether the predicted effects on visual amenity and views at the property are such that it has reached the Residential Visual Amenity Threshold, as described in the introduction. This property has potential to reach the Residential Visual Amenity Threshold due to the high magnitude of change on some of the views experienced by the residents.		



It is considered on this occasion that the Residential Visual Amenity Threshold would not be reached due to a combination of factors: the moderate horizontal field of view that the Proposed Development (approximately 20°) would extend across, the extent of landform screening to Turbines 3 and 4, the intervening distance between the property and the proposed turbines which places the property at the outer edge of the RVAA Study Area, and the relatively simple design composition. As a result of these factors, the Proposed Development will appear as prominent features in the wider landscape, but they would not be overbearing or overwhelming.



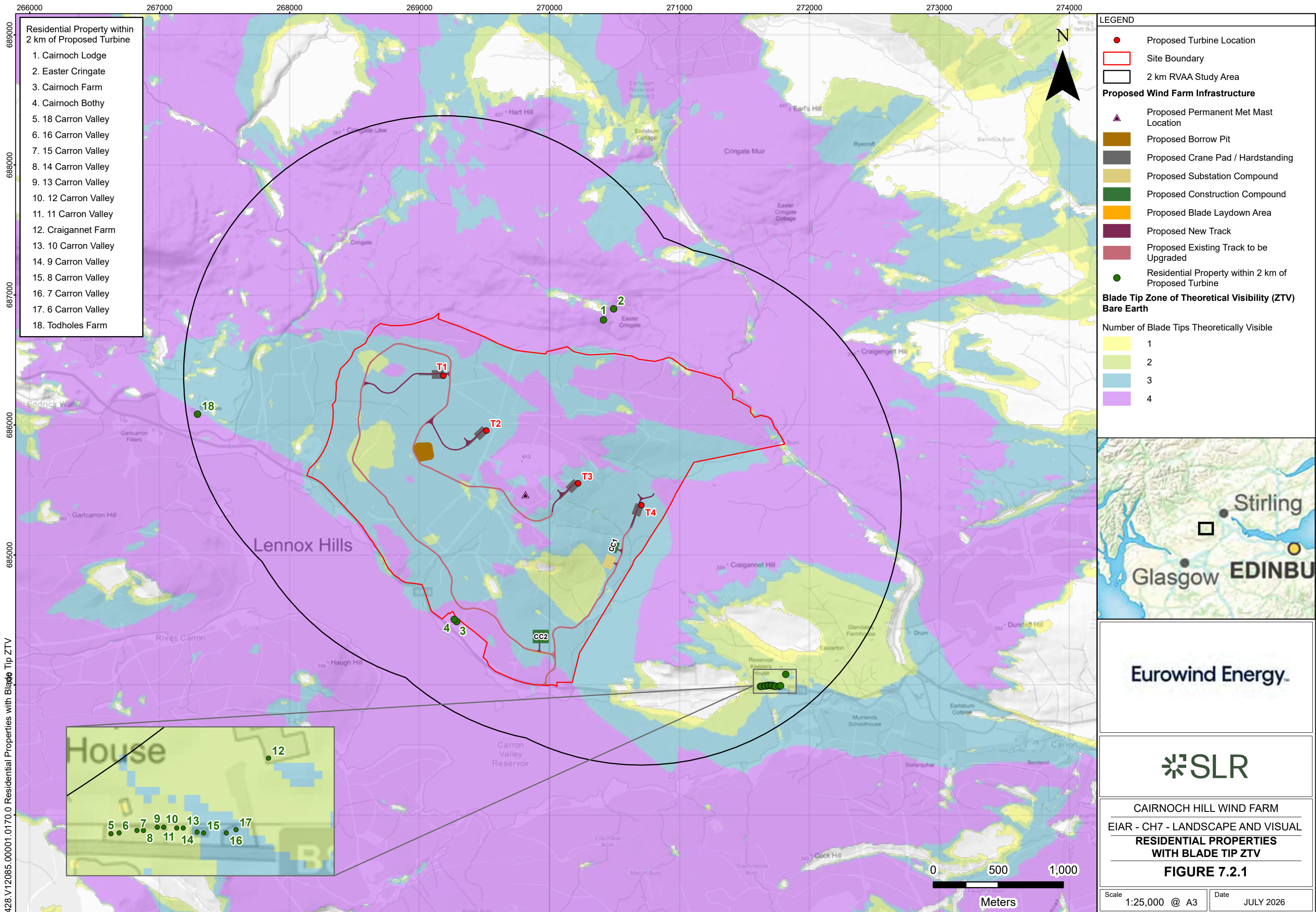
1.3 RVAA Summary and Conclusions

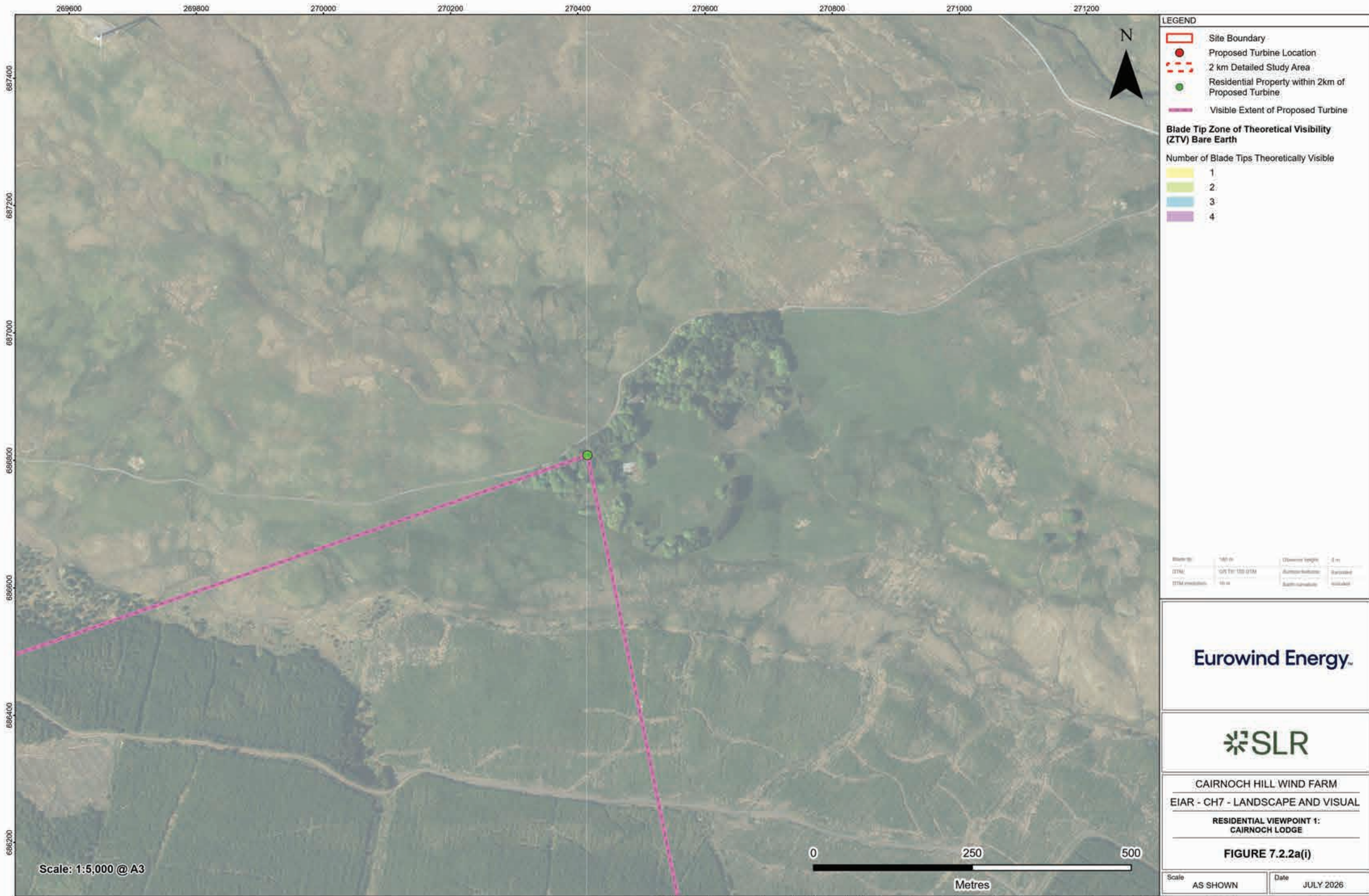
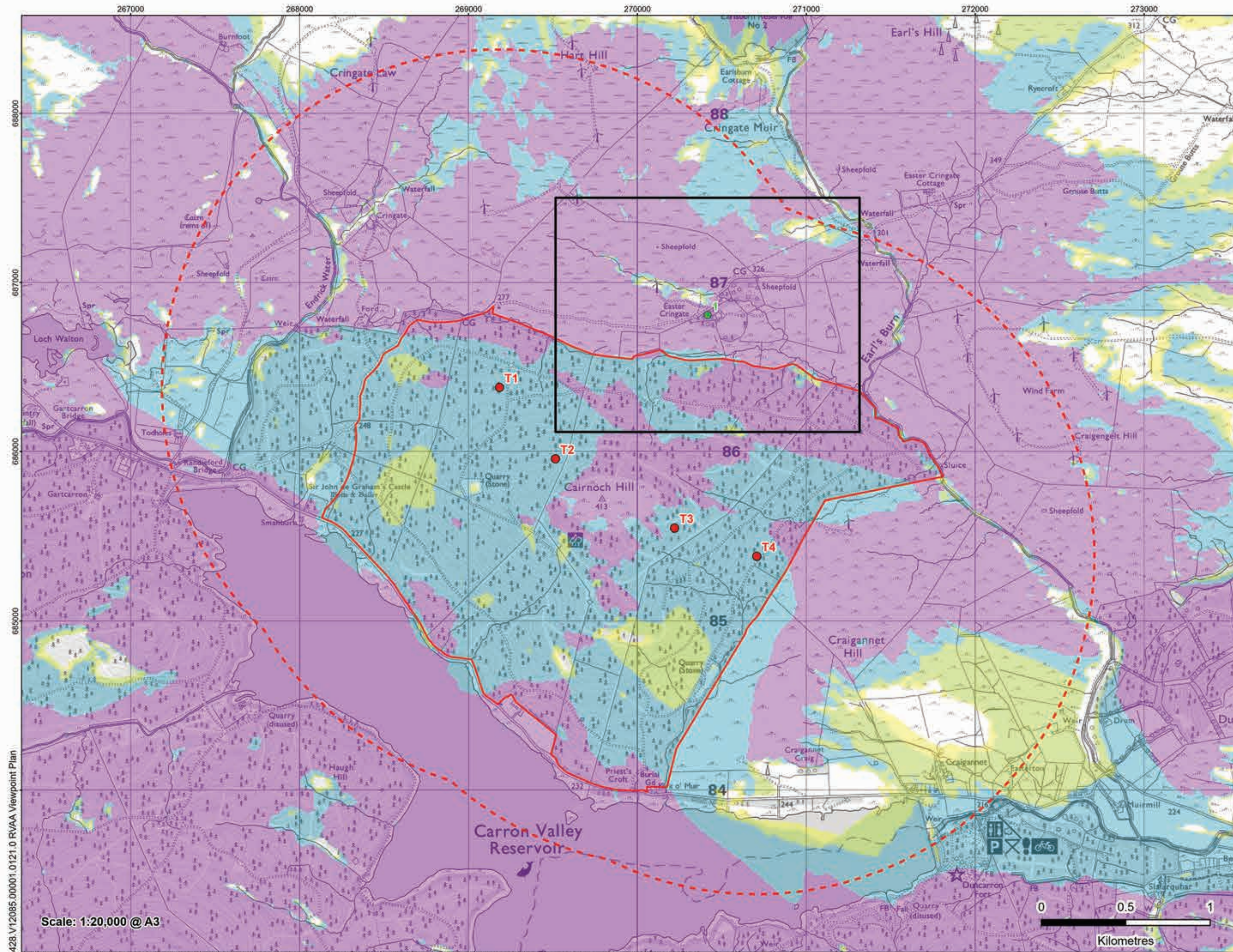
The RVAA sheets in this Technical Appendix detail the assessments for the six property groups that have been evaluated through this assessment, and **Table 3** below provides a summary of the results of this assessment. The RVAA indicates that four of the six property groups assessed are likely to experience a significant visual effects as a result of the Proposed Development. Of these properties, only one would have a high magnitude of change, with screening from intervening landform and forestry/ woodland reducing the magnitude of change at other properties to medium-high and below. In accordance with the methodology, a Step 4 Assessment was therefore only required for Todholes Farm (18), and it is considered that effects would not reach the Residential Visual Amenity Threshold in that instance.

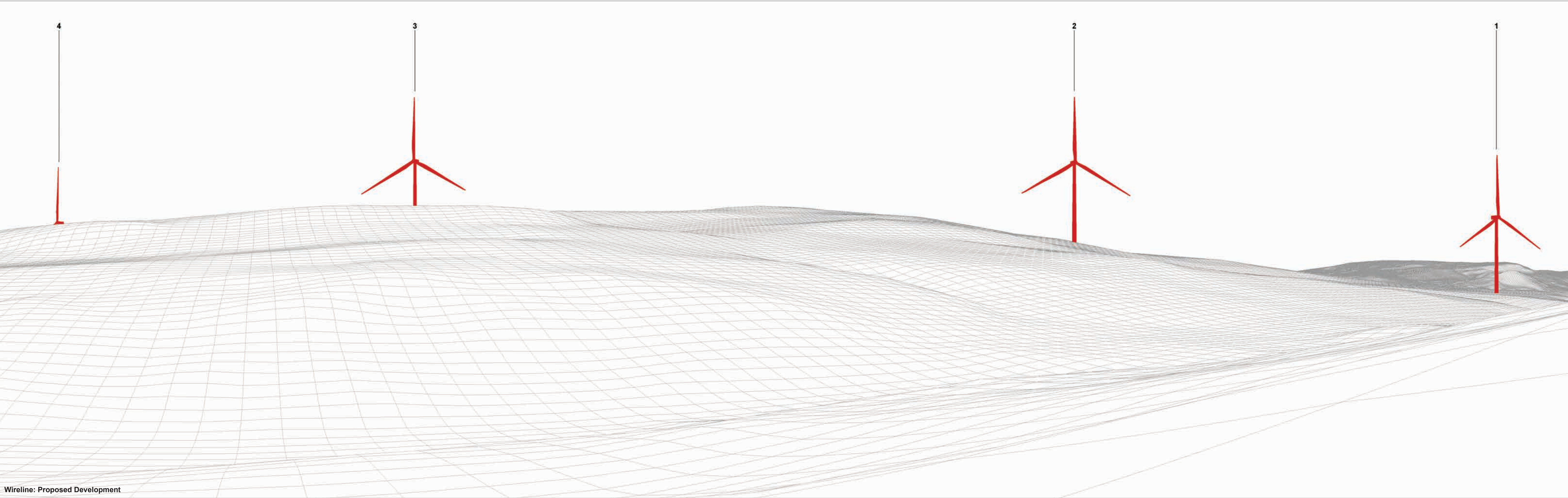
Table 3: RVAA Summary

Ref	Address	Sensitivity	Magnitude of Change	Significance of Effect	Threshold Reached?
1	Cairnoch Lodge and Cairnoch Lodge Cottage	High	Medium	Significant	No
2	Easter Cringate Farm	High	Low	Not Significant	No
3-4	Cairnoch Farm and Cairnoch Bothy	High	Medium to Medium-high	Significant	No
5-11 and 13-17	No. 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, and 18 Carron Valley	High	Medium	Significant	No
12	Craigannet Farm	High	Low	Not Significant	No
18	Todholes Farm	High	High	Significant	No





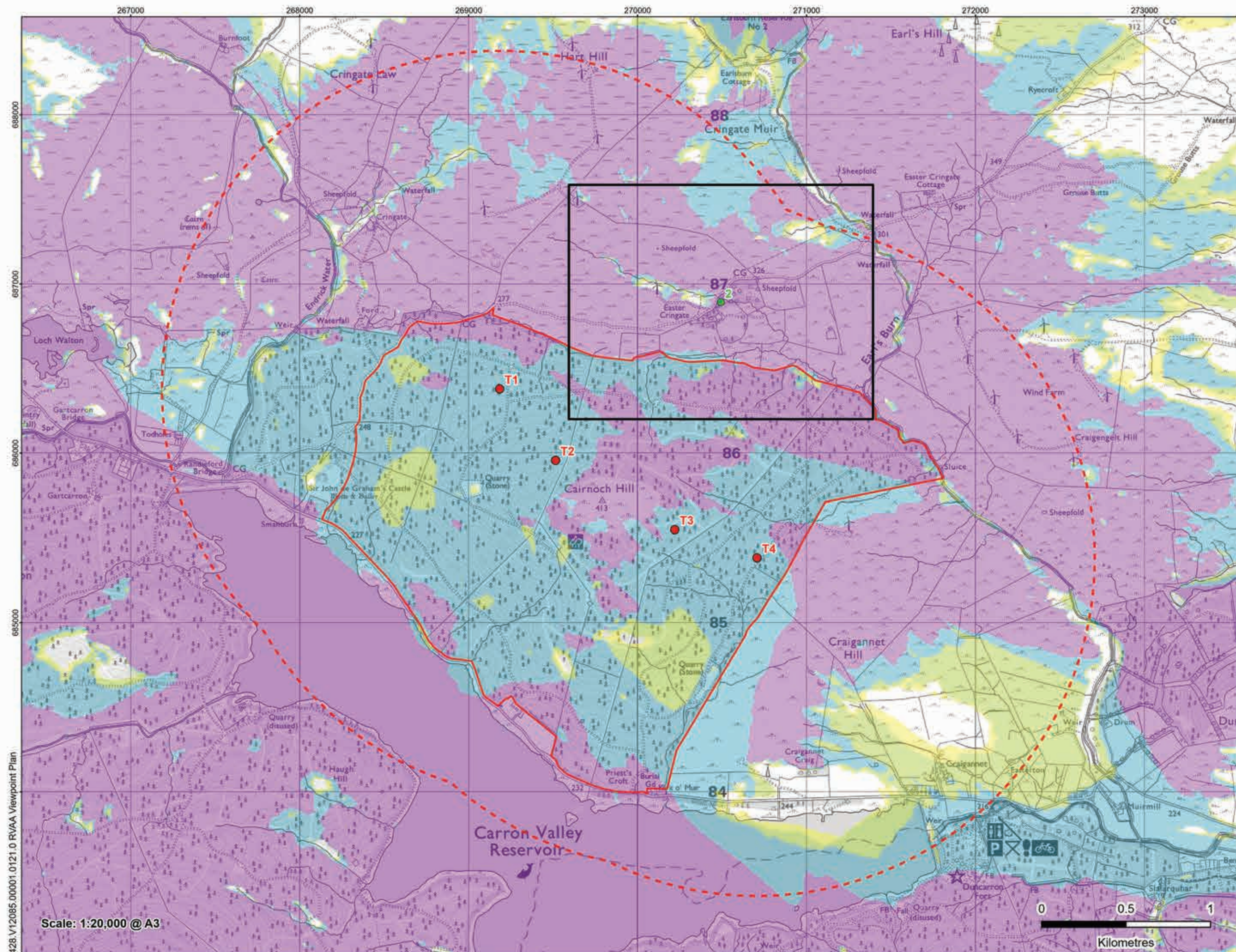




OS reference: 270415 E 686808 N
Eye level: 316.1 mAOD
Direction of view: 210°
Nearest turbine: 1.24 km

Horizontal field of view: 90° (cylindrical projection)
Principal distance: 522 mm
Paper size: 841 x 297 mm (half A1)
Correct printed image size: 820 x 260 mm

Figure: 7.2.2a(ii)
Residential Viewpoint 1: CAIRNOCH LODGE
Cairnoch Hill Wind Farm
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LEGEND

- Site Boundary
- Proposed Turbine Location
- 2 km Detailed Study Area
- Residential Property within 2km of Proposed Turbine
- Visible Extent of Proposed Turbine

Blade Tip Zone of Theoretical Visibility (ZTV) Bare Earth

Number of Blade Tips Theoretically Visible

- 1
- 2
- 3
- 4

Blade tip: 140 m
ZTV: 100 m
ZTV maximum: 100 m

Obstacle height: 0 m
Obstacle location: 100 m
Obstacle maximum: 100 m

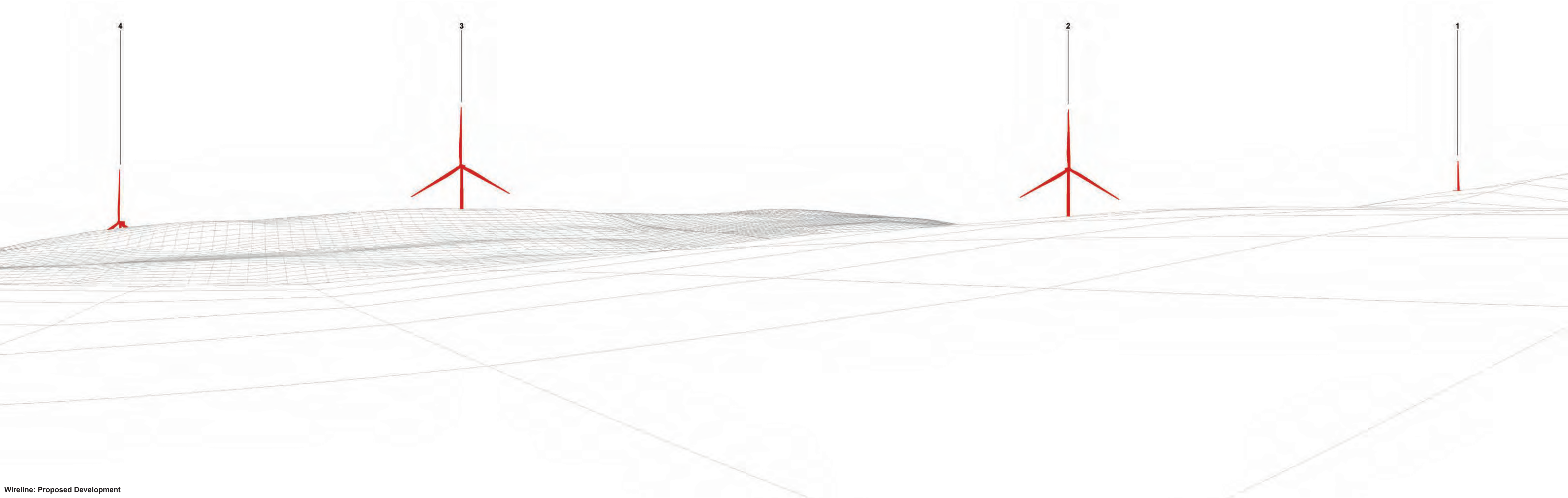
Eurowind Energy.

SLR

CAIRNOCH HILL WIND FARM
EIAR - CH7 - LANDSCAPE AND VISUAL
RESIDENTIAL VIEWPOINT 2: EASTER CRINGATE

FIGURE 7.2.2b(i)

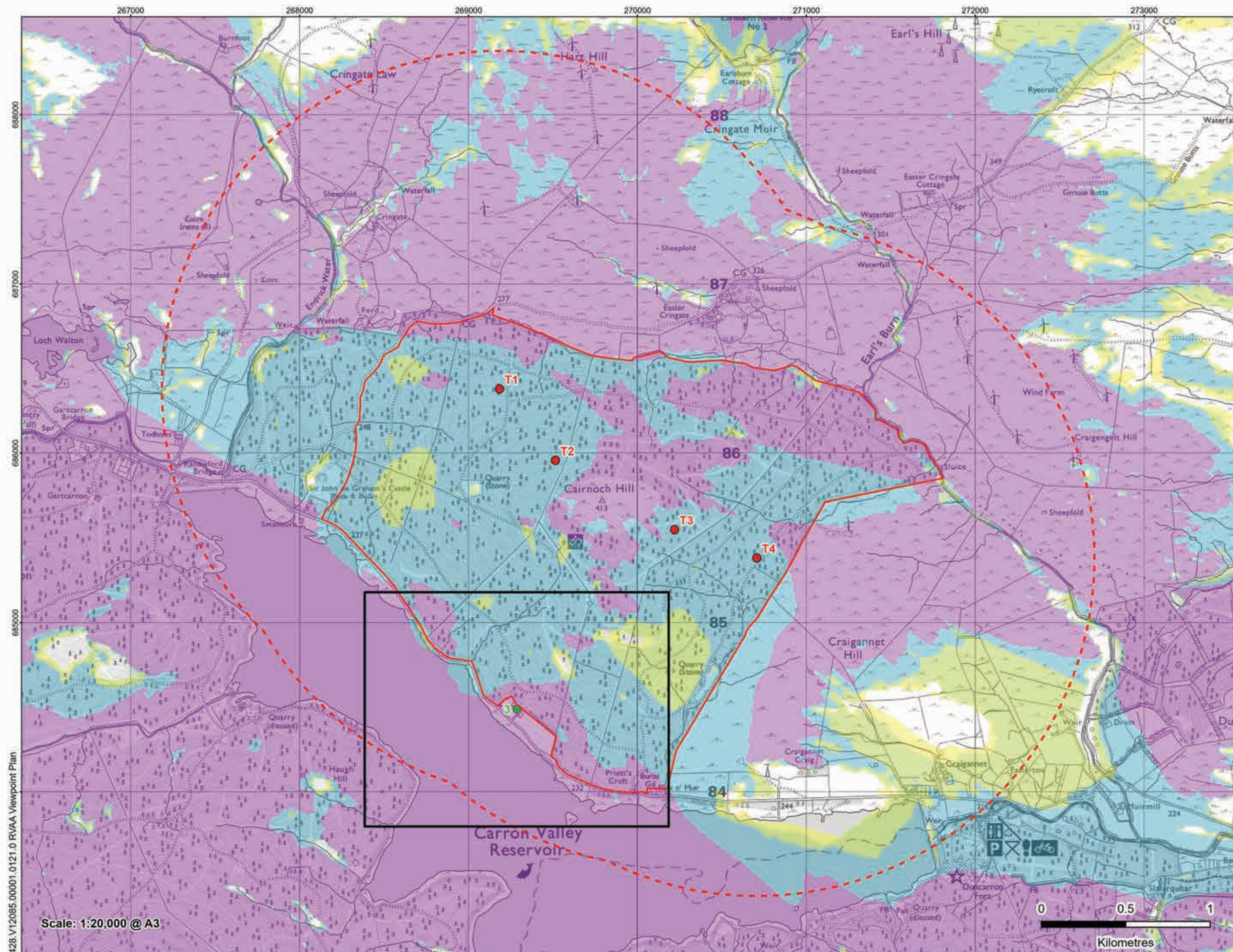
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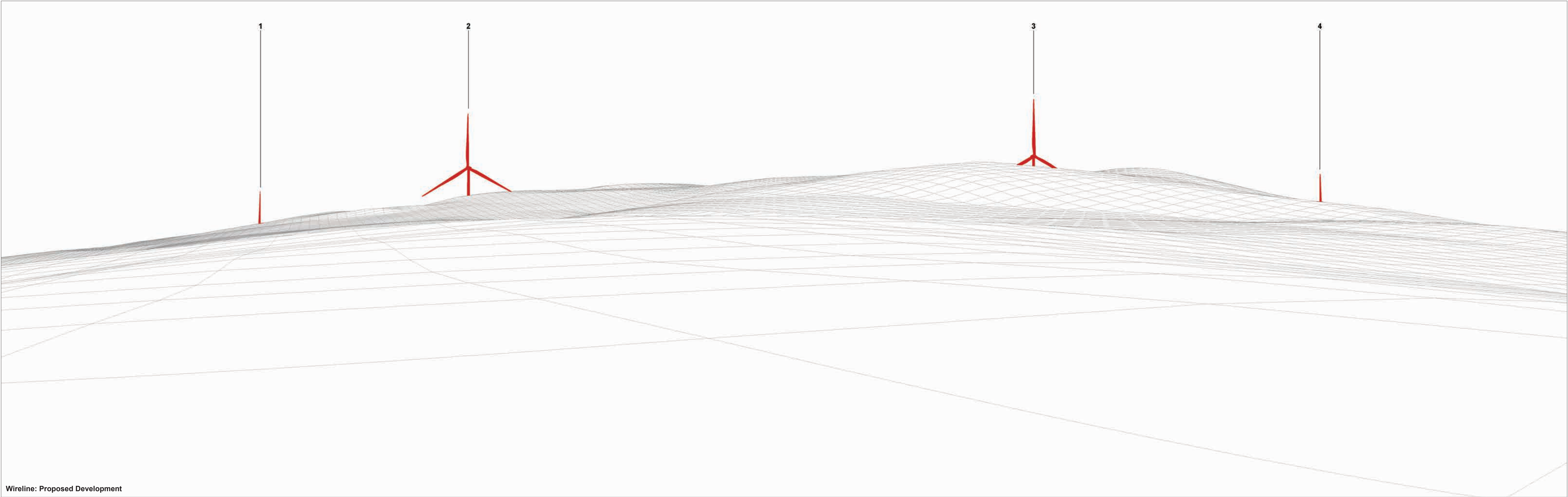


Wireline: Proposed Development

OS reference:	270493 E 686893 N	Horizontal field of view:	90° (cylindrical projection)
Eye level:	311.2 mAOD	Principal distance:	522 mm
Direction of view:	210°	Paper size:	841 x 297 mm (half A1)
Nearest turbine:	1.35 km	Correct printed image size:	820 x 260 mm

Figure: 7.2.2b(ii)
Residential Viewpoint 2: EASTER CRINGATE
Cairnoch Hill Wind Farm
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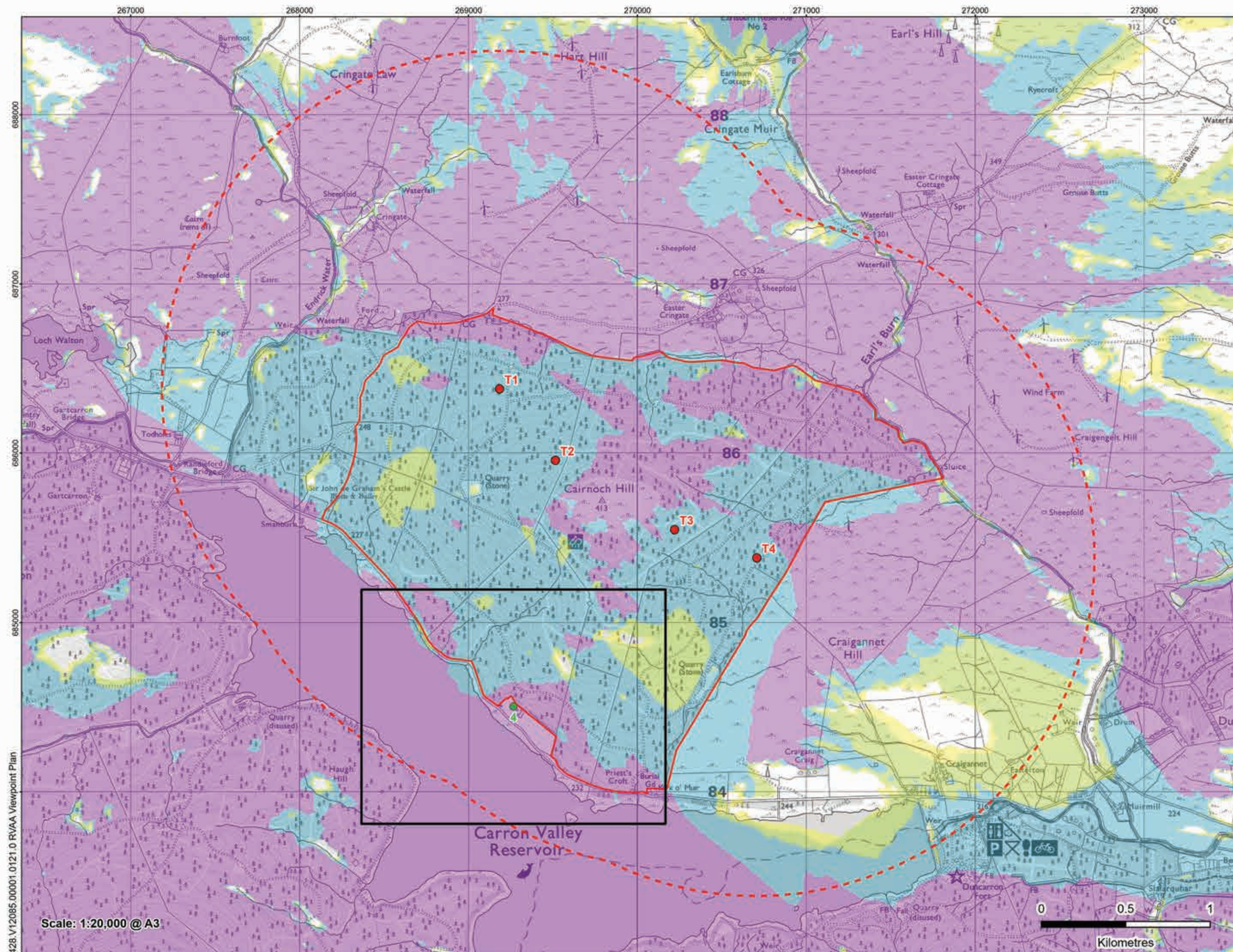




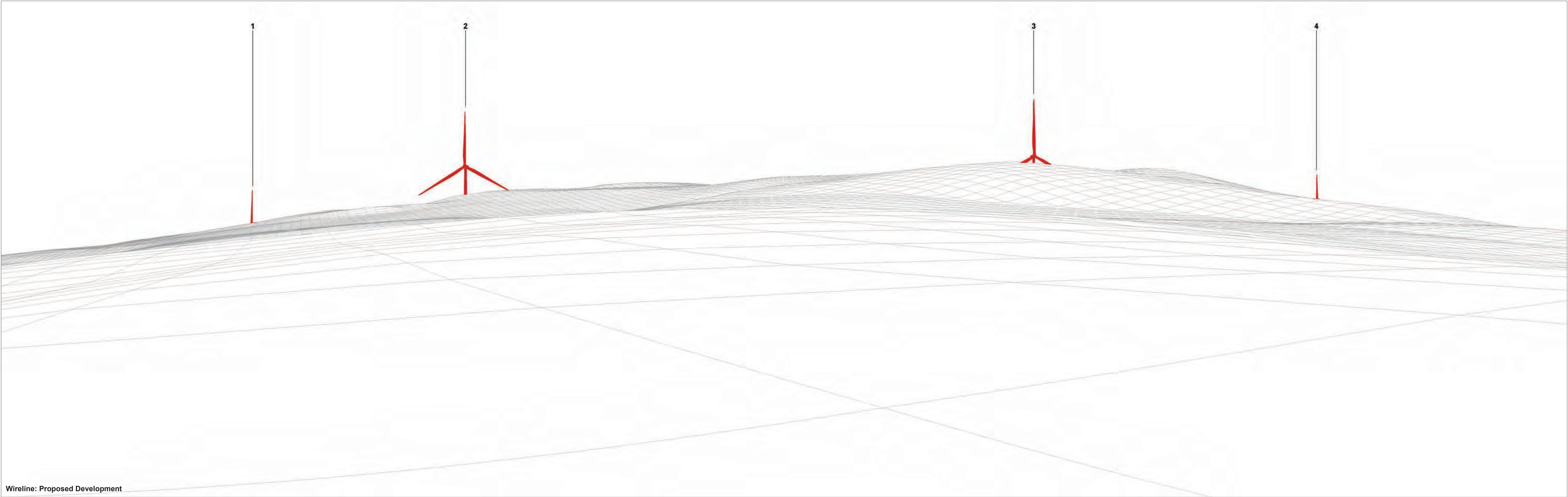
Wireline: Proposed Development

OS reference:	269285 E 684488 N	Horizontal field of view:	90° (cylindrical projection)
Eye level:	242.4 mAOD	Principal distance:	522 mm
Direction of view:	27°	Paper size:	841 x 297 mm (half A1)
Nearest turbine:	1.42 km	Correct printed image size:	820 x 260 mm

Figure: 7.2.2c(ii)
Residential Viewpoint 3: CAIRNOCH FARM
Cairnoch Hill Wind Farm
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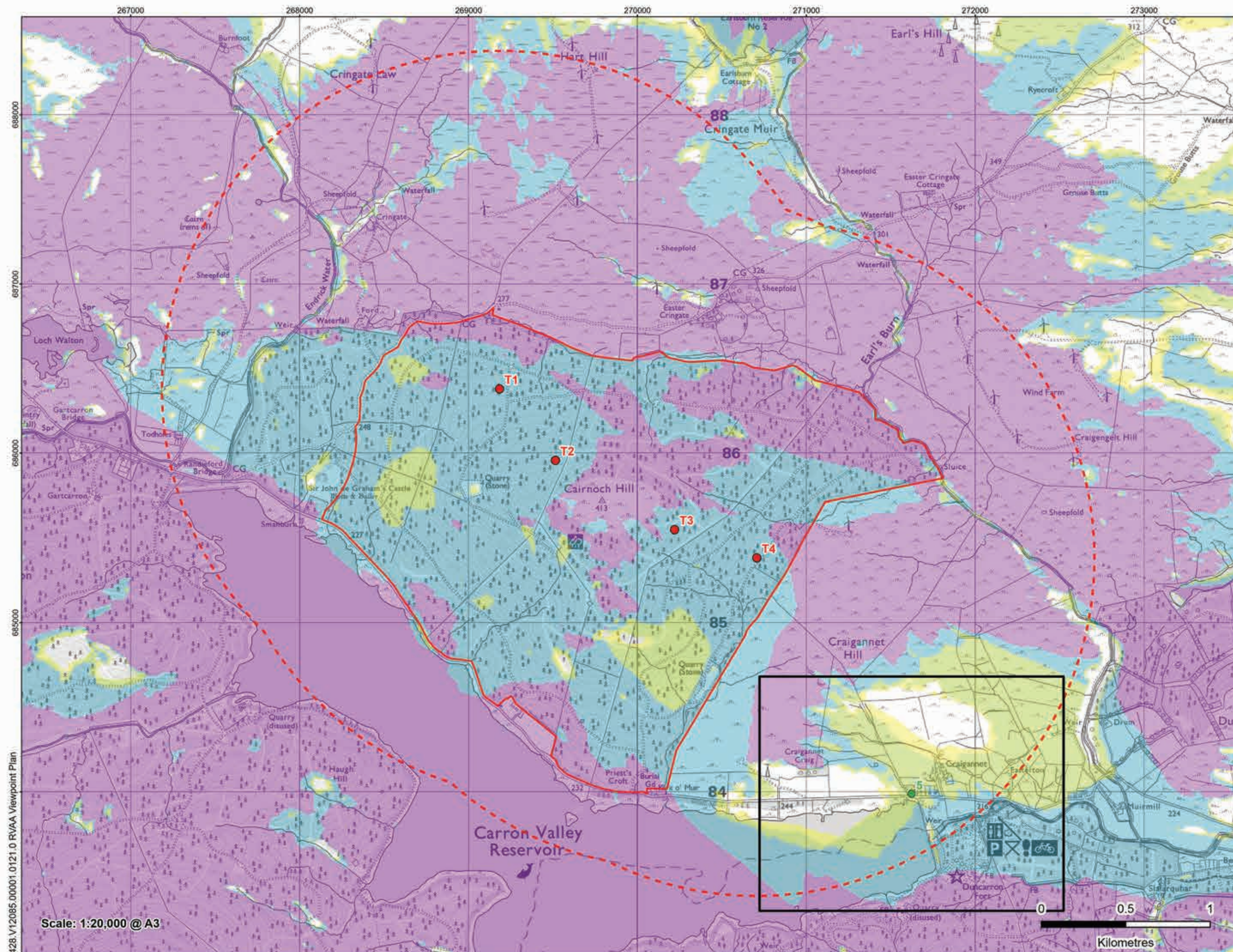
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Wireline: Proposed Development

OS reference:	269266 E 684504 N	Horizontal field of view:	90° (cylindrical projection)
Eye level:	242.3 mAOD	Principal distance:	522 mm
Direction of view:	28°	Paper size:	841 x 297 mm (half A1)
Nearest turbine:	1.42 km	Correct printed image size:	820 x 260 mm

Figure: 7.2.2d(ii)
Residential Viewpoint 4: CAIRNOCH BOTHY
Cairnoch Hill Wind Farm
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LEGEND

- Site Boundary
- Proposed Turbine Location
- 2 km Detailed Study Area
- Residential Property within 2km of Proposed Turbine
- Visible Extent of Proposed Turbine

Blade Tip Zone of Theoretical Visibility (ZTV) Bare Earth

Number of Blade Tips Theoretically Visible

- 1
- 2
- 3
- 4

Blade tip: 140 m
Tower height: 8 m
TOTAL: 148 m
TOTAL elevation: 148 m

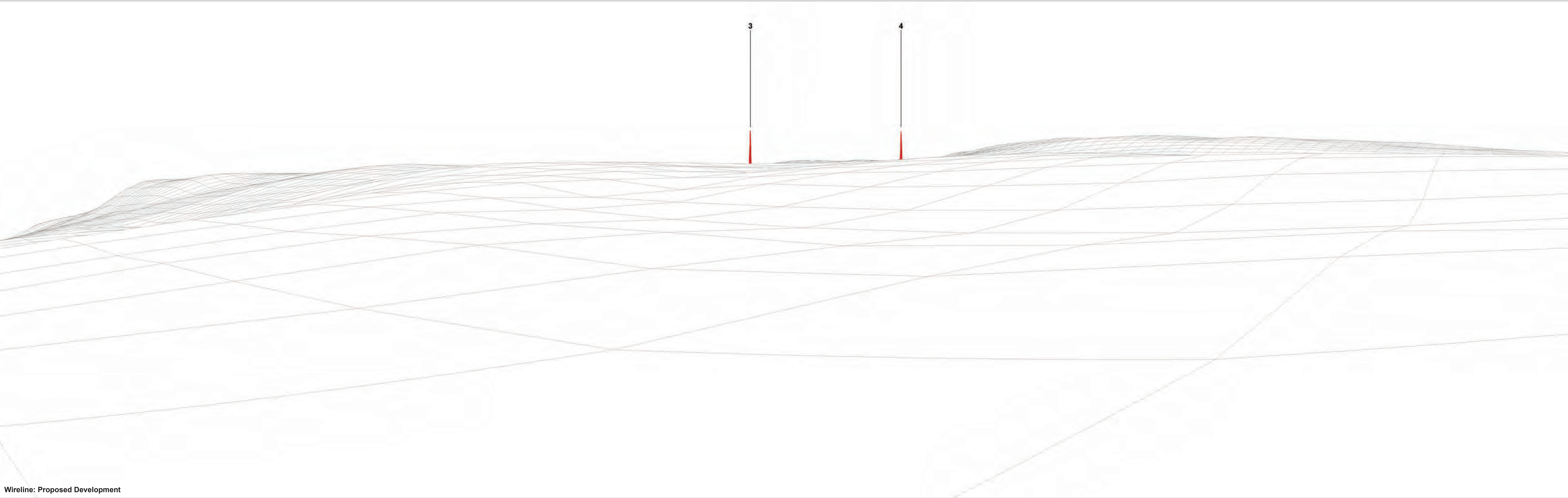
Eurowind Energy.

SLR

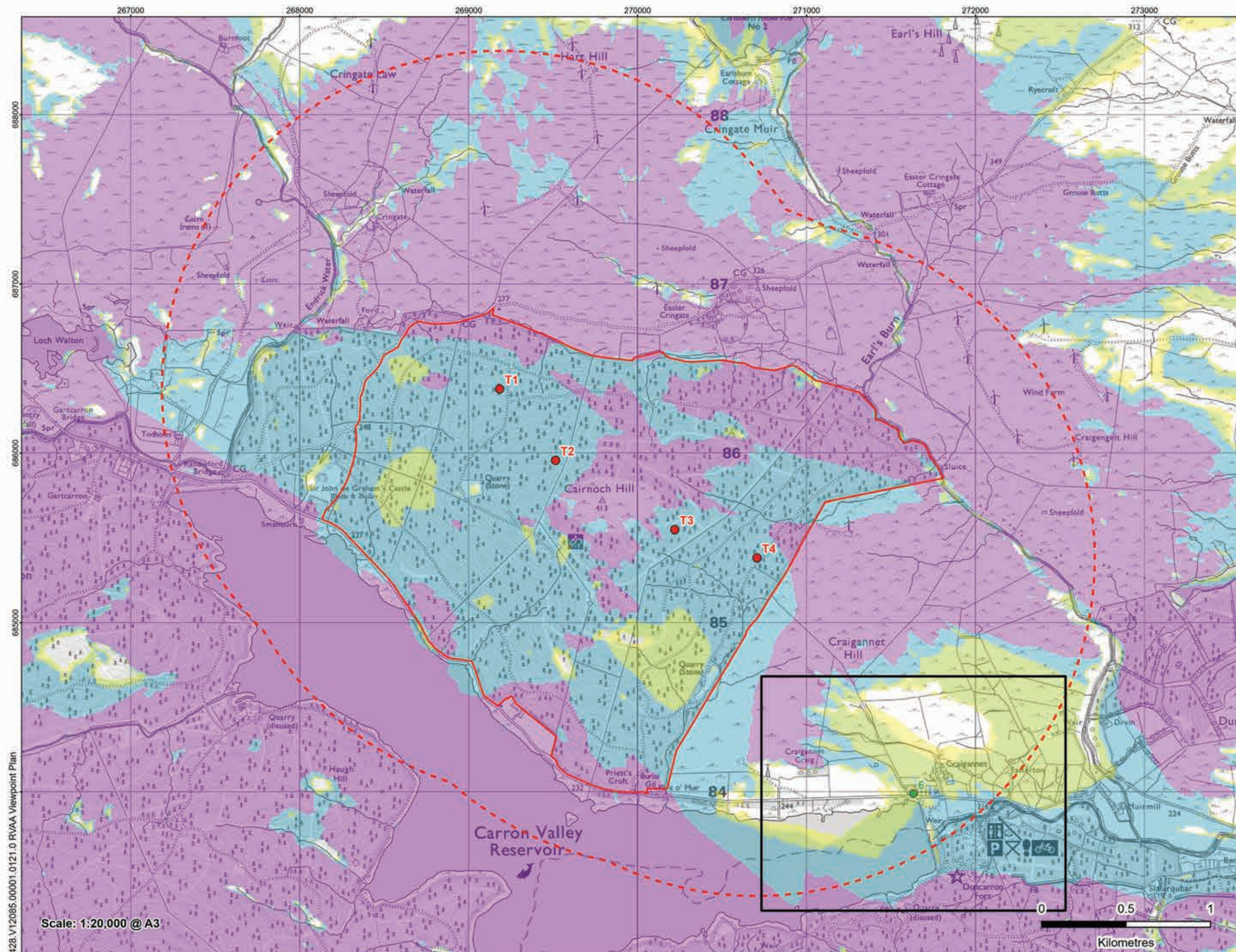
CAIRNOCH HILL WIND FARM
EIA - CH7 - LANDSCAPE AND VISUAL
RESIDENTIAL VIEWPOINT 5:
18 CARRON VALLEY

FIGURE 7.2.2e(i)

Scale AS SHOWN Date JULY 2026



OS reference:	271623 E 683989 N	Horizontal field of view:	90° (cylindrical projection)
Eye level:	230.8 mAOD	Principal distance:	522 mm
Direction of view:	320°	Paper size:	841 x 297 mm (half A1)
Nearest turbine:	1.67 km	Correct printed image size:	820 x 260 mm



428.V12085.00001.0121.0 R/A/A Viewpoint Plan

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Scale: 1:5,000 @ A3

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- LEGEND**
- Site Boundary
 - Proposed Turbine Location
 - 2 km Detailed Study Area
 - Residential Property within 2km of Proposed Turbine
 - Visible Extent of Proposed Turbine

Blade Tip Zone of Theoretical Visibility (ZTV) Bare Earth

- Number of Blade Tips Theoretically Visible
- 1
 - 2
 - 3
 - 4

Eurowind Energy.

SLR

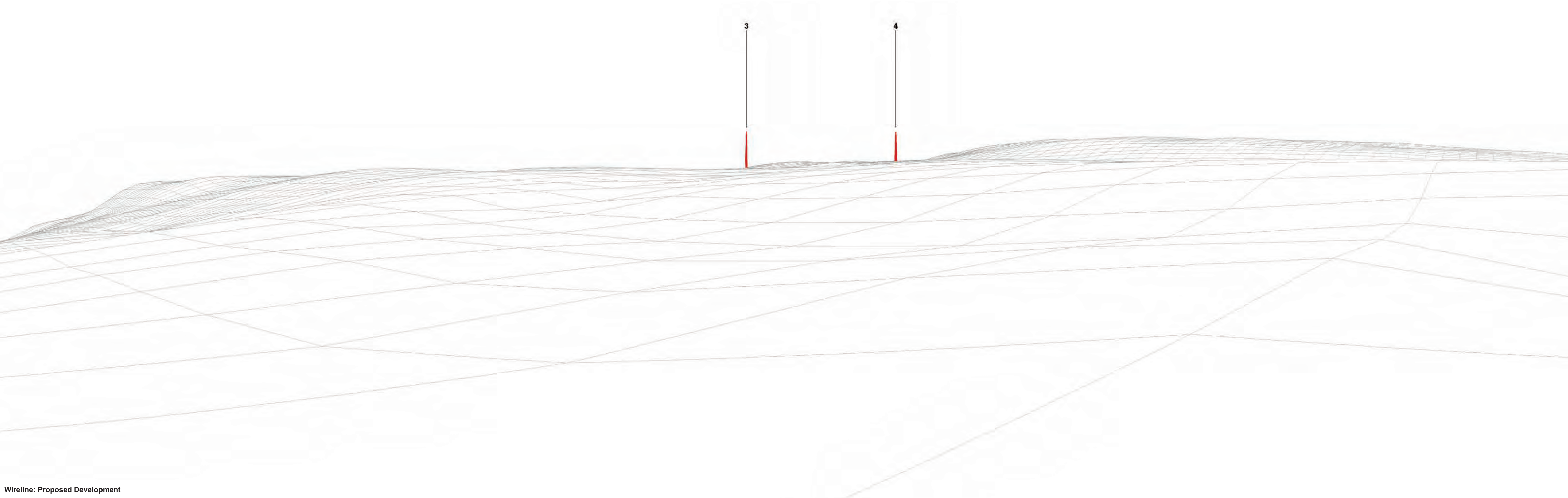
CAIRNOCH HILL WIND FARM

EIAR - CH7 - LANDSCAPE AND VISUAL

**RESIDENTIAL VIEWPOINT 6:
16 CARRON VALLEY**

FIGURE 7.2.2f(i)

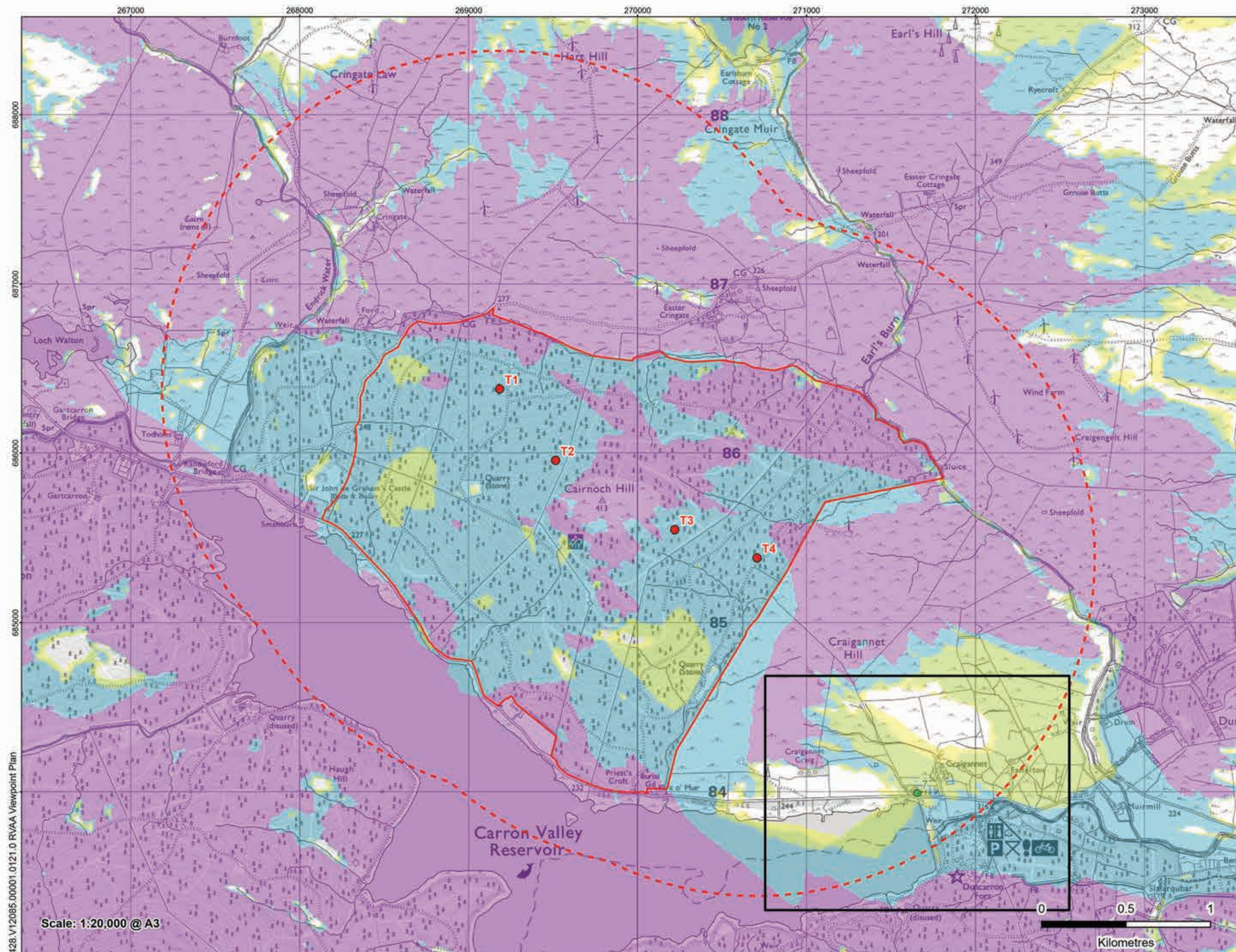
Scale AS SHOWN Date JULY 2026

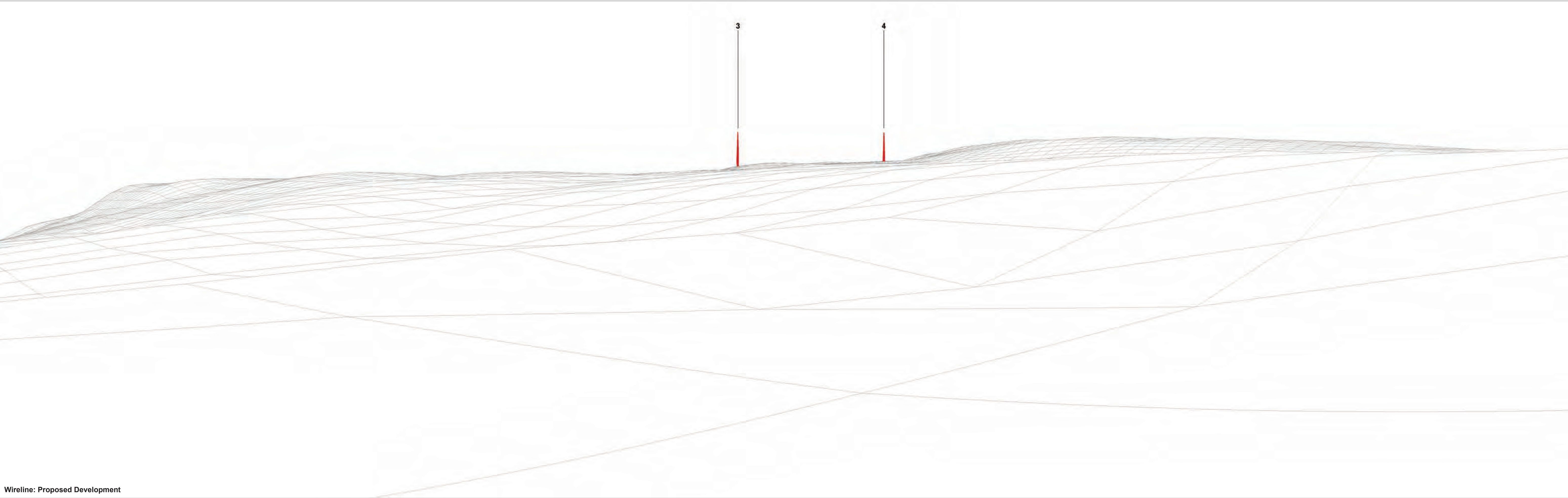


Wireline: Proposed Development

OS reference:	271633 E 683990 N	Horizontal field of view:	90° (cylindrical projection)
Eye level:	231.3 mAOD	Principal distance:	522 mm
Direction of view:	320°	Paper size:	841 x 297 mm (half A1)
Nearest turbine:	1.67 km	Correct printed image size:	820 x 260 mm

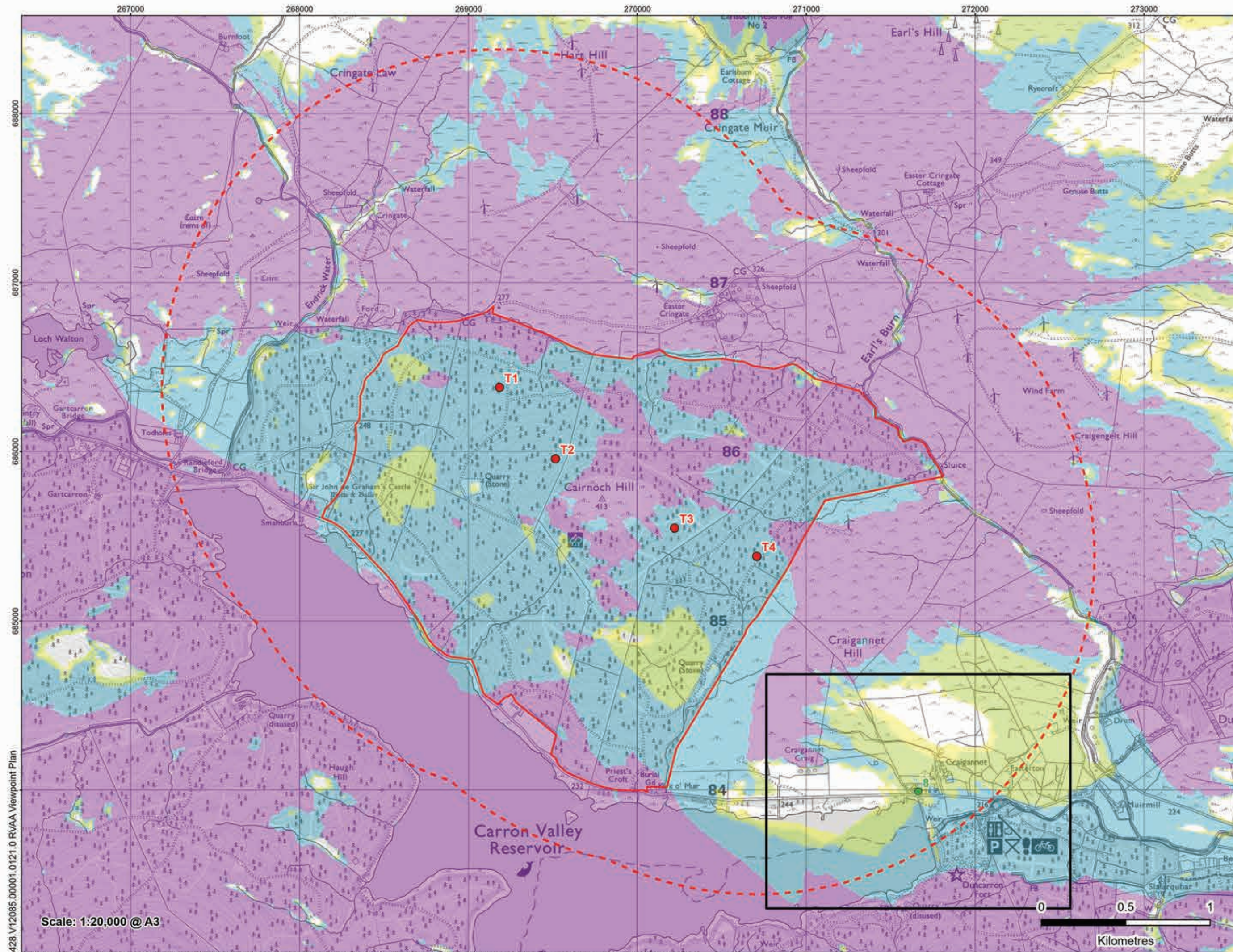
Figure: 7.2.2f(ii)
Residential Viewpoint 6: 16 CARRON VALLEY
Cairnoch Hill Wind Farm
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Wireline: Proposed Development

OS reference:	271655 E 683993 N	Horizontal field of view:	90° (cylindrical projection)
Eye level:	230.7 mAOD	Principal distance:	522 mm
Direction of view:	320°	Paper size:	841 x 297 mm (half A1)
Nearest turbine:	1.68 km	Correct printed image size:	820 x 260 mm



LEGEND

- Site Boundary
- Proposed Turbine Location
- 2 km Detailed Study Area
- Residential Property within 2km of Proposed Turbine
- Visible Extent of Proposed Turbine

Blade Tip Zone of Theoretical Visibility (ZTV) Bare Earth

Number of Blade Tips Theoretically Visible

- 1
- 2
- 3
- 4

Eurowind Energy.

SLR

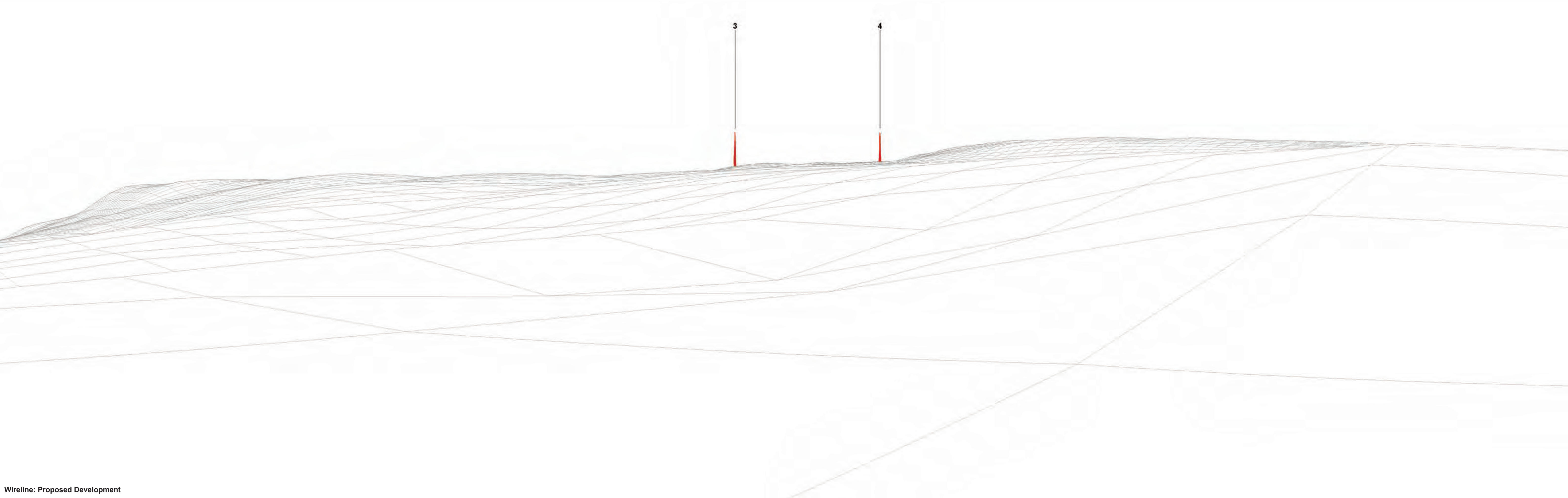
CAIRNOCH HILL WIND FARM

EIAR - CH7 - LANDSCAPE AND VISUAL

RESIDENTIAL VIEWPOINT 8: 14 CARRON VALLEY

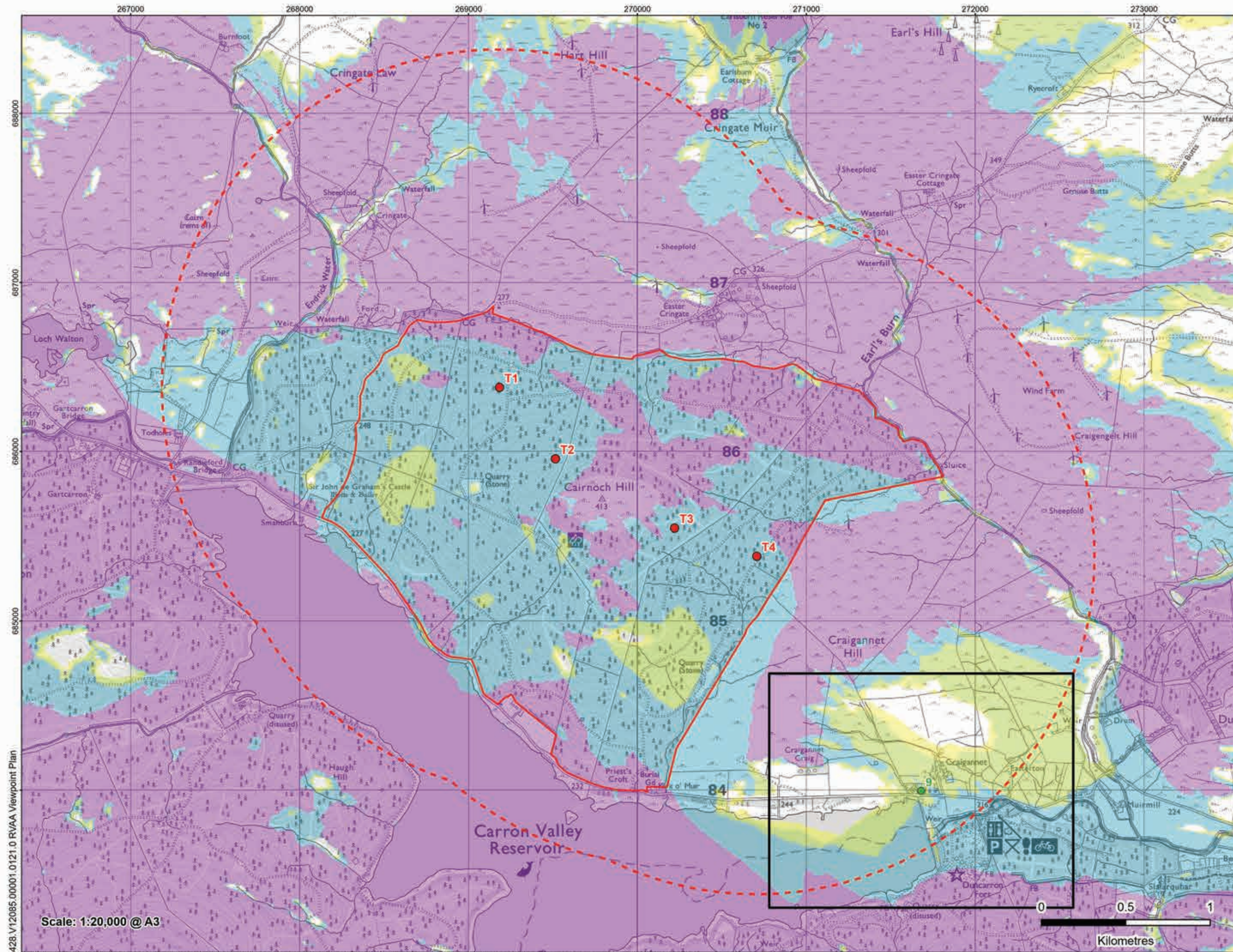
FIGURE 7.2.2h(i)

Scale AS SHOWN Date JULY 2026



Wireline: Proposed Development

OS reference:	271663 E 683993 N	Horizontal field of view:	90° (cylindrical projection)
Eye level:	230.5 mAOD	Principal distance:	522 mm
Direction of view:	320°	Paper size:	841 x 297 mm (half A1)
Nearest turbine:	1.69 km	Correct printed image size:	820 x 260 mm



LEGEND

- Site Boundary
- Proposed Turbine Location
- 2 km Detailed Study Area
- Residential Property within 2km of Proposed Turbine
- Visible Extent of Proposed Turbine

Blade Tip Zone of Theoretical Visibility (ZTV) Bare Earth

Number of Blade Tips Theoretically Visible

- 1
- 2
- 3
- 4

Eurowind Energy.

SLR

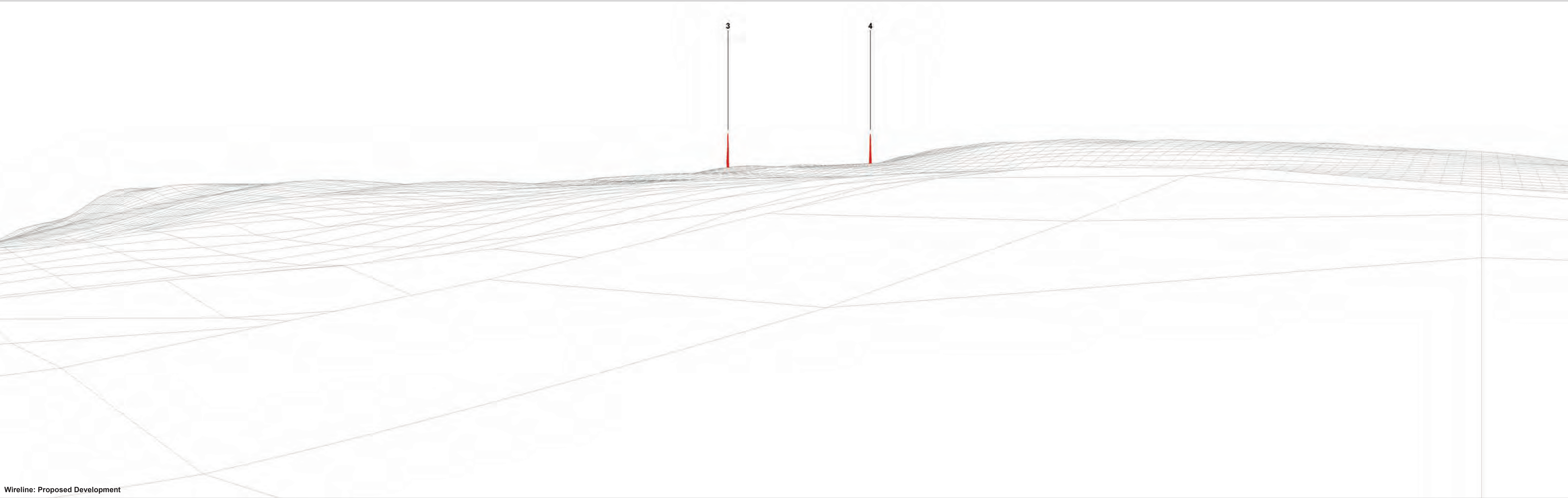
CAIRNOCH HILL WIND FARM

EAIR - CH7 - LANDSCAPE AND VISUAL

RESIDENTIAL VIEWPOINT 9: 13 CARRON VALLEY

FIGURE 7.2.2i(i)

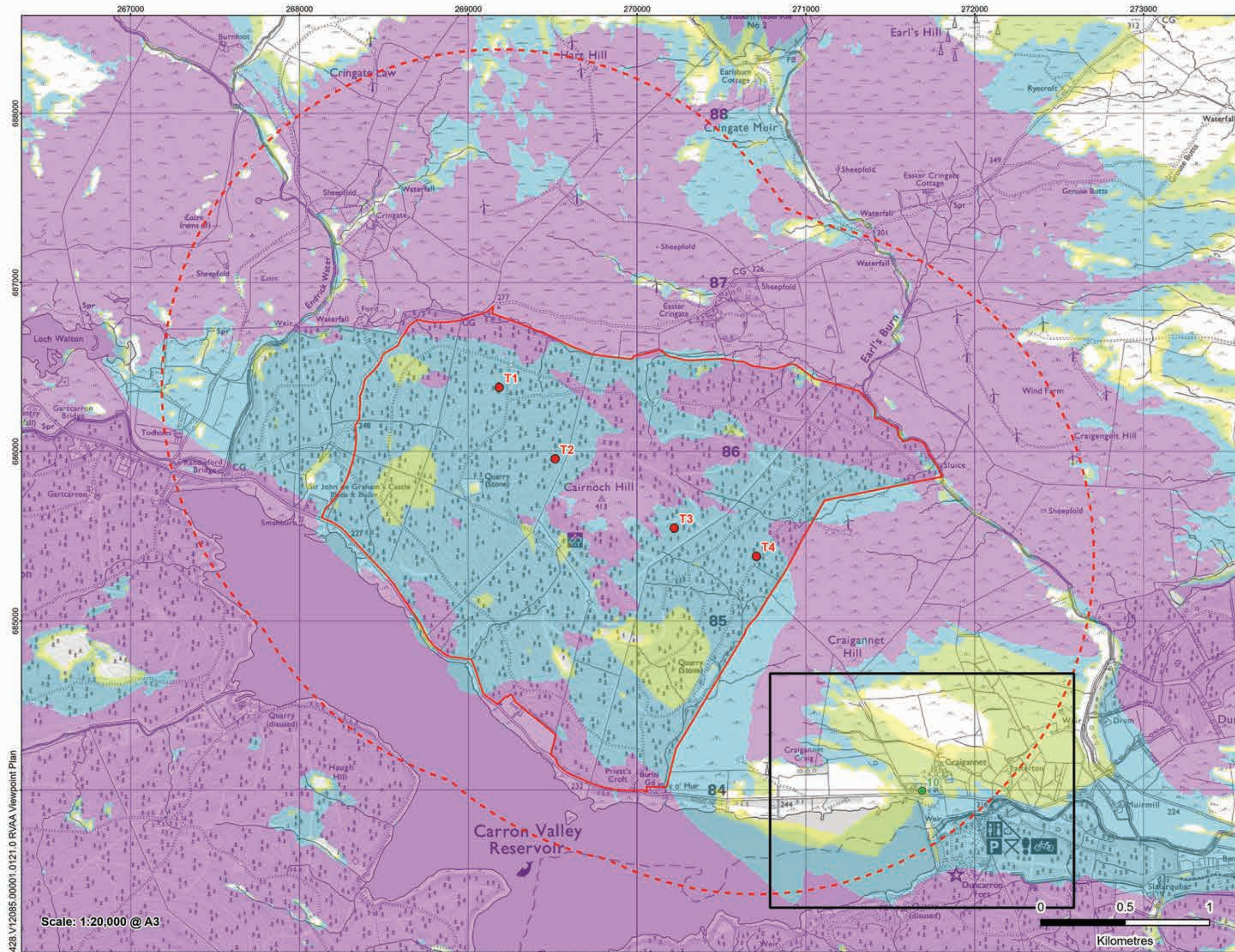
Scale AS SHOWN Date JULY 2026



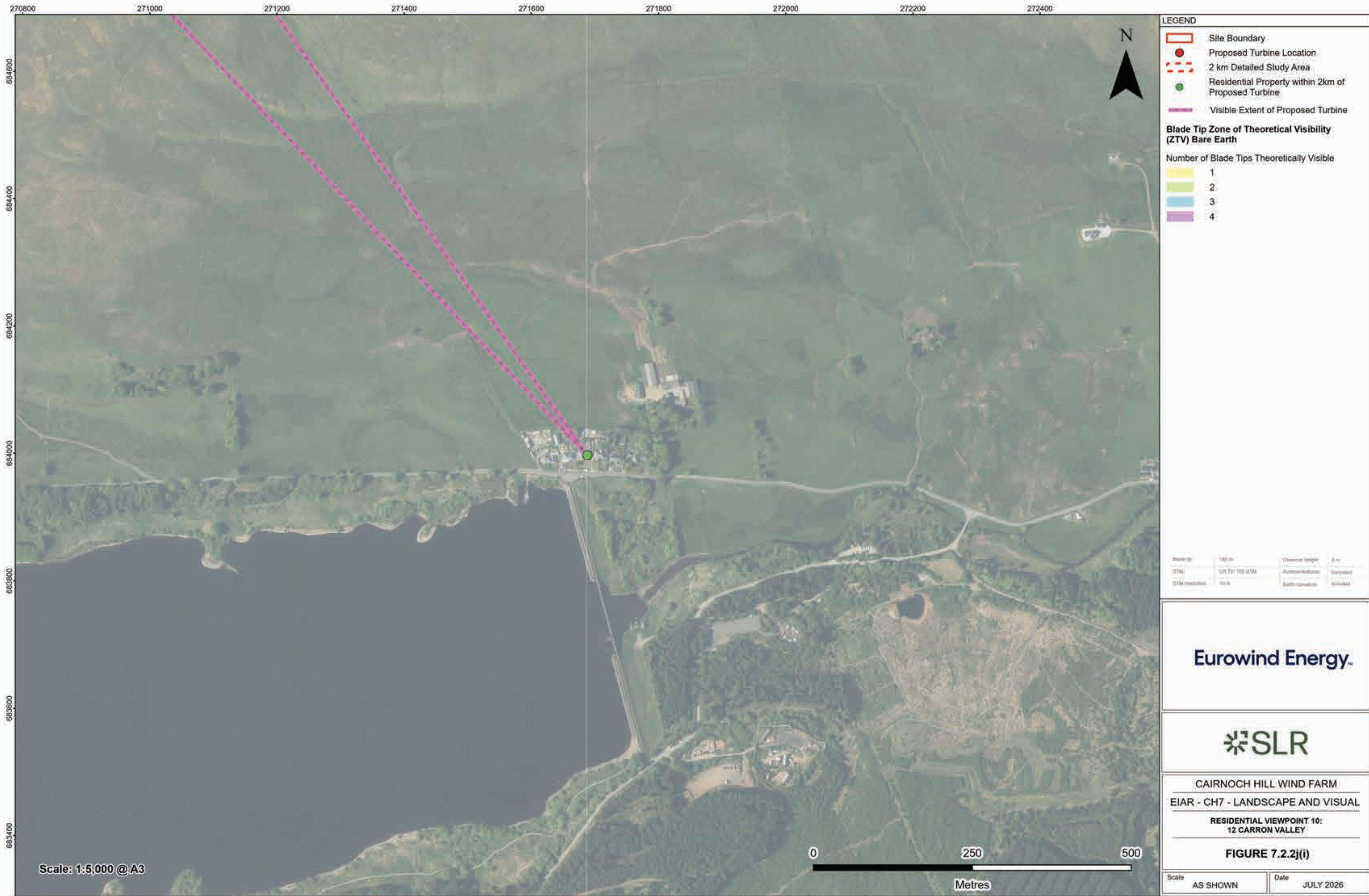
OS reference: 271680 E 683997 N
Eye level: 231.6 mAOD
Direction of view: 320°
Nearest turbine: 1.69 km

Horizontal field of view: 90° (cylindrical projection)
Principal distance: 522 mm
Paper size: 841 x 297 mm (half A1)
Correct printed image size: 820 x 260 mm

Figure: 7.2.2i(ii)
Residential Viewpoint 9: 13 CARRON VALLEY
Cairnoch Hill Wind Farm
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- LEGEND
- Site Boundary
 - Proposed Turbine Location
 - 2 km Detailed Study Area
 - Residential Property within 2km of Proposed Turbine
 - Visible Extent of Proposed Turbine

- Blade Tip Zone of Theoretical Visibility (ZTV) Bare Earth
- Number of Blade Tips Theoretically Visible
- 1
 - 2
 - 3
 - 4

Blade tip:	140 m	Distance height:	0 m
ETM:	100 m 100 m 100 m	Distance height:	0 m
ETM resolution:	10 m	Distance height:	0 m

Eurowind Energy.

SLR

CAIRNOCH HILL WIND FARM

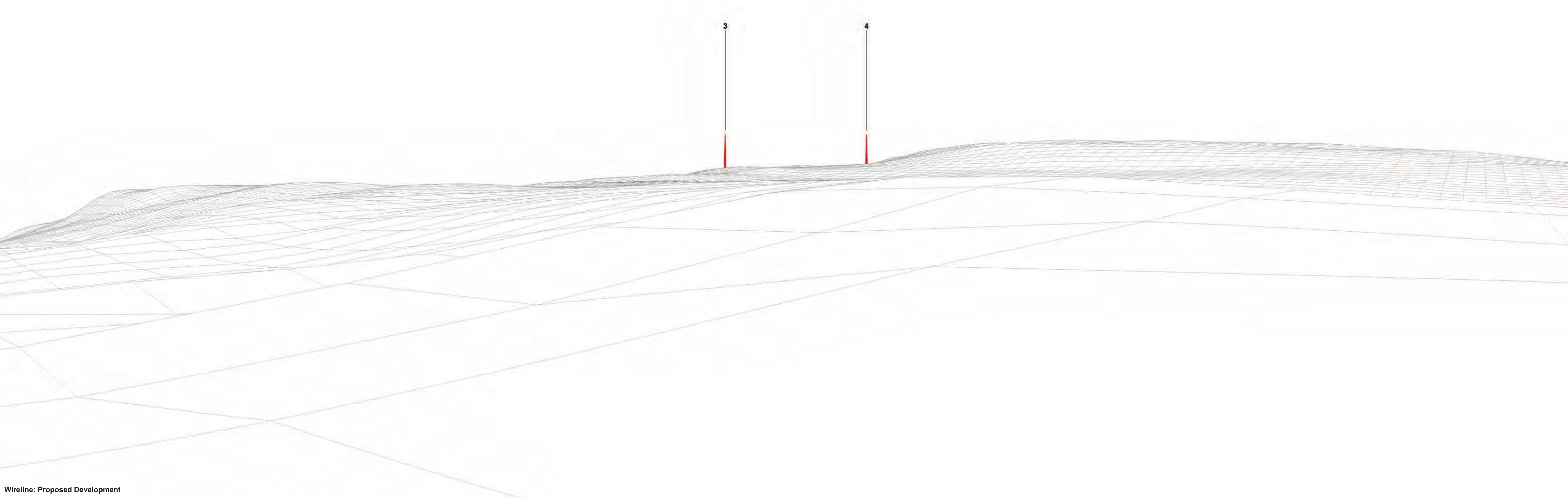
EAIR - CH7 - LANDSCAPE AND VISUAL

RESIDENTIAL VIEWPOINT 10:
12 CARRON VALLEY

FIGURE 7.2.2j(i)

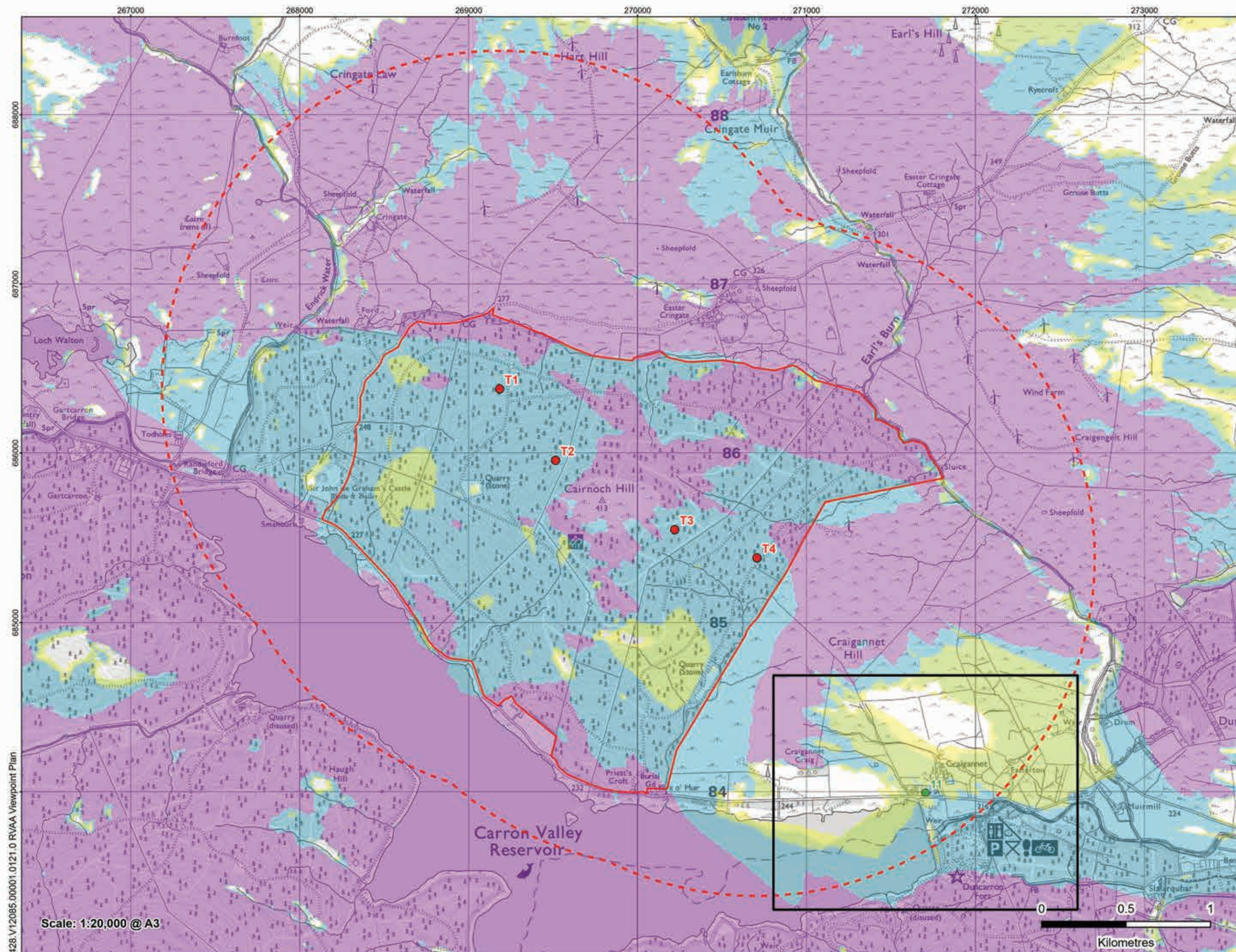
Scale AS SHOWN Date JULY 2026

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Wireline: Proposed Development

OS reference:	271688 E 683997 N	Horizontal field of view:	90° (cylindrical projection)
Eye level:	231.7 mAOD	Principal distance:	522 mm
Direction of view:	320°	Paper size:	841 x 297 mm (half A1)
Nearest turbine:	1.70 km	Correct printed image size:	820 x 260 mm



Scale: 1:5,000 @ A3



LEGEND

- Site Boundary
- Proposed Turbine Location
- 2 km Detailed Study Area
- Residential Property within 2km of Proposed Turbine
- Visible Extent of Proposed Turbine

Blade Tip Zone of Theoretical Visibility (ZTV) Bare Earth

Number of Blade Tips Theoretically Visible

- 1
- 2
- 3
- 4

Eurowind Energy.

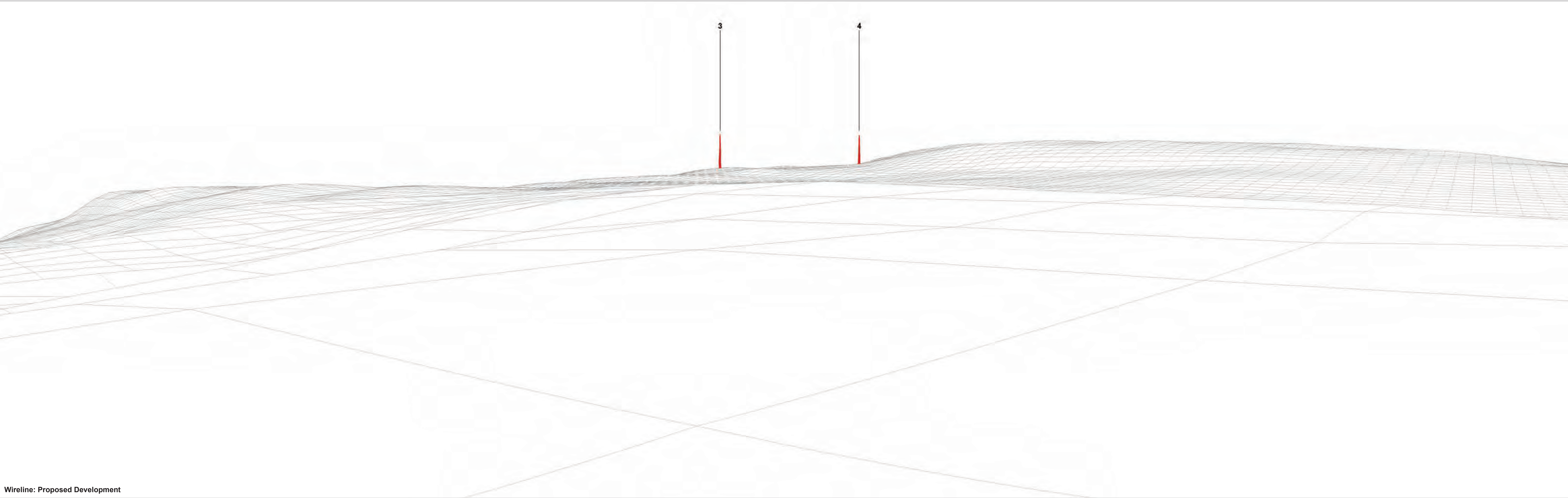
SLR

CAIRNOCH HILL WIND FARM
EIA - CH7 - LANDSCAPE AND VISUAL

RESIDENTIAL VIEWPOINT 11:
11 CARRON VALLEY

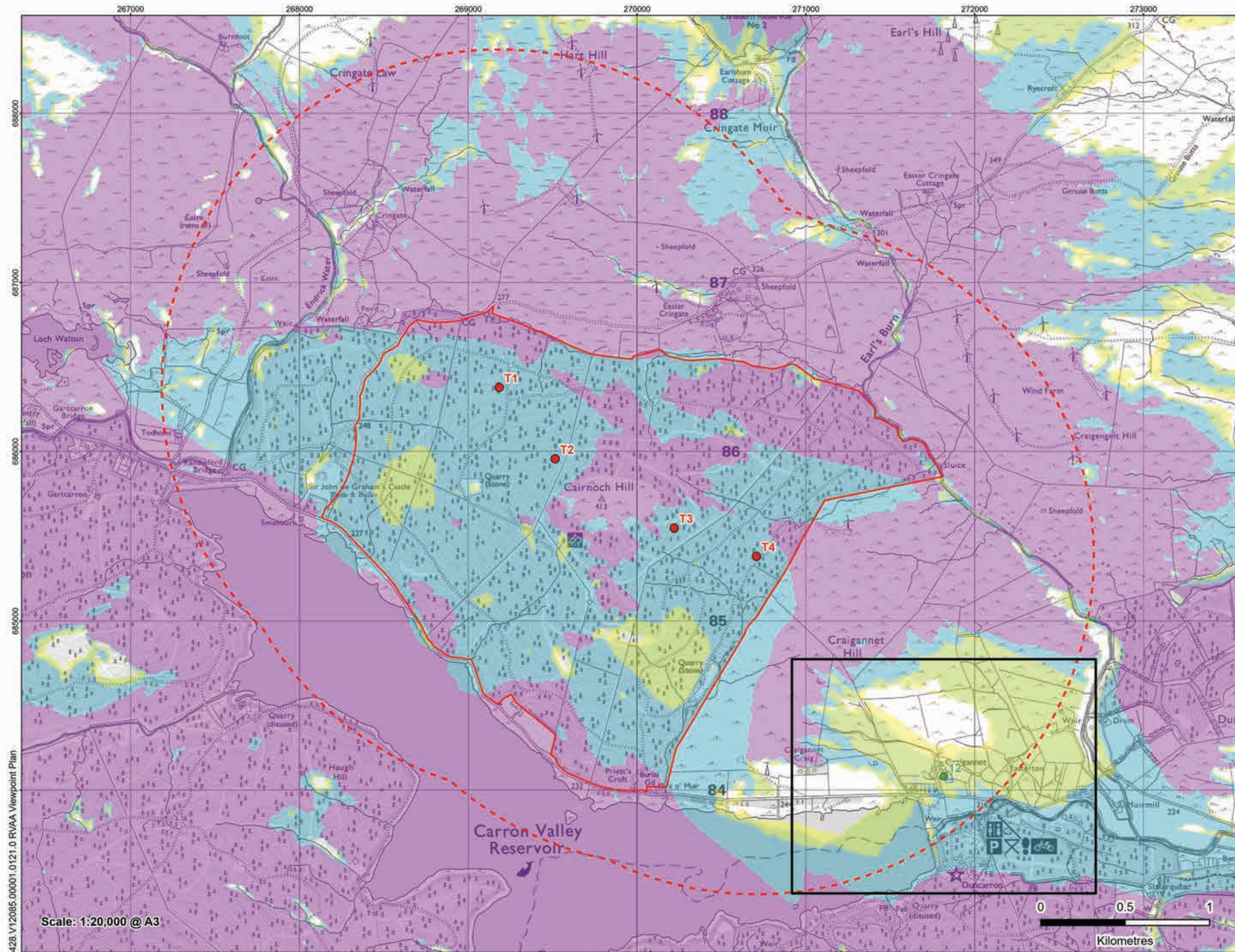
FIGURE 7.2.2k(i)

Scale AS SHOWN Date JULY 2026



Wireline: Proposed Development

OS reference:	271704 E 683996 N	Horizontal field of view:	90° (cylindrical projection)
Eye level:	231.0 mAOB	Principal distance:	522 mm
Direction of view:	320°	Paper size:	841 x 297 mm (half A1)
Nearest turbine:	1.71 km	Correct printed image size:	820 x 260 mm



LEGEND

- Site Boundary
- Proposed Turbine Location
- 2 km Detailed Study Area
- Residential Property within 2km of Proposed Turbine
- Visible Extent of Proposed Turbine

Blade Tip Zone of Theoretical Visibility (ZTV) Bare Earth

Number of Blade Tips Theoretically Visible

- 1
- 2
- 3
- 4

Blade tip	140 m	Observer height	2 m
UTM	UTM 11N 15D QTM	European datum	European
UTM coordinate	10 m	Datum coordinate	10 m

Eurowind Energy.

SLR

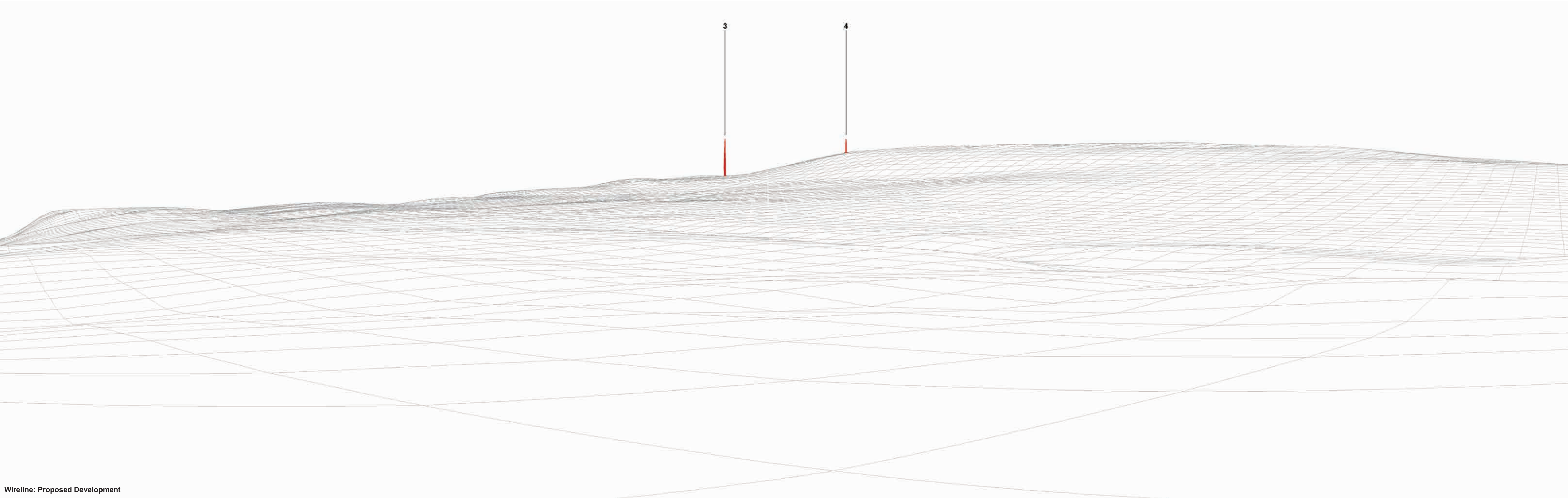
CAIRNOCH HILL WIND FARM

EIAR - CH7 - LANDSCAPE AND VISUAL

RESIDENTIAL VIEWPOINT 12: CRAIGANNET FARM

FIGURE 7.2.2(i)

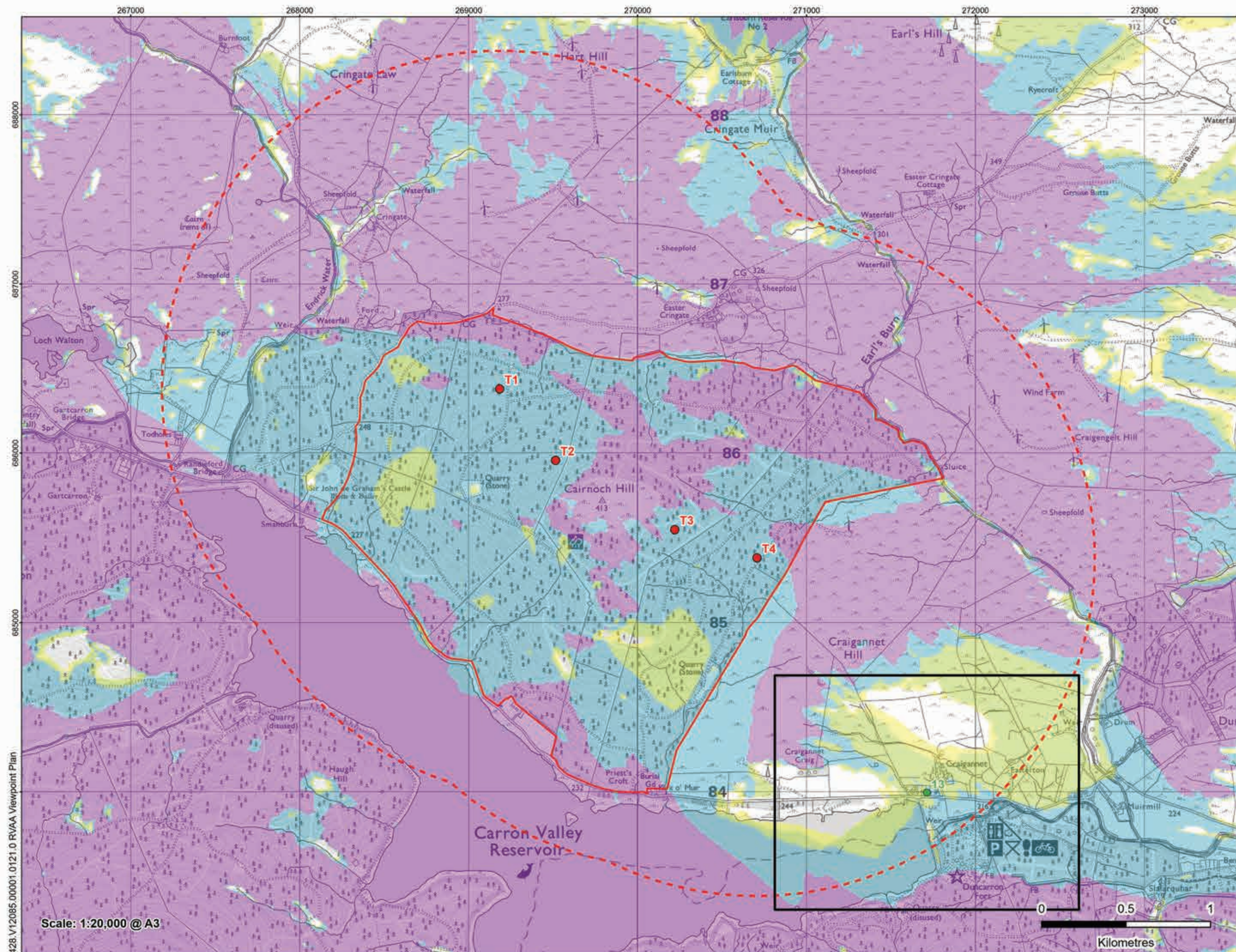
Scale	AS SHOWN	Date	JULY 2026
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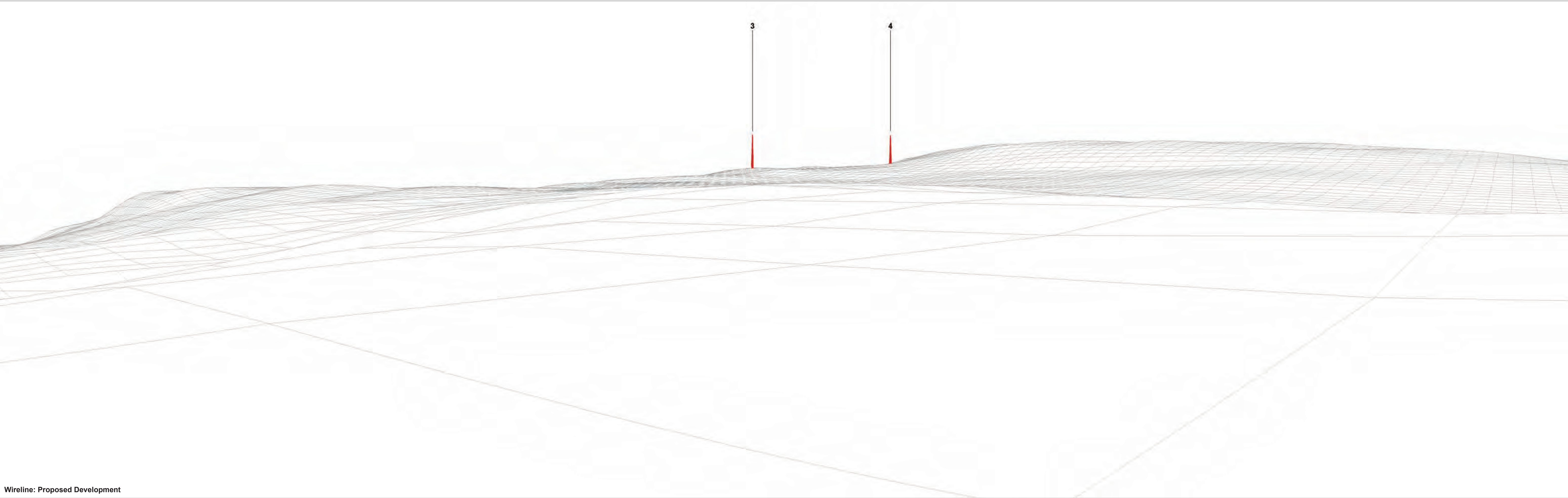


Wireline: Proposed Development

OS reference:	271817 E 684082 N	Horizontal field of view:	90° (cylindrical projection)
Eye level:	237.7 mAOB	Principal distance:	522 mm
Direction of view:	316°	Paper size:	841 x 297 mm (half A1)
Nearest turbine:	1.71 km	Correct printed image size:	820 x 260 mm

Figure: 7.2.2(ii)
Residential Viewpoint 12: CRAIGANNET FARM
Cairnoch Hill Wind Farm
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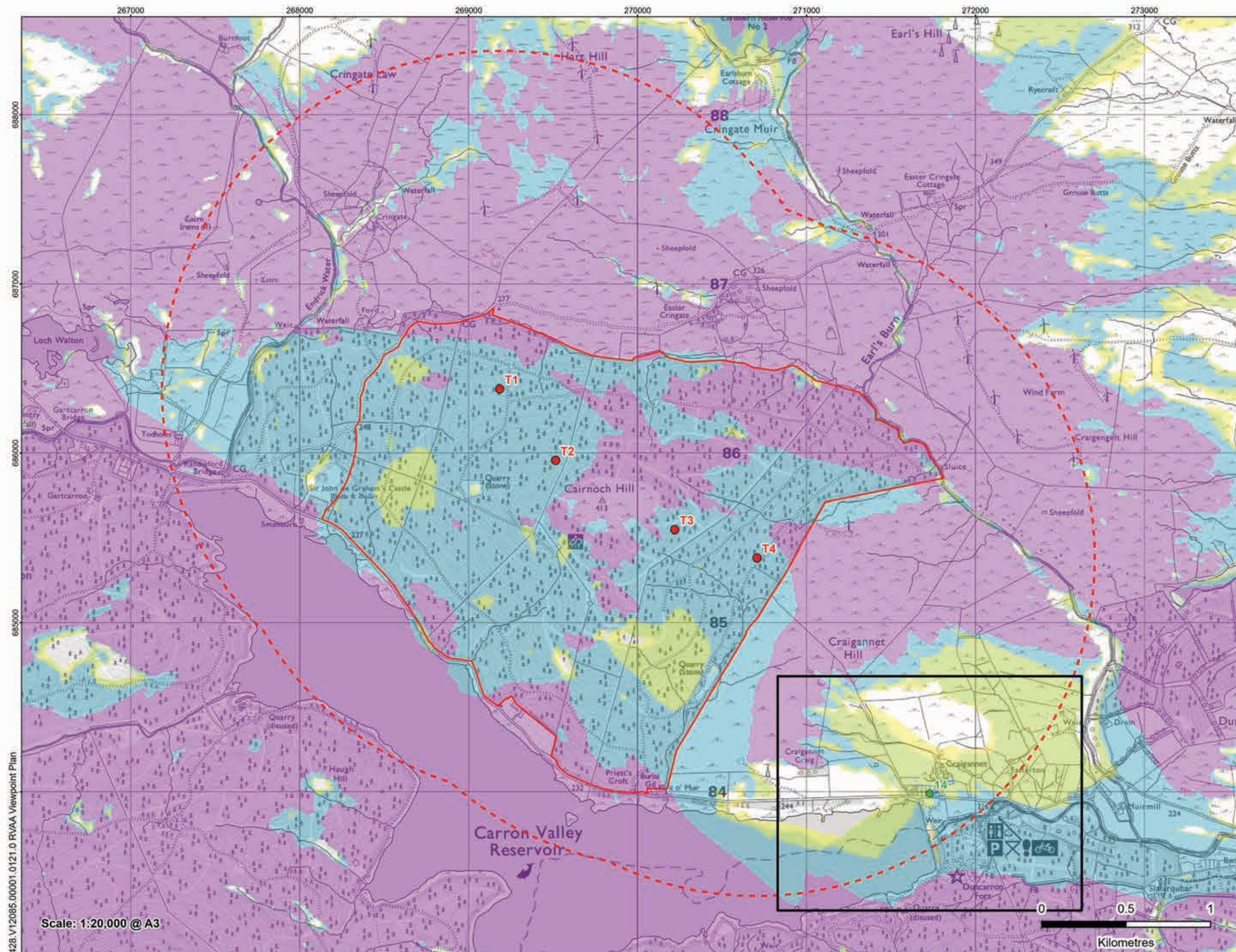


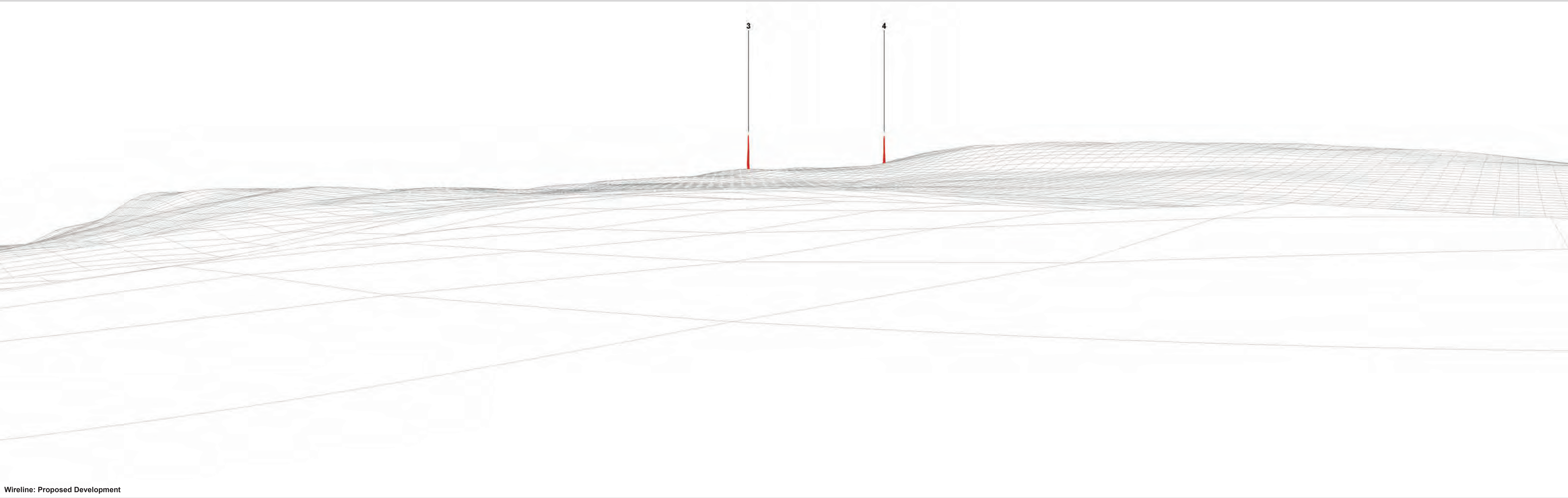


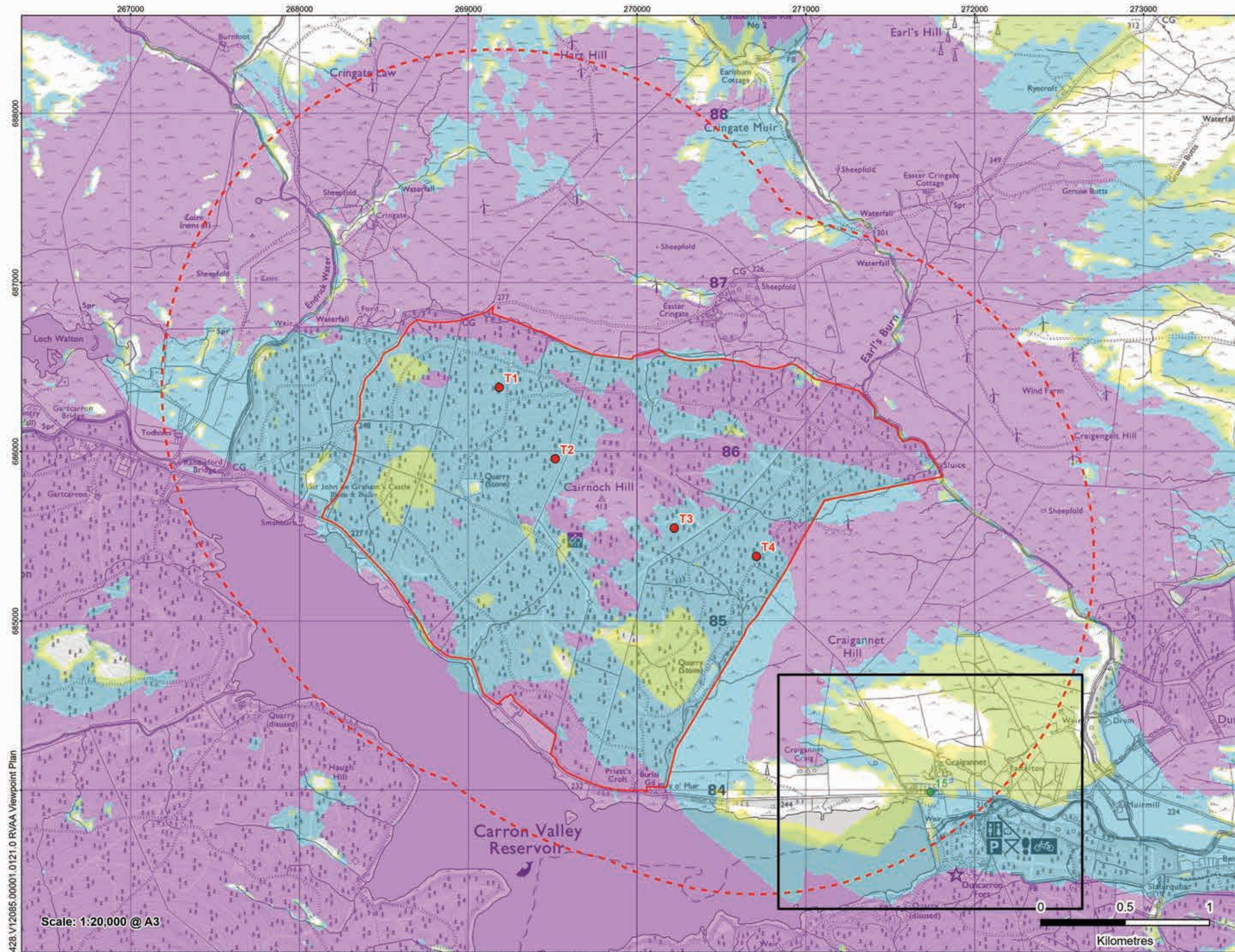
Wireline: Proposed Development

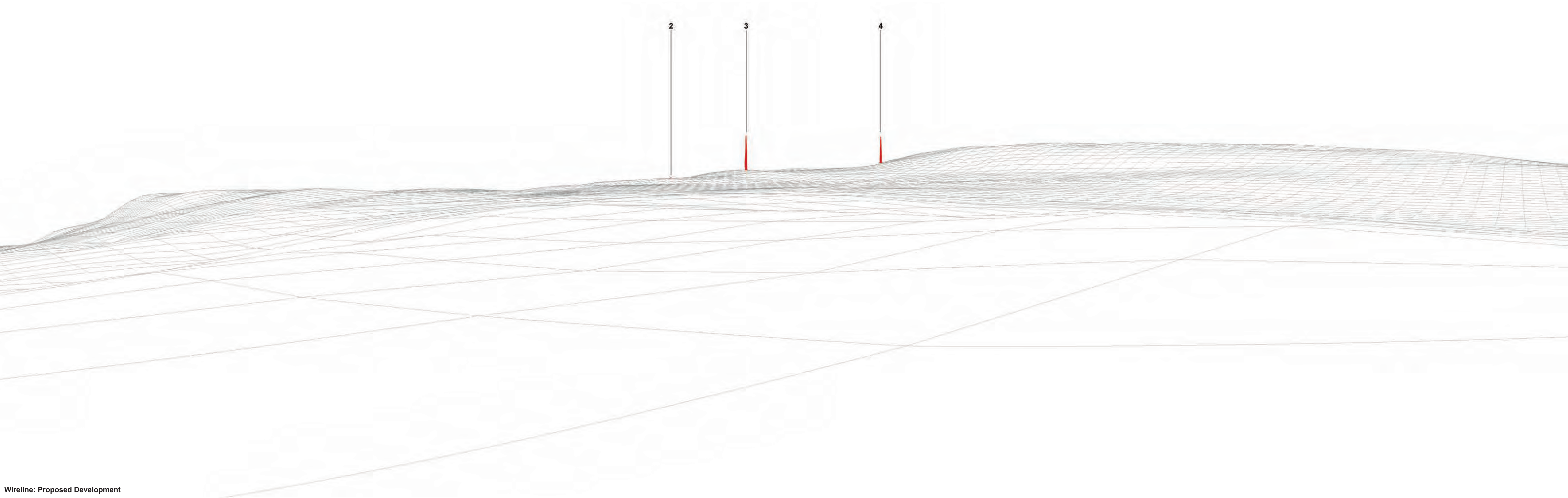
OS reference:	271712 E 683996 N	Horizontal field of view:	90° (cylindrical projection)
Eye level:	230.7 mAOB	Principal distance:	522 mm
Direction of view:	318°	Paper size:	841 x 297 mm (half A1)
Nearest turbine:	1.71 km	Correct printed image size:	820 x 260 mm

Figure: 7.2.2m(ii)
Residential Viewpoint 13: 10 CARRON VALLEY
Cairnoch Hill Wind Farm
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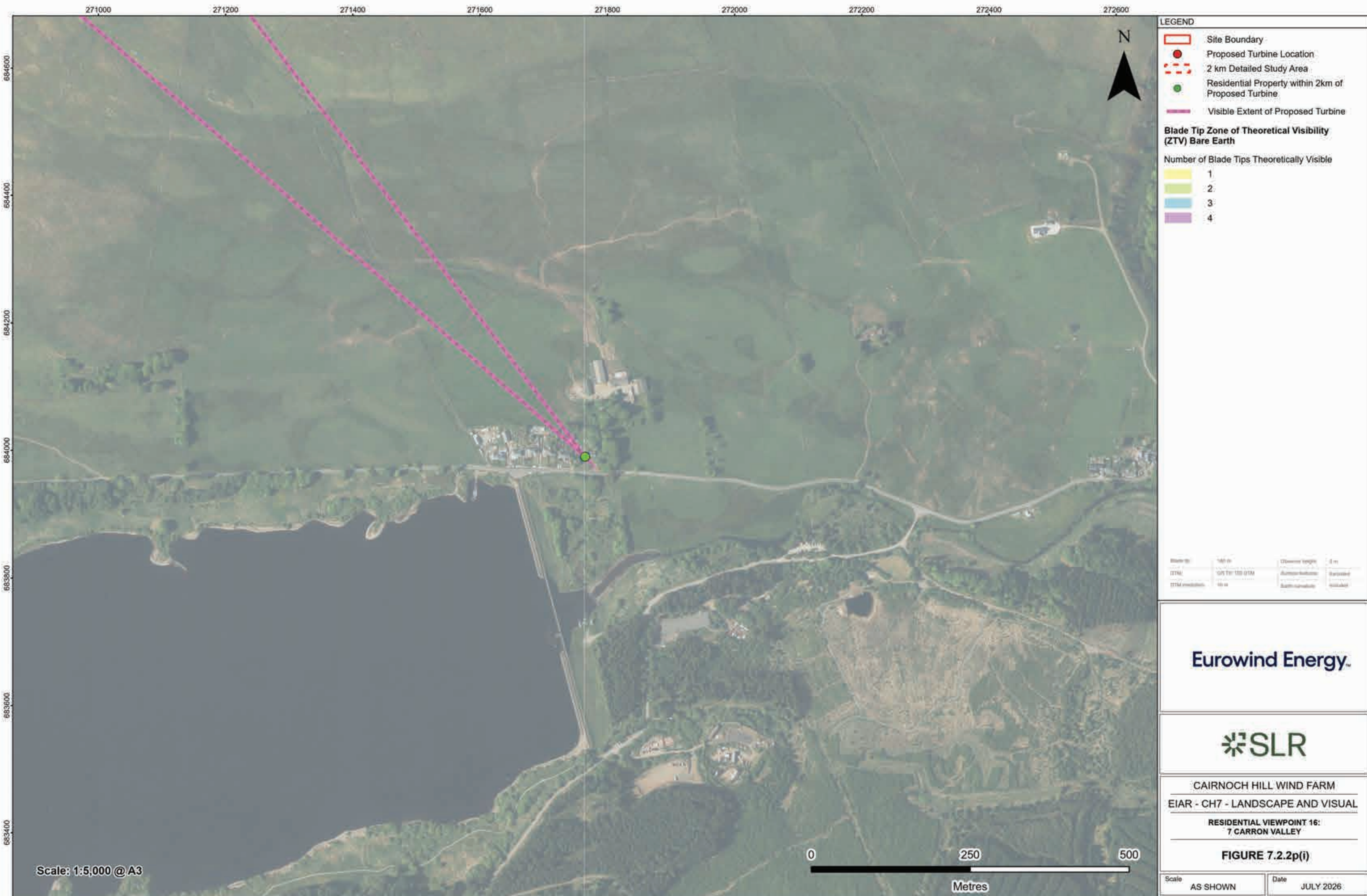
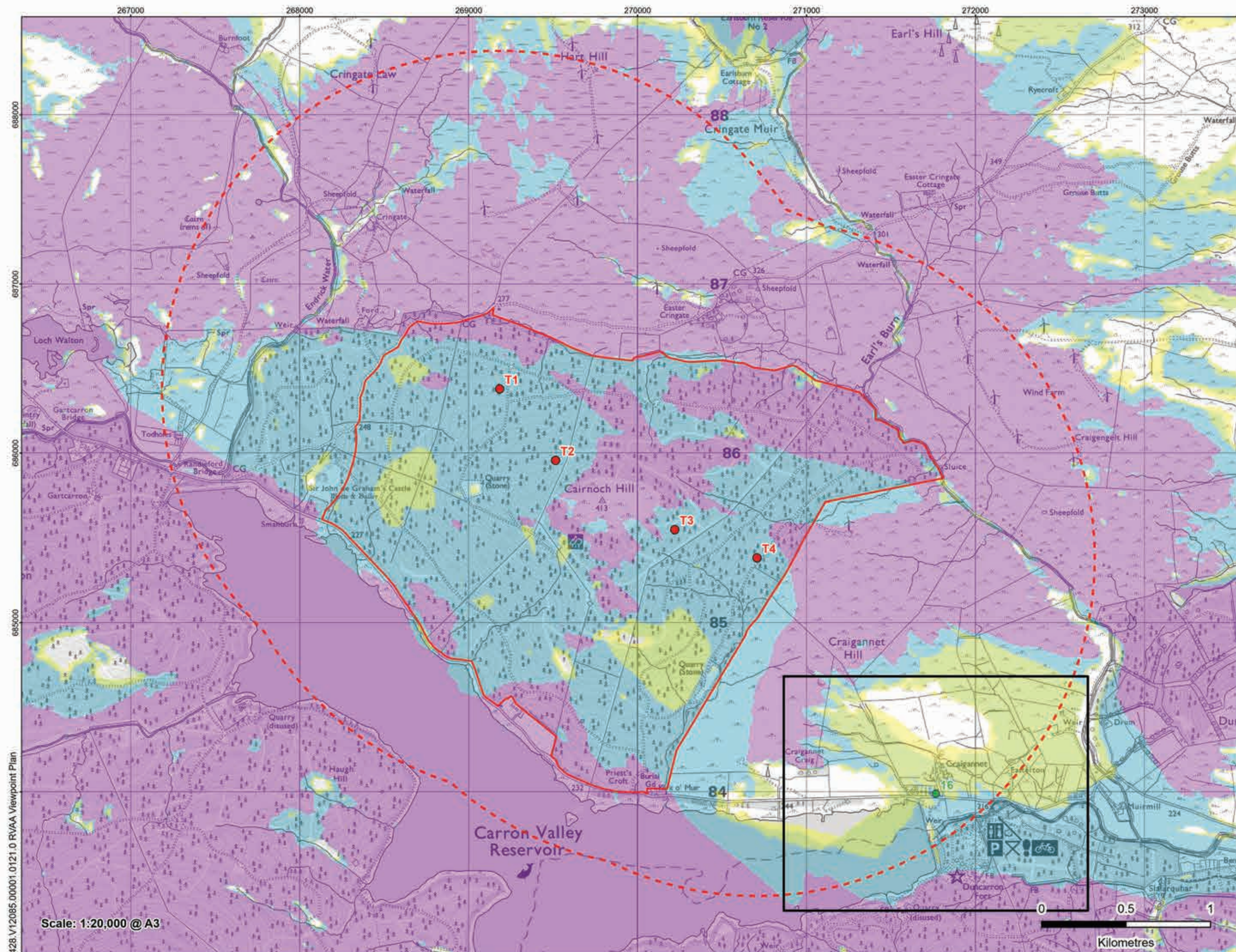


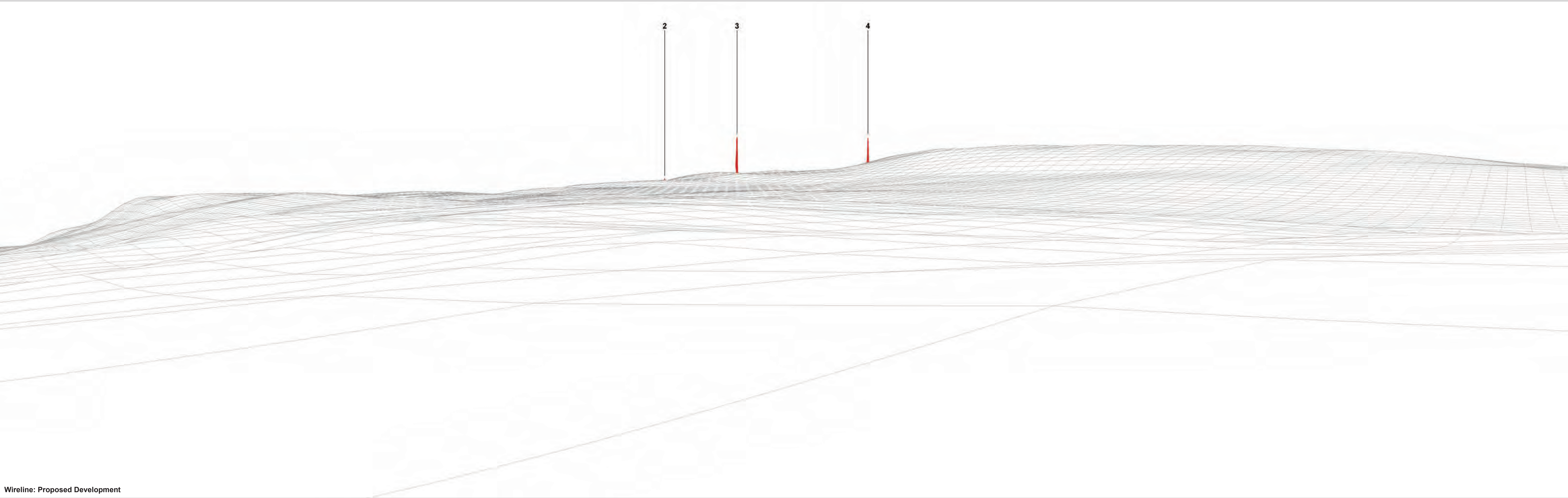


Wireline: Proposed Development

OS reference:	271737 E 683990 N	Horizontal field of view:	90° (cylindrical projection)
Eye level:	230.0 mAOB	Principal distance:	522 mm
Direction of view:	318°	Paper size:	841 x 297 mm (half A1)
Nearest turbine:	1.73 km	Correct printed image size:	820 x 260 mm

Figure: 7.2.2o(ii)
Residential Viewpoint 15: 8 CARRON VALLEY
Cairnoch Hill Wind Farm
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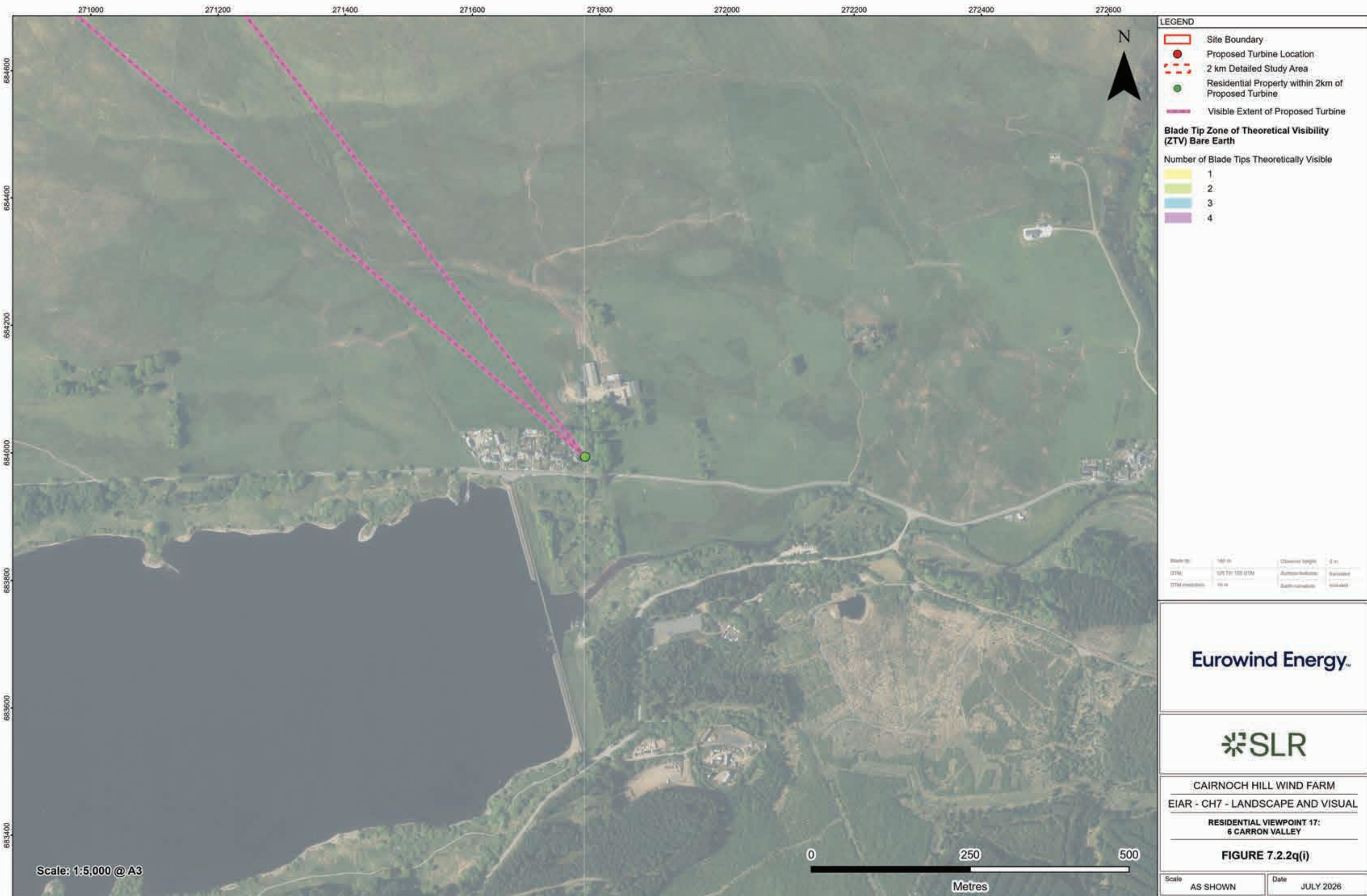
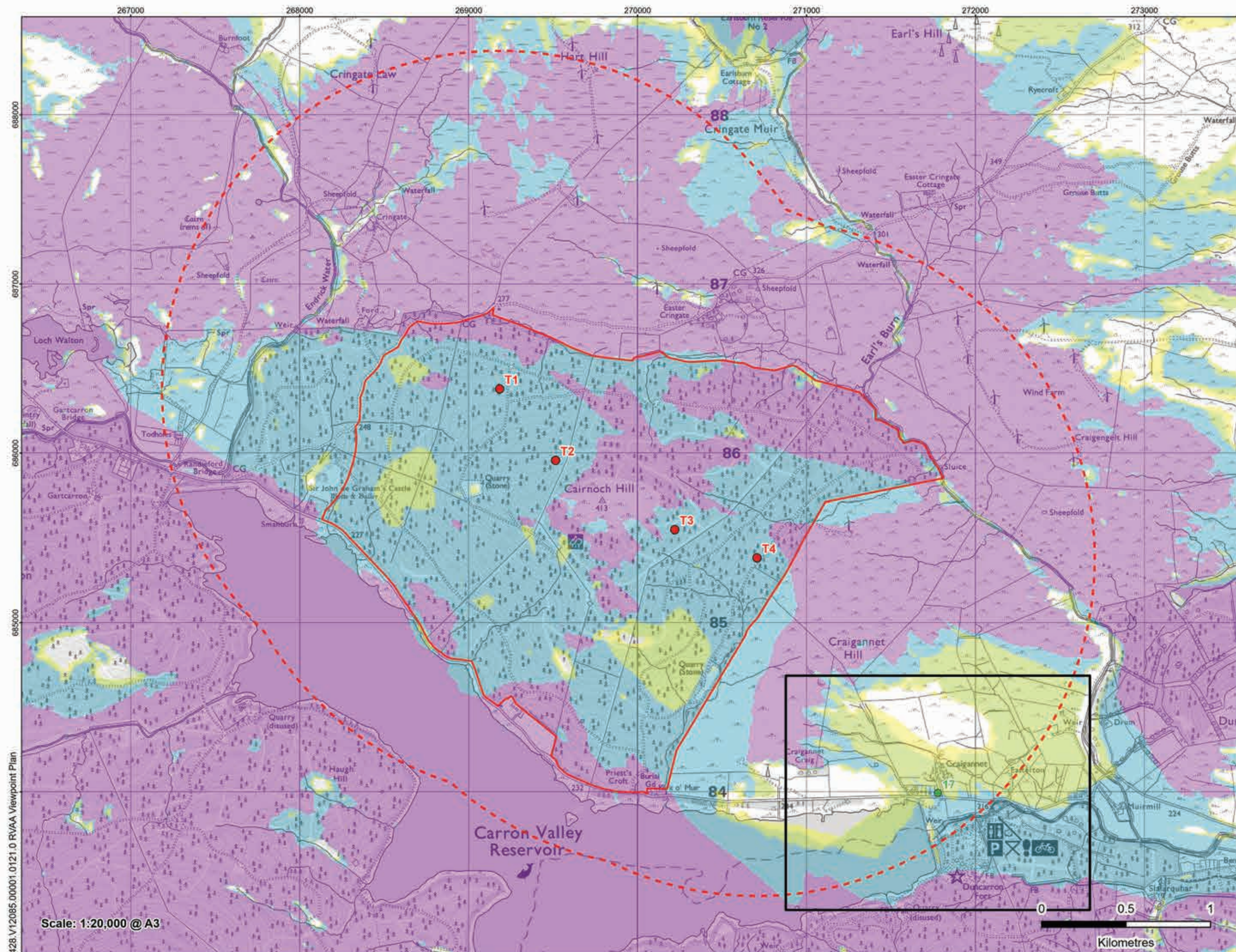


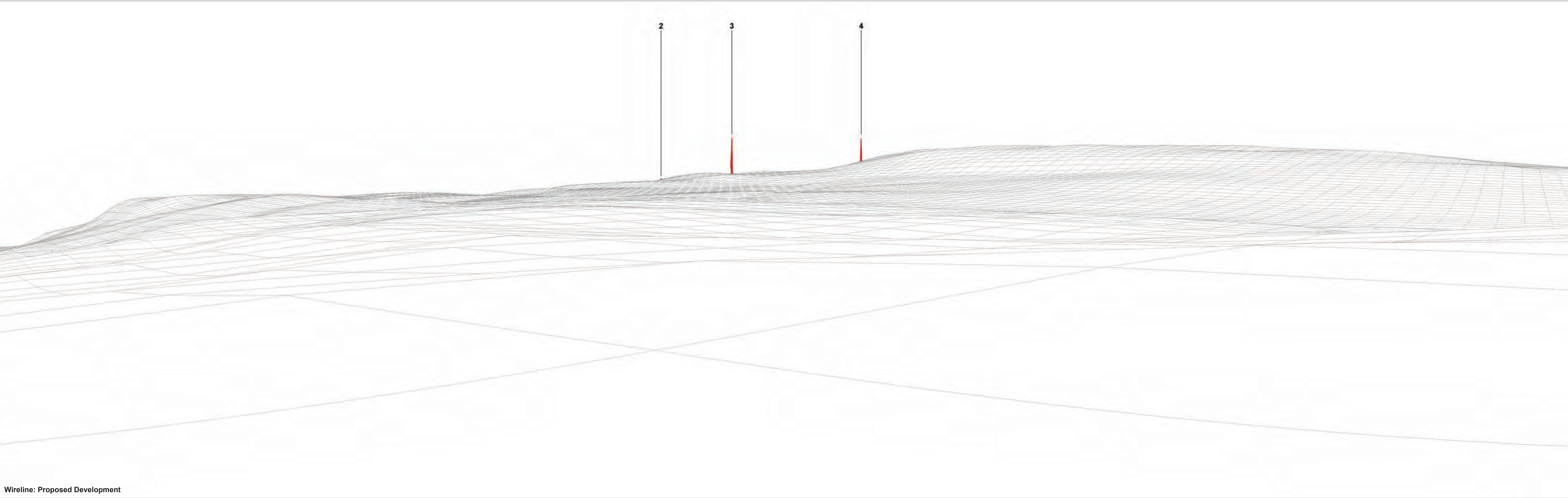


Wireline: Proposed Development

OS reference:	271765 E 683990 N	Horizontal field of view:	90° (cylindrical projection)
Eye level:	229.9 mAOD	Principal distance:	522 mm
Direction of view:	318°	Paper size:	841 x 297 mm (half A1)
Nearest turbine:	1.75 km	Correct printed image size:	820 x 260 mm

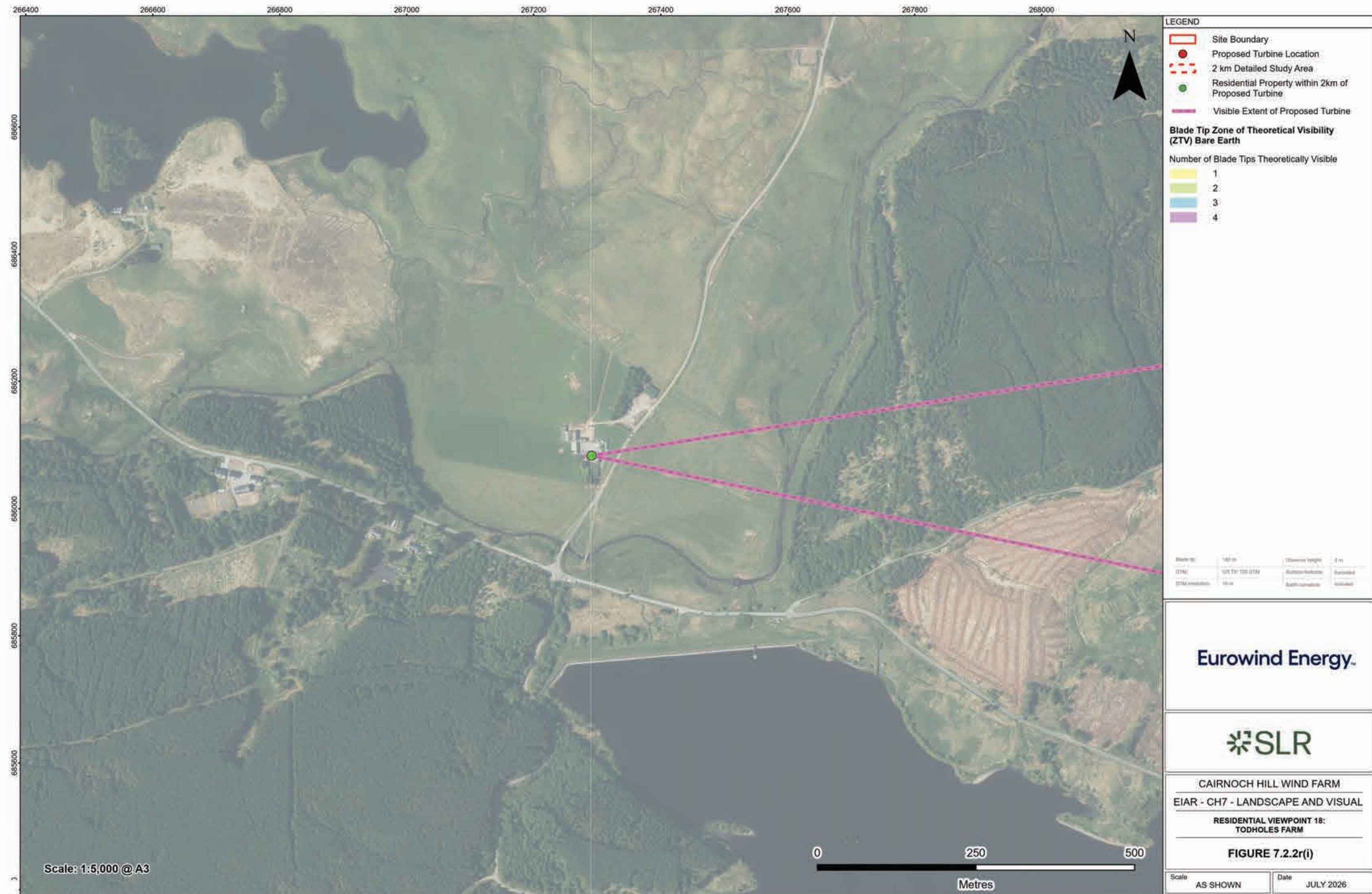
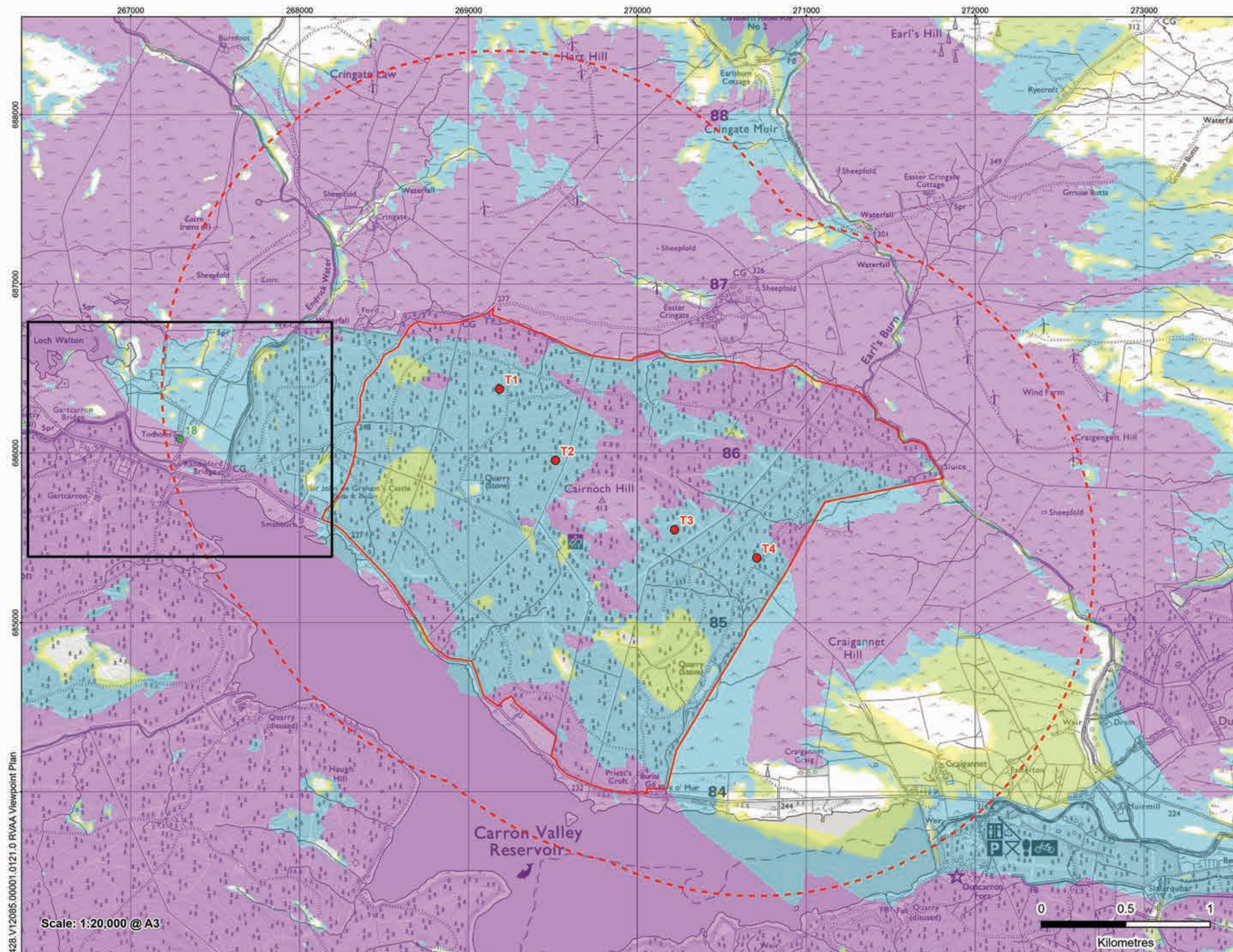
Figure: 7.2.2p(ii)
Residential Viewpoint 16: 7 CARRON VALLEY
Cairnoch Hill Wind Farm
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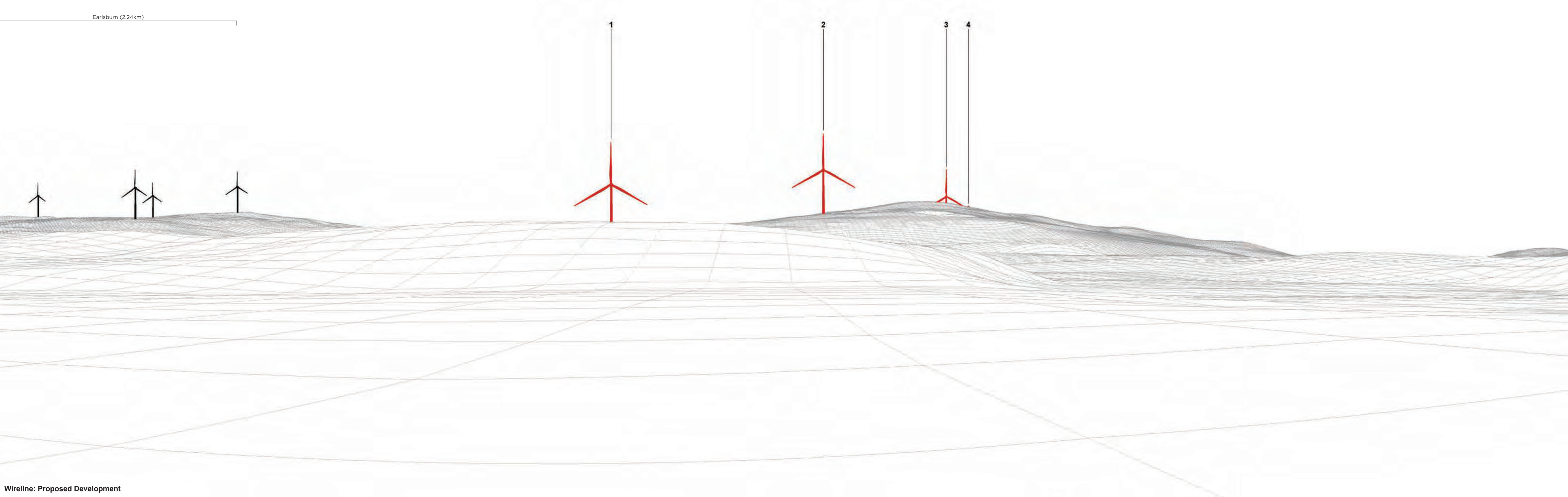




OS reference: 271777 E 683994 N
Eye level: 229.8 mAOD
Direction of view: 318°
Nearest turbine: 1.75 km

Horizontal field of view: 90° (cylindrical projection)
Principal distance: 522 mm
Paper size: 841 x 297 mm (half A1)
Correct printed image size: 820 x 260 mm





OS reference:	267291 E 686083 N	Horizontal field of view:	90° (cylindrical projection)
Eye level:	214.5 mAOD	Principal distance:	522 mm
Direction of view:	91°	Paper size:	841 x 297 mm (half A1)
Nearest turbine:	1.92 km	Correct printed image size:	820 x 260 mm



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