

DEVELOPMENT MANAGEMENT REVIEW COMMITTEE

APPLICATION FOR REVIEW

**PLANNING PERMISSION FOR ERECTION OF WIND TURBINE AND
ANCILLARY DEVELOPMENT AT BAIRDS MALT, ELLIOT INDUSTRIAL
ESTATE, ARBROATH – BAIRDS MALT SINGLE TURBINE LTD**

APPLICATION NO 14/01067/FULL

APPLICANT'S SUBMISSION

ITEM 1 Notice of Review

ITEM 2 Appeal Statement including Productions:-

ANNEX 1 Similar Project Comparison Figure (Comparative Turbine Elevations)

A01 Environmental Report and Appendices

A02 Landscape and Visual Figures

A03 Site Plans and Elevations

A04 Planning Application Form

A05 Additional Noise Information

A06 Additional Shadow Flicker Information

A07 Response to Countryside Officer

A08 Supporting Letter to Planning Officer

B01 Screening Opinion

B02 Application Validation Notification

B03 Countryside Officer Response

B04 Decision Notice

B05 Report of Handling

C01 Angus Local Plan Review 2009 (pages 10, 14, 70 and 92-97)

C02 TAYplan Strategic Development Plan (pages 18 and 19)



County Buildings Market Street Forfar DD8 3LG Tel: 01307 461 460 Fax: 01307 461 895 Email: plnprocessing@angus.gov.uk

Applications cannot be validated until all the necessary documentation has been submitted and the required fee has been paid.

Thank you for completing this application form:

ONLINE REFERENCE 100014515-001

The online reference is the unique reference for your online form only. The Planning Authority will allocate an Application Number when your form is validated. Please quote this reference if you need to contact the planning Authority about this application.

Applicant or Agent Details

Are you an applicant or an agent? * (An agent is an architect, consultant or someone else acting on behalf of the applicant in connection with this application)

Applicant Agent

Agent Details

Please enter Agent details

Company/Organisation:	<input type="text" value="Green Cat Renewables"/>		
Ref. Number:	<input type="text"/>	You must enter a Building Name or Number, or both: *	
First Name: *	<input type="text" value="Graham"/>	Building Name:	<input type="text" value="Stobo House"/>
Last Name: *	<input type="text" value="Donachie"/>	Building Number:	<input type="text"/>
Telephone Number: *	<input type="text" value="01314406155"/>	Address 1 (Street): *	<input type="text" value="Midlothian Innovation Centre"/>
Extension Number:	<input type="text"/>	Address 2:	<input type="text"/>
Mobile Number:	<input type="text"/>	Town/City: *	<input type="text" value="Roslin"/>
Fax Number:	<input type="text"/>	Country: *	<input type="text" value="UK"/>
		Postcode: *	<input type="text" value="EH25 9RE"/>
Email Address: *	<input type="text" value="graham@greencatrenewables.co.uk"/>		

Is the applicant an individual or an organisation/corporate entity? *

Individual Organisation/Corporate entity

Applicant Details

Please enter Applicant details

Title:	<input type="text"/>	You must enter a Building Name or Number, or both: *	
Other Title:	<input type="text"/>	Building Name:	<input type="text" value="Bairds Malt"/>
First Name: *	<input type="text"/>	Building Number:	<input type="text"/>
Last Name: *	<input type="text"/>	Address 1 (Street): *	<input type="text" value="Bairds Malt"/>
Company/Organisation	<input type="text" value="Bairds Malt Single Turbine Ltd"/>	Address 2:	<input type="text" value="Elliot Industrial Estate"/>
Telephone Number: *	<input type="text"/>	Town/City: *	<input type="text" value="Arbroath"/>
Extension Number:	<input type="text"/>	Country: *	<input type="text" value="UK"/>
Mobile Number:	<input type="text"/>	Postcode: *	<input type="text" value="DD11 2NB"/>
Fax Number:	<input type="text"/>		
Email Address: *	<input type="text"/>		

Site Address Details

Planning Authority:	<input type="text" value="Angus Council"/>
Full postal address of the site (including postcode where available):	
Address 1:	<input type="text" value="MALTINGS"/>
Address 2:	<input type="text" value="PEASIEHILL ROAD"/>
Address 3:	<input type="text" value="ELLIOT INDUSTRIAL ESTATE"/>
Address 4:	<input type="text"/>
Address 5:	<input type="text"/>
Town/City/Settlement:	<input type="text" value="ARBROATH"/>
Post Code:	<input type="text" value="DD11 2NJ"/>

Please identify/describe the location of the site or sites

Northing	<input type="text" value="740245"/>	Easting	<input type="text" value="361773"/>
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Description of Proposal

Please provide a description of your proposal to which your review relates. The description should be the same as given in the application form, or as amended with the agreement of the planning authority: *
(Max 500 characters)

Erection of a single turbine of no greater than 77m to tip height, and associated infrastructure including access and a crane hardstanding.

Type of Application

What type of application did you submit to the planning authority? *

- Application for planning permission (including householder application but excluding application to work minerals).
- Application for planning permission in principle.
- Further application.
- Application for approval of matters specified in conditions.

What does your review relate to? *

- Refusal Notice.
- Grant of permission with Conditions imposed.
- No decision reached within the prescribed period (two months after validation date or any agreed extension) – deemed refusal.

Statement of reasons for seeking review

You must state in full, why you are seeking a review of the planning authority's decision (or failure to make a decision). Your statement must set out all matters you consider require to be taken into account in determining your review. If necessary this can be provided as a separate document in the 'Supporting Documents' section: * (Max 500 characters)

Note: you are unlikely to have a further opportunity to add to your statement of appeal at a later date, so it is essential that you produce all of the information you want the decision-maker to take into account.

You should not however raise any new matter which was not before the planning authority at the time it decided your application (or at the time expiry of the period of determination), unless you can demonstrate that the new matter could not have been raised before that time or that it not being raised before that time is a consequence of exceptional circumstances.

See Appeal Statement.

Have you raised any matters which were not before the appointed officer at the time the Determination on your application was made? *

Yes No

If yes, you should explain in the box below, why you are raising the new matter, why it was not raised with the appointed officer before your application was determined and why you consider it should be considered in your review: * (Max 500 characters)

Please provide a list of all supporting documents, materials and evidence which you wish to submit with your notice of review and intend to rely on in support of your review. You can attach these documents electronically later in the process: * (Max 500 characters)

See Appeal Statement.

Application Details

Please provide details of the application and decision.

What is the application reference number? *

14/01067/FULL

What date was the application submitted to the planning authority? *

24/12/2014

What date was the decision issued by the planning authority? *

01/03/2016

Review Procedure

The Local Review Body will decide on the procedure to be used to determine your review and may at any time during the review process require that further information or representations be made to enable them to determine the review. Further information may be required by one or a combination of procedures, such as: written submissions; the holding of one or more hearing sessions and/or inspecting the land which is the subject of the review case.

Can this review continue to a conclusion, in your opinion, based on a review of the relevant information provided by yourself and other parties only, without any further procedures? For example, written submission, hearing session, site inspection. *

Yes No

In the event that the Local Review Body appointed to consider your application decides to inspect the site, in your opinion:

Can the site be clearly seen from a road or public land? *

Yes No

Is it possible for the site to be accessed safely and without barriers to entry? *

Yes No

Checklist – Application for Notice of Review

Please complete the following checklist to make sure you have provided all the necessary information in support of your appeal. Failure to submit all this information may result in your appeal being deemed invalid.

Have you provided the name and address of the applicant?. *

Yes No

Have you provided the date and reference number of the application which is the subject of this review? *

Yes No

If you are the agent, acting on behalf of the applicant, have you provided details of your name and address and indicated whether any notice or correspondence required in connection with the review should be sent to you or the applicant? *

Yes No N/A

Have you provided a statement setting out your reasons for requiring a review and by what procedure (or combination of procedures) you wish the review to be conducted? *

Yes No

Note: You must state, in full, why you are seeking a review on your application. Your statement must set out all matters you consider require to be taken into account in determining your review. You may not have a further opportunity to add to your statement of review at a later date. It is therefore essential that you submit with your notice of review, all necessary information and evidence that you rely on and wish the Local Review Body to consider as part of your review.

Please attach a copy of all documents, material and evidence which you intend to rely on (e.g. plans and Drawings) which are now the subject of this review *

Yes No

Note: Where the review relates to a further application e.g. renewal of planning permission or modification, variation or removal of a planning condition or where it relates to an application for approval of matters specified in conditions, it is advisable to provide the application reference number, approved plans and decision notice (if any) from the earlier consent.

Declare – Notice of Review

I/We the applicant/agent certify that this is an application for review on the grounds stated.

Declaration Name: Mr Graham Donachie

Declaration Date: 31/05/2016



Green Cat Renewables

BAIRDS MALT
WIND TURBINE

Appeal Statement

May 2016



Bairds malt

Appeal Statement

Prepared for:
Bairds Malt Single Turbine Ltd



Prepared by:
Green Cat Renewables Ltd



Edinburgh Office
Midlothian Innovation Centre
Roslin,
EH25 9RE
Tel: 0131 440 8350

**BAIRDS MALT
WIND TURBINE**

May 2016

Checked By: Graham Donnachie	Date: 31/05/2015
Approved By: Cameron Sutherland	Date: 31/05/2015

EXECUTIVE SUMMARY

This Appeal is against the refusal by Angus Council of the planning application for the erection of a single wind turbine of 55m to hub height and 77m to blade tip including ancillary infrastructure at Bairds Malt, Elliot Industrial Estate, Arbroath. The planning application reference is **14/01067/FULL**.

This Statement has been prepared by Green Cat Renewables Ltd (The Agent) on behalf of Bairds Malt Single Turbine Ltd (the Appellant) to support an Appeal against the refusal by Angus Council of the planning application. The application was determined by the Planning Officer under delegated powers and as such this appeal is to the Local Review Body, in this case the Development Management Review Committee (DMRC).

The Decision Notice (**B04**) and accompanying Report of Handling (**B05**) were issued on 1st March 2016. The two reasons for the refusal were specified as:

1. The proposed development would give rise to unacceptable impacts on occupants of residential property by virtue of the height of the wind turbine and proximity to residential properties; and
2. The proposed development would result in unacceptable adverse landscape impacts having regard to landscape character and setting within the immediate and wider landscape.

The Appellant contends that:

1. The height of the selected wind turbine is the lowest possible height of wind turbine for a commercial scale machine that allows it to be above the surrounding Bairds Malt infrastructure and ensure that it is not sheltered from the wind.
2. From the vast majority of receptors, the turbine would be located at a greater distance than the existing large grain silos at Bairds Malt. Thus the turbine would fit into the landscape and would not be an overbearing feature.
3. Whilst any wind turbine proposal results in potentially significant visual effects, the visual impacts, assessed based on the currently available guidance, were found to be acceptable for this project.
4. There will be no significant landscape effects.
5. The development is located within an established functional industrial area, directly adjacent to another area of 51 hectares which has received planning consent for an expansion of the industrial estate and activity.
6. The development is located at the source of a huge demand for energy, where the vast majority of the energy generated will be used on site, providing a very direct benefit. The development will help to significantly offset the current energy costs of the facility which amount to ~£2.5 million a year.

7. The development will aid Bairds Malt in remaining competitive in the global market, securing a sustainable future and safeguarding local employment. The Arbroath facility of Bairds Malt directly employs 57 staff and is a vital link in the supply chain for approximately 230 farms across Angus.
8. The benefits of the development to Bairds Malt, a valued local employer, and the local economy are significant, and it is considered by the Appellant that the benefits of the scheme to the local economy greatly outweigh the perceived subjective landscape impacts.

The Appellant therefore contends that the proposed development is in compliance with the applicable policies and guidance and that there are significant material considerations which provide strong justification for siting the wind turbine in this location. The DMRC are respectfully asked to allow this appeal.

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ANNEX 1 – Similar Project Comparisson Figure

LIST OF PRODUCTIONS

Applicant’s documents

Reference	Description	Posted/Uploaded
A01	Environmental Report and Appendices	Posted
A02	Landscape and Visual Figures	Posted
A03	Site Plans and Elevations	Uploaded
A04	Planning Application Form	Uploaded
A05	Additional Noise Information	Uploaded
A06	Additional Shadow Flicker Information	Uploaded
A07	Response to Countryside Officer	Uploaded
A08	Supporting Letter to Planning Officer	Uploaded

Council & Consultee documents

Reference	Description	Posted/Uploaded
B01	Screening Opinion	Uploaded
B02	Application Validation Notification	Uploaded
B03	Countryside Officer Response	Uploaded
B04	Decision Notice	Uploaded
B05	Report of Handling	Uploaded

Other documents

Reference	Description	Posted/Uploaded
C01	Angus Local Plan Review 2009 (<i>pages 10, 14, 70 & 92-97</i>)	Uploaded
C02	TAYplan Strategic Development Plan (<i>page 18 & 19</i>)	Uploaded

Note:

Hard copies of all documents can be provided on request.

- 1.4 The overall outcome of the project will be to deliver production and cost efficiencies that will increase the market competitiveness of the business and thus safeguard local jobs. Operating in a competitive global market, an increase in the sustainability and stability of the business will also help support both the existing employment and create potential for new employment as the business continues to expand.
- 1.5 The Estate contains a mixture of industrial and commercial units. These are typically large warehouse type structures. A 40m communications mast in the north-eastern corner of the estate is another prominent feature. The tallest of the grain drying towers are 27m in height. The proposed wind turbine has accounted for the existing large infrastructure, and is the smallest commercial turbine whose lower blade sweep is clear of the tallest building, to ensure the turbine is effective, efficient and is not sheltered from the surrounding buildings.

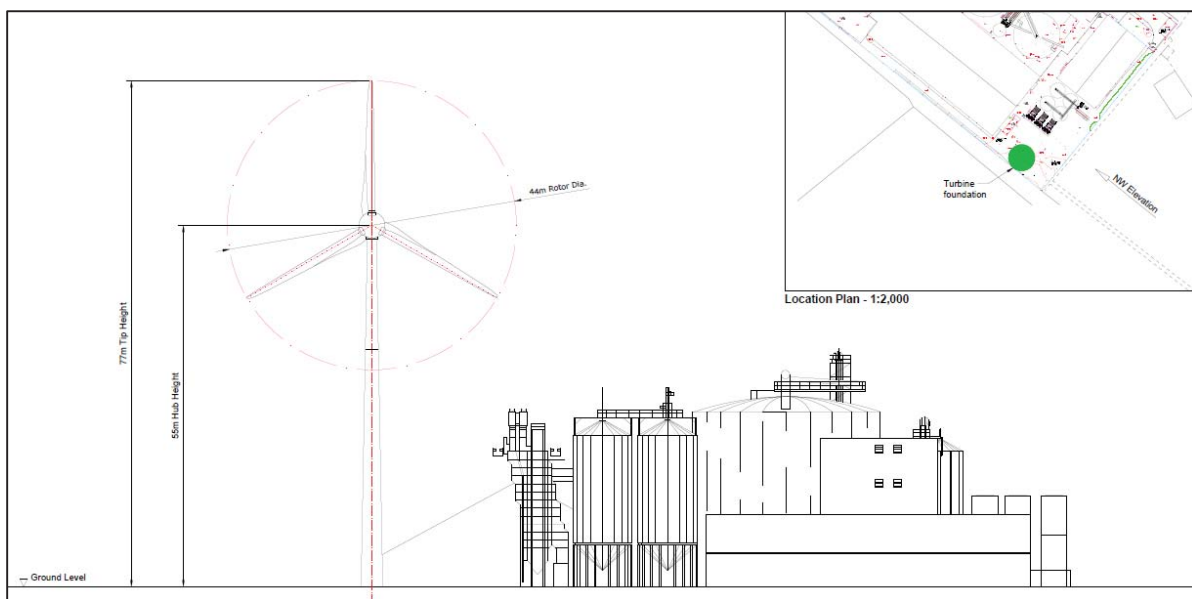


Figure 1.2 – Proposed site elevation

- 1.6 The land take of the wind turbine and associated infrastructure is small and current operations would continue undisturbed around the turbine once operational.
- 1.7 At the end of the project's operational life (25 years) the wind turbine would be decommissioned, the principal elements removed, and the site restored leaving little, if any, visible trace.
- 1.8 **Section 2** of the Environmental Report (**A01**) contains further details of the development.

2 DEVELOPMENT BACKGROUND AND PROCEDURAL HISTORY

Development Background

- 2.1 The Arbroath facility has undertaken a number of major upgrades during its operation, in order to keep up-to-date with the latest technological innovations. Given the increasing market pressures the facility is facing from the continually growing global reach of the whisky industry, and the increasing uncertainty surrounding energy security, Bairds Malt Ltd is seeking to implement measures to remain competitive and safeguard the future of the business. After exhausting the potential to develop other sources of renewable solutions, namely solar (not enough roof or site space) or Geothermal (not hot enough), Bairds Malt Ltd identified that the most effective and beneficial way of generating their own supply of electricity would be through the installation of a wind turbine. This is primarily due to the small footprint of a wind turbine and the limited space available on the site, as well as the substantial wind resource that is available given its coastal location.
- 2.2 Bairds Malt identified Kilmac Construction as a suitable local company to partner with on the project's promotion and development. The Kilmac Group is a Perth-based privately owned construction company formed in 2004. Having diversified into the Renewables market, Kilmac now specialise in the promotion, construction and operation of onshore wind projects. Kilmac employ over 100 people predominately from the Tayside area.

Procedural History

- 2.3 A screening request was submitted to Angus Council in October 2012 which determined that an Environmental Impact Assessment for the proposed development was not required (ref: 12/00922/EIASCR) (**B01**). The Council indicated that the application should be accompanied by a detailed Environmental Appraisal document.
- 2.4 The scope of the assessments was discussed and agreed with Angus Council and other consultees through an informal scoping exercise.
- 2.5 Community consultation was undertaken during the detailed project design stage to inform nearby residents of the proposal and provide detailed information. Public Exhibitions were held at the Bairds Malt facility on the 3rd and 4th of July 2013. Being a prominent local employer, Bairds Malt Ltd were keen to engage with nearby residents to ensure transparency and allow a forum for those concerned to get clarity.
- 2.6 The scheme was also presented to Arbirlot Community Council on 14th July 2014.
- 2.7 The Application was submitted, with a supporting Environmental Appraisal, to Angus Council on the 24th of December 2014 and subsequently validated (14/01067/FULL) on the 9th of January 2015 (**B02**).
- 2.8 The planning process was extensive in this case, taking over 14 months from submission to determination. The primary reason for the drawn out planning process was due to the extensive requirement for noise surveying and assessment from the Angus Council Environmental Health Department. The data required in order to satisfy the requests of

Environmental Health took a substantial amount of expense, time and effort to prepare, but ultimately satisfied the requirements of the Environmental Health Department, only for the application to be refused on the subjective grounds of landscape and visual impact.

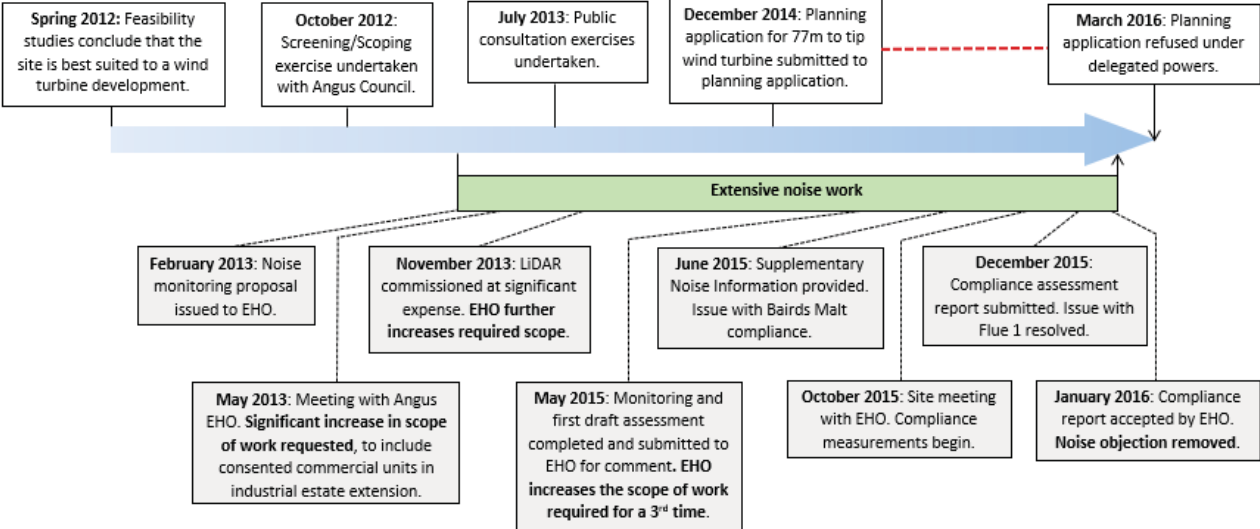


Figure 2.1 – Planning Application Timeline

2.9 Following the extensive process through planning, the application was refused under delegated powers by the appointed Planning Officer on the 1st of March 2016 (B04).

3 SUMMARY OF CONSULTEE RESPONSES AND PUBLIC REPRESENTATIONS

Compliance

- 3.1 The following table demonstrates what aspects of the proposed development were found to be acceptable in regard to policy and the consultation responses from Statutory Consultees.

Table 3.1 – Development Compliance

Statutory Consultees	No Objection Received	Objection
Community Council		
Angus Council (Roads)		
Scottish Water		
Ministry of Defence (MoD)		
Angus Council Environmental Health		
Historic Environment Scotland		
NERL Safeguarding		
Spectrum		
Joint Radio Company		
RSPB Scotland		
Civil Aviation Authority		
Dundee Airport		
Aberdeenshire Council Archaeology Service		
Angus Council (Economic Development Unit)		
Angus Council (Countryside Officer)		

Planning Officer Assessment	Compliant	Non-compliant
Environmental & Economic Benefits		
Landscape Impact		
Visual Impact (including Visual Amenity)		
Cumulative Landscape and Visual Impact		
Amenity (Noise/Shadow Flicker etc.)		
Natural Heritage		
Cultural Heritage		
Impact on Aviation		
Other Development Plan Considerations		
Other Material Considerations		

- 3.2 As the table demonstrates, all aspects of the development have been considered compliant with policy and acceptable in environmental impact terms, with the exception of the landscape and visual impact according to the Planning Officer's own assessment, following the response of the Countryside Officer.
- 3.3 Angus Council's own Countryside Officer provided comment in relation to landscape and visual effects. These comments indicate concern over the development that would lead to significant adverse landscape, visual and cumulative effects (**B03**). A detailed rebuttal to these comments was provided (**A7**), to which the Countryside Officer further commented to state that their opinion was largely unchanged, without any justification or explanation why (**B03**).

3.4 Bairds Malt has invested significant amounts of finance and time into this development that will act as a catalyst to business diversification and reinvestment. The development is set within an operational industrial estate, directly adjacent to a large functional maltings and an area which has consent for further industrial expansion, where the addition of a wind turbine would have a limited impact. The development has been pursued by the Appellant for some three and a half years, promoting the development the within the local community and forward planning for the future of the business based on early advice from the local planning authority. The Appellant committed a significant investment into the project, ensuring that a diligent application was submitted and that would warrant a clean bill of health, on the basis that no negative feedback was received during the screening/scoping process.

Public Representations

3.5 As documented within the Report of Handling, 195 letters of representation were received:

- **141 letters of objection** were received in regard to this application;
- **53 letters of support** were received; and
- 1 letter neither supported nor objected.

3.6 The Report of Handling has summarised the main reasons for objection or support of the application. It is considered that no new points of objection were raised that had not already been covered within the Environmental Report (ER) (**A01**).

4 MATERIAL CONSIDERATIONS

- 4.1 What makes this proposed development unique is the opportunity to provide indisputable support to a recognised and established local employer. Bairds Malt is also a major supplier of malt to the Scottish whisky industry, one of Scotland's most valuable exports. In addition, they regularly work with eight haulage companies for supply and distribution as well as sub-contracting other local engineering services for plant and machine maintenance. This creates a significantly important supply chain that should be maintained and supported locally and nationally.
- 4.2 Furthermore, the development represents an excellent opportunity to create employment for local contractors and suppliers to benefit from the construction and operation of the proposed development. The Kilmac Group, who has a strong track record of working with local businesses, will lead the construction and installation stages. This will support the ambition to retain as much economic value locally as possible.
- 4.3 The socioeconomics of the development are a key benefit to the local area which will result in a positive socioeconomic impact and provide a much needed boost to the local economy. As part of the application, a robust socioeconomic impact assessment was undertaken by EKOS Ltd (**Appendix 6 in A01**). This report raises some key considerations for determining this application. Such as, over the 25-year lifetime the proposed turbine project is estimated to:
- Support/safeguard approximately 60 full-time equivalent jobs at Bairds Malt;
 - Create 20 construction/operational/maintenance PYE jobs;
 - Generate/safeguard net additional economic output (GVA) of ~£63.5m for further reinvestment into Bairds Malt and the local economy; and
 - Generate expendable income (salaries) of ~£37.6m within the Angus economy.
- 4.4 There is a unique opportunity for local businesses to work with and benefit from the proposed development through the supply chain linkages during the construction stage of the development, and during its operational lifetime. As a construction partner in the development, the Kilmac Group are keen to emphasise the opportunities for local contractors and suppliers to benefit from the project.
- 4.5 A key way in which the project can positively impact the local economy is through facilitating local employment training and apprenticeship schemes during the construction, and operational and maintenance phases. These schemes can be targeted at particular groups e.g. young people and, in addition to helping develop new skills, will also help to build confidence in supported individuals.
- 4.6 Past examples include a civil engineering project undertaken by Kilmac Construction (upgrade of the South Inch play park project, Perth) included working in partnership with the local authority to provide work experience/apprenticeship positions to nine unemployed young offenders (considered by the local authority as persons most difficult

to find jobs for due to the scope and scale of barriers they face to access employment opportunities).

- 4.7 After successful completion of the scheme, five of the young people were offered permanent employment with Kilmac Construction as apprentice ground workers. In addition, through working with other local businesses, Kilmac were able to support three of the young people into employment as trainee greenkeepers at Craigiehill Golf Club. The scheme not only provided basic training and work experience, which ultimately helped open up new employment opportunities, but also helped get the young people enthused about working.
- 4.8 Such was the success of this scheme that Kilmac have committed resources to continue this programme on future projects throughout Tayside. Kilmac employed 8 young people as part of the Employability Scheme in partnership with Dundee City Council. Out of the 8 that were offered the chance 6 of these young people are now employed within the construction industry in and around Dundee. Having a pipeline of work locally allows Kilmac to continue growing and in return Kilmac are keen to run more employment initiatives and support local community causes where possible and have given commitment to Angus Council to offer similar opportunities through the project, this includes renewable and more traditional civil based projects.
- 4.9 The extract below, **Figure 4.1**, from the Socioeconomic Impact Assessment shows the project logic model and how it stands to benefit the local area.

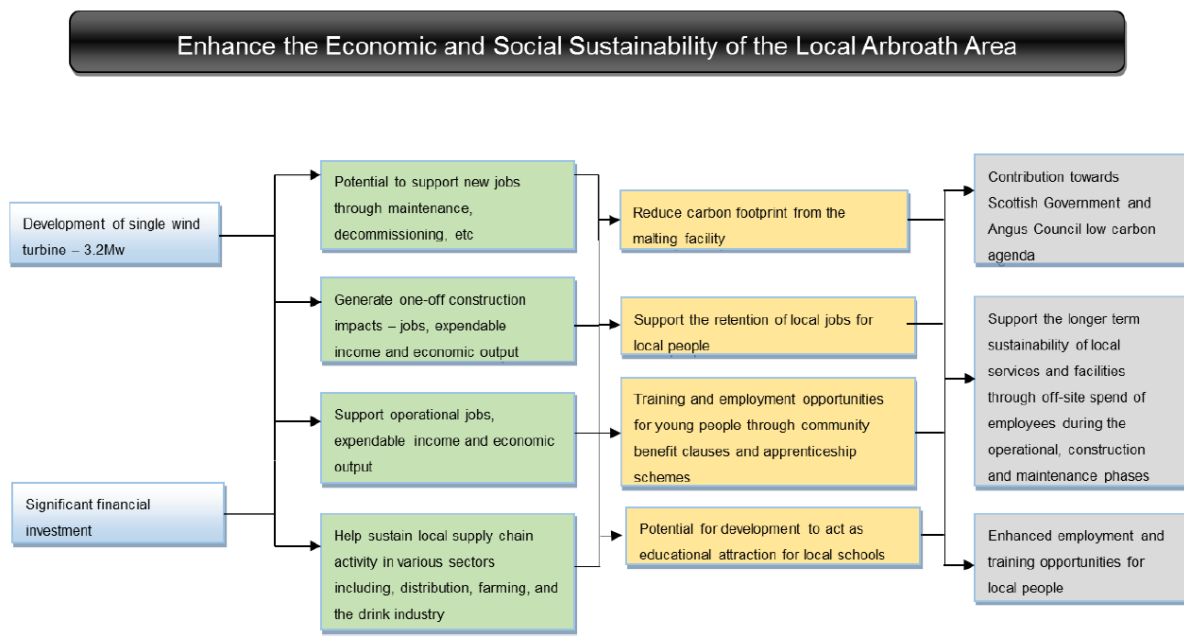


Figure 4.1 – Project Logic Model (extract from Socioeconomic Impact Assessment)

4.10 The main aims of the project are to:

- **Reduce the businesses' electricity costs.** The facility has a 24/7 demand for electricity, with an annual consumption of 10GWh, equivalent to 2,200 homes, costing

approximately £2.5 million a year. Given the rising electricity costs and the global strain on energy security, generating your own energy is one of the most productive ways in order to safeguard a business. On the basis that electricity costs are the greatest overhead to the facility, generation of their own supply will represent a significant saving, boosting the businesses' financial performance and securing the future of the plant.

- **Generate clean electricity.** It is estimated that the turbine is likely to generate approximately 2.3GWh of electricity annually, which represents 23% of the demand of the facility. This is becoming of increasing importance for Bairds Malt as the market demands are shifting towards greater sustainability and a reduction in carbon footprint.
- **Reduce the businesses' carbon footprint.** As a high energy user involved in the supply of products to large suppliers throughout the UK and beyond, the business is seeking to improve its sustainability and reduce its carbon footprint. The need to demonstrate commitment to sustainability is increasing as customers demand higher environmental standards from their suppliers. Over the turbine's 25 year lifecycle, the project is expected to result in a carbon saving of ~6,500 tonnes and a CO₂ saving of ~34,700 tonnes when compared to more traditional means of electricity generation such as coal. The wind turbine will offset the electricity import requirement of the plant, and will provide a source of green energy that helps to lower the business' carbon footprint.

4.11 The Report of Handling is clear in the support for the development in regard to the benefits that would occur should it be realised. Both national and local policy are unquestionably clear that developments that provide opportunities such as present at Bairds Malt, should be supported where appropriate. The committee report states that *"It is accepted that the proposed turbine could make a contribution towards renewable energy generation and carbon reduction and as such the proposals attract in principle support from the development plan"*. The report goes on to state that *"It is also accepted that the proposed development would improve the operational efficiency of the Bairds Malt operation and would make it more financially viable going forward, which is a significant benefit to the local economy"*. The report concludes with *"I am very conscious that the applicant is a valued employer in the local area and I am sympathetic to their desire to increase the competitiveness of the site and reduce its carbon emissions"*.

4.12 Whilst the acknowledgement from the Planning Officer that the proposal does stand to significantly benefit the local economy and support a valued employer are welcomed, the Appellant contends the conclusion that the perceived impact on local residents outweighs these substantial benefits. The Appellant contends that the landscape and visual impacts are not unacceptable, and that there are very significant material considerations which justify the siting of the wind turbine in this location. It is important for the Council to support the proposal and demonstrate Angus Council is progressive and recognise the policy position of the Angus Local Plan Review that provides a presumption in favour of renewable energy and support for local businesses.

4.13 The turbine relates well to the scale and industrial of the surrounding buildings and would add a vertical feature of similar colour to the views which already contain several industrial elements, and take up only a small extent of the horizontal view. It should be

noted that the selected turbine is the smallest commercial sized turbine that can be accommodated onto the site due to the need for a minimum clearance height above the grain drying towers. The figures provided in **Annex 1** shows the proposed turbine in comparison to the operational Michelin turbines in Dundee, and the turbine type previously proposed by Glaxo-Smith Kline in Montrose. The proposed model, the Enercon E44, is 43m smaller than the operational Michelin turbines in Dundee, and 55m smaller than the proposed GSK turbines.

- 4.14 In the first instance, it is considered that the proposal is policy compliant with planning policy. However, should members of the Development Management Review Board consider otherwise, then there is a significant case that the material considerations for the proposal entirely justify a minor departure from planning policy.

5 APPRAISAL OF GROUNDS FOR REFUSAL

5.1 The application was refused under delegated powers on 1st March 2016. The Decision Notice (**B04**) gave the following reasons for the refusal of this application:

1. *That the application is contrary to policies S1 criterion (a), S6 criteria (b), and ER34 criterion (a) of the Angus Local Plan Review (2009) as the proposed development would give rise to unacceptable impacts on the occupants of residential property by virtue of the height of the wind turbine and its proximity to residential properties.*
2. *That the application is contrary to Policy 6 of TAYplan and policies ER5 and ER34 criterion (b) of the Angus Local Plan Review (2009) as the proposed development would result in unacceptable adverse landscape impacts having regard to landscape character and setting within the immediate and wider landscape.*

5.2 It is worth noting that, with regard to energy, the Angus Local Plan Review (ALPR) (**C01**) recognises that *'...in terms of sustainable development, energy efficiency and non-polluting power generation are fundamental to establishing a stable and environmentally acceptable energy policy.'* The Plan also identifies that the Scottish Government's target of electricity generation from renewable sources *'will require major investment in commercial renewable energy production and distribution capacity'*.

5.3 This section provides an appraisal of the reasons for refusal and the corresponding policies in which the Report of Handling has deemed that the proposal does not comply with.

Refusal Reason 1

5.4 The Report of Handling references a number of policies within this reason for refusal, in which the Planning Officer has found the proposal is contrary to, all of which relate to the acceptability of impacts upon residential properties. However, the proximity of a development to residential properties is not in itself a decisive factor in the acceptableness of a proposed development. A critique of these policies, against which the proposed development is tested, is provided below:

Policy S1 of the Angus Local Plan Review (2009) (C01)

Development Boundaries

- a. Within development boundaries proposal for new development on sites not allocated on Proposals Maps will generally be supported where they are in accordance with the relevant policies of the Local Plan

5.5 This policy is generally supportive of new developments within the development boundaries, where the turbine would be located. Whilst the development is situated in proximity to residential areas properties, when visible and not obscured by the built up

environment, the turbine is also viewed directly adjacent to, and in context with, the large grain silos which are 27m in height and 34m in width, offering a considerable massing. Therefore, whilst the proposed turbine is taller, the grain silos have a substantially greater footprint and wider effect on the horizontal aspect. The development has been designed to be in comparative scale with the maltings which in turn provide a similar man-made character. The Elliot Industrial Estate features a number of different man-made structures, including a tall telecommunications mast, which bring a developed character to this edge of the settlement. When the turbine is visible, particularly from Patrick Allen-Fraser Street, Kinghorne Street and Gerrard Place, it is viewed alongside significant parts of the industrial estate and grain silos. Again, while the proposed development is taller in the view, it is not considered to be out of scale with these elements.

Policy S6 of the Angus Local Plan Review (2009) (C01)

Development Principles

Proposals for development should where appropriate have regard to the relevant principles set out in Schedule 1 which includes reference to amenity considerations; roads and parking; landscaping, open space and biodiversity; drainage and flood risk, and supporting information.

- b. Proposals should not result in unacceptable visual impact.

- 5.6 Whilst it is acknowledged that there will be some occasional significant effects, as there is with all wind turbine developments. As stated within the LVIA, these effects are not unacceptable. The turbine would be a noticeable feature but viewed intermittently across the residential area which includes Patrick Allen-Fraser Street, Kinghorne Street, Glamis Road, School Road and Gerrard Place. Due to the layout and density of this residential estate, views of the turbine tends to be screened by the built up environment on most occasions, particularly from dwelling windows and gardens. Furthermore, whenever visible, the turbine would be viewed behind the large grain silos, which further screen the proposed turbine and provide context. The LVIA found that whilst there are some significant effects from nearby residential areas, these were not deemed to be oppressive or unacceptable, and therefore, the development is compliant with Policy S6(b).

Policy ER34 of the Angus Local Plan Review (2009) (C01)

Renewable Energy Developments

Proposals for all forms of renewable energy development will be supported in principle and will be assessed against the following criteria:

- a. The siting and appearance of apparatus have been chosen to minimise the impact on amenity, while respecting operational efficiency.

- 5.7 It is considered that the development has been sited in order to minimise the effect on the amenity of nearby residents or receptors. This has been achieved by locating the development on an industrial estate, at the furthest possible point from any residential properties. The industrial estate is a long established facility and therefore local residents have a strong association with operational activities in the area. By locating the proposed turbine on the edge of this area opens up no new areas to operational or industrial activity. Whilst the proposed turbine is naturally taller than the surrounding industrial buildings, the turbine does not have the same massing effect as the grain silos, some of which are 34m in diameter, and provide a significant baseline for development.
- 5.8 Policy ER34(a) also puts significant importance and value of maintaining the operational efficiency of the development. As detailed within **Section 5** of the ER (A01), the operational efficiency of the development has been a major consideration in the design of the scheme. The scale of the turbine is dictated by the vertical constraints of the site as sufficient clearance needs to be allowed between the lowest height of the blade sweep and the grain silos, some of which are 27m in height. The development is at the point in which any reduction in turbine height or scale would have a dramatic impact on the efficiency and operation of the wind turbine that would ultimately have an impact on the viability of the development.

Significant Visual Effects on Residential Properties

- 5.9 The Report of Handling explains that residents should be treated as high sensitivity in assessing the significance of visual impact, which is entirely agreeable and put in to practice within the LVIA. The point of contention in this matter is what constitutes as acceptable significant impacts, or unacceptable significant impacts, the principle of which was introduced by SPP in 2010. The LVIA has identified properties in which significant effects are expected to occur, however, whilst the effects are significant, it is not considered that these will be unacceptable, as discussed below.

Peasiehill Farm Cottages

- 5.10 Peasiehill Farm Cottages will have a significant visual impact. This impact is not considered to be unacceptable for the following reasons:
- The development is a single turbine, 44m in blade diameter, thus only affecting a small angle of view;
 - The development will only be visible from one side of the dwelling, occupying a narrow extent of the horizontal aspect;
 - The turbine is will be viewed alongside the industrial estate and grain silos; and
 - From this direction the turbine appears as a similar height to the buildings at the industrial estate (this is a result of the relative distance between the property, the industrial estate and the turbine).
- 5.11 Therefore whilst there is a significant impact, this impact does not alter the overall experience or enjoyment of the property and does not render the property an unattractive place to live nor provide an unpleasantly overwhelming feature.



Figure 5.1 – Viewing direction towards development from Peasiehill Farm Cottages



Figure 5.2 – Visualisation of proposed development from Peasiehill Farm Cottages

Peasiehill Farm, Krojan and Crudie

5.12 From further back at Peasiehill Farm, Krojan and Crudie the proposed wind turbine will appear larger than the grain silos in terms of its vertical scale. Despite this, it is in keeping with the overall scale of the industrial estate and landscape. Particularly as the grain silos have a substantially greater horizontal scale and massing effect, even when compared to the vertical scale of the turbine. When visible from these properties the grain silos and industrial estate are still the primary feature, with the turbine becoming a secondary feature in the view. While it may still be a significant visual effect, it certainly would not constitute as unacceptable, due to:

- The distance between the properties and the turbine is considerable at over

650m;

- The turbine is in scale with the grain silos and communications mast;
- The development impacts only on one aspect of the properties' views, and;
- The properties' are elevated above the development.

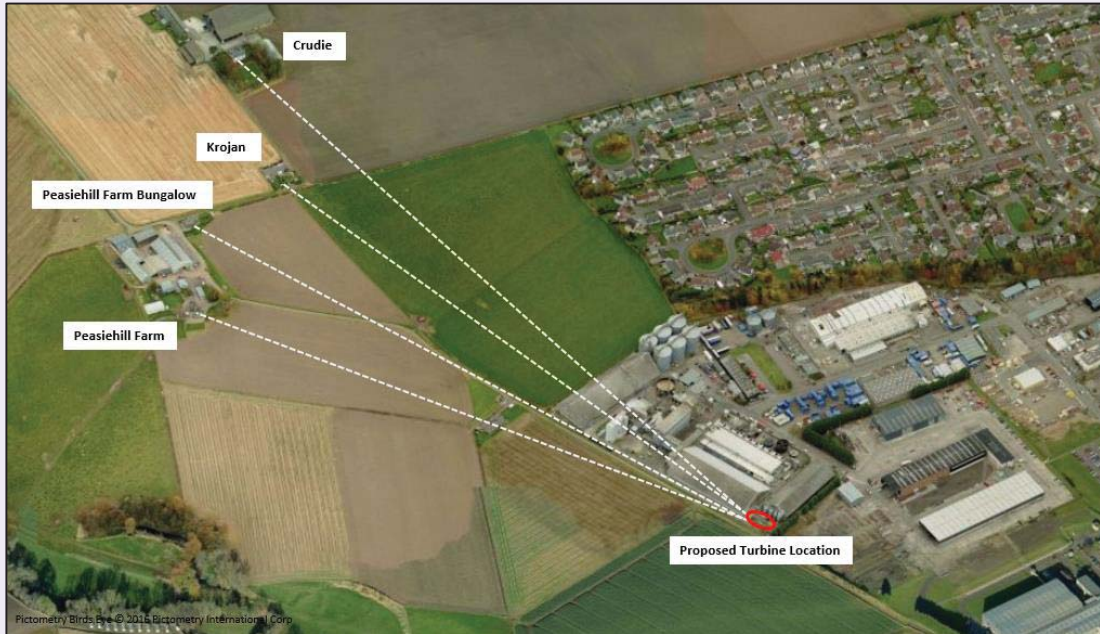


Figure 5.3 – Viewing direction towards development from Peasiehill Farm, Krojan and Crudie

Residential Estate to the north

5.13 There is a residential area to the north-east of the proposed development, which includes Kinghorne Street, Glamis Road, School Road, Hospitalfield Road, Gerrard Place and Patrick Allan-Fraser Street. South facing properties on the western edge of the street will have the most direct views, although these will be partially screened by the buildings on the southern side of the street and the trees situated in a small amenity grassland area in the centre of the street. While the turbine will be an obvious feature to these dwellings, the views will be mitigated which in turn will not render the scheme unacceptable. For the following reasons the impact on the worst affected properties on Patrick Allan-Fraser Street will not be unacceptable:

- The lower half of the turbine will be screened by a combination of vegetation and the built environment;
- The turbine will always be visible behind the grain silos;
- The turbine, despite appearing taller than the existing built features will still be of a similar scale and character;
- Impact will only affect one aspect of the property, with no impact on the rear windows and rear garden areas, and;
- The character of the view is already influenced by the substantial industrial features at the maltings which are intermittently visible and provide baseline character to the residential area.

- 5.14 Other parts of this residential estate, particularly Kinghorne Street and Gerrard Place will also be affected, however, significant views will be much rarer and less likely to occur. This is due to a combination of increased distance to the development, higher proportion of screening features and visibility being more intermittent. The western end of Kinghorne Street will again be one of the more affected area with the turbine seen rising above the roofs of the properties on the southern side.
- 5.15 Whilst the maltings is a less visible feature from this area, the turbine is equally less visible, and does not rise as high in the view, limiting any potential overbearing elements.



Figure 5.4 – Viewing direction of the development from most impacted area of residential estate

Arbilot Road West, Bankhead Road and Bankhead Crescent

- 5.16 Views from properties on Arbilot Road West, Bankhead Road and Bankhead Crescent will have open visibility of the development, however, these views are between 1km and 2km from the proposed turbine location, and the impact is considered to be significantly less.
- 5.17 From both Bankhead Crescent and Bankhead Road the views are unlikely to be considered significant with views screened by a combination of vegetation and the built environment. It is not considered that any properties on these roads will have direct unobstructed views of the development and as such there will be no unacceptable impacts on residential amenity.
- 5.18 The mostly likely views would be from the open play park at the northern end of

Bankhead Crescent where the turbine is visible in full.

- 5.19 The proposed development neither constitutes an overbearing feature nor does it distract attention away from the recreational use of the park, with the turbine appearing of a similar height to the trees, telecoms mast and street lighting currently in the view.
- 5.20 While views from Arbilot Road West would be more open and properties, including the flats, are more likely to have unrestricted direct views, these views are not considered significant due to the narrow extent of the view that the turbine would occupy and the context in which it is viewed. As a result the impacts are not unacceptable.



Figure 5.5 – Illustration of development from Bankhead Crescent Play Park

Properties around Elliot

- 5.21 From the properties at Elliot to the south, the turbine would be a prominent feature seen on the horizon rising high in the view, due to the low elevation of the properties, near the coastline. Despite this, it is not considered that the impact is unacceptable for the following reasons:
- The primary aspect of these properties is south-east, looking over the coast and out to sea. These views would be unaffected by the development;
 - The turbine, when seen from the rear windows and gardens, will appear alongside the maltings which has a similar character, with the caravan park in the foreground; and
 - Despite appearing above the viewer, the turbine does not introduce an overbearing element.
- 5.22 The development would certainly not cause material harm to living conditions of these properties nor would it make them a less attractive to live in, particularly as their primary view and setting is related to the coast.
- 5.23 Therefore, whilst there are a notable number of residential properties within proximity

to the development, some of which have been identified to experience a significant visual impact, none of the impacts identified are considered to be unacceptable.

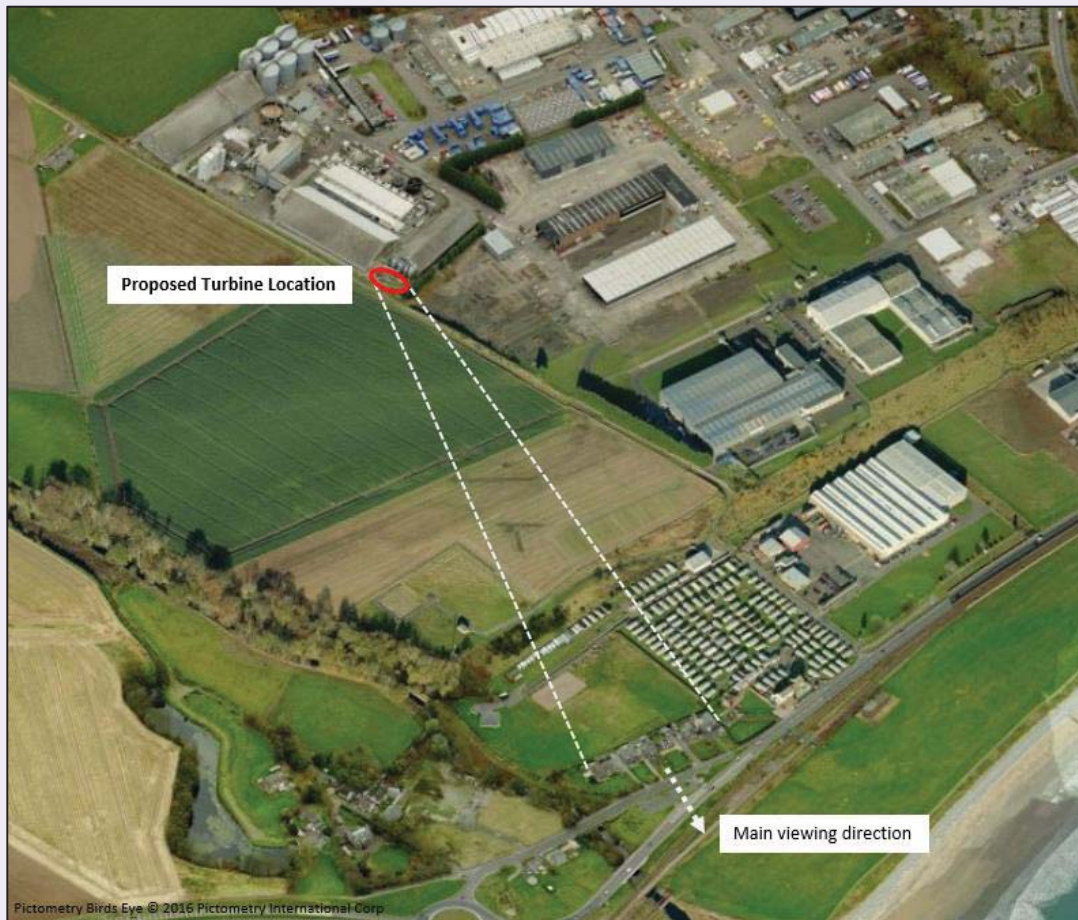


Figure 5.6 – Viewing direction of effected properties around Elliot

Significant, but acceptable, impact

- 5.24 It has been established that there needs to be a degree of harm over and above any significant effects in order for the development to be considered unacceptable in terms of residential amenity impact. This distinction has been clearly established in planning case history when two decisions at Enifer Downs and Den Brook, where it was stated that, *“separation distance is not, in itself, a decisive factor in judging policy compliance or the associated standards of environmental quality, but it provides a broad context for consideration of amenity impacts”*. Amenity is not just visual, but should also consider noise and shadow flicker effects, of which the Report of Handling has concluded are acceptable.
- 5.25 The universal approach adopted by The Planning and Environmental Appeals Division (DPEA) is that in the planning system, no individual has the right to a particular view. Equally, the right to a view is not a material planning consideration. However, there may be a point when, by virtue of the proximity, size and scale of a development, a residential property would be rendered so unattractive a place to live that planning permission should be refused. It is important to note that significant adverse change to an outlook from a property does not, in itself, result in material harm to living conditions – there

needs to be a degree of harm over and above this to warrant a refusal of an application in the public interest.

- 5.26 In the instance of the Baird's Malt turbine, it would be difficult to argue that the development would render the area so unattractive a place to live and as such is unacceptable. The turbine would need to present an overbearing presence, which is difficult given the high level of screening provided by the existing built environment, the context provided by the large scale industrial activity and associated buildings on the site, or it would need to be an oppressive or unavoidable feature. The screening provided means that the turbine is intermittent and is never consistently visible, nor visible for long periods of time when travelling through the residential area.
- 5.27 Given the nature of the development, and other wind turbine developments within industrial estates, there is no avoiding a level of proximity to residential dwellings. Projects such as the Michelin Tyre Factory in Dundee, which comprises two 120m wind turbines, operates with properties located approximately 300m from the nearest turbine. Equally the FMC Technologies development, a single 100m turbine in Dunfermline, is located within an industrial estate which, naturally, is in relatively close proximity to residential dwellings. However, the projects have been developed, in an already industrial setting, as a means of offsetting the high energy demand of which their respective operations require, as is the case with the proposed Bairds Malt development. **Annex 1** provides a useful visual comparison of similar projects.
- 5.28 These developments were consented as the decision makers respected the legitimate requirement and considered reasons in which the developments were brought forward, and saw the value in the overwhelming benefits that a development of this nature would bring to the established local employers, to local economy and to the longevity of business. The same is directly applicable to the proposal at Bairds Malt, with the exception that Bairds Malt has proposed a significantly reduced scale, making it more sensitive, more appropriate and more in scale with the surroundings.

Refusal Reason 2

- 5.29 This section will look at the policy and supporting documents relevant to impact on landscape character in order to illustrate how, contrary to the Report of handling, the development is compliant with policy and fits within the landscape character. The second refusal reason states the landscape impacts are contrary to the aims of local plan policies ER5 and ER34.
- 5.30 The Report of Handling states that “*Local plan Policy ER5 (Conservation of Landscape Character) requires development proposals to take account of the guidance provided by the Tayside Landscape Character Assessment (TLCA), prepared for Scottish Natural Heritage (SNH) in 1999, and indicates that, where appropriate, sites selected should be capable of absorbing the proposed development to ensure that it fits into the landscape*”.

Policy ER5 of the Angus Local Plan Review (2009) (C01)

Conservation of Landscape Character

Development proposals should take account of the guidance provided by the TLCA and where appropriate will be considered against the following criteria:

- a. Sites selected should be capable of absorbing the proposed development to ensure that it fits into the landscape;
- b. Where required, landscape mitigation measures should be in character with, or enhance, the existing landscape setting;
- c. New buildings/structures should respect the pattern, scale, siting, form, design, colour and density of existing development;
- d. Priority should be given to locating new development in towns, villages or building groups in preference to isolated development.

- 5.31 Looking at the individual criterion in Policy ER5, a critique of the proposal against these requirements is discussed below:

- (a) The site was selected specifically to be absorbed into the landscape as is evident by its location directly adjacent to the maltings, within an industrial estate. This has the benefit of only directly affecting an industrious part of the landscape, with no loss of any features key to the character of the LCA, which is discussed further below. With the maltings already a significant feature in this part of the LCA, there is a strong precedence for significant man-made structures in this area. It should also be noted that the fields adjacent to the development site have planning consent to extend the industrial estate, further strengthening the case the area is designated for industrious activity. By co-locating the turbine with the maltings, the effects experienced are limited to areas of the landscape where receptors are already affected by the maltings.

- (b) Mitigation is provided by the positioning of the turbine adjacent to a large scale industrial facility which helps provide visual context for the development and creates a visual relationship between the development and the industrial surroundings. Further mitigation will be provided when by the 51 hectare extension of the industrial estate which secured planning permission in 2011.
- (c) The design respects the existing pattern of development by locating the turbine directly adjacent to the maltings, where the energy generated by the turbine will be used on site, giving a logical visual connection and sense of appropriateness. As the electricity generated is used directly on site, the presence of the turbine is mitigated by the existing features, which provide both screening from some directions, but also provide context, scale and pattern.
- (d) The development is located within the settlement boundary and adjacent to other industrial buildings. The turbine is right on the south-western edge of Arbroath will give the impression of the turbine being associated with the settlement, and in particular the maltings facility. This part of the settlement's skyline is already affected by the silos at the maltings, and as such the addition of the turbine would not be in contrast to the landscape baseline.

The report of handling also highlighted the development as being contrary to Policy ER34 criterion (b):

Policy ER34 of the Angus Local Plan Review (2009) (C01)

Renewable Energy Developments

Proposals for all forms of renewable energy development will be supported in principle and will be assessed against the following criteria:

- (b) There will be no unacceptable adverse landscape and visual impacts having regard to landscape character, setting within the wider landscape, and sensitive viewpoints.

5.32 While the development will have significant visual impacts, as detailed within the ER, no significant landscape effects were found as part of the LVIA. Additionally, none of the significant visual effects were considered to be unacceptable. It is not considered that a single 77m tall turbine, located at the far end of a large industrial estate, adjacent to large and prominent industrial silos, will have unacceptable landscape effects on a low sensitivity landscape. With the strong presence of industrial man-made elements in this part of the Dipslope Farmland, it is difficult to appreciate how one can conclude that the proposed development could result in unacceptable landscape impacts, particularly given the modest scale of the turbine and the location in a long established industrial estate that has been earmarked for further industrial expansion. There will be no loss of any landscape features. The project resembles those at the Michelin Tyre Factory in Dundee which is comprised of two 120m turbines, or the FMC Technologies turbine in Dunfermline which is comprised of a single 100m tall turbine. In the case of the Bairds

Malt development, the turbine will be of a significantly smaller and more modest scale compared to those other development.

- 5.33 Whilst some significant impacts have been identified, these are not in relation to landscape impact and are not considered unacceptable. The Report of Handling concludes that *“a 77m turbine in this location would be out of scale when viewed against the existing landscape features and would be significantly and adversely affect the landscape and townscape in the area”*. The report at no point identifies specifically which landscape or townscape features are significantly impacted on, nor illustrates why these impacts are unacceptable. There are discussions about the Dipslope Farmland LCT and Coast with Sand LCT, however, no comment is provided on the acceptability of the development in relation to either of these landscapes or their specific features. A critique of the development against these designations is provided below:

Strategic Landscape Capacity Assessment

- 5.34 The Strategic Landscape Capacity Assessment for Wind Energy, produced by Angus Council, identifies and discusses the opportunities and constraints for development within each of the designated LCAs. The proposed Bairds Malt turbine, although located within a brownfield industrial site on the settlement edge of Arbroath, is also considered to be part of the Dipslope Farmland LCT, sub-area Letham, Lunan and Arbroath.
- 5.35 While the capacity study has identified that there is only capacity for turbines up to 50m in height, it does specifically state that turbines should be *“associated with settlements or intensive agriculture”*. The Bairds Malt site is favourable to this criteria, as it is not only associated to the settlement of Arbroath, but more so the industrial malting operation. It is interpreted that guidance is seeking to achieve appropriate development which fits with the baseline and keeps development to sections of the landscape with a strong existing man-made presence, which is entirely agreeable. By locating the proposed turbine on the south-western edge of the settlement, the development will be directly associated with the industrial area of the settlement and also with man-made features, which will keep these type of features to one section of the LCA, leaving the remainder of the Dipslope Farmland with less development and free of tall structures.
- 5.36 The Coast with Sand LCT is located to the south of the development. The Report of Handling indicates that this landscape only has capacity for wind turbines up to 30m in height. While this is correct, this recommendation of development height is specifically in relation to wind turbine development located within that particular LCT, whereas, although adjacent to the Coast with Sand LCT, the effects will be substantially different to those where the turbine is located within it. Therefore, although this provides an indication for development, it does not form a definitive guide on the suitable heights of turbines within the urban area.
- 5.37 On reading the Report of Handling, it was identified that there is some contradiction with regards to the impact on the skyline of the proposed development and it becoming a landmark feature of the coastline and the relatively hidden nature of Arbroath. The Report of Handling correctly acknowledges, and is concurred with by the Landscape Character Assessment, that Arbroath does not have a strong visual influence and the

topography helps to limit views of the settlement. As such more distant views, where the turbine is visible, do not have views of the settlement, meaning the two are not always viewed together, which in turn minimises its potential to be a landmark feature.

5.38 Furthermore, the Report of Handling states that the turbine's height causes it to breach the skyline of the landscape behind Arbroath. However, this is only particularly evident in **Viewpoint 5**, as this is one of the few locations in which this can occur. In nearly all other instances where the proposed development would breach the skyline of the landscape behind Arbroath, would occur out at sea and therefore less frequently.

5.39 The appropriateness of using the SLCA as grounds to formal a refusal have recently be questioned in a successful appeal determined by the Directorate for Planning and Environmental Appeals for two 47m tall wind turbines in Angus (PPA-120-2036). The Reporter, appointed by the Scottish Ministers stated in Paragraph 10 of the Appeal Decision Notice (**B04**):

Landscape capacity studies can be helpful tools in understanding the nature of the landscape impacts caused by wind turbines. However, they should not be given the attribute of detailed zonings for a particular number of turbines of a particular size. I note that paragraph 1.4 of the Strategic Landscape Capacity Assessment for Wind Energy in Angus (2014) states, *"It is emphasised that this is a strategic level landscape and visual study, providing a context for consideration of capacity for, and the cumulative effects of, existing and potential wind turbine developments in Angus. No site specific conclusions should be drawn from it in relation to current, proposed or future wind turbines and wind farms."*

5.40 It is evident from the Report of Handling that the Planning Department have drawn site specific conclusions from the SLCA when the document itself advises against doing so. It is equally evident that the Planning Department have adopted a regimented stance on the application of the SLCA where the document itself states that its purpose is to provide 'context for consideration'.

Landscape Character Assessment

Dipslope Farmland LCT

5.41 The site is located within the Dipslope Farmland LCT as indicated by the Tayside Landscape Character Assessment produced by SNH. The document lists a number of characteristics which are key to this LCA and help provide it with its unique character. These are listed below along with the potential impact the proposed turbine could have of these features:

- **Extensive area of land, generally sloping from the north-west to the south-east.** By locating the turbine at close proximity to the settlement it maintains any sense of extensiveness and openness with the turbine clustered alongside the settlement. This limits its impact across the LCA, keeping the impact of development to sections of the landscape already affected by man-made structures. As the landform is gently sloping down towards the coast, there is no prominent peak or ridge that could be affected by

the scale of the proposed turbine. Had the topography been more defined or prominent this could have been an issue, however with rolling or gently sloping topography, tall vertical structures can be more easily accommodated.

- **Dominated by productive agricultural land.** The development is situated within Elliot Industrial Estate, and as such would result in no loss of any productive agricultural land, which the Report of Handling is in agreement with. Despite a relatively small footprint, a turbine located in the middle of agricultural land could be perceived as reducing the agricultural capacity of an area.
- **Low woodland cover, except on large estates and along river corridors.** The development would not result in the loss of any woodland and should not impinge on the low woodland cover. As a result of its location, the turbine does not affect the setting of any estates or river corridors.
- **Variety of historic sites.** All historic sites were assessed have been thoroughly assessed and no significant effects were found. Historic Environment Scotland did not offer an objection and the Report of Handling agreed with the findings.
- **Dispersed settlement pattern, including some suburban development.** Although located on the edge of a settlement, the development would not affect the pattern of the settlement. The site has been granted consent for a 51 hectare extension to the industrial estate, which will not be impacted by the proposed development.
- **Limited visual impact of Dundee and Arbroath.** Arbroath has a limited visual impact due to its location on low ground contained by higher rolling farmland. One of the more prominent elements in the south-west side of Arbroath is the maltings at the Elliot Industrial Estate, which include 27m high grain silos and associated infrastructure. These buildings form part of the skyline and also have a strong massing element, bringing a certain character to this part of the landscape. While the turbine is taller, it does not have the same levels of massing, and is of a character which fits well with the existing buildings.

Coast with Sand LCT

5.42 The proposed development, will also have an indirect impact on the adjacent LCT (Coast with Sand) due to its close proximity. The Report of Handling has indicated that, in their opinion, there will be significant effects on this LCT, but have not identified or indicated if these effects are acceptable or not. No significant effects were found on this landscape character within the LVIA. Whilst the turbine may be visible from this landscape, that alone should not cause unacceptable effects, particularly as this part of the LCT is adjacent to the settlement of Arbroath where man-made features are commonly visible and part of the baseline character. The key features of this landscape are outlined below including the potential impact of the proposed development:

- **Areas of marine alluvium and windblown sand along lower sections of the coast.** As the development is not situated within this landscape it will have no direct impact on these type of features and they will remain intact.
- **Sand dunes inland.** Again, there will be no direct impacts on the sand dunes. Whilst the turbine may appear in views with the sand dunes it is unlikely that its presence

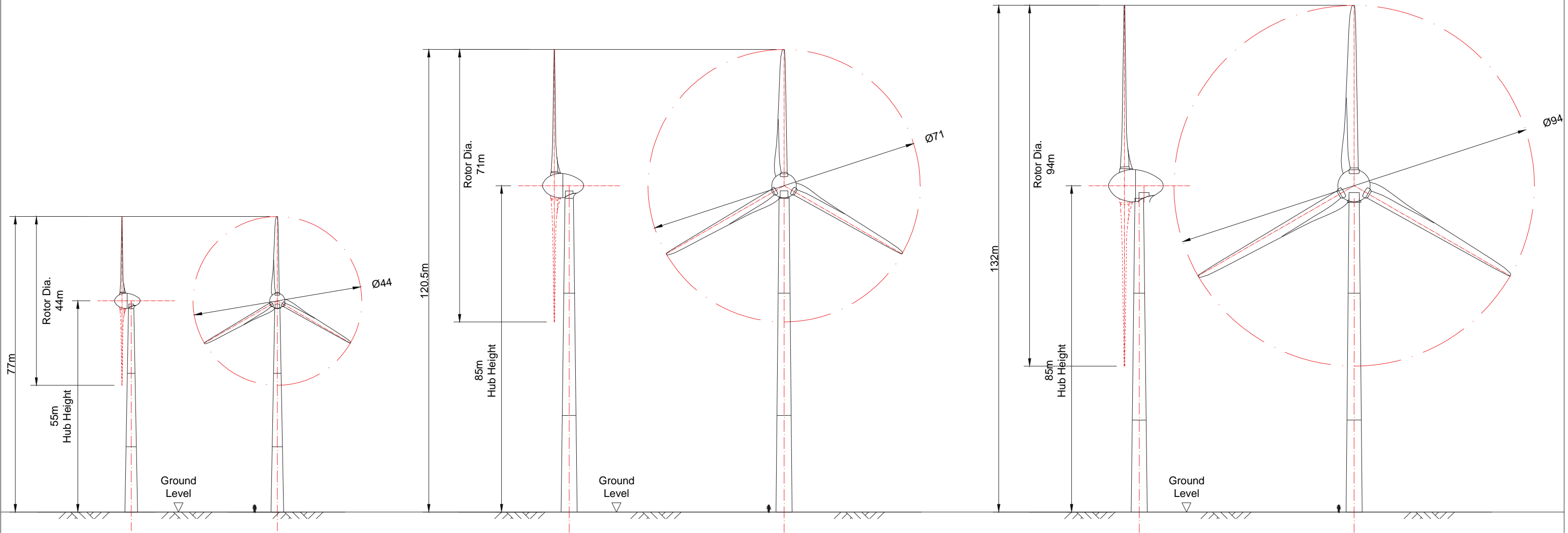
would cause a significant impact on their character or setting, particularly as vegetation and other man-made features would appear between the dunes and the turbine.

- **Ever-changing landscape of shifting sands, erosion and deposition.** It is highly unlikely the turbine would have any impact on this feature.
- **Golf Courses.** Whilst there would be no direct impacts on golf courses, there will be partial views from Arbroath Golf Club, where the turbine will appear partially screened by a combination of vegetation and topography.
- **Limited settlement.** By locating the turbine adjacent to one of the few settlements in the area, it helps limit the impact on the character by keeping all man-made features to one section of the LCT. When the turbine is visible from within this LCT, there are also views of other man-made features, such as roads, dwellings, agricultural and industrial buildings as well as other infrastructure.

6 CONCLUSION

- 6.1 The Scottish Government is supportive of this scale of renewable project, particularly where these are locally owned and will support local businesses. The Scottish Government policy is clear that it looks to support renewable development and meet the ambitious targets set out in the 2020 Routemap for Renewable Energy in Scotland. The development would generate energy to be used directly onsite, and would make a contribution to the Scottish Government's target for 500MW of community or locally owned renewable capacity by 2020.
- 6.2 In terms of Local Policy, Angus Council are supportive of renewable energy development where they are considered to be environmentally acceptable and they contribute to the development of a low carbon economy. It is considered that the overwhelming local benefits, resulting from the creation of a viable local business diversification and the support of a valued local employer, will be greater than any negative perceived and subjective landscape and visual effects.
- 6.3 The Report of Handling provided two reasons for refusal, citing unacceptable significant landscape and visual impact. No objections were received from any statutory consultees. Landscape and visual comments were provided by Angus Council's Countryside Officer, who considered the effects of the turbine on the landscape and nearby residents as being unacceptable.
- 6.4 The Appellant commissioned a robust LVIA as part of the Environmental Report which demonstrated that whilst the proposal would cause significant impact on a number of nearby residential properties, these impacts would not be unacceptable given the existing industrial character of the site. It is also considered that the development is unlikely to have significant impact in terms of Landscape impact.
- 6.5 As acknowledged in the Report of Handling, the development will help to safeguard the existing facility at Bairds Malt and encourage additional investment and upgrade works. Small businesses, especially those in rural areas, bring much needed income into the area and create employment for local people. The construction of a single turbine at Bairds Malt will make a vital contribution to the reduction in energy costs, which currently exceed £2.5 million a year, and underpin business at a local level for the future. In order for the business to remain competitive, and to strive for a sustainable future, safeguarding measures need to be implemented against the dangers of volatile energy costs and an expanding global marketplace. Additionally, the development will be a major factor in the safeguarding of the 57 jobs at the facility as well as security for the supply chain that includes 230 farms in Angus alone.
- 6.6 Accordingly, it is the Appellant's contention that the proposal complies with the Development Plan and is supported by applicable policy and guidance and that there are significant material considerations which provide strong justification for siting the turbine in this location. The Appellant respectfully requests that permission, subject to the usual conditions for an application of this scale and nature, be granted.

ANNEX 1 – SIMILAR PROJECT COMPARISSON FIGURE



PROPOSED BAIRDS MALT TURBINE, ARBROATH
55.0m Hub
77m to tip

OPERATIONAL MICHELIN TURBINES, DUNDEE
85.0m Hub
120.5m to tip

PROPOSED GSK TURBINES, MONTROSE
85.0m Hub
132.0m to tip

Environmental Report
Prepared for:

BAIRDS MALT WIND TURBINE

Bairds Malt Single Turbine Ltd

Prepared By:
Green Cat Renewables Ltd.



Green Cat Renewables

Checked By: Glen Moon	Date: 17/12/2014
Approved By: Stephanie Ewing	Date: 18/12/2014

Preface

This Environmental Report seeks assessed the environmental effects of the proposed Bairds Malt wind turbine development, which comprises the installation and operation of a single wind turbine of 77m to blade tip height.

As a single turbine with a hub height in excess of 15m, the proposed development falls within Schedule 2 of the EIA Regulations (Scotland) 2011.

A Screening Request was submitted to Angus Council in October 2012, who determined that an Environmental Impact Assessment for the proposed development was not required (ref: 12/00922/EIASCR). The Council indicated that the application should be accompanied by a detailed Environmental Appraisal document.

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Appendix 6 – Socio-Economic Impact Report

1 Project Summary

1.1 Introduction

The proposed development comprises the installation and operation of a single wind turbine, of 77m to blade tip height. The turbine would be located in the southern corner of the Bairds Malt plant, on the western edge of Elliot Industrial Estate, Arbroath.

This report assesses the potential environmental impacts likely to results from the proposal, and has been produced in line with relevant environmental policies and planning guidance.

1.2 Background

Bairds Malt Ltd is proposing the development of a single turbine at their plant on Elliot Industrial Estate, which will help secure the future of the facility and safeguard local jobs.

The application, would, if consented, help minimise the company's high energy costs and generate renewable energy on-site. Energy consumption at the plant costs Bairds Malt ~£2.5million per annum in energy bills and the turbine would reduce the electricity consumption from the National Grid by a third; a significant saving for the Arbroath facility.

Bairds Malt is working with Kilmac Construction on the development. Kilmac is a Tayside-based company who has worked with Bairds Malt for a number of years and has to date undertaken over 100 projects in Angus.

As Scotland's leading malt producer the Bairds Malt process 255,000 tonnes of malt per year, which is destined primarily for distilling. The company has invested significantly in its Arbroath facility since its construction in 1970, which has included major upgrades in 1980 and 2009, the latter ensuring that the site now incorporates the latest innovations in maltings technology.

The Arbroath facility, with its new grain drying complex is now capable of producing over 300 tonnes of malt (circa 174,000 bottles of whisky) every 48 hours, with total annual production reaching over 57,000 tonnes. The site employs 57 people who are drawn from the local area and the business is supplied by 230 live farm accounts within Angus alone.

1.3 Aims of the Project

In constant operation for seven days a week, the Malt has an extremely high energy usage and requires in the region of 10GWh of electricity per year, the equivalent of the supply required for 2,200 homes. The main aims of the project are to:

- **Generate clean electricity.** The proposed turbine is expected to generate 2.3GWh of electricity per year, equivalent to around 20% of the plant's usage.

- **Reduce business costs** through the direct use of electricity generated on site, and through the sale of any electricity not used by the plant. This will have the added bonus of insulating the business against any future price rises in electricity.
- **Reduce the businesses' carbon footprint**, which is of increasing importance to major suppliers.

The overall outcome of the project will be to deliver production and cost efficiencies that will increase the market competitiveness of the business and thus safeguard local jobs.

1.4 Community Consultation

A public information event was held at Bairds Malt on Wednesday 3rd and Thursday 4th July 2013. The drop-in events ran from **2pm to 7pm** and provided details about the proposed scheme, and presented the findings of the environmental studies that had been carried out to date. Representatives from Bairds Malt, Kilmac Energy and members of the Green Cat Renewables project team were on hand to answer any questions members of the public had about the scheme.

The event was advertised in the Forfar Dispatch on Tuesday 19th November and was covered in an article in the Dundee Courier on 25th June 2014. In addition to this, an invitation was posted to each property on the Patrick Allan Fraser estate. Letters were also sent to each of the local councillors and Graeme Day, MSP for Angus South.

Bairds Malt were keen to provide as much information as possible to members of the public prior to the application being lodged, and the event itself was well attended.

The scheme was also presented to Arbirlot Community Council on 14th July 2014.

1.5 Scope of the Environmental Report

The scope of the assessments has been discussed and agreed with Angus Council and other consultees through an informal scoping exercise. The Environmental Report (ER) comprises the following sections:

- The Proposed Development (including Traffic and Transport);
- Planning and Environmental Policy Context;
- Local Economic Benefits;
- Project Design Considerations;
- Ecology and Ornithology;
- Landscape and Visual Impact;
- Noise;
- Cultural Heritage and Archaeology;
- Surface and Groundwater Hydrology;
- Existing Infrastructure, Telecommunications, Television, Aviation and Electromagnetic Safety;
- Shadow Flicker; and
- Climate Change

2 The Proposed Development

2.1 Purpose of the Development

Why wind?

Bairds Malt has considered a range of renewable sources, and a wind turbine was the favoured option as it maximises the potential of the site, taking up a small footprint and generating a substantial amount of electricity.

Other technologies considered were:

- Solar power – this required a large development footprint, and given the constrained site, the amount of electricity generated would be a small proportion of that used by the Maltings.
- Geothermal power – this was not technically viable on the site.
- Biomass – again required a larger footprint than that available on the site, and there were concerns about the overall sustainability of this option.

None of the above technologies were commercially viable on the Bairds site, and therefore the decision was taken to investigate a wind turbine, which was the clear option to emerge.

Electricity generation

The malting process requires significant levels of energy consumption by the business, with an annual requirement in the region of 10GWh - the businesses' largest costs. As well as being connected to the National Grid, the proposed turbines will supply 'green' electricity directly to the plant, resulting in an efficient use of a natural resource, and significant financial savings. The proposed turbine will supply 20% of the plant's electricity, and it is anticipated that all of the electricity generated will be used directly by the plant.

Business diversification

The addition of the turbine will lead to an additional source of income for the business which will help to cushion it from market volatility caused by significant annual factors such as grain harvests and fluctuating commodity prices. Operating in a competitive European market, an increase in the sustainability and stability of the business will also help support both the existing employment and create new employment as the business continues to expand.

Reduction of the business' carbon footprint

As a high energy user involved in the supply of products to large suppliers throughout the UK and beyond, the business is seeking to improve its sustainability and reduce its carbon footprint. The need to demonstrate commitment to sustainability is increasing as customers demand higher environmental standards from their suppliers. Thus the development of renewable energy should increase the attractiveness of the Malt's produce to suppliers through its sustainable production.

Summary

The development of wind energy at Bairds Malt will provide the business with a source of renewable energy to meet its extremely high energy demand whilst at the same time significantly reducing the business' carbon footprint.

2.2 The Site

The Bairds Malt site is located on the western edge of Arbroath on the Elliot Industrial Estate, in an area that is not covered by any national planning designation. The proposed development site location is shown in **Figure 2.1**



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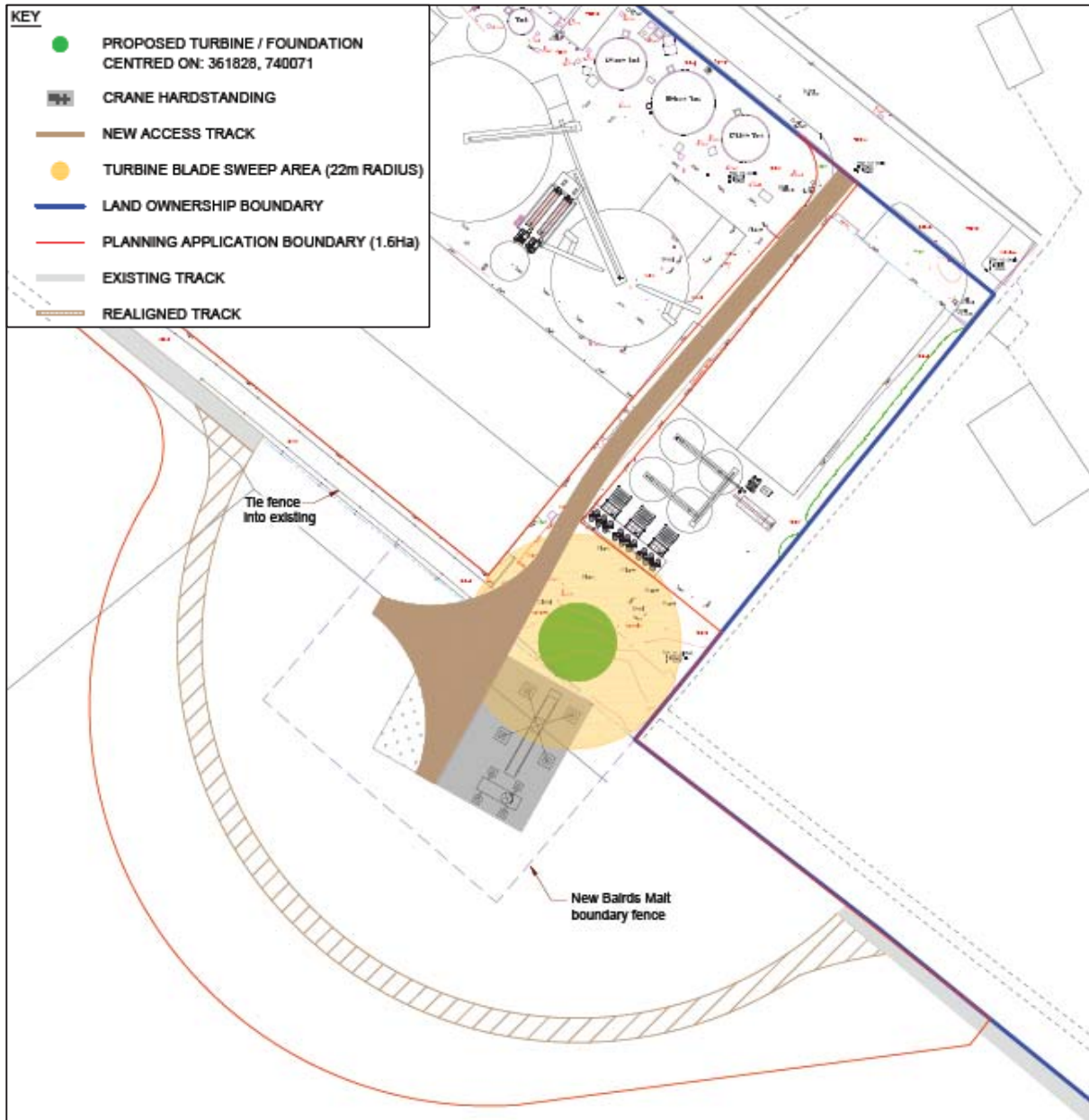
Figure 2.1 – Site location in the context of Arbroath

Turbine location

The proposed development consists of a single wind turbine of 55m to hub and 77m to tip, which would be located in the southern corner of the Bairds Malt site, to the south-west of the prominent Drying Towers which were constructed in 2009. The turbine and foundations would be contained within the boundary of the Maltings, with the crane hardstanding and turning head being located on third-party land immediately to the south-west, as agreed with the landowner.

The development would require a minor diversion to Core Path 152, the access track to Peasiehill Farm. This realignment has been agreed with the landowner. The diverted section of path would be constructed to the same specification as the existing path. A minimum distance of 77m (turbine height) has been provided between the turbine and the path.

The boundary fencing of the Maltings would be extended to encompass the crane hardstanding and turning bell. The proposed site layout is shown in **Figure 2.2**.



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Figure 2.2 – Site layout

Malt Operations

The Bairds Malt site covers approximately 5ha and produces malts for the distilling, brewing and export markets. The site opened in 1970 and has undergone phased development since

then, with major upgrades in 1980 and 2009. A Site Plan showing the major elements of the Bairds operation is provided as **APP-004**.



Figure 2.3 – Photograph of the site looking south-east from Peasihill Farm

The plant is operational 365 days a year, and there is a constant high demand for electricity. Between mid-October and mid-August the focus of activity is generally in the area between Silo 1 and Silo 3, and centred on the Steep House.

For the remaining two months of the year the Steep House is inactive and activity focuses on the southern portion of the site, in the area of the proposed turbine. These activities consist of the unloading of barley into the drying towers, which are active in the second half of August, all of September and for the first half of October. At peak times up to 70 vehicles a day arrive to unload barley, with an average of 15 vehicles per day throughout the remainder of the year.

Lorries enter the site at the eastern gate, and travel between Silo 2 and the site boundary. The vehicles then reverse up the intake ramp to unload, before passing between Silo 1 and the western site boundary and turning right to pass the laboratory buildings and exit the site via the main entrance. Swept path analysis has been undertaken to confirm that this route can continue to be used once the turbine is in place.

Bairds Central Laboratory and Operations Office are located towards the north of the site. The Laboratory carries out malt analysis for all sites in the Bairds Malt group. Within the Operations Office are the Accounts and MIS departments, and the Commercial team which deals with customer sales, delivery schedules, logistics and customer service activities.



Figure 2.4 – The site in the vicinity of the proposed turbine

The turbine would not affect the operation of the Malt, and the area between the diverted Core Path and the new Maltings boundary fence could continue to be used for agricultural purposes.

2.3 The Local Area

The site sits to the north of the A92 and the East Coast Main Railway Line, and is accessed via the A933 and Peasiehill Road. **Figure 2.5** shows the area surrounding the site in more detail.

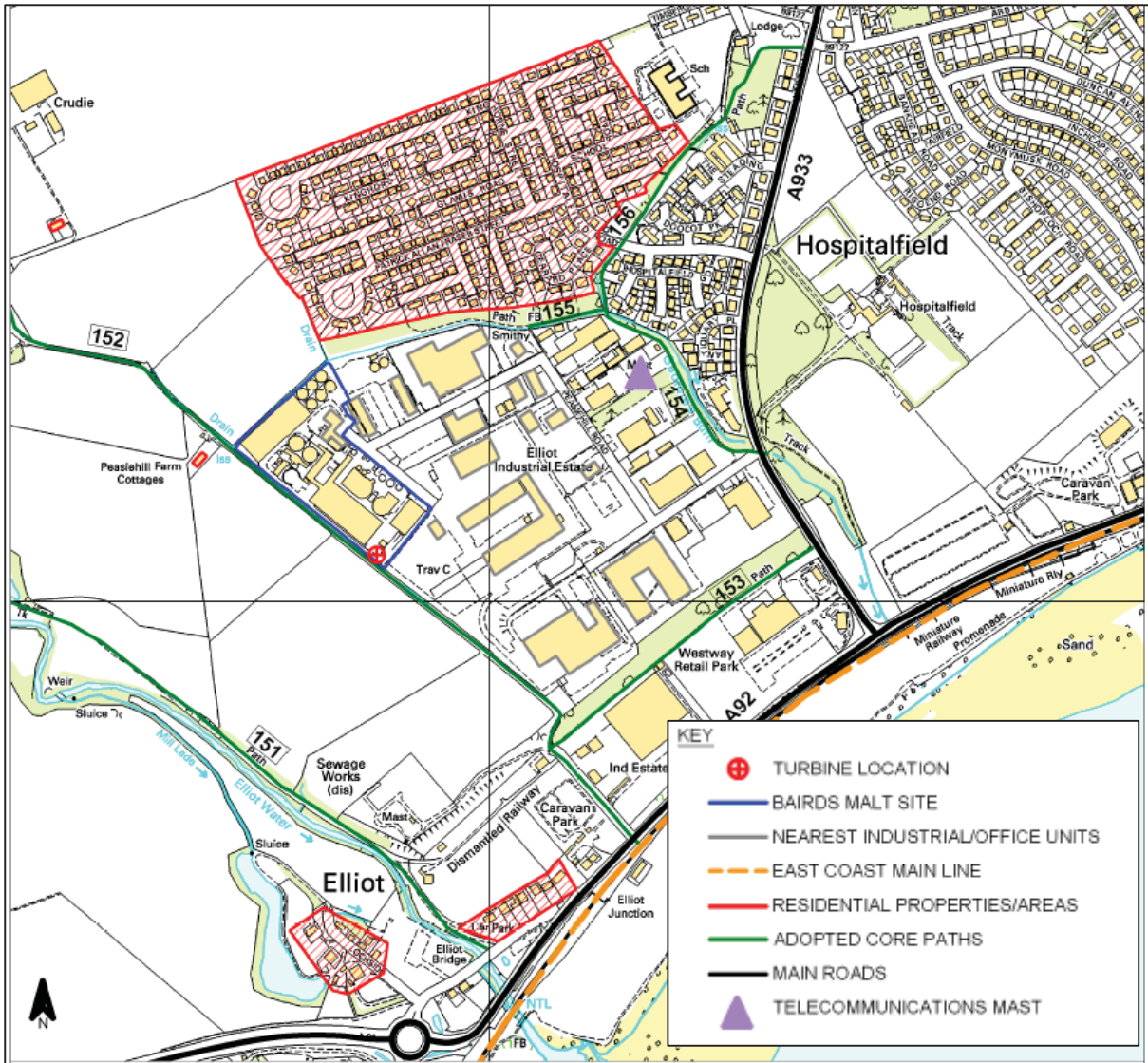


Figure 2.5 – The local area surrounding Bairds Malt

The western edge of Arbroath contains the following elements:

- The Elliot Industrial Estate;
- Commercial / Retail areas such as the Westway Retail Park;
- Residential Areas centred around Patrick Allan-Fraser Street and Hospitalfield Road;
- Open agricultural land such as that to the west of the Elliot Industrial Estate; and
- Single properties and clusters of properties such as those at Peasiehill, Crudie and Elliot Bridge.

Elliott Industrial Estate

The Bairds Malt site is located on the western edge of the Elliot Industrial Estate which is itself situated on the western edge of Arbroath. It is accessed via Peasiehill Road and the A933, which joins the A92 to the east of the Westway Retail Park. The Estate contains a mixture of industrial and commercial units. These are typically large warehouse type structures, which can contain smaller areas of associated office space, such as those occupied by Halliburton and PMP Interplex. There are also smaller workshop type buildings,

which are typically used for manufacturing or storage purposes. A 40m communications mast in the north-eastern corner of the estate is another prominent feature.

Elliott Industrial Estate Extension

In 2011 Angus Council secured planning permission in principle to extend the Elliott Industrial Estate into the fields to the south-west Bairds Malt. This land, covering a total of 51 hectares, is zoned for employment use within the Local Plan, but is not under the ownership of the Council and would need to undergo compulsory purchase.

It was the Council's intention to service the full site, but it is understood that current plans are to service one half of the site initially, creating a land supply of roughly ten years, with the remainder to be serviced if the extension approaches full occupancy. The initial development would create around 14 plots ranging from about 0.5ha to 2ha in size. The plots would be available for sale to businesses for general manufacturing, storage, office and distribution uses. The construction and build out phase would not be affected by the operation of the proposed turbine.

Compulsory purchase of the site has yet to be completed, and the overall situation is uncertain, with several plots currently lying vacant on the existing industrial estate.

The proposed turbine crane hardstanding and turning head are located in a small portion of the area earmarked for Industrial Estate extension (specifically Plots 24 and 25). The remainder of the proposed extension footprint would be unaffected by the proposed turbine infrastructure.

Residential Areas

The closest residential area to the site is the large housing estate centred on Patrick Allen-Fraser Street, the closest property of which is situated 350m to the north of the proposed turbine location. The closest residential properties to the site are the conjoined Peasiehill Farm Cottages, which are situated 300m to the north-west of the proposed turbine. These properties, and Peasiehill Farm itself, are owned by a party with a financial interest in the turbine development.

The Elliot Caravan Park is located 450m to the south of the proposed turbine location, and is accessed directly from the A92 Westway.

Public Access

There are several Core Paths in the vicinity of the site. Core Path 152 runs along the western boundary of the Elliott Industrial Estate, linking the West Sands in the south with Peasiehill Farm and the B9127 to the east of Arbirlot. This path would need to be diverted as part of the proposed development to loop around the area of the crane pad and hardstanding, and this diversion has been agreed with the landowner.

Core Path 151 is situated 350m to the south-west of Core Path 152, and runs in a north-westerly direction from Elliott Bridge to Arbirlot, passing to the east of Kellie Castle. This path runs along the route of a disused railway line.

Core Path 153 links Core Path 152 to Peasiehill Road, running to the north of Westway Retail Park. There are three further section of Core Path in the area, which run along the eastern edge of the Elliot Industrial Estate and pass Muirfield Primary School.

2.4 Description of the Proposed Wind Turbine

A diagram of the principal dimensions of the Enercon E44, which is the most likely turbine for the development, is shown in **Figure 2.6**, and a scaled drawing is included as **APP-002**..

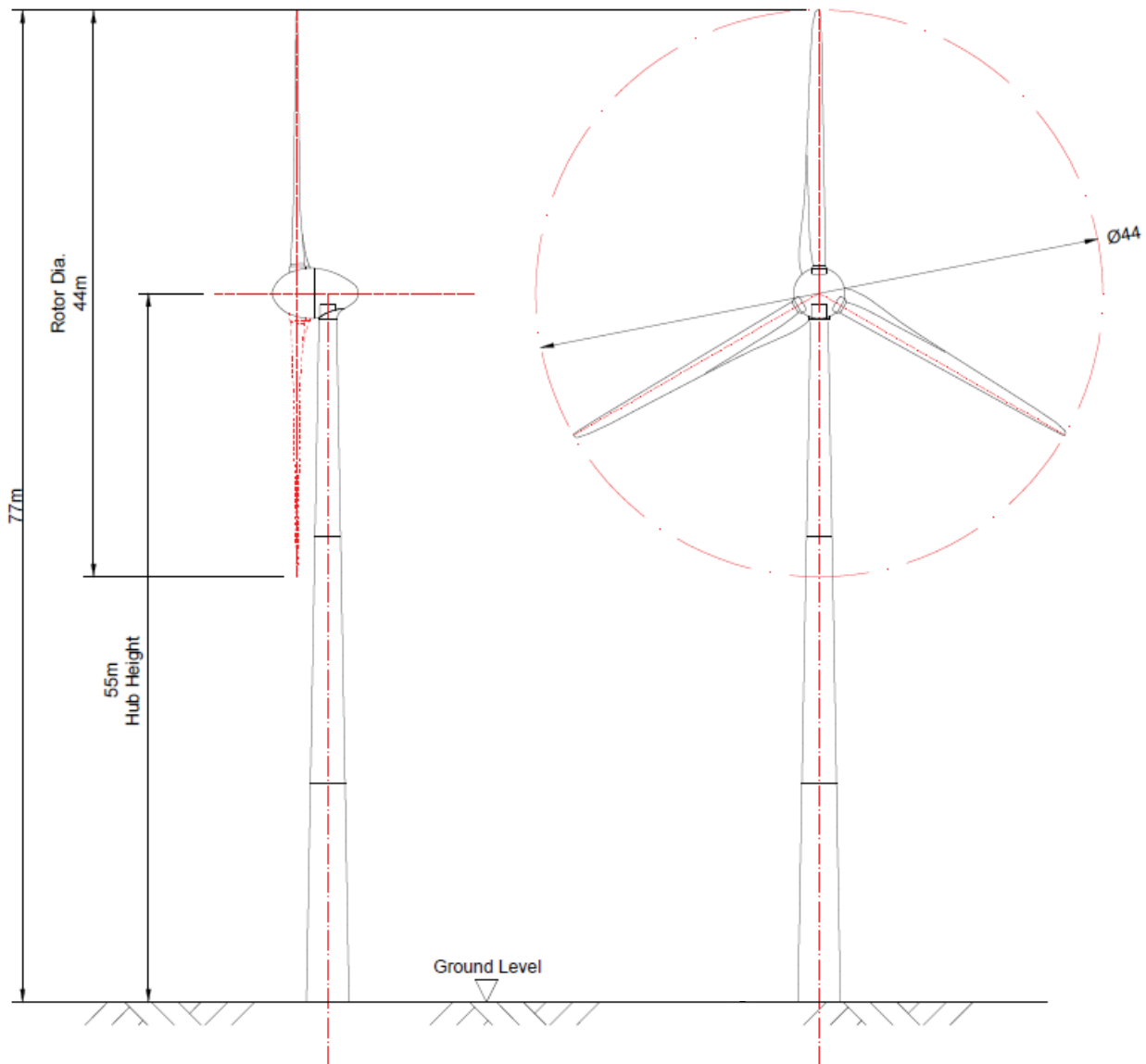


Figure 2.4 - Enercon E44 wind turbine showing principal dimensions

The key dimensions of the Enercon E44 are summarised in **Table 2.2**.

Table 2.2 – Key dimensions of the Enercon E48

Dimension	Length (m)
Hub height	55
Rotor diameter	44
Total height	77

The nacelle housing contains the generator and other operating equipment. The transformer of the candidate machine is contained inside the tower base. It is proposed that the finish of the wind turbine, tower and blades will be semi-matt and will be pale grey in colour.

Unlike some other makes of wind turbines that are programmed to stop when the wind speed exceeds 25m/s ('cut-out' wind speed), Enercon wind turbines are fitted with a storm control feature which enables the turbine to continue to operate in very high wind speeds; this avoids the need for sudden shutdowns and the resulting energy yield losses.

2.5 Associated Infrastructure

Site Tracks and Crane Hardstanding

The proposed access route to the construction area is well surfaced and would be suitable for the turbine construction traffic without the need for reinforcement.

Construction of the small area of access track, turbine head and crane hardstanding to the south-west of the turbine would involve the removal of the vegetation and top soil to a depth of approximately 200 mm. This would be stored adjacent to the tracks for later, partial reinstatement. Where necessary, a geotextile layer would be placed directly onto the exposed subsoil, upon which the crushed rock would be placed.

Appropriate drainage requirements would be incorporated where the site specific conditions make this necessary. If any areas of softer ground are encountered, the depth of crushed rock may need to increase to approximately 700 mm and a layer of geotextile material embedded within the structure would be used.

The crane platform would be of similar construction to the access tracks, designed to withstand the maximum load bearing applied by the crane during the construction process.

Figure 2.7 shows the specification of the required crane hardstanding.

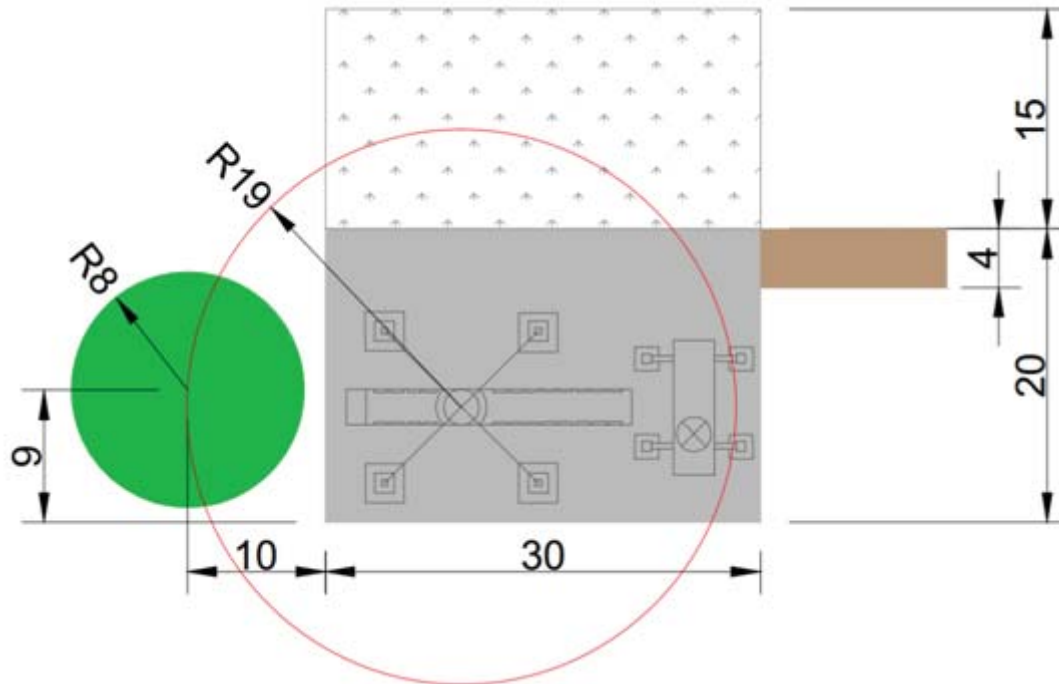


Figure 2.7 – Crane and hardstanding diagram

Any excess earth excavated during the construction phase would be stored behind the foundations. Reinstatement of the track verges and the areas of hardstanding will be undertaken where appropriate. As there would be a continuing need to use the hardstanding and turning head, these would be left in place for the lifetime of the development.

Construction Compound

The local ground works contractor would set up a small compound for site offices, welfare facilities and storage of tools. It is likely that these could be accommodated within the existing Maltings buildings.

Turbine Foundations

The turbine's foundations will be designed as either buoyant or non-buoyant. Buoyant foundations are larger and have been used as a conservative assumption in this assessment, though the need for a buoyant foundation is deemed to be extremely unlikely. **Figure 2.6** shows the typical dimensions of a buoyant turbine foundation. The foundation would have a diameter of up to 16 m, and a depth of approximately 1.7 m. When the foundations are excavated, a further metre around the foundation will be dug to allow access during construction. A thin layer, called a 'blinding layer', will be poured to provide a surface on which the foundation can be constructed. Conservatively, each foundation would comprise:

- 29 tonnes of steel reinforcement bars;
- 181 cubic metres of concrete; and
- 23 tonnes concrete blinding layer slab.

As can be seen in **Figure 2.8**, the turbine foundations will be covered by topsoil when construction is complete, leaving a plinth of about 5.5m in diameter just above the surface

level, upon which the turbine would be bolted. Much of the excavated material will be used for this back-filling.

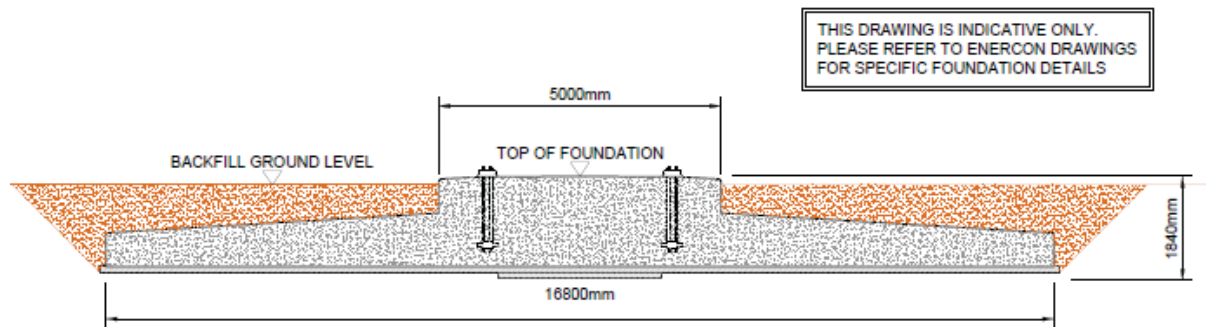


Figure 2.8 – Typical buoyant foundation dimensions for E44 turbine

The Balance of Plant work, inclusive of foundation construction and electrical installation will be undertaken by Kilmac, the project's construction partner, who are a local contractor employing in excess of 100 employees throughout Tayside.

2.6 Grid / Local Electrical Connection

The wind turbine envisaged for use on this site produces electricity at 400 volts. This would be transformed to 11 using a transformer within the turbines. Grid connection has been secured with Scottish and Southern Energy.

From the transformer, underground cable runs will link the turbine to the existing substation within the Malt, the location of which is shown in **APP-001**.

Figure 2.9 shows the proposed scenario at Bairds Malt, where the turbine will supply electricity to the Maltings and export any excess onto the grid. It is anticipated that virtually all of the energy generated by the turbine will be used on-site.

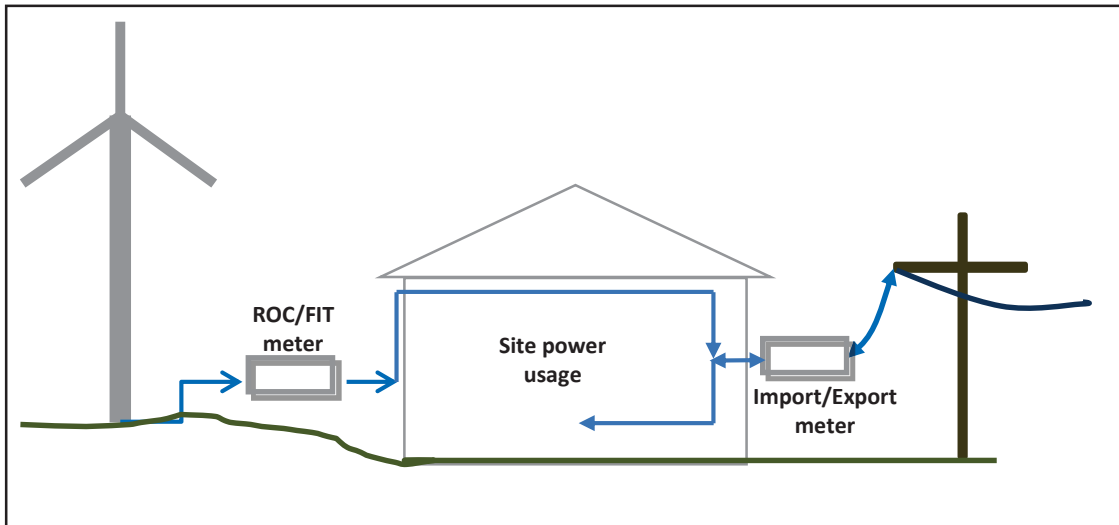


Figure 2.9 - Metering system schematic with on-site power usage

2.7 Access to the Site

It is intended that the turbines would be landed at Montrose and then transported south to the southern outskirts of Arbroath on the A92. Access to the site would be via the A933 and Peasiehill Road. The turbine components and construction traffic would enter the Bairds site via an existing gate to the north-west of Silo 2, and then proceed along the western edge of Silo 2 to reach the construction area.

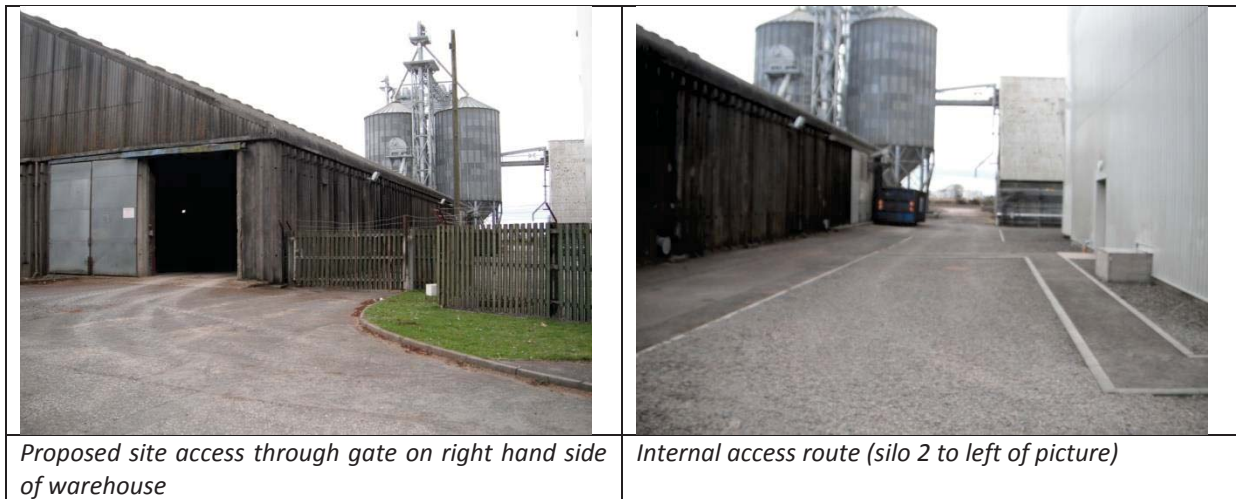


Figure 2.10 – Site access arrangements

2.8 Construction Programme

The construction phase would start after the financial and due diligence process has been completed and would be on-going for approximately 2-3 months, from construction of the crane hardstanding and foundation through to erection and commissioning of the turbine.

2.9 Construction Traffic

There are three distinct phases of the development in traffic terms:

- Construction;
- Operation; and
- Decommissioning.

Construction traffic

The traffic involved throughout the construction phase includes the turbine component delivery vehicles, lorries with aggregates for construction of the small section of new track and crane hardstandings, concrete deliveries for the foundation, reinforcement steel and cabling, as well as personnel commuting. **Table 2.4** gives an estimate of the volume of traffic likely to be involved during the construction phase.

Table 2.4 – Construction Traffic

	Load	Number of deliveries
Aggregate for new and upgraded track and crane hardstanding	~330 m ³	40
Concrete turbine foundations	~210 m ³	26
Reinforcement steel	29 tonnes	2
Cabling	Unknown	One lorry can carry several reels of cable, normally one lorry will provide for the whole project
Personnel	-	6-10 cars/vans a day at peak time
Turbine components	-	5 articulated lorries

Wind turbine components would be delivered to the site on articulated lorries. Extended trailers would be used to deliver the turbine blades which are 22m in length.

The largest type of crane required is a Liebherr LTM 1500-8.1 mobile crane, which is 21.4m long, 3.2m wide and has a 500 tonne lift capacity. The crane has eight axles, all of which have axle loads of 12 tonnes, so the total vehicle weight is 96 tonnes. Aggregate would be sourced from the most convenient local quarry.

Operational traffic

Once erected the wind turbine would operate automatically. Typically, Enercon maintenance teams are scheduled to conduct quarterly checks on the operation of turbines. These are undertaken in light commercial vehicles such as vans, cars or similar vehicles

Decommissioning traffic

The amount of site traffic during decommissioning would be less than that during the construction stage.

2.10 Decommissioning

At the end of the development's operational life, the wind turbines would be decommissioned, the principal elements removed, and the site restored leaving little, if any, visible trace.

The wind turbine would be removed from the site and the foundations, tracks and hardstandings would be covered over with topsoil and reseeded. The cables would be de-energised and left in place, with any cable marker signs removed.

The decommissioning process would take approximately two months to complete. A decommissioning programme would be agreed with the relevant authority prior to the commencement of decommissioning works.

3 Planning and Environmental Policy Context

An application for the development of a wind project should be assessed in the context of national policy and guidance; the local planning authority development plan; and supplementary planning guidance.

3.1 National Planning Policy Guidance

The main driving force that has led to the legally binding UK renewable energy target of 15% is the mandatory EU 2020 Targets: reduction of greenhouse gas emissions by 20% and an increase in the proportion of final energy consumption from renewable sources to 20% by 2020.

The current SPP (2014) has identified targets for delivering renewable sources of electricity and *'supports the transformational change to a low carbon economy, consistent with national objects and targets.'* Within the SPP it indicates that:

- 30% of overall energy demand from renewable sources by 2020;
- 11% of heat demand from renewable sources by 2020; and
- The equivalent of 100% of electricity demand from renewable sources by 2020.

Capitalising on the potential of the renewable energy sector is a major cornerstone of the Scottish Government's principle objective of facilitating sustainable economic growth. This includes the encouragement and support of diversification and the growth of the rural economy. Indicating that it *'promotes economic activity and diversification, where appropriate sustainable development linked to tourism, forestry, farm and croft diversification, aquaculture, nature conservation and renewable energy developments'*.

Scottish Planning Policy (SPP, 2014) is the statement of the Scottish Government's policy on nationally important land use planning matters. It sets out:

- The Scottish Government's view of planning;
- The core principles for the operation of the system;
- Statutory guidance on sustainable development and planning;
- Concise subject planning policies; and
- Expectations of the intended outcomes.

SPP aims to ensure the delivery of national renewable energy targets, and states that *'planning must facilitate the transition to a low carbon economy, and help deliver the aims of the Scottish Government's Report of Proposals and Policies'*.

With regard to promoting rural development it states (paragraph 74) that *'NPF3 sets out a vision for vibrant rural, coastal and island areas, with growing, sustainable communities supported by new opportunities for employment and education.'* It goes on to explain how the planning system should:

- In all rural and island areas promote a pattern of development that is appropriate to the character of the particular rural area and the challenges it faces;
- Encourage rural development that supports prosperous and sustainable communities and businesses whilst protecting and enhancing environmental quality; and
- Support an integrated approach to coastal planning.

With regard to renewable energy and government commitments to reduce CO₂ emissions it states (paragraph 153) that *'Terrestrial and marine planning facilitate development of renewable energy technologies, link generation with consumers and guide new infrastructure to appropriate locations. Efficient supply of low carbon and low cost heat generation of heat and electricity from renewable energy sources are vital to reducing greenhouse gas emissions and can create significant opportunities for communities.'*

In relation to renewable energy applications it states that (paragraph 154) *'The planning system should support the development of a diverse range of electricity generation from renewable energy technologies – including the expansion of renewable energy generation capacity and the development of heat networks.'*

Development plans are required to guide development to appropriate locations and should *'seek to ensure an area's full potential for electricity and heat from renewable sources is achieved, in line with the national climate change targets, giving due regard to relevant environmental, community and cumulative impact considerations.'* (Paragraph 155).

Specifically for wind developments the SPP encourages the use of a spatial framework which *'identifies those areas that are likely to be most appropriate for onshore wind farms as a guide for developers and communities.'* It also provides a spatial framework table outlining appropriate and non-appropriate areas, with three distinct groups:

- Group 1: Areas where wind farms will not be acceptable – National Park and National Scenic Areas;
- Group 2: Areas of significant protection – National and international designations, other nationally important mapped environmental interests and community separation for consideration of visual impact; and
- Group 3: Areas with potential for wind farm development – beyond groups 1 and 2 wind farms are likely to be acceptable, subject to detailed consideration against identified policy criteria.

The SPP states that in relation to the spatial framework *'local development planning authorities, working together where required, should identify where there is strategic capacity for wind farms, and areas with the greatest potential for wind development, considering cross-boundary constraints and opportunities.'*

NPF3 was laid before the Scottish Parliament on 23rd June 2014 and confirms target of at least 30% of overall energy demand from renewables by 2020 including generating the equivalent of at least 100% of gross electricity consumption from renewables, with an interim target of 50% by 2015.

3.2 Local Planning Policy

The key local development documents are:

- TAYplan (Approved 2012):
- Angus Local Plan Review (Adopted 2009)

In addition to the development plan a number of other publications are also particularly relevant to the consideration of the application. These include:

- Tayside Landscape Character Assessment (1998);
- Angus Council Implementation Guide for Renewable Energy Proposals (2012);
- Angus Windfarms Landscape Capacity and Cumulative Impacts Study (Ironsides Farrar, 2008);
- Strategic Landscape Capacity Assessment for Wind Energy in Angus (prepared by Ironsides Farrar for Angus Council and SNH, November 2013)

TAYplan: Scotland's SusTAYnable Region

In June 2012, TAYplan replaced the Dundee and Angus Structure Plan 2002 and became the statutory Strategic Development Plan. The plan embraces sustainability stating in the foreword *'We want to provide future generations with opportunities to improve their lives; what better legacy to leave our children. Therefore the mitigation of and adaptation to climate change, as the single greatest challenge facing humankind, is central to this Plan. We must shift to a low carbon and zero waste economy by using our land and resources more efficiently.'*

This is embodied in the Vision and Objectives which aims to 'support the switch to a low carbon and zero waste economy' and to *'strengthen the economic base to support the renewable energy and local carbon technology sectors'*.

Policy 6: Energy and Waste/Resource Management Infrastructure requires the Local Development Plans to identify areas suitable for different forms of renewable heat and electricity infrastructure with areas of search, allocated sites and decisions on proposals taking into account:

- *'The specific land take requirements associated with the infrastructure technology and associated statutory safety exclusion zones where appropriate;*
- *Proximity of resources (e.g. woodland, wind or waste material); and to users/customers, grid connections and*
- *distribution networks for the heat, power or physical materials and waste products, where appropriate;*
- *Anticipated effects of construction and operation on air quality, emissions, noise, odour, surface and ground water pollution, drainage, waste disposal, radar installations and flight paths, and, of nuisance impacts on off-site properties;*

- Sensitivity of landscapes (informed by landscape character assessments and other work), the water environment, biodiversity, geo-diversity, habitats, tourism, recreational access and listed/scheduled buildings and structures;
- Impacts of associated new grid connections and distribution or access infrastructure;
- Cumulative impacts of the scale and massing of multiple developments, including existing infrastructure;
- Impacts upon neighbouring planning authorities (both within and outwith TAYplan); and,
- Consistency with the National Planning Framework and its Action Programme’.

The Angus Local Plan Review (Adopted 2009)

This is the local element of the statutory Local Development Plan and is therefore the prime policy against which applications are determined.

Table 3.1 presents the main relevant aims and policies set out within the ALPR, and discusses the compliance of the Bairds Malt Scheme with these.

ALPR Aim / Policy	Policy	Comment
Aim 2 , p6	<i>Create the conditions for a vibrant and diverse economy providing increased and varied job opportunities.</i>	The turbine will support an established local business and help to it to consolidate and expand in the European marketplace.
Aim 3 , p6	<i>Give priority to the reuse of previously developed sites where appropriate.</i>	The turbine makes productive use of a small un-productive area of the current Maltings plant and would appear as part of the existing industrial complex.
Aim 5 , p6	<i>Promote environmentally sustainable use of existing and planned infrastructure and service capacity to support and facilitate development.</i>	
Policy S1: Development Boundaries	<p><i>‘(a) Within development boundaries proposals for new development on sites not allocated on Proposals Maps will generally be supported where they are in accordance with the relevant policies of the Local Plan.</i></p> <p><i>(c) Development proposals on sites contiguous with a development boundary will only be acceptable where there is a proven public interest and social, economic or environmental considerations confirm there is an overriding need for the development which cannot be met within the development boundary.’</i></p>	The turbine would be located within an area designated as, ‘Employment land’ on the ALPR Arbroath proposals map. The crane hardstanding and turning bell would be located on adjacent the land to the west of the existing Elliot Industrial Estate, as discussed in Policy A11 below.
Policy S3: Design Quality	<p><i>A high quality of design is encouraged in all development proposals. In considering proposals the following factors will be taken into account:</i></p> <ul style="list-style-type: none"> • <i>site location and how the development fits with the local landscape character and pattern of development;</i> 	This aspect of the development has been considered in detail in Sections 5 and 7 of the ER. The wind turbine would sit alongside the existing industrial buildings and infrastructure in the Elliot area, which would minimise its visual impact when compared to a turbine on a greenfield site. The tall structures in the

	<ul style="list-style-type: none"> • <i>proposed site layout and the scale, massing, height, proportions and density of the development including consideration of the relationship with the existing character of the surrounding area and neighbouring buildings;</i> • <i>use of materials, textures and colours that are sensitive to the surrounding area; and the incorporation of key views into and out of the development.</i> 	<p>area, such as the telecommunications mast to the east, and the grain drying chimneys are of a similar scale to the turbine, which when constructed would add another functional element to the Maltings plant.</p>
<p>Policy S4 : Environmental Protection, p12</p>	<p><i>Where development proposals raise issues under environmental protection regimes, developers will require to demonstrate that any environmental protection matter relating to the site or the development has been fully evaluated. This will be considered alongside planning matters to ensure the proposal would not unacceptably affect the amenity of the neighbourhood.</i></p>	<p>The Environmental Impact of the development has been fully considered within the ER, the main aspects of importance being visual impact, and impacts on residential amenity such as noise and shadow flicker. The ER concludes that the primary impacts will be visual impacts on the local area, which should be considered against the wider economic and environmental benefits of the scheme.</p>
<p>Policy SC16 : Employment Land Supply</p>	<p><i>Angus Council will maintain a supply of employment land to which proposals for business and industry will be directed as follows:</i></p> <ul style="list-style-type: none"> • <i>Arbroath, Elliot and Kirkton, (minimum 10 ha);</i> <p><i>At these locations, and other established employment areas, planning permission will not normally be granted for uses other than Class 4* (business), Class 5* (general industry), and Class 6* (storage and distribution), but may be considered where they are small scale, complementary and ancillary to the existing or proposed use. Development proposals will require to demonstrate there is no detriment to the surrounding amenity.</i></p>	<p>Policy SC16 relates to the existing Elliot Industrial Estate. The turbine would be ancillary and complementary to the existing Class 5 industry at Bairds Malt.</p>
<p>Policy SC36 : Access Rights,</p>	<p><i>Development proposals, which will result in a significant loss to the public of linear access, area access or access to inland water will be resisted.</i></p>	<p>The development requires a small diversion to Core Path 152, to ensure that the path does not pass within 80m ('toppling distance') of the wind turbine. No linear access will be lost as a result of the project.</p>
<p>Policy ER5 : Conservation of Landscape Character</p>	<p><i>Development proposals should take account of the guidance provided by the Tayside Landscape Character Assessment and where appropriate will be considered against the following criteria:</i></p> <p><i>(a) sites selected should be capable of</i></p>	<p>A full Landscape Character Assessment (including a Townscape Assessment) has been provided in Section 7 of the ER. This concludes that overall there will be a low level of impact on landscape, with the turbine being incorporated into an area</p>

	<p><i>absorbing the proposed development to ensure that it fits into the landscape;</i></p> <p><i>(b) where required, landscape mitigation measures should be in character with, or enhance, the existing landscape setting;</i></p> <p><i>(c) new buildings/structures should respect the pattern, scale, siting, form, design, colour and density of existing development;</i></p> <p><i>(d) priority should be given to locating new development in towns, villages or building groups in preference to isolated development.</i></p>	<p>already defined by industrial structures.</p>
<p>Policy ER33 : Energy Efficiency</p>	<p><i>Angus Council will encourage energy efficiency through the promotion of:</i></p> <ul style="list-style-type: none"> • <i>renewable energy generation and energy efficient systems in domestic and commercial buildings where appropriate, which reduce demand for power from non-renewable sources.</i> 	<p>The wind turbine will supply around 20% of the Malting's annual energy demand, significantly reducing the need to import electricity from the grid.</p>
<p>Policy ER34 : Renewable Energy Developments</p>	<p><i>Proposals for all forms of renewable energy development will be supported in principle and will be assessed against the following criteria:</i></p> <p><i>(a) the siting and appearance of apparatus have been chosen to minimise the impact on amenity, while respecting operational efficiency;</i></p> <p><i>(b) there will be no unacceptable adverse landscape and visual impacts having regard to landscape character, setting within the immediate and wider landscape, and sensitive viewpoints;</i></p> <p><i>(c) the development will have no unacceptable detrimental effect on any sites designated for natural heritage, scientific, historic or archaeological reasons;</i></p> <p><i>(d) no unacceptable environmental effects of transmission lines, within and beyond the site; and</i></p> <p><i>(e) access for construction and maintenance traffic can be achieved without compromising road safety or causing unacceptable permanent and significant change to the environment and landscape.'</i></p>	<p>All of the elements set out in Policy ER34 have been assessed within the ER. The main impacts found relate to visual affects at the nearest properties and residential areas. These visual impacts are balanced by the environmental, social and economic benefits of the scheme.</p> <p>No significant impacts are predicted in terms of:</p> <ul style="list-style-type: none"> • Landscape character; • Cultural Heritage • Natural Heritage • Transmission lines • Traffic / Access
<p>Policy ER35 : Wind Energy Development</p>	<p><i>Wind energy developments must meet the requirements of Policy ER34 and also demonstrate:</i></p> <p><i>(a) the reasons for site selection;</i></p> <p><i>(b) that no wind turbines will cause unacceptable interference to birds, especially those that have statutory protection and are susceptible to</i></p>	<p>a) Section 5 of the ER sets out the design process that determined the turbine location and scale. This demonstrates that the chosen location and turbine type are the optimum on the Bairds Malt site.</p> <p>b) Section 6 of the ER demonstrates that there will be no unacceptable impact on birds.</p>

	<p><i>disturbance, displacement or collision;</i> <i>(c) there is no unacceptable detrimental effect on residential amenity, existing land uses or road safety by reason of shadow flicker, noise or reflected light;</i> <i>(d) that no wind turbines will interfere with authorised aircraft activity;</i> <i>(e) that no electromagnetic disturbance is likely to be caused by the proposal to any existing transmitting or receiving system, or (where such disturbances may be caused) that measures will be taken to minimise or remedy any such interference;</i> <i>(f) that the proposal must be capable of co-existing with other existing or permitted wind energy developments in terms of cumulative impact particularly on visual amenity and landscape, including impacts from development in neighbouring local authority areas;</i> <i>(g) a realistic means of achieving the removal of any apparatus when redundant and the restoration of the site are proposed.</i></p>	<p>c) Section 7 of the ER contains a detailed residential and townscape assessment. This predicts Major or Major / Moderate effects at seven receptors within 1km. The noise and shadow flicker assessments in Section 8 and 12 show that no significant impacts on residential properties are expected.</p> <p>d) The turbine is expected to be visible to the radar at RAF Leuchars. It is the intention of the applicant to seek to agree a planning condition with the MoD on the basis that an in-fill radar solution is provided as part of the development.</p> <p>e) All of the companies with communication links in the area have been contacted, and all are content that the development will not interfere with these assets.</p> <p>f) Cumulative impact is not assessed as being a major issue for the Bairds Malt turbine, as there are few projects which can interact with the proposed development.</p> <p>g) The turbine would be removed from site after the agreed period of operation. A suitable legal agreement confirming this arrangement will be reached with Angus Council should this be required.</p>
A11 : Working - West of Elliot Industrial Estate	<p><i>21 ha of land to the west of the existing Elliot Industrial Estate is allocated for Class 4* (business), Class 5* (general industry), and Class 6* (storage and distribution) uses. Development proposals which would prejudice the expansion of employment land to the west of the existing Elliot Industrial Estate will not accord with this Local Plan.</i> <i>*As defined in the Town and Country Planning (Use Classes) (Scotland) Order 1997.</i></p>	<p>Discussions have taken place with Angus Council's Economic Development team. The proposed turbine does not preclude the expansion of the Elliot Industrial Estate on land to the west.</p>
A19 : Hospitalfield House	<p><i>Hospitalfield House and grounds will be protected from development that would be detrimental to the historic character and landscape setting of the property.</i></p>	<p>As discussed with Historic Scotland, a full assessment has been made of the impact of the development on Hospitalfield House. This concludes that there would be no significant effects on the historic character or landscape setting of the property.</p>

The Local Plan contains a specific section on Arbroath, aiming to “*maintain the focus on the regeneration of brownfield and opportunity sites within the built up area... this includes identifying and safeguarding future employment land at Elliot*” (p8).

The Plan also states that, “Diversification of the economy and regeneration of the town

continues to be a priority. While inward investment has introduced new businesses, Arbroath's traditional manufacturing sector has continued to contract". (p110)

The plan elaborates on Policy A11 (the proposed extension to the Elliot Industrial Estate), stating that, *"An area west of the existing industrial estate at Elliot provides the opportunity to take advantage of the upgrading of the A92 road and to extend the range and quantity of the long-term employment land supply in Arbroath. Development proposals which would prejudice the expansion of employment land to the west of the existing Elliot Industrial Estate will not accord with this Local Plan. Brownfield sites within Arbroath that are well related to the town centre and transport links provide the potential for reuse for more specialised needs such as office or business use"*.

The Local Plan will resist development proposals that would prejudice the future expansion of the Elliot Industrial Estate to the west, to ensure this site can be developed as the need arises (p38).

Tayside Landscape Character Assessment (TLCA)

The TLCA, published in 1999, identifies that the application site falls on the edge of the urban area of Arbroath, which is not considered in detail within the TLCA.

It is adjacent to the **Dipslope Farmland Landscape Character Type (LCT)**, which extends over a large area from the Montrose Basin south-westwards as far as the countryside north of Dundee adjoining the Sidlaw Hills. Its key characteristics are its general slope from north-west to south-east; the dominance of productive agricultural land; low woodland cover, except on large estates and along river corridors; a variety of historic sites; and the limited visual impact of Dundee and Arbroath. The landscape is described as being of medium scale, semi-enclosed to open, with extensive arable production on very fertile land, medium to large fields and a scattered settlement pattern of hamlets and farmsteads.

Angus Windfarms Landscape Capacity and Cumulative Impacts Study (AWLCCIS)

The Study, published in September 2008, provides further information on the characteristics and capacity of the Dipslope Farmland LCT.

The Study suggests that *"the area is considered to have a medium landscape value. Together with a medium sensitivity this gives an **overall medium capacity for windfarm development**. Large or medium windfarms would not be appropriate in this area due to scale and visual sensitivity limitations. Any proposed development should be of limited scale and extent, reflecting the scale and pattern of the local landscape and would be limited by proximity of the settlements and scattered residential population"*.

The study defines a small/medium windfarm as *"A windfarm of more than three turbines up to 20MW output, the examples given being four turbines of over 50m, ten turbines of 2MW power or six turbines of 3MW power"*.

2MW turbines are typically 100m in height, and 3MW turbines around 125m in height. Set against these criteria, the proposed Bairds Malt development, with a single turbine of 77m

in height, would not be considered a large enough development to be a small/medium scale windfarm, and would fall below this threshold.

Angus Council Renewable Energy Implementation Guide

The Guide, which was approved on 14 June 2012, seeks to clarify existing development plan policy and to assist in considering proposals against those policies. The Guide describes the existing character of the Dipslope Farmland as a '*Landscape with Views of Windfarms*', and states that the Acceptable Character in a future scenario would be for a '*Landscape with Occasional Windfarms*', described as:

- *A landscape type or area in which windfarms or wind turbines are located or are very close to and visible. However they are not of such a size, number, extent or contrast in character that they become one of the defining characteristics of the landscape's character; and*
- *Visual receptors would experience occasional close-quarters views of a windfarm or turbines and more frequent background views of windfarms or turbines. Some turbines may or may not be perceived as being located in the landscape character area. No overall perception of windfarms being a defining feature of the landscape.*

The guide states that the LCT is 'Considered to have scope for turbines circa 80m in height'.

Strategic Landscape Capacity Assessment of Wind Energy in Angus (November 2013)

The most recent guidance on landscape capacity is provided by the '*Strategic Landscape Capacity Assessment (SLCA) for Wind Energy in Angus November 2013*'. This provides specific guidance on each Landscape Character Type within the Local Authority Area, and assesses the acceptable future level of change within each area. The Bairds Malt site is fully situated within the Urban area of Arbroath, however, it neighbours the 'Letham, Lunan Water and Arbroath Valleys' sub-section of the 'Dipslope Farmland' character type which is described as:

"Letham, Lunan Water and Arbroath Valleys: This sub-area surrounds watercourses that drain to the sea at Lunan Bay and Arbroath. It is generally lower and/or less open and exposed than neighbouring sub areas and has more settlement, including the significant settlements of Arbroath, Letham and Friockheim as well as smaller hamlets, isolated farms and houses. A golf/housing resort is identified in the local plan at Letham Grange near Arbroath. The land is intensively farmed, including area of polytunnels. There are significant areas of mature trees: within designed landscapes such as Guthrie and Pitmuies, along watercourses and around settlements. Roads follow the valley landforms. An electricity transmission line lies near Arbroath. Due to its more enclosed and settled character, the sub-area would be more sensitive to wind energy developments"

The SLCA states that this landscape character area would be suitable for development of small numbers of turbines up to 50m in height. The guide states that there is no capacity for larger development within this landscape character area.

The SLCA does not provide any guidance for development within the urban areas or the urban fringes around the local settlements. The proposed location for this development is within the industrialised area to the south-west of the settlement of Arbroath. The character of this area is considered in detail within **Section 7** of the Environmental Report, and a full townscape assessment has been undertaken. The area immediately around the site is characterised by the industrial estate, with the turbine location adjacent to a number of large scale industrial units and warehouses which comprise the Maltings workings and the wider industrial estate. The landcover is predominantly concrete and the existing buildings are a variety of style and finishes, primarily clad in concrete or metal which adds to the industrial feel of the area.

The townscape assessment considers the impact of the turbine on this immediate area, as well as on the other townscapes within Arbroath.

3.3 Conclusion

The proposed wind turbine is an important element in consolidating and strengthening one of the largest manufacturing businesses and employers within Arbroath, that operates in a sector which the Local Plan notes has seen contraction in recent years. The turbine makes productive use of the available land on the existing Bairds Malt site, and although occupying a small area of the land earmarked for westward expansion of the Elliot Industrial Estate, will not greatly affect its potential for future development.

The turbine would be viewed within the current industrial setting of the area, appearing alongside tall vertical elements such as the grain drying towers and large structures of the Maltings Plant. The main impacts upon local amenity will be visual impacts upon the nearest residential receptors, which currently have views of the Maltings site.

The turbine would contribute a small amount to renewable energy targets, but more significantly would supply around 20% of the high electricity demand for the Maltings Plant. This is firmly in line with the Scottish Government's aspirations concerning local renewable energy ownership and use, with the turbine directly supplying electricity to a company with strong local connections and suppliers throughout the region.

The proposed development at Bairds Malt is therefore deemed to comply with national, regional and local policies relating to wind energy. The remainder of this report assesses the proposed development in more detail, looking at the site specific aspects of the proposal.

3.4 References

Angus Council (2012), *Renewable Energy Implementation Guide*, Angus Council.
Historic Scotland (2009), *Scottish Historic Environmental Policy*, Historic Scotland, Edinburgh.
Historic Scotland (2010), *Managing Change in the Historic Environment*, Historic Scotland, Edinburgh.

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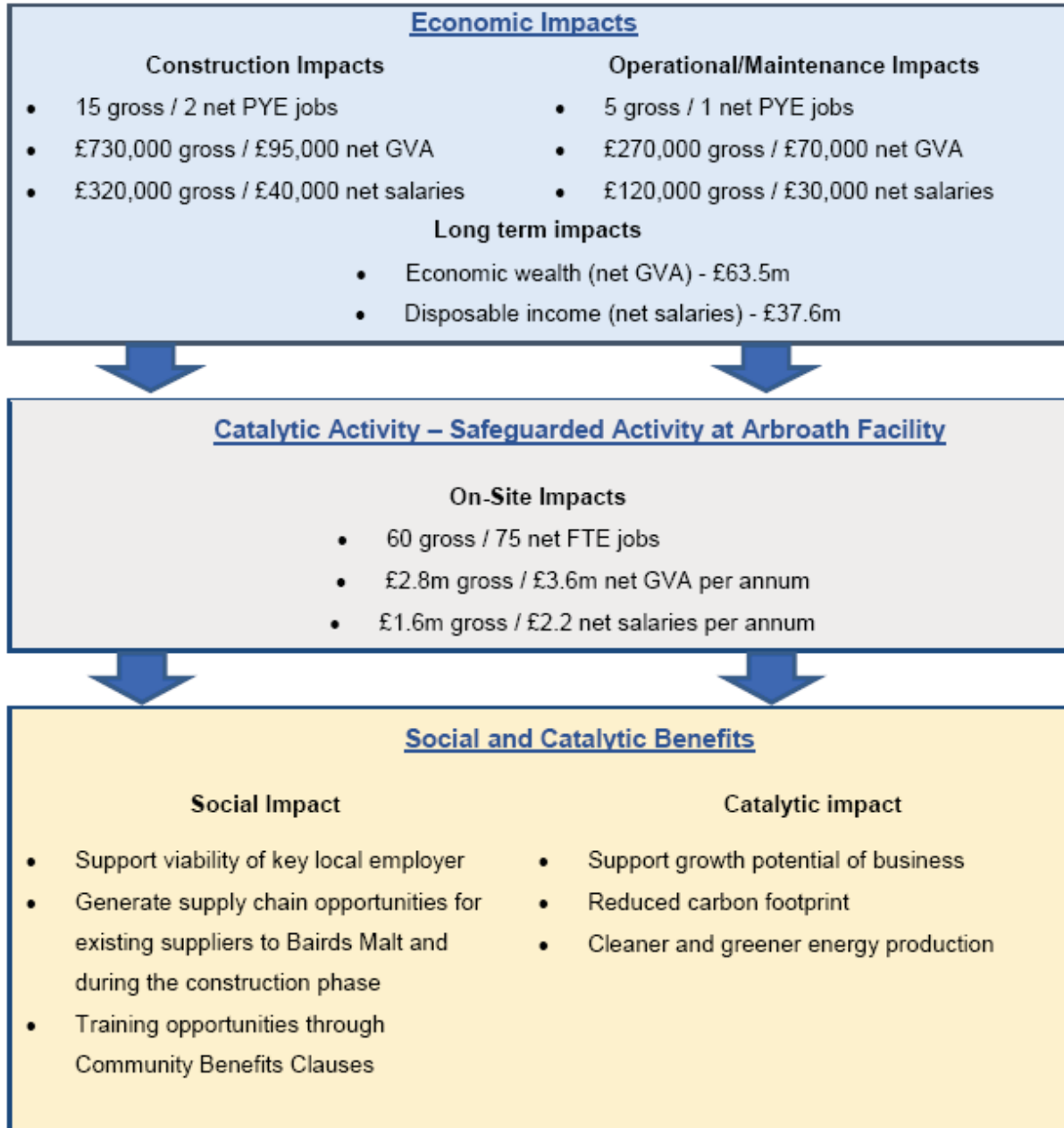
Scottish Government (2011), *Circular 3/2011 – The Town and Country Planning (Environmental Impact Assessment) (Scotland) Regulations 2011*, Scottish Government.

Scottish Government (2012), *Online Wind Turbines*
<http://www.scotland.gov.uk/Topics/Built-Environment/planning/National-Planning-Policy/themes/renewables/Onshore> (accessed April 2012).

Scottish Government (2012), *Process for preparing spatial frameworks for wind farms*
<http://www.scotland.gov.uk/Topics/Built-Environment/planning/National-Planning-Policy/themes/renewables/spatialframework> (accessed April 2012).

4 Local Economic Benefits

A detailed Socio-Economic Assessment has been completed that quantifies the expected benefits of the scheme. This is included as **Appendix 6**. A summary of the impacts and benefits is provided below.



5 Project Design Considerations

5.1 Turbine Type

The first consideration was to identify the size of the turbine that would be suitable for the site. The overall aim was to install a turbine that could supply a significant portion of the Malt's electricity demand whilst meeting technical and environmental constraints. A larger turbine would have a higher electrical output, but would also have a higher visual impact and would require more space on site.

The annual electricity demand of the Maltings is 10GWh per year, which is more than the equivalent annual output of a 3MW turbine, which would be in the region of 126m in height and with an 82m rotor diameter, similar in scale to those in operation at the Michelin Plant in Dundee which are 120m to tip height. No single turbine would therefore be able to satisfy all of the current electrical demand for the Maltings, so the aim was supply as high a proportion as possible.

The smallest turbine possible on the site is dictated by the vertical constraints of the site. Sufficient clearance needs to be allowed between the lowest height of the blade sweep and the buildings throughout the site, the tallest of which are the grain drying towers which are 27m in height.

Table 5.1 shows the different turbine options that were considered on site.

Table 5.1 – Turbine options

Turbine model	Hub Height	Rotor Diameter	Tip Height	Blade sweep minimum height	Rated capacity	% of annual Maltings demand ¹
E82	85m	82m	126m	44m	3MW	76%
E70	65m	70m	100m	30m	2.3MW	58%
E53	60m	53m	87m	33.5m	800kW	20%
E44	55m	44m	77m	33m	900kW	23%

The decision was made to proceed with the **Enercon E44**, which has the lowest tip height of all of the turbines that were considered. This was assessed as providing the best balance between energy production and visual impact, whilst also satisfying the necessary clearance height from the Maltings buildings. Another aspect of the E44 is that it has the smallest rotor diameter of the turbines considered which would further reduce its visual impact. An added advantage of Enercon turbines is that the generators are directly driven, without the need for a separate gearbox. This makes them amongst the quietest turbines in their respective classes.

Figure 5.1 demonstrates that the proposed Bairds turbine is much smaller than those in operation at the Michelin Plant in Dundee and those previously proposed at GSK in

¹ Based upon the UK onshore wind average capacity factor of 28.9%. Digest of UK Energy Statistics 2013 (DUKES) Table 6.5 - Load factors for renewable electricity generation, November 2013

Montrose. The E44's smaller rotor diameter means that it occupies a smaller portion of the horizontal extent of views.

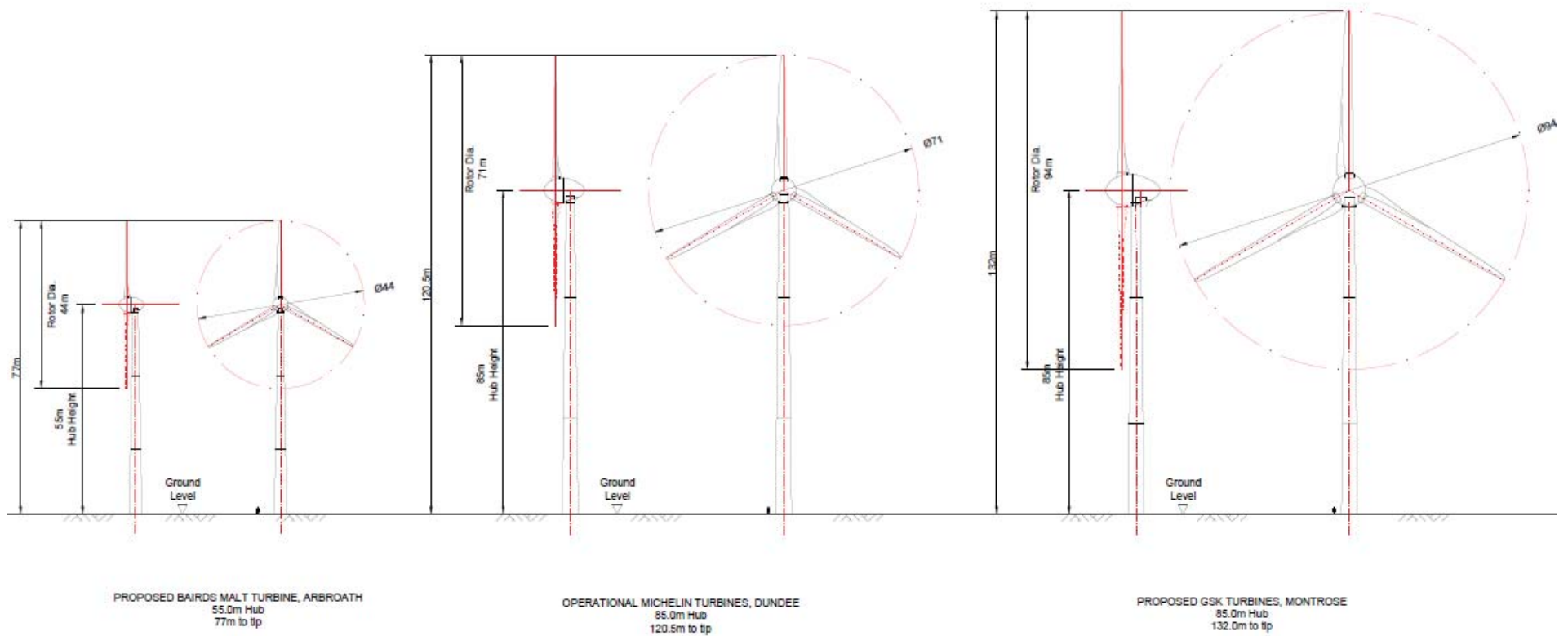


Figure 5.1– Comparison between the proposed Bairds Malt turbine, the Michelin Dundee turbines and the proposed GSK turbines at Montrose

5.2 Turbine Location

Having identified the preferred turbine, the next step was to identify the best location on the site. The key considerations when locating the turbine were to:

- Ensure that sufficient space was available for the turbine, access track and crane pad;
- Ensure that the current operation of the Malt could continue with as little disruption as possible during construction and operation of the turbine;
- Ensure that the construction area could be accessed by the Turbine Delivery Vehicles and Crane;
- Ensure that the 22m turbine blades would not overhang any 3rd party land; and
- Maximise as far as possible the distances from residential receptors such as those located in the residential area containing Patrick Allen-Fraser Street, and stand-alone properties such as Peasiehill Farm Cottages;

When assessing the options a turbine located in the south-eastern corner of the site seemed the obvious choice. This location is the furthest possible distance from residential receptors to the north, and was in an area that was clear of any existing site infrastructure. A turbine located here would also not interfere with the Malt's operations.

It was identified at an early stage that the crane pad and the termination of the access track / turning bell could not be accommodated in the space available, and a third-party land agreement would need to be secured to allow these to be located in fields to the south-west of the turbine. It was also identified that Core Path 152 that runs alongside the Malt's boundary between the West Sands and Peasiehill would need to be diverted to skirt the proposed project infrastructure.

Agreement was reached with the third-party landowner, and a separation distance of 77m between the turbine location and diverted Core Path has been incorporated into the final design. **APP-001** presents the final project layout.

Access

Access to this area of the site is straight forward. The turbine components and construction traffic would enter the Bairds site via an existing gate to the north-west of Silo 2, and then proceed along the western edge of Silo 2 to reach the construction area.

Malt Operations

The proposed turbine and infrastructure would have a minimal impact on existing Malt operations. The existing arrival and exit routes used by lorries to unload grain can continue to be used, although there will be some temporary disruption during the construction phase.

5.3 Main Environmental Considerations

Ecology

As a working industrial complex with no running water on site, the potential impacts on wildlife are extremely limited, and no protected species or habitats are expected to be affected by the development. A discussion of the predicted ecological impacts of the development is presented in **Section 6**.

Landscape and Visual Impact

The final turbine location maximises the available distance between residential areas and the nearest individual properties. The visual impact of the turbine is nevertheless an important consideration in the planning process. A detailed Landscape and Visual Impact Assessment (LVIA) is presented in **Section 7**.

Noise

A full picture of existing background noise levels and predicted turbine noise levels has been built up at different times throughout the day and night. In consultation with Angus Council, noise constraints, in line with the ETSU-R97 Guidelines, have been established for the nearest noise sensitive receptors to the proposed turbine. The proposed turbine has been designed to meet these constraints and on this basis, noise from the turbine is not expected to have an unacceptable or adverse impact on any nearby properties. This noise assessment is presented in full in **Section 8**.

Shadow Flicker

A full assessment of the potential for shadow flicker from the proposed turbine at residential, commercial and industrial receptors is presented in **Section 11**. The results show that there is not expected to be an un-acceptable impact at nearby residential and commercial properties.

6 Ecology and Ornithology

6.1 Introduction

GLM Ecology, an established consultancy with extensive experience of ecological work at wind farm sites, was commissioned to carry out a Protected Species Survey of the Bairds Malt site. The aim was to highlight potential ecological constraints and to provide an assessment of the potential for impacts on protected species and habitats.

This section summarises the findings of this assessment. The full Protected Species Report is included as **Appendix 1**. Its confidential nature means that it is not publicly available.

6.2 Methodology

The assessment consisted of a desktop data study combined with an initial site visit. The desktop study utilised the following resources to identify the presence of any protected species present within the 10km grid square encompassing the survey site:

- NBN Gateway;
- RSPB sensitivity maps;
- Scottish Natural Heritage (SNH) Sitelink;
- Scottish Raptor Group; and
- Multi Agency Geographic Information for the Countryside (MAGIC).

To support the desktop study a field survey was carried out in May 2012 in good weather conditions.

6.3 Results

The following ecological sites of interest were identified in the area around the Bairds Malt site.

Table 6.1 – Ecological sites within a 20km radius

Ecological feature	Zone of impact from site boundary	Sites
Internationally designated sites (SPA, SAC, Ramsar)	Within 20km	Montrose SPA – designated for non-breeding assemblage of waterfowl and pink-footed goose. Firth of Tay and Eden Estuary SPA - designated for non-breeding assemblage of waterfowl and pink-footed goose.
■ Nationally designated sites (SSSI, NNR)	Within 5km	Elliot Links SSSI– Designated for sand dunes.
■ Locally designated sites (LNR, WS)	Within 1km	None

Ornithology

The desktop study and the site visit concluded that given the small size of the site, its industrial habitat, and the lack of suitable breeding and foraging habitat for birds the proposed development would have a negligible significance of impact on any breeding, migratory or over wintering species.

Habitats and Mammals

As an industrial site with no running water, no suitable habitat exists on site for any protected flora, mammals, amphibians or reptiles, with the exception of bats.

Bats

The site visit identified that the Bairds buildings could be potentially suitable for bat roosts, and so an initial bat survey was recommended to identify whether bats were present on site.

This survey was undertaken in May 2012 in accordance with guidance from the Bat Conservation Trust and Natural England. This comprised of two elements:

1. A Habitat Survey to identify potential flight lines/commuting routes, roosts and foraging areas and the overall suitability of the site for bats. Any potential foraging areas were examined and linear features were assessed for their suitability as flight lines or commuting pathways.
2. Bat detector surveys in which dusk and dawn transect surveys were undertaken. A SM2 static bat recorder was also positioned for five nights adjacent to the turbine location.

No bats were recorded on either the bat detector survey or on the static bat recorder.

6.4 Summary and Conclusion

Survey work was completed across the site and the immediately surrounding area, following best practice and industry guidance to identify the species and habitats present.

No suitable breeding or foraging habitat exists for badger, otter, water vole or protected bird species. Bat surveys were carried out following BCT guidelines and no bats were recorded.

It is considered unlikely that the development will have any long-term impact on the integrity of the area's ornithological features or the conservation status of the species found here.

It is also considered that the integrity of qualifying species and habitats for the identified designated sites (Montrose and Firth of Tay SPAs and Elliot Links SSSI) would not be impacted upon.

7 Landscape and Visual Impact

7.1 Introduction

This section reports on the potential landscape and visual effects of the proposed Bairds Malt Wind Turbine.

The aim of the design and assessment process is to promote the best “environmental fit” for the development through consideration of the existing landscape resource, the potential landscape and visual effects and design alternatives. This assessment process will refer to landscape value, and in particular landscape designations and related planning policy, as well as landscape character and the capacity for wind turbine development at this site. Included as part of this chapter are accompanying figures, illustrating potential visibility and, photomontaged examples from a range of receptors, descriptions of which can be found in **Bairds Malt Wind Turbine Landscape Figures** which accompany the Environmental Report.

Summary of Scope

The scope of the assessment, as shown in **Table 7.1**, has been established on the basis of professional judgement and through the consultation process. A meeting was held with Angus Council on the 13th December 2012 to agree the scope of the Landscape & Visual Assessment.

Table 7.1 - Scope of the Landscape and Visual Assessment

Landscape Issues	Description
Landscape Character	The effects of the proposed development on the landscape character and quality of the site area, as defined by the <i>Tayside Landscape Character Assessment</i> and site survey.
Landscape Elements	Direct or physical effects on landscape elements.
Landscape Designations	Views from Areas of Great Landscape Value, National Scenic Areas and Gardens and Designed Landscapes as well as views from other areas of landscape character as perceived by people
Visual Issues	Description
Local Community	Views from local communities, particularly from residential properties near the site and from local settlements which lie within the ZTV. Views from roads and popular tourist / walker destinations and hilltops will also be taken into consideration.
Tourist Destinations	Views from popular outdoor tourist destinations which entail an appreciation of the landscape, where the setting of landscape features provide the visitor experience.
Major Transport Routes	Transport routes including the A92 and the minor road between Arbroath and Forfar.
Cumulative Issues	Description
Cumulative Assessment	The cumulative assessment includes viewpoint assessment within the Study Area where simultaneous and/or successive views of more than one wind energy development may be achieved, and sequential cumulative assessment, where more than one wind energy development may be viewed along transport routes (simultaneous or successive).

7.2 Guidance

The methodology for the landscape and visual impact assessment (LVIA) and the cumulative landscape and visual assessment (CLVIA) has been undertaken in accordance with the methodology set out below and conforms with *The Guidelines for Landscape and Visual Impact Assessment*, Second Edition (Landscape Institute and IEMA, 2002).

Additional guidance has been taken from the following publications:

- *The Tayside Landscape Character Assessment*, Land Use Consultants, 1999;
- *Fife Landscape Character Assessment*, David Tyldesley and Associates, 1999;
- *South and Central Aberdeenshire Landscape Character Assessment*, Environmental Resources Management, 1998;
- *Implementation Guide for Renewable Energy Proposals*, Angus Council, June 2012;
- *Siting and Designing Windfarms in the Landscape*, Scottish Natural Heritage, Version 1, December 2009;
- *Visual Representation of Windfarms Good Practice Guidance*, prepared by Horner + Maclennan and Envision for Scottish Natural Heritage, The Scottish Renewables Forum and the Scottish Society of Directors of Planning, March 2007
- *Landscape Character Assessment: Guidance for England and Scotland* (Countryside Agency and Scottish Natural Heritage publication, produced by the University of Sheffield and Landuse Consultants), 2002;
- *Guidance: Cumulative Impacts of Onshore Wind Developments*, Scottish Natural Heritage Advisory Service, Version 3, March 2012;
- *Landscape Character Assessment Topic Paper 6 - Techniques and Criteria for Judging Capacity and Sensitivity*, Countryside Agency and Scottish Natural Heritage, 2004;
- *Photography and Photomontage in Landscape and Visual Assessment*, Landscape Institute Advice Note 01/2011, 2011.

7.3 Assessment Methodology

Defining the Study Area

An overall Study Area of 35km radius from the site centre has been established following consultation with Angus Council. This is as specified in the Council's Implementation Guide. The study area was further defined for each part of the assessment process as follows:

Landscape and Visual Impact Assessment (LVIA) – the study area was restricted to the application site, access routes, and the potential Zone of Theoretical Visibility (ZTV) from where there may be a view of the development at up to 35km distance from the site centre. The main focus of the assessment has been the area within 10km as this would be the distance within which effects of the proposed development are most likely to be experienced. This has been informed with reference to the findings of field surveys and viewpoint analysis, as well as from professional experience from previous assessments.

Cumulative Landscape and Visual Impact Assessment (CLVIA) - considers existing wind energy development proposals that have permissions, and those that are currently the subject of undetermined applications within a search area of 60km radius of the site centre. An initial assessment of the cumulative visibility of these wind farms within the Cumulative Search Area was then undertaken in order to determine which have the potential to contribute to a significant cumulative effect following addition of the Bairds Malt Wind Turbine. Many of these developments were scoped out of the assessment at this stage due to the lack of combined visibility or long distance from the proposed site such that they would not contribute to significant cumulative effects. The detailed assessment, therefore, focuses on those sites with potential for significant cumulative effects in combination with the Bairds Malt Wind Turbine. These wind farms are considered to be those within a 10-15km radius from the site, as presented in **Figures 7.6a, b and c**.

A Zone of Theoretical Visibility (ZTV) was created using the ReSoft © WindFarm computer software to identify areas that have potential visibility of any part of the proposed wind turbine's blade tip and hub-height. The ZTV however, does not take account of built development and vegetation, which can significantly reduce the area and extent of actual visibility in the field and as such provides the limits of the visual assessment study area. This is particularly relevant to visibility within the Arbroath urban area.

Figure 7.4 illustrates the ZTV to a hub height of 55m at 1:250,000 scale. **Figure 7.5** illustrates the ZTV to a tip height of 77m at this scale. **Figure 7.6** illustrates the ZTV segments to blade tip at a more detailed scale.

Baseline Landscape and Visual Resource

This part of the LVIA refers to the existing landscape character, quality or condition and value of the landscape and landscape elements on the site and within the surrounding area, as well as general trends in landscape change across the study area. A brief description of the existing landscape character and land use of the area which includes reference to settlements, transport routes, vegetation cover, as well as landscape planning designations, local landmarks, and tourist destinations.

Assessing Landscape Effects

Landscape Effects are defined by the Landscape Institute as “*changes to landscape elements, characteristics, character, and qualities of the landscape as a result of development*”. The potential landscape effects, occurring during the construction and operation period, may therefore include, but are not restricted to, the following:

- Changes to landscape elements: the addition of new elements or the removal of trees, vegetation, and buildings and other characteristic elements of the landscape character type;
- Changes to landscape quality: degradation or erosion of landscape elements and patterns, particularly those that form characteristic elements of landscape character types;
- Changes to landscape character: landscape character may be affected through the incremental effect on characteristic elements, landscape patterns and qualities and the cumulative addition of new features, the magnitude of which is sufficient to alter the overall landscape character type of a particular area; and
- Cumulative landscape effects: where more than one wind farm may lead to a potential landscape effect.

The development may have a direct (physical) effect on the landscape as well as an indirect effect or effect perceived from out with the landscape character area. Landscape effects are assessed by considering the sensitivity of the landscape against the degree of change posed by the development. The sensitivity of the landscape to a particular development is based on factors such as its quality and value and is defined as high, medium or low. Examples of landscape sensitivity and criteria are described below:

High Sensitivity – This would primarily be rare landscapes, or landscapes which have been afforded either a national or local designation such as National Parks, National Scenic Areas or Areas of Great Landscape Value. These landscapes can be fairly dramatic in terms of scale and may feature a number of attractive landscape features, including mature woodland, intricate gorges and river valleys, prominent summits or features of cultural heritage. Man-made features or modifications to the landscape will be minimal and the landscape may have a wild or remote feeling to it;

Medium Sensitivity – This would include landscapes which are still relatively attractive and generally rural but do contain some man-made elements. It may be landscapes which have been modified to accommodate farming practices and landscapes which include more prominent settlement pattern and road networks. These landscapes may also contain woodland including plantation forestry and shelterbelts; and

Low Sensitivity – This would only be reserved for landscapes which may be deemed unattractive due to heavy modification and prominent man-made features, such as industrial units.

The magnitude or degree of change considers the scale and extent of the proposed development, which may include the loss or addition of particular features, and changes to landscape quality, and character. Magnitude can be defined as high, medium, low or negligible, examples of magnitude are shown below:

High Magnitude – This would be a major change to baseline conditions, where the character of the landscape may be altered from its existing state into a landscape with wind farms;

Medium Magnitude – This would be a noticeable change in the baseline condition but not necessarily one which would be enough to alter the character of the landscape and will generally diminish with distance;

Low Magnitude – This would be a minor change to the baseline conditions where the development would be readily missed by a casual viewer and any character of the landscape would remain intact; and

Negligible Magnitude – This would be a change which would be difficult to notice and the baseline conditions are likely to remain almost as they were.

The level of effect is determined by the combination of sensitivity and magnitude of change as shown in **Table 7.2**.

Table 7.2 - Magnitude and Sensitivity Matrix for assessing Overall Level of Effect

Sensitivity	Magnitude of Change			
	High	Medium	Low	Negligible
High	Major	Major/Moderate	Moderate	Moderate/Minor
Medium	Major/Moderate	Moderate	Moderate/Minor	Minor
Low	Moderate	Moderate/Minor	Minor	Minor/Negligible

Assessing Visual Effects

Visual effects are recognised by the Landscape Institute as a subset of landscape effects and are concerned wholly with the effect of the development on views, and the general visual amenity. The visual effects are identified for different receptors (people) who will experience the view at their places of residence, during recreational activities, at work, or when travelling through the area. These may include:

- Visual effect: a change to an existing view, views or wider visual amenity as a result of development or the loss of particular landscape elements or features already present in the view; and
- Cumulative visual effects: the cumulative or incremental visibility of similar types of development may combine to have a cumulative visual effect. Either:
 - Simultaneously - where a number of developments may be viewed from a single fixed viewpoint simultaneously within the viewer’s field of view without moving;

- Successively - where a number of developments may be viewed from a single viewpoint successively by turning around at a viewpoint, to view in other directions; and
- Sequentially - where a number of developments may be viewed sequentially or repeatedly from a range of locations when travelling along a route.

The general principles adopted for the assessment of visual effects were taken from *The Guidelines for Landscape and Visual Impact Assessment* Second Edition, produced by the Landscape Institute, 2002. This guidance outlines the approach to define a 'sensitivity' for a given view and a 'magnitude of change' that would be caused by the development in question over its lifetime. A matrix in the Guidance is then used to assess the overall 'level of effect'. This matrix is the same format as used to understand landscape effects and can be seen in **Table 7.2**. Examples of visual sensitivity are highlighted below:

High Sensitivity – These include residential receptors, such as views from individual properties or views from within settlements. Views from both recreational locations, such as hill summits, long distance footpaths, cycle paths and tourist locations such as castles and visitor centres are also considered to be of high sensitivity;

Medium Sensitivity – This would include most other visual receptors such as views from roads, other areas of landscape which would not be classed as recreational areas and views from areas within settlements which would not be considered residential; and

Low Sensitivity – This would cover views experienced by people at work and views where the existing view is already dominated by significant man-made features.

In the context of this project, the effects during operation are always direct and long term (reversible after 25 years). Effects may also be non-cumulative or cumulative. None of the visual effects relating to this project have been considered positive in order to present a worst case view of any effects, although it should be noted that surveys have consistently shown that the majority of people are positively disposed to wind farm development once it is built.

Viewpoint Analysis Method

Viewpoint analysis is used to assist the LVIA from selected viewpoints within the study area. The purpose of this is to assess both the level of visual impact for particular receptors and to help guide the assessment of the overall effect on visual amenity and landscape character. The assessment involves visiting the viewpoint location in good weather and viewing wireframes and photomontages prepared for each viewpoint location. Illustrated turbines always face the viewer to give a worst case impression of the development under consideration. As far as possible the viewpoints have been selected to meet the following criteria:

- A balance of viewpoints to the north, south, east and west;
- A range of near middle and distance views of the development;
- A proportion representing areas known locally where people use the landscape, such as prominent hill tops or footpaths; and
- A proportion representing designated areas.

A wide range of viewpoints have been studied as part of this assessment and 10 viewpoints have been illustrated with photomontages to assist the assessment for the proposed development. **Table 7.3** below provides a summary of the viewpoint locations and rationale for their selection.

Table 7.3 - Summary of locations selected for Viewpoint Assessment

Viewpoint	Reason for Initial Selection	Distance
1. Queens Drive	Located at the side of the A92 to the south-east of the proposed turbine. The view was chosen to represent the waterfront area and road users leaving the settlement of Arbroath	1.4km
2. Elliot Bridge	Located by a small cluster of properties to the south of the proposed turbine. The view was chosen to represent local residents.	700m
3. Arbirlot Road West	The viewpoint is located at the side of the Arbirlot Road West to the north-west of the proposed development. The view was selected to represent local residents of Hospitalfield and local road users.	1km
4. Boulzie Hill	Located near the summit of Boulzie Hill, an area of open space within the settlement of Arbroath, it is popular with local residents and visitors to the town.	2.8km
5. Bearfauld Road	The viewpoint is taken from the side of Bearfauld Road, which forms part of the National Cycle network to the north-east of Arbroath and represents road users, cyclists and local residents	4.2km
6. East Haven	The viewpoint is taken from the side of a local minor road near to East Haven, which forms part of the National Cycle network and represents road users, cyclists and local residents	4.8km
7. A92, Salmonds Muir	The viewpoint is taken from the side of the A92 near Salmonds Muir to the south of Arbroath and represents road users.	4.0km
8. Patrick Allan Fraser Street	The viewpoint is located in the neighbouring housing estate. The viewpoint was selected to represent some of the closest residential receptors of the proposed development	420m
9. Firthfield	The viewpoint is taken from a local road to the north of the proposed development; the viewpoint was chosen to represent road users, primarily local residents of neighbouring farms and steadings	4.1km
10. Braemore	The viewpoint is taken from a local road to the west of the proposed development, the viewpoint was chosen to represent local residents of neighbouring farms and steadings	2.8km
11. A933 Montreathmont	The viewpoint is taken from the A933 to the north of Friockheim. It is representative of road users.	11.5km
12. Dodd Hill	Located at the summit of Dodd Hill on the edge of the Sidlaws. The viewpoint is representative of hill walkers in the area.	16.6km
13. Turin Hill	Located at the summit of Turin Hill. The viewpoint was chosen to represent hill walkers as well as the impact on the hill fort.	17.1km
14. Tentsmuir	Located on the north-eastern coast of Fife. The viewpoint is representative of visitors to the Special Landscape Area, which is popular with walkers, cyclists	19.1km

Viewpoint	Reason for Initial Selection	Distance
	and other users	
15. St Andrews	Located near the coast overlooking the links to the north. The viewpoint was chosen to represent local residents and visitors to St Andrews.	25.5km
16. White Caterthun	Located at the summit of the ancient fort settlement. The viewpoint represents visitors to the white and brown Caterthun forts as well as hill walkers in the area.	26.9km

Methodology for Production of Visualisations

With the view selected, the locations were confirmed and then photographed with a digital Single Lens Reflex (SLR) camera set to produce photographs equivalent to that of a manual 35 mm SLR camera with a fixed 50 mm focal length lens. In accordance with the SNH guidance *Visual Representation of Windfarms Good Practice Guidance*, panoramic images were produced from these photographs to record a 76° angle of view illustrating the typical extent of view that would be experienced by the viewer at the viewpoint when facing in one direction and also provides an indication of the visual context of the proposed development. The wider 360° of each view were also taken into account, particularly for the hill summit viewpoints.

Each view was illustrated using a panoramic photograph, a wireline and, in some cases, a photomontage. Wirelines and photomontages were produced using Resoft© WindFarm software and utilising 50m² Ordnance Survey Digital Terrain Mapping (DTM) height data covering the study area.

The Landscape and Visual Impact Assessment has been undertaken using a candidate turbine, the Enercon E44 with a hub height of 55m and tip height of 77m.

Visual Assessment of Settlements and Residential Properties

All settlements within the study area have been assessed with regards to the level of visual impact the development will have on them. The sensitivity for each of the settlements is considered to be high in accordance with Guidelines for Landscape and Visual Impact Assessment, 2002.

An assessment of the visual amenity of residential properties within 2km of the wind turbine was undertaken, as set out in Angus Council's guidance and agreed at the Scoping stage. Individual residential properties have been assessed from public roads and footpaths within the area and the assessment represents a 'best estimate' of the likely visual effects. In line with the guidance from the Landscape Institute², the views from upper floor windows are considered to be of lesser importance, but the garden and public areas are included as well as the visual context in which views are experienced. In addition to this all settlements within the study area have been assessed and level of effect noted.

² Paragraph 7.30 page 90 in 'Guidelines for Landscape and Visual Impact Assessment. Second Edition.' Landscape Institute and Institute of Environmental Management and Assessment. March 2002.

Visual Assessment of Main Transport Routes

A route assessment has been undertaken which explores the visual impact of the development on views experienced by road users along major transport routes in the area and assumes that the viewer would be travelling at speed.

It also includes assessment of any National Cycle Routes, Long Distance Footpaths and locally valued footpaths which fall within the study area. This part of the assessment has been considered cumulatively along with all other wind energy development within the study area.

Cumulative Landscape and Visual Assessment

In addition to the Landscape Institute methodology for LVIA, the cumulative landscape and visual assessment (CLVIA) has considered the emerging guidance from Scottish Natural Heritage's '*Assessing the Cumulative Impact of Onshore Wind Energy Developments*', Scottish Natural Heritage, March 2012. The CLVIA is however, not a substitute for individual wind development landscape and visual impact assessment.

Predicting Cumulative Landscape Effects

The assessment considers the extent to which the proposed development, in combination with others, may change landscape character through either incremental effect on characteristic elements, landscape patterns and quality, or by the overall cumulative addition of new features. Identified cumulative landscape effects are described in relation to each individual Landscape Character Area and for any designated landscape areas that exist within the study area.

Predicting Cumulative Visual Effects

The assessment of cumulative visual effects involves reference to the cumulative visibility ZTV maps and the cumulative viewpoint analysis. Cumulative visibility maps are analysed to identify the residential and recreational locations and travel routes where cumulative visual effects on receptors (people) may occur as a result of the proposed development.

With potential receptor locations identified, cumulative effects on individual receptor groups are then explored through viewpoint analysis, which involves site visits informed by wireline illustrations that include other wind developments. Travel routes are driven to assess the visibility of different wind developments and inform the assessment of sequential cumulative effects that may occur along a route or journey.

Cumulative Viewpoint Analysis

Each viewpoint has been assessed cumulatively in order to understand whether or not the proposed development introduces a cumulative impact on the view from that location. All visible operational, consented and undetermined planning application wind energy projects are considered along with the Bairds Malt Wind Turbine development and a level of cumulative magnitude is assigned. The level and significance of cumulative visual effects is determined in the same manner as the main LVIA, using the previous matrix shown in **Table 7.2**.

7.4 Landscape Design Considerations

Project Description

The proposed development comprises the construction of a single turbine in the south-west corner of the Bairds Malt compound. The turbine proposed is 55m in height to hub and up to 77m to blade tip.

Landscape Design Considerations

In accordance with SNH's *Strategic Locational Guidance for Onshore Wind Farms*, the site location would lie within Zone 1, which is described as follows:

Zone 1: Lowest natural heritage sensitivity identifies areas at the broad scale with least sensitivity to wind farms, with the greatest opportunity for development, within which overall a large number of developments could be acceptable in natural heritage terms, so long as they are undertaken sensitively and with due regard to cumulative impact.

However, this assessment is the result of a broad based study and provides an indication only.

Angus Local Plan Review

The Guide, which was approved in June 2012, seeks to clarify existing development plan policy and to assist in considering proposals against those policies. The Guide describes the existing character of the Dipslope Farmland as a '*Landscape with Views of Windfarms*', and states that the Acceptable Character in a future scenario would be for a '*Landscape with Occasional Windfarms*', described as:

- *A landscape type or area in which windfarms or wind turbines are located or are very close to and visible. However they are not of such a size, number, extent or contrast in character that they become one of the defining characteristics of the landscape's character; and*
- *Visual receptors would experience occasional close-quarters views of a windfarm or turbines and more frequent background views of windfarms or turbines. Some turbines may or may not be perceived as being located in the landscape character area. No overall perception of windfarms being a defining feature of the landscape.*

The guide states that the LCT is 'Considered to have scope for turbines circa 80m in height'.

Strategic Landscape Capacity Assessment of Wind Energy in Angus (November 2013)

The most recent guidance on landscape capacity is provided by the '*Strategic Landscape Capacity Assessment (SLCA) for Wind Energy in Angus November 2013*'. This provides specific guidance on each Landscape Character Type within the Local Authority Area, and assesses the acceptable future level of change within each area. The Bairds Malt site is fully situated within the Urban area of Arbroath, however, it neighbours the 'Letham, Lunan Water and Arbroath Valleys' sub-section of the 'Dipslope Farmland' character type which is described as:

“Letham, Lunan Water and Arbroath Valleys: This sub-area surrounds watercourses that drain to the sea at Lunan Bay and Arbroath. It is generally lower and/or less open and exposed than neighbouring sub areas and has more settlement, including the significant settlements of Arbroath, Letham and Friockheim as well as smaller hamlets, isolated farms and houses. A golf/housing resort is identified in the local plan at Letham Grange near Arbroath. The land is intensively farmed, including area of polytunnels. There are significant areas of mature trees: within designed landscapes such as Guthrie and Pitmuies, along watercourses and around settlements. Roads follow the valley landforms. An electricity transmission line lies near Arbroath. Due to its more enclosed and settled character, the sub-area would be more sensitive to wind energy developments”

The SLCA states that this landscape character area would be suitable for development of small numbers of turbines up to 50m in height. There is no capacity for larger development within this landscape character area.

The SLCA does not provide any guidance for development within the urban areas or the urban fringes around the local settlements. The proposed location for this development is within the industrialised area to the south-west of the settlement of Arbroath, and the turbine has been assessed in this context. The field immediately to the south-west of the Maltings, within which the crane pad hardstanding would be located is zoned for light industrial use within the Local Plan. As discussed in **Section 2**, Angus Council successfully applied for planning permission for an extension of the Peasiehill Industrial Estate into this area.

Design Objectives

The design of the proposed development has been led by the on-site energy demands and the constraints of the existing infrastructure, primarily the Maltings Plant. A detailed description of the site, turbine location and specification and the rationale for these selections as well as construction and decommissioning information are included in **Section 2** and **Section 5** of the Environmental Report.

7.5 Baseline Conditions

Information on the existing landscape and visual resource has been collected by reference to Local Plans, Ordnance Survey maps and relevant literature, including the Tayside Landscape Character Assessment as well as information gathered from field surveys.

Broad Landscape Context

The study area for the proposed development is located within the Tayside Landscape Character Assessment. Located on the south-western fringes of the settlement of Arbroath, the landscape has a fairly urban feel, although outwith the settlement to the west and north the landscape quickly changes to a more rural character with large sprawling fields covering the majority of the landscape interspersed with areas of woodland and shelterbelts. To the east the coast has a significant influence and is visible over large sections of the main coastal transport corridor, the A92, which runs between Dundee and Arbroath. **Figure 7.2** illustrates

the various landscape characters types, which have been classified by Scottish Natural Heritage and their consultant landscape architects. It can be seen from **Figure 7.2** that the site study area is covered by three different area reports; Tayside, South and Central Aberdeenshire and Fife.

The proposed development site is adjacent to the Dipslope Farmland Landscape Character Type (LCT) as defined by the Tayside Landscape Character Assessment document. The Dipslope Farmland is a fairly extensive LCT which runs along much of the southern section of Angus, between Birkhill and Auchterhouse in the west all the way to Montrose in the east.

In addition to this landscape there are also a number of other landscape character areas that lie within the study area. **Table 7.4** summarises all the landscape character areas that are situated within the study area. Any areas highlighted in green are not within the ZTV.

Table 7.4 - Key Characteristics of Landscape Character Types

Name	Key characteristics
Tayside Landscape Character Assessment	
Coast With Sand	Located between Broughty Ferry and Carnoustie, including Barry Links, where a rounded peninsula of sand dunes extends southwards into the Firth of Tay. Woodland is confined to hedgerows trees and shelterbelts on farmland adjoining the coast. Arable farming tends to occur along the coastal strip with pasture lands on the dune slack and along the lower sections of the river valleys. Fields are bound by hedges and walls with occasional fences.
Coast With Cliffs	Located north of Carnoustie, between Arbroath and the southern end of Lunan Bay. Woodland is absent except on field boundaries and shelterbelts along the coastal strip. Some arable farming takes place on the coastal strip, with medium rectilinear fields where the topography allows. Fields tend to be bound by hedges and walls where they occur.
Broad Valley Lowlands	Located south of the Highland boundary Fault lie five broad lowland valleys or straths. These share a range of common characteristics which set them apart from other valleys and glens. The five areas of Broad Valley lowland are: Strathmore, Strathearn, Strathalan, Lower south and north Esk river valleys and the Pow Water Valley between Gask Ridge and Keillour Forest. Valleys such as Strathmore had comprised extensive areas of rough grazing, scrub woodland and unproductive wetland. Overtime large rectilinear fields were created as the area became predominant in agriculture.
Firth Lowlands	Lying along the northern side of the Firth of Tay, between Perth and Dundee, Bound to the north by the steep Sidlaw Hills, the area forms one of the most fertile parts of Scotland. The area is principally an agricultural area and the landscape is dominated by large, geometric fields. Field boundaries within parcels of land are often absent, the distinction between different fields being marked by drainage ditches or simply changes in crop.
Low Moorland Hills	The Low Moorland hills are formed by a series of east-west ridge like hills with a sharply defined northern edge and gentler eastern slopes. Woodland is limited to the extensive plantation centred on Montreatmont Moor. Agriculture is primarily pasture, much of it occurring on the poorer soils of the upper slopes. Field boundaries where they occur are marked with a variety of hedgerows, stone walls and post-and-wire fences.
Highland Foothills	This is a complex geological structure resulting from its position along the line of the Highland Boundary Fault. It features whale backed hills, winding gorge like main river valleys and is a gateway to the Angus Glens. A complex landscape which features glimpses of the Highlands and lowland areas.
Igneous Hills	The Igneous Hills are a generally open landscape of almost conical summits dominated by grass moorland. Though there are areas of improved pasture and even some cultivation within the more sheltered glens, the land is generally of low fertility. Where they occur field boundaries are marked by a combination of stone dykes and post-and-wire fences, occasionally marked by isolated Scots Pine in upper areas and deciduous species in more sheltered parts. The Ochils have a considerable amount of coniferous forestry, however, the most extensive woodlands are located in the heart of the eastern Ochils. The effect is to transform the sparse, open landscape of the Ochil summits, and to create a sense of enclosure which is absent elsewhere on the hills.

Name	Key characteristics
Mid Highland Glens	These are the mid sections of the principle Highland Glens and contain a concentration of agricultural activity on narrow but distinct valley floors. There is a predominance of rough grazing, bracken, heather moorland with substantial areas of commercial coniferous forestry.
Highland Summits and Plateaux	Are areas of upland separating the principal glens with vegetation patterns that closely reflect the altitude and exposure, including heather, grassland, blanket bog and arctic alpine plant communities. There is little or no settlement and most of the area is managed as open moorland. This area is one of the most remote and wildest landscapes within the UK.
Upper Highland Glens	The upper glens are of comparatively small scale. With little or no floodplain, the valley sides rise steeply so that the glen as a whole is little more than 1 to 1.5km wide at the crest of the enclosing hills. While valley floors are typically between 200 and 250 metres AOD. In the east, these summits are generally rounded. In the west they are craggier and more clearly defined. In both areas it is the mountains and the upland character that extends throughout the glen that shapes perceptions and appreciation of the landscape.
Lowland Basin	The Montrose Basin is a large, rounded estuarine basin formed near the mouth of the River South Esk. The basin is tidal, revealing extensive mudflats at low tide with an area of low lying, drained farmland which extends inland, while the basin is separated from the sea by Montrose, and located on a low peninsula split of land less than 2km wide.
Fife Landscape Character Assessment	
Coastal Hills	Located around the coast of Fife, the Coastal Hills are mainly located above the Coastal Cliffs, Braes and terraces, which slope gradually towards the sea offering panoramic views of the Firths. They are characterised by their strong association with the sights, sounds and smells of the coast and usually comprise large, undulating, regular, open, arable landscapes with few hedges but some linear shelterbelts and policy plantings. These are medium to large-scale, often open or exposed coastal landscapes where the character is always influenced by the sea. Generally a simple, sloping, balanced, active, organised, tended, farming landscape with regular or geometric patterns. These hills mark the transition between coastal and landward areas of Fife sharing characteristics of both.
Coastal Terrace	The Coastal Terraces are mostly flat or gently sloping towards the coast. They are extensively built upon or relatively undeveloped comprising large, open, undulating, arable fields with infrequent or more regular steadings. They have little vegetation cover except policy planting and shelter-belts around the large houses and designed landscapes, or on the steeper slopes often above burns. There are few field boundaries, limited to some hedgerows, stone dykes or post-and-wire fencing primarily around the larger houses and farmsteads. These are coastal landscapes where the character is always influenced by the sea and typically they are a simple, undulating, balanced landscape with muted colours, varied textures and slow movement.
Coastal Flats	The Coastal Flats on the south coast are very flat, low-lying coastal landscapes claimed from the Firth of Forth. On the north-east coast they are developed on blown sands and old dune systems and covered by a variety of land uses such as the afforestation at Tentsmuir Forest, the airfield at Leuchars and the world famous golf courses at St Andrews. Therefore they have a diversity of landscape character but their close association with the sea is ever present in these very flat, low-lying, horizontal, open, large-scale, exposed coastal landscapes. Typically, intensively cultivated, geometrically laid out, large to medium-scale, predominantly arable fields or forestry plantations with rectilinear, fenced enclosures.
Lowland Dens	The Lowland Dens are deeply incised sometimes narrow gorges or valleys cut by fast flowing burns across gently rolling Coastal Hills and Terraces on the north, east and south-east coasts of Fife. Often they have extensive semi-natural woodland with broadleaved trees and few buildings other than occasional steadings or large houses with policies. These are confined, small-scale, intimate, sheltered, textured, colourful, balanced and calm landscapes.
Lowland Open Sloping Farmland	Located in eastern Fife the Lowland Open Sloping Farmland comprises predominantly large, open, sloping, arable fields, often with no field boundaries or with mainly wire fences, low hedges or some stone dykes and little other vegetation cover with relatively few plantations and shelterbelts. This is a large-scale, open or exposed landscape where the character is strongly influenced by the weather conditions and views of the sky. It is a simple, sloping, balanced, active, organised, tended, and farming landscape with regular geometric patterns.
Lowland Hills and Valleys	The Upland Foothills of the Ochils, Lomond and Cleish Hills are very conspicuous, often defining the edge of other landscape types and the extent of views across the lowlands. The natural slopes of the landform of the Foothills are gentler and less pronounced than the Upland Slopes but usually steeper and higher than the Lowland Hills. They too form distinctive backdrops to other landscape types. The Foothills have several conspicuous point features, providing each area with its own identity. They are characterised by a combination of steep sided, rugged, open landform and land cover on the upper foothills, and shallower,

Name	Key characteristics
	smoother, more vegetated or developed landform lower down.
Lowland Glacial Meltwater Valleys	The Lowland Glacial Meltwater valleys are 'U' shaped, flat bottomed channel-like valleys with distinctive often pronounced and frequent eskers, kames and mounds deposited by melting glaciers. Typically used for intensive arable cultivation, the valley floor and lower slopes contrast with the mixed farming or grazing land on the rising slopes. There are medium to large-scale geometric field patterns enclosed by low, gappy hedges or post and wire fences. Steadings are located along distinct lines of transition from fertile valley soils to the poorer soils of hill slopes. They have small, sinuous often inconspicuous burns or small rivers which appear to be too small for the size of the valley. In parts, there are extensive conspicuous sand and gravel quarries disrupting an otherwise generally well organised, tended, balanced, open, locally busy and diverse landscape with regular patterns, smooth textures and seasonally variable colours.
Upland Foothills	The Upland Foothills of the Ochils, Lomond and Cleish Hills are very conspicuous, often defining the edge of other landscape types and the extent of views across the lowlands. The natural slopes of the landform of the Foothills are gentler and less pronounced than the Upland Slopes but usually steeper and higher than the Lowland Hills. They too form distinctive backdrops to other landscape types. There is a lack of settlements but a general abundance of farmsteadings which, along with the many types of woodland are well related to landform, often in association with the frequent burns running down gullies or folds or narrow glens. The Foothills have several conspicuous point features, providing each area with its own identity. They are characterised by a combination of steep sided, rugged, open landform and land cover on the upper foothills, and shallower, smoother, more vegetated or developed landform lower down. These are medium to large-scale, open, simple, sloping, curved, quiet and balanced landscapes with smooth or varied textures and muted colours.
Pronounced Volcanic Hills & Craigs	The Pronounced Volcanic Hills and Craigs form conspicuous, pronounced, often distinctive and recognisable hills or hill ranges sometimes protruding high above the lowlands or extending the uplands or foothills. They form important backdrops to the lowlands. Their distinctive shapes, silhouettes and skylines, with recognisable shapes, peaks and slopes give Fife a strong sense of place and direction. The farmsteadings and woodlands are well related to landform and there is a variety of other individual buildings and structures, sometimes associated with the burns and contributing to the identity of the area. The upper slopes of these Hills and Craigs can be steep sided, rugged and open, contrasting with the shallower, smoother, more open, simple, sloping, curved, quiet and balanced landscapes with smooth or varied textures and muted colours.
South & Central Aberdeenshire Landscape Character Assessment	
Kincardine Links	To the south of Inverbervie, the land is distinctly flat and farm land rises gradually from the Kincardine Links to form a gently sloping apron of land that extends into the more pronounced relief of Garvock and Glenbervie. The wide coastal fringe is the most distinctive element of this landscape character area. Immediately south of Inverbervie it merges with farmland directly or across low steps that mark the edge of the raised beaches. South of St Cyrus they form an enclosed platform, backed by the prominent cliff line, and encompass a considerable tract of farmland as well as areas of saltmarsh and dune close to the North Esk Estuary.
Garvock & Glenbervie	The Garvock & Glenbervie landscape character area include an extensive area of rolling farmland which encompasses not only Garvock Hill in the south-west of the area, but the farmland around Glenbervie at the edge of Highland Boundary Fault. The character of the area stems essentially from its relief, a series of sweeping, rolling hills that present distant views and draw the eye up and down the terrain. The area has a bold geometric field pattern. The few coniferous plantations are generally small and although they may be prominent on top of hills, their influence on landscape character is slight.
The Mounth	The Mounth character area forms a large expanse of Moorland Plateaux, where the foothills of the Grampians extend almost to the coast at Stonehaven. Its location emphasises the relief of this unbroken ridge which looms over the flat farmland of Howe of the Mearns to the south. Its eastern foothills, which tumble down to the coast, are less dramatic and form a more gradual transition with surrounding farmland. Lower slopes are forested but the plateau itself is covered by a pelt of heather moorland which extends westwards into the Cairngorms revealing a strong, rolling relief whose ridges recede into the distance across interlocking horizons. The plateau is an exposed and wild landscape, but rarely inhospitable enough to escape human influence.
Howe of the Mearns	The Howe of the Mearns encompasses some of Scotland's most fertile soils. Its relief is emphasised by the steep moorland slopes which rise abruptly behind it marking the line of the Highland Boundary Fault. It is a colourful landscape; vivid fields of red soil are juxtaposed with the bright greens of pasture or young cereals, while at other times fields of rape, daffodils and tulips present a startling patchwork of colours. As with other lowland farmlands, the distinctive character of this landscape derives from its large pattern of fields, crops and woods and, while this is obscured from low level views in its midst, it can be seen from elevated locations such as the moorland ridge to the north or the Garvock Hills to the south.

Broad Townscape Context

The turbine would be located within the Arbroath settlement boundary and as such a townscape assessment has been undertaken. On the east of the settlement is the old fishing harbour which has been modernised over time with the construction of a wet dock. Set back from the harbour is the historic centre of Arbroath, which is focussed on the Abbey, with narrower streets and fairly high density residential and retail areas.

Over time the settlement has expanded and peripheral housing estates both local authority and privately developed have helped to expand the town boundaries. While some of the historic centre has been designated as a heritage zone others have made way for more modern developments such as supermarkets and new buildings.

Table 7.5 below indicates and briefly describes each of the different areas of townscape character that can be found within Arbroath.

Table 7.5 – Key Characteristics of Townscape Character Areas

Name	Key characteristics
Arbroath	
Harbour and Waterfront	This area forms a prominent character area along the waterfront to the east of the settlement and provides a focus of employment and activity. As well as the industrial landscape there are recreational areas for the local community including play parks, leisure centre and paths spread along the waterfront. The local football stadium Gayfield Park is also located in this coastal area. Buildings, predominantly residential properties tend to be two storey terraces, set back from the harbour and the waterfront. The A92 runs through the settlement with fairly open views over the less developed areas of the coast to the west of the settlement.
Historic Centre	This area is the core of the original settlement and is of a more dense nature containing much narrower streets than the rest of the settlement, which forms a tight linear town centre dictated by the topography. Building styles are mostly older in nature, being two or three storeys in height, stone and Victorian in style. Land use is a mix between residential and small scale retail, with a number of shops clustered along the streets particularly South Street and North Street. Most of this character area is designated as a Conservation Area, part of the Angus Heritage Institute.
Buildings in Space	These areas include community facilities such as schools, libraries and hospitals which sit in public space or have large grounds and are not part of the overall settlement pattern. This type of townscape is traditionally found located in the centre of residential estates or along main transport routes and offers a focal point and natural centre to neighbourhoods and provides some open space.
Open Spaces	Open spaces are primarily located within or adjacent to residential areas to provide amenity green space for the residents and includes parks, gardens, semi-natural green space, green corridors, beaches and cemeteries. These areas tend to be landscaped or have some form of planting regime. Areas include the cemetery, High Common, Boulzie Hill and the Keptie Pond.
Local Authority Housing	This townscape character can be seen across many settlements in Scotland and forms large areas of many towns, primarily in a rectilinear pattern albeit with some occasional crescents. Building styles are dominated by 2 storey semi-detached housing that dates from about the 1960s.
Flats / High Density Housing	There are a number of areas within Arbroath of higher density flats, many of these are incorporated into the local authority housing areas. The buildings styles are fairly uniform all with similar finishing and pale grey in colour arranged in rows with amenity areas around them.
Modern Residential Estates	These areas are a result of recent settlement expansion and feature a combination of single storey bungalows and two storey detached and semi-detached housing. They form a pattern of cul-de-sacs and crescents bordered by areas of amenity grassland and tend to be of a lower density than residential areas nearer the centre. These areas tend to be found the outskirts of Arbroath and have an inward orientation arranged in estates. Hospitalfield is an example of this townscape type.

Name	Key characteristics
Industrial Estates	Industrial estates form a distinct area of townscape character with a mix of light industry, warehouses and some retail, usually containing large tarmaced areas and some planting regimes. There is a variety of building styles, ranging from small offices to larger warehouses; however they tend to all be single storey except for the Maltings Plant which is up to three storeys in some parts. This type of character can usually be found on the settlement edge to the west and north-west.

Land use and Landscape Change

The Bairds Malt turbine is located within the Elliot industrial estate on the western edge of the settlement of Arbroath. The landscape to the west gives way from the urban landform to become surrounded by farmland, which is predominantly mixed arable with fields varying between arable and grazing. The site itself is located within the Maltings plant which is located within the industrial estate. The landscape to the east and north is dominated by the urban areas of Arbroath, with housing estates, the historic town centre and the harbour on the nearby coast. The settlement of Arbroath has expanded over time, claiming parts of the arable farmland which covers much of the wider area, and moving northwards away from the coast. The main transport links in the area are the A92 Dundee to Stonehaven road which passes just over 550m to the south-east of the site, and the A933 Arbroath to Brechin Road which is 570m to the east. There are a number of vertical features in the local area associated with the local settlement of Arbroath including communication masts and church spires.

Local Townscape Character

The townscape immediately around the site is characterised by the industrial nature of the surrounding landscape, with the turbine location proposed within the industrial estate's land holding, located on the western edge of Arbroath. The turbine location is currently adjacent to a number of fairly large scale industrial units and small warehouses which comprise the Maltings workings and the wider industrial estate. The landcover is predominantly concrete, with no vegetation on site save a band of mature shelterbelt which provides some screening for the residents within the neighbouring housing estate. The existing buildings are a variety of style and finishes, primarily concrete or metal clad adding to the industrial feel of the area; outwith the Maltings towers these do not exceed three storeys in height.

Townscape Elements and Features

Townscape elements are the component parts of the townscape such as building typologies, streets and open areas including parks and waterfronts. Often these characteristic elements may be distinctive to particular regional areas or more localised areas of townscape character which help form a distinct character. The main elements of townscape character which typify the settlement include the historic town centre, defined by the ruinous Abbey, and narrow street pattern, which connect down to the harbour and the waterfront. Peripheral housing estates have increased the size of the settlement over time; these tend to be located around the edge of the settlement.

Dipslope Farmland Landscape Character Type

Adjacent to the settlement of Arbroath and the Elliot Industrial estate is the Dipslope Farmland LCT, this landscape character type surrounds Arbroath and is defined by SNH in the Tayside Landscape Character Assessment and is described below:

"The area falls from up to 180 metres in the north-west to about 50 metres along the coastal strip. The Dipslope blends almost imperceptibly into the southern slopes of the Sidlaws and Montreathmont Hills.

This is one of the most fertile and productive agricultural areas in Scotland, with much of the land being categorised as Classes 1 or 2. It is not surprising, therefore, that intensive agriculture, based on cereals, is the dominant land use. Fields tend to be large and rectilinear. Woodland cover is low or even absent in some areas, particularly closest to the coast, creating an open, exposed landscape in places. Elsewhere, particularly on some of the larger estates more extensive woodland survives, comprising a mixture of shelterbelts and hedgerow trees. Where these survive, the landscape is enclosed and structured. Often the trees are wind trimmed and bent slightly away from the coast. Semi natural woodland is limited to steeper valley sides. A dense scatter of more isolated farmsteads is supplemented by a number of isolated houses, reflecting the proximity to Dundee and Arbroath. Both settlements are, however, relatively well hidden in this otherwise open landscape. Dundee is screened by a ridgeline running parallel to the Firth of Tay, while Arbroath occupies lowland at the mouth of a shallow valley."

Broad Visual Context

To the east of the site the coastline and North Sea provide significant features, present in many views throughout the area, settlement is located up and down the coastline with Arbroath, Montrose and Carnoustie local examples. Inland the landscape is dominated by agricultural land, the topography consisting of gently sloping land, occasionally interrupted by tree plantations of various kinds or small clusters of trees surrounding the farm steadings and dispersed settlement which dots the countryside. Electricity pylons and communications masts frequently cross the landscape. Long distance views are limited, occurring more prominently over the coastline with the vast expanse of the sea stretching out to the east. Views inland area interrupted by the gentle rise in the topography and vegetation features. Within Arbroath itself views tend to be more internal, looking along narrow streets of the central areas or the more enclosed housing estates around the periphery of the settlement. All the time, however, the viewer is reminded of the coastal location with the shore and sea catching the eye through gaps in the townscape or providing a backdrop to many vistas. Views from the more elevated locations within the settlement offer some longer distance views above the rooftops and church spires to the south and west.

Weather conditions

Changing weather patterns and local climatic conditions will influence the visibility of the development in terms of the extent of view, the colour and contrast of the turbine and thus the perceived visual impact. There will be periods of low visibility (fog, low cloud, and bright sunny conditions that are accompanied by haze generated by temperature inversions) as well as periods of high visibility in clear weather. In some instances and from some

locations it may be ‘back-lit’ (e.g. appearing darker in colour during sunset/sunrise and periods of pale or white blanket cloud) and in other circumstances may appear to be ‘up-lit’ (e.g. during stormy periods that combine dark clouds and bright sunshine).

Landscape Planning Designations

The study area for the proposed development as shown in **Figure 7.1** is located primarily within the Angus Council area, with areas of Fife and Aberdeenshire also included. The local development plans contain a number of policies which seek to protect landscape resources. The site itself is not located within any designated landscape; however, there are other landscapes within the study area which are designated. The key landscape planning designations are illustrated in **Figure 7.3**.

Landscape planning designations and policies are considered in the determination of the sensitivity of landscape receptors as they provide an indication of value ascribed to the landscape resource.

Those designated landscapes that overlap the ZTV (and may potentially have views of the proposed development) have been considered as part of this assessment and are listed in **Table 7.6**. Other planning policies and designated landscapes located out with the ZTV have been excluded from further study as they will not experience any effects from the proposed development.

Table 7.6 - Landscape Planning Designations

Designation	Description
Fife Council - Special Landscape Areas (SLA)	Tay Coast. The SLA is made up of a long band of low hills and coastal landscapes that border the southern shores of the Firth of Tay and extend from Newport on Tay to Newburgh. The western boundary is formed by the slopes containing the basin of Lindores Loch, while the south-western boundary follows the foot of Dunbog Hill. The A92 forms the southern boundary before heading towards the coast at the foot of hills to Wormit. In the east of the area, the southern boundary again follows lower hill slopes around St Fort and minor roads on the boundary of the Scotsraig Estate. The designation is located ~19.4km to the south-west of the proposed development and is covered by Policy E19 in the St. Andrews and East Fife Local Plan.
	Tentsmuir Coast. The SLA comprises the coastal dunes and long sandy beach of Tentsmuir Sands extending from the River Eden estuary to Tayport. The western boundary of this area is drawn just inside the edge of the extensive Tentsmuir Forest. It is situated 16.5km from the development to the south-west and is covered by Policy E19 in the St. Andrews and East Fife Local Plan.
	Tarvit and Ceres. The SLA comprises the valley of the Ceres and Craigrothie Burns and the softly rolling hills which contain it. Extending from the A914 at Cupar to the B940 at Pitscottie in the west, to Falfield, New Gilston and east to the A916. The designation is situated 30.2km to the south-west of the turbine and covered by Policy E19 in the St. Andrews and East Fife Local Plan.
	St Andrews Links. The SLA is located on the western coast of Fife to the north of the settlement of St Andrews, covering the world famous St Andrews Golf Courses and West Sands. The designation is situated 23.8km to the south-west of the proposed development and is covered by Policy E19 in the St. Andrews and East Fife Local Plan.
	Craigtoun. The SLA includes the Kinness, Claremont, Lumbo and Cairns Dens which extend from the south-west of St Andrews broadly from the B939 to the A919 and incorporating the wooded valleys which lie within this area and Craigtoun Country Park. It is situated 28.4km distance from the development to the south-west and covered by Policy E19 in the St. Andrews and East Fife Local Plan.
	St Andrews and Fife Ness. The SLA incorporates the coastal edge which extends from the urban edge of St Andrews at the junction of the A917 and the B9131 incorporating Boarhills, Kingbarns and the

Designation	Description																										
	policies of Cambo and extending around the coastal edge of Fife Ness to Crail. The designation is located 26.1km to the south and covered by Policy E19 in the St. Andrews and East Fife Local Plan.																										
Aberdeenshire Council - Area of Landscape Significance (ALS)	Johnshaven Coast ALS is a small area around the settlements of Johnshaven and St Cyrus. This designation covers a narrow strip of landscape along the coast and is located ~25.5km to the north-east of the proposed site. This designation is covered by Policy Env\5A in the Aberdeenshire Local Plan.																										
	Marr ALS is a large area of landscape covering both the Dee Valley and the uplands south of this. It covers much of the north-western half of the study area and is located ~31.7km to the north of the proposed site. This designation is covered by Policy Env\5A in the Aberdeenshire Local Plan.																										
Gardens and Designed Landscapes (GDL)	(Listed in the Inventory of GDL for Scotland) are designated for their unique combinations of horticultural, landscape, scenic and historic interest. There are 26 Gardens and Designed Landscapes within the study area, which are located within the various council areas. The GDL's are covered by Policy ER20 in the Angus Local Plan, Policy E15 in the St Andrews and East Fife Local Plan, Policy Env\20 in the Aberdeenshire local Plan and Policy 16 in the Dundee Local Plan. A list of all GDL's within the study area is provided below:																										
	<table border="1"> <tbody> <tr> <td>The Guynd</td> <td>Cortachy Castle</td> <td>The Burn</td> </tr> <tr> <td>Baxter Park</td> <td>House of Pitmuies</td> <td>Fasque House</td> </tr> <tr> <td>Balgay Park</td> <td>Guthrie Castle</td> <td>Naughton</td> </tr> <tr> <td>Camperdown House</td> <td>Brechin Castle</td> <td>Earlshall</td> </tr> <tr> <td>Rossie Priory</td> <td>Edzell Castle</td> <td>Dalgairn</td> </tr> <tr> <td>Drumkilbo</td> <td>Kinnaird Castle</td> <td>St Andrews Links</td> </tr> <tr> <td>Glamis Castle</td> <td>House of Dun</td> <td>Craigtoun</td> </tr> <tr> <td>Airlie Castle</td> <td>Dunninald</td> <td>Cambo</td> </tr> <tr> <td>Ascreavie</td> <td>Craig house</td> <td></td> </tr> </tbody> </table>	The Guynd	Cortachy Castle	The Burn	Baxter Park	House of Pitmuies	Fasque House	Balgay Park	Guthrie Castle	Naughton	Camperdown House	Brechin Castle	Earlshall	Rossie Priory	Edzell Castle	Dalgairn	Drumkilbo	Kinnaird Castle	St Andrews Links	Glamis Castle	House of Dun	Craigtoun	Airlie Castle	Dunninald	Cambo	Ascreavie	Craig house
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Ascreavie	Craig house																										

Visual Baseline and Receptors

Visual receptors would include anyone who may have visibility of the turbines, such as people who may work in the area, residents or tourists. The table below identifies all visual receptors that were considered as part of the assessment.

Table 7.7 - Landscape Planning Designations

Visual Receptor	Description
Residents	There are a number of properties located within 2km of the development these include Crudie, Peasiehill Farm and Cottages. As well as the neighbouring housing estate.
Settlements	Settlements that will be assessed include Arbroath, Arbirlot and Carnoustie. Photomontages have been produced for a number of these settlements. Settlements out with 15km are unlikely to experience significant visual effects.
Road Users	The A92 has been assessed both with regards to the impact of Bairds Malt Wind Turbine and any potential sequential cumulative effects.
Recreational	Recreational receptors in the area mostly refer to core paths and the National Cycle Network which crosses the wider area.

7.6 Assessment of Landscape Effects

Landscape Effects are defined by the Landscape Institute as “Change in the elements, characteristics, character, and qualities of the landscape as a result of development.” These

effects are assessed by considering the landscape sensitivity against the magnitude of change. The matrix used to guide the evaluation or level of effect as illustrated in **Table 7.2**. The type of effect may also be described as temporary or long term/permanent, direct or indirect, cumulative and positive, neutral, or negative.

Indirect Effects on the Dipslope Farmland LCA

Landscape Sensitivity of the Dipslope Farmland LCA

The Dipslope Farmland area covers a large section of the study area surrounding the site and running east to west where it stretches all the way to Montrose. The low lying character area is dominated by arable farming practice, and with little in the way of woodland, the land cover is predominantly large rectilinear fields as it stretches between the Sidlaw Hills and the Forfar Hills. The condition/quality of the landscape is generally medium.

In terms of landscape value, within the study area, the landscape area is not designated. As an area that is defined by large scale agriculture with constantly changing crop coverings and other significant infrastructure such as the A90 and communication masts common features, the landscape value is considered to be medium.

The overall sensitivity of the Dipslope Farmland is considered to be medium.

Magnitude of Change

During operation, the Bairds Malt Wind Turbine would occupy and directly affect a negligible area of the Dipslope Farmland area, however it may be visible from across the character area indirectly affecting its character (and similarly affecting a small proportion indirectly). The ZTV indicates that other than the landscape immediately around the site inside ~4km, much of this landscape is actually free from visibility. When visible the turbine will appear alongside the Maltings industrial workings. Even when visible from these more remote areas the turbine will be visible in a section of the landscape which is less scenic, lower in altitude and already characterised by structures such as masts and electricity pylons and the settlement of Arbroath. The magnitude of change on the Dipslope Farmland resource would be negligible, resulting in a **minor** level of effect, which would be long term (reversible), direct/indirect and negative.

Indirect Effects on Neighbouring Landscape Character Areas

Neighbouring areas of landscape character are formed by coastal landscapes, lowlands and uplands.

None of these areas would be directly affected by the wind turbine and there would be no direct effects on the key physical characteristics that form the areas' landscape character or their quality and integrity. However, the turbine may be visible from these areas and as such could indirectly affect the landscape character where particular views or scenic qualities are noted as a key characteristic of the landscape. Alternatively, the wind turbine could be frequently visible and particularly prominent in the landscape such that the addition of this new feature affects the character of the area. In this instance the development is not located on a prominent summit, and views will be restricted to the immediate landscape and to the east and west of the development.

Table 7.8 - Indirect Landscape Effects on Neighbouring Landscape Character Areas

Landscape Character Area	Assessment
Tayside Landscape Character Assessment	
Coast With Sand	<p>The Coast with Sand character area is one of the closest neighbouring areas to the proposed development located ~680m to the south at its closest point. The character type occurs in several areas to the north and south of the proposed development. The ZTV indicates theoretical visibility over the areas to the south and south-west of the development. From the close in area near Elliott on the edges of Arbroath the view is considered to be similar to those shown in Viewpoint 2. The turbine appearing in the view as a prominent feature alongside the infrastructure of the maltings and some surrounding woodland. From the surrounding areas around Barry Links and Lunan Bay to the north the views are less prominent, with the intervening landscape beginning to screen the development, combined with built features and vegetation the visibility of the development quickly becomes reduced.</p> <p>The landscape character area is considered to be of medium sensitivity. Overall the magnitude of change would be low and the overall level of effect would be moderate/minor, indirect, negative and reversible.</p>
Coast With Cliffs	<p>The Coast with Cliffs character area sits between the Coast with Sand character areas, occurring in three distinct locations within the study area. The closest area is located ~2.4km to the south-west of the proposed development. From this area around New Haven there may be some potential views of the turbine. The intervening bands of shelterbelt which populate the wider landscape would screen potential views, with the any views limited to the upper sections of the turbine which would be viewed against the sky.</p> <p>These views would be limited with the other areas to the north of Arbroath gaining limited views.</p> <p>The landscape character area is considered to be of medium sensitivity. Overall the magnitude of change would be low and the overall level of effect would be moderate/minor, indirect, negative and reversible.</p>
Broad Valley Lowlands	There are no views of the development from within this landscape character area. Therefore there would be no indirect effects on its character.
Firth Lowlands	There are no views of the development from within this landscape character area. Therefore there would be no indirect effects on its character.
Low Moorland Hills	<p>The Low Moorland Hills character area is located ~11.7km to the north-west of the proposed development. The ZTV indicates an area of theoretical visibility around the Montreatmont Moor and Forest in the north-east of the character area. Views from within this area are extremely limited with on the blades and blade tips visible. At this distance the intervening landscape features including woodland and other built features would likely screen any of these potential views.</p> <p>The landscape character area is considered to be of medium sensitivity. Overall the magnitude of change would be negligible and the overall level of effect would be minor, indirect, negative and reversible.</p>
Highland Foothills	<p>The Highland Foothills Character are occurs in several zones to the far north-west of the study area situated ~25.2km from the proposed turbine. The character area is predicted to be largely free of any potential views according to the ZTV save for a small area around the Caterthun Forts and Kirkton of Menmuir. At this distance the single turbine would be a barely distinguishable feature in the view. The intervening landscapes providing screening for the turbine.</p> <p>The landscape character area is considered to be of high sensitivity. Overall the magnitude of change would be negligible and the overall level of effect would be moderate/minor, indirect, negative and reversible.</p>
Igneous Hills	<p>The Igneous Hills character area is situated ~12.3km to the west of the proposed development. The ZTV indicates minimal areas of theoretical visibility around the summits of Carrot and Gallow Hill. From these elevated locations the turbine would be a barely discernible feature in the wider landscape with long distance views overlooking the eastern coast and southwards towards the Tay estuary and Fife.</p> <p>The landscape character area is considered to be of high sensitivity. Overall the magnitude of change would be negligible and the overall level of effect would be moderate/minor, indirect, negative and reversible.</p>
Mid Highland Glens	There are no views of the development from within this landscape character area. Therefore there would be no indirect effects on its character.
Highland Summits and Plateaux	<p>The Highland Summits and Plateaux character type occurs in several locations around the north-western edges of the study area due to their elevated nature at their closest point the character area is located ~30km from the turbine. Views of the turbine would be extremely limited, with the intervening topography screening the majority of views. Where visibility does occur it is limited in most cases to the blade tips of the turbine, at this distance the development is not predicted to be an easily discernible feature in any views.</p> <p>The landscape character area is considered to be of high sensitivity. Overall the magnitude of change would</p>

Landscape Character Area	Assessment
	be negligible and the overall level of effect would be moderate/minor , indirect, negative and reversible.
Upper Highland Glens	There are no views of the development from within this landscape character area. Therefore there would be no indirect effects on its character.
Lowland Basin	There are no views of the development from within this landscape character area. Therefore there would be no indirect effects on its character.
Fife Landscape Character Assessment	
Coastal Hills	<p>The Coastal Hills landscape character area occurs in several areas throughout Fife on the northern and eastern coasts. The closest area is situated ~19.6km to the south-west of the proposed turbine around Tayport on the northern coast of Fife. Views from these areas on the north coast would be extremely limited with only the blade tips theoretically visible. On the eastern coast around St Andrews, the turbine is theoretically visible against the surrounding landscape, in reality these views will occur over a distance of ~26.7km. At this distance it is unlikely that the turbine, viewed against the distant coastline will be an easily discernible feature in this view.</p> <p>The landscape character area is considered to be of high sensitivity. Overall the magnitude of change would be negligible and the overall level of effect would be moderate/minor, indirect, negative and reversible.</p>
Coastal Terrace	<p>The Coastal Terrace landscape occurs in several locations on the eastern coast of Fife, generally set back from the immediate coast, except for the area around Cambo and Fife Ness. This character area is situated ~25.9km to the south of the proposed development. With the primary views from this area facing east towards the sea and south towards the Firth of Forth, it is unlikely that the proposed development will be an easily discernible feature in any views.</p> <p>The landscape character area is considered to be of high sensitivity. Overall the magnitude of change would be negligible and the overall level of effect would be moderate/minor, indirect, negative and reversible.</p>
Coastal Flats	<p>The Coastal Flats character type occurs predominantly on the north-eastern coast of Fife around Tentsmuir. The ZTV indicates theoretical visibility across much of the area, however, due to the wooded nature of the surrounding views would be extremely limited. Any views from this location are unlikely to be significant given the distances from the turbine, 16.5km.</p> <p>The landscape character area is considered to be of high sensitivity. Overall the magnitude of change would be negligible and the overall level of effect would be moderate/minor, indirect, negative and reversible.</p>
Lowland Dens	<p>The Lowland Dens character area occurs in several areas across Fife. The ZTV indicates theoretical visibility from many of the more elevated parts of these character areas. Due to their location significant views from within these areas are unlikely. The closest area is situated ~25.7km from the proposed development. The intervening built features and vegetation would likely combine to completely screen any views.</p> <p>The landscape character area is considered to be of high sensitivity. Overall the magnitude of change would be negligible and the overall level of effect would be moderate/minor, indirect, negative and reversible.</p>
Lowland Open Sloping Farmland	<p>The Lowland Open Sloping Farmland character area sits to the far south of the study area, located ~27.3km from the proposed development. The ZTV indicates theoretical visibility over the northern parts of the character area. In reality at this distance views of the turbine are not likely to be possible. Intervening features including the built environment and vegetation would combine to screen any potential views.</p> <p>The landscape character area is considered to be of medium sensitivity. Overall the magnitude of change would be negligible and the overall level of effect would be minor, indirect, negative and reversible.</p>
Lowland Hills and Valleys	<p>The Lowland Hills and Valleys character type occurs in several locations within Fife. The ZTV indicates some theoretical visibility from the more elevated locations within these areas. Although in reality views are unlikely to occur. A combination of distance and other features in the wider landscape such as woodland and built features combining to restrict any views.</p> <p>The landscape character area is considered to be of medium sensitivity. Overall the magnitude of change would be negligible and the overall level of effect would be minor, indirect, negative and reversible.</p>
Lowland Glacial Meltwater Valleys	There are no views of the development from within this landscape character area. Therefore there would be no indirect effects on its character.
Upland Foothills	The Upland Foothills landscape occurs in three distinct areas within the study area, around the north of Fife. The ZTV indicates some theoretical visibility over the eastern fringes of the character areas. Located over 19km from the proposed development it is unlikely that there will be any significant views possible towards the development.

Landscape Character Area	Assessment
	The landscape character area is considered to be of high sensitivity. Overall the magnitude of change would be negligible and the overall level of effect would be moderate/minor , indirect, negative and reversible.
Pronounced Volcanic Hills & Craigs	<p>The Pronounced Volcanic Hills & Craigs character areas occur in several locations throughout Fife, located over 30km from the proposed development. The ZTV indicates some minimal patches of visibility within these areas, however, at this distance it is unlikely that any significant views of the proposed development will occur, the features in the wider landscape including settlements, vegetation and other built features combine to screen views.</p> <p>The landscape character area is considered to be of high sensitivity. Overall the magnitude of change would be negligible and the overall level of effect would be moderate/minor, indirect, negative and reversible.</p>
South & Central Aberdeenshire Landscape Character Assessment	
Kincardine Links	There are no views of the development from within this landscape character area. Therefore there would be no indirect effects on its character.
Garvock & Glenbervie	<p>The Garvock & Glenbervie character area is located 24.1km to the north of the proposed turbine. The ZTV indicates a small area of theoretical visibility over the most elevated areas near Dykelands. From this location views of the turbine are limited to the very tips of the blades and would appear solely against the open coastal views to the east. It is not predicted there will be any significant views possible of the development from this area.</p> <p>The landscape character area is considered to be of medium sensitivity. Overall the magnitude of change would be negligible and the overall level of effect would be minor, indirect, negative and reversible.</p>
The Mounth	<p>Located on the northern edge of the study area the Mounth character area is situated almost 35km from the proposed development. The ZTV indicates an area of theoretical visibility from within the area, however, in reality the views are restricted by topography to the blade tips of the turbine, which at the distance would not be visible.</p> <p>The landscape character area is considered to be of high sensitivity. Overall the magnitude of change would be negligible and the overall level of effect would be moderate/minor, indirect, negative and reversible.</p>
Howe of the Mearns	There are no views of the development from within this landscape character area. Therefore there would be no indirect effects on its character.

Direct and Indirect Effects on Landscape Planning Designations

The site area is not designated and there would be no direct effects on any designated landscape areas. Any landscape effects therefore would be limited to indirect effects on the views and visual character experienced from within these areas, whilst viewing towards the wind turbine. The assessment below considers if these effects on the views would lead to an indirect effect on the landscape character and valued features and characteristics for which these areas are designated.

The assessment of the overall indirect effects experienced by people viewing the wind farm from within these areas is provided in **Table 7.10**. The sensitivity of all designated landscapes considered as part of this assessment has been considered as high.

Table 7.9 - Indirect Landscape Effects on Landscape Planning Designations

Designation	Assessment
Fife Council - Special Landscape Areas (SLA)	
Tay Coast SLA	At its closest point this designation would be ~19.4km to the south-west of the proposed development covering the coastal areas and upland foothills of northern Fife. The ZTV indicates there will be very little visibility from within this relatively large designation, with potential views restricted to an area of the north-east coast around Tayport and some intermittent views from the most elevated areas within the designation. At this distance, the views of the proposed development are extremely limited, with

Designation	Assessment
	<p>only the upper sections of the turbine theoretically visible. It is unlikely that there will be any significant views of the proposed turbine from within this SLA.</p> <p>The landscape designation is considered to be of high sensitivity. Overall the magnitude of change would be negligible and the overall level of effect would be moderate/minor.</p>
Tentsmuir Coast SLA	<p>The Tentsmuir Coast is situated on the north-east coast of Fife ~16.5km to the south-west of the proposed development. From this coastal area there are theoretical views of the proposed development to the north-east. The turbine appears predominantly against the landscape from this location and over this distance views are likely to be significantly screened by the built features of intervening coastal settlement such as Carnoustie and other features such as woodland and farming infrastructure in the wider landscape.</p> <p>The landscape designation is considered to be of high sensitivity. Overall the magnitude of change would be negligible and the overall level of effect would be moderate/minor.</p>
Tarvit and Ceres SLA	<p>The Tarvit & Ceres designation is located over 30km to the south-west of the turbine covering the Hill of Tarvit and the settlement of Ceres. The ZTV indicates a minimal area of theoretical visibility around the most elevated areas within the designation. At this distance it is unlikely that there will be any significant views of the proposed development.</p> <p>The landscape designation is considered to be of high sensitivity. Overall the magnitude of change would be negligible and the overall level of effect would be moderate/minor.</p>
St Andrews Links SLA	<p>This designation is located ~23.8km to the south-west of the proposed development. The ZTV indicates theoretical visibility over the designation. The turbine appears theoretically to the north-east, where views do occur the turbine would be viewed against the surrounding landscape and at this distance it is unlikely that it will be a discernible feature in any views from within this designation.</p> <p>The landscape designation is considered to be of high sensitivity. Overall the magnitude of change would be negligible and the overall level of effect would be moderate/minor.</p>
Craigtoun SLA	<p>Located inland from St Andrews, Craigtoun is situated ~28.4km from the proposed turbine. The ZTV indicates theoretical visibility over the whole designation, however, in reality views are unlikely to occur over this distance, with the turbine located near the distant coastline to the north-east of the designation. Features present within the landscape including vegetation, woodland and other built features combining to screen any potential views of the development from within this landscape.</p> <p>The landscape designation is considered to be of high sensitivity. Overall the magnitude of change would be negligible and the overall level of effect would be moderate/minor.</p>
St Andrews and Fife Ness SLA	<p>The St Andrews and Fife Ness SLA is located ~26.1km to the south of the proposed development. The ZTV indicates theoretical visibility over much of the designation. At this distance the turbine would be a barely discernible feature, amongst the developed coast to the north, with other features including woodland also present in any views.</p> <p>The landscape designation is considered to be of high sensitivity. Overall the magnitude of change would be negligible and the overall level of effect would be moderate/minor.</p>
Aberdeenshire Council - Area of Landscape Significance (ALS)	
Johnshaven Coast ALS	<p>There is no visibility of the development predicted from this designation and as such there will be no impact on its unique character as an ALS.</p>
Marr ALS	<p>The Marr ALS is located on the northern boundary of the study area ~32km from the proposed development. The ZTV indicates some theoretical visibility from within this area; however, at this distance it is unlikely that the turbine will be an easily discernible feature within the open landscapes to the south.</p> <p>The landscape designation is considered to be of high sensitivity. Overall the magnitude of change would be negligible and the overall level of effect would be moderate/minor.</p>
Gardens and Designed Landscapes (GDL)	
The Guynd	<p>The Guynd GDL is located ~4.2km to the west of the proposed development; the property is set within an area of dense mature woodland. The ZTV indicates theoretical visibility over much of the GDL; however, there are no views towards the coast from within the GDL, due to the bands of dense mature woodland which bound the area on all sides, screening all potential views of the turbine from within the designation.</p> <p>The landscape designation is considered to be of high sensitivity. Overall the magnitude of change would be negligible and the overall level of effect would be moderate/minor.</p>

Designation	Assessment
Dunninald	<p>Dunninald is located ~15.9km to the north of the proposed development. The ZTV indicates a small area of theoretical visibility over the southern edges of the GDL. The property and gardens are set within an area of mature woodland which encloses the area. The mature woodland provides screening from the GDL and would limit any outward views towards the proposed turbine.</p> <p>The landscape designation is considered to be of high sensitivity. Overall the magnitude of change would be negligible and the overall level of effect would be moderate/minor.</p>
Earlshall	<p>Earlshall is located ~24.1km to the south-west of the proposed development. The property and gardens are located near to RAF Leuchars, set within an area of woodland there are no outwards views towards the proposed development from this location.</p> <p>The landscape designation is considered to be of high sensitivity. Overall the magnitude of change would be negligible and the overall level of effect would be moderate/minor.</p>
St Andrews Links	<p>Similar to the designation that also covers the area, there may be some potential visibility of the proposed development from this location, however, the turbine is located ~24km from the designation which overlooks the St Andrews Coastline and offers long distance views over the North Sea. Views up the coast would be limited by coastal development and vegetation.</p> <p>The landscape designation is considered to be of high sensitivity. Overall the magnitude of change would be negligible and the overall level of effect would be moderate/minor.</p>
Craigtoun	<p>The GDL is heavily screened by woodland, which would limit any potential views of the development. Similar to the wider designation, views are unlikely to occur and over this distance any views would not be significant.</p> <p>The landscape designation is considered to be of high sensitivity. Overall the magnitude of change would be negligible and the overall level of effect would be moderate/minor.</p>
Cambo	<p>Located ~27.6km from the proposed development, the ZTV indicates theoretical visibility over much of the GDL. The designation is set within an area of mature woodland which encloses the gardens and the surrounding properties from outwards views. With any views focused to the east over the nearby coastline, it is unlikely that there will be any views of the development from within the GDL and surrounding areas.</p> <p>The landscape designation is considered to be of high sensitivity. Overall the magnitude of change would be negligible and the overall level of effect would be moderate/minor.</p>

Sensitivity of Local Townscape Character

The site is currently used for industrial purposes and has no notable natural landscape features or elements. Prominent features include the operating Maltings buildings, predominantly made of corrugated metal, fencing and tarmaced surfaces with some boundary planting between the neighbouring housing estate at Hospitalfield, which consists of mature and semi mature woodland. There are no designations on this section of townscape and it has little value with regards to the townscape of the settlement, as the site is impermeable and lacks any legibility. The sensitivity of this townscape to a development of this type would be low.

Magnitude of Change

The turbine would directly affect a moderate proportion of this townscape. There would be no elements of townscape lost and the industrial nature of the development would work well within the existing townscape. The addition of this turbine may actually give some legibility to the site, viewed alongside other industrial elements within the local area. The finish of the turbine will blend with the surrounding industrial finished on the local buildings which tend to be matt grey concrete or metal cladding. Any effects should be considered neutral, culminating in a **moderate/minor** overall magnitude of change. The overall level of direct landscape effects on the local landscape character resource would be minor, long term (reversible) and neutral.

Indirect Effects on Adjacent Townscape Character

The surrounding area consists primarily of residential areas, with the historic centre to the north and harbour and waterfront areas to the east.

The residential area of Hospitalfield to the north would be indirectly affected by the addition of the proposed turbine. The potential visual effects from this area are discussed in detail within the residential assessment, with photomontages showing a number of views from within the area. Across the wider settlement views would be severely limited, with only the more open and elevated areas of landscape such as Boulzie Hill experiencing any potential views of the proposed turbine. Where visible the turbine would appear alongside the industrial features associated with the Maltings workings. None of these areas would be directly affected by the turbine and there would be no direct effects on the key physical characteristics that form the areas townscape character or their quality and integrity. The indirect effects are assessed in **Table 7.8**.

Table 7.10 – Indirect Townscape Effects

Townscape Character	Assessment
Arbroath	
Harbour and Waterfront	<p>This area covers the coastline running from the east of the proposed turbine. The views from the harbour would be limited by the built environment which lines the streets behind the harbour. The views from the more open coastal areas on the edge of the settlement are considered in Viewpoint 1. The turbine would be viewed to the south when approaching the harbour, although it would not appear in the same general views from the immediate coastal areas.</p> <p>The townscape character is considered to be of medium sensitivity. Overall the magnitude of change would be high and the overall level of effect would be major/moderate, indirect, neutral and reversible.</p>
Historic Centre	<p>This area sits ~2km to the east of the proposed turbine and theoretically will have views of the turbine throughout the character area. The buildings in this area are a mix of two and three storeys and streets tend to be fairly narrow which would restrict potential views of the proposed turbine. When visible from more open areas around Boulzie Hill, as shown in Viewpoint 4 the turbine will be viewed as part of the industrial area along the edge and not associated with the historic centre, where views tend to be focused internally or across the nearby harbour to the coast.</p> <p>This character is considered to be of high sensitivity as much of it falls within the Conservation Area. Overall the magnitude of change would be low and the overall level of effect would be moderate, indirect, negative and reversible.</p>
Buildings in Space	<p>These areas tend to be located within the housing areas to the east and around the historic centre of the town. Views of the turbine are unlikely and would tend to be screened by intervening buildings and vegetation. When travelling through the settlement it would be unlikely that there would be views of these areas and the turbine together.</p> <p>This character is considered to be of low sensitivity, as receptors tend to comprise public buildings and service centres. Overall the magnitude of change would be low and the overall level of effect would be minor, indirect, negative and reversible.</p>
Open Spaces	<p>The most prominent areas of open space are Boulzie Hill and the area surrounding Keptie Pond, as well as other areas around the coastline and throughout the settlement. The ZTV indicates theoretical visibility from much of these areas. The views from the elevated area around Boulzie Hill are considered in Viewpoint 4. The lower lying areas around Keptie would be heavily screened by the intervening woodland that bounds these areas and views would be unlikely.</p> <p>This character is considered to be of high sensitivity, providing a green and open space within the settlement. Overall the magnitude of change would be low and the overall level of effect would be moderate, indirect, negative and reversible.</p>
Local Authority Housing	<p>The local authority housing areas occur to the north of the historic centre, with a crescent pattern of predominantly two storey semi-detached properties in an area called Deepdale. The generally rectilinear pattern of the estate mean external views are limited. There are two other areas to the north-east of the</p>

Townscape Character	Assessment
Flats / High Density Housing	<p>historic centre the Hayshead and Clifftown areas of the town, follow a similar street and development pattern to Deepdale. Potential views from within these areas are limited, a combination of intervening built features and woodland which bounds local open spaces and parks limit views outwith the immediate area.</p> <p>This character is considered to be of high sensitivity, as the main residential areas for local residents within the settlement. Overall the magnitude of change would be low and the overall level of effect would be moderate, indirect, negative and reversible.</p>
Modern Residential Estates	<p>These areas are limited with some new local authority development replacing older dwellings around the historic centre and around Hospitalfield where there are a small number of flatted developments over three storeys. As well as these areas there are some higher density blocks around the local authority housing areas.</p> <p>This character is considered to be of high sensitivity, as high density living areas. There are no significant impacts predicted from these areas, these developments tend to be located near main roads such as Arbirlot Road. The overall magnitude of change would be low and the overall level of effect would be moderate, indirect, negative and reversible.</p> <p>These areas are located on the very edges of the settlement or have been developed on Brownfield sites within the settlement. Hospitalfield and Warddykes are examples of more modern estates within Arbroath. The Hospitalfield area has been considered in greater detail as part of the settlement assessment as one of the neighbouring areas to the proposed development.</p> <p>The character of these areas is considered to be high, as residential areas. Overall the magnitude of change would be medium and the overall level of effect would be major/moderate for those neighbouring areas while other areas are considered to be moderate.</p>
Industrial Estates	<p>These tend to be located around the edges of the settlement, the Elliot estate which contains the developments and the Kirkton Industrial estate to the north of the proposed development. These areas form the boundary between the settlement and the surrounding countryside. The buildings and area tending to be lower quality than the surrounding areas of townscape. Buildings are matt concrete or steel and vary in size and height depending on the use from one storey garages and storage units to the significantly larger scale Maltings Plant on the Elliot estate.</p> <p>This character is considered to be of low sensitivity, as an area of business use, the areas tend to be concrete, with little or no vegetation and are defined by their use as working areas of the settlement. Overall the magnitude of change would be low and the overall level of effect would be moderate, indirect, negative and reversible.</p>

7.7 Assessment of Visual Effects

Visual effects are recognised by the Landscape Institute as a subset of landscape effects and are concerned wholly with the effect of the development on views, and the general visual amenity. The assessment has been conducted in periods of fine weather and assumes good visibility and limited seasonal leaf cover.

ZTV and Visual Receptors

A blade tip ZTV is illustrated in **Figure 7.5** and indicates the maximum potential visibility of the wind turbine, assuming there are no trees, woodland or buildings within the area (i.e. a bare earth scenario). It is likely that this visibility would be reduced further by the screening effect of trees, woodland, and buildings on the ground, particularly in relation to settlements.

The pattern of ZTV coverage is influenced by the larger scale topography to the north-west and west of the development, with the landscape becoming more elevated as it rises from the Dipslope Farmland into the Igneous Hills which restricts visibility in these directions. The most prominent areas of visibility would be in the immediate ~5km around the site, with visible areas spreading out over the coast and sea to the south-east, with a small scattering

of theoretical visibility to the north and theoretical visibility over the eastern coast of Fife. **Figure 7.6** illustrates the ZTV in a more detailed fashion, divided into six sections, each focusing on a different part of the study area.

The key visual effects to be addressed include the following:

- Visual effects on the views experienced by local communities;
- Visual effects on the views experienced by users of footpaths and general recreational areas/ tourist destinations; and
- Visual effects on the views experienced by road users along the main transport routes.

Viewpoint Analysis

Viewpoint analysis has been undertaken for each of the viewpoints and is provided below. A summary of the results of the viewpoint analysis is provided in **Table 7.11** and this analysis reveals that Major or Major / Moderate visual effects are predicted from five of the sixteen viewpoints. These effects were found from the areas closest to the proposed turbine and the more elevated locations within the settlement of Arbroath. **Table 7.12** presents detailed analysis for each site.

Table 7.11 - Summary of Viewpoints Analysis

Location	Assessment			Distance from Development
	Sensitivity	Magnitude	Overall Impact	
1. Queens Drive Arbroath	High	Medium	Major / Moderate	Viewpoint located at ~1.4km distance
2. Elliot Bridge	High	High	Major	Viewpoint located at ~700m distance
3. Arbirlot Road West	High	Medium	Major / Moderate	Viewpoint located at ~1.0km distance
4. Boulzie Hill	High	Medium	Major/Moderate	Viewpoint located at ~2.8km distance
5. Bearfauld Road	High	Low	Moderate	Viewpoint located at ~4.2km distance
6. East Haven	High	Low	Moderate	Viewpoint located at ~4.8km distance
7. A92, Salmonds Muir	Medium	Low	Moderate/Minor	Viewpoint located at ~4.0km distance
8. Patrick Allan Fraser Street	High	High	Major	Viewpoint located at ~420m distance
9. Firthfield	High	Low	Moderate	Viewpoint located at ~4.1km distance
10. Braeside	High	Low	Moderate	Viewpoint located at ~2.8km distance
11. A933 Montreathmont	Medium	Negligible	Minor	Viewpoint located at ~11.5km distance
12. Dodd Hill	High	Negligible	Moderate/Minor	Viewpoint located at ~16.6km distance
13. Turin Hill	High	Negligible	Moderate/Minor	Viewpoint located at ~17.1km distance
14. Tentsmuir	High	Negligible	Moderate/Minor	Viewpoint located at ~19.1km distance
15. St Andrews	High	Negligible	Moderate/Minor	Viewpoint located at ~25.5km distance
16. White Caterthun	High	Negligible	Moderate/Minor	Viewpoint located at ~26.9km distance

Visual Effects during Operation

Post-construction and during operation, the appearance of the wind turbine site would recover a calmer visual character with negligible levels of maintenance activity visible on site from the nearest visual receptors. These effects would largely be indistinguishable from the day-to-day operations of the Maltings.

The visibility of the turbine, however, would extend over the study area affecting a range of visual receptors including residents, road users, tourists, and people undertaking recreational activity. The visual effects of the wind turbine on views and visual amenity during operation are assessed in the following sections.

Visual Effects on Settlements

Arbroath

Effects on Arbroath have been considered in detail within both the Townscape Assessment (**Table 7.8**) and within the Viewpoint Analysis (**Table 7.11**). The Townscape Assessment assesses the wider impacts of the turbine on the character of different areas of the town, whilst the Viewpoint Analysis assesses specific locations within these character areas. Viewpoints 1, 2, 3, 4, 5 and 8 are located within Arbroath and demonstrate the different impacts of the proposed turbine from different locations throughout the town.

Other settlements

Many of the settlements within the study area will gain very limited, or no views of the wind turbine due to the concentration of buildings and other urban features and the landform of the area. Of the 10 settlements that were assessed (including Arbroath), four of these are not covered by the ZTV and will therefore receive no views of the development. Settlements that have been predicted to receive views are likely to only get views of the development from open areas, prominent hill tops within settlements and from settlement edges, as it is likely that woodland and the built environment will screen outward views.

Other settlements

Table 7.12 - Visual effect on settlements within the ZTV

Settlement	Distance	Visual Assessment
Settlements <5km from Bairds Malt Wind Turbine		
Arbroath		Considered separately within the Townscape and Viewpoint Assessments.
Arbirlot	1.7km	<p>The small hamlet of Arbirlot is situated 1.7km to the west of the proposed development. The ZTV indicates overall visibility across the whole settlement. However, the settlement is bound by bands of mature woodland which run alongside the Elliott Water which runs by the settlement on its way towards the coast. These areas of woodland enclose the settlement to the east and would screen any potential views for the majority of the residents of Arbirlot. Exiting the settlement to the north-east, the road begins to gain altitude and there may be some views of the proposed turbine over the surrounding tree line from this area of the settlement. From this area the visible portion of the turbine would be viewed solely against the sky.</p> <p>Overall the magnitude of change for the settlement is considered to be low which would result in a moderate level of effect.</p>
Settlements between 5-10km from Bairds Malt Wind Turbine		

Settlement	Distance	Visual Assessment
Carnoustie	6.8km	<p>The settlement of Carnoustie is situated 6.8km to the south-west of the proposed development on the Angus Coastline. The ZTV indicates an area of theoretical visibility over the north-eastern edge of the settlement. Views from this area are extremely limited with only the blade tip of the proposed turbine theoretically visible over the horizon. In reality these views would be further reduced by the intervening landscape features such as woodland and other shelterbelts. It is not predicted that there will be any significant impacts on the settlement of Carnoustie.</p> <p>Overall the magnitude of change for the settlement is considered to be negligible which would result in a moderate/minor level of effect.</p>
Redford	6.8km	<p>The settlement of Redford is situated 6.8km to the north-west of the proposed development. The ZTV indicates theoretical visibility from the whole settlement. Where visible the turbine would appear back dropped by the surrounding landscape and the sea. The intervening landscape screens most of the turbine tower from view leaving only the hub and blades visible. With the landscape containing shelterbelt trees and other woodland features would limit any potential views of the development from the edges of the settlement. The remainder of the settlement would experience no views, with the built features screening outward views to the south-east.</p> <p>Overall the magnitude of change for the settlement is considered to be negligible which would result in a moderate/minor level of effect.</p>
Greystone	8.6km	There are no views of the proposed development from this settlement.
Friockheim	9.7km	There are no views of the proposed development from this settlement.
Settlements between 10-15km from Bairds Malt Wind Turbine		
Guthrie	11.4km	There are no views of the proposed development from this settlement.
Monikie	11.7km	<p>The settlement of Monikie is situated 11.7km to the west south-west of the proposed development. The ZTV indicates theoretical visibility across the majority of the settlement. Potential views of the development from within the settlement are extremely limited with only the blade tips theoretically visible from this area. The settlement is located next to the Monikie Reservoirs which are heavily wooded on the western edges, screening views of the nearby reservoir from within the settlement. It is not expected that there will be any views of the development from within the settlement.</p> <p>Overall the magnitude of change for the settlement is considered to be negligible which would result in a moderate/minor level of effect.</p>
Letham	12.1km	There are no views of the proposed development from this settlement.
Monifieth	13.4km	<p>The settlement of Monifieth is situated 13.4km to the south-west of the proposed development. The ZTV indicates an area of theoretical visibility over the northern part of the settlement. At this distance the majority of the potential views would be limited by the surrounding built features within the settlement with theoretical views limited to the edges of the settlement. At this distance the potential views of the development are limited to the very tips of the blades, when considering features in the intervening landscape such as shelterbelt woodland other man made features associated with farms it is unlikely that there will be any views of the development from within the settlement.</p> <p>Overall the magnitude of change for the settlement is considered to be negligible which would result in a moderate/minor level of effect.</p>
Settlements beyond 15km are unlikely to experience any significant effects		

Visual Effects on Residential Properties

A total of sixty three properties within a radius of 2km of the turbine have been included in the Residential Assessment. These have been broken down into twenty four clusters or individual properties, as shown in **Table 7.13**. These include properties located on the all sides of the proposed development. The assessment has looked at the theoretical visibility in conjunction with the properties' primary and secondary views as well as views from the garden area, taking into account any vegetation or woodland which may surround the

property. A summary of the assessment of all residential properties within 2km of the nearest turbine is provided in **Table 7.13** and the full assessment can be found in **Appendix 2.2**.

Table 7.13 - Predicted Visual Effects on Residential Properties

Property	Distance	Magnitude of Change	Level of Effect
1. Peasiehill Farm Cottages	330m	High	Major
2. Peasiehill Farm House	650m	Medium	Major/Moderate
3. Peasiehill Farm Bungalow	720m	Medium	Major/Moderate
4. Krojan Cottages	700m	Medium	Major/Moderate
5. Crudie Farm House	810m	Medium	Major/Moderate
6. Crudie Farm Cottages	920m	None	None
7. Elliot Cottages	580m	High	Major
8. Elliot Bridge	685m	Negligible	Moderate/Minor
9. Elliot	630m	None	None
10. A92 Cottages	1.3km	Low	Moderate
11. Willow Cottage	1.1km	Low	Moderate
12. Balcathie Farm Cottages	1.1km	Low	Moderate
13. Balcathie Farm	1.2km	Negligible	Moderate/Minor
14. Grahamston Cottages	1.7km	Negligible	Moderate/Minor
15. Kellie Castle Lodge	1.7km	Negligible	Moderate/Minor
16. The Manse Cottage	1.8km	None	None
17. The Glebe House	1.7km	None	None
18. Bank	1.3km	Low	Moderate
19. Broomhill	1.5km	Negligible	Moderate/Minor
20. Loanend	1.8km	Negligible	Moderate/Minor
21. Fairyknowe	1.4km	Medium	Major/Moderate
22. Bankhead	1.9km	Negligible	Moderate/Minor
23. Crudie Acres	1.6km	Low	Moderate
24. Bottlend Cottages	1.7km	Negligible	Moderate/Minor

In summary, out of the receptors detailed in **Table 7.11** two are predicted to experience major effects. These are Peasiehill Farm Cottages, the closest properties to the Maltings which are owned by the landowner of the field to the west of the Maltings who is a financially interested party. Elliot Cottages are the other receptor predicted to experience a major effect, with the properties receiving views of the turbine from the rear rooms and gardens.

A further five receptors are predicted to experience major/moderate effects, which tend to occur within 1km of the proposed turbine. These effects would be in relation to views from the primary windows and garden areas, although it should be noted even when visible the turbine is never an overbearing feature and is not assessed as constituting an unacceptable change to the quality of living for the residents. Outwith 1km, potential effects were found to be diminished.

Where visible from these more rural areas to the south and west of the proposed development the turbine would appear in the view alongside the industrial workings associated with the Maltings Plant. It would be viewed as an industrial feature alongside the man-made features already present in the view, and would not open up any other areas of visibility or limit views towards the coastline where these occur from the more elevated locations to the west.

7.8 Assessment of Major Tourist and Transport Routes

An assessment of the potential for visual effects from selected routes within the study area has been undertaken. These routes are:

- A92 – Monifieth to Montrose.
- A933 – Arbroath to Colliston.
- Core Paths 151 & 152

A92 Monifieth to Montrose

The A92 is the coastal route between Dundee and Stonehaven, following the nearby coastline offering a more scenic alternative to the A90 which runs through the neighbouring countryside. The section of the route assessed runs from Monifieth in the south to Montrose in the north, travelling amongst the fairly flat farmland that flanks the western side of the road there are often open and long distance views over the coastline to the east. The intervening landscape features and the gently rolling topography present within the wider farmland to the west often limit longer distance views. The route travels on a generally north-east/south-west trajectory for the whole of the assessed section. The road passes through or close to Monifieth, Carnoustie, Arbroath and Montrose as well as several individual farms which are generally located away from the roadside. At its closest point the route is 600m distance from the proposed turbine. The section assessed runs for ~38km and is considered to be of medium sensitivity, as a busy transport route.

The ZTV indicates the turbine will first come into view for north bound traffic as the south passes by Monifieth. The turbine is heavily screened by the intervening landscape over this section of the route, with only the blade tips theoretically visible. These views would be screened by the intervening vegetation and other features present in this view. The turbine disappears from view for ~4km, screened completely from view by the surrounding landscape. As the route approaches Muirdrum the ZTV indicates the turbine will again become visible, remaining in the view over the next ~6km as the route approaches Arbroath.

The turbine will appear in front of the road user as they make their way towards Arbroath. **Viewpoint 7** was taken from the side of the A92 at Salmonds Muir and represents a typical view along this section of the road. Approaching Arbroath the turbine will become a more prominent feature in the view due to its location on the south-western edge of the settlement. The visible portion of the turbine would be viewed against the sky, with the lower sections screened by the intervening buildings. On approach to Arbroath the woodland around Elliot would limit views for a short time, as the views towards the turbine become more oblique. As the route arrives in Arbroath the turbine passes to the rear of the view.

Travelling south from Montrose the turbine first comes into view as the road passes by Upper Dysart, the turbine would not be an obvious feature from this location, heavily screened by the intervening built features, these views would occur for ~2km before the turbine is again screened from view by the surrounding landscape, the turbine remains hidden from view for ~7km reappearing to the north-east of Arbroath. The views on approach to Arbroath would be similar to those in **Viewpoint 5** although the A92 is slightly lower lying than the more elevated viewpoint location. On approach to Arbroath views would become increasingly screened by the built environment. Travelling through Arbroath views would become screened for a time. As the route passes by the football ground the views again open towards the coast, as the developed areas of the settlement pass to the rear of the view, the turbine would become visible for a short section of the road upon leaving Arbroath views would become quickly oblique as the route passes by Elliot Bridge the turbine passes to the rear of the view.

The magnitude of change for the route as a whole would be **medium**, resulting in a **moderate/minor** level of effect.

A933 Arbroath to Colliston

The A933 runs from Arbroath to Brechin, linking the coastal settlement with the A90 which runs both north and south. The section of the route assessed runs from Colliston to Arbroath. The route runs through a predominantly flat agricultural landscape, with large rectilinear fields flanking both sides of the route. Shelterbelt woodland peppers the landscape and at times the roadside. The section assessed runs for ~6km and is considered to be of medium sensitivity, as a local transport route.

The route turns off the A92 on the western south-western edge of Arbroath, travelling past the industrial estate and the proposed turbine, views of the turbine would be partially screened by the intervening buildings at the Maltings with the visible portion of the turbine viewed against the sky. Views of the turbine would occur for ~500-600m before the turbine moves to the rear of the view.

Travelling from Colliston towards Arbroath, the ZTV indicates that the turbine will come into view almost immediately, remaining in the view for the whole route into Arbroath. Despite this views of the turbine would be extremely limited the majority of the route is screened by roadside shelterbelt woodland, particularly around the disused Airfield. As the route enters Arbroath views would become increasingly intermittent with the built environment offering

a great deal of screening of the proposed turbine. As the route approaches the A92 the turbine would pass to the rear of the view.

Core Paths 151 & 152

There are a number of Core Paths within this area of Angus, with two paths passing close to the proposed Baird Malt site. These are Core Path 151 which passes between Elliot and Arbirlot and Core Path 152 which runs from Elliot towards Peasiehill Farm and the B9127. The Core Paths are considered to be of high sensitivity

Path 151 follows the route of a disused railway line and the path of the Elliot water. Its route is heavily wooded with some open views over the open section of the path towards the maltings and the caravan site in the land adjacent to the industrial estate. The turbine would appear in these views for a short time. Travelling towards Arbirlot on the path the views would become quickly screened by the dense mature woodland which surrounds the river banks. The magnitude of change for the route as a whole would be **low**, resulting in a **moderate** level of effect.

Path 152 passes to the west of the Maltings and the Hospitalfield industrial estate. Views of the proposed turbine would occur regardless of direction of travel over the whole section of the path, with the turbine appearing amongst the industrial units. The magnitude of change for the route as a whole would be **high**, resulting in a **major/moderate** level of effect.

7.9 Assessment of Cumulative Visual Effects

Wind Energy Development Included in the CLVIA

The cumulative assessment includes existing wind energy developments (those operating or under construction), proposals with planning permission, and those that are currently the subject of undetermined applications within a 60km radius of the Bairds Malt Wind Turbine site. Other known pre-application wind energy development proposals have been identified as part of the assessment process and considered in outline only, due to the more limited information available in connection with these proposals.

For the purpose of the assessment, consideration was given to turbines over 50m to blade tip, as in line with SNH guidance.

The list of other wind energy development sites to be included in the assessment has been confirmed with Angus Council and SNH and compiled from known wind energy development planning applications and formal requests for scoping opinions held by the various planning authorities.

All wind energy developments included or referred to in this assessment out to 60km are illustrated on a plan in **Figure 7.7**. Listed below in **Table 7.14** are the key projects, within 15km of the development which are likely to have some level of cumulative impact with Bairds Malt Wind Turbine, potentially appearing simultaneously or successively in views.

Table 7.14 - Summary of key Wind Energy Projects within 15km (Cumulative Study Area)

Development Name	Scale of Project (Single turbine, Cluster or Wind farm)	Tip Height (m)	Distance to Project (approx. in km)
Operational Projects			
North Mains of Cononsyth	Single Turbine	67m	8.1km
Pickerton	Single Turbine	84.5m	13.2km
Consented Projects			
Cuthlie	Single Turbine	77m	4km
Ascurry	Single Turbine	77m	10.5km
Greenhillock	Single Turbine	67m	13km
Stotfaulds	Single Turbine	77m	12.5km
Projects in Planning			
Crofts Farm	Cluster	80m	6km
Montquhir	Single Turbine	77m	8km
Upper Balmachie	Single Turbine	77m	8.5km
Dubton Farm	Single Turbine	77m	13km

Two or more wind developments are required for the occurrence of a cumulative visual effect. This assessment has therefore considered the development of Bairds Malt Wind Turbine in addition to the other wind farm sites in the landscape in order to test the landscape capacity of the area and provide conclusions for the CLVIA relevant to this proposal.

Figure 7.7 shows the location of all of the wind development currently operational, consented and in planning within a 60km radius of the proposed turbine at Bairds Malt Wind.

From this overall picture, it can be seen that the majority of operational developments in the area occur in the Igneous Hills landscape to the west of Bairds Malt Wind Turbine. Ark Hill and Scotston Hill are examples of this. Outwith Angus, larger scale developments are more common and are mostly located within Upland type landscape and spread out across the area. To the west, the larger wind farm of Drumderg sits within the upland landscape, while Tullo is situated to the north east. In the areas to the south and south-west of the proposed development, projects tend to be smaller scale clusters and single turbines. The Bairds Malt Wind Turbine would fit into the existing pattern of development across the Dipslope Farmland.

A series of potential cumulative ZTV's (based on submission status) is illustrated in **Figure 7.7** showing the potential cumulative ZTV for each of the key wind farms. The findings from the analysis of the cumulative visibility maps and cumulative viewpoint assessment have been used to form a conclusion as to the level of overall cumulative visual effects during operation as experienced by various receptors.

Cumulative Viewpoint Assessment

Each viewpoint assessed as part of the viewpoint assessment has also been considered cumulatively with all other wind energy projects identified within the 60km cumulative study area. A summary of potential cumulative visibility assessment from each of the

viewpoints is provided in **Table 7.15**. Further detail can be found in the viewpoint assessment located in **Appendix 2.1**.

Table 7.15 - Summary of Cumulative Viewpoint Analysis

Viewpoint No.	Sensitivity	Magnitude	Level of Effect
Viewpoint 1: Queens Drive Arbroath			
Bairds Malt Wind Turbine and Operational Wind farms		-	-
Bairds Malt Wind Turbine and Operational, Consented Wind farms	High	Negligible	Moderate/Minor
Bairds Malt Wind Turbine and Operational, Consented, Planned Wind farms		Negligible	Moderate/Minor
Viewpoint 2: Elliot Bridge			
Bairds Malt Wind Turbine and Operational Wind farms		-	-
Bairds Malt Wind Turbine and Operational, Consented Wind farms	High	-	-
Bairds Malt Wind Turbine and Operational, Consented, Planned Wind farms		-	-
Viewpoint 3: Arbirlot Road West			
Bairds Malt Wind Turbine and Operational Wind farms		-	-
Bairds Malt Wind Turbine and Operational, Consented Wind farms	High	-	-
Bairds Malt Wind Turbine and Operational, Consented, Planned Wind farms		-	-
Viewpoint 4: Boulzie Hill			
Bairds Malt Wind Turbine and Operational Wind farms		■ -	■ -
Bairds Malt Wind Turbine and Operational, Consented Wind farms	High	Negligible	Moderate/Minor
Bairds Malt Wind Turbine and Operational, Consented, Planned Wind farms		Negligible	Moderate/Minor
Viewpoint 5: Bearfauld Road			
Bairds Malt Wind Turbine and Operational Wind farms		Negligible	Moderate/Minor
Bairds Malt Wind Turbine and Operational, Consented Wind farms	High	Negligible	Moderate/Minor
Bairds Malt Wind Turbine and Operational, Consented, Planned Wind farms		Negligible	Moderate/Minor
Viewpoint 6: East Haven			
Bairds Malt Wind Turbine and Operational Wind farms		-	-
Bairds Malt Wind Turbine and Operational, Consented Wind farms	High	-	-
Bairds Malt Wind Turbine and Operational, Consented, Planned Wind farms		-	-
Viewpoint 7: A92, Salmonds Muir			
Bairds Malt Wind Turbine and Operational Wind farms		-	-
Bairds Malt Wind Turbine and Operational, Consented Wind farms	Medium	-	-
Bairds Malt Wind Turbine and Operational, Consented, Planned Wind farms		-	-
Viewpoint 8: Patrick Allan Fraser Street			
Bairds Malt Wind Turbine and Operational Wind farms		-	-
Bairds Malt Wind Turbine and Operational, Consented Wind farms	High	-	-
Bairds Malt Wind Turbine and Operational, Consented, Planned Wind farms		-	-
Viewpoint 9: Firthfield			

Viewpoint No.	Sensitivity	Magnitude	Level of Effect
Bairds Malt Wind Turbine and Operational Wind farms		-	-
Bairds Malt Wind Turbine and Operational, Consented Wind farms	High	Negligible	Moderate/Minor
Bairds Malt Wind Turbine and Operational, Consented, Planned Wind farms		Negligible	Moderate/Minor
Viewpoint 10: Braeside			
Bairds Malt Wind Turbine and Operational Wind farms		-	-
Bairds Malt Wind Turbine and Operational, Consented Wind farms	High	-	-
Bairds Malt Wind Turbine and Operational, Consented, Planned Wind farms		-	-
Viewpoint 11: A933 Montreathmont			
Bairds Malt Wind Turbine and Operational Wind farms		-	-
Bairds Malt Wind Turbine and Operational, Consented Wind farms	Medium	-	-
Bairds Malt Wind Turbine and Operational, Consented, Planned Wind farms		-	-
Viewpoint 12: Dodd Hill			
Bairds Malt Wind Turbine and Operational Wind farms		Negligible	Moderate/Minor
Bairds Malt Wind Turbine and Operational, Consented Wind farms	High	Negligible	Moderate/Minor
Bairds Malt Wind Turbine and Operational, Consented, Planned Wind farms		Negligible	Moderate/Minor
Viewpoint 13: Turin Hill			
Bairds Malt Wind Turbine and Operational Wind farms		Negligible	Moderate/Minor
Bairds Malt Wind Turbine and Operational, Consented Wind farms	High	Negligible	Moderate/Minor
Bairds Malt Wind Turbine and Operational, Consented, Planned Wind farms		Negligible	Moderate/Minor
Viewpoint 14: Tentsmuir Recreational Area			
Bairds Malt Wind Turbine and Operational Wind farms		Negligible	Moderate/Minor
Bairds Malt Wind Turbine and Operational, Consented Wind farms	High	Negligible	Moderate/Minor
Bairds Malt Wind Turbine and Operational, Consented, Planned Wind farms		Negligible	Moderate/Minor
Viewpoint 15: St Andrews			
Bairds Malt Wind Turbine and Operational Wind farms		Negligible	Moderate/Minor
Bairds Malt Wind Turbine and Operational, Consented Wind farms	High	Negligible	Moderate/Minor
Bairds Malt Wind Turbine and Operational, Consented, Planned Wind farms		Low	Moderate
Viewpoint 16: White Caterthun			
Bairds Malt Wind Turbine and Operational Wind farms		Negligible	Moderate/Minor
Bairds Malt Wind Turbine and Operational, Consented Wind farms	High	Negligible	Moderate/Minor
Bairds Malt Wind Turbine and Operational, Consented, Planned Wind farms		Negligible	Moderate/Minor

Cumulative Assessment of Major Tourist and Transport Routes

An assessment of the potential for cumulative effects from all major routes within the study area has been undertaken and includes the following:

- A92 – Monifieth to Montrose.

- A933 – Arbroath to Colliston.
- Core Paths 151 & 152

A summary of significance of impact is outlined in **Table 7.16** at the end of the assessment.

A92 Monifieth to Montrose

Operational

There are no significant cumulative views with any operational developments when travelling in either direction along this section of the A92. The cumulative magnitude of change when considering operation projects is **none**.

Consented

There may be some oblique views towards the Cuthlie turbine to the left of the roadside on approach to Arbroath although these views are likely to be subject to some screening from localised vegetation.

The cumulative magnitude of change when considering consented projects will become **negligible**.

In Planning

Cumulative views between Upper Balmachie and Bairds would be limited as the Bairds Malt turbine is not an overly prominent feature over this section of the route. Similarly is also visible over this section of the route, located to the west of the road. The Upper Balmachie turbine would appear simultaneously with the Bairds malt turbine intermittently visible in the distance. As the turbine move to the rear of the view, the Bairds Malt turbine will begin to come into view. Travelling south from Montrose there are no significant cumulative effects between Bairds and any planning development. The cumulative magnitude of change will remain **negligible**.

A933 Arbroath to Colliston

Operational

There are no significant cumulative views with any operational developments when travelling in either direction along this section of the A92. The cumulative magnitude of change when considering operation projects is **none**.

Consented

The Cuthlie turbine is obliquely visible as the route leaves Colliston, quickly passing to the rear of the view, and there would be no significant cumulative effects with the Bairds malt turbine. The cumulative magnitude of change when considering consented projects will remain **negligible**.

In Planning

The Montquhir and Upper Balmachie turbines all appear in the same general view for ~1.5km as the route approaches Arbroath, however, this section of the route is heavily wooded and views of the more distant turbines are unlikely to occur as the Bairds malt

turbine is also likely to be heavily screened in these areas. The cumulative magnitude of change will remain **negligible**.

Core Paths 151 & 152

There are no cumulative effects on the Core Paths.

Table 7.16 - Summary of Cumulative Viewpoint Route Analysis

Route	Sensitivity	Magnitude	Level of Effect
A92 Monifieth to Montrose			
Bairds Malt Wind Turbine and Operational Wind farms		-	-
Bairds Malt Wind Turbine and Operational, Consented Wind farms	Medium	Negligible	Minor
Bairds Malt Wind Turbine and Operational, Consented, Planned Wind farms		Negligible	Minor
A933 Arbroath to Colliston			
Bairds Malt Wind Turbine and Operational Wind farms		-	-
Bairds Malt Wind Turbine and Operational, Consented Wind farms	Medium	Negligible	Minor
Bairds Malt Wind Turbine and Operational, Consented, Planned Wind farms		Negligible	Minor

7.10 Summary of Assessment Conclusions

Introduction

The proposed Bairds Malt Wind Turbine is located within the Maltings within the Hospitalfield Industrial Estate on the south-western edge of Arbroath. The area forms part of the urban fringe of Arbroath and would sit alongside various other industrial features, primarily the Maltings.

Landscape Design

The project includes a single wind turbine with a hub height of 55m and a maximum tip height of 77m. The turbine size, layout and location have been proposed to fit alongside the existing infrastructure on the site including the drying towers associated with the maltings.

The associated infrastructure including substation has been located sensitively to minimise visual impact. There will be no significant effects resulting from the construction and operation of the associated infrastructure, although negative effects are anticipated during the temporary construction period. These would be restored and mitigated on completion of the construction period.

Townscape/Landscape Assessment

The proposed Bairds Malt Wind Turbine is located within urban fringe of Arbroath, within the Elliot Industrial Estate adjacent to the Dipslope Farmland Landscape Character Area, and would affect a proportion of part of this area. As an urban area on the edge of this character area, which is heavily man-modified and busy with activity, there would be very little direct effects on the character, although there would be indirect effects relating to its visibility across the landscape character area to the south-west and west.

Considering the wider area, the assessment has concluded that there would be no significant indirect effects from any of the other landscape character areas within the study area.

The proposed turbine is located within an industrial zone on the south-western edge of Arbroath. The turbine appears predominately in views alongside the Maltings Plant infrastructure and would be seen alongside these industrial features already present within the view. The turbine may appear slightly more prominent in vertical scale, however, it will fit well with the industrial cladding of the buildings in the surrounding landscape.

Considering the wider area, the assessment has concluded that there would be no significant indirect effects from any of the other landscape character types or within the study area.

Effects on Designated Landscapes

The landscape of the site area is not designated and as such there will be no direct effects of any designated landscape and any effects would be as a result of indirect landscape effects from designated areas within the study area. The assessment has concluded that there would be no significant indirect landscape effects on designated landscape areas including Areas of Great Landscape Value, Special Landscape Areas and Gardens and Designed Landscapes.

Visual Assessment

The viewpoint analysis is contained in **Appendix 2.1** and indicates that there would be no Major or Major / Moderate visual effects occurring beyond ~3km from the proposed turbine. The conclusions from the viewpoint assessment have been used to form a view as to the level of overall visual effects within the study area.

Visual Effects: Construction Period

There will be no significant visual effects resulting from the construction period and visibility of the ground based activity. Views of concentrated areas of construction could however lead to a temporary and negative effect that in some cases may appear more disruptive than the finished development. Post construction, the appearance of the site would recover a calmer visual character with negligible levels of activity visible on site from the nearest visual receptors.

Visual Effects: Operational Period

Views of the proposed turbine would be limited from within the neighbouring settlement of Arbroath. The turbine appears as part of the skyline from some of the more elevated open locations within the settlement, appearing in views alongside the Maltings Plant. The two developments appear similar in type with the turbine a fairly industrial feature, similar in colour to the concrete and metal cladding that makes up the Maltings Plant buildings. The majority of the settlement will gain little or no views of the proposed development with the majority of the residential areas located to the north and west of the settlement. The vegetation and built features which surround these areas screening potential views. The neighbouring Hospitalfield housing estate will experience some views from the areas around

the properties, with the turbine appearing alongside the Maltings Plant which is already an easily discernible feature in the views from these more open areas around the housing scheme.

Cumulative Landscape and Visual Effects

The Bairds Malt Wind Turbine would rarely be seen in conjunction with other wind developments. The nearest operating turbine is located over 6km inland from the coastal settlement of Arbroath, with the nearest consented development over 10km from the settlement.

Certain Impact

Considering the introduction of the proposed Bairds Malt Wind Turbine development and the effects it will have on operational developments within the study area, it is considered that the overall level of cumulative effect due to Bairds Malt Wind Turbine would be negligible.

Likely Impact

Considering the introduction of the proposed Bairds Malt Wind Turbine development and the effects it will have on operational and consented projects in the study area, it is considered that the overall level of cumulative effect due to Bairds Malt Wind Turbine would remain negligible.

Uncertain Impact

In addition to the above, when considering all the currently planned wind energy developments, the impact of Bairds Malt Wind Turbine would remain negligible.

7.11 Summary of Effects

It is concluded that the addition of a single turbine to the industrial zone on the south-western edge of Arbroath would have some potentially significant effects, relating to some of the nearest residential receptors, views from some areas of Arbroath and from five of the sixteen viewpoints. While views from some of the residential properties are deemed significant, the impact would not be unacceptable and although prominent in views the turbine would not be an overbearing feature which dominates the receptor nor would it be an overbearing structure that is consistently visible. The turbine appears in views which already contain strong industrial elements from the neighbouring maltings and does not open up any new areas of visibility that may be deemed as scenic or picturesque.

Typically the turbine is visible along with the infrastructure associated with the Maltings which has been a feature of the skyline in Arbroath for over 40 years. The turbine relates well to the scale of the surrounding buildings and would add a vertical feature to the views which already contain several industrial elements, and take up only a small extent of the horizontal view. As well as the vertical scale, the turbine will fit well with the industrial nature of the buildings with a similar colour palette. These effects are fairly localised occurring within 2-3km of the turbine, with much of the settlement remaining free from views due to the built up nature of the settlement.

The turbine would be introduced to an industrialised area of the local landscape which is defined by the maltings operation on site. The addition of a 77m wind turbine to these features will have a low level of impact from a landscape and visual perspective when consider within the wider townscape and landscape setting.

8 Noise

8.1 Introduction

This noise assessment has been carried out in accordance with the recommendations of *ETSU-R-97, The Assessment and Rating of Noise from Wind Farms* and more recent guidelines issued by the Institute of Acoustics in 2009 and 2013³. Detailed predictions of the operational noise of the Enercon E44 turbine, the candidate turbine model of the proposed development, have been made and compared with the measured background noise levels used to derive noise related constraints for the project. Using this data, an assessment of the likelihood of the project meeting derived noise limits has been undertaken.

The site is unusual for a wind development in that it includes urban and industrial areas. The approach developed for this assessment was therefore the result of a six month period of consultation with Angus Council Environmental Health who offered guidance at each stage of the process. Rather than assess the proposed development as an additional on-site process at Bairds Malt (BS 4142), the Council preferred that an ETSU-R-97 noise assessment be conducted and that measured noise levels be referenced to wind speeds derived from a hub height wind speed measurement.

A preliminary assessment was conducted to identify the source, position, sound power and pattern of use, of the most significant noise producing processes on-site at Bairds Malt⁴. This consisted of a number of attended noise measurements across the site and over the six month period. Unattended noise measurements were also made at two locations identified as having the potential to be the most noise sensitive; these measurements were made during a three week period when on-site activity was at an annual minimum.

Following this, a background noise survey has been carried out at four properties representative of the nearest noise sensitive receptors, to establish noise related planning conditions for the proposal, should it be consented. Given the relatively high number of potential noise receptors, particular care was taken in ensuring that noise monitoring equipment was placed in positions likely to measure the quietest background noise levels in each location. These locations were agreed in advance with Angus Council Environmental Health who oversaw the deployment of noise monitoring equipment as the survey got underway. The survey equipment was deployed on the 15th January 2014 and remained for a period of approximately four weeks.

Terminology

The symbols used for noise levels in this report are:

- L_{WA} is the A-weighted sound power level – a measure of the total sound energy emitted by a source of noise;

³ Institute of Acoustics, *Prediction and assessment of wind turbine noise – agreement about relevant factors for noise assessment from wind energy projects*, Acoustics Bulletin, March/April 2009; and, Institute of Acoustics, *“A good practice guide to the application of ETSU-R-97 for the assessment and rating of wind turbine noise”* — issued 05-2013

⁴ The positions and patterns of use of the most significant noise sources at Bairds are shown at Appendix 1

- $L_{A,eq}$ is the A-weighted equivalent continuous sound pressure level, which is a measure of the total ambient noise at a given place at a given time; and
- $L_{A90,10min}$ is the A-weighted sound pressure level exceeded for 90 percent of the time in the averaging time period specified – in this case 10 minutes – and is the index most widely used for background noise level measurements.

ETSU-R-97 states that the $L_{A90,10min}$ noise descriptor should be adopted for the noise assessment and the more recent IoA guidance indicates that 2dB (A) should be subtracted from $L_{A,eq}$ values when converting them to $L_{A90,10min}$ values. The wind speeds referred to in this report are:

- v_{10} wind speeds are standardised 10m wind speeds. All background noise, turbine sound power levels and predicted turbine noise levels are quoted with reference to standardised 10m wind speeds. These were derived from wind speeds measured at 55m height above ground level (hub height) and extrapolated to 10m wind speeds assuming a standard wind profile.
- v_h wind speeds are hub height wind speeds measured directly with a LiDAR device located adjacent to the proposed turbine location and used to extrapolate to v_{10} wind speeds.

Guidance

Potential impacts

Noise can have an effect on the environment and on the quality of life enjoyed by individuals and communities. The impact of noise can therefore be a material consideration in the determination of planning applications. Noise impacts can arise from three distinct areas of the wind farm development:

- The construction of the wind turbine;
- During operation of the wind turbine; and
- Resulting from increased traffic flow during the construction and operation stages.

Given the scale of the development, it is anticipated that construction noise will be short term and in the most part will not increase background noise levels beyond the recommended limits set out by the World Health Organisation and the former Department of the Environment.

National guidelines

Guidance for assessing operational noise from wind farms is given in:

- 'ETSU-R-97: the Assessment and Rating of Noise from Wind Farms (1997)'; The Department of Trade and Industry. (usually referred to as the Noise Working Group Recommendations); and

The Institute of Acoustics (IoA) has since provided clarity on requirements for noise assessment of wind turbines in an attempt to encourage a standardised approach to this type of measurement:

- ‘Prediction and assessment of wind turbine noise – agreement about relevant factors for noise assessment from wind energy projects’, Acoustics Bulletin, March/April 2009, IoA
- More recently; ‘A good practice guide to the application of ETSU-R-97 for the assessment and rating of wind turbine noise’, May 2013, IoA; and the related Supplementary Guidance Notes that followed.

Noise limits

In September 1996, the Noise Working Group published its recommendations in ETSU-R-97. The report describes a framework for the measurement of wind farm noise and includes suggested noise limits, derived with reference to existing standards and guidance relating to the emission of noise from various sources existing at that time. The ETSU-R-97 guidelines recommend that wind turbine noise should be limited to an absolute lower limit, of 35 - 40dB(A) [$L_{A90,10min}$] for quiet daytime periods and 43dB(A) for night-time periods, or 5dB(A) above the background noise levels, whichever the greater.

However, following World Health Organisation guidelines on sleep disturbance⁵, a reduced lower fixed limit of 38dB(A) is proposed for night-time periods. A 38dB(A) lower limit is also proposed for quiet daytime periods. Measurement data suggested that the lowest representative backgrounds in the area surrounding Bairds Malt were around 38dB(A) L_{A90} . A 38dB(A) limit would therefore be justified as industrial noise from the Elliot Industrial Estate (Including Bairds Malt) during amenity hours, raises background noise levels such that the possibility of amenity loss through turbine noise being a margin above background noise, as could occur in quieter locations, is greatly reduced. It is also suggested that where a resident has a demonstrable financial interest in the project, a lower fixed limit of 45dB (A) should apply at that property during both quiet daytime and night-time periods.

The quiet daytime periods (amenity hours), are defined as:

- 18:00 – 23:00 – Monday to Friday;
- 13:00 – 23:00 – Saturdays; and
- 07:00 – 23:00 – Sundays.

Night time periods are: 23:00 – 07:00 each day

8.2 Background noise measurements

Noise monitoring was conducted at four properties to characterise the prevailing background noise environment of the area. Measurements were made between the 18th of January and the 20th of February 2014. Each of the four residents was provided with a ‘noise diary’ in which they were encouraged to make a note of anything unusual occurring that was audible at their property.

⁵ World Health Organisation, “Guidelines for Community Noise”, p40, 1999

Location map with 35dB(A) noise contour

Figure 8.1 shows the location of the proposed wind turbine, the LiDAR and the noise monitoring positions. The noise contour encloses an area where the worst case turbine noise levels are predicted to exceed 35dB(A) [LA90,10min]. This contour has been used to define the study area. The prediction assumes downwind conditions.

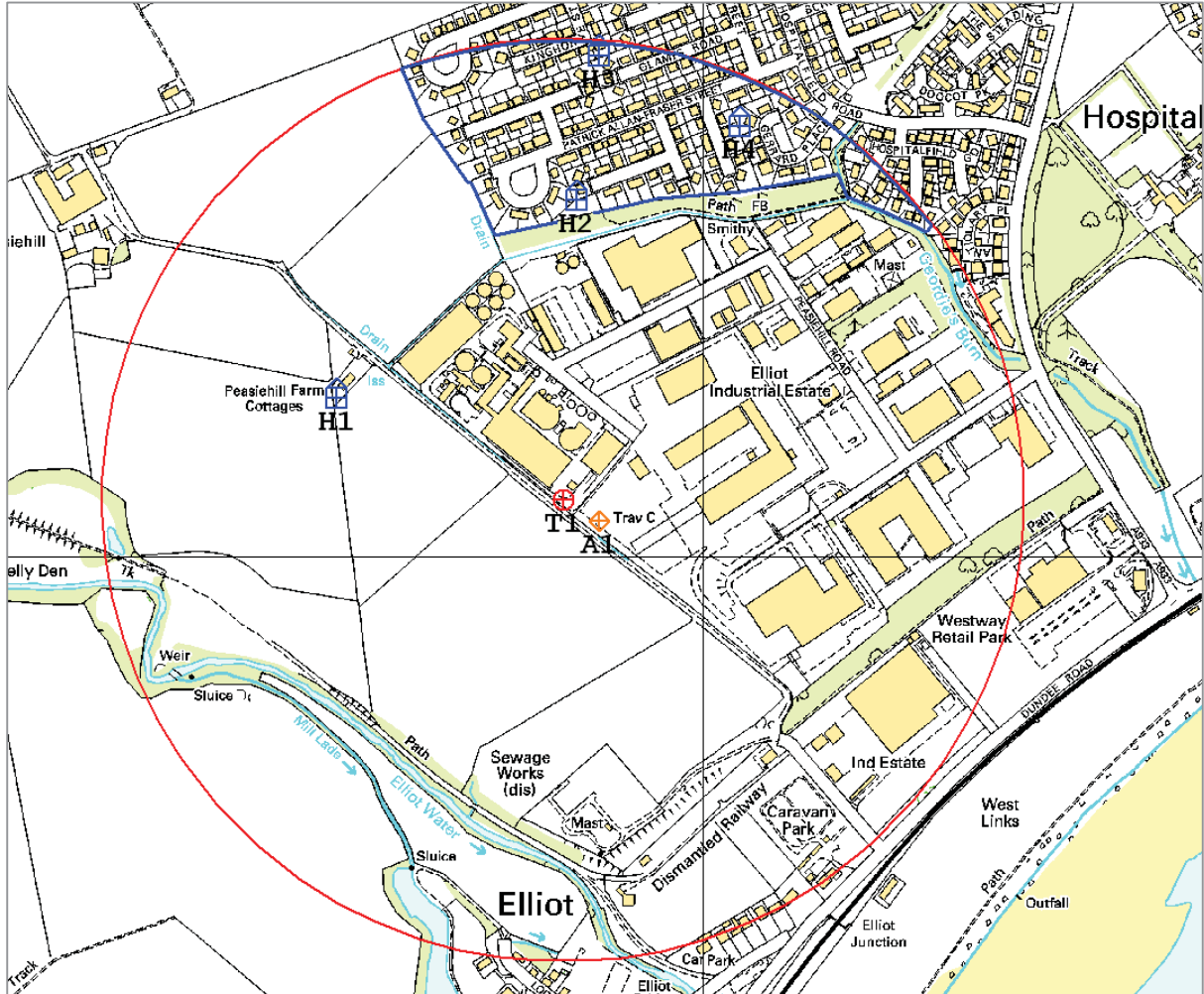






Figure 8.1: Map showing turbine positions and potential noise receptors

Key:

- Proposed wind turbine: T1 
- LiDAR: A1 
- Noise monitoring positions: Peasiehill Cottages  H1
- Hospitalfield estate  H2, H3, H4. The blue outline encompasses the potential noise sensitive receptors represented by H2 - 4

Noise monitoring location H1

Peasiehill Cottages form a small terrace to the west of Bairds Malt and north of the proposed turbine position. A suitable monitoring position was located in the amenity area at the west end of the terrace. As many of the most significant noise sources at Bairds are located on its western side, Peasiehill Cottages are the more exposed of the dwellings near Bairds to those sources. Most often these noise sources combine to produce a unified hum

occupying a broad range of frequencies. However, pellet production can intermittently produce a percussive noise that was observed to increase noise levels by between 6dB – 10dB for a period of up to 30 minutes.

Noise sources other than those from Bairds, observed during site visits, were the calls from groups of gulls, distant traffic noise from the A92 that joins Arbroath with Dundee, and the noise from occasional military aircraft.

The monitoring position was sufficiently distant from building facades, vegetation and boiler flues, for these features not to cause artificially elevated noise levels to be measured. **Figure 8.2** shows the monitoring position at Peasiehill Cottages and the western corner of site at Bairds Malt.



Figure 8.2: Satellite image showing detail at Peasiehill Cottages.

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Key

Monitoring position  Occupied dwellings 

A photograph of the monitoring position in relation to the terrace façade and Bairds Malt is shown in **Figure 8.3**.



Figure 8.3: Noise monitoring position at Peasiehill Cottages.

Details of the monitoring equipment used for the assessment is shown in **Table 8.17**.

Equipment List	
Sound Level Meter (IEC 61672-1 Class 1):	<i>Rion NL-31 - Serial No. 01283511</i>
Microphone:	<i>Rion UC-53A - Serial No. 315537</i>
Pre-amp:	<i>Rion NH-21 - Serial No. 29268</i>
Acoustic Calibrator (IEC 60942 Class 1):	<i>Rion NC-74 - Serial No. 34494275</i>
Tripod:	<i>Single integrated pole (1.40m)</i>
Wind Shield:	<i>Double skin Rion WS-03</i>
Environmental Case:	<i>Yes</i>
Measurement GPS position:	<i>361546,740192</i>
Nearest reflecting elements & distances from microphone:	<i>Property façade >10m Shed >8m Fence >6m</i>

Table 8.17: List of equipment used at Peasiehill Cottages

Noise monitoring location H2

Of the four possible locations considered as candidates to represent the dwellings on Patrick Allan Fraser Street nearest to Bairds Malt, this location was chosen as being the most representative. Noise levels at two of the other locations had the potential to be affected by prominent boiler flues and the third was out on the western periphery of the estate and relatively exposed to the prevailing south-westerly winds.

The amenity area at H2 is relatively compact; in order that the measurement position is away from vegetation and more than 3.5m from all significant surfaces, it was placed against a concrete wall, shown in **Figure 8.5**. It was judged that the wall-top area within 3.5m of the microphone was sufficiently small that it would not compromise noise measurements. H2 has shelter from all wind directions, particularly the prevailing south-westerlies.

Figure 8.4 shows the noise monitoring position at H2. It should be noted that, because the monitoring period was undertaken in January and February, foliage and vegetation generally, was at a minimum.



Figure 8.4: Satellite image including H2 at Patrick Allan Fraser Street.

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Key

Monitoring position ↓ Dwelling associated with the monitoring position 🏠

The daytime noise environment at H2 was predominantly broadband industrial noise emanating from both Bairds Malt and the Elliot Industrial Estate in general. This position is the most exposed to the overhead grain conveyors at Bairds which are used intermittently. Photographs of the monitoring position in relation to the property façade and Bairds Malt are shown in **Figure 8.5**:



Figure 8.5: Noise monitoring position at H2.

Details of the monitoring equipment used at H2 are listed in Table 8.18:

Equipment List	
Sound Level Meter (IEC 61672-1 Class 1):	Rion NL-31 - Serial No. 01283510
Microphone:	Rion UC-53A - Serial No. 315536
Pre-amp:	Rion NH-21 - Serial No. 29267
Acoustic Calibrator (IEC 60942 Class 1):	Rion NC-74 - Serial No. 34494275
Tripod:	Single integrated pole (1.40m)
Wind Shield:	Double skin Rion WS-03
Environmental Case:	Yes
Measurement GPS position:	361843,740432
Nearest reflecting elements & distances from microphone:	Property façade >8m Shed >5m Side wall >5m Adjacent wall-top <3.5m

Table 8.18: List of equipment used at H2

Noise monitoring location H3

H3 is located on Kinghorne Street which lies to the north of Patrick Allan Fraser Street and is more distant from Bairds Malt and the proposed turbine location. After reviewing a number of potential sites, this location was elected to be the most representative of the dwellings that lie towards the north of the housing estate but within the 35dB(A) noise contour shown in **Figure 8.1**.

The noise environment at H3 was noticeably quieter than H2; industrial noise was much less distinct from the more general hum of what appeared to be distant traffic. The amenity area at H3 is relatively large and is located on its southern and eastern sides. The boiler flue is located on the building’s northern side. A suitable monitoring position was located on the south side of the property, more than 10m from a large evergreen shrub and more than 3.5m from all significant surfaces. The monitoring position has shelter from all wind directions. **Figure 8.6** shows a satellite image of H3 at Kinghorne Street.



Figure 8.6: Satellite image including H3 at Kinghorne Street.

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Key

Monitoring position ↓ Associated dwelling 🏠

Photographs of the monitoring position in relation to the property façade and amenity perimeter in the direction of Bairds Malt is shown in **Figure 8.7**.



Figure 8.7: Noise monitoring position at H3.

Details of the monitoring equipment used for the assessment is shown in **Table 8.19**

Equipment List	
Sound Level Meter (IEC 61672-1 Class 1):	<i>Rion NL-31 - Serial No. 00903982</i>
Microphone:	<i>Rion UC-53A - Serial No. 317501</i>
Pre-amp:	<i>Rion NH-21 - Serial No. 33990</i>
Acoustic Calibrator (IEC 60942 Class 1):	<i>Rion NC-74 - Serial No. 34494275</i>
Tripod:	<i>Single integrated pole (1.40m)</i>
Wind Shield:	<i>Double skin Rion WS-03</i>
Environmental Case:	<i>Yes</i>
Rain Gauge:	<i>Davis II (tipping bucket type)</i>
Measurement GPS position:	<i>361872,740615</i>
Nearest reflecting elements & distances from microphone:	<i>Property façade >5m 1.2m high wall >5m</i>

Table 8.19: List of equipment used at H3

Noise monitoring location H4

H4 was chosen to represent the dwellings on Gerrard Street and Hospitalfield Gardens. The chosen property has a relatively large amenity area and was comparatively quiet relative to other potential sites, on the day of deployment. **Figure 8.8** shows the noise monitoring position at H4 (Gerrard Street).



Figure 8.8: Satellite image showing detail at Gerrard Street.

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Key

Monitoring position ↓ Dwelling associated with the monitoring position 🏠

The background noise environment had a noticeably different character than at the other monitoring positions. This may be due to its proximity to the more easterly portion of the Elliot Estate and the industrial processes active there. H4 is also nearer the coastline and Arbroath town centre than the other monitoring locations, but it also appeared to be the quietest. The amenity area is very sheltered being bordered by shrubs and small trees.

Figure 8.9 shows the monitoring position at H4 in relation to the property façade and sheltering vegetation to the south.



Figure 8.9: Noise monitoring position at H4.

Details of the monitoring equipment used at H4 are listed in Table 8.20

Equipment List	
Sound Level Meter (IEC 61672-1 Class 1):	Rion NL-31 - Serial No. 00603864
Microphone:	Rion UC-53A - Serial No. 316984
Pre-amp:	Rion NH-21 - Serial No. 32969
Acoustic Calibrator (IEC 60942 Class 1):	Rion NC-74 - Serial No. 34494275
Tripod:	Single integrated pole (1.40m)
Wind Shield:	Double skin Rion WS-03
Environmental Case:	Yes
Measurement GPS position:	362049,740525
Nearest reflecting elements & distances from microphone:	Property façade >5m

Table 8.20: List of equipment used at H4

Noise monitoring

Noise levels were recorded using Rion NL-31 Class 1 integrating sound level meters housed in an environmental case, set to log $L_{A90,10min}$ and $L_{Aeq,10min}$ throughout the monitoring period. A double skin wind shield was fitted to the microphone to ensure continued accuracy at higher wind speeds. Acoustic calibration of the device was carried out before, during and after the monitoring period using a Rion NC-74 Acoustic Calibrator. The acoustic calibrator is calibrated every year, while the sound level meter is calibrated by an external body every two years. This ensures IEC 61672 Class 1 compliance.

Wind speed measurement

Wind speed was measured by a Galion G250-SRI LiDAR unit positioned as near to the proposed turbine location as practical. The turbine location was not suitable due to its proximity to the ~30m tall grain dryers and a row of small trees. It was considered by the LiDAR installation technician that these features had the potential to interfere with the proper functioning of the LiDAR. A suitable location was found in an adjacent storage yard just 50m from the proposed turbine location.

The LiDAR was installed at 361872E,440045N on 15th January 2014. Wind speeds used in this noise assessment were derived from a 55m wind speed measurement. **Table 8.21** lists the met-mast instruments and calibration dates. Data was recorded by the Le-Net data-logging system from Logic Energy, accessible via GSM. Measurements were made over a sufficient period for an appropriate range of wind speeds to be recorded.

Sensor	Model	Unit number	Date of last calibration
LiDAR	G250	SR02	10/06/2013
Rain gauge	Davis II	-	-

Table 8.21: LiDAR instruments and calibration dates

Figure 8.10 shows the LiDAR position relative to the Grain Driers near the proposed turbine position.



Figure 8.10: LiDAR position

8.3 Data reduction

Exclusions – Atypical data

Rainfall has the potential to raise background noise levels; rainfall data was recorded at both H4 and the LiDAR position throughout the monitoring period. The data were compared, compiled and used to flag the presence of rain in the area. For the avoidance of doubt, noise data logged at any of the four monitoring positions during a 10 minute period when rainfall was logged, were excluded automatically. Any 10 minute period preceding or following a period when rain was logged that appears to have been affected by rain, was also excluded.

Time histories of the noise levels recorded at all monitoring positions were interrogated for atypical noise levels that were time dependent or one-off events that appeared not to be associated with the wind conditions. The time histories were also cross-referenced so that the effect of a noise event evident at one monitoring position could be assessed at the others. These atypical data were also removed; all excluded data are shown in the resulting scatter plots for information but are excluded from the regression analysis.

Adequate dataset

A minimum of 200 valid data points is required during both amenity hours and night time periods (100 where data has been directly filtered). Sufficient data were recorded for downwind conditions to be filtered and analysed in isolation. Downwind conditions from the perspective of the receptor are defined as winds arriving from the turbine position $\pm 80^\circ$, based on evidence from the 'Joule project'⁶; in this case, the receptor is taken as the monitoring position.

⁶ Institute of Acoustics, "A good practice guide to the application of ETSU-R-97 for the assessment and rating of wind turbine noise", 2013, p22; 4.4.2 / 4.4.3

To establish the applicable noise limits, data were plotted against the concurrent v_{10} wind speeds measured by LiDAR, and correlations of noise levels to wind speed were established using third or fourth order polynomial functions selected on the basis of 'best fit'; the function and correlation coefficient (R^2) values are stated on each chart.

8.4 Wind turbine noise prediction

Propagation model

The International Standard ISO 9613, 'Acoustics – Attenuation of Sound During Propagation Outdoors - Part 2', noise propagation model has been used for the turbine noise calculations. L_{Aeq} noise propagation was modelled using WindFarm v4.2.1.7 by ReSoft Ltd, which implements the ISO 9613 model. L_{A90} levels were derived by subtracting two decibels from the L_{Aeq} values as per the ETSU-R-97 guidance.

The following input parameters are assumed and are consistent with current guidance. Broadband sound power levels are listed for information but have not been used. Octave band calculations were carried out with measured noise levels obtained via the turbine manufacturer assuming atmospheric attenuation coefficients corresponding to 10°C and 70% humidity, a ground attenuation factor of $G=0.5$ (representing semi-soft ground), and a receptor height of 4m. No barrier correction is applicable to the calculations in this case as at least some portion of the rotor is predicted to be visible from all sensitive dwellings.

Sound Power Levels

The proposed candidate turbine model is the Enercon E44 with a hub height of 55m. **Table 8.22** shows the measured octave band levels for the candidate turbine model with a hub height of 50m. These levels do not include measurement uncertainty (Q).

L _{WA} (dB)	Standardized v_{10} wind speed (ms^{-1})			
	7	8	9	10
Octave band				
63Hz	80.7	83.7	84.4	84.2
125Hz	87.5	89.2	90.9	89.9
250Hz	92.5	92.8	93.1	93.3
500Hz	93.5	94.9	96.0	96.3
1000Hz	94.8	96.9	97.5	97.4
2000Hz	92.0	94.2	94.0	94.1
4000Hz	85.3	86.9	86.7	86.8
8000Hz	80.6	80.8	80.4	79.9

Table 8.22: Measured octave band noise levels as a function of wind speed⁷

The levels in **Table 8.22** require an upward adjustment due to the 5m increase in hub height. This is calculated to be 0.24 dB and is added to all the above octave band levels.

Measurement uncertainty

Measurement uncertainty (Q) is stated in the noise report for each wind speed. Total uncertainty is calculated by multiplying Q by a factor of 1.645 and shown in Table 8.23 below:

Standardised 10m wind speed (m/s)	7	8	9	10
Measurement uncertainty (Q) dB(A)	0.75	0.83	0.83	0.86
Total uncertainty (Q x 1.645) dB(A)	1.23	1.37	1.37	1.41

⁷ Noise Report: *WICO 042SE207_pdf*

Table 8.23: Measurement uncertainty

Warranted Broadband Levels

Table 8.24 shows the warranted broadband levels for the candidate turbine model excluding uncertainty.

Warranted Broadband Noise levels (55m hub)				
Standardized v_{10} wind speed (ms^{-1})	7	8	9	10
LWA (dB)	101.1	102.6	103.0	103.0

Table 8.24: Warranted broadband levels as a function of wind speed⁸

The 900kW E44 reaches rated power before a v_{10} of 10ms^{-1} is reached; therefore it is assumed that sound power levels do not increase at higher wind speeds.

Predicted noise levels at wind speeds below 7ms^{-1}

Sound power levels for wind speeds of 4, 5 and 6ms^{-1} are not available. The mean rate of decrease in the predicted levels at the monitoring positions, from 8ms^{-1} to 7ms^{-1} is $1.7\text{dB(A)}/\text{ms}^{-1}$. This rate is extrapolated to estimate the sound power for wind speeds of 6, 5 and 4ms^{-1} . **Figure 8.11** shows warranted broadband levels for the 900kW E44 with the extrapolated sound power levels for the lower wind speeds, alongside the levels for an 800kW E48 turbine; the closest relative in the range of Enercon turbine models.

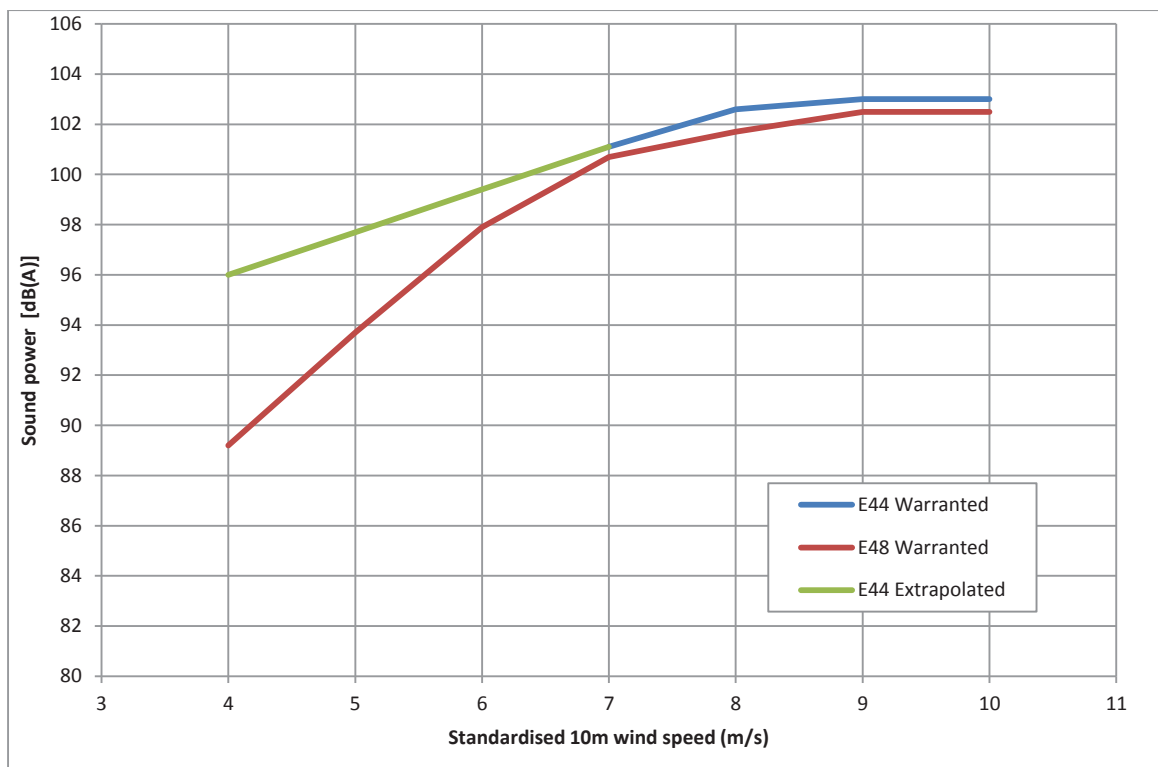


Figure 8.11: Extrapolated sound power with reference to the 55m, E48 – 800kW

The chart shows that the extrapolated rate of decrease is conservative in comparison to an E48 model turbine with the same 55m hub height.

⁸ Noise Report: SA-04-SPL Guarantee E-44-Rev1_2-ger-eng.pdf

Atmospheric attenuation

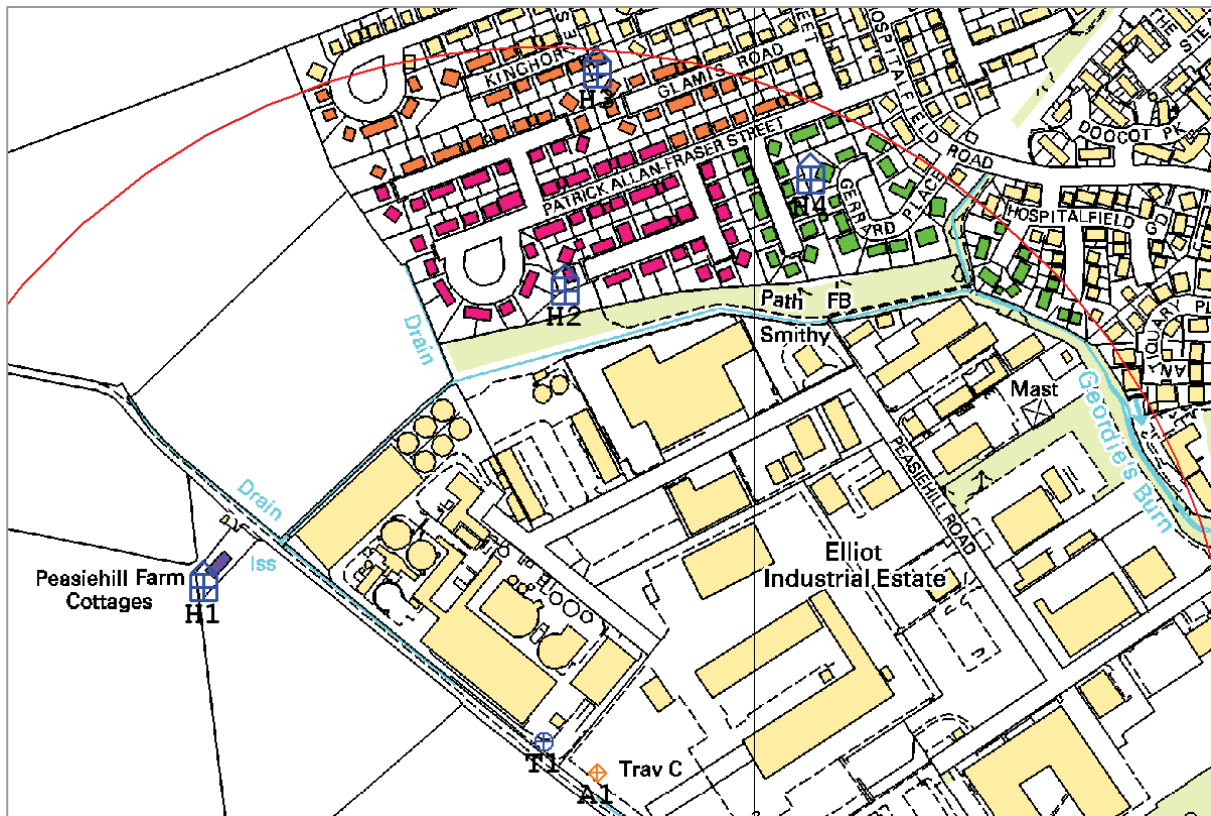
The attenuation of noise as it travels through the air varies with frequency. The atmospheric attenuation coefficients are tabulated below in **Table 8.25**:

Octave Band (Hz)	63	125	250	500	1000	2000	4000	8000
Attenuation Coefficient	0.0001	0.0004	0.0010	0.0019	0.0037	0.0097	0.0328	0.1170

Table 8.25: Attenuation coefficients used for the noise propagation model

Modelled distances

The following figure indicates the properties that H1, H2, H3 and H4 are representative of:



- H1 – Peasiehill Cottages – purple properties
- H2 – Patrick Allan Fraser Street – red properties
- H3 – Kinghorne Street – orange properties
- H4 – Gerrard Street – green properties
- T1 – Proposed turbine position
- A1 – LiDAR position

‘Line of sight’ distances have been assumed, shown to the nearest 10m. The Cottages at Peasiehill are equidistant from the proposed turbine. Properties H2, H3 and H4 are representative of properties that have a range of distances from the proposed turbine. Those ranges are stated in **Table 8.26**:

House ID	Name	Min distance	Actual distance	Max distance
H1	Peasiehill Cottages	310	310	310
H2	Patrick Allan Fraser Street	340	370	510
H3	Kinghorne Street	480	550	570
H4	Gerrard Street	460	510	570

Table 8.26: Distance of sensitive properties to the nearest turbine

The ranges of distances from the turbine imply a corresponding range of turbine noise levels. This range of levels is represented in the following charts by the 'max' and 'min' values.

Predicted wind turbine noise levels

Table 8.27 shows the predicted turbine $L_{A90,10min}$ noise levels calculated using the previously defined octave band sound power levels, inclusive of uncertainty. Noise levels are tabulated with reference to v_{10} wind speeds of $4ms^{-1}$ to $12ms^{-1}$.

Representative Properties			Standardised 10m wind speeds								
House ID	Easting	Northing	4	5	6	7	8	9	10	11	12
H1	361548	740197	33.4	35.1	36.8	38.5	40.2	41.1	41.1	41.1	41.1
Max	361761	740406	32.4	34.1	35.8	37.5	39.2	40.0	40.1	40.1	40.1
H2	361845	740441	31.7	33.4	35.1	36.8	38.4	39.3	39.3	39.3	39.3
Min	361923	740568	28.6	30.3	32.0	33.7	35.3	36.2	36.2	36.2	36.2
Max	361680	740525	29.2	30.9	32.6	34.3	35.9	36.8	36.8	36.8	36.8
H3	361872	740620	27.7	29.4	31.1	32.8	34.5	35.3	35.3	35.3	35.3
Min	361642	740608	27.4	29.1	30.8	32.5	34.1	35.0	35.0	35.0	35.0
Max	362076	740458	29.5	31.2	32.9	34.6	36.3	37.1	37.2	37.2	37.2
H4	362047	740535	28.4	30.1	31.8	33.5	35.2	36.0	36.1	36.1	36.1
Min	362094	740573	27.4	29.1	30.8	32.5	34.1	35.0	35.0	35.0	35.0

Table 8.27: Predicted wind turbine noise levels ($L_{A90,10min}$) at representative properties.

Table 8.27 shows that the worst case predicted turbine noise levels are for property H1 – Peasiehill Cottages where levels may reach 41.1dB(A) under worst case wind conditions.

8.5 Noise impact assessment

Wind data

Figure 8.12 shows standardised 10m wind speeds logged during the monitoring period. A direction of zero degrees equates to a northerly wind, 90° = E, 180° = S, 270° = W etc.

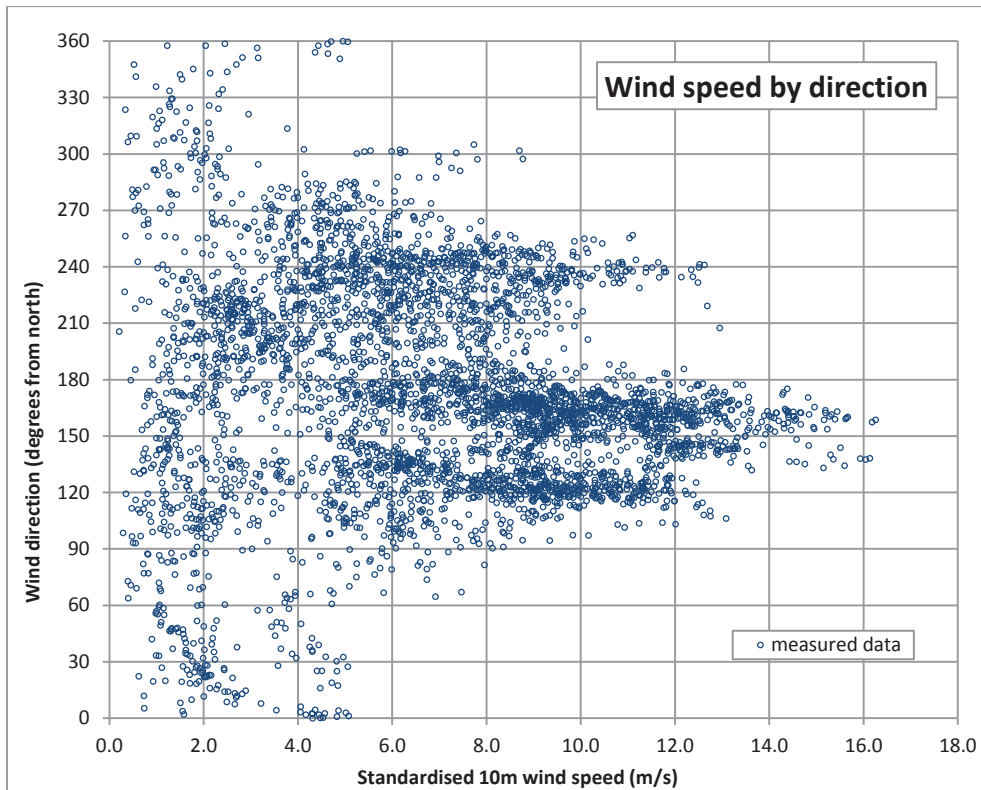


Figure 8.12: Variation of Wind Speed with direction measured at 10m height

The above chart shows that the winds measured during the monitoring period have been predominantly from the south-east through south-west, ideal wind directions for this assessment; both prevailing and downwind conditions are captured for each receptor.

On-site production activity

Table 8.28 compares production activity levels to those that are typical for the eight months of the year between early December and the end of July.

Noise source	Normal pattern of operation	During monitoring period
Grain Driers	September to mid-October (harvest season)	Not active
Steep House CO2 extraction fans	Mon 19:00 – Tues 15:00. Tues 21:00-Weds 11:00. Thurs 14:00- Fri 02:00. Fri 06:00-Fri 12:00 Active throughout the year with the exception of September and October.	Normal
Silo 3 cooling fans	3 weeks in total (weather dependant) between end of October and early December.	Not active
Barley Plant blower	All day until between 22:00 & 23:00, 7 days per week	Normal
Steep House conveyor	Monday pm and Wednesday pm for 2 hours when required by Clova. Some occasional additional operation.	Barely used at all
Upper conveyors	Very difficult to quantify, sometimes several hours per day, sometimes not for weeks at a time.	Much less active than typical
Kiln Clova Fans	When kilning: Mon 08:00 – Tues 22:00. Weds 08:00 – Thurs 22:00	Normal
Buhler Tower fans	24 hours per day, 7 days per week	Normal

Table 8.28: On-site production activity during monitoring period

On-site activity was normal for this time of year with the exception of the conveyors which were less active than typical.

Results

The following figures and associated tables show the measured $L_{A90,10min}$ background noise levels and predicted turbine levels as a function of v_{10} wind speeds. The data are represented by best fit polynomial regression functions from which the noise limits are derived. The figures show the predicted turbine noise levels in relation to the derived limits.

H1 – Peasiehill Cottage: night-time

Figure 8.13 shows background levels, derived limits and predicted turbine noise levels for H1 during night-time hours.

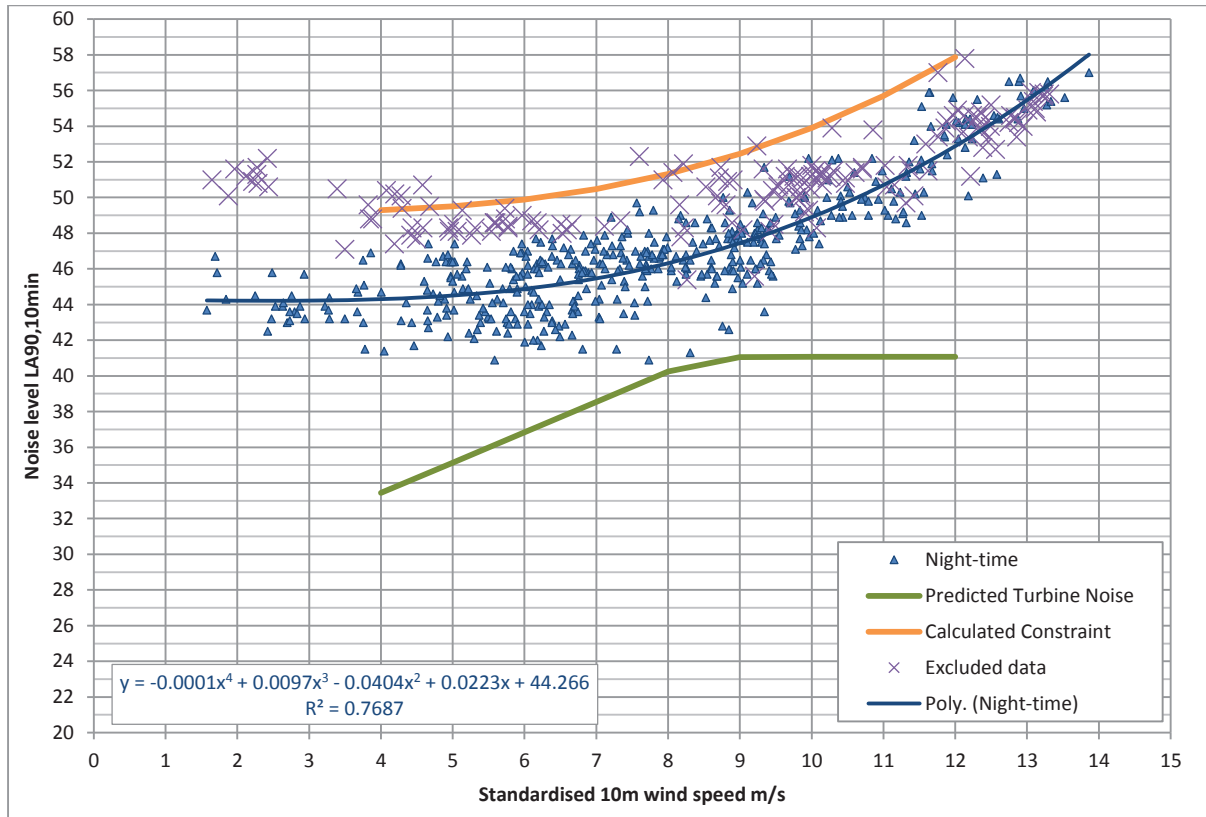


Figure 8.13: Background levels, derived limits and predicted turbine noise levels for H1 during night-time.

Table 8.29 shows the tabulated results for H1 during night time hours.

Standardised wind speed	ms ⁻¹	4	5	6	7	8	9	10	11	12
Reference electric power	kW	63	133	232	372	543	699	803	866	902
Background Noise										
Number of values (total)	(416)	16	47	74	62	54	78	32	26	27
Average value L _{A90,10min}	dB(A)	44.3	44.5	44.9	45.5	46.3	47.4	48.9	50.7	52.9
Calculated Constraint										
Average value L _{A90,10min}	dB(A)	49.3	49.5	49.9	50.5	51.3	52.4	53.9	55.7	57.9
Predicted Turbine Noise										
Average value L _{A90,10min}	dB(A)	33.4	35.1	36.8	38.5	40.2	41.1	41.1	41.1	41.1
Level Difference										
Exceedence	dB(A)	-15.9	-14.4	-13.0	-11.9	-11.1	-11.4	-12.8	-14.6	-16.8

Table 8.29: Background levels, derived limits and predicted turbine noise levels for H1 during night-time.

Predicted turbine noise remains below all measured background data, suggesting a low likelihood of audibility. Turbine noise remains more than 10dB(A) below the calculated constraints at all times.

H1 – Peasiehill Cottage: quiet daytime

Figure 8.14: shows background levels, derived limits and predicted turbine noise levels for H1 during quiet daytime hours.

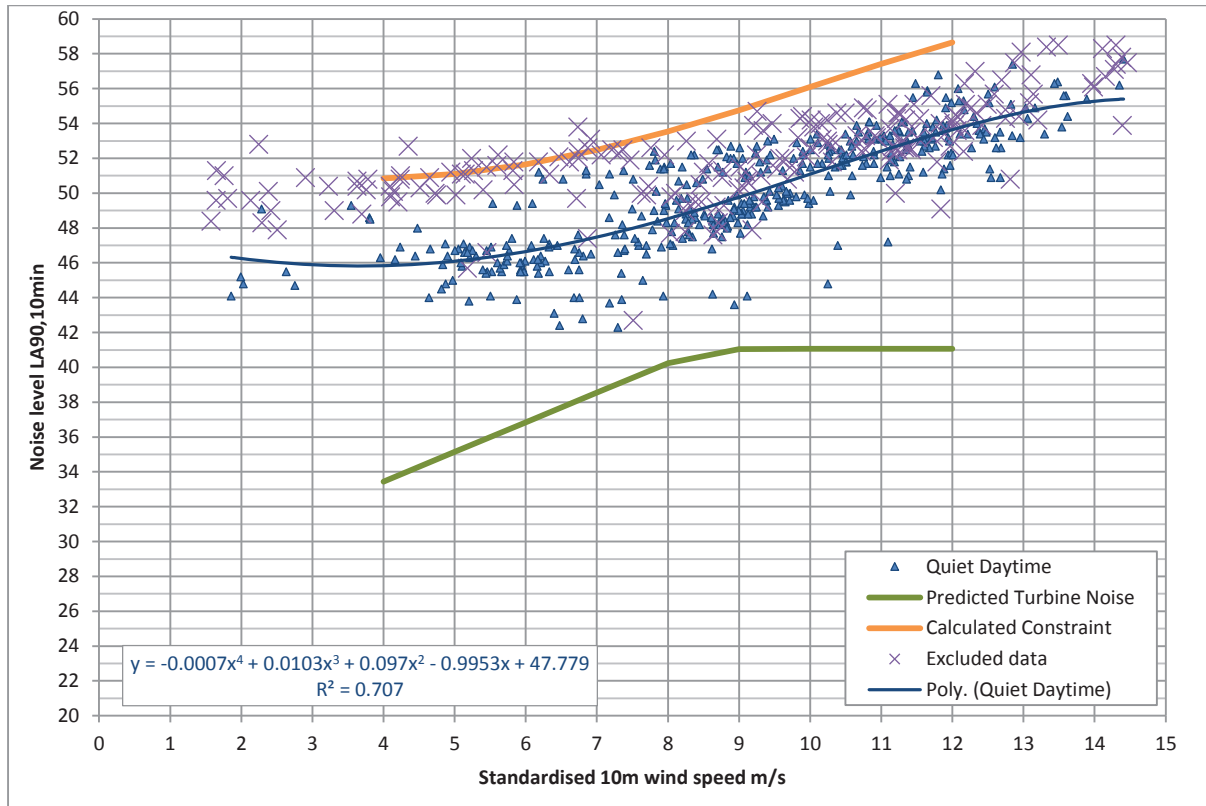


Figure 8.14: Background levels, derived limits and predicted turbine noise levels H1 during quiet daytime hours.

Table 8.30 shows the tabulated results for H1 during quiet daytime hours

Standardised wind speed	ms ⁻¹	4	5	6	7	8	9	10	11	12
Reference electric power	kW	63	133	232	372	543	699	803	866	902
Background Noise										
Number of values (total)	(382)	8	25	41	30	52	72	50	56	48
Average value L _{A90,10min}	dB(A)	45.8	46.1	46.6	47.5	48.5	49.8	51.1	52.4	53.6
Calculated Constraint										
Average value L _{A90,10min}	dB(A)	50.8	51.1	51.6	52.5	53.5	54.8	56.1	57.4	58.6
Predicted Turbine Noise										
Average value L _{A90,10min}	dB(A)	33.4	35.1	36.8	38.5	40.2	41.1	41.1	41.1	41.1
Level Difference										
Exceedence	dB(A)	-17.4	-16.0	-14.8	-13.9	-13.3	-13.7	-15.0	-16.3	-17.6

Table 8.30: Background levels, derived limits and predicted turbine noise levels for H1 during quiet daytime hours.

Predicted turbine noise remains below all measured background data. Turbine noise remains more than 10dB(A) below the calculated constraints at all times.

H2 – Patrick Allan Fraser Street: night-time

Figure 8.15 shows background levels, derived limits and predicted turbine noise levels for H2 during night-time hours.

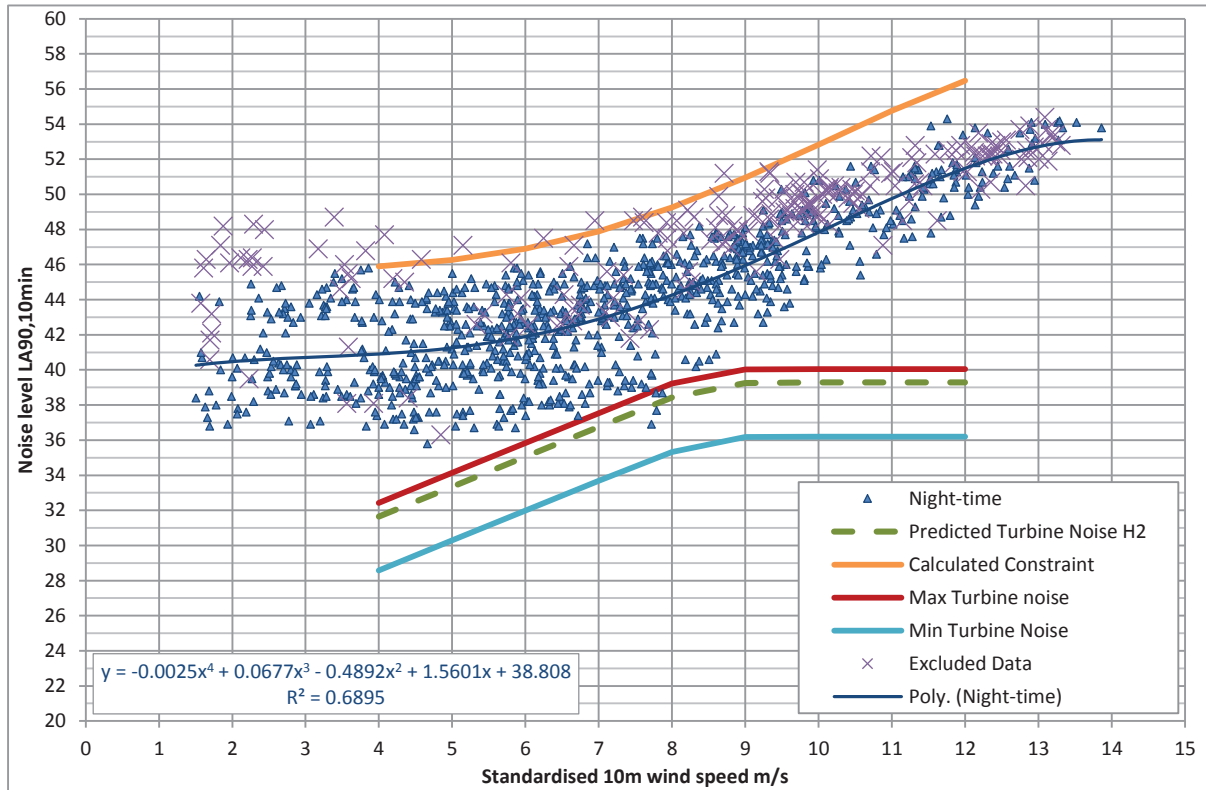


Figure 8.15: Background levels, derived limits and predicted turbine noise levels for H2 during night-time.

Table 8.31 shows the tabulated results for H2 during night-time hours.

Standardised wind speed	ms ⁻¹	4	5	6	7	8	9	10	11	12
Reference electric power	kW	63	133	232	372	543	699	803	866	902
Background Noise										
Number of values (total)	(780)	80	102	152	109	102	108	53	37	37
Average value L _{A90,10min}	dB(A)	40.9	41.3	41.9	42.9	44.3	45.9	47.8	49.8	51.5
Calculated Constraint										
Average value L _{A90,10min}	dB(A)	45.9	46.3	46.9	47.9	49.3	50.9	52.8	54.8	56.5
Max Predicted Turbine Noise										
Average value L _{A90,10min}	dB(A)	32.4	34.1	35.8	37.5	39.2	40.0	40.1	40.1	40.1
Level Difference										
Exceedence	dB(A)	-13.5	-12.1	-11.1	-10.4	-10.0	-10.9	-12.8	-14.7	-16.4

Table 8.31: Background levels, derived limits and predicted turbine noise levels for H2 during night-time.

Maximum predicted turbine noise is below measured background data during all but a small number of 10 minute periods. Turbine noise remains 10dB(A) or more below the calculated constraints at all times.

H2 – Patrick Allan Fraser Street: quiet daytime

Figure 8.16 shows background levels, derived limits and predicted turbine noise levels for H2 during quiet daytime hours.

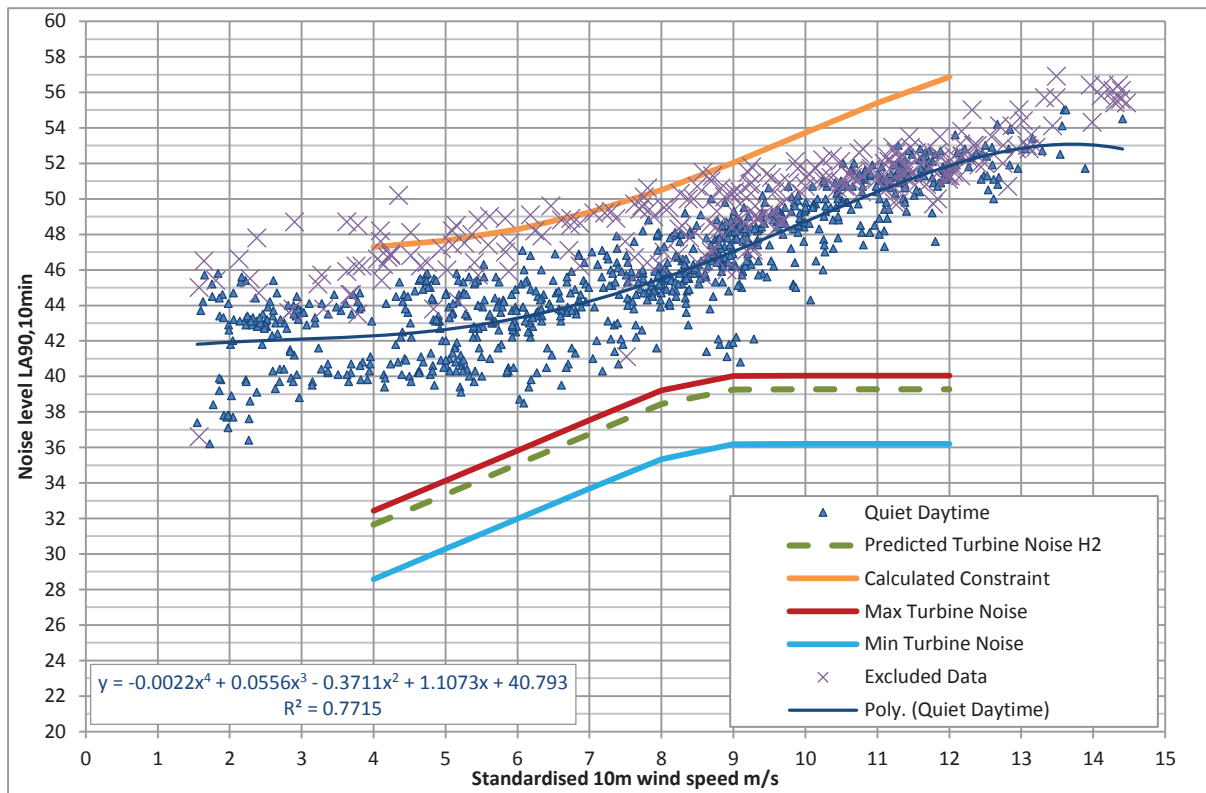


Figure 8.16: Background levels, derived limits and predicted turbine noise levels H2 during quiet daytime.

Table 8.32 shows the tabulated results for H2 during quiet daytime hours.

Standardised wind speed	ms ⁻¹	4	5	6	7	8	9	10	11	12
Reference electric power	kW	63	133	232	372	543	699	803	866	902
Background Noise										
Number of values (total)	(710)	41	90	83	64	111	122	81	72	46
Average value L _{A90,10min}	dB(A)	42.3	42.6	43.3	44.2	45.5	47.0	48.7	50.4	51.9
Calculated Constraint										
Average value L _{A90,10min}	dB(A)	47.3	47.6	48.3	49.2	50.5	52.0	53.7	55.4	56.9
Max Predicted Turbine Noise										
Average value L _{A90,10min}	dB(A)	32.4	34.1	35.8	37.5	39.2	40.0	40.1	40.1	40.1
Level Difference										
Exceedence	dB(A)	-14.9	-13.5	-12.4	-11.7	-11.3	-12.0	-13.7	-15.3	-16.8

Table 8.32: Background levels, derived limits and predicted turbine noise levels for H2 during quiet daytime.

Maximum predicted turbine noise remains below all measured background data. Turbine noise remains more than 10dB(A) below the calculated constraints at all times.

H3 – Kinghorn Street: night-time

Figure 8.17 shows background levels, derived limits and predicted turbine noise levels for H3 during night-time hours.

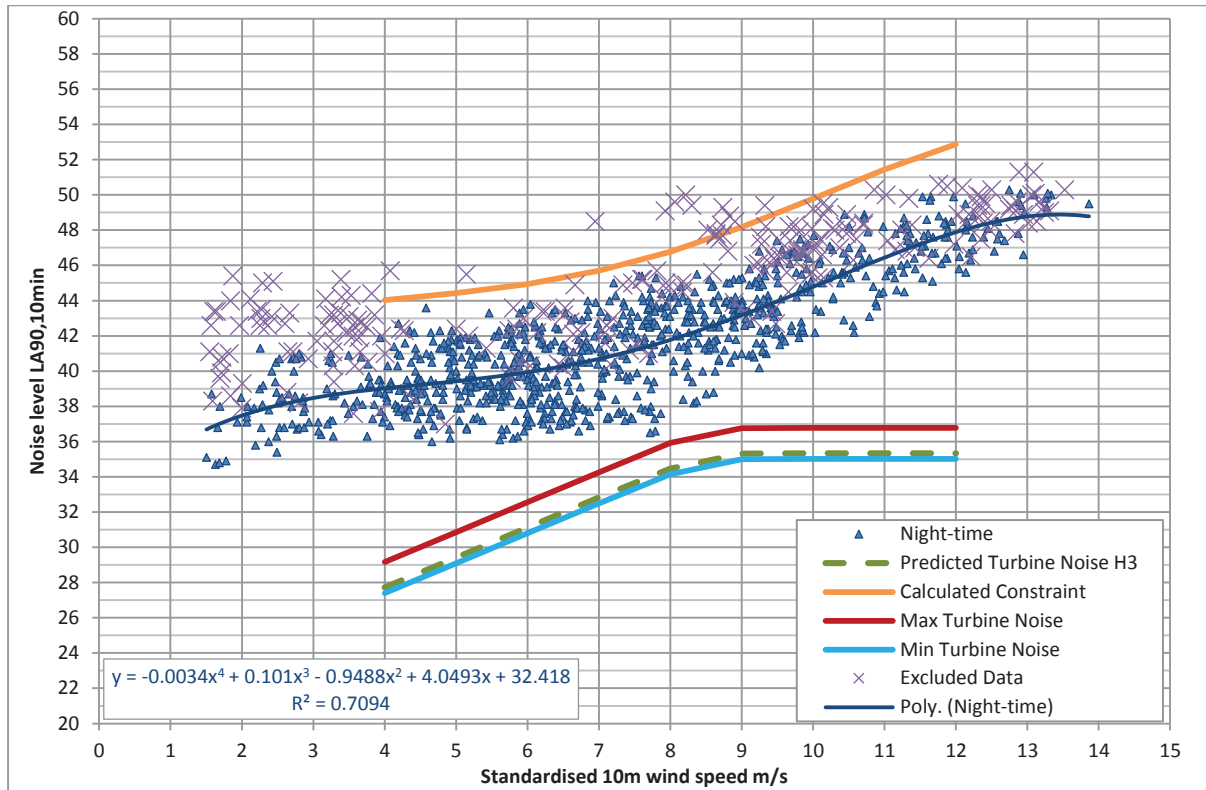


Figure 8.17: Background levels, derived limits and predicted turbine noise levels for H3 during night-time.

Table 8.33 shows the tabulated results or H3 during night time hours.

Standardised wind speed	ms ⁻¹	4	5	6	7	8	9	10	11	12
Reference electric power	kW	63	133	232	372	543	699	803	866	902
Background Noise										
Number of values (total)	(779)	71	102	148	104	103	109	58	43	41
Average value L _{A90,10min}	dB(A)	39.0	39.4	39.9	40.7	41.8	43.2	44.8	46.4	47.9
Calculated Constraint										
Average value L _{A90,10min}	dB(A)	44.0	44.4	44.9	45.7	46.8	48.2	49.8	51.4	52.9
Max Predicted Turbine Noise										
Average value L _{A90,10min}	dB(A)	29.2	30.9	32.6	34.3	35.9	36.8	36.8	36.8	36.8
Level Difference										
Exceedence	dB(A)	-14.9	-13.6	-12.4	-11.4	-10.9	-11.4	-13.0	-14.7	-16.1

Table 8.33: Background levels, derived limits and predicted turbine noise levels for H3 during night-time.

Maximum predicted turbine noise remains below all measured background data. Turbine noise remains more than 10dB(A) below the calculated constraints at all times.

H3 – Kinghorn Street: quiet daytime

Figure 8.18 shows background levels, derived limits and predicted turbine noise levels for H3 during quiet daytime hours.

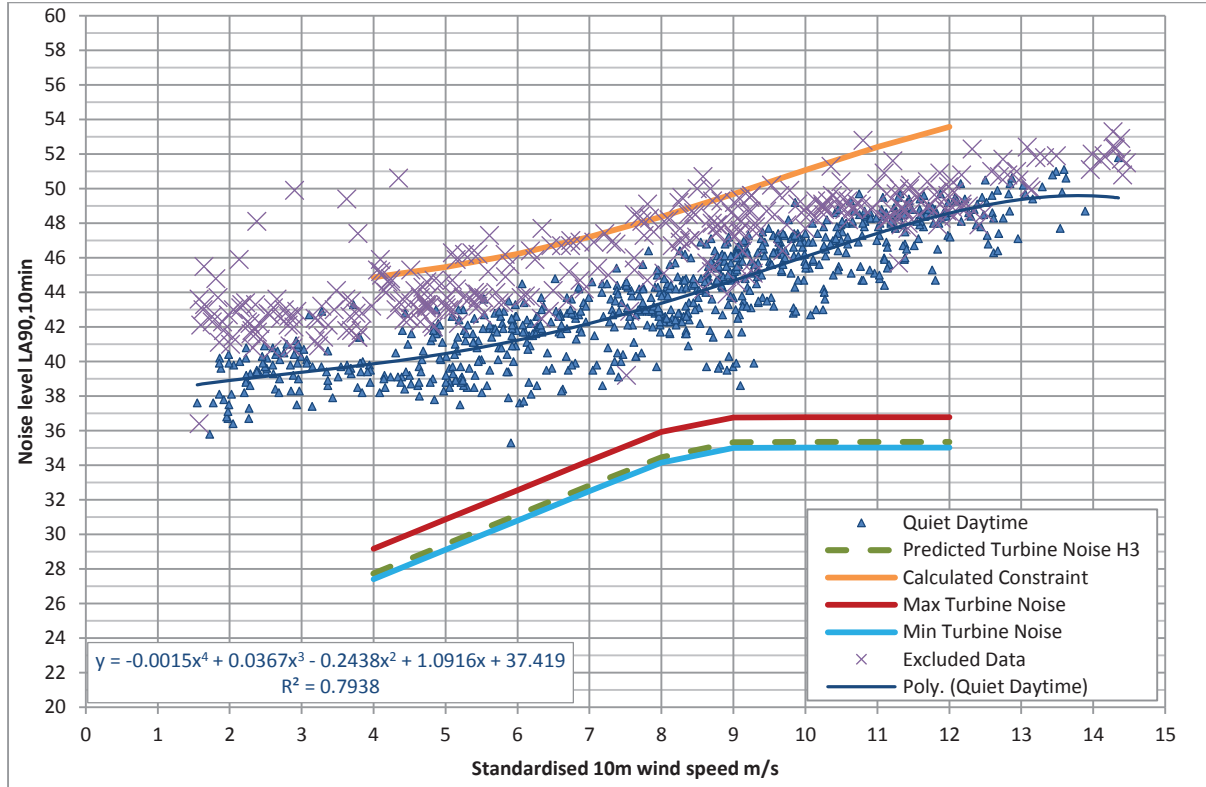


Figure 8.18: Background levels, derived limits and predicted turbine noise levels H3 during quiet daytime.

Table 8.34 shows the tabulated results for H3 during quiet daytime hours

Standardised wind speed	ms ⁻¹	4	5	6	7	8	9	10	11	12
Reference electric power	kW	63	133	232	372	543	699	803	866	902
Background Noise										
Number of values (total)	(665)	33	68	73	62	104	120	85	72	48
Average value L _{A90,10min}	dB(A)	39.9	40.5	41.2	42.2	43.4	44.7	46.1	47.4	48.6
Calculated Constraint										
Average value L _{A90,10min}	dB(A)	44.9	45.5	46.2	47.2	48.4	49.7	51.1	52.4	53.6
Max Predicted Turbine Noise										
Average value L _{A90,10min}	dB(A)	29.2	30.9	32.6	34.3	35.9	36.8	36.8	36.8	36.8
Level Difference										
Exceedence	dB(A)	-15.7	-14.6	-13.7	-12.9	-12.4	-12.9	-14.3	-15.6	-16.8

Table 8.34: Background levels, derived limits and predicted turbine noise levels for H3 during quiet daytime.

Maximum predicted turbine noise remains below all measured background data. Turbine noise remains more than 10dB(A) below the calculated constraints at all times.

H4 – Gerrard Street: night-time

Figure 8.19 shows background levels, derived limits and predicted turbine noise levels for H4 during night-time hours.

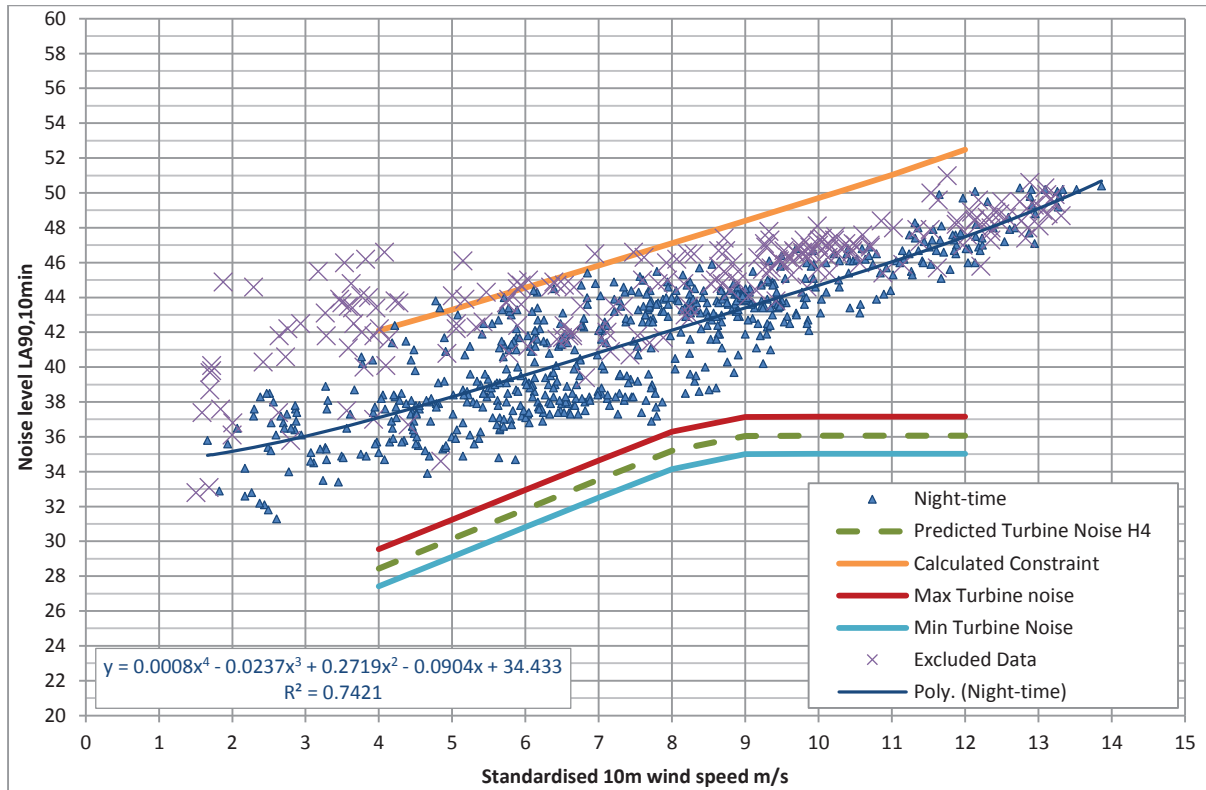


Figure 8.19: Background levels, derived limits and predicted turbine noise levels for H4 during night-time.

Table 8.35 shows the tabulated results for H4 during night-time hours.

Standardised wind speed	ms ⁻¹	4	5	6	7	8	9	10	11	12
Reference electric power	kW	63	133	232	372	543	699	803	866	902
Background Noise										
Number of values (total)	(574)	44	59	114	78	87	93	37	30	32
Average value L _{A90,10min}	dB(A)	37.1	38.3	39.5	40.8	42.1	43.4	44.7	46.0	47.5
Calculated Constraint										
Average value L _{A90,10min}	dB(A)	42.1	43.3	44.5	45.8	47.1	48.4	49.7	51.0	52.5
Max Predicted Turbine Noise										
Average value L _{A90,10min}	dB(A)	29.5	31.2	32.9	34.6	36.3	37.1	37.2	37.2	37.2
Level Difference										
Exceedence	dB(A)	-12.6	-12.1	-11.6	-11.2	-10.8	-11.3	-12.5	-13.9	-15.3

Table 8.35: Background levels, derived limits and predicted turbine noise levels for H4 during night-time.

Maximum predicted turbine noise remains below all measured background data. Turbine noise remains more than 10dB(A) below the calculated constraints at all times.

H4 – Gerrard Street: quiet daytime

Figure 8.20 shows background levels, derived limits and predicted turbine noise levels for H4 during quiet daytime hours.

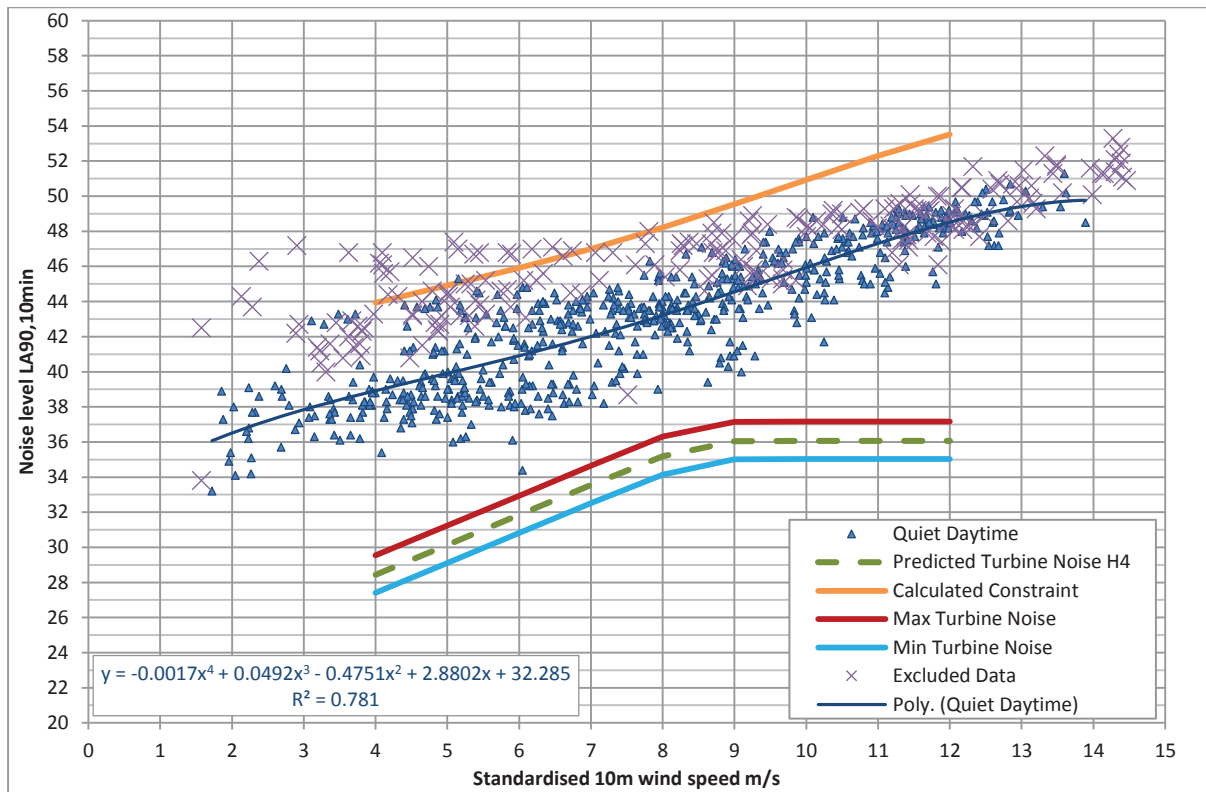


Figure 8.20: Background levels, derived limits and predicted turbine noise levels H4 during quiet daytime.

Table 8.36 shows the tabulated results for H4 during quiet daytime hours.

Standardised wind speed	ms ⁻¹	4	5	6	7	8	9	10	11	12
Reference electric power	kW	63	133	232	372	543	699	803	866	902
Background Noise										
Number of values (total)	(564)	47	76	73	63	83	69	51	56	46
Average value L _{A90,10min}	dB(A)	38.9	39.9	40.9	42.0	43.2	44.5	45.9	47.3	48.5
Calculated Constraint										
Average value L _{A90,10min}	dB(A)	43.9	44.9	45.9	47.0	48.2	49.5	50.9	52.3	53.5
Max Predicted Turbine Noise										
Average value L _{A90,10min}	dB(A)	29.5	31.2	32.9	34.6	36.3	37.1	37.2	37.2	37.2
Level Difference										
Exceedence	dB(A)	-14.4	-13.7	-13.0	-12.4	-11.9	-12.4	-13.8	-15.1	-16.4

Table 8.36: Background levels, derived limits and predicted turbine noise levels for H4 during quiet daytime.

Maximum predicted turbine noise remains below all measured background data. Turbine noise remains more than 10dB(A) below the calculated constraints at all times.

8.6 Discussion

Review of measured background levels

The monitoring positions were within ~500m of each other. As a cross-reference, all night-time levels, followed by the corresponding quiet daytime levels, are plotted on the two charts that follow; Figure 8.21 shows the background levels measured during night-time periods.

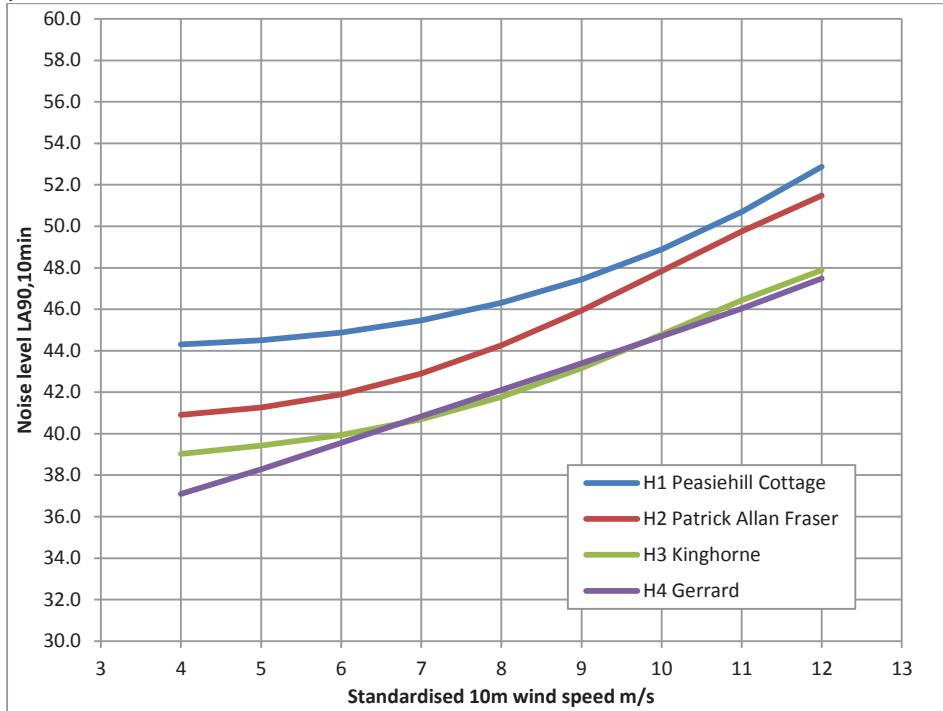


Figure 8.21: Measured night-time background levels

Figure 8.22 shows measured levels during quiet daytime hours

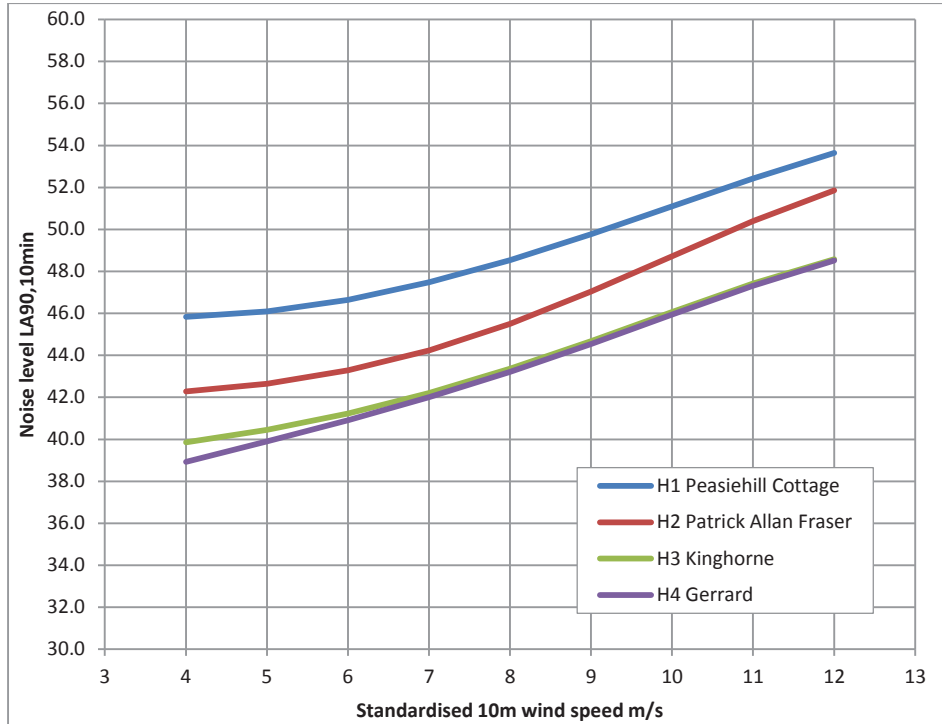


Figure 8.22: Measured quiet daytime background levels

Being an urban location, the measured levels appear high in comparison with the rural levels more typical of an ETSU-R-97 assessment. However, the record of operations at Bairds Malt indicate that the level of activity during the monitoring period was representative of a baseline level of activity, typical for the majority of the annual production cycle, and no unusual noise events were recorded by any of the four residents who consented to having noise monitoring equipment at their property⁹.

The plots show that there is a good deal of coherence, both between the two measurement periods, and the four measurement locations. H2 shows the steepest noise slope above 9ms^{-1} , possibly due to having more trees within 100m than other locations; none were in leaf during the monitoring period. Upwards of 7ms^{-1} , H3 and H4 show very close agreement giving a positive indication that the noise environment of the quieter locations (represented by these two monitoring positions) does not vary significantly; Gerrard Street appears the quieter of the two at the lower wind speeds.

Of the data shown, wind driven noise is at a minimum during 10m wind speeds of 4ms^{-1} . At this wind speed, the two closest locations to Bairds show a similar $\sim 1.5\text{dB}$ reduction in level between quiet daytime and night-time periods suggesting that Bairds is the dominant noise source under these conditions and is more active during quiet daytime hours than at night. If Bairds (resolved to a point source at approximately 361720E,740210N) were the most significant noise source across all monitoring positions, a 6dB reduction would be expected for every doubling of distance.

⁹ Example Noise Diary shown at appendix 2

This is approximately the case for the 50% increase in distance between H1 and H2 from this nominal point, at 4ms^{-1} during quiet daytime periods. The rate of decrease between H2 and H3 is $\sim 3.5\text{dB}$, and between H2 and H4 $\sim 4.5\text{dB}$, per doubling of distance, under these conditions. This implies that other significance noise sources are contributing to the noise environment at the more distant locations; H3 and H4.

Tabulated exceedence for all properties during night-time hours

Exceedence (dB) is shown in **Table 8.37**.

Representative Properties		Standardised 10m Wind Speeds								
House ID	Name	4	5	6	7	8	9	10	11	12
H1	Peasiehill Cottage	-15.9	-14.4	-13.0	-11.9	-11.1	-11.4	-12.8	-14.6	-16.8
H2 (max)	Patrick Allan Fraser	-13.5	-12.1	-11.1	-10.4	-10.0	-10.9	-12.8	-14.7	-16.4
H3 (max)	Kinghorne	-14.9	-13.6	-12.4	-11.4	-10.9	-11.4	-13.0	-14.7	-16.1
H4 (max)	Gerrard	-12.6	-12.1	-11.6	-11.2	-10.8	-11.3	-12.5	-13.9	-15.3

Table 8.37: Tabulated exceedence (dB) for all properties during night-time

Tabulated exceedence for all properties during quiet daytime hours

Exceedence (dB) is shown in **Table 8.38**.

Representative Properties		Standardised 10m Wind Speeds								
House ID	Name	4	5	6	7	8	9	10	11	12
H1	Peasiehill Cottage	-17.4	-16.0	-14.8	-13.9	-13.3	-13.7	-15.0	-16.3	-17.6
H2 (max)	Patrick Allan Fraser	-14.9	-13.5	-12.4	-11.7	-11.3	-12.0	-13.7	-15.3	-16.8
H3 (max)	Kinghorne	-15.7	-14.6	-13.7	-12.9	-12.4	-12.9	-14.3	-15.6	-16.8
H4 (max)	Gerrard	-14.4	-13.7	-13.0	-12.4	-11.9	-12.4	-13.8	-15.1	-16.4

Table 8.38: Tabulated exceedence (dB) for all properties during quiet daytime

The tabulated values show a maximum exceedence of -10.0dB at H2 during night-time hours. The most sensitive wind speed in all cases is a 10m wind speed of 8ms^{-1} and where a similar level of impact is shown.

8.7 Conclusions

Assessment of noise impact

It has been demonstrated that the project would comfortably meet ETSU-R-97 guidance derived noise constraints at the nearest properties in the absence of any mitigating factors. The information collated here strongly suggests that the proposed turbine would have a low level of noise impact in the context of the noise environment characterised at this location. It is noteworthy that, with very limited exceptions, even the worst case predicted turbine levels (H1) would remain below the quietest of the prevailing background levels measured (H4).

It is expected that the proposed wind project would rarely be audible, and could therefore be accommodated in this area in noise terms without unacceptable impact on surrounding properties.

Mitigation

The project is predicted to comfortably meet the background related constraints, therefore no mitigation is proposed.

Summary

Using worst case assumptions, noise constraints have been derived for the closest properties to the proposed wind turbines, based on the variation of background noise with wind speed. It is expected that these constraints would be comfortably met during both night-time and daytime amenity hours.

Noise conditions

It is recommended that, if the project is to go ahead, suitable planning conditions are formulated based on the background noise constraints found referenced to v_{10} wind speeds.

9 Cultural Heritage/Archaeology

9.1 Introduction

Cultural heritage is represented by a wide range of features, both above and below ground, which result from past human use of the landscape. Cultural heritage and archaeology features can include features such as buildings, earthwork monuments and artefact scatters as well as sub-surface archaeological remains and landscape features such as field boundaries and industrial remains.

The aim of this study is to identify elements of archaeological and cultural heritage value that may be impacted upon by the proposed wind turbine at Bairds Malt.

9.2 Guidance

Statutory, general, national and local guidance for assessing the potential impact of wind turbines on cultural heritage features is given in:

- SPP – Historic Environment
- Scottish Historic Environment Policy (SHEP) 2011
- Managing Change in the Historic Environment guidance note series –Setting
- PAN 2/2011 – Planning and Archaeology

9.3 Methodology

This study assesses both the direct and indirect impacts of the proposed development. This section sets out the assessment methodology and how the significance of these impacts has been derived.

Data Sources

In the preparation of this assessment, a range of historical and technical data was collected and analysed. The following sources were consulted:

- Historic Environment Record (HER);
- National Monuments Record Scotland (NMRS);
- Aerial photograph collection held by the Royal Commission on the Ancient and Historical Monuments of Scotland (RCAHMS);
- National Library of Scotland (Map Library); and
- Historic Scotland's database of; Listed Buildings, Scheduled Monuments (SMs), Gardens and Designed Landscapes (GDLs), Conservation Areas, Inventory Battlefields, World Heritage Sites and monuments proposed for scheduling.

A phased approach to the assessment was adopted:

Direct Impact

The area most at risk of direct impact was assessed to be land 50m either side of the access track and within 200m of the proposed wind turbine location (**Figure 9.1**).

Indirect Impact

The indirect visual impact on the setting, character and historical integrity of known cultural heritage sites has been considered within this assessment.

Nationally significant features such as Scheduled Monuments, Gardens and Designed Landscapes, 'A' Listed Buildings, Inventory Battlefields and World Heritage Sites were considered within 5km of the proposed wind turbine.

Regionally significant features such as 'B' listed buildings, and conservation areas were considered out to 2km of the proposed turbine (**Figure 9.2**).

Other local or nationally important features identified by either Historic Scotland (HS) or the Council's archaeologist during the consultation process have also been included in the assessment.

It is acknowledged that woodland and vegetation that could potentially restrict views of a development is subject to change. External factors such as felling, disease and wind damage are out with the applicant's control. The setting of each historic feature has been assessed as per the current situation, but it is recognised that screening provided by vegetation and woodland is potentially subject to change.

Cultural Heritage/Archaeology Figures and Visual Aids

The assessment has made use of the following:

- Zone of Theoretical Visibility (ZTV) maps which identify which areas the turbine is theoretically visible from. This is a 'bare earth' representation which does not take into account local screening from vegetation or buildings;
- Wirelines produced using the ReSoft Windfarm programme; and
- Photomontages (where requested by Historic Scotland or the Council's Archaeologist).

Historic Maps

Historic maps held at the National Library of Scotland (Map Library) and aerial photographs were consulted as part of the desk based assessment.

Table 9.1 - Historic maps of the proposed wind turbine location

Map	Date	Notable Historic Changes
Roy Highlands	1747-1752	Area is not depicted on the map.
OS Six Inch	1843-1882	Hospitalfield is depicted on the map.
OS One Inch - Outline	1855-1900	No changes discernible.
OS One Inch - Hills	1855-1903	No changes discernible.
OS Six Inch	1892-1905	Hospitalfield grounds are bordered by mature woodlands.
Bartholomew Half Inch	1897-1907	No changes discernible.
Bartholomew Survey Atlas	1912	No changes discernible.
OS Quarter Inch	1921-1923	No changes discernible.
Bartholomew Half-Inch	1926-1935	No changes discernible.
OS 1: 25, 000	1937-1961	Hospitalfield now labelled as 'Art College', Geordies Burn is depicted on the map.
Air Photos	1944-1950	Village of Hospitalfield is shown.
OS One Inch	1945-1948	No changes discernible.
OS One Inch	1955-1961	No changes discernible.

Information Gaps

An attempt has been made to consult all readily available documentary sources. However, it is possible that there may be other documentary sources held by RCAHMS and the National Archives of Scotland, which have not been consulted as part of this assessment.

Assessment Criteria

The following general criteria outlined in **Tables 9.2** and **9.3** have been used, as guided by Historic Scotland, in the assessment of significance of any direct or indirect impact on any site of cultural heritage importance.

Table 9.2 – Sensitivity of cultural heritage and archaeological features

Sensitivity	Definition
High	Category A listed buildings Scheduled Monuments Gardens and Designed Landscapes World Heritage Sites Inventory Battlefields Non-statutory List of sites likely to be of national importance
Medium	Category B listed buildings Category C listed buildings Archaeological sites on the Sites and Monuments Record (of regional and local importance) Conservation Areas
Low	Archaeological sites of lesser importance Non-Inventory Gardens and Designed Landscapes

Table 9.3 - Magnitude of cultural heritage and archaeological effects

Magnitude	Definition
High	<p>Any number of wind turbines and/or ancillary development that would result in:</p> <ul style="list-style-type: none"> • the removal or partial removal of key features, areas or evidence important to the historic character and integrity of the site, which could result in the substantial loss of physical integrity; and/or • a substantial obstruction of existing view by the addition of uncharacteristic elements dominating the view, significantly altering the quality of the setting or the visual amenity of the site both to and from.
Medium	<p>Any number of wind turbines and/or ancillary development that would result in:</p> <ul style="list-style-type: none"> • the removal of one or more key features, parts of the designated site, or evidence at the secondary or peripheral level, but are not features fundamental to its historic character and integrity; and/or • a partial obstruction of existing view by the addition of uncharacteristic elements which, although not affecting the key visual and physical relationships, could be an important feature in the views, and significantly alter the quality of the setting or visual amenity of the site both to and from.
Low	<p>Any number of wind turbines or ancillary developments that may result in:</p> <ul style="list-style-type: none"> • a partial removal/minor loss, and/or alteration to one or more peripheral and/or secondary elements/features, but not significantly affecting the historic integrity of the site or affect the key features of the site; and/or • an introduction of elements that could be intrusive in views, and could alter to a small degree the quality of the setting or visual amenity of the site both to and from.
Negligible	<p>Any number of wind turbines or ancillary developments that may result in:</p> <ul style="list-style-type: none"> • a relatively small removal, and/or alteration to small, peripheral and/or unimportant elements/features, but not affect the historic integrity of the site or the quality of the surviving evidence; and/or • an introduction of elements that could be visible but not intrusive in views, and the overall quality of the setting or visual amenity of the site would not be affected both to and from.

The overall significance of effect on each feature is determined by the combination of sensitivity and the predicted magnitude of change. This is presented in **Table 9.4**.

Table 9.4 – Significance of effect matrix

Sensitivity	Magnitude of Change			
	High	Medium	Low	Negligible
High	Major	Major/Moderate	Moderate	Moderate/Minor
Medium	Major/Moderate	Moderate	Moderate/Minor	Minor
Low	Moderate	Moderate/Minor	Minor	Minor/Negligible

Development Operation and Decommissioning

After the 25 year life span of the development, the project will be de-commissioned and the surrounding landscape will be returned to its original state.

9.4 Consultation

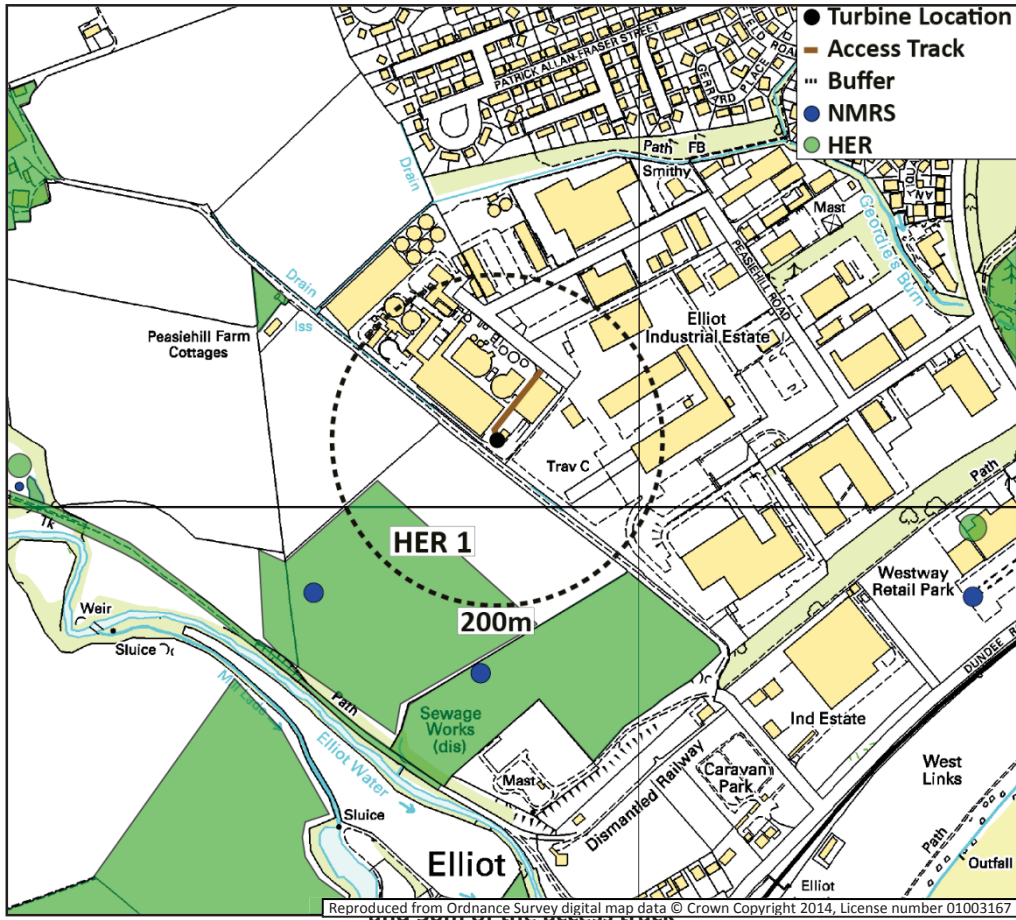
Angus Council and Historic Scotland were consulted as part of an informal scoping exercise in May 2013.

Historic Scotland's consultation response stated that, *"On the basis of the information supplied so far, we can indicate at this stage that we have no objection in principle to a wind turbine development in this location, but would expect certain aspects of the proposals to be assessed"*.

Historic Scotland requested the production of photomontages from Hospitalfield (HB No. 21253), which is a nearby 'A' listed building, to support the assessment. The response stated that a photomontage from *"the tower or a principle room on the W and a viewpoint showing Hospitalfield with the proposed turbine behind and in line with the A listed building would be very useful."* These have been produced as part of this assessment, and are included as **Appendix 4**.

9.5 Baseline

Direct Impacts



As shown in **Figure 9.1**, there is one feature of historical significance within the 200m buffer. A brief description of the feature is given in **Table 9.5** below.

Table 9.5 - Cultural Heritage within 200m

NMRs/ HER number	Site number	Distance	Name	Description
HER 1	NO63NW12	~160m	Peasiehill	Cropmarks, of a ring-ditch, pits and rig and furrow; recorded by aerial photography in 1981 and subsequently by the RCAHMS during aerial reconnaissance in 1981 and 1996.

Peasiehill (HER 1) is within a modern agricultural field ~160m to the south-west of the proposed single turbine location at its closest point.

Indirect Visual impacts

2km Study Radius

The study has found 2 conservation areas, 18 'B' listed buildings, 2 'A' listed buildings and 3 SMs within 2km of the proposed wind turbine. No Inventory Battlefields, World Heritage Sites or GDLs were found to fall within this radius.

5km Study Radius

Within 5km of the project an additional 8 'A' listed buildings, 18 SMs and a GDL were identified. No World Heritage Sites or Inventory Battlefields are located within 5km of the proposed turbine. The locations of the historic features are shown in **Figure 9.2**. A larger version of this map, along with a brief description and comment on the setting of each feature, can be found in **Appendix 4**.

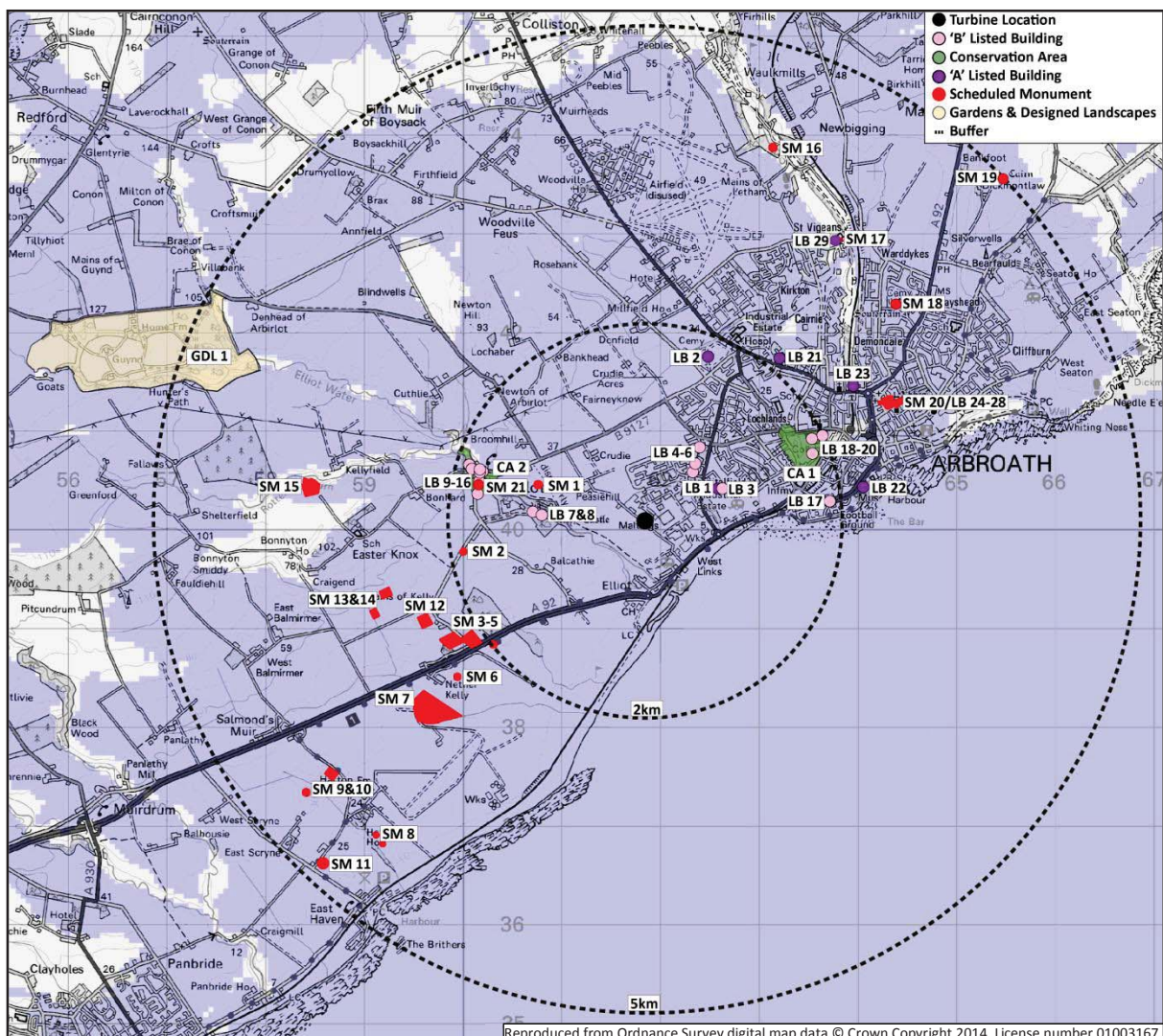


Figure 9.2 – Features of historical significance within 5km, showing area of theoretical visibility.

9.6 Evaluation of Effects

Direct Effects

One feature was found within the direct impact study radius. The impact of the Bairds Malt turbine on this feature is assessed below.

Table 9.7 - Effects and Evaluation of Significance: Direct Effects

Effect	Distance	Sensitivity	Magnitude	Significance	Comment
HER 1 Peasiehill	~160m	Medium	Negligible	Negligible	The feature lies outwith the development's direct impact footprint. No adverse impact is predicted.
Direct effect on presently unrecorded archaeology	Unlikely	Unknown	Unknown	Unknown	The small area of intrusive works is unlikely to have a significant impact on archaeological remains.

Indirect Effects within 5km

The indirect visual impact of the proposed turbine on each of the identified features is assessed below.

Table 9.8 - Effects and Evaluation of Significance: Indirect Effects Features 5km

Name	Distance	Sensitivity	Magnitude	Impact	Comment
LB 1 Hospitalfield 'A' listed	~0.8km	High	Low	Moderate	<p>The current setting of the baronial mansion is characterised by its location at the end of a tree lined access track and amongst the mature trees that comprise its immediate border. To the rear of the property lie the House's gardens and the urban area of Arbroath, to the north-west the residential area of Hospitalfield and to the south-west an industrial estate. The main façade of the house is oriented to the south-west with views across the industrial estate. There is an industrial estate in the predominant views from the houses main facade, which adds an industrial element to the house's current setting. The telecommunications mast within the industrial estate adds a vertical aspect to the views to the south-west of the house.</p> <p>The proposed single turbine will be located to the south-west of the mansion, and will form part of the industrial estate.</p> <p>As requested by Historic Scotland, CHVP-01 was taken from the tower as this view represented the most open view in the direction of the development, and as such represents the worst case scenario. From this elevated position, it is clear that the turbine will add a vertical element in views to the south-west of the house although the existing telecommunications mast is an existing predominant structure in this view. It is not expected that the proposed turbine will detract from the current view in this direction, which also includes the industrial estate, the Westway retail park and the Hospitalfield residential areas.</p> <p>CHVP-02 shows that from ground level, the tower of the turbine will be visible. The turbine will be located to the left of the existing telecommunications mast, appearing of a similar scale to this structure.</p> <p>Two further viewpoints have been taken in order to represent the potential impact of the development upon the wider setting of the house, as requested by Historic Scotland. CHVP-03 was taken from the A92. The view shows that the mature trees, which characterise the immediate setting of the house, partially screen the house from this view. To the left of the view both the telecommunications mast and the turbine are clearly visible. From this viewpoint it is clear that the development does not detract from the current setting of the house. CHVP-04 was taken from the road to Arbirlot looking back across the industrial estate towards the house. Although the turbine and telecommunications mast are again visible, the intervening industrial estate and surrounding mature trees screen views of the house from this viewpoint.</p> <p>Although the turbine will add a vertical element to views both to and from the house, the proposed</p>

Name	Distance	Sensitivity	Magnitude	Impact	Comment
					single turbine is not expected to adversely impact upon the house's current setting or the way in which it is understood within the landscape.
LB 2 Mortuary Chapel 'A' listed	~1.8km	High	Negligible	Minor/ Negligible	The full extent of the proposed single turbine is expected to be visible in views to the south-south-west of the chapel. The immediate setting of the chapel is within its associated graveyard on the eastern periphery of Arbroath. The intervening townscape of both the east of Arbroath and the urban area of Hospitalfield are expected to prevent long distance views in the direction of the proposed development.
LB 3 Hospitalfield Fernery 'B' listed	~0.9km	Medium	Negligible	Minor	The full extent of the proposed single turbine is expected to be visible in views to the south-west of the fernery. The immediate setting of the historic feature is within the grounds of Hospitalfield mansion. The mansion grounds are bordered by mature woodlands that are expected to prevent long distance views both to and from the feature.
LB 4, LB 5 & LB6 Hospitalfield Doocot, Farm Building and North Lodge	~0.7km	Medium	Negligible	Minor	Despite theoretical visibility of the development, no views of the turbine can be expected due to the surrounding buildings.
LB 7 Kelly Castle 'B' listed	~1.0km	Medium	Low	Moderate/ Minor	The immediate setting of the castle is within mature woodlands. The mature woodlands to the north-east of the castle are expected to prevent ground level long distance views of the single turbine. The turbine is expected to be visible in oblique views from the upper floors to the east. No significant adverse impacts upon the current setting of the castle are predicted.
LB 8 Kelly Castle-Doocot 'B' listed	~1.2km	Medium	Low	Moderate/ Minor	The full extent of the proposed single turbine is expected to be visible to the east. The immediate setting of the doocot is within Kelly Castle's mature woodlands. The woodlands that surround the doocot are expected to restrict long distance views in the direction of the proposed development. The current setting of the doocot is not expected to be adversely impacted by the proposed single turbine.
LB 9, 11-16 'B' Listed buildings within Arbirlot	~1.7km	Medium	Low	Moderate/ Minor	The localised setting of the listed buildings is within the village of Arbirlot, creating an immediate urban setting. The hub of the proposed single turbine is theoretically visible in views to the east south-east of the conservation area. The layout of the conservation area is such that the predominant views from the houses are into the surrounding buildings. No significant adverse impacts upon the current setting of the listed buildings are predicted.
LB 10 Arbirlot Bridge Over Elliot Water	~1.7km	Medium	Negligible	Minor	The bridge spans the tree-lined Elliot Water, and is located to the north of the A92. The bridge has a currently functional setting that allows a single track road to pass over the river. The proposed single turbine is not expected to adversely impact upon the bridge's current setting.
LB 17 & 20	~1.9km	Medium	Low	Moderate/	Both listed buildings are located within Arbroath. The urban setting of both features creates a secluded

Name	Distance	Sensitivity	Magnitude	Impact	Comment
4&5 Gayfield & St Margaret's Church 'B' listed				Minor	setting with the predominant views from the historic features being into the surrounding townscape. The proposed single turbine is not expected to adversely impact upon the current setting or historical integrity of the listed buildings.
LB 18 & 19 Arbroath High School & Water Tower Keptie Hill 'B' listed	~1.8-1.9km	Medium	Negligible	Minor	The full extent of the proposed single turbine is expected to be visible in views to the south-west of the project. Both listed buildings are located within the Keptie Hill conservation area. The localised setting of the conservation area is such that the intervening buildings within the town of Arbroath are expected to prevent long distance views in the direction of the proposed development.
LB 21 The Elms	~2.1km	High	Negligible	Moderate/Minor	The localised setting of the house is within the town of Arbroath. The surrounding buildings within the town will prevent long distance views in the direction of the proposed development.
LB 22 Ladyloan Bell Rock Lighthouse	~2.2km	High	Negligible	Moderate/Minor	The immediate setting of the lighthouse is on the southern periphery of Arbroath. The predominant views from the lighthouse are out across the North Sea. The tower of the proposed single turbine is expected to be visible in views to the west of the lighthouse. The intervening buildings within the town of Arbroath are expected to prevent any long distance views in the direction of the proposed development.
LB 23 Dens Road, Baltic Works	~2.5km	High	Negligible	Moderate/Minor	The current localised setting of the warehouse is such that it is situated in the heart of Arbroath where the intervening buildings within the town are expected to prevent long distance views of the proposed development.
SM 20/ LB 24-28 Arbroath Abbey- Pend, Abbot's House, Conventual Building, Abbey Church and Precincts	~2.7km	High	Negligible	Moderate/Minor	The immediate setting of the abbey and its associated buildings is within the abbey's formal grounds. The predominant views from the abbey are into the surrounding townscape of Arbroath's old town. The tower of the proposed single turbine is theoretically fully visible in views to the south-west of the abbey. It is expected that the surrounding buildings that characterise the abbey's setting, will prevent long distance views in the direction of the proposed development. No significant adverse impacts upon the abbey's current urban setting are predicted.

Name	Distance	Sensitivity	Magnitude	Impact	Comment
LB 29 St. Vigeans Parish Kirk	~3.4km	High	Negligible	Moderate/ Minor	The localised setting of the kirk is upon the banks of the Brothock Water, immediately adjacent to a railway line. The current localised setting of the kirk is not expected to be adversely impacted by the proposed development.
SM 1-15	~1.1- 4.7km	High	Negligible	Moderate/ Minor	The current setting of each of these features is within modern agricultural fields to the south-west and west of the proposed development. Although each of these features has theoretical views of the proposed development they remain as sub-surface features that are subject to intense agricultural practices. The turbine will be viewed in conjunction with the industrial features associated with the area and back dropped by the built up settlement of Arbroath. No adverse impact upon the current setting of these features is predicted.
SM 16 & SM 17	~3.4-4km	High	Negligible	Moderate/ Minor	There is no theoretical visibility from these features therefore visual impact is not considered to be a significant concern.
SM 18 Souterrain Eastern Cemetery	~3.3km	High	Negligible	Moderate/ Minor	The localised setting of the souterrain is within a cemetery on the northern periphery of Arbroath. The buildings within the intervening townscape are predicted to prevent long distance views of the proposed development.
SM 19 Dickmount Law, cairn	~4.9km	High	Negligible	Moderate/ Minor	The localised setting of the cairn is upon a modern field boundary. The intervening townscape of Arbroath is expected to prevent long distance views in the direction of the single turbine.
SM 21 Arbirlot, carved stone	~1.8km	High	Negligible	Moderate/ Minor	The current localised setting of the SM is within the village of Arbirlot. The surrounding houses within the town are expected to prevent long distance views both to and from the carved stone.
GDL 1 The Guynd	~4.3km	High	Negligible	Moderate/ Minor	The full extent of the proposed single turbine is expected to be visible in views to the east south-east of the gardens. The turbine is theoretically visible from the majority of the GDL, with the exception of the south-easterly corner. The garden's mature woodland shelter belts to the east and south-east are expected to prevent any long distance views in the direction of the proposed development. Furthermore, at this distance the proposed single turbine is expected to appear as part of the wider landscape. No significant adverse impacts upon the current setting or historical integrity of the proposed development are predicted.
CA 1 Arbroath Keptie Pond	~1.6km	Medium	Negligible	Minor	The full extent of the proposed turbine is expected to be visible in views to the south-west of the proposed single turbine. The conservation area spans the Keptie Pond area within the town of Arbroath. The conservation area is bordered by roads on the north and east and the surrounding town of Arbroath to the west. The intervening townscape of Arbroath is expected to prevent any long distance views in the direction of the proposed single turbine. No significant adverse impacts upon the current setting or historical integrity of the conservation are predicted.
CA 2	~1.6km	Medium	Low	Moderate/	The orientation of the buildings within the conservation area suggests that the predominant views from

Name	Distance	Sensitivity	Magnitude	Impact	Comment
Arbirlot				Minor	the feature are into the conservation area itself. The current setting of the conservation area is characterised by its location upon the banks of the tree lined Elliot Water. The tower of the proposed single turbine is expected to be visible in views to the east south-east of the conservation area. No significant adverse impacts upon the current setting of the conservation area are predicted.

9.7 Mitigation Incorporated into the Proposed Development

Planning guidance (SPP – Historic Environment) states that it is Government policy to protect and preserve archaeological sites and monuments in situ wherever feasible. Where preservation in-situ is not possible planning authorities should ensure that an appropriate level of excavation, recording, analysis, publication and archiving is carried out before and/or during development.

Permanent Land-take and Operation

The proposed turbine location, access and other aspects of development avoid the locations of known features of cultural heritage interest and as such no direct impact has been identified.

While this assessment has found no indication of the survival of any archaeological features or deposits that are not visible above ground level, it is nevertheless possible that such features do exist within the application area, although this is considered unlikely due to the industrial nature of the site.

In the event that archaeological features are encountered, a suitable program of archaeological works will be implemented to the satisfaction of the planning authority.

Restoration

No restoration measures are currently proposed.

9.8 Summary of Predicted Impacts and Effects

Direct Impact

No direct impact has been identified on any feature of cultural heritage interest, according to current proposals. In the event that archaeological features are encountered, a suitable program of archaeological works will be implemented to the satisfaction of the planning authority.

Indirect Visual Impact

2km study radius

The study has found 2 conservation areas, 18 'B' listed buildings, 2 'A' listed buildings and 3 SMs within 2km of the proposed wind turbine. No Inventory Battlefields, World Heritage Sites or GDLs were found to fall within this radius.

Only one 'Moderate' impact is predicted, at the closest feature of 'High' sensitivity to the turbine – Hospitalfield House, which has an associated Fernery and Doocot. The current setting of the house is such that the Elliot Industrial Estate, the Westway Retail Park and modern residential areas are all features of current views to the south-west. The turbine will be visible to the left of the telecommunications mast, and appear of a similar scale to this structure. It is not considered to detract from the current setting of the Hospitalfield House, which is also characterised by the belt of mature trees that surround the house and grounds to the west.

The next closest feature is Kelly Castle. The Castle's associated mature woodlands are expected to restrict potential views of the development at ground level and again a low impact is predicted.

The conservation area of Arbirlot spans the village of Arbirlot and encompasses a number of 'B' listed buildings.. The layout of the conservation area is such that the predominant views from the features are contained within the surrounding buildings of the village.

Of the remaining features within 2km, none are expected to experience more than a 'Low' magnitude of change as a result of the development.

5km study radius

Within 5km of the project an additional 8 'A' listed buildings, 18 SMs and a GDL were identified. No World Heritage Sites or Inventory Battlefields are located within 5km of the proposed turbine. All of these features are expected to experience a 'Negligible' magnitude of change as a result of the development.

The magnitude of indirect visual impact on cultural sites beyond 5km from the single wind turbine is assessed to be **negligible**. The intervening distance will result in the single wind turbine appearing as part of the wider landscape where the quality of the setting could be altered to a small degree.

9.9 Conclusion

No direct effect has been identified on any known features of cultural heritage interest according to current proposals. The potential for development to encounter previously unrecorded features is considered to be unlikely being limited by the small extent of intrusive works associated with the proposed development.

The proposed single turbine has been assessed as having an overall **low** impact upon Hospitalfield House (LB 1). With regards to the other features of historical significance within 5km, the proposed development is expected to have a **negligible** or **low** level of effect upon their current settings. Therefore the proposed development is not predicted to cause significant adverse impact on the cultural heritage assets within the surrounding area

10 Surface and Groundwater Hydrology

10.1 Background

A surface water drainage system is already in place on the application site which has been approved by the Scottish Environment Protection Agency (SEPA) and Angus Council.

10.2 Evaluation

The drainage of the small area of the development outside the current Bairds boundary will be tied back into the Bairds Malt drainage system.

The majority of potentially significant negative impacts on water quality are only predicted to occur in the short term through potential increased sedimentation and construction pollution during the construction phase. The adoption of best practice management and control procedures by all site personnel will bring any risks down to acceptable levels.

10.3 Conclusion

This element has been scoped out of the Environmental Report and no further assessment/consideration is deemed to be required. Any further revisions to the existing surface water drainage system will be implemented simultaneously with the development and will be approved to the satisfaction of Angus Council and prior to any construction activities taking place.

11 Existing Infrastructure, Telecommunications, Television, Aviation and Electromagnetic Interference

11.1 Introduction

Operational wind turbines have the potential to interfere with:

- Communication networks that use electromagnetic signals;
- Civil aviation radars;
- Safeguarding radars operated by the MOD; and
- Other types of infrastructure such as high pressure gas, water pipes or electricity lines and cables.

The potential impact of the proposed wind turbines on this infrastructure is considered in this chapter.

11.2 Guidance

Guidance for assessing the potential impact of wind turbines on electromagnetic infrastructure is given in:

- Scottish Planning Policy, Subject Policy: *Renewable Energy*, Scottish Government, 2010;
- Tall structures and their impact on broadcast and other wireless systems, Ofcom, 2009; and
- Wind farms assessment tool, BBC

Guidelines and publications for assessing potential impact on aviation activities are:

- Wind Energy and Aviation Interim Guidelines, BWEA, 2002;
- CAP 428 - Safety Standards at Unlicensed Aerodromes, CAA, 2004; and
- CAP 764 – Policy and Guidelines on Wind Turbines, CAA, 2012.

11.3 Methodology

A list of consultees with aviation, telecommunications, television and other infrastructure interests in the area was identified based upon advice given in Scottish Planning Policy. These consultees are listed in **Table 11.1**.

Table 11.1 – Infrastructure, telecommunications and other infrastructure consultation

Consultee	Comments
Aviation	
CAA	No issues expected
MOD	Objection expected on basis of RAF Leuchars
BAA	No issues expected
NATS	No issues expected
Telecommunications	
Ofcom	Identified the interested operators below
Atkins	No objection
Ericsson	No objection
JRC	No objection
Orange	No objection
Scottish and Southern Energy	No objection

11.4 Assessment of Impact

Civil aviation

An independent aviation study commissioned by the client has established that there are not expected to be any conflicts with civil aviation.

Ministry of Defence (MOD)

An independent aviation study has identified that the turbine is likely to be visible to the radar at RAF Leuchars, which may trigger an initial objection.

Should this be the case, it is proposed that an in-fill radar solution be developed by a specialist aviation consultancy and agreed with the MoD. This approach was successfully adopted for the Govals Wind Farm, with the MoD content to make the successful implementation of such a scheme a condition of planning.

Telecommunications

Ofcom identified five companies with links in the vicinity of the proposed development. All of the identified link providers were consulted with the details of the proposal and responded with no objections.

Other infrastructure

No underground services or overhead power lines have been identified within the vicinity of the proposed wind turbines.

Television

The digital switchover for the whole of the UK has been completed.

A 2009 Ofcom report stated that:

“Digital television signals are much better at coping with signal reflections, and digital television pictures do not suffer from ghosting. However a digital receiver that has to deal with reflections needs a somewhat higher signal level than one that has to deal with the direct path only. This can mean that viewers in areas where digital signals are fairly weak can experience interruptions to their reception should new reflections appear.

Over time, this problem is expected to diminish as the power of transmitters is increased as digital switchover continues across the UK. However, higher transmitter powers will not be a solution in all situations which means that reflections may still affect digital television reception in some areas, although the extent of the problem should be far less than for analogue television.”

There are a number of technical solutions available should interference be proven as an issue as a result of the turbines. If in the unlikely event that there are any impacts, these would be of a temporary nature until a technical alternative can be put in place. Overall, any potential effects on television are considered to be negligible.

11.5 Impacts, Issues and Mitigating Actions

There is a possibility that the MoD is likely to object to the turbine based upon the potential impact to the radar at RAF Leuchars. Negotiations with the MoD will be undertaken post-submission, if required. There is a high level of confidence that suitable mitigation measures can be agreed, as was successfully taken forward for the Govals Wind Farm.

11.6 References

British Wind and Energy Association (BWEA), Civil Aviation Authority (CAA), Department of Trade and Industry (DTI), (2002), *Wind Energy and Aviation Interests – Interim Guidelines*, BWEA, CAA, DTI.

Civil Aviation Authority (2004), *CAP 428 – Safety Standard at Unlicensed Aerodromes (Including Helicopter Landing Sites)*, Civil Aviation Authority.

Civil Aviation Authority (2012), *CAP 764 – CAA Policy and Guideline on Wind Turbines*, Civil Aviation Authority.

digitaluk <http://www.digitaluk.co.uk/> (accessed October 2013)

Ofcom (2009), *Tall structures and their impact on broadcast and other wireless services*, Ofcom.

Scottish Government (2010), *Scottish Planning Policy*, Scottish Government.

12 Shadow Flicker

This section of the report looks at potential for shadow flicker impacts on residential, commercial and industrial properties.

12.1 Background

Tall structures such as wind turbines cast shadows. These shadows vary in length according to the sun's altitude and azimuthal position. Under certain combinations of geographical position and time of day, the sun may pass behind the rotor of a wind turbine and cast a moving shadow over neighbouring properties. Where this shadow passes over a narrow opening such as a window, the light levels within the room affected will decrease and increase as the blades rotate, hence the shadow causes light levels to 'flicker' - an effect commonly known as 'shadow flicker'.

Whilst the moving shadow can occur outside, the shadow flicker effect is only experienced inside buildings where the shadow passes over a narrow window opening. The seasonal duration of this effect can be calculated from the geometry of the machine and the latitude of the site. A single window in a single building is likely to be affected for a few minutes at certain times of the day for short periods of the year. The likelihood of this occurring and the duration of such an effect depend upon:

- The direction of the property relative to the turbine(s);
- The distance from the turbine(s);
- The turbine hub-height and rotor diameter;
- The time of year;
- The proportion of day-light hours in which the turbine operates;
- The frequency of bright sunshine and cloudless skies (particularly at low elevations above the horizon); and
- The prevailing wind direction.

The further the property is from the turbine the less pronounced the effect will be. There are several reasons for this:

- There are fewer times when the sun is low enough to cast a long shadow;
- When the sun is low it is more likely to be obscured by either cloud on the horizon or intervening buildings and vegetation; and,
- The centre of the rotor's shadow passes more quickly over the land reducing the duration of the effect.

At a 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 weak effect is observed at a distance from the turbines.

12.2 Methodology

Guidance

As confirmed by DECC's Report 'Update of UK Shadow Flicker Evidence Base'¹⁰, there is no standard UK Guidance on acceptable levels of shadow flicker. The only guidance that provides suggested levels is Northern Ireland's Best Practice Guidance to Renewable Energy¹¹, which recommends that shadow flicker at neighbouring offices and dwellings within 500m should not exceed 30 hours per year. This position is based on research by Predac, a European Union sponsored organisation promoting best practice in energy use and supply which draws on experience from Belgium, Denmark, France, the Netherlands and Germany.

The Scottish Government's online planning guidance for renewable energy, specifically the 'Onshore Wind Turbines' note last updated in October 2012, states that,

"Where this (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..."

The Northern Ireland Guidance also states that, *"Shadow flicker generally only occurs in relative proximity to sites and has only been recorded occasionally at one site in the UK. 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."*

Approach

The following approach has been adopted, which takes into account the Guidance discussed above:

¹⁰ Update of UK Shadow Flicker Evidence Base, DECC (2011)

<http://www.decc.gov.uk/assets/decc/What%20we%20do/UK%20energy%20supply/Energy%20mix/Renewable%20energy/ORED/1416-update-uk-shadow-flicker-evidence-base.pdf>

¹¹ Best Practice Guidance to Planning Policy Statement 18: Renewable Energy, Department of the Environment (Northern Ireland), (2009).

http://www.planningni.gov.uk/index/policy/policy_publications/planning_statements/planning_policy_statement_18_renewable_energy_best_practice_guidance.pdf

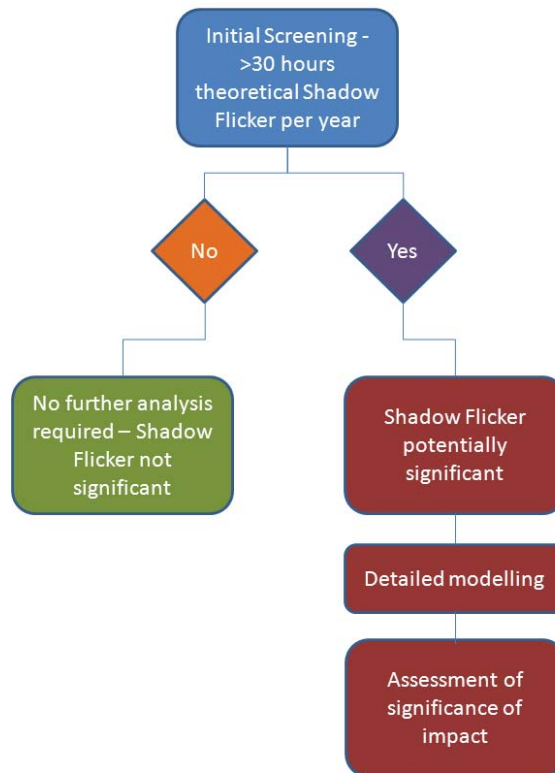


Figure 12.1 – Process for assessment of Shadow Flicker

Windfarm Model

ReSoft’s WindFarm software has been used to calculate theoretical levels of shadow flicker. This software models shadow flicker effects by using simple geometric considerations: the position of the sun at a given date and time; the size and orientation of the windows that may be affected; and the size of the turbine that may cast the shadows. The model adopts a worst case approach by assuming that:

- The turbine is facing the sun at all times of the day;
- It is always sunny;
- The turbine is always operating; and
- There is no local screening.

Realistic Levels of Shadow Flicker

Realistic levels of shadow flicker have been calculated using the theoretical figures as a base. These realistic levels take into account actual annual hours of sunlight for the area, hours of turbine operation, and the average yaw angle of the turbine.

The mitigation factors are derived from the following:

- The average sunlight hours for the Arbroath area which is ~1,564 hours. This has been estimated from the 1981-2010 met office data for Leuchars. Therefore, on average it is sunny for ~35% of the daylight hours.
- The rotor of a modern wind turbine can be expected to turn approximately 90% of the time.
- According to the Danish Wind Energy Association website, shadow flicker is reduced to 63% of the maximum possible if the wind turbine is assumed to be randomly yawed relative to the sun position.

The realistic results are therefore 20% of the uncorrected total ($0.35 \times 0.90 \times 0.63 = 0.20$). The assessment of significance is based upon these realistic levels.

Sensitivity of receptors

The area surrounding Bairds Malt contains residential, commercial and industrial receptors. It is difficult to assign a general level of sensitivity for each group of receptors as the sensitivity of each receptor is generally building specific, and will depend upon the use of the rooms that are affected, the level of shading surrounding the property and how susceptible the receptor is to light flicker. All of the receptors have therefore been assumed to be of a High sensitivity.

Where shadow flicker occurs outside of the hours 8am to 6pm then this has been noted. Similarly, where premises are un-occupied over the weekend then shadow flicker would not be an issue. This consideration has not been taken into account in the assessment, but would become pertinent when calculating turbine shut-down times should a turbine shut-down strategy be required.

Assessment of Significance

The following impact assessment matrix has been devised based on this guidance and professional judgement, and is presented below in **Table 12.1**.

Table 12.1 – Assessment Matrix

Sensitivity	Magnitude of Change (Realistic total shadow flicker duration per year)			
	High (>30 hours per year)	Medium (>6 and <30 hours per year)	Negligible (<6 hours)	None
High	Major	Moderate	Minor	Negligible / None

The threshold for negligible impact has been set at the 30 theoretical hours when mitigating factors are taken into account – $30 \text{ hours} \times 0.2 = 6 \text{ hours}$ realistic shadow flicker.

12.3 Screening of Receptors

The WindFarm model was run to identify those receptors where the theoretical shadow flicker impact is greater than 30 hours per year. The results of this exercise are shown in **Figure 12.2 (Appendix 5)**. Further information on each receptor is provided below.

Peasiehill Cottages (1 and 20)



South-eastern façade of the properties, which face the turbine

Description of receptor	Two semi-detached single storey residential properties. Although outside the zone of 30 hours influence, these are the closest residential properties to the turbine, and have therefore been included in the assessment.
Type of receptor	Residential
Distance to turbine	310m
Main orientation of receptor	South-west, towards turbine.
Number of windows affected	Two per property, facing towards the turbine.
Screening	No
Considered further within assessment?	Yes

PAF 1 (2)



The northern façade of the property facing away from the turbine



Typical photograph of the shelter belt of trees to the south of Patrick Allan Fraser Street

Description of receptor	The closest semi-detached single storey property in the south-west corner of the housing estate.
Type of receptor	Residential
Distance to turbine	350m
Main orientation of receptor	North, away from turbine. Rear of the property faces south, towards the turbine.
Number of windows affected	Two on the rear of the property.
Screening	A belt of deciduous trees to the south of the property would offer screening in the months when foliage is present.
Considered further within assessment?	Yes

PAF 2 (3)

The northern façade of the house, which faces away from the turbine. Shelter belt of trees visible to the rear.

Description of receptor	Semi-detached single storey property on the southern edge of Patrick Allan Fraser Street.
Type of receptor	Residential
Distance to turbine	390m
Main orientation of receptor	North, away from turbine. Rear of the property faces south, towards the turbine.
Number of windows affected	Two on the rear of the property.
Screening	A belt of deciduous trees to the south of the property would offer screening in the months when foliage is present.
Considered further within assessment?	Yes

PAF 3 (4)

The northern façade of the house, which faces away from the turbine. Shelter belt of trees visible to the rear.

Description of receptor	Semi-detached single storey property on the southern-eastern edge of Patrick Allan Fraser Street. The front of the property faces away from the turbine.
Type of receptor	Residential
Distance to turbine	400m
Main orientation of receptor	North, away from turbine. Rear of the property faces south, towards the turbine.
Number of windows affected	Two on the rear of the property.
Screening	A belt of deciduous trees to the south of the property would offer screening in the months when foliage is present.
Considered further within assessment?	Yes

PAF 3 (5)



The southern façade of the house which faces the turbine

Description of receptor	Detached single storey property on Patrick Allan Fraser Street. The property's main views are towards the turbine.
Type of receptor	Residential
Distance to turbine	430m
Main orientation of receptor	South, towards the turbine.
Number of windows affected	Two on the front of the property.
Screening	None
Considered further within assessment?	Yes

SRCL (6)



The southern façade of the unit, which faces the turbine.

Description of receptor	Single storey industrial unit.
Type of receptor	Industrial
Distance to turbine	180m
Main orientation of receptor	North-east, away from the turbine.
Number of windows affected	None
Screening	-
Considered further within assessment?	No

Tayside Doors (7)



Main façade of industrial units showing potentially affected windows.

Description of receptor	Two industrial units with the main facades orientated in a south-westerly direction, oblique to the turbine.
Type of receptor	Industrial
Distance to turbine	220m
Main orientation of receptor	South-west, obliquely towards the turbine.
Number of windows affected	16 small windows which are currently barred. The windows appear to be associated with warehouse space.
Screening	None
Considered further within assessment?	Yes

Elliott Business Park (8)



Northern portion of the south-eastern façade of the Business Park offices



Southern portion of the south-eastern façade of the Business Park offices

Description of receptor	Large warehouse with office facilities in the south-western portion. These premises are currently unoccupied.
Type of receptor	Industrial / Commercial
Distance to turbine	260m
Main orientation of receptor	South-east, oblique to the turbine.
Number of windows affected	No windows on the south-western façade, which provides access to the warehousing facility. Strip of windows ~75m in length across most of the SSW face could potentially be affected by shadow flicker.
Screening	None.
Considered further within assessment?	Yes

Smithy (9)

South-western façade of the Smithy premises which is oblique to the turbine.

Description of receptor	Single storey building with yard being used to store containers. It is not known whether this building is currently in use.
Type of receptor	Industrial
Distance to turbine	370m
Main orientation of receptor	South-west, obliquely towards the turbine.
Number of windows potentially affected	Four windows. These are currently barred.
Screening	None
Considered further within assessment?	Yes

Mackays (10)



South-western façade of the premises, oblique to the turbine

Description of receptor	Distribution Warehouse and Factory Shop.
Type of receptor	Industrial
Distance to turbine	210m
Main orientation of receptor	North-west, away from the turbine.
Number of windows potentially affected	None.
Screening	-
Considered further within assessment?	No

NETDWES Self Storage (11)

Photograph of the northern façade of the property. Western façade is to the right of the picture

Description of receptor	Single storey warehouse
Type of receptor	Industrial
Distance to turbine	310m
Main orientation of receptor	South-west, obliquely towards the turbine.
Number of windows potentially affected	None. Large warehouse entrance is on the façade.
Screening	-
Considered further within assessment?	No

Halliburton 1 (12)

Description of receptor	Large single storey warehouse
Type of receptor	Industrial
Distance to turbine	170m
Main orientation of receptor	South-east, oblique to the turbine.
Number of windows potentially affected	None.
Screening	-
Considered further within assessment?	No

Halliburton 2 (13)



North-western façade of the property facing obliquely away from the turbine.



South-western façade of the premises, facing towards the turbine. One window is visible halfway up the left edge of the building.

Description of receptor	Large warehouse structure
Type of receptor	Industrial
Distance to turbine	90m
Main orientation of receptor	North-west, oblique to the turbine.
Number of windows potentially affected	Three on the north-western façade, one on the south-western façade.
Screening	A large coniferous hedge is located ~15m to the west of the building.
Considered further within assessment?	Yes

Halliburton Offices (14)



South-western façade of the building. The offices are visible in the distance, between the two large warehouses.

Description of receptor	Large 'U' shaped building. The northern and southern wings are large warehouse structures with no windows. The eastern part of the building, the rear of which faces the turbine, comprises three storeys of office space.
Type of receptor	Industrial / Commercial
Distance to turbine	260m (Offices)
Main orientation of receptor	South-west towards the turbines (offices)
Number of windows potentially affected	16 windows split over three floors.
Screening	None
Considered further within assessment?	Yes

Energy Alloys (15)



The northern aspect of the premises. The large warehouse is towards the rear of the picture. The offices are located in the grey brick building to the left of the picture.

Description of receptor	Large warehouse complex, with office premises to the east.
Type of receptor	Industrial / Commercial
Distance to turbine	330m (Offices)
Main orientation of receptor	North-west oblique to the turbine.
Number of windows potentially affected	The office premises have a single second-storey window in the aspect facing the turbine location.
Screening	None
Considered further within assessment?	Yes

Masstock (16)



South-western façade of the building which faces the turbine

Description of receptor	Single storey warehouse type building with offices in the northern half.
Type of receptor	Industrial / Commercial
Distance to turbine	350m
Main orientation of receptor	North-east away from the turbine.
Number of windows potentially affected	None
Screening	-
Considered further within assessment?	No

Buildbase (17)



The north-eastern façade of the building, facing away from the turbine

Description of receptor	Single storey warehouse type building with a small office on the eastern aspect.
Type of receptor	Industrial / Commercial
Distance to turbine	330m
Main orientation of receptor	North-east away from the turbine.
Number of windows potentially affected	None
Screening	-
Considered further within assessment?	No

Halliburton 4 (18)



The eastern façade of the building, facing away from the turbine.

Description of receptor	Single storey warehouse type building with offices on the eastern side.
Type of receptor	Industrial / Commercial
Distance to turbine	340m
Main orientation of receptor	North-east away from the turbine.
Number of windows potentially affected	None
Screening	-
Considered further within assessment?	No

PMP Interplex (19)

The north-western façade of the building showing the commercial offices.

Description of receptor	Warehousing and offices. The offices are located on the north-western side of the building over two floors.
Type of receptor	Industrial / Commercial
Distance to turbine	360m
Main orientation of receptor	North-west obliquely towards the turbine.
Number of windows potentially affected	All of the windows on the north-western façade covering a distance of around 50m.
Screening	None.
Considered further within assessment?	Yes

Detailed Shadow Flicker analysis

For each of the receptors carried forward for detailed assessment, the windows with the potential to be affected by shadow flicker have been modelled within WindFarm software. The size, orientation and position of each window has been coded using:

- Photographs taken on-site.
- Imagery available on Google Earth; and
- OS Mapping imported in to WindFarm.

12.4 Results and Assessment

The calculation results, both theoretical and realistic, along with the resulting impact assessment based on the assessment matrix above, are given in **Table 12.3** below.

Table 12.3 – Results and Impact Assessment

Shadow Flicker Impact Assessment							
ID	Name	Sensitivity	Number of days	Mean hours per day	Total hours per year		Impact (Based on mitigated levels)
					Theoretical	Realistic	
1R	Peasiehill Cottages (S)	High	50	0.5	25.7	5.1	Minor
2R	PAF1	High	59	0.55	32.7	6.5	Moderate
3R	PAF2	High	50	0.44	22.0	4.4	Minor
4R	PAF3	High	62	0.48	29.8	6.0	Minor
5R	PAF4	High	30	0.61	9.3	1.9	Minor
7I	Tayside Doors	Low	113	1.05	118.6	23.7	Moderate
8C	Elliott Business Park	High	104	1.20	124.6	25.0	Moderate
9I	Smithy	Low	84	0.41	34.2	6.8	Minor
13I	Halliburton 2	Low	183	1.26	231.3	46.0	Major
14C	Halliburton Offices	High	77	.80	61.9	12.4	Moderate
15C	Energy Alloys	High	55	0.43	23.6	4.7	Minor
19C	PMP Interplex	High	67	0.55	36.5	7.3	Minor
20R	Peasiehill Cottages (N)	High	50	0.51	25.7	5.1	Minor

R=Residential, I=Industrial, C=Commercial

A discussion of the results is provided below.

Residential Properties

- The highest theoretical impact at a **residential property** is 32.7 hours per year, at PAF 1. This amounts to 6.5 hours of predicted shadow flicker impact when more realistic results are considered. This has been assessed as a **Moderate** impact. This property is screened from the turbine by a shelter belt of trees which would further mitigate impacts.
- The remaining five residential properties assessed are all predicted to have theoretical levels of shadow flicker of under 30 hours per year, falling to less than 6 hours when realistic factors are considered. This has been assessed as a **Minor** impact. All of the properties on the southern-edge of Patrick Allan Fraser Street are expected to receive screening from the belt of trees to the south of the estate. This will be more substantial in the months when the trees are in leaf.

Commercial Properties

- The highest theoretical impact at a **commercial property** is 124.6 hours per year, at Elliott Business Park. This amounts to 25 hours of predicted shadow flicker impact when more realistic results are considered, which has been assessed as a **Moderate** impact. This property does not appear to be currently occupied.
- The remaining commercial properties are expected to receive lower levels of shadow flicker. The impact on the Halliburton Offices has been assessed as **Moderate**, with **Minor** impacts at Energy alloys and PMP Interplex.

Industrial Properties

- The highest theoretical impact at an **industrial property** is 231 hours per year, at Halliburton 2, which is the closest building to the turbine. This amounts to 46 hours of predicted shadow flicker impact when more realistic results are considered, which has been assessed as a **Major** impact.
- Tayside Doors has been assessed as experiencing a **Moderate** impact, with 23.7 hours of realistic shadow flicker impacts predicted per year. The predicted impacts on the Smithy have been assessed as **Minor**.

12.5 Mitigation

DECC has stated that, *“Mitigation measures which have been employed to operational wind farms such as turbine shut down strategies, have proved very successful, to the extent that shadow flicker cannot be considered to be a major issue in the UK”¹².*

There are four main mitigation measures that can be applied to reduce shadow flicker effects:

- Careful site design to minimise impacts;
- Implementation of a turbine shut-down strategy;
- The installation of blinds at affected properties; and
- Landscaping or the planting of vegetation to provide screening.

The biggest predicted impact (realistic total) at the Halliburton warehouse equates to 2.9% of annual daylight hours (46 / 1,564). Given the findings of this assessment, no mitigation measures are proposed at this stage.

It is recommended that a watching brief be undertaken throughout the first year of the turbine’s operation to establish whether shadow flicker is problematic at any particular locations and at any particular times of the year.

Should shadow flicker be a concern for the Local Authority (for residential, commercial or industrial locations), then the simplest option would be to install blinds at affected premises, with the agreement of the owner / occupier. This would be an effective, low cost solution, and would be the applicant’s preferred option.

Alternatively, a turbine shut down strategy could be agreed at the post-planning stage which would automatically stop the turbine during particular combinations of date, time and turbine position and when light levels are such that shadow flicker could occur and cause nuisance.

Enercon wind turbines, such as the E44 model proposed for this site, have a shadow shut off system integrated within their control system. The predicted theoretical times of shadow flicker nuisance, as modelled using ReSoft’s WindFarm software, are programmed into the

¹² Update of UK Shadow Flicker Evidence Base’ Department of Energy and Climate Change (2011)

control system as a table, which includes the daily start and end times of theoretical shadow flicker.

The turbine would be fitted with three light sensors spaced at 120° angles to ensure that one sensor is always exposed towards the orientation of the sun, and one is always on the shaded side of the turbine. Based on the measured values of the sensors, the control system determines the ratio between the level of highest and lowest illumination, known as the shut-off intensity.

The shutdown procedure is activated under the following conditions:

- When luminance from the sun is 120 W/m² or greater; and
- Shut-off intensity is 36% or less.

When both of these criteria are met within the timeframes programmed into the turbine from the shadow flicker model, the turbine will proceed to shut down.

12.6 Conclusion

A detailed assessment of potential shadow flicker impacts has been undertaken in the area around the proposed Bairds Malt turbine. This has considered the impact on residential, commercial and industrial premises.

Taking into account realistic assumptions relating to actual sunlight hours and turbine orientation, shadow flicker impacts are not expected to exceed 6.5 hours per year at the nearest residential properties to the proposed Bairds Malt turbine. Given these results, shadow flicker is not expected to be a nuisance at any residential properties.

The biggest predicted impact at a commercial property (which currently appears to be vacant) is 25 hours per year. The worst affected industrial property is predicted to experience 46 hours of shadow flicker impact per year, which equates to 2.9% of daylight hours (46/1,564).

Given the findings of the assessment, no further mitigation is proposed at this stage, but a watching brief is recommended throughout the turbine's first year of operation. Should Angus Council consider shadow flicker to be an issue then it is proposed that suitable mitigation measures be agreed at the post-planning stage, comprising of either the installation of blinds at affected premises or the development of a turbine shut-down strategy.

13 The Carbon Balance

This section considers the impact of the proposed wind turbine on climate change.

13.1 Introduction

The UK and Scottish Governments have developed ambitious targets for tackling climate change:

- The UK Government in the 2008 Climate Change Act made a commitment to reduce the UK's emissions of CO₂ by 34% (on 1990 levels) by 2020 and 80% by 2050.
- The Climate Change (Scotland) Act 2009 sets in statute the Government's Economic Strategy target to reduce Scotland's emissions of greenhouse gases by 80% by 2050 (on 1990 levels), with an interim reduction target of at least 42%. These targets will be achieved through an investment in energy efficiency and clean technologies such as renewable energy generation.

The Scottish Government has developed a Climate Change Programme which sets a goal of generating the equivalent of 100% of Scotland's electricity demand by renewable means by 2020, with an interim target of 50% by 2015¹³. The vast majority of this new target is still expected to be met by hydro and by onshore wind.

New developments will continue to be implemented through the Renewables Obligation (Scotland) on all licensed electricity suppliers in Scotland, and through other incentives such as the Feed in Tariff (FiT).

13.2 Potential Impacts

The main greenhouse gas pollutants associated with conventional power stations include: carbon dioxide (CO₂); sulphur dioxide (SO₂); and oxides of nitrogen (NO_x).

The following table, which has been adapted from SNH guidance, summarises the potential CO₂ savings and costs associated with different aspects of each wind development:

Table 13.1 – Carbon savings / losses associated with wind developments

Potential Carbon Savings	Potential Carbon Losses
Carbon emission savings when compared to emissions from different power sources	Production, transportation, erection, operation and decommissioning of the wind turbine
Improvement of habitat	Requirement for backup power generation
	Loss of carbon fixing potential of peatland
Loss and/or saving of carbon stored in peatland (by peat removal or changes in drainage)	
Loss and / or saving of carbon fixing potential as a result of forestry clearance	

In assessing the overall impact of the project on climate change, the full lifecycle of the wind turbines need to be considered. The remainder of this section quantifies each of the different elements presented above.

¹³ Renewable Routemap for Scotland - Update October 2012, The Scottish Government.

13.3 Guidance

This section has been written with reference to the following technical guidance:

- SNH Technical Guidance Note, 2.0.1, 2011¹⁴; and
- ‘Onshore Wind Energy Figures’¹⁵, Renewables UK (Accessed: November 2013).

SNH published a Technical Guidance Note in 2003 for calculating carbon ‘payback’ times for wind farms. The 2003 guidance adopted a relatively simple approach towards impacts on peatland hydrology and stability. The 2011 Technical Guidance Note presents a more comprehensive approach towards these issues.

Baseline Data

The annual carbon dioxide emissions saving of a wind turbine are estimated as:

$$CO_2 \text{ emissions saving} = \frac{\text{total electricity generation expected [MWh]}}{\text{Emission Factor of Displaced Generation [tCO}_2\text{/MWh]}}$$

The SNH Technical Guidance Note states that, “**in most circumstances it is not possible to define the electricity source for which a renewable electricity project will substitute**”, although it does state that as nuclear power generation is not affected by renewable energy generation “**this suggests that carbon emission savings from wind farms should be calculated using the fossil fuel sourced grid mix as the counterfactual**” SNH’s Technical Note presents result for each of the three sets of figures, as shown in **Table 13.2**.

Table 13.2 – Counterfactual emission factors

Energy	Emission Factor (tCO ₂ per mWh) ¹⁶
Grid Mix	0.43
Coal Fired	0.86
Fossil Fuel Mix	0.607

Within this section, the predicted carbon savings against both the Grid Mix and the Fossil Fuel Mix are presented. The Grid Mix figures present a more conservative estimate of CO₂ emission savings.

¹⁴ <http://www.scotland.gov.uk/Resource/Doc/917/0120448.pdf>

¹⁵ Renewable website –Onshore Wind Energy Figures, <http://www.renewableuk.com/en/renewable-energy/wind-energy/onshore-wind/index.cfm>, accessed November 2013

¹⁶ Table 2, SNH Technical Guidance Note, 2.0.1, 2011

Capacity Factor

A wind project capacity factor has to be determined in order for the total electricity generation of the wind project to be calculated. This is the ratio of the actual energy generated to the theoretical amount that the machine would generate if running at full rated power during a given period of time. The average capacity factor observed for the onshore wind farms in the UK between 2007 and 2012 is 26.2%¹⁷. The Scottish average is believed to be better thanks to more frequent and higher wind speeds, and in 2012 this was 32%¹⁸. The UK average in 2013 was 28.9%, and it is this information which has been used in the calculations below.

13.4 Carbon balance

Project CO₂ emission savings

The calculation was carried out in accordance with SNH Technical Note version 2.0.1, 2011¹⁹, using the overall grid mix and fossil fuel sourced grid mix figures to produce the counterfactuals for comparison. Results are presented in **Table 13.3**.

Power Generation Characteristics	
Number of turbines	1
Total installed capacity	0.9MW
Capacity Factor	29%
Lifetime	25 years
Annual Energy Output	~2,300 MWh/yr

Counterfactual Emissions Factors	
Overall 'grid' mix generation	0.43 tCO ₂ /MWh
Fossil fuel sourced mix	0.607 tCO ₂ /MWh

Project estimated CO ₂ emission savings over:	tCO ₂ /yr	tCO ₂ /25yr
Grid mix generation	983	24,600
Fossil fuel mix generation	1,388	34,700

Assuming 1 tCO₂ = 0.27 tC:

Total Project Estimated Carbon saving over:	tC /yr	tC /25yr
Overall 'grid' mix generation	265	6,600
Fossil fuel mix generation	375	9,400

Table 13.3 – Calculated CO₂ emission savings

¹⁷ Digest of UK Energy Statistics 2013 (DUKES) Table 6.5 - Load factors for renewable electricity generation, November 2013

¹⁸

https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/244732/1_regional_renewables_2012.pdf

¹⁹ <http://www.scotland.gov.uk/Resource/Doc/917/0120448.pdf>

Projected carbon savings and costs

The potential carbon savings and carbon costs associated with wind farm development are as follows:

- Carbon emission savings (based on emissions from different power sources);
- Loss of carbon due to production, transportation, erection, operation and decommissioning of the wind farm;
- Loss of carbon from backup power generation;
- Loss of carbon-fixing potential of peatland;
- Loss and/or saving of carbon stored in peatland (by peat removal or changes in drainage);
- Carbon saving due to improvement of habitat; and
- Loss and/or saving of carbon-fixing potential as a result of forestry clearance.

An assessment of the Bairds Malt turbine against each of these elements is presented below.

Production, transportation, erection, operation and decommissioning of the wind farm

In the absence of a specific life cycle assessment for the turbine, the SNH Technical Guidance Review recommends using the following equations:

$$\text{For turbines } <1\text{MW: } L_{\text{life}} = (517.62 * C_{\text{turbine}}) - 0.1788$$

$$\text{For turbines } >1\text{MW: } L_{\text{life}} = (934.35 * C_{\text{turbine}}) - 467.55$$

Where C_{turbine} is the capacity of each machine.

Using this formula, the lifecycle CO₂ emissions of the turbine can be estimated to be **466 tonnes** which corresponds to a payback time of around **6.3 months** against the grid mix generation. This corresponds to **126 tonnes** of carbon.

Requirement for backup power generation

The SNH Technical Guidance Review states that the extra capacity required for backup power generation is estimated to be 5%, if wind energy contributes more than 20% to the national grid.

The guidelines estimate that the contribution of wind power to the national grid will not exceed 20% until 2038. The Bairds Malt turbine is scheduled for build in 2015 and is intended to be decommissioned after the 25 year operational life in 2040. Therefore no additional CO₂ loss from back up generation requirements can be attributed to the project over the first 23 years of operation, however over the latter 2 years the 5% additional CO₂ loss will apply.

Backup power generation is assumed to be by fossil-fuel mix of electricity generation. The additional CO₂ loss is calculated using the following equation:

CO ₂ Emissions (Backup Generation)	=	Rated Capacity [MW/yr]
		x
		Backup Capacity Required [%]
		x
		Additional emissions due to reduced thermal efficiency of reserve generation [%]
		x
		Grid mix of electricity generation [TCO ₂ /yr]
		x
		Lifetime of project (years)

At the proposed wind farm site the CO₂ emissions associated with the requirement for extra backup generation over the latter years of operation is calculated as a loss of **~34 tonnes of CO₂**.

Peat

No areas of peat will be affected by the proposal, either through direct impacts or indirectly through impact upon drainage.

Forestry

No areas of forestry are expected to be cleared as a result of the proposal.

Results

The following table summarises the overall carbon balance of the development over its 25 year lifecycle, based upon the overall grid mix counterfactual, which represents a conservative estimate.

Table 13.3– Predicted carbon savings / losses

Element:	Predicted lifetime savings / losses (tC)
Projected carbon savings compared to grid mix	-6,636
Production, transportation, erection, operation and decommissioning	+126
Requirement for backup power generation	+34
Peat losses / savings	0
Forestry losses / savings	0
Total	-6,476

Table 13.3 shows that over its 25 year lifecycle the project is expected to result in a carbon saving of **~6,500 tonnes**.

Other Polluting Gas Emissions Savings

Other gas emissions resulting for fossil fuel sourced electricity generation are sulphur dioxide (SO₂) and nitrogen dioxide (NO_x), both responsible for acid rains. Emissions savings relating to the project can be calculated using the BWEA guidance. This suggests that the

SO₂ and NO_x emissions savings are, respectively, 10 and 3 kg per MWh. This translates to emissions factors of 0.01 and 0.003 [tonnes/MWh] respectively.

Project total emission savings of:	
Sulphur dioxide SO ₂	~572 tonnes /25yr
Nitrogen dioxide NO _x	~171 tonnes /25yr

13.5 Mitigation

As the development as a whole is expected to have a small beneficial effect on climate change in terms of offsetting greenhouse gas emissions, no mitigating actions are suggested.

13.6 Conclusions

It is concluded from the above that the development would have an overall modest positive effect in reducing UK greenhouse gas emissions.

The wind turbine will offset the electricity import requirement of the plant, and will provide a source of green energy that helps to lower the business' carbon footprint.

13.7 References

Department of Energy and Climate Change (2013), *Regional and local authority electricity consumption statistics: 2005 to 2013*.

The Scottish Government (2013), *Energy Statistics Summary*, The Scottish Government.

The Scottish Government (2009), *Climate Change (Scotland) Act 2009*, The Scottish Government.

The Scottish Government (2013), *2020 Routemap for Renewable Energy in Scotland - Update*, The Scottish Government.

UK Government (2008), *Climate Change Act 2008*, UK Government.

14 Safety

14.1 Introduction

This chapter describes the potential health and safety issues relating to the operation of the proposed turbine. The paragraphs below outline the procedures that will be put in place and followed to ensure the safety of the workforce and the public, specifically in relation to the following:

- Approach to safe operation and maintenance;
- Turbine safety;
- Safe operation;
- Safety during adverse weather conditions; and
- Public safety.

14.2 Legislation and Standards

The construction of the turbine must comply with the requirements of the Construction (Design and Management) Regulations 2007. These regulations oblige the developer to notify the Health and Safety Executive (HSE) of the project, and to establish a safety management system encompassing risk assessment, design measures and management instructions to ensure the safety of construction (and operational) staff and the public. Best practice health and safety guidelines published by Renewable UK (2010), will be adhered to and speed limits will be put in place to regulate traffic flows.

SNH have also provided a Good Practice Guide to good practice in wind farm construction:

<http://www.snh.gov.uk/planning-and-development/renewable-energy/onshore-wind/good-practice-during-windfarm-const/>.

14.3 General Approach to Safe Operation and Maintenance

As for any mechanical or electrical installation, wind farms could pose a safety risk if not managed and maintained correctly. The Construction (Design and Management) Regulations 2007 (CDM) are now well established as the key legislation that is applicable to the development and construction of onshore and offshore renewable energy projects within the jurisdiction of Great Britain. It is important to comply with this legislation to avoid enforcement action and possible prosecution.

Detailed risk analysis and avoidance limitation measures are required for every facet of the development and operation of a wind project. These measures would be contained in the Health and Safety file for the proposed Bairds site, which would be open to inspection by the Health and Safety Executive. All site personnel would have full safety training, to ensure risk of accidents occurring is minimised.

Safety of the public and contractors are of paramount importance to Kilmac Energy. During construction and subsequent operation of the development, site safety procedures will be strictly enforced and followed.

14.4 Assessment of Predicted Impacts and Effects

14.4.1 Best Practice Guidelines for Wind Energy Health and Safety

During the construction, decommissioning and operational phase of the projects relevant guidance, legislation and standards as well as 'good and best practices' will be adopted to maintain site safety.

All personnel working on the site would undergo an induction covering topics including health and safety, environmental protection and pollution prevention, control and response.

A Construction Method Statement (CMS) would be developed to ensure a coordinated approach. This plan would highlight the health, safety and environmental considerations related to the proposed works and define the controls to be implemented to ensure a safe system of work.

14.4.2 Turbine Safety

The selected Enercon E44 wind turbine model has full certification from a recognised authority against internationally recognised standards, and a proven track record of safe operation. The main certification agencies, have well developed and proven certification procedures. A mature suite of safety and testing standards developed over many years by the International Electrotechnical Commission are now in place and are widely accepted. Working in parallel, these standards and certification procedures have ensured that wind turbines adhering to them have high levels of intrinsic safety.

As stated in PAN 45: *"Many blades are composite structures with no bolts or other separate components. Even for blades with separate control surfaces on or comprising the tips of the blade, separation is most unlikely"* (Para 48, SEDD, 2002). Although PAN 45 has now been revised and updated this advice remains relevant. The highest risk of damage is in extreme wind speed conditions (>100mph) when the likelihood of anyone being on site is remote. Even under these conditions the risk of damage is small (for example, the Wigton wind farm in Jamaica which RES constructed and commissioned in 2004 did not incur any significant damage by Hurricane Ivan which caused devastation throughout the island on 10th September later that year). The turbines proposed for the site would be certified to withstand appropriately extreme conditions.

14.4.3 Safe Operation

Modern wind turbines incorporate sophisticated supervisory control systems that continually interrogate the operational status and safe working of key components of each turbine and allow an operator to remotely monitor the turbines via satellite link. Under fault conditions, affected turbines automatically shut down and send an alarm to the maintenance engineer. For safety-critical faults, turbines do not re-start until the maintenance engineer has diagnosed and rectified the problem.

In terms of general safety during operation, the turbines would be supported by the manufacturer's operational and maintenance safety manuals, which would be available on

site. These manuals would form the basis of the regular safety checks that would be undertaken throughout the life of the development.

The operator of the turbine, in compliance with relevant safety regulations, would display appropriate warning signs concerning restricted areas on the turbines, sub-station enclosure and control building. Authorised personnel and persons under their supervision who visit the restricted areas of the site during its operation would operate under site-specific safety rules established by the owner and operator. Electrical installation conducted in accordance with standards and recognised codes of practice, with adequate signage and protection.

14.4.4 Public Safety

After construction is completed, there would be no reason under normal circumstances to restrict access to the Core Path and fields to the east of the turbine.

As for any structure, storm damage to turbines can be sustained during severe storm events. A few isolated cases of turbine blade or other damage have occurred in exceptionally high wind conditions.

The plant, equipment and their enclosures are designed to incorporate the best available technology and access to the proposed wind project site should pose no danger to the public. During routine maintenance operations 'warning' signs would be erected. At the main entrance to the site, signs would be deployed giving basic safety information, including speed limits, appropriate personal protective equipment and also giving details of whom to contact in an emergency. Emergency contact information would also be posted at the local police station and with the local power distribution company, SSE.

14.4.5 Safety During Adverse Weather Conditions

Although the possibility of attracting lightning strikes applies to all tall structures, wind turbines have specific protection requirements due to their size and nature. Specific design features are required to ensure safety and to ensure that the turbines can operate during lightning storms without damage and without impact on reliability. Specific features are incorporated into the blades to ensure strikes are conducted harmlessly past the sensitive parts of the nacelle and down the tower into the earth. Protection also includes a buried earthing mat around each turbine foundation and/or a deeply sunk lightning conduction cable which is sunk to a substantial depth into the earth, sufficient to ensure appropriate conduction to ground.

In some countries, icing of wind turbine blades presents a potential risk that must be managed. In the more temperate climates of the UK, icing has not been a major problem to date, but at higher elevations and at locations further north, the risk will be greater and needs to be suitably assessed.

Generally, there is no inherent danger in operating a wind turbine at low temperatures, and there is no particular risk simply because it is frosty or snowing. However, under certain atmospheric conditions, such as freezing-fog which specifically involve low temperatures and high humidity, hard ice can form on the blades (this can also happen either when rain freezes on contact with a blade or should the turbine be operating in low cloud). The

Enercon turbine proposed at the site has an ice detection system which will shut down the turbine if a build-up of ice is detected; thus reducing the risk of ice throw.

In order to further minimise the risk of falling ice (i.e. ice falling off stationary blades and being blown by the wind) an ultrasonic anemometer can be mounted on the turbine to further reduce this risk.

14.5 Summary of Predicted Impacts and Effects

Wind turbines have a proven track record for safety, and the Enercon turbine proposed for Bairds Malt will be constructed and operated in accordance with relevant health and safety legislation. Commercial sized turbines are particularly reliable, requiring minimal intervention and maintenance during operation. They are designed to cope with extreme wind and weather conditions.

Only turbines with a proven record of safety and reliability will be selected for this site. The risk of ice throw (ice falling or being thrown from a turbine during particular circumstances) is also low. An ice detection system on the turbines will ensure they are deactivated if there is a risk of ice throw.

14.6 References

- 1) RenewableUK (2010), Guidelines for onshore and offshore wind farms – Health and Safety in the Wind Energy Industry Sector, RenewableUK, London.
- 2) Scottish Government (2002) *PAN 45 – Renewable Energy Technologies*, Scottish Government (replaced with web based renewables guidance: <http://www.scotland.gov.uk/Topics/Built-Environment/planning/National-Planning-Policy/themes/renewables>).
- 3) Scottish Government (2007), Statutory Instruments, 2007 No. 320, Health and Safety – The Construction (Design and Management) Regulations 2007, Scottish Government.

BAIRDS MALT WIND TURBINE

Appendix 2.1 – Viewpoint Assessment

December 2014

Figure 7.13	Viewpoint 1: Queens Drive Arbroath	
Description	<p>The viewpoint is located on the waterfront just off Queens Drive in Arbroath at E363270 N740128. The view faces west towards the proposed development and is situated 1.4km from the turbine. This is a fairly open vista with long distance views occurring over the shoreline to the left hand side of the view. The foreground landscape is predominantly flat, forming the transition between the nearby coastline and the land. The sea wall forms a physical barrier between the two landscapes. The landscape rises over the middle ground with the embankment containing the nearby A92 as it makes its way southwards from Arbroath. The middle ground contains several large industrial buildings including the Maltings. Bands of mature shelterbelt woodland line the horizon limiting potential views over the countryside which covers much of the landscape to the west of the settlement. There are a number of vertical features within the view including street lighting, walls and fencing, the industrial buildings and the children's play park all appear in the view. The viewpoint has been heavily modified over time as Arbroath has expanded the man-made feel of the area has increased significantly.</p>	
Sensitivity	<p>The viewpoint is taken from the coastline near Queens Drive Arbroath and is therefore considered to be of High sensitivity.</p>	
Magnitude of Change	<p>Receptors of this view would be 1.4km from the proposed development.</p> <p>From this location the proposed turbine would be an obvious vertical feature within the view. The turbine would be viewed on the horizon, backdropped solely by the sky. The maltings buildings and the surrounding woodland provide some screening of the lower sections of the turbine tower. The turbine while an obvious vertical feature would appear in the view alongside a number of other features including street lighting and other street furniture which runs the length of the view, communication masts and the towers at the maltings. The turbine would occupy a medium extent of the vertical view and a low extent of the horizontal view, despite being an obvious feature the turbine would not dominate the views from this location.</p> <p>Overall the magnitude of change is considered to be medium, resulting in a major/moderate level of effect.</p>	
Cumulative Impact	<p><u>Operational</u></p> <p>There are no operational developments visible from this location.</p> <p>The cumulative magnitude of change for operational projects would be none.</p> <p><u>Operational, Consented</u></p> <p>The Cuthlie turbine appears theoretically visible to the right of the view. The single turbine is partially screened by the intervening landscape, while the vegetation on the horizon would screen the visible portion of the turbine completely from this location.</p> <p>The cumulative magnitude of change for consented projects would become negligible.</p> <p><u>Operational, Consented, In Planning</u></p> <p>There are theoretical views of a handful of planning developments from this location, the single turbines of Upper Balmachie and Montquhir appearing in the same general view as the propose Bairds Malt turbine. The turbines would in reality be screened by the surrounding areas of.</p> <p>The cumulative magnitude of change for planning projects would remain negligible.</p>	
Type of Effect	<p>On completion of the development the visual effect from this viewpoint would be permanent (reversible) and direct. The development would lead to a medium magnitude of change and despite the careful design of the project a man-made vertical structure in this area would always lead to a negative effect.</p>	
Assessment of Visual Effects	Sensitivity:	<i>High</i>
	Magnitude:	<i>Medium</i>
	Type of Effect:	<i>Permanent, direct and negative</i>
	Level of Effect:	Major/Moderate

Figure 7.14	Viewpoint 2: Elliot Bridge	
Description	<p>The viewpoint is located on the waterfront just off the A92 as it enters Arbroath next to a small cluster of properties known as Elliot Bridge at E362001 N739451. The view faces north-west towards the proposed development and is situated ~700m from the turbine.</p> <p>The view is fairly enclosed from this location. The minor road which serves as access for the nearby properties runs through the foreground of the view. A stone wall bounds the roadside area separating it from the landscape beyond. The middle ground comprises an area of woodland to the left of the view, associated with the nearby Elliot water as it flows towards the sea, while the middle of the view overlooks the nearby caravan park. To the right views are restricted by the nearby properties which sit on the opposite side of the road. The landscape over the middle ground rises with the formation of lip that encloses the view, alongside the woodland and other built features contained within the vista. The maltings are partially visible on the horizon. The view is made of predominately man-made features with natural features limited to the woodland and vegetation contained to the left of the view.</p>	
Sensitivity	<p>The viewpoint is taken from the access road to some of the closest residential receptors and is therefore considered to be of High sensitivity.</p>	
Magnitude of Change	<p>Receptors of this view would be 700m from the proposed development.</p> <p>From this location the turbine would be viewed on the horizon, alongside the maltings. The turbine would be an obvious and easily discernible change to the baseline features of the view, appearing solely against the sky. The rise in topography and the surrounding vegetation would screen the lower tower sections from view which would reduce the vertical extents of the development slightly. The turbine would occupy a medium extent of the horizontal view and a high extent of the vertical view becoming the tallest structure in the view.</p> <p>Overall the magnitude of change is considered to be high, resulting in a major level of effect.</p>	
Cumulative Impact	<p><u>Operational</u></p> <p>There are no operational developments visible from this location.</p> <p>The cumulative magnitude of change for operational projects would be none.</p> <p><u>Operational, Consented</u></p> <p>There are no consented developments visible from this location</p> <p>The cumulative magnitude of change for consented projects would remain none.</p> <p><u>Operational, Consented, In Planning</u></p> <p>There are theoretical cumulative views with the Montquhir and Crofts Farm turbines from this location, in reality the dense woodland which surround the area would completely screen any potential views towards these developments.</p> <p>The cumulative magnitude of change for planning projects would remain none.</p>	
Type of Effect	<p>On completion of the development the visual effect from this viewpoint would be permanent (reversible) and direct. The development would lead to a high magnitude of change and despite the careful design of the project a man-made vertical structure in this area would always lead to a negative effect.</p>	
Assessment of Visual Effects	Sensitivity:	<i>High</i>
	Magnitude:	<i>High</i>
	Type of Effect:	<i>Permanent, direct and negative</i>
	Level of Effect:	Major

Figure 7.15	Viewpoint 3: Arbirlot Road West	
Description	<p>The viewpoint is located at the side of Arbirlot Road West which runs along western edge of Arbroath at E362203 N741066. The view faces south-west towards the proposed development and is situated ~1km from the turbine.</p> <p>The view feels fairly open from this location, the sense of openness coming from the large, flat arable field that dominates the foreground of the view. Long distance views are quickly limited by the nearby built environment comprising the nearby housing estate and the Maltings, which tends to dominate the horizon. The field is bound with a post-and-wire fence as well as clusters of trees to the rear of some of the properties and a band of shelterbelt trees to the left of the view. The scene is fairly urban with the properties and the Maltings providing the key features in the vista.</p>	
Sensitivity	<p>The viewpoint is taken from the western edge of the settlement of Arbroath and represents local residents and is therefore considered to be of High sensitivity.</p>	
Magnitude of Change	<p>Receptors of this view would be 1km from the proposed development.</p> <p>From this location the turbine would be viewed on the horizon amongst the industrial buildings of the Maltings. The turbine would be partially screened from view by the drying towers, with the visible portion of the turbine viewed solely against the sky. The proposed development would be a fairly obvious feature in the view rising above the existing vertical features; however, it would add another industrial feature to a view which already contains several industrialised components as well as a host of other built features.</p> <p>Overall the magnitude of change is considered to be medium, resulting in a <u>major/moderate</u> level of effect.</p>	
Cumulative Impact	<p><u>Operational</u></p> <p>There are no operational developments visible from this location.</p> <p>The cumulative magnitude of change for operational projects would be none.</p> <p><u>Operational, Consented</u></p> <p>There are theoretical views of the Cuthlie and Kenly Farm turbines, the intervening housing estate will screen any potential views. The cumulative magnitude of change for consented projects would remain none.</p> <p><u>Operational, Consented, In Planning</u></p> <p>There are also theoretical successive views with the Crofts Farm turbines, although in reality these developments would be screened by intervening woodland.</p> <p>The cumulative magnitude of change for planning projects would remain none.</p>	
Type of Effect	<p>On completion of the development the visual effect from this viewpoint would be permanent (reversible) and direct. The development would lead to a medium magnitude of change and despite the careful design of the project a man-made vertical structure in this area would always lead to a negative effect.</p>	
Assessment of Visual Effects	Sensitivity:	<i>High</i>
	Magnitude:	<i>Medium</i>
	Type of Effect:	<i>Permanent, direct and negative</i>
	Level of Effect:	<i>Major/Moderate</i>

Figure 7.16	Viewpoint 4: Boulzie Hill	
Description	<p>The viewpoint is located at the summit of Boulzie Hill which is the most prominent location within the settlement of Arbroath at E364569 N740924. The view faces south-west towards the proposed development and is situated ~2.8km from the turbine.</p> <p>The elevated position of the viewpoint offers open long distance views over the surrounding settlement particularly to the west and south, with the views to the north restricted by properties and other built features of a similar elevation to the hilltop. The view is dominated by the settlement of Arbroath stretching all the way to the horizon, to the south there are more open views over the nearby coastline, with views possible out to sea and on clear days towards Fife. Views over the surrounding countryside are possible beyond the built environment of the settlement although the view is primarily characterised by the urban nature of the settlement. The settlement pattern of the older areas of Arbroath is visible, with the narrow streets around the old centre the dominant feature. Arbroath Abbey and the nearby Kelly Castle appear slightly more prominently in the view elevated from the surrounding buildings. The view represents one of the most open areas within the settlement of Arbroath.</p>	
Sensitivity	<p>The viewpoint is taken from one of the most open and prominent locations within Arbroath and represents local residents and is therefore considered to be of High sensitivity.</p>	
Magnitude of Change	<p>Receptors of this view would be 2.8km from the proposed development.</p> <p>From this location the turbine would be viewed on the horizon amongst the industrial buildings of the Maltings. The turbine would be partially screened from view by the drying towers, with the visible portion of the turbine viewed solely against the sky. The proposed development would be a fairly obvious feature in the view rising above the existing vertical features; however, it would add another industrial feature to a view which already contains several industrialised components as well as a host of other built features.</p> <p>Overall the magnitude of change is considered to be medium, resulting in a major/moderate level of effect.</p>	
Cumulative Impact	<p><u>Operational</u></p> <p>There are no operational developments visible from this location.</p> <p>The cumulative magnitude of change for operational projects would be none.</p> <p><u>Operational, Consented</u></p> <p>There are theoretical views of a small number of consented developments from this location with the turbines of Cuthlie, Stotfaulds and Cruivie Farm all appearing theoretically visible in the same general view as the Bairds Malt turbine from this location. The Cuthlie turbine would be the most prominent of these developments and would appear on the distant horizon, the other developments would likely be screened by other features in the wider view.</p> <p>The cumulative magnitude of change for consented projects would become negligible.</p> <p><u>Operational, Consented, In Planning</u></p> <p>As well as the consented turbines there are theoretical views of a small number of planning developments such as Montquhir and Upper Balmachie appearing theoretically visible in the same general view as the Bairds Malt turbine from this location. The cumulative magnitude of change for planning projects would remain negligible.</p>	
Type of Effect	<p>On completion of the development the visual effect from this viewpoint would be permanent (reversible) and direct. The development would lead to a medium magnitude of change and despite the careful design of the project a man-made vertical structure in this area would always lead to a negative effect.</p>	
Assessment of Visual Effects	Sensitivity:	<i>High</i>
	Magnitude:	<i>Medium</i>
	Type of Effect:	<i>Permanent, direct and negative</i>
	Level of Effect:	Major/Moderate

Figure 7.17	Viewpoint 5: Bearfauld Road	
Description	<p>The viewpoint is located at the side of Bearfauld Road, part of the National Cycle Network to the north-east of Arbroath at E365244 N742573. The view faces south-west towards the proposed development and is situated ~4.2km from the turbine.</p> <p>The view feels very open from this location, offering long distance views from the elevated position overlooking the nearby settlement of Arbroath, towards the coast and over the wider arable landscape which forms much of the Dipslope farmland. The landscape rolls away gently from the viewer, land cover over the foreground is dominated by a large arable field. The settlement of Arbroath sits within the landscape below, the topography rolling away to the nearby coastline. A dense band of mature woodland lines the middle ground screening views of the nearby A92. Beyond this the landscape rises, forming a gently rolling horizon that limits further views. This landscape is fairly typical of the wider rural area, with large rectilinear fields and clusters of woodland around the summits.</p>	
Sensitivity	<p>The viewpoint is taken from the side of Bearfauld Road, which forms part of the National Cycle network to the north-east of Arbroath and represents road users, cyclists and local residents and is therefore considered to be of High sensitivity.</p>	
Magnitude of Change	<p>Receptors of this view would be 4.2km from the proposed development.</p> <p>From this location the proposed turbines would be viewed breaking the horizon, with the majority of the turbine tower viewed against the landscape, the upper tower section, hub and blades would be viewed against the sky. The turbine would occupy a low extent of the vertical and horizontal view from this location, sited away from the nearby summits the turbine would not dominate or control this view.</p> <p>Overall the magnitude of change is considered to be low, resulting in a moderate level of effect.</p>	
Cumulative Impact	<p><u>Operational</u></p> <p>There are theoretical long distance views towards the Ark Hill windfarm although the intervening landscape would screen the majority of the development from view and located over 20km from the viewer it is unlikely to be an easily discernible feature within this view.</p> <p>The cumulative magnitude of change for operational projects would be negligible.</p> <p><u>Operational, Consented</u></p> <p>Frawney and Govals similar to the Ark Hill turbines appear on the distant horizon to the right of the view. The landscape screening all but the blade tips of the development from this location. The Cuthlie turbine is more prominent in the same view direction, sitting on the horizon the single turbine is viewed against the sky.</p> <p>The cumulative magnitude of change for consented projects would remain negligible.</p> <p><u>Operational, Consented, In Planning</u></p> <p>There are theoretical views of the single turbine at Upper Balmachie and Montquhir, the single turbines appearing predominantly against the landscape from this location. It is unlikely that they will be prominent or discernible features within the open view from this location.</p> <p>The cumulative magnitude of change for planning projects would remain negligible.</p>	
Type of Effect	<p>On completion of the development the visual effect from this viewpoint would be permanent (reversible) and direct. The development would lead to a low magnitude of change and despite the careful design of the project a man-made vertical structure in this area would always lead to a negative effect.</p>	
Assessment of Visual Effects	Sensitivity:	<i>High</i>
	Magnitude:	<i>Low</i>
	Type of Effect:	<i>Permanent, direct and negative</i>
	Level of Effect:	<i>Moderate</i>

Figure 7.18	Viewpoint 6: East Haven	
Description	<p>The viewpoint is located at the side of a minor road by East Haven, part of the National Cycle Network to the south-west of Arbroath at E358631 N736475. The view faces north-east towards the proposed development and is situated ~4.8km from the turbine.</p> <p>The view feels fairly open from this location. The landscape is fairly flat over the foreground, rising slightly but not sufficiently to limit long distance views towards the rolling hills to the north-west of Arbroath. The land cover across the foreground is dominated by a series of large fields, used for grazing and arable farming; a drystone wall runs through the view marking the field boundary. The horizon is broken with two bands of distinct shelterbelt woodland, which frames the centre of the view. To the far right of the view glimpses towards the coast are also possible adding to the open nature of the vista. The view contains a number of man-made features including the nearby farm buildings and a communication mast which sits amongst the trees to the left of the view. The view is pleasant; containing a significant number of man-made features it does not feel particularly remote and typical of the wider farming landscape of the area.</p>	
Sensitivity	<p>The viewpoint is taken from the side of a local minor road near to East Haven, which forms part of the National Cycle network and represents road users, cyclists and local residents and is therefore considered to be of High sensitivity.</p>	
Magnitude of Change	<p>Receptors of this view would be 4.8km from the proposed development.</p> <p>From this location the proposed turbine would be viewed breaking the horizon, partially backdropped by the distant upland landscape. The turbine would not be an overly prominent feature in the view over this distance, appearing alongside several more prominent vertical features in the nearby woodland and the communication mast. The turbine would occupy a low extent of the horizontal and vertical view.</p> <p>Overall the magnitude of change is considered to be low, resulting in a moderate level of effect.</p>	
Cumulative Impact	<p><u>Operational</u></p> <p>There are no operational developments visible from this location.</p> <p>The cumulative magnitude of change for operational projects would be none.</p> <p><u>Operational, Consented</u></p> <p>There are no consented developments visible from this location</p> <p>The cumulative magnitude of change for consented projects would remain none.</p> <p><u>Operational, Consented, In Planning</u></p> <p>There are no planned developments visible from this location.</p> <p>The cumulative magnitude of change for planning projects would remain none.</p>	
Type of Effect	<p>On completion of the development the visual effect from this viewpoint would be permanent (reversible) and direct. The development would lead to a low magnitude of change and despite the careful design of the project a man-made vertical structure in this area would always lead to a negative effect.</p>	
Assessment of Visual Effects	Sensitivity:	<i>High</i>
	Magnitude:	<i>Low</i>
	Type of Effect:	<i>Permanent, direct and negative</i>
	Level of Effect:	Moderate

Figure 7.19	Viewpoint 7: A92, Salmonds Muir	
Description	<p>The viewpoint is located at the side of the A92 to the south of Arbroath at E358388 N737974. The view faces north-east towards the proposed development and is situated ~4.0km from the turbine.</p> <p>The view is very open from this location. The foreground remains almost uniformly flat, overlooking the surrounding farmland the land cover is dominated by a mixture of large predominantly arable fields. These fields are bound by post-and-wire fencing, hedgerows and the occasional area of shelterbelt woodland. The A92 runs through the middle of the scene although the road itself is not particularly visible the road furniture signs and other features are visible in the view. To the right of the view the landscape ends abruptly at the horizon with views towards the sea possible, adding to the openness of the vista. Woodland is a more prominent feature inland over the middle ground towards the settlement of Arbroath, limiting views of the settlement itself. The view is fairly modified with a number of man-made elements present within the wider view from farming infrastructure to the road network and associated features.</p>	
Sensitivity	<p>The viewpoint is taken from the side of the A92 and represents road users and is therefore considered to be of Medium sensitivity.</p>	
Magnitude of Change	<p>Receptors of this view would be 4.0km from the proposed development.</p> <p>From this location the proposed turbine would be viewed breaking the horizon, with the tower predominantly viewed against the landscape, the hub and blades would be viewed against the sky. The turbine would not be an overly prominent feature within this open and fairly large scale vista, appearing less prominent than some of the nearby road paraphernalia.</p> <p>Overall the magnitude of change is considered to be low, resulting in a moderate/minor level of effect.</p>	
Cumulative Impact	<p><u>Operational</u></p> <p>There are no operational developments visible from this location.</p> <p>The cumulative magnitude of change for operational projects would be none.</p> <p><u>Operational, Consented</u></p> <p>There are no consented developments visible from this location</p> <p>The cumulative magnitude of change for consented projects would remain none.</p> <p><u>Operational, Consented, In Planning</u></p> <p>There are no planned developments visible from this location.</p> <p>The cumulative magnitude of change for planning projects would remain none.</p>	
Type of Effect	<p>On completion of the development the visual effect from this viewpoint would be permanent (reversible) and direct. The development would lead to a low magnitude of change and despite the careful design of the project a man-made vertical structure in this area would always lead to a negative effect.</p>	
Assessment of Visual Effects	Sensitivity:	<i>Medium</i>
	Magnitude:	<i>Low</i>
	Type of Effect:	<i>Permanent, direct and negative</i>
	Level of Effect:	Moderate/Minor

Figure 7.20	Viewpoint 8: Patrick Allan Fraser Street	
Description	<p>The viewpoint is located on Patrick Allan Fraser Street within the housing estate adjacent to the Maltings at E361793 N740492. The view faces south towards the proposed development and is situated ~420m from the turbine.</p> <p>The view is very enclosed from this location. A row of properties is located on the opposite side of the street from the viewer, these dwellings limit views beyond. To the rear of these properties a band of mature trees form a barrier between the rear garden areas and the nearby Maltings which can be seen rising above the tree line, the elevated walkways between the grains silos an obvious feature within this urban setting. An area of open grassland is located to the right of the view, interspersed with trees.</p>	
Sensitivity	<p>The viewpoint is taken from nearby housing estate and represents the views of some of the closest residential receptors and is therefore considered to be of High sensitivity.</p>	
Magnitude of Change	<p>Receptors of this view would be 420m from the proposed development.</p> <p>From this location the turbine would be an obvious and easily discernible feature in this view. Rising above the nearby tree line and the Maltings infrastructure. The turbine would control part of the view, occupying a high extent of both the horizontal and vertical view.</p> <p>Overall the magnitude of change is considered to be high, resulting in a major level of effect.</p>	
Cumulative Impact	<p><u>Operational</u></p> <p>There are no operational developments visible from this location.</p> <p>The cumulative magnitude of change for operational projects would be none.</p> <p><u>Operational, Consented</u></p> <p>There are no consented developments visible from this location</p> <p>The cumulative magnitude of change for consented projects would remain none.</p> <p><u>Operational, Consented, In Planning</u></p> <p>There are no consented developments visible from this location</p> <p>The cumulative magnitude of change for planning projects would remain none.</p>	
Type of Effect	<p>On completion of the development the visual effect from this viewpoint would be permanent (reversible) and direct. The development would lead to a high magnitude of change and despite the careful design of the project a man-made vertical structure in this area would always lead to a negative effect.</p>	
Assessment of Visual Effects	Sensitivity:	<i>High</i>
	Magnitude:	<i>High</i>
	Type of Effect:	<i>Permanent, direct and negative</i>
	Level of Effect:	<i>Major</i>

Figure 7.21	Viewpoint 9: Firthfield	
Description	<p>The viewpoint is located at the side of a local minor road to the north-west of Woodville Feus at E359546 N743455. The view faces south-east towards the proposed development and is situated ~4.1km from the turbine.</p> <p>The view feels fairly open from this location. The foreground landscape is dominated by a series of flat arable fields, the local road runs through the foreground of the view disappearing as it rounds a corner to the left of the view. The rear of the view is restricted by a band of roadside woodland which can be seen to the left of the view. A small drystone wall bounds the local road with the neighbouring fields. A band of mature shelterbelt woodland occupies the horizon to the right of the view, while individual trees and hedgerows mark out field boundaries in the centre of the view. Due to the local topography longer distance views occur across the central areas of the vista with views possible towards the nearby coastline, with the sea rising beyond the landscape forming an infinite horizon. The settlement of Arbroath is visible in the distance, interspersed with areas of mature woodland next to the coast. The view does not feel particularly remote, overlooking a heavily man modified landscape with annually changing crop patterns as well as the local settlements, a series of metal electricity pylons traverse the middle ground of the landscape appearing against the sea adding further vertical elements to the view.</p>	
Sensitivity	<p>The viewpoint is taken from a local road to the north of the proposed development; the viewpoint was chosen to represent road users, primarily local residents of neighbouring farms and steadings and is therefore considered to be of High sensitivity.</p>	
Magnitude of Change	<p>Receptors of this view would be 4.1km from the proposed development.</p> <p>From this location the turbine would appear predominantly backdropped by the surrounding landscape and sea. The development would occupy a negligible extent of both the horizontal and vertical view. From this location the turbine would appear in keeping with the other vertical feature present in the view including the nearby electricity pylons, it is not predicted that the turbine will be an overly prominent feature which would not dominate or control or limit longer distance views to the sea.</p> <p>Overall the magnitude of change is considered to be low, resulting in a moderate level of effect.</p>	
Cumulative Impact	<p><u>Operational</u></p> <p>There are no operational developments visible from this location.</p> <p>The cumulative magnitude of change for operational projects would be none.</p> <p><u>Operational, Consented</u></p> <p>There are successive views with the single Cuthlie turbine from this location. The turbine would appear to the right of the viewer on the horizon the turbine would appear solely against the sky in a more enclosed area of the landscape than the Bairds Malt turbine. Located closer to the viewer it would be a more prominent feature in this view.</p> <p>The cumulative magnitude of change for consented projects would become negligible.</p> <p><u>Operational, Consented, In Planning</u></p> <p>Successive views would also occur with the Crofts Farm turbines, although the intervening vegetation would significantly limit the views of the turbines to the rear of the view.</p> <p>The cumulative magnitude of change for planning projects would remain negligible.</p>	
Type of Effect	<p>On completion of the development the visual effect from this viewpoint would be permanent (reversible) and direct. The development would lead to a low magnitude of change and despite the careful design of the project a man-made vertical structure in this area would always lead to a negative effect.</p>	
Assessment of Visual Effects	Sensitivity:	<i>High</i>
	Magnitude:	<i>Low</i>
	Type of Effect:	<i>Permanent, direct and negative</i>
	Level of Effect:	Moderate

Figure 7.22	Viewpoint 10: Braeside	
Description	<p>The viewpoint is located at the side of a local minor road to the west of the proposed development at E359045 N739953. The view faces east towards the proposed development and is situated ~2.8km from the turbine.</p> <p>The view from this location is very open. The landscape rolls away gently from the viewer towards the nearby coastline, offering long distance views out over the sea from this slightly more elevated location. The landscape is made up of a patchwork of large predominantly rectilinear fields, the differing colours strengthening the patchwork effect. Fields are bound by a mixture of drystone walls, hedgerows and post-and-wire fences, with occasional trees and shelterbelts also reinforcing boundary lines. To the left of the view the settlement of Arbroath is visible spreading inland from the coastline. The view overlooks a distinctly modified landscape with the intense agricultural use highlighted by annually changing crop rotations, there are a number of individual properties scattered throughout the vista, primarily farms with isolated rows of cottages. Minor roads cross the area as well as the A92 which is visible over the middle ground between the viewer and the coast. Rows of electricity pylons cross the landscape, predominantly viewed against the landscape from this position.</p>	
Sensitivity	<p>The viewpoint is taken from a local road to the west of the proposed development; the viewpoint was chosen to represent local residents of neighbouring farms and steadings and is therefore considered to be of High sensitivity.</p>	
Magnitude of Change	<p>Receptors of this view would be 2.8km from the proposed development.</p> <p>From this location the proposed turbine would appear predominantly backdropped by the landscape and the nearby sea. Occupying a negligible extent of both the horizontal and vertical view from this location, the turbine appears alongside the Maltings workings and while adding a fairly strong vertical element to the view it occupies the same space as the most prominent industrial element already present in the view. The turbine would not limit or restrict views over the coastline or towards the settlement of Arbroath from this location adding a vertical man-made feature to the view which contains a number of man modified elements.</p> <p>Overall the magnitude of change is considered to be low, resulting in a moderate level of effect.</p>	
Cumulative Impact	<p><u>Operational</u></p> <p>There are no operational developments visible from this location.</p> <p>The cumulative magnitude of change for operational projects would be none.</p> <p><u>Operational, Consented</u></p> <p>There are no consented developments visible from this location</p> <p>The cumulative magnitude of change for consented projects would remain none.</p> <p><u>Operational, Consented, In Planning</u></p> <p>There are no planned developments visible from this location.</p> <p>The cumulative magnitude of change for planning projects would remain none.</p>	
Type of Effect	<p>On completion of the development the visual effect from this viewpoint would be permanent (reversible) and direct. The development would lead to a low magnitude of change and despite the careful design of the project a man-made vertical structure in this area would always lead to a negative effect.</p>	
Assessment of Visual Effects	Sensitivity:	<i>High</i>
	Magnitude:	<i>Low</i>
	Type of Effect:	<i>Permanent, direct and negative</i>
	Level of Effect:	Moderate

Figure 7.23	Viewpoint 11: A933 near Montreathmont	
Description	<p>Viewpoint 11 is taken from E359107 N751263 at the side of the A933.l. The view faces south-east towards the turbine which is located ~11.5km from the viewer.</p> <p>The view feel relatively enclosed from this location. The A933 forms a prominent man-made feature within the view, running across the centre to the right of the view, disappearing over the middle ground beyond the tree line. The route is bound on the right by a band of mature shelterbelt woodland, while the left of the road, the landscape is relatively flat, with a small number of large rectilinear fields. The field boundaries are marked over the middle ground by a significant band of mature shelterbelt woodland. The shelterbelt also encloses the view, limiting long distance views over the surrounding countryside to the south-east. A large farm and outbuilding are located beyond amongst the woodland in the centre of the vista. The view feels heavily man-made with the predominantly farming landscape, the A933 and the farm the main features in the view.</p>	
Sensitivity	The viewpoint is located at the side of the A933 and was chosen to represent road users, and is therefore considered to be of Medium sensitivity.	
Magnitude of Change	<p>Receptors of this view would be 11.5km from the proposed turbine.</p> <p>From this location the proposed Bairds Malt turbine is heavily screened by the intervening landscape with only the blade tips of the proposed turbine theoretically visible. Due to the intervening screening of the woodland there would be no views of the proposed turbine from this location.</p> <p>The overall magnitude of change for the development is considered to be negligible, as the turbine is unlikely to be discernible within the wider landscape from this location, leading to a minor level of effect.</p>	
Cumulative Impact	<p><u>Operational</u></p> <p>There are no operational developments visible from this location.</p> <p>The cumulative magnitude of change for operational projects would be none.</p> <p><u>Operational, Consented</u></p> <p>There are no consented developments visible from this location</p> <p>The cumulative magnitude of change for consented projects would remain none.</p> <p><u>Operational, Consented, In Planning</u></p> <p>There are no planned developments visible from this location.</p> <p>The cumulative magnitude of change for planning projects would remain none.</p>	
Type of Effect	On completion of the development the visual effect from this viewpoint would be permanent (reversible) and direct. The development would lead to a negligible magnitude of change and despite the careful design of the project a man-made vertical structure in this area would always lead to a negative effect.	
Assessment of Visual Effects	Sensitivity:	<i>Medium</i>
	Magnitude:	<i>Negligible</i>
	Type of Effect:	<i>Permanent, direct and negative</i>
	Level of Effect:	Minor

Figure 7.24	Viewpoint 12: Dodd Hill	
Description	<p>Viewpoint 12 is taken from E345256 N739618, by the cairn at the summit of Dodd Hill. The view faces east towards the turbines which is located ~16.6km from the viewer.</p> <p>The view is very open from this prominent elevated location. Facing eastwards, the view overlooks the large agricultural plain that makes up much of the intervening landscape, between the Sidlaws and the eastern coast. The landscape slopes gently towards the coast, allowing for views of the sea beyond the landscape, when looking north-east, east and south-east towards Dundee. Inland the view offers a more rural and natural landscape with the foreground consisting of heather moorland and gorse. In the middle ground arable fields and coniferous plantations are the predominant land cover and this continues until the topography begins to rise again in the distance. For much of the view the northern end of the Sidlaw Hills make up the horizon and towards the right of the view further in the distance the landscape opens up over the Strathmore Valley. The landscape is fairly expansive and of a large scale with a few man-made features such as electricity pylons, communication masts and farm infrastructure. The view will be valued as part of the Sidlaw hills and by walkers in the area.</p>	
Sensitivity	The viewpoint is located at the summit of Dodd Hill and is representative of views experienced by walkers in the area, and is therefore considered to be of High sensitivity.	
Magnitude of Change	<p>Receptors of this view would be 16.6km from the proposed turbine.</p> <p>From this location the proposed Bairds Malt turbine is heavily screened by the intervening landscape with only the blade tips of the proposed turbine theoretically visible within the open vista. The turbine would be barely distinguishable in this view, occupying a negligible extent of both the horizontal and vertical view.</p> <p>The overall magnitude of change for the development is considered to be negligible, as the turbine is unlikely to be discernible within the wider landscape from this location, leading to a moderate/minor level of effect.</p>	
Cumulative Impact	<p><u>Operational</u></p> <p>There are no operational turbines visible in the same direction as the Bairds Malt turbine from this location. The North Mains of Cononsyth turbine is heavily screened and is unlikely to be visible from this location. The Michelin Tyre Factory turbines appear below the viewer, viewed solely against the landscape, appearing successively in this view. The operational Tealing turbine appears to the rear of the view, the single turbine appearing against the landscape would not feature prominently, viewed against the flat arable landscape to the west.</p> <p>There are theoretical distant views of the Tullo developments, however, from this location they are barely discernible features on the distant horizon.</p> <p>The cumulative magnitude of change for operational projects would be negligible.</p> <p><u>Operational, Consented</u></p> <p>The single turbine at Stotfaulds appears in the same view as the Crofts Farm turbines, the single turbine is a much more prominent feature in this landscape, viewed breaking the horizon from this location..</p> <p>Successive views occur with the nearby Govals and Frawney developments which appear to the rear of the view. The cumulative magnitude of change for consented projects would remain negligible.</p> <p><u>Operational, Consented, In Planning</u></p> <p>There are also views of the Montquhir, Upper Balmachie and Crofts Farm turbines, although these developments are less prominent features in the view, similar to the Bairds Malt development.</p> <p>The cumulative magnitude of change for planning projects would remain negligible.</p>	
Type of Effect	On completion of the development the visual effect from this viewpoint would be permanent (reversible) and direct. The development would lead to a negligible magnitude of change and despite the careful design of the project a man-made vertical structure in this area would always lead to a negative effect.	
Assessment of Visual Effects	Sensitivity:	<i>High</i>
	Magnitude:	<i>Negligible</i>
	Type of Effect:	<i>Permanent, direct and negative</i>
	Level of Effect:	<i>Moderate/Minor</i>

Figure 7.25	Viewpoint 13: Turin Hill	
Description	Viewpoint 13 is taken from E351395 N753524 , at the summit of Turin Hill. The view faces south-east towards the turbine which is located ~17.1km from the viewer. This is a grand and open vista from the hill summit, with long distance views to the south and east. The landscape rolls gently allowing for views towards the coast, with the sea visible to the left of the view. The land cover is again dominated by large scale rectilinear fields, in keeping with the predominant landscape character in the area. The fields create a distinct patchwork effect on the surrounding landscape. While bands of shelterbelt and larger scale plantation woodland help to break up the dominant pattern of agriculture a little. To the right of the view the eastern banks of Roscobie Loch can be seen feeding the Balgavies Loch which sits in the middle of the view. The lochs and connecting waterways are lined by dense mature woodland, picking them out of the surrounding landscape. There are a number of man-made features within the wider landscape, these are predominantly farm properties, associated with the surrounding landscape, these farms tend to sit adjacent to other infrastructure such as large outbuildings and sheds, as well as occasional grain silos. The settlement of Letham is also visible to the right of the view beyond the Lochs.	
Sensitivity	The viewpoint represents walkers and other visitors to the summit of Turin Hill and as such is considered to be of high sensitivity.	
Magnitude of Change	Receptors of this view would be 17.1km from the proposed turbine. From this location the proposed development would be a barely discernible feature on the horizon. The intervening landscape provides a significant amount of screening, with only the blade tips of the proposed turbine theoretically visible. The proposed turbine would occupy and affect a negligible extent of both the horizontal and vertical view from this elevated position. The overall magnitude of change for the development is considered to be negligible, as the distance between the viewer and the development and the openness of the view would limit the potential impacts of the proposed development on the view, leading to a moderate/minor level of effect.	
Cumulative Impact	<p><u>Operational</u></p> <p>The North Mains of Cononsyth turbine appears in the same general view as the proposed Bairds Malt turbine, the single turbine appears almost completely backdropped by the surrounding landscape from this location.</p> <p>The cumulative magnitude of change for operational projects would be negligible.</p> <p><u>Operational, Consented</u></p> <p>The Hillhead of Ascurry turbine appears to the right of the view, the single turbine viewed predominantly against the landscape from this location.</p> <p>Distant views are theoretically possible with the Kenly Farm Windfarm in Fife, located almost 30km from the viewer it is unlikely that the Windfarm will be an easily discernible feature in this view.</p> <p>The cumulative magnitude of change for consented projects would remain negligible.</p> <p><u>Operational, Consented, In Planning</u></p> <p>Crofts Farm and Montquhir all appear in the same theoretical view as the Bairds Malt turbine from this location. The Crofts Farm turbines are located on the more distant horizon and appear solely against the sky, while the Montquhir turbine is partially screened by the intervening landscape with the visible portion appearing on the horizon against the sky.</p> <p>The cumulative magnitude of change for planning projects would remain negligible.</p>	
Type of Effect	On completion of the development the visual effect from this viewpoint would be permanent (reversible) and direct. The development would lead to a negligible magnitude of change and despite the careful design of the project a man-made vertical structure in this area would always lead to a negative effect.	
Assessment of Visual Effects	Sensitivity:	<i>High</i>
	Magnitude:	<i>Negligible</i>
	Type of Effect:	<i>Permanent, direct and negative</i>
	Level of Effect:	<i>Moderate/Minor</i>

Figure 7.26	Viewpoint 14: Tentsmuir Recreational Area	
Description	<p>Viewpoint 14 is taken from E347170 N727786 at the edge of the Tentsmuir recreational area, a large coastal area of Fife popular for various outdoor recreation purposes such as cycling, walking and bird watching.</p> <p>Much of the area is covered with tree plantation, but the view looks north-west from the recreational path which circumnavigates the area, just to the east of Tayport, across the Firth of Tay towards Dundee and Broughty Ferry. From this sea level view, the key foreground features of the scene include the rough grasses which grow on the sandy soils at the water's edge and the Firth of Tay itself. The town of Tayport consists of low rise housing which clings to a low hill to the west, partially masked by trees and surrounded by agricultural fields. Across the Tay, Broughty Ferry and Dundee can be seen, with the wind turbines and chimneys associated with an industrial estate clearly visible above the heavily wooded residential areas which flank the Firth. Beyond this low coastal horizon, a secondary but also minor horizon of fields can be discerned, marking a distinction between the urban environment and the agricultural area beyond. This horizon is often topped with trees and other dark vegetation which provides a visual contrast to the patchwork of fields immediately below. In the background of the centre of the view, the Sidlaw Hills rise up with a more barren appearance which is frequently punctuated by large telecommunications masts.</p>	
Sensitivity	<p>This viewpoint was selected to represent recreational users visiting the area and forms part of the Tentsmuir SLA as such is considered to be of High sensitivity.</p>	
Magnitude of Change	<p>Receptors of this view would be 19.1km from the proposed development.</p> <p>From this location the proposed Bairds Malt turbine would appear on the distant horizon, partially screened by the intervening landscape features. With the turbine visible over the expanding Tay estuary as it merges with the North Sea, occupying a negligible extent of both the horizontal and vertical views. The proposed turbine would be barely distinguishable in this vista given the openness and the scale providing by the nearby estuary and coastline.</p> <p>Overall the magnitude of change is considered to negligible, resulting in a moderate/minor level of effect.</p>	
Cumulative Impact	<p><u>Operational</u></p> <p>Successive views would occur with the operating Michelin turbines to the left of the view, the turbines appearing amongst the urban areas of Dundee as opposed to the surrounding countryside.</p> <p>The cumulative magnitude of change for operational projects would be negligible.</p> <p><u>Operational, Consented</u></p> <p>The Cuthlie turbine appear in the same general view as the Bairds development, neither turbines are predicted to be discernible features within this view</p> <p>Successive views may occur with both the Govals and Frawney wind farms appearing on the more elevated ground to the left of the view, the turbines occupy a similar section of the view to the operating Michelin turbines.</p> <p>The cumulative magnitude of change for consented projects would remain negligible.</p> <p><u>Operational, Consented, In Planning</u></p> <p>Theoretical views are also possible with the Balmachie, Crofts Farm and Montquhir turbines although the intervening landscape and vegetation features on the opposite banks would limit potential views of these turbines.</p> <p>The cumulative magnitude of change for planning projects would remain negligible.</p>	
Type of Effect	<p>On completion of the development the visual effect from this viewpoint would be permanent (reversible) and direct. The development would lead to a negligible magnitude of change and despite the careful design of the project a man-made vertical structure in this area would always lead to a negative effect.</p>	
Assessment of Visual Effects	Sensitivity:	<i>High</i>
	Magnitude:	<i>Negligible</i>
	Type of Effect:	<i>Permanent, direct and negative</i>
	Level of Effect:	Moderate/Minor

Figure 7.27	Viewpoint 15: St Andrews	
Description	<p>Viewpoint 15 is taken from E350539 N717240 looking north-east over the beach towards the coast line and the North Sea.</p> <p>The view is representative of the worst case views for residents of that side of town, golfers who come from all over the world to sample the Old Course, and people using the area for other recreational purposes. The views is fairly simple, with the nearby coastline and the sea occupying a majority of the view providing a certain amount of uniformity to the view. The Angus landscape can be seen in the distance stretching from the left of the view, it rises from the sea, with an undulating horizon created by the local hills around Forfar and the eastern end of the Ochil Hills.</p>	
Sensitivity	<p>This viewpoint was selected to represent residents as well as visitors to the area and is considered to be of High sensitivity.</p>	
Magnitude of Change	<p>Receptors of this view would be 25.5km from the proposed development.</p> <p>At this distance the Bairds Malt wind turbine extension would be a barely discernible feature in this view. The sea creates an open and expansive feature within the view drawing the eye far out to sea towards the horizon. The proposed turbine would occupy a negligible extent of both the horizontal and vertical view within the open vista.</p> <p>Overall the magnitude of change is considered to negligible, resulting in a <u>moderate/minor</u> level of effect.</p>	
Cumulative Impact	<p><u>Operational</u></p> <p>There are theoretical views of the Tullo Windfarm on the distant horizon, although these projects are located over 50km from the viewer and are unlikely to be discernible features within the view.</p> <p>Successive views occur with the operating Michelin turbines to the left of the view. The turbines would be viewed against the landscape amongst the urban fringes of Dundee and would not be overly prominent features within this view.</p> <p>The cumulative magnitude of change for operational projects would be negligible.</p> <p><u>Operational, Consented</u></p> <p>The Cuthlie and Stotfaulds turbines appear in the same general view as the Bairds turbine, neither development features prominently from this location.</p> <p>Similarly the Govals and Frawney wind farms appear on the more elevated landscape to the north of Dundee sharing the view with the Michelin turbines. At this distance it is unlikely that the developments will become obvious or easily discernible features in the view.</p> <p>The cumulative magnitude of change for consented projects would remain negligible.</p> <p><u>Operational, Consented, In Planning</u></p> <p>There are a small number of planning projects theoretically visible in the same view as the Bairds Malt turbine, these include Crofts Farm, Balmachie and Montquhir. None of these developments are predicted to be prominent features within this view, the distance between the viewer and the projects as well as the openness of the vista limiting any potential impacts on the vista.</p> <p>The cumulative magnitude of change for planning projects would become low.</p>	
Type of Effect	<p>On completion of the development the visual effect from this viewpoint would be permanent (reversible) and direct. The development would lead to a negligible magnitude of change and despite the careful design of the project a man-made vertical structure in this area would always lead to a negative effect.</p>	
Assessment of Visual Effects	Sensitivity:	<i>High</i>
	Magnitude:	<i>Negligible</i>
	Type of Effect:	<i>Permanent, direct and negative</i>
	Level of Effect:	Moderate/Minor

Figure 7.28	Viewpoint 16: White Caterthun	
Description	<p>Viewpoint 16 is taken from E354782 N766029, at the summit of the ancient fort of White Caterthun. The view faces southwards towards the turbine which is located ~26.9km from the viewer.</p> <p>The panoramic view offered from the top of the fort is very open, particularly to the east where views are not constrained by the more upland landscapes to the west. The view overlooks a predominantly flat agricultural plain, dominated by large arable fields. The openness of the view allows for visibility of the coast which is located ~25km from the viewer at this location. The landscape is interspersed with woodland features ranging from tree clusters and shelterbelts to large scale plantations. To the rear of the view the landscape takes on a more moorland upland feel, with rough grasses and heather dominating the land cover, while the large scale hills to the west limit long distance views. The view is open and vast, with views over distant settlements such as Brechin, Forfar and Stonehaven all possible from this elevated location. Roads and other key infrastructure features such as pylons and communications masts nestle within the landscape below without being prominent in the grand scale of the vista.</p>	
Sensitivity	The viewpoint represents visitors to the ancient forts and as such is considered to be of high sensitivity.	
Magnitude of Change	<p>Receptors of this view would be 26.9km from the proposed turbine.</p> <p>The proposed turbine appear theoretically visible on the distant horizon within this view. The turbine would be viewed solely against the landscape in this view. The proposed development would occupy a negligible extent of both the horizontal and vertical view from this viewpoint. In reality it is unlikely that the turbine will be an easily discernible feature in this view, at this distance it is not predicted that there will be any significant impacts on the scale or setting of the surrounding open landscape.</p> <p>The overall magnitude of change for the development is considered to be negligible, due to the openness and scale of the surrounding landscape, as well as the distance to the proposed development, leading to a moderate/minor level of effect.</p>	
Cumulative Impact	<p><u>Operational</u></p> <p>Successive views occur to the north-east of the view with the operating Windfarm at Tullo, the turbines are viewed at distance on the distant horizon.</p> <p>The operating North Mains of Cononsyth appears in the view alongside the proposed Bairds Malt turbine, due to the distance between the viewer and the turbine it is not an easily discernible feature within this view.</p> <p>Ark Hill is also theoretically visible to the right of the view but is well screened by the intervening landscape features and is not a prominent feature in this view.</p> <p>The cumulative magnitude of change for operational projects would be negligible.</p> <p><u>Operational, Consented</u></p> <p>Successive views occur to the north-east with the Steelstrath. Brighton Farm turbines.</p> <p>The Whitfield of Dun turbine, Dunswood, Frawney and Govals appear theoretically in a similar view to the proposed Bairds Malt turbine, the Dunswood turbine the most prominent of these developments located within the middle ground between the viewer and the more distant hills of Frawney and Govals.</p> <p>The cumulative magnitude of change for consented projects would remain negligible.</p> <p><u>Operational, Consented, In Planning</u></p> <p>The developments of Crofts Farm, Dubton Farm, Montquhir and Balnacake appear in the same general view as the proposed Bairds Malt turbine. All of these proposed turbines would be viewed at a significant distance from the viewer. The turbines appearing solely against the landscape in this view it is unlikely that they would be easily discernible features within the open vista.</p> <p>Successive views occur to the north-east with Mains of Bridgeton, Hospital Shields Farm and Craggie Farmhouse, the single turbines appearing on the distant horizon over 20km from the viewer.</p> <p>The cumulative magnitude of change for planning projects would remain negligible.</p>	
Type of Effect	On completion of the development the visual effect from this viewpoint would be permanent (reversible) and direct. The development would lead to a negligible magnitude of change and despite the careful design of the project a man-made vertical structure in this area would always lead to a negative effect.	
Assessment of Visual Effects	Sensitivity:	<i>High</i>
	Magnitude:	<i>Negligible</i>
	Type of Effect:	<i>Permanent, direct and negative</i>
	Level of Effect:	Moderate/Minor

BAIRDS MALT WIND TURBINE

Appendix 2.2 – Residential Assessment

December 2014



Project Name: **Bairds Malt Wind Turbine**

Document Title: **Residential Map**

Scale: **1:10,000**

Key:

- Proposed Turbine Location
- 1 & 2km Radii from Wind Turbine

Level of Effect

- Major
- Major/Moderate
- Moderate
- Moderate/Minor
- None

Primary View Direction

- ▲ Major
- ▲ Major/Moderate
- ▲ Moderate
- ▲ Moderate/Minor
- ▲ None

Properties

- | | |
|-----------------------------|-------------------------|
| 1. Peasiehill Farm Cottages | 13. Balcathie Farm |
| 2. Peasiehill Farm House | 14. Grahamston Cottages |
| 3. Peasiehill Farm Bungalow | 15. Kellie Castle Lodge |
| 4. Krojan Cottages | 16. The Manse Cottage |
| 5. Crudie Farm House | 17. Glebe House |
| 6. Crudie Farm Cottages | 18. Bank |
| 7. Elliot Cottages | 19. Broomhill |
| 8. Elliot Bridge | 20. Loanend |
| 9. Elliot | 21. Fairyknowe |
| 10. A92 Cottages | 22. Bankhead |
| 11. Willow Cottage | 23. Crudie Acres |
| 12. Balcathie Farm Cottages | 24. Bottend Cottages |

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Client: **Bairds Malt Single Turbine Ltd**



Drawing by: **Green Cat Renewables Ltd**

Document Number: **CO621-163/App 2.2**
 Version: **1.0**
 Author: **SS**
 Checked by: **RC**
 Approved By: **GM**
 Date: **18/12/2014**



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Property Name: Peasihill Farm Cottages

Reference Number: 1

Grid Reference: 361543, 740215

Distance from Turbine: 326m

Number of Properties: 2

Property Orientation: South-East

Direction of Turbines: South-East



South-East elevation

Property Description

Peasihill Farm Cottages are situated ~326m to the north-west of the proposed development. The properties are semi detached traditional T-shaped one storey cottages. To the south-east of each property there is a modest garden area, bound by a small hedgerow and some metal temporary fencing. To the north-west of the properties there is a small area for car parking. The primary views from the properties overlook the garden areas to the south-east.

Views from Dwelling

The turbine would be visible from the windows on the south-eastern façade of the buildings, appearing alongside the Bairds Malt buildings which themselves are considerable in height. The turbine would likely be partially screened by these intervening buildings with the upper tower sections hub and blades visible against the sky. The turbine would add a significant vertical feature to the view, which will sit alongside the industrial infrastructure of the maltings.

Views from Environs

From the garden areas the turbine would be visible, a significant vertical element appearing in the view alongside the malting buildings. From the garden the turbine would occupy a low extent of the vertical views with many of the primary views towards the coast remaining uninterrupted by the proposed turbine. The turbine would occupy a high extent of the vertical view, appearing over the nearby buildings.

Magnitude of Change: High

Level of Effect: Major



Approximate boundary of domestic curtilage and line of sight from dwelling

Property Name: Peasiehill Farm House

Reference Number: 2

Grid Reference: 361254, 740363

Distance from Turbine: 650m

Number of Properties: 1

Property Orientation: South

Direction of Turbines: South-East



East elevation

Property Description

Peasiehill Farm House is situated ~650m to the north-west of the proposed development. The property is a traditional two storey L-shaped farm house. The primary views from the property tend to face to the south, looking towards the coastline with views towards the North Sea. The property is set within an area of garden that surrounds all sides of the property, the main garden area is located to the south of the dwelling. To the north and north-west a number of large farm outbuildings mark the property boundary in this direction, to the south-east and east a band of mature shelterbelt trees mark the property boundary. Open views are possible from the garden area to the south.

Views from Dwelling

Views from the dwelling would be extremely limited, there are minimal windows on the south-eastern façade and these face onto the band of shelterbelt on the property perimeter. In the wintering months when there is less vegetation on the trees the views may become slightly more apparent.

Views from Environs

Views from the garden area to the south of the property will be possible. The turbine would be viewed to the south-east amongst the maltings buildings, the upper sections of the turbine tower, hub and blades would appear against the sky. Occupying a medium extent of the vertical views and a low extent of the horizontal view. The turbine would not block views towards the coast from this area of the dwelling.

Magnitude of Change: Medium

Level of Effect: Major/Moderate



Approximate boundary of domestic curtilage and line of sight from dwelling

Property Name: Peasiehill Farm Bungalow

Reference Number: 3

Grid Reference: 361247, 740496

Distance from Turbine: 722m

Number of Properties: 1

Property Orientation: South-South-East

Direction of Turbines: South-East



South-East elevation

Property Description

Peasiehill Farm Bungalow is situated ~722m to the north-west of the proposed development. The property is a traditional L-shaped farm cottage which has been extended to the north-east. A garden area sits to the south and east of the property, the eastern area of garden is bound by large mature hedgerow. The main views from the property face towards the distant coastline and North Sea, facing in a south-easterly direction, overlooking rolling fields and the Bairds Malt.

Views from Dwelling

Views from the primary windows on the south-eastern façade of the property would occur, the turbine tower would be partially screened by the intervening buildings of the maltings, however, the upper tower sections, hub and blades would be viewed against the sky above the building line.

Views from Environs

Views from the garden area would be similar to those experienced in Viewpoint 4 of the Residential Assessment appendix. The viewpoint is taken in front of the property, facing in the direction of the proposed development. The turbine would occupy a low extent of the horizontal view and a medium extent of the vertical view from this location. Views towards the coast would be largely uninterrupted as the turbine appears associated with the more industrial buildings present in the view.

Magnitude of Change: Medium

Level of Effect: Major/Moderate



Approximate boundary of domestic curtilage and line of sight from dwelling

Property Name: Krojan Cottages

Reference Number: 4

Grid Reference: 361334, 740567

Distance from Turbine: 698m

Number of Properties: 2

Property Orientation: South- East

Direction of Turbines: South-East



South-East elevation

Property Description

Krojan cottages are situated ~698m to the north-west of the proposed development. The dwellings comprise two semi detached traditional stone built single storey cottages. Both properties face to the south east overlooking a garden area, with a small driveway to the north of each property. The primary view from each dwelling faces to the south east towards the coast and each is bound on the southern boundary by a mature hedge-row as well as other screening features present within the garden particularly the initial property next to the access road which has a heavily wooded garden area. There is also an outbuilding at the bottom of the neighbouring garden.

Views from Dwelling

Views from within the properties may occur as the dwellings are slightly elevated, overlooking the sloping landscape as it rolls away towards the coast beyond the maltings. The views of the development would be similar to those experienced in Viewpoint 4 of the residential figures, taken from the nearby Peasiehill property. The turbine would be viewed alongside the industrial buildings as opposed to blocking the views towards the coast from the properties, occupying a low to medium extent of both the horizontal and vertical view.

Views from Environs

Views from the garden areas around the property would also be similar to those experienced in viewpoint 4, although the garden vegetation would provide some screening of the lower tower sections and the maltings. The visible portion of the turbine would be seen against the sky. Again the proposed development would not obstruct the potential views towards the coast and sea beyond, appearing alongside the grain silos and cooling towers of the maltings. The turbine would occupy a medium extent of the vertical view and a low extent of the horizontal view.

Magnitude of Change: Medium

Level of Effect: Major/Moderate



Approximate boundary of domestic curtilage and line of sight from dwelling

Property Name: Crudie Farm House

Reference Number: 5

Grid Reference: 361337, 740723

Distance from Turbine: 810m

Number of Properties: 1

Property Orientation: South- East

Direction of Turbines: South-East



South-East elevation

Property Description

Crudie Farm House is situated ~810m to the north-west of the proposed development. The property is a large traditional build two storey property, with a conservatory on the south western façade of the main dwelling. To the south east of the main property there is a large garden area, bound by mature trees and hedgerows. A small stone wall runs around the perimeter of the property. The main views from the property face to the south east and east, with the conservatory offering 180° views from the north-west to the south-east.

Views from Dwelling

There may be some views from within the dwelling, with a number of windows located on the south-eastern façade of the building. The intervening screening provided by the boundary woodland would reduce these views slightly, although in the wintering months screening would be lessened as the vegetation cover thins. From the property the turbine would appear against the sky, with the lower tower sections screened by the intervening buildings that comprise the maltings. The turbine would not limit or block the views towards the sea and would occupy a low extent of the horizontal view and low to medium extent of the horizontal view.

Views from Environs

Views from the garden area would be subject to the same screening features, in the summer months the more dense vegetation would significantly reduce potential views, while in the winter the turbine may be more visible. The turbine would appear in any view alongside the buildings of the maltings as opposed to the open views to the south-west of Arbroath and the Elliot industrial estate towards the North Sea. A worst case scenario view would be similar to that experienced in viewpoint 4 of the residential appendix figures, although slightly further from the proposed development the impacts would be slightly less on the receptors.

Magnitude of Change: Medium

Level of Effect: Major/Moderate



Approximate boundary of domestic curtilage and line of sight from dwelling

Property Name: Crudie Farm Cottages

Reference Number: 6

Grid Reference: 361227, 740771

Distance from Turbine: 918m

Number of Properties: 3

Property Orientation: West-South-West

Direction of Turbines: South-East

Property Description

The Crudie Farm Cottages are situated ~918m from the proposed turbine at Bairds Malt. Comprising a small row of three semi detached one storey traditional built cottages. The properties face to the West-South-West overlooking the open farmland landscapes towards the Elliott Water. The properties are bound by a small stone wall which runs along the perimeter marking the garden areas to the rear (West-south-west) of the properties as well as smaller garden areas to the front of the properties. The end terrace on the south-east of the row has a slightly larger garden spreading from the rear around onto the south eastern side of the dwelling. A large farm outbuilding stands on the opposite side of the property marker in this direction.

Views from Dwelling

The dwellings are orientated away from the proposed development and as such there would be no potential views of the turbine from within these properties.

Views from Environs

Views from the garden would be extremely limited with some views to the south possible in the direction of the coast. Views of the turbine may be possible, however, the large outbuilding located at the end of the row of cottages would provide significant screening in this direction and there would be no views of the proposed development from the surrounding environs of the cottages.

Magnitude of Change: None

Level of Effect: None



Approximate boundary of domestic curtilage and line of sight from dwelling

Property Name: Elliott Cottages

Reference Number: 7

Grid Reference: 362057, 739553

Distance from Turbine: 578m

Number of Properties: 10

Property Orientation: South-East

Direction of Turbines: North-North-West



North-West elevations

Property Description

Located on the outskirts of Arbroath next to Elliot Bridge, there are a small row of 10 detached properties, situated ~578m from the proposed turbine. A mixture of one and one and a half storey properties, they tend to face over the A92 towards the coast. The properties are bound to the front and rear by gardens, while the perimeter to the south east is marked by a small stone wall which runs along the pavement in front of the dwellings. To the rear the gardens overlook the neighbouring caravan park which occupies the neighbouring field. The primary views from this row of properties face the coast to the south east, in the opposite direction to the proposed development although there are windows on the other facades which may experience some views of the turbine.

Views from Dwelling

The primary views would remain free from views, facing in the opposite direction to the development. From the rear of the dwellings there would be some views of the development. The turbine appearing alongside the visible portion of the maltings which is partially screened by an area of intervening woodland. The turbine would be viewed predominantly against the sky. The view from these properties is considered in view-point 1 of the residential appendix.

Views from Environs

Views from the front garden areas would be largely limited by the intervening dwellings. Tot the rear the gardens are subject to some screening features with a mature hedgerow running along the outer perimeter of the majority of the dwellings offering some screening from the neighbouring caravan park. Views would occur from some areas of the garden, with the turbine occupying a low to medium extent of the horizontal view and a medium to high extent of the vertical view, appearing alongside the vertical features of the cooling towers and other buildings associated with the maltings.

Magnitude of Change: High

Level of Effect: Major



Approximate boundary of domestic curtilage and line of sight from dwelling

Property Name: Elliott Bridge

Reference Number: 8

Grid Reference: 361944, 739413

Distance from Turbine: 685m

Number of Properties: 2

Property Orientation: South-East

Direction of Turbines: North



North-West elevations

Property Description

West Bay Cottage & Walmar Cottage is situated ~685m to the south of the proposed development. West Bay Cottage is a traditional build Bungalow, while Walmar Cottage is a one and a half storey dwelling. Both properties overlook the coast to the south-east, with the primary views facing in this direction overlooking garden areas, although there are some windows on the northern façade of each property. The properties are bound to the north a red brick wall marking West Bay and a more traditional Stone wall marking the boundary of Walmar Cottage.

Views from Dwelling

There are no views predicted from within either dwelling. The combination of the perimeter wall and the intervening woodland which surrounds the nearby Elliott Water, limits any potential views from within the dwellings.

Views from Environs

Views from the surrounding garden areas are also predicted to be limited. The intervening buildings and woodland which surrounds the property to the north would limit. There may be some theoretical visibility from the bottom of the garden at Walmar towards the A92, where the turbine may be viewed over the tree line, although these views would be minimal. The turbine would occupy a low to negligible extent of any view from this area of the garden.

Magnitude of Change: Negligible

Level of Effect: Moderate/Minor



Approximate boundary of domestic curtilage and line of sight from dwelling

Property Name: Elliot

Reference Number: 9

Grid Reference: 361781, 739460

Distance from Turbine: 634m

Number of Properties: 8

Property Orientation: Various

Direction of Turbines: North

Property Description

This small collection of properties make up the small settlement of Elliot, located to the rear of Elliot House, the properties are enclosed by the woodland that surrounds the nearby Elliot Water. The properties are all single storey dwellings, facing out onto the access lane. The properties are set within modest gardens which bound the property to the front and rear.

Views from Dwelling

There are no views predicted from within any of the dwellings the dense woodland between the proposed site and the settlement would limit any potential views.

Views from Environs

There are no predicted views from any of the environs surrounding the properties. The area feels very enclosed by the surrounding screening features.

Magnitude of Change: None

Level of Effect: None



Approximate boundary of domestic curtilage and line of sight from dwelling

Property Name: A92 Cottages

Reference Number: 10

Grid Reference: 361104, 739241

Distance from Turbine: 1.3km

Number of Properties: 2

Property Orientation: South-East

Direction of Turbines: North-East



North-West elevation

Property Description

These cottages are located at the side of the A92 ~1.3km to the south-west of the proposed development. The dwelling comprises two semi detached one storey cottages. The primary view from each dwelling faces towards the south-east away from the proposed development, although there are windows on the north-west façade of one of the properties, which may experience some views. To the front and rear of each property there is a small garden area, bound by a drystone wall which runs around the perimeter of both properties.

Views from Dwelling

Views are predicted from the dwelling on the north-eastern side of the development, with some windows on this façade, views may be possible towards the proposed turbine. The primary views would remain unaffected. Where visible the turbine would be viewed amongst an area of woodland and the maltings buildings on the horizon. The turbine tower would be partially screened by the intervening woodland, with the visible portion appearing against the sky. The turbine would occupy a negligible extent of the horizontal view and a low to medium extent of the vertical view over this distance.

Views from Environs

Views from the garden areas would be possible, with the intervening buildings providing a little bit of screening of the development. Views would be similar to those experienced in Viewpoint 2 of the residential assessment appendix. The lower tower sections would be screened from view by the intervening shelter belt, with the remainder of the turbine appearing against the sky, viewed alongside the maltings buildings. The turbine would occupy a low extent of the horizontal and vertical views from this location.

Magnitude of Change: Low

Level of Effect: Moderate



Approximate boundary of domestic curtilage and line of sight from dwelling

Property Name: Willow Cottage

Reference Number: 11

Grid Reference: 361029, 739380

Distance from Turbine: 1.1km

Number of Properties: 1

Property Orientation: South-West

Direction of Turbines: North-East



South-East elevation

Property Description

Willow Cottage is situated ~1.1km to the south-west of the proposed turbine. The property is a single storey cottage, which has been extended and modernised over time. The primary views from the property overlook the garden areas to the south-west and north-east of the property. The perimeter is marked by a drystone wall to the front (south-west) and a brown wooden fence and some intermittent trees to the rear (north-east). The property is accessed via a short driveway to the south-east of the property.

Views from Dwelling

Views from the dwelling would occur from the rear windows which face in the direction of the proposed development. The views experienced would be similar to those experienced in viewpoint 2 in the residential assessment. The turbine would occupy a low extent of both the horizontal and vertical views. With the vegetation on the perimeter offering limited potential screening from within the property.

Views from Environs

Views from the garden areas to the rear of the property would be similar to those experienced in Viewpoint 2 of the residential assessment. The base of the tower would be hidden from view by the intervening shelterbelt woodland. The remainder of the turbine would be viewed predominantly against the sky alongside other vertical features such as wooden electricity pylons and the buildings that comprise the maltings. The turbine would occupy a low extent of both the horizontal and vertical view from these areas.

Magnitude of Change: Low

Level of Effect: Moderate



Approximate boundary of domestic curtilage and line of sight from dwelling

Property Name: Balcathie Farm Cottages

Reference Number: 12

Grid Reference: 360960, 739487

Distance from Turbine: 1.1km

Number of Properties: 2

Property Orientation: South-West

Direction of Turbines: North-East



North-West elevation

Property Description

Balcathie Farm Cottages are situated ~1.1km to the south-west of the proposed turbine. The properties are semi-detached, traditional stone built single storey cottages. The primary view from each dwelling faces to the south-west, overlooking the main garden areas located in front of the properties. As well as the main garden area there is a smaller garden area located to the rear of the properties. The perimeter around the properties is marked by a small drystone wall to the front and side, while the back is marked by a post-and-wire fence which runs around the edge of the neighbouring field.

Views from Dwelling

Views from the dwelling would be restricted to the rear of the properties. The views would be similar to those experienced in Viewpoint 2 of the residential assessment figures. The turbine appearing over the neighbouring field. The lower tower is hidden from view by an area of shelterbelt woodland, with the remainder of the turbine viewed against the sky alongside the industrial buildings of the maltings. The turbine would occupy a negligible extent of the horizontal view and a low extent of the vertical view.

Views from Environs

The primary garden areas to the front of the properties would be largely free from views. The primary views face to the south-west and the south away from the development, while potential views towards the development are limited by the dwellings. There may be some views from the edges of the gardens, to the south-east and north-west of the properties respectively. From these locations the views will be similar to those experienced in Viewpoint 2.

Magnitude of Change: Low

Level of Effect: Moderate



Approximate boundary of domestic curtilage and line of sight from dwelling

Property Name: Balcathie Farm

Reference Number: 13

Grid Reference: 360960, 739487

Distance from Turbine: 1.2km

Number of Properties: 1

Property Orientation: South-West

Direction of Turbines: North-East

Property Description

Balcathie Farm House is situated ~1.2km to the south-west of the proposed development. The property is a large traditional two storey dwelling. The property is set within fairly large grounds with gardens surrounding the property. The property is set within woodland, with mature shelterbelts running around the perimeter of the property enclosing the dwelling and gardens. The property is accessed via a short driveway to the south of the main dwelling. A stone wall covered in part by vegetation mark the outer perimeter of the environs surrounding the property.

Views from Dwelling

Views from the dwelling are predicted to be extremely limited, with the primary views to the front of the property facing away from the proposed development. Views from the rear would be heavily screened by the mature woodland which surrounds the property.

Views from Environs

Similarly views from the primary garden areas to the west and south-west of the main dwelling would experience no views, with the property intervening between the potential receptor and any views, combined with the woodland features there are no predicted significant views from the areas surrounding the property. There may be some oblique views on the access to the property may occur although these will be fleeting and largely screened by vegetation and nearby farm outbuildings.

Magnitude of Change: Negligible

Level of Effect: Moderate/Minor



Approximate boundary of domestic curtilage and line of sight from dwelling

Property Name: Grahamston Cottages

Reference Number: 14

Grid Reference: 360109, 739976

Distance from Turbine: 1.7km

Number of Properties: 12

Property Orientation: South-East

Direction of Turbines: East



South-East elevations

Property Description

Grahamston Cottages are made up of 12 semi detached two-storey cottages, situated ~1.7km to the west of the proposed development. The cottages face in a generally south-easterly direction looking towards the distant coastline with views towards the North-Sea. To the front and rear of each property there is a modest garden area, with hedgerows marking the property boundaries to the rear and a mixture of hedgerows and walls to the front. Each property has a driveway to the side of the main dwelling.

Views from Dwelling

The property orientation means that views are unlikely from the rear of the properties. The primary viewing direction would remain unaffected by the proposed development. The proposed development would not interrupt any views towards the coastline. If views were to occur the turbine would be partially screened by the band of shelterbelt woodland which runs along the Elliot Water. The upper sections of the turbine would be viewed against the sky above the tree line, similar to the views experienced in Viewpoint 3 of the residential assessment.

Views from Environs

Views from the garden area would be similar to those experienced in viewpoint 3, with the main views towards the coastline unaffected the turbine would occupy a negligible extent of both the horizontal and vertical view from these areas. There are other features present within the different gardens which would further limit these potential views.

Magnitude of Change: Negligible

Level of Effect: Moderate/Minor



Approximate boundary of domestic curtilage and line of sight from dwelling

Property Name: Kellie Castle Lodge

Reference Number: 15

Grid Reference: 360175, 740075

Distance from Turbine: 1.7km

Number of Properties: 1

Property Orientation: South-East

Direction of Turbines: East



South-East elevation

Property Description

Kellie Castle Lodge is situated 1.7km to the north-west of the proposed turbine. The dwelling is situated at the end of the driveway to Kellie Castle. It is a one and a half storey property. The primary views face to the south-east, overlooking a small garden area and the castle driveway. To the rear of the dwelling there is a paved driveway area with garage outbuilding.

Views from Dwelling

The driveway is bound to the south by a band of mature trees, these would completely screen any potential views of the development from within the dwelling.

Views from Environs

Views from the garden areas to the south of the property would be subject to the same screening features as the dwelling with the woodland limiting any potential views. In the wintering months when leaf cover is less prominent there may be some views possible, however, as well as the trees nearby there woodland that lines the Elliot Water also provides a great deal of screening as seen in viewpoint 3. It is unlikely that there will be any views of the development from the areas surrounding this property.

Magnitude of Change: Negligible

Level of Effect: Moderate/Minor



Approximate boundary of domestic curtilage and line of sight from dwelling

Property Name: The Manse Cottage

Reference Number: 16

Grid Reference: 360075, 740214

Distance from Turbine: 1.8km

Number of Properties: 1

Property Orientation: South-East

Direction of Turbines: East-South-East



East elevation

Property Description

The Manse Cottage is situated ~1.8km to the west-north-west of the proposed development. The property is a traditional stone built one storey L-shaped cottage. To the front of the property there is a small garden which is bound by a hedge, with the main garden area to the rear of the property. The property is accessed via a short driveway from the nearby minor road.

Views from Dwelling

There are no predicted views from within the dwelling. The surrounding area is heavily wooded, screening any potential views of the development.

Views from Environs

There are no predicted views from the garden areas at the property the local woodland screening any potential views of the turbine.

Magnitude of Change: None

Level of Effect: None



Approximate boundary of domestic curtilage and line of sight from dwelling

Property Name: The Glebe House

Reference Number: 17

Grid Reference: 360137, 740383

Distance from Turbine: 1.7km

Number of Properties: 1

Property Orientation: South-West

Direction of Turbines: East-South-East

Property Description

The Glebe House is situated ~1.7km to the west-north-west of the proposed development. The dwelling is a grand two storey traditional stone built property set within an area of woodland which surrounds the property on all sides. A large garden area surrounds the property on all sides, while a stone wall marks the perimeter alongside the dense mature woodland. The property is accessed via a short driveway from the minor road which runs by the front of the house.

Views from Dwelling

There are no predicted views from within the dwelling. The surrounding area is heavily wooded, screening any potential views of the development.

Views from Environs

There are no predicted views from the garden areas at the property the local woodland screening any potential views of the turbine.

Magnitude of Change: None

Level of Effect: None



Approximate boundary of domestic curtilage and line of sight from dwelling

Property Name: Bank

Reference Number: 18

Grid Reference: 360652, 740641

Distance from Turbine: 1.3km

Number of Properties: 4
(including new build under construction)

Property Orientation: South

Direction of Turbines: South-East

Property Description

This is a small collection of properties including one property which is under construction currently, situated ~1.3km to the north-west of the proposed development. The original dwelling of Bank Farm House is a traditional stone built two storey farmhouse. The primary views from the dwelling face to the south, with an internal courtyard to the east overlooking the farm outbuildings. The other two properties have been created from a conversion of the existing outbuildings at the farm, these are renovated traditional stone built dwellings which have been split to create two separate single storey properties. To the south of this cluster a new property is currently under construction.

Views from Dwelling

Views from Bank Farm House are not predicted, with the intervening outbuildings screening potential views. From the Bank Farm Cottages, the property on the eastern side of the two has windows which will face towards the proposed development. From here the turbine will be viewed alongside the visible portion of the maltings buildings and intermittent shelter belt trees which are present in the intervening landscape. The turbine would occupy a low extent of both the horizontal and vertical view from this location. Views are unknown from the new build property but potential mitigation would be the planting of screening vegetation such as hedgerow trees on the eastern boundary of the garden.

Views from Environs

There is a small garden area to the south of the Banks Farm House, views from this area are possible but will likely be screened by the addition of the new build property which is situated to the south-east. The Banks Farm Cottages have a modest garden area to the front of each property, with the eastern most property having a slightly larger area on the eastern side of the property as well. Views from this area of the garden will be similar to those experienced at the windows on this façade of the dwelling. Views from the new build are unknown but following the pattern of the nearby development it is predicted the garden area will be located to the south of the dwelling, views from this area may be possible and will be similar to those experienced at the neighbouring cottage. The turbine would occupy a low extent of both the horizontal and vertical view from this area.

Magnitude of Change: Low

Level of Effect: Moderate



Approximate boundary of domestic curtilage and line of sight from dwelling

Property Name: Broomhill

Reference Number: 19

Grid Reference: 360579, 740862

Distance from Turbine: 1.5km

Number of Properties: 1

Property Orientation: South

Direction of Turbines: South-East



South elevation

Property Description

Broomhill is situated ~1.5km to the north-west of the proposed development. The property is a traditional stone built T-shaped building, a conservatory has been added to the southern façade in more recent times. The property perimeter is marked by a small drystone wall, which surrounds the garden area to the south of the main dwelling. To the north a cluster of farm outbuildings enclose the property creating a small courtyard to the north. The property is accessed via a short driveway from the B9127 which runs past the farm.

Views from Dwelling

Views from the conservatory which offers panoramic views to the south, east and west would be possible. The turbine would be viewed from this area of the property, alongside the visible maltings buildings and would add a vertical feature to the view. The turbine would not block any views towards the distant coastline appearing with the industrial elements already present in the view. The turbine would occupy a negligible extent of the horizontal view and a low extent of the vertical view.

Views from Environs

Views from the garden area to the south would be similar to those experienced from within the conservatory area of the property. The open views from the garden towards the coast would remain largely unaffected with the turbine appearing alongside the maltings towers and buildings, occupying a negligible extent of the horizontal view and a low extent of the vertical view.

Magnitude of Change: Negligible

Level of Effect: Moderate/Minor



Approximate boundary of domestic curtilage and line of sight from dwelling

Property Name: Loanend

Reference Number: 20

Grid Reference: 360430, 741151

Distance from Turbine: 1.8km

Number of Properties: 2

Property Orientation: South-East

Direction of Turbine: South-East

Property Description

Loanend is situated ~1.8km to the north-west of the proposed development. The property is a traditional L-shaped building split into two single storey cottages. There are garden areas for each property to the front and rear of the building. The property perimeter is marked by a drystone wall to the east and a wooden fence and a coniferous hedgerow on the other sides. The property is accessed via the B9127 which runs past the property.

Views from Dwelling

Views from the dwelling would be limited by the vegetation which lines the property boundary. There may be some views of the turbine and where these do occur the turbine would appear within an open vista, occupying a negligible extent of both the horizontal and vertical view. The turbine would be viewed predominantly against the sky, partially screened by intervening feature present in the wider landscape such as trees and shelterbelt.

Views from Environs

Views from the garden would be limited again by the vegetation which surrounds the properties, with no views occurring in the northern areas of the garden to the rear of the dwellings. There may be some oblique views from the driveway which passes in front of the houses, these views again would see the turbine occupy a negligible extent of the open vista.

Magnitude of Change: Negligible

Level of Effect: Moderate/Minor



Approximate boundary of domestic curtilage and line of sight from dwelling

Property Name: Fairyknowe

Reference Number: 21

Grid Reference: 361115, 741342

Distance from Turbine: 1.4km

Number of Properties: 1

Property Orientation: South-East

Direction of Turbine: South-South-East

Property Description

Fairyknowe is a traditional two storey farmhouse situated ~1.4km to the north-north-west of the proposed development. To the west of the property there is a large fairly secluded garden area. The property is bound in the main by a drystone wall with an area of hedgerow on the southern edges as well. The property is accessed via a short driveway from the local minor road and runs to the north of the property.

Views from Dwelling

There will be some direct views towards the proposed development from the southern side of the property with windows facing out over the open landscape, the turbine would appear predominantly against the sky from these areas, the turbine occupying a negligible extent of the horizontal views which are open and far reaching and a low extent of the vertical views.

Views from Environs

The garden area to the west of the property is fairly secluded with trees and other vegetation forming a boundary to the area, where gaps appear in this vegetation there will be some views to the south towards the proposed development. Similar to the views from the property the turbine appearing against the sky. The turbine would occupy a negligible portion of the overall open and far reaching views that are possible to the south and west from this area around the property. Oblique views from the driveway would be screened by the stone wall which lines this area of the property.

Magnitude of Change: Medium

Level of Effect: Major/Moderate



Approximate boundary of domestic curtilage and line of sight from dwelling

Property Name: Bankhead

Reference Number: 22

Grid Reference: 360947, 741754

Distance from Turbine: 1.9km

Number of Properties: 1

Property Orientation: South-East

Direction of Turbine: South- East

Property Description

Bankhead is a traditional stone built single storey farm cottage situated ~1.9km to the north-west of the proposed development. The property is bound by a series of large outbuildings to the north and east, while a significant band of mature coniferous shelterbelt lines the property perimeter on all sides. The property is accessed via a local minor road from the B9127.

Views from Dwelling

The dense coniferous vegetation would limit any potential views of the proposed development from within the dwelling.

Views from Environs

The garden area to the south is lined by dense vegetation and there would be no views of the proposed development from these areas. There may be some oblique views when travelling along the local road towards the dwelling, the turbine would appear in context with the more prominent metal electricity pylons that line the horizon in the area, with the turbine appearing as a minor feature on the horizon.

Magnitude of Change: Negligible

Level of Effect: Moderate/Minor



Approximate boundary of domestic curtilage and line of sight from dwelling

Property Name: Crudie Acres

Reference Number: 23

Grid Reference: 360947, 741754

Distance from Turbine: 1.6km

Number of Properties: 1

Property Orientation: South-East

Direction of Turbine: South

Property Description

Crudie Acres is a modern build T-shaped property situated ~1.6km to the north of the proposed development. The property is bound to the north by a series of large farm outbuildings, with a significant garden area running to the south-east of the main property. The garden appears bound by an area of mature hedgerow while a cluster of woodland is located on the southern edge of the garden. A row of mature shelterbelt trees occupy the landscape to the immediate south of the property adding further enclosure. The property is accessed via a short minor road from the B9127 to the south.

Views from Dwelling

Views from within the property would be extremely limited with the significant areas of screening present both within the garden and in the surrounding landscape it is not predicted that the turbine would be a prominent feature in the views from within the property. Where visible the turbine would be viewed in context with a series of large metal electricity pylons which run directly to the south of the property. The turbine would occupy a low extent of both the horizontal and vertical view.

Views from Environs

The views from the garden area would also be limited due to the intervening vegetation. There may be some views when travelling away from the property, these views would be direct for a short time with the turbine appearing against the sky on the horizon. The turbine would occupy a low extent of the horizontal and vertical view for a short time view alongside the Maltings infrastructure.

Magnitude of Change: Low

Level of Effect: Moderate



Approximate boundary of domestic curtilage and line of sight from dwelling

Property Name: Bottlend Cottages

Reference Number: 24

Grid Reference: 362201, 741794

Distance from Turbine: 1.7km

Number of Properties: 2

Property Orientation: South-East

Direction of Turbine: South-West

Property Description

Bottlend Cottages consist of a terraced row of two bungalows situated ~1.7km to the north-east of the proposed development. The properties overlook an internal courtyard formed by the stand alone garages located on the southern boundary of the properties. Each property has a modest garden on the northern side of the main dwellings. Set back from the local road the properties are bound by a small wall and wooden fence, with an area of mature woodland bounding the nearby cemetery forming the south-eastern marker of the property. Located at the side of the local East Muirlands Road.

Views from Dwelling

The orientation of the properties and the intervening built features would completely screen any potential views towards the turbine from within the dwellings.

Views from Environs

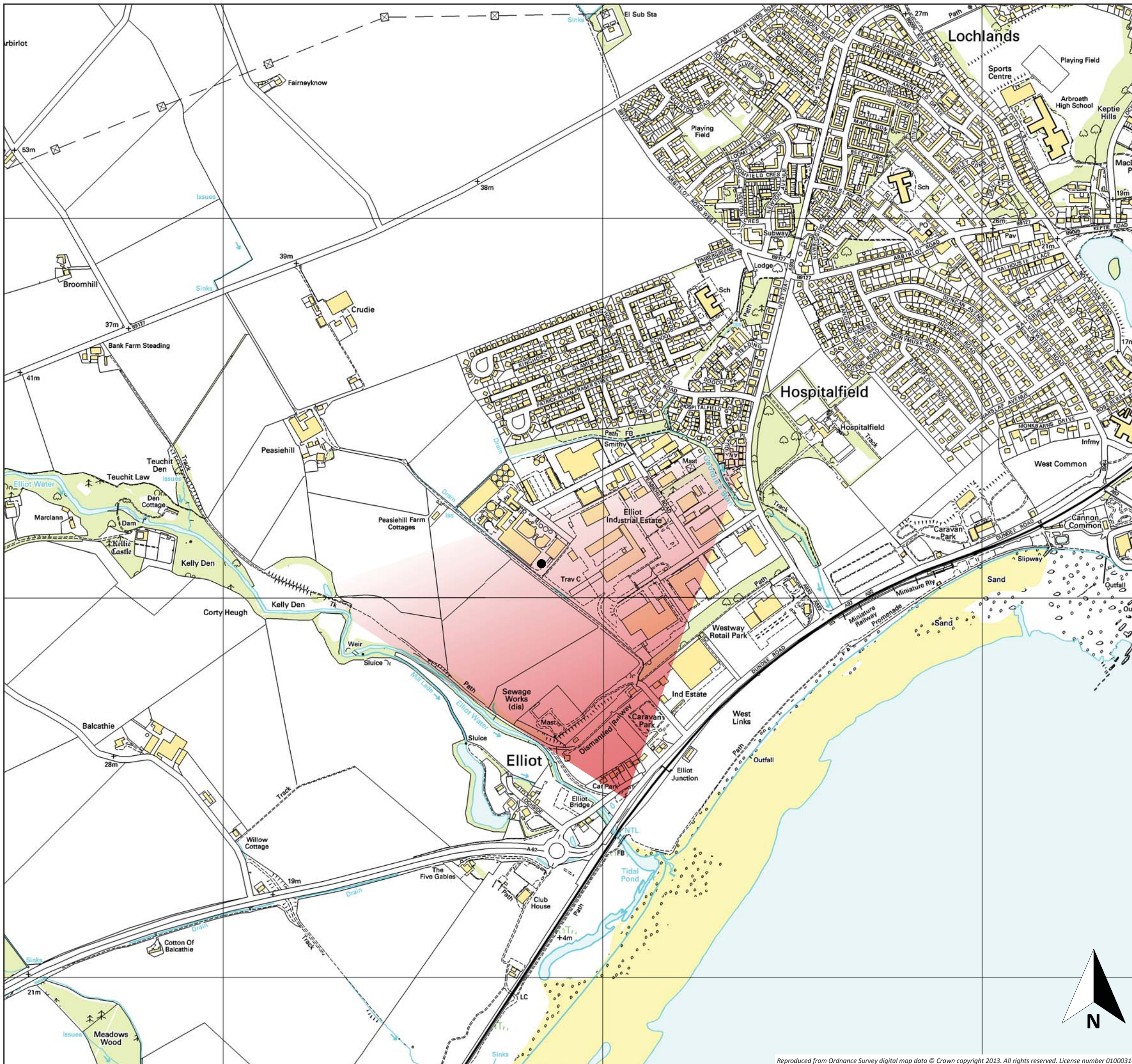
Views from the areas surrounding the properties would also be limited with the properties screening views from the northern areas, the garages screening views from the southern areas. Intervening shelterbelts in the wider landscape would further screen any potential views from the short driveway.

Magnitude of Change: Negligible

Level of Effect: Moderate/Minor




Approximate boundary of domestic curtilage and line of sight from dwelling




Project Name: **Bairds Malt Wind Turbine**

Document Title: **VP01 - A92, Elliot**

Scale: **1:10,000 @ A3**

Key:
 Proposed Turbine Location

 76° Field of View

Viewpoint Information

Viewpoint Location: **E362065 N739470**

Viewpoint Elevation: **1m (A.O.D)**

View Direction: **339°**

Distance to Turbine: **658m**

Visibility: **Hub**

Camera Type: **Nikon D3100**

Focal Length: **35mm**

Effective Focal Length: **54.6mm**

Date Taken: **19/07/2013**

Time Taken: **12:18**

Height above elevation: **1.5m**

Visual Impact

Magnitude: **High**

Sensitivity: **Low**

Overall: **Moderate**

Please note for a 76° field of view, a viewing distance of 300mm is recommended.

Client: **Bairds Malt Single Turbine Ltd**



Drawing by: **Green Cat Renewables Ltd**

Document Number: **CO621-163/App 2.3a**

Version: **1.0**

Author: **SS**

Checked by: **RC**

Approved By: **GM**

Date: **18/12/2014**



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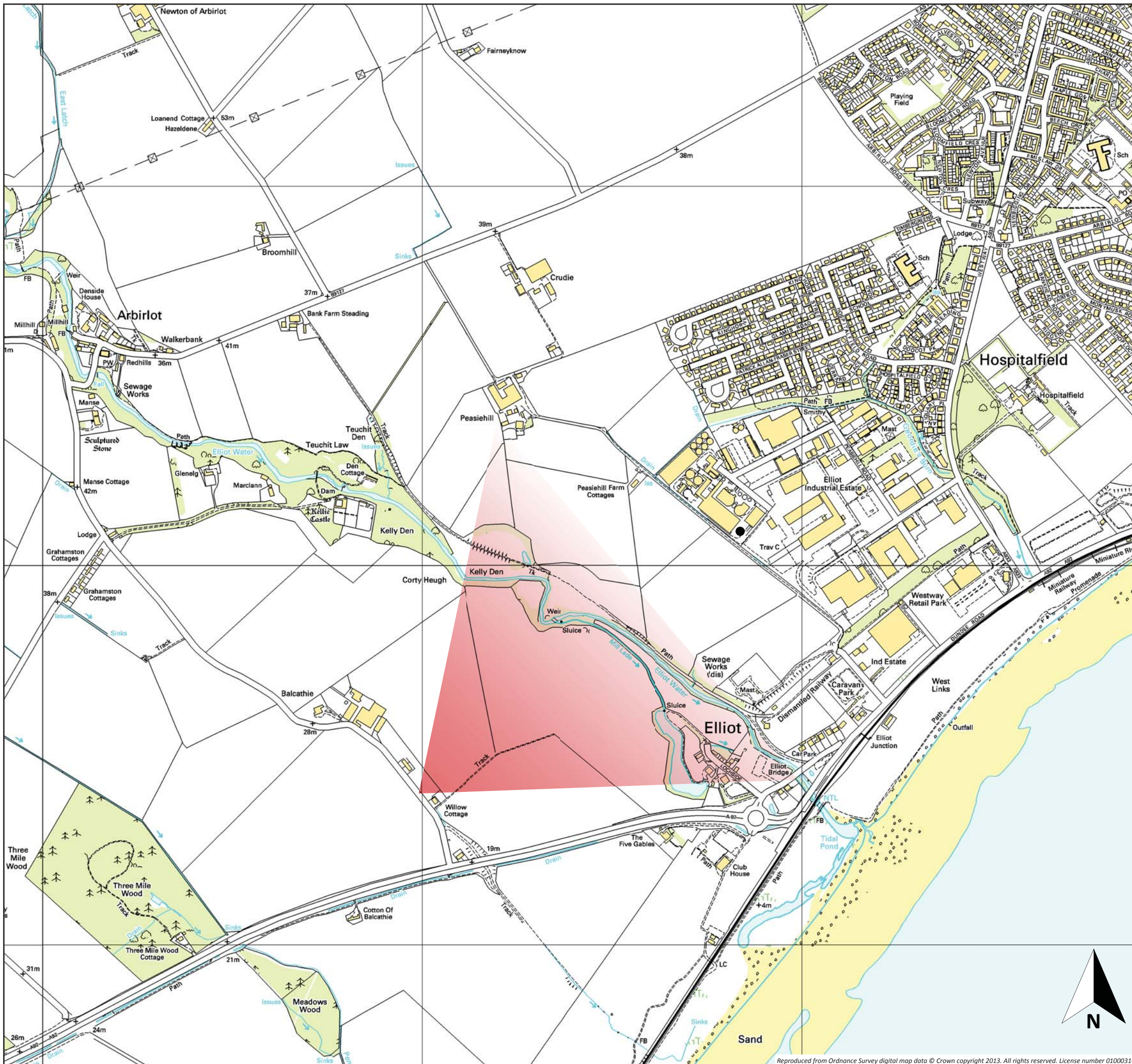
VP01 - PHOTOGRAPH OF EXISTING VIEW



VP01 - WIRELINE DRAWING









Project Name: **Bairds Malt Wind Turbine**

Document Title: **VP02 - Balcathie**

Scale: **1:10,000 @ A3**

Key:
 Proposed Turbine Location

 76° Field of View

Viewpoint Information

Viewpoint Location: **E360975 N739404**
 Viewpoint Elevation: **20m (A.O.D)**
 View Direction: **49°**
 Distance to Turbine: **1.1km**

Visibility: **Hub**

Camera Type: **Nikon D3100**
 Focal Length: **35mm**
 Effective Focal Length: **54.6mm**
 Date Taken: **19/07/2013**
 Time Taken: **13:26**
 Height above elevation: **1.5m**

Visual Impact

Magnitude: **High**
 Sensitivity: **Low**
 Overall: **Moderate**

Please note for a 76° field of view, a viewing distance of 300mm is recommended.

Client: **Bairds Malt Single Turbine Ltd**



Drawing by: **Green Cat Renewables Ltd**

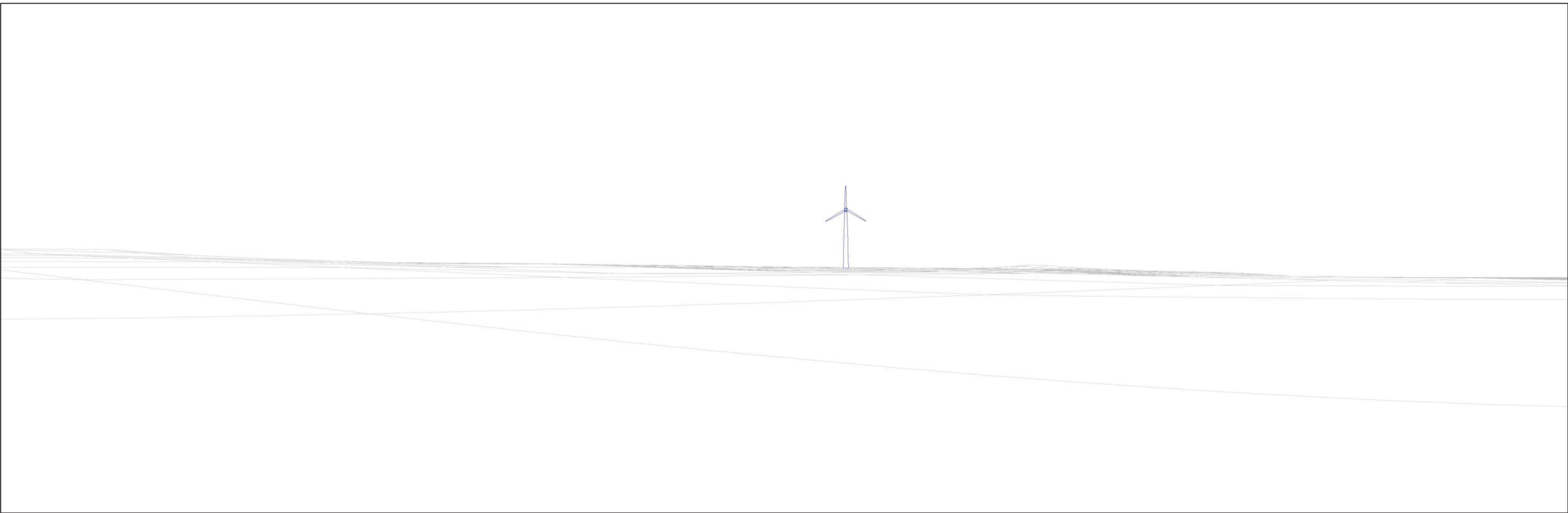
Document Number: **CO621-163/App 2.3b**
 Version: **1.0**
 Author: **SS**
 Checked by: **RC**
 Approved By: **GM**
 Date: **18/12/2014**



VP02 - PHOTOGRAPH OF EXISTING VIEW



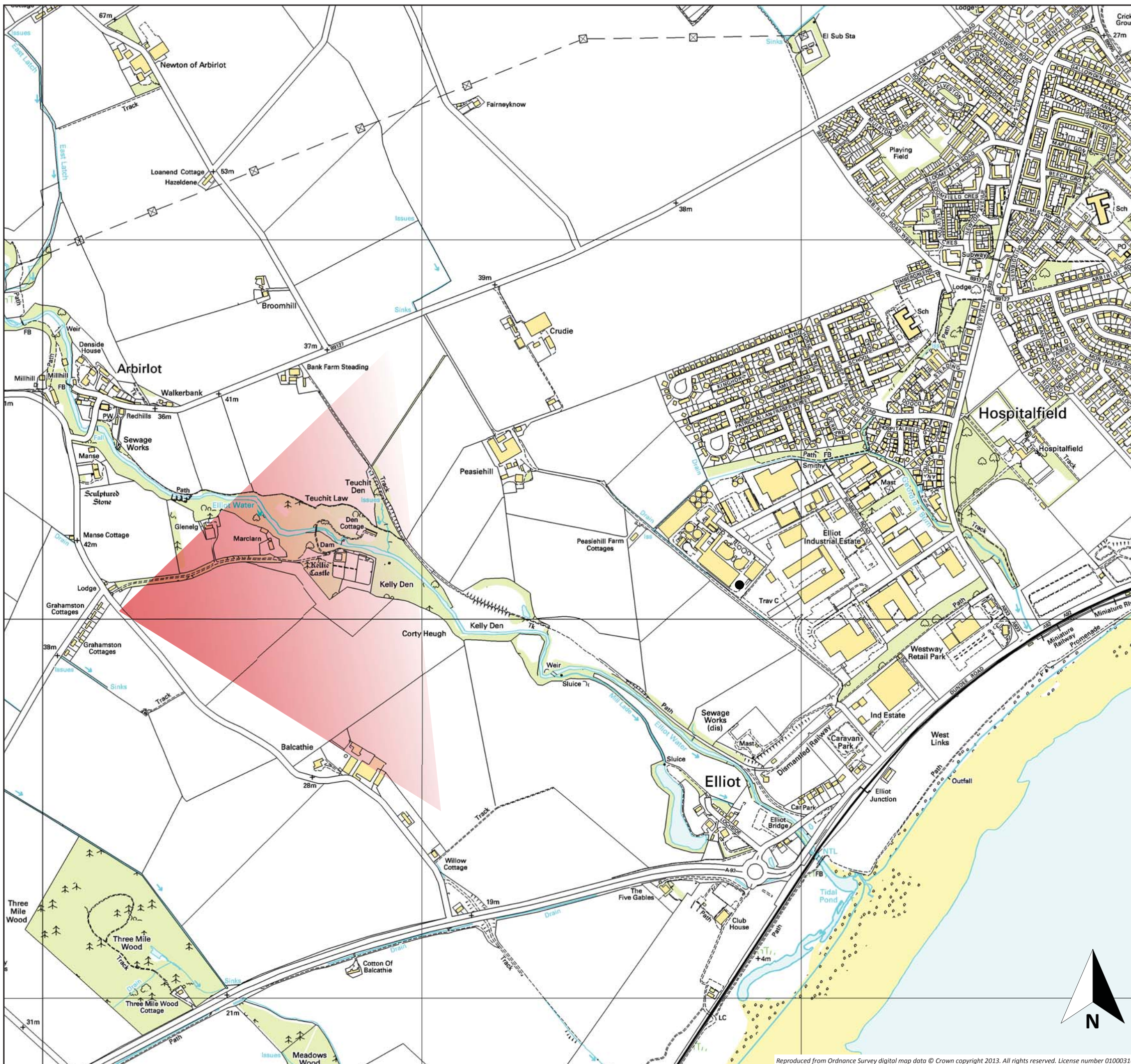
VP02 - WIRELINE DRAWING





VP02 - PHOTOMONTAGE OF PROPOSAL

76° VIEWING ANGLE
300MM VIEWING DISTANCE





Project Name: **Bairds Malt Wind Turbine**
 Document Title: **VP03 - Grahamston Cottages**
 Scale: **1:10,000 @ A3**

Key:
 Proposed Turbine Location
 76° Field of View

Viewpoint Information

Viewpoint Location: **E360198 N740013**
 Viewpoint Elevation: **38m (A.O.D)**
 View Direction: **83°**
 Distance to Turbine: **1.6km**
 Visibility: **Hub**
 Camera Type: **Nikon D3100**
 Focal Length: **35mm**
 Effective Focal Length: **54.6mm**
 Date Taken: **19/07/2013**
 Time Taken: **13:37**
 Height above elevation: **1.5m**

Visual Impact

Magnitude: **High**
 Sensitivity: **Low**
 Overall: **Moderate**

Please note for a 76° field of view, a viewing distance of 300mm is recommended.

Client: **Bairds Malt Single Turbine Ltd**



Drawing by: **Green Cat Renewables Ltd**

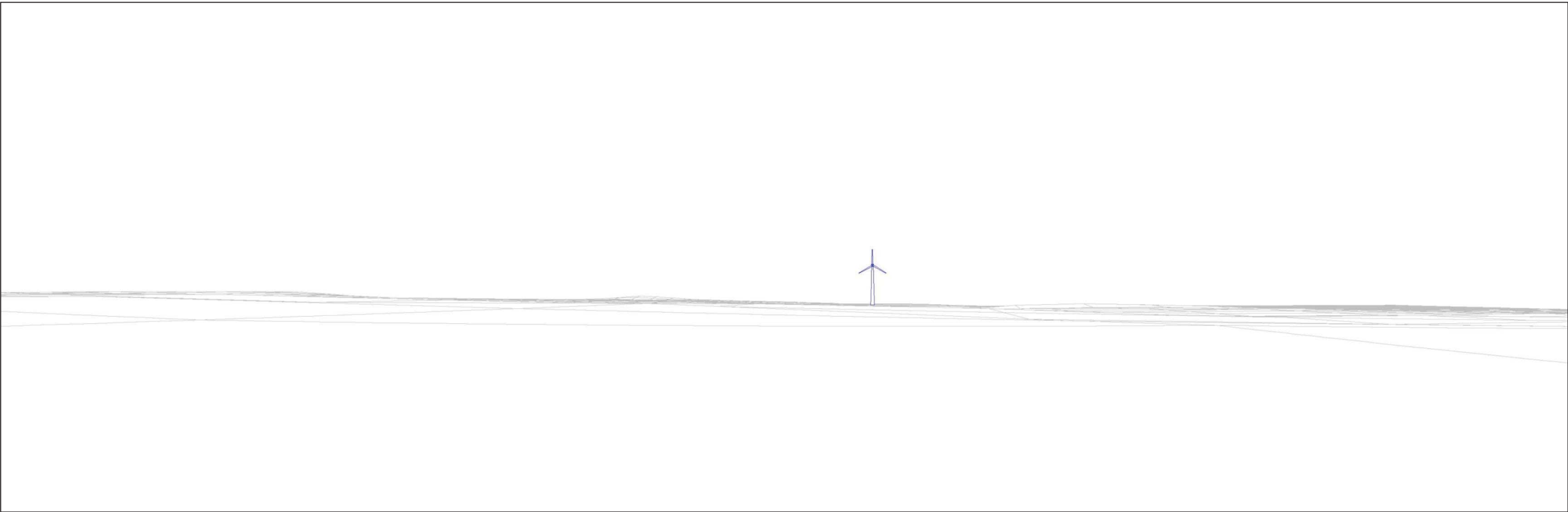
Document Number: **CO621-163/App 2.3c**
 Version: **1.0**
 Author: **SS**
 Checked by: **RC**
 Approved By: **GM**
 Date: **18/12/2014**



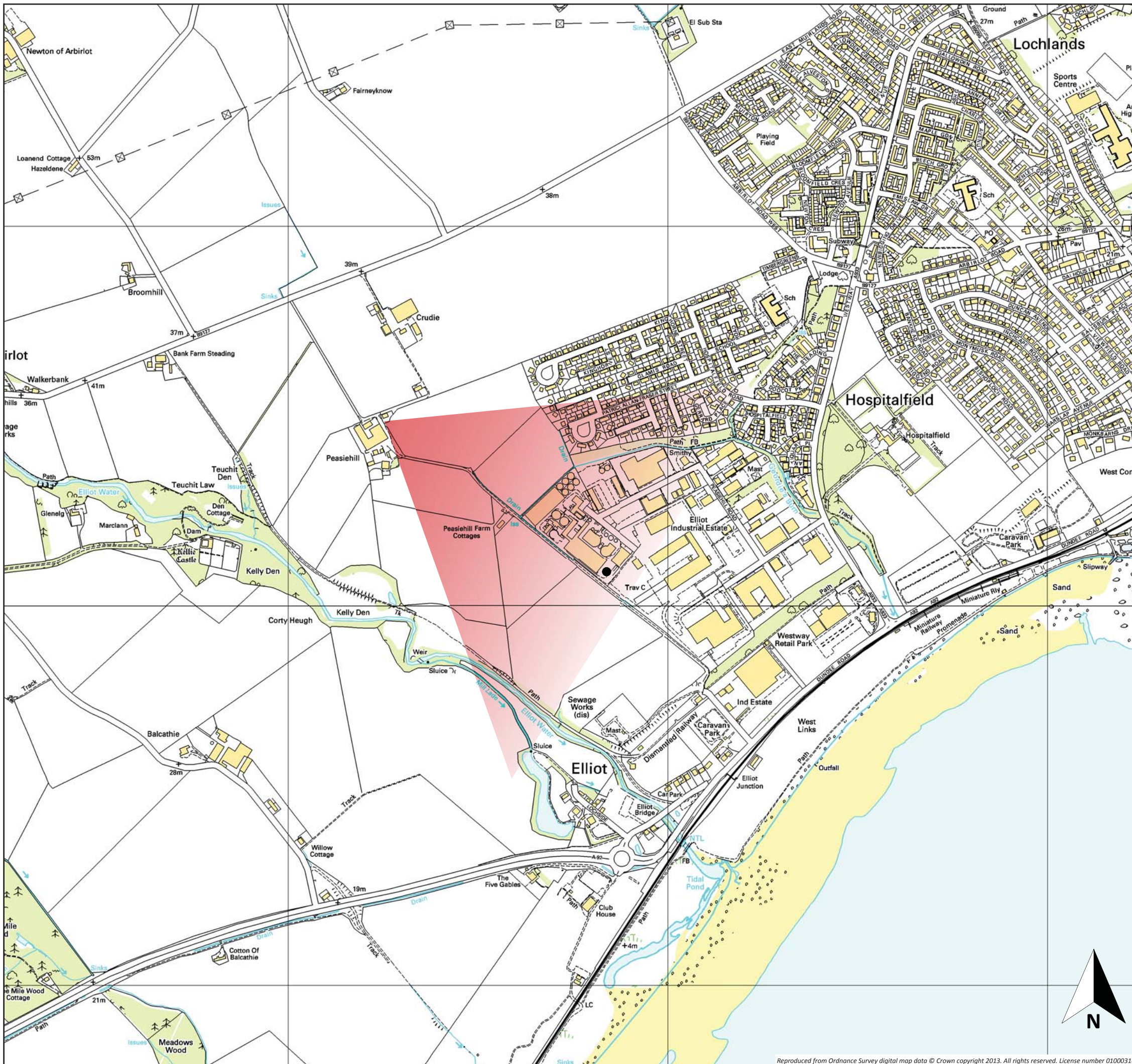
VP03 - PHOTOGRAPH OF EXISTING VIEW



VP03 - WIRELINE DRAWING








Project Name: **Bairds Malt Wind Turbine**

Document Title: **VP04 - Peasiehill**

Scale: **1:10,000 @ A3**

Key:
 Proposed Turbine Location

 76° Field of View

Viewpoint Information

Viewpoint Location: **E361259 N740492**
 Viewpoint Elevation: **32m (A.O.D)**
 View Direction: **123°**
 Distance to Turbine: **710km**

Visibility: **Hub**

Camera Type: **Nikon D3100**
 Focal Length: **35mm**
 Effective Focal Length: **54.6mm**
 Date Taken: **19/07/2013**
 Time Taken: **14:07**
 Height above elevation: **1.5m**

Visual Impact

Magnitude: **High**
 Sensitivity: **Low**
 Overall: **Moderate**

Please note for a 76° field of view, a viewing distance of 300mm is recommended.

Client: **Bairds Malt Single Turbine Ltd**



Drawing by: **Green Cat Renewables Ltd**

Document Number: **CO621-163/App 2.3d**
 Version: **1.0**
 Author: **SS**
 Checked by: **RC**
 Approved By: **GM**
 Date: **18/12/2014**

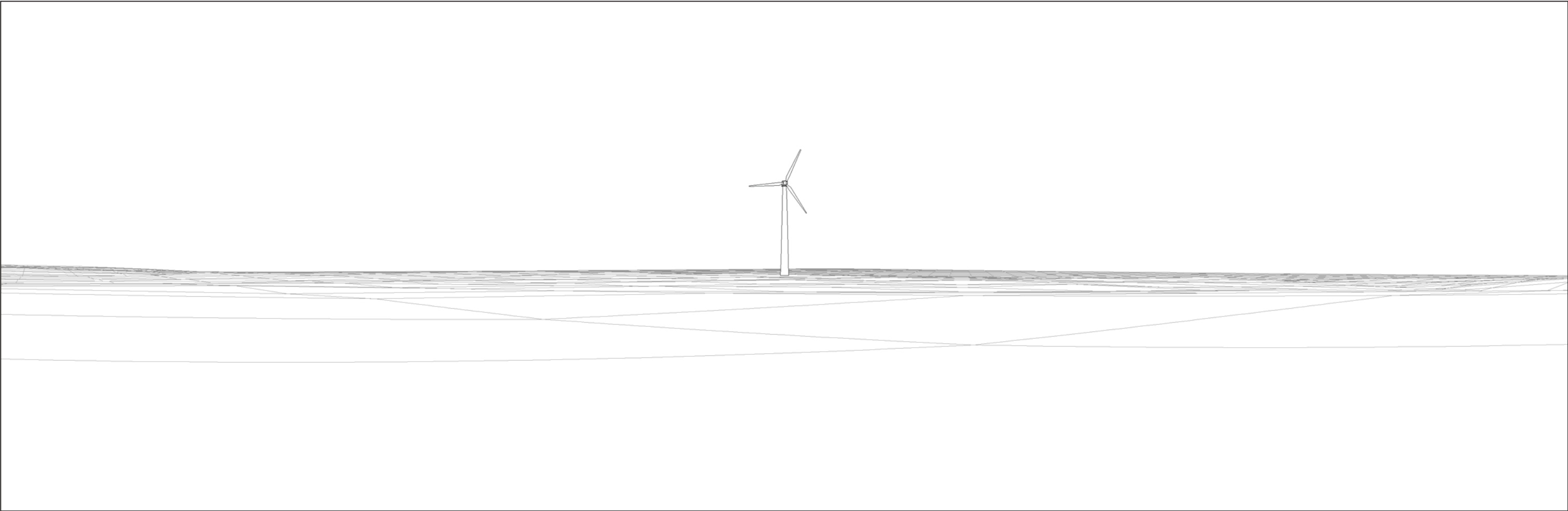


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VP04 - PHOTOGRAPH OF EXISTING VIEW



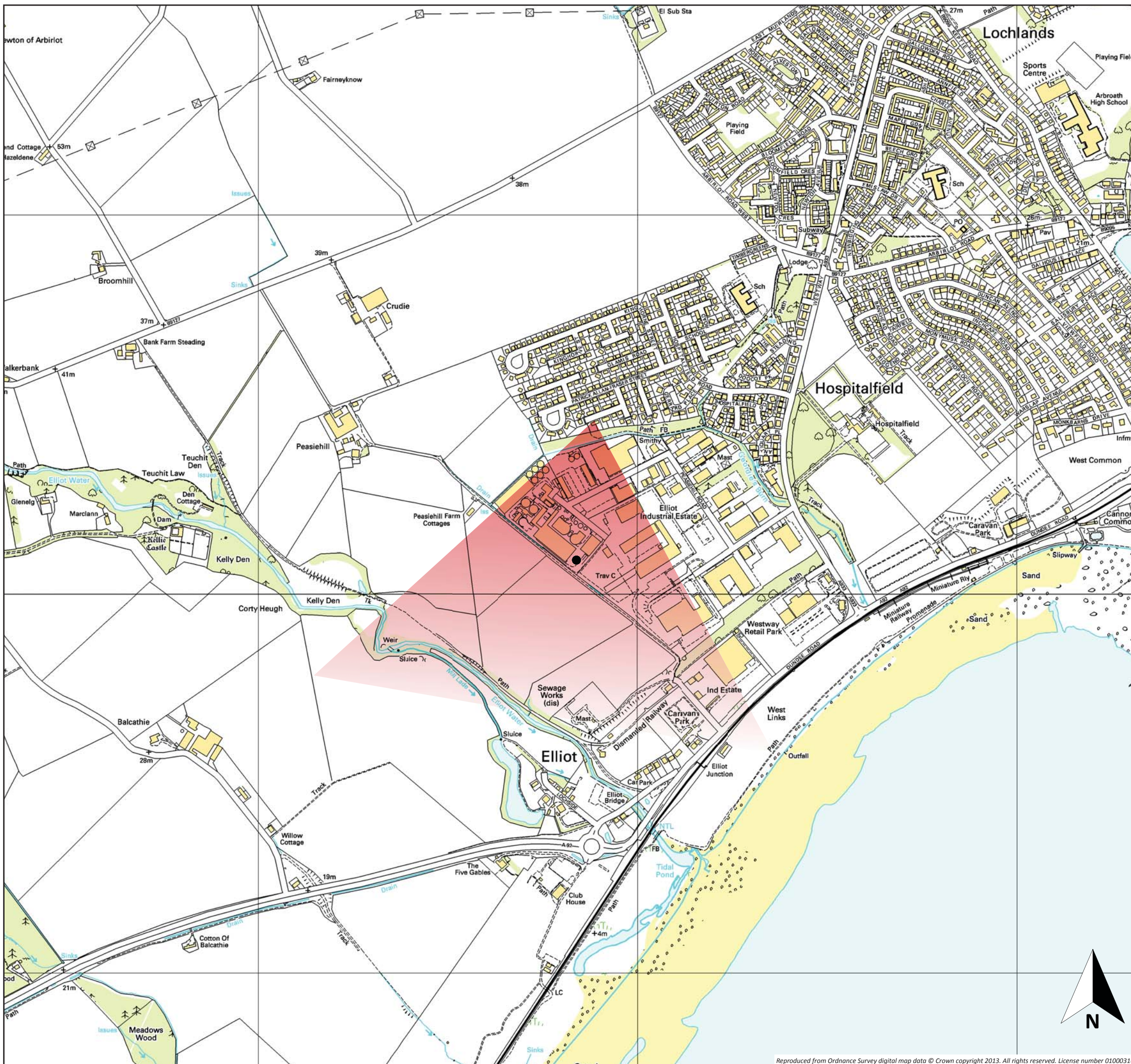
VP04 - WIRELINE DRAWING





VP04 - PHOTOMONTAGE OF PROPOSAL

76° VIEWING ANGLE
300MM VIEWING DISTANCE





Project Name: **Bairds Malt Wind Turbine**
 Document Title: **VP05 - 71 Patrick Allan-Fraser Street**
 Scale: **1:10,000 @ A3**

Key:
 Proposed Turbine Location
 76° Field of View

Viewpoint Information

Viewpoint Location: **E361889 N740459**
 Viewpoint Elevation: **20m (A.O.D)**
 View Direction: **190°**
 Distance to Turbine: **370m**
 Visibility: **Hub**
 Camera Type: **Nikon D3100**
 Focal Length: **35mm**
 Effective Focal Length: **54.6mm**
 Date Taken: **19/07/2013**
 Time Taken: **14:59**
 Height above elevation: **1.5m**

Visual Impact

Magnitude: **High**
 Sensitivity: **Low**
 Overall: **Moderate**

Please note for a 76° field of view, a viewing distance of 300mm is recommended.

Client: **Bairds Malt Single Turbine Ltd**



Drawing by: **Green Cat Renewables Ltd**

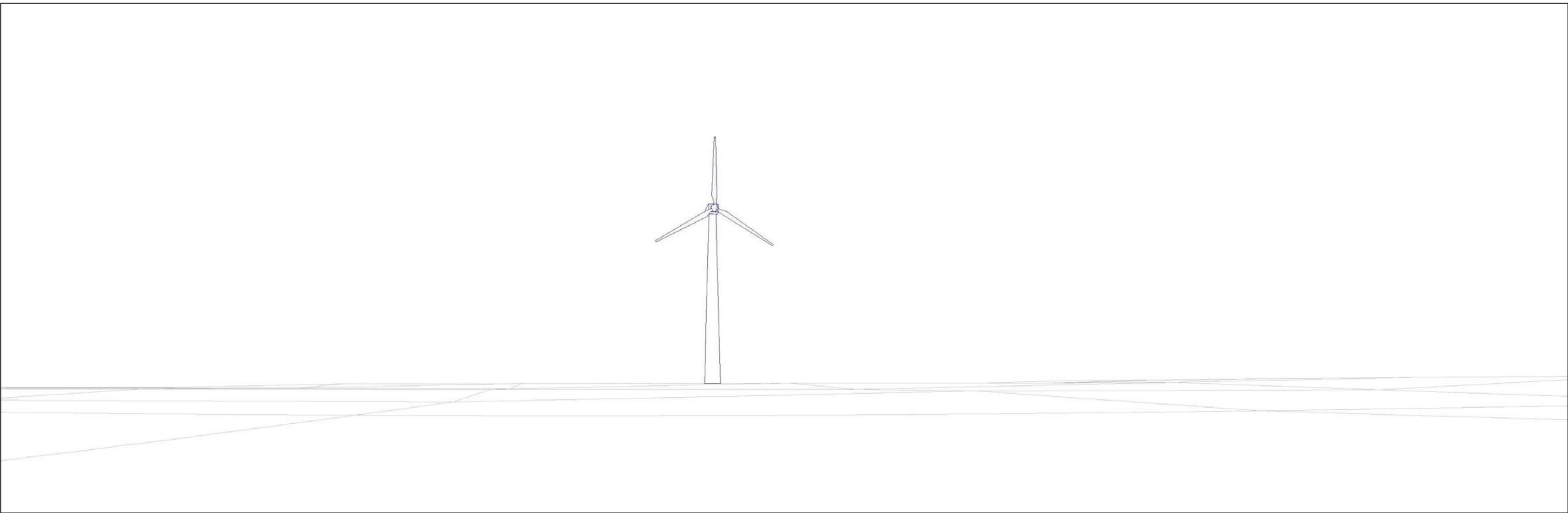
Document Number: **CO621-163/App 2.3e**
 Version: **1.0**
 Author: **SS**
 Checked by: **RC**
 Approved By: **GM**
 Date: **18/12/2014**



VP05 - PHOTOGRAPH OF EXISTING VIEW



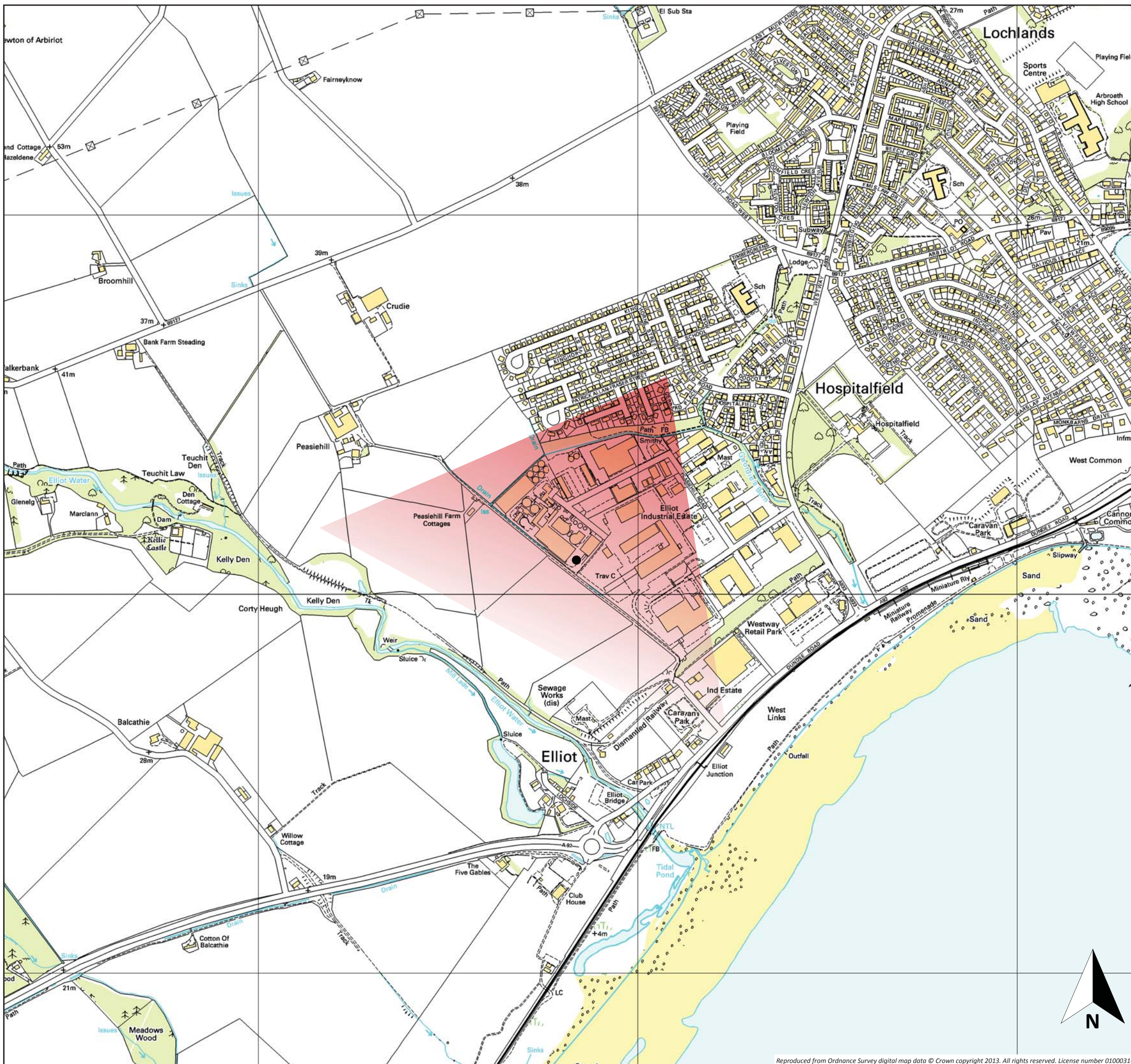
VP05 - WIRELINE DRAWING





VP05 - PHOTOMONTAGE OF PROPOSAL

76° VIEWING ANGLE
300MM VIEWING DISTANCE





Project Name: **Bairds Malt Wind Turbine**
 Document Title: **VP06 - 5 Patrick Allan-Fraser Street**
 Scale: **1:10,000 @ A3**

Key:
 Proposed Turbine Location
 76° Field of View

Viewpoint Information

Viewpoint Location: **E362083 N740556**
 Viewpoint Elevation: **19m (A.O.D)**
 View Direction: **205°**
 Distance to Turbine: **531m**
 Visibility: **Hub**
 Camera Type: **Nikon D3100**
 Focal Length: **35mm**
 Effective Focal Length: **54.6mm**
 Date Taken: **19/07/2013**
 Time Taken: **15:15**
 Height above elevation: **1.5m**

Visual Impact

Magnitude: **High**
 Sensitivity: **Low**
 Overall: **Moderate**

Please note for a 76° field of view, a viewing distance of 300mm is recommended.

Client: **Bairds Malt Single Turbine Ltd**



Drawing by: **Green Cat Renewables Ltd**

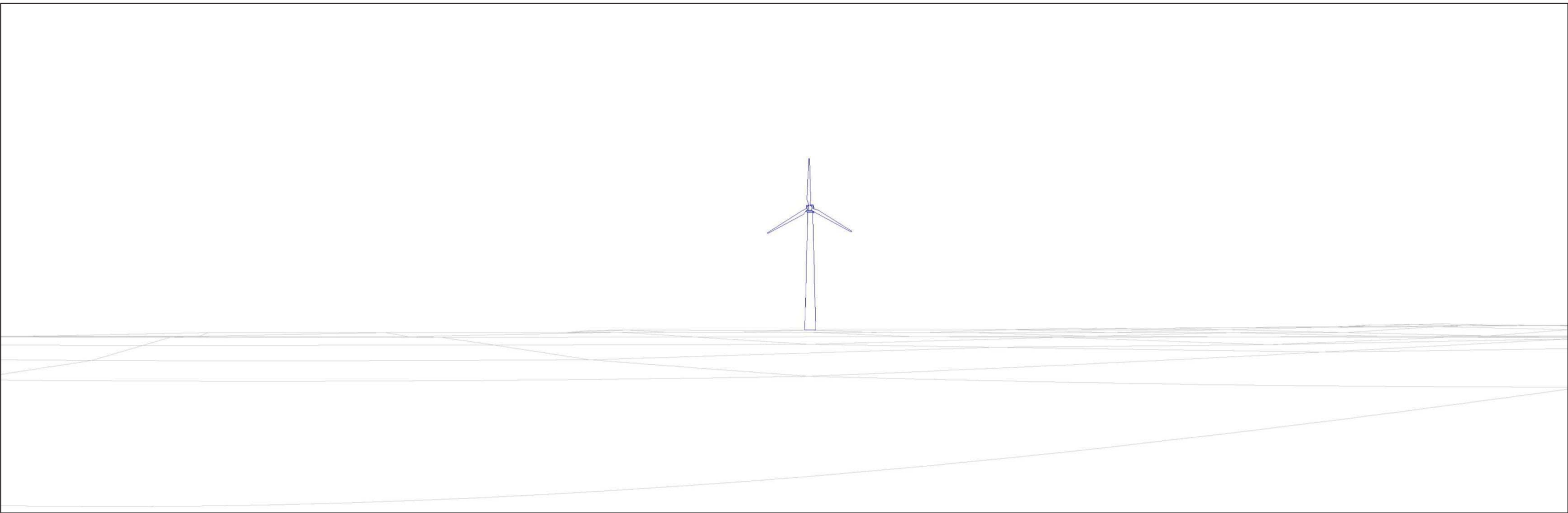
Document Number: **CO621-163/App 2.3f**
 Version: **1.0**
 Author: **SS**
 Checked by: **RC**
 Approved By: **GM**
 Date: **18/12/2014**



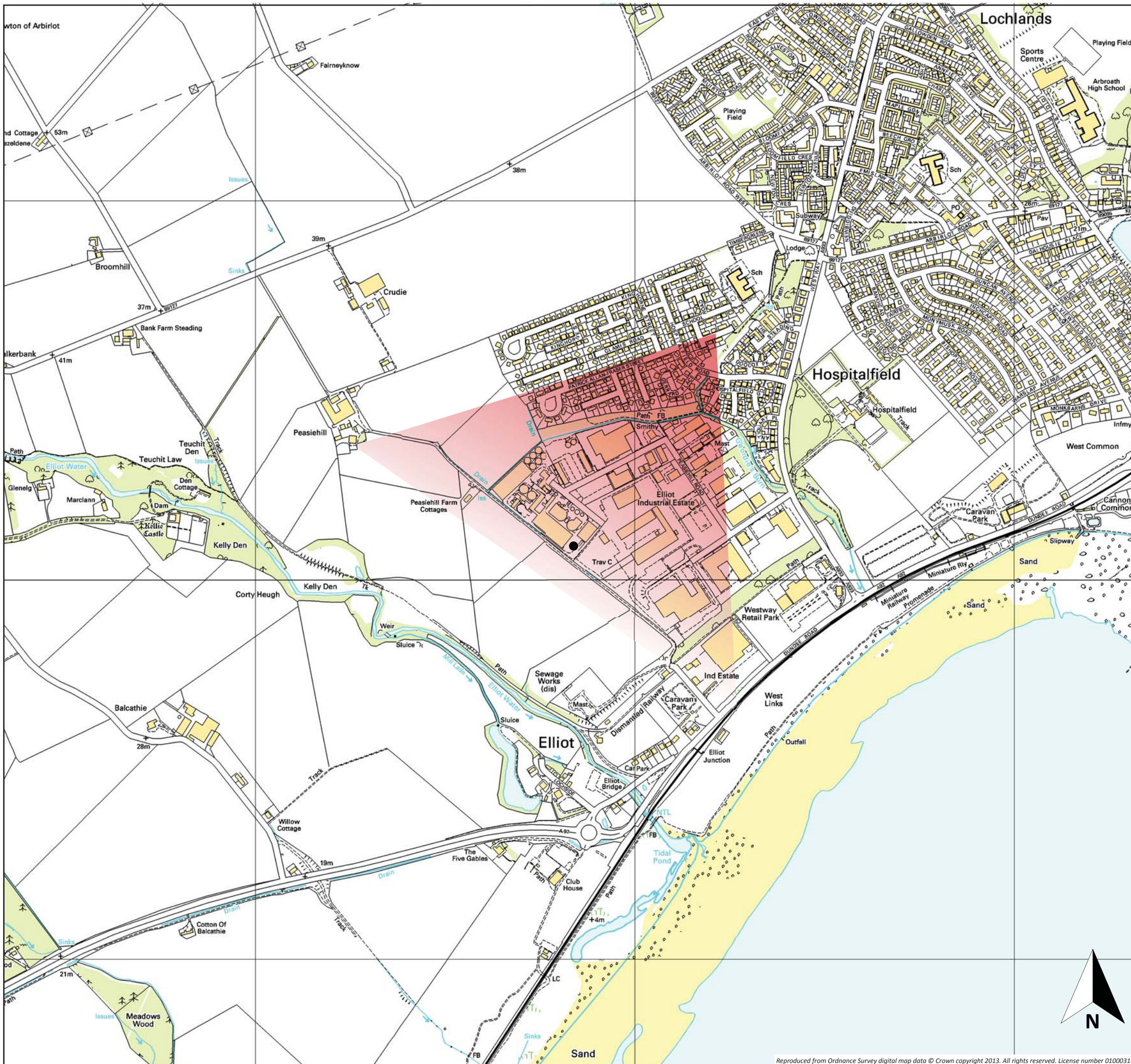
VP06 - PHOTOGRAPH OF EXISTING VIEW



VP06 - WIRELINE DRAWING









Project Name: **Bairds Malt Wind Turbine**

Document Title: **VP07 - 24 School Road**

Scale: **1:10,000 @ A3**

Key:
 Proposed Turbine Location

 76° Field of View

Viewpoint Information

Viewpoint Location: **E362220 N740648**

Viewpoint Elevation: **20m (A.O.D)**

View Direction: **213°**

Distance to Turbine: **671m**

Visibility: **Hub**

Camera Type: **Nikon D3100**

Focal Length: **35mm**

Effective Focal Length: **54.6mm**

Date Taken: **19/07/2013**

Time Taken: **15:35**

Height above elevation: **1.5m**

Visual Impact

Magnitude: **High**

Sensitivity: **Low**

Overall: **Moderate**

Please note for a 76° field of view, a viewing distance of 300mm is recommended.

Client: **Bairds Malt Single Turbine Ltd**



Drawing by: **Green Cat Renewables Ltd**

Document Number: **CO621-163/App 2.3g**

Version: **1.0**

Author: **SS**

Checked by: **RC**

Approved By: **GM**

Date: **18/12/2014**



VP07 - PHOTOGRAPH OF EXISTING VIEW



VP07 - WIRELINE DRAWING



VP07 - PHOTOMONTAGE OF PROPOSAL

76° VIEWING ANGLE
300MM VIEWING DISTANCE



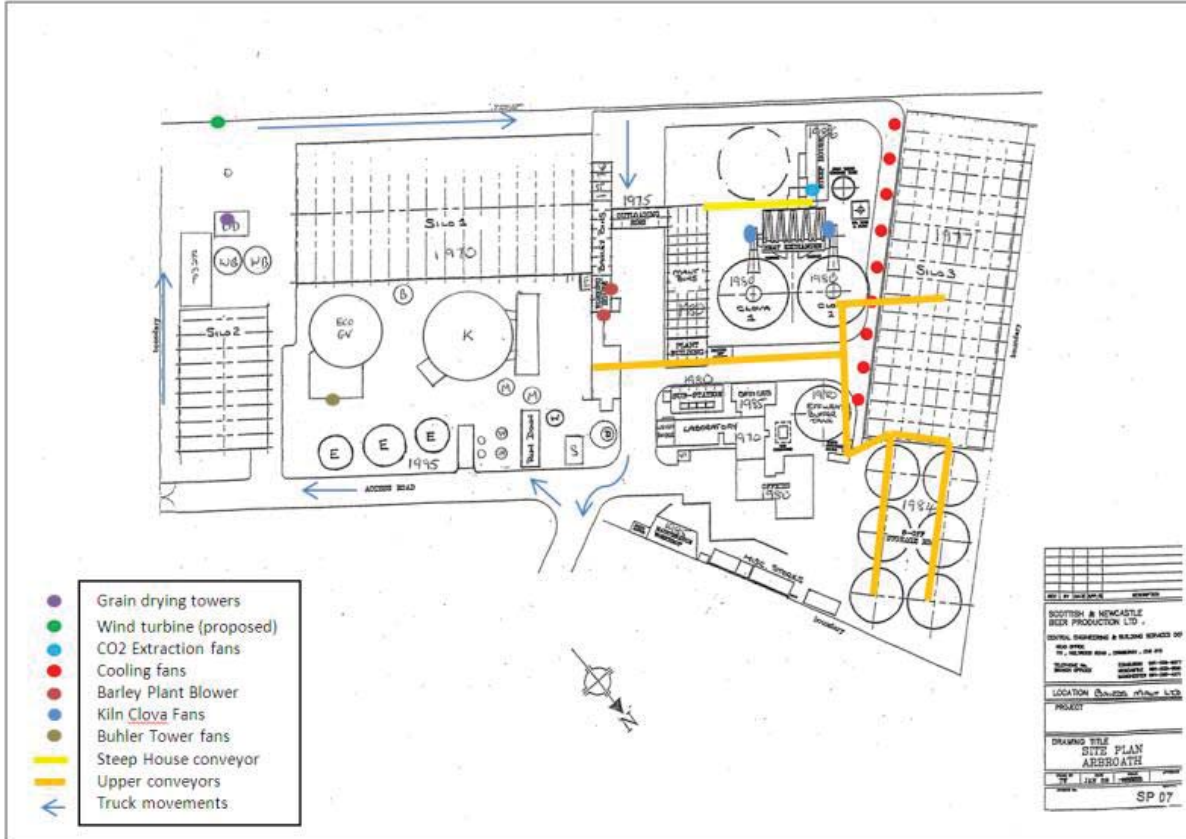
BAIRDS MALT WIND TURBINE

Appendix 3 – Noise

December 2014

1) On-site noise sources at Bairds Malt

Production activities at Bairds Malt have a both a weekly and a seasonal cycle. Error! Reference source not found. shows the location of the most significant sources of noise on-site at Bairds Malt.



Primary noise sources at Bairds Malt

These noise sources have the following normal patterns of use, shown below

Noise source	Normal pattern of operation
Grain Driers	September to mid-October (harvest season)
Steep House CO ₂ extraction fans	Mon 19:00 – Tues 15:00. Tues 21:00-Weds 11:00. Thurs 14:00- Fri 02:00. Fri 06:00-Fri 12:00. Active throughout the year with the exception of September and October.
Silo 3 cooling fans	3 weeks in total (weather dependant) between end of October and early December.
Barley Plant blower	All day until between 22:00 & 23:00, 7 days per week
Steep House conveyor	Monday pm and Wednesday pm for 2 hours when required by Clova. Some occasional additional operation.
Upper conveyors	Very difficult to quantify, sometimes several hours per day, sometimes not for weeks at a time.
Kiln Clova Fans	When kilning: Mon 08:00 – Tues 22:00. Weds 08:00 – Thurs 22:00
Buhler Tower fans	24 hours per day, 7 days per week

Patterns of use of noise sources

2) Noise Diary Sheet

NOISE DIARY SHEET

MONITORING LOCATION Name: Address:	INSTRUCTIONS The purpose of this sheet is to provide a means for each resident who has consented to noise monitoring at their property to be able to make a note of any unusual noises that occur during the monitoring period. Examples of unusual noise could include an industrial noise that is not considered typical or perhaps the DIY activities of a neighbour. Unusual noises should only be noted if they occur during the following periods: Night-time periods: 11:00pm – 7:00am – every day Quiet daytime periods: 6:00pm – 11:00pm – every day (evenings), 1:00pm – 6:00pm – Saturday afternoon or 7:00am – 6:00pm – Sunday daytime.
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DATE	START TIME	FINISH TIME	DESCRIPTION OF NOISE	SOURCE OF NOISE (IF KNOWN)	ANY OTHER COMMENTS

Noise Diary Sheet

BAIRDS MALT WIND TURBINE

Appendix 4.1 – Cultural Heritage Feature Table

December 2014

LB/SM/ GDL no.	HBNUM/ Index no.	Distance from turbine	Name	Listing & Description		Theoretical Visibility	Comments
LB 1	21253	~0.8km	Hospitalfield	'A'	Large two and three-storey mansion house, Baronial, towered and turreted, ornate detail. Red sandstone and slate. 1840-70, incorporating mediaeval fragments. Interesting interiors. Built by Patrick Allan-Fraser on site of the Hospital of the Abbey.	Yes	The current setting of the baronial mansion is characterised by its location at the end of a tree lined access track and amongst the mature trees that comprise its immediate border. To the rear of the property lie the houses gardens and the urban area of Arbroath, to the north-west the residential area of Hospitalfield and to the south-west an industrial estate. The main façade of the house is oriented to the south-west with views across the industrial estate. There is an industrial estate in the predominant views from the houses main facade, adding an industrial element to the houses current setting. The telecommunications mast within the industrial estate adds a vertical aspect to the views to the south-west of the house.
LB 2	21252	~1.8km	Mortuary Chapel	'A'	Baronial, towered and turreted, ornate detail. Red sandstone. Built by Patrick Allan-Fraser. 1875.	Yes	The chapel is located within its associated graveyard. The immediate setting of the chapel is upon the north-westerly periphery of the town of Arbroath. The chapel has a more open setting to the west with views out across agricultural farmland in this direction.
LB 3	21254	~0.9km	Hospitalfield Fernery	'B'	Mock ruin containing plant house. Second half 19th cent.	Yes	The fernery is within the grounds of Hospitalfield mansion house. The fernery is located to the rear of the house, within the houses gardens. The wider setting of the fernery is surrounded by modern agricultural land with the built up, urban areas of Hospitalfield to the north-west and the town of Arbroath to the east.
LB 4	21257	~0.7km	Hospitalfield Doocot	'B'	Rectangular lean-to, rubble and slate with crow stepped flanks. 17th cent., remodelled second half 19th cent.	Yes	The doocot has theoretical views of the proposed project. The localised setting of the doocot is within the village of Hospitalfield. The surrounding buildings are expected to prevent long distance views of the development.
LB 5	21256	~0.8km	Hospitalfield Farm Building	'B'	Single-storey south front, rubble and slate, with Baronial centre piece. Mid-19th cent. and earlier.	Yes	The steading has theoretical views of the development. The localised setting of the steading is within the village of Hospitalfield. The surrounding buildings within the townscape are expected to prevent long distance views of the proposed turbine.
LB 6	21255	~0.9km	Hospitalfield - North Lodge	'B'	Two-storey gate house, Baronial, rubble and slate; depressed three-centre arch with oriel over, round corner tower and single-storey lodge. C.1860	Yes	The lodge has theoretical views of the project. The current setting of the lodge is upon the northern periphery of the village of Hospitalfield. The intervening townscape is expected to prevent long distance views in the direction of the proposed single turbine.

LB/SM/ GDL no.	HBNUM/ Index no.	Distance from turbine	Name	Listing & Description		Theoretical Visibility	Comments
LB 7	4575	~1.0km	Kelly Castle	'B'	Four-storey tower-house L-plan, single-storey ranges enclosing small entrance court. Rubble and slate. Mainly 16 th and 17 th cents., restored about 1870.	Yes	The castles localised setting is within mature woodlands upon the southern bank of the Elliot Water. The main façade of the castle is orientated to the west south-west, across the castles associated courtyard. The wider setting of the castle is within modern agricultural farm land.
LB 8	4576	~1.2km	Kelly Castle- Doocot	'B'	Large rectangular gabled, harl and slate tabled skews. May date 17 th cent. But has been partially reconstructed.	Yes	The localised setting of the doocot is within mature woodland in the Kelly Castle grounds. The current setting of the doocot restricts long distance views either to or from the feature.
LB 9	4597	~1.7km	Arbirlot Parish Kirk Manse	'B'	Large two-storey, rubble and slate. 1835. Columned porch in re-entrant angle probably comes from another building. Good carved stone, north side. Thomas Guthrie lived here.	Yes	The localised setting of the manse is on the southern edge of the village of Arbirlot. The features immediate location within the village creates a rural community setting. The predominant views from the houses within the conservation area are into the surrounding buildings. The wider setting of the village is within modern agricultural farmland.
LB 10	4598	~1.7km	Arbirlot Bridge Over Elliot Water	'B'	Large single stilted semi-circular arch, ashlar, voussoirs with relief carvings. 19 th cent. Picturesque.	Yes	The bridge falls within the project's ZTV. The bridge spans the tree-lined Elliot Water. The bridge has a currently functional setting that allows a single track road to pass over the river. The proposed single turbine is not expected to adversely impact upon the bridges current setting or the way in which it is understood within the landscape.
LB 11	4592	~1.7km	Arbirlot Parish Kirk	'B'	Small cruciform, gothic with spired belfry. Rubble and slate. 1832. Bell dated 1655. Additions 1886.	Yes	The parish kirk is at the heart of the village of Arbirlot, providing a village setting. The kirk has theoretical views of the development.
LB 12	4595	~1.7km	Former School House	'B'	Plain single-storey cottage, colour washed rubble and slate, with symmetrical projecting wings, classic, pediments and venetian windows, which appear to	Yes	The immediate setting of the school house is on the eastern periphery of the village of Arbirlot.

LB/SM/ GDL no.	HBNUM/ Index no.	Distance from turbine	Name	Listing & Description		Theoretical Visibility	Comments
					have been reconstructed from an earlier house. About 1830.		
LB 13	4593	~1.7km	Bridgeview	'B'	Plain single-storey cottages, rubble and slate. 19 th cent.	Yes	The current setting of the cottage is within the village of Arbirlot. The predominant views from the feature are into the surrounding village, there is the potential for the turbine to be visible in oblique views to the east.
LB 14	4594	~1.8km	Former Parish School	'B'	Small single-storey symmetrical with pedimented bay surmounted by belfry. White washed rubble and slate. About 1830. Now used as henhouse.	Yes	The current setting of the school is within the village of Arbirlot.
LB 15	4600	~1.8km	Denside House Doocot	'B'	Rectangular lean-to, rubble and corrugated iron. Inset stone (M.R.)P (17)47. Altered to toolshed.	Yes	The immediate setting of the doocot is on the western edge of the village of Arbirlot.
LB 16	4573	~1.7km	Millhill Mill	'B'	Two-storey mealmill, L-plan, rubble and slate, external wheel. Lintel dated 1719 and superscribed 1864. Detached bow-fronted kiln at higher level. Workings complete and in use up to ten years ago.	Yes	The current setting of the mill is upon the banks of the Elliot Water.
LB 17	21245	~1.9km	4&5 Gayfield	'B'	Two-storey classic double house, ashlar and slate with centre pedimented bay, pilastered, (antae), corners and doorpieces. C.1830. Later dormered attics	Yes	The immediate setting of the house is within the southern periphery of Arbroath. The locality of the house within the town of Arbroath characterises its urban setting. The current setting of the house is such that it is immediately adjacent to a modern road. The predominant views from the house are into the surrounding townscape.
LB 18	21240	~1.8km	Water Tower	'B'	Sham mediaeval, rusticated red sandstone walls with	Yes	The localised setting of the tower is within the Keptie conservation area. The listed buildings urban settings are expected to prevent long distance views in the direction of

LB/SM/ GDL no.	HBNUM/ Index no.	Distance from turbine	Name	Listing & Description		Theoretical Visibility	Comments
			Keptie Hill		towers and machicolated battlements. 1885. Wm. Gillespie Lamond, (of Friockheim), archt. Elevated site.		the proposed development.
LB 19	21239	~1.9km	Arbroath High School	'B'	Large two-storey U-plan Jacobean, rubble and slate; north front with projecting centre bay and end wings. C.1875. Carver and Symon, (of Arbroath), archts.	Yes	The localised setting of the school is within the Keptie conservation area. The listed buildings urban settings are expected to prevent long distance views in the direction of the proposed development.
LB 20	21237	~1.9km	St Margaret's Church	'B'	Aisled oblong with transepts and projecting porch, decorative Gothic, rubble and slate; south-east bell tower with crenellated and pinnacled parapet. 1877-79. Thomas S. Robertson, (of Dundee), archt.	Yes	The localised setting of the church is within the town of Arbroath. The urban setting of the church is such that the dominant views from the listed building are into the surrounding townscape. The surrounding buildings within the town of Arbroath are expected to prevent long distance views both to and from the church.
LB 21	21250	~2.1km	The Elms	'A'	Two-storey mansion house, French Gothic, rubble and slate with ashlar dressings; steep-pitched roof, arched porch and round corner tower. C.1869. Wm. Leiper, (of Glasgow), archt.	Yes	The localised setting of the house is within the town of Arbroath. The surrounding buildings within the town will prevent long distance views in the direction of the proposed development.
LB 22	21230	~2.2km	Ladyloan Bell Rock Lighthouse	'A'	1813. Classical and castellated group of twin lodges and signal tower. Painted stone. TOWER: engaged, 4-storey castellated tower rising from centre of piend-	Yes	The localised setting of the lighthouse is upon the southern periphery of Arbroath. The intervening buildings within the town are expected to screen views of the development at ground level. To the east the lighthouse has a more open setting with views out across the North Sea.

LB/SM/ GDL no.	HBNUM/ Index no.	Distance from turbine	Name	Listing & Description		Theoretical Visibility	Comments
					roofed, 2-storey, 3-bay house.		
LB 23	21141	~2.5km	Dens Road, Baltic Works	'A'	1852 power loom linen weaving factory, ashlar and squared rubble-built. Slate roofs, Windows multi-paned sash and case, mostly now blocked.1. 4-storey 13-bay triple-pedimented Palladian frontage, pedimented sections slightly advanced and defined by quoins. 3-bay gables with die finials (one missing).	Yes	The current localised setting of the warehouse is such that it is situated in the heart of Arbroath where the intervening buildings within the town are expected to prevent long distance views of the proposed development.
SM 20/ LB 24	21133	~2.7km	Arbroath Abbey- Regality Tower	'A'	Square keep, three-storey with vaulted floors and corbelled parapet; formed N.W. corner of Abbey precincts adjoining the regality courthouse. 13 th century.	Yes	The immediate setting of the Abbey and its associated buildings within the Abbey grounds. The current setting of the Abbey grounds is within the heart of Arbroath. The predominant views from the abbey itself are into the surrounding townscape.
SM 20/ LB 25	21132	~2.7km	Arbroath Abbey- pend	'A'	Fortified gatehouse, with remains of groined roof. Corbel course at upper floor level over archway: formerly defended by portcullis. 15 th century.	Yes	The immediate setting of the Abbey and its associated buildings within the Abbey grounds. The current setting of the Abbey grounds is within the heart of Arbroath. The predominant views from the abbey itself are into the surrounding townscape.
SM 20/ LB 26	21134	~2.7km	Arbroath Abbey- Abbot's House	'A'	Three-storey with groined roof to ground floor. Parts dating 13 th century. Best example of its kind remaining in Scotland and now preserved as a	Yes	The immediate setting of the Abbey and its associated buildings within the Abbey grounds. The current setting of the Abbey grounds is within the heart of Arbroath. The predominant views from the abbey itself are into the surrounding townscape.

LB/SM/ GDL no.	HBNUM/ Index no.	Distance from turbine	Name	Listing & Description	Theoretical Visibility	Comments
				museum.		
SM 20/ LB 27	21131	~2.7km	Arbroath Abbey- Conventual Building	'A' Two-storey remains of west range forming part of enclosure to Abbey precincts. 13 th century	Yes	The immediate setting of the Abbey and its associated buildings within the Abbey grounds. The current setting of the Abbey grounds is within the heart of Arbroath. The predominant views from the abbey itself are into the surrounding townscape.
SM 20/ LB 28	21130	~2.7km	Arbroath Abbey- Abbey Church and Precincts	'A' Red sandstone ruin. Cruciform plan with aisleless presbytery, transeptal chapels and twin towers with great western doorway. Royal foundation dedicated by William the Lion to St. Thomas of Canterbury in 1176. Assembly of Nation issued declaration of Arbroath here in 1320	Yes	The immediate setting of the Abbey and its associated buildings within the Abbey grounds. The current setting of the Abbey grounds is within the heart of Arbroath. The predominant views from the abbey itself are into the surrounding townscape.
LB 29	4770	~3.4km	St. Vigeans Parish Kirk	'A' Aisled oblong with west tower and polygonal apse as restored in 1871 by Sir R. Rowand Anderson, arch. Incorporates 12 th cent. Gables, 15 th cent. Tower and arcading and Celtic stones built into the fabric. Picturesque and elevated site.	No	The parish kirk falls outwith the proposed developments ZTV. The localised setting of the kirk is upon the banks of the Brothock Water, immediately adjacent to a railway line. The current localised setting of the kirk is not expected to be adversely impacted by the proposed development.
SM 1	6648	~1.1km	Peasiehill, souterrains	The monument comprises the remains of two souterrains of later prehistoric date represented by cropmarks visible in oblique aerial photographs.	Yes	This feature survives as cropmarks visible on oblique aerial photographs. The current setting of each the feature is within modern agricultural fields subject to intense agricultural practices.
SM 2	7072	~1.8km	Grahamston	The monument comprises two	Yes	This feature survives as cropmarks visible on oblique aerial photographs. The current

LB/SM/ GDL no.	HBNUM/ Index no.	Distance from turbine	Name	Listing & Description	Theoretical Visibility	Comments
			Cottages, souterrains	souterrains of later prehistoric date, visible as cropmarks on oblique aerial photographs.		setting of each the feature is within modern agricultural fields subject to intense agricultural practices.
SM 3	7071	~1.9km	Cotton of Balcathie, unenclosed settlement	The monument comprises an unenclosed settlement of prehistoric date, visible as a series of cropmarks on oblique aerial photographs.	Yes	This feature survives as cropmarks visible on oblique aerial photographs. The current setting of each the feature is within modern agricultural fields subject to intense agricultural practices.
SM 4	7068	~2.1km	Cotton of Balcathie, unenclosed settlement	The monument comprises an unenclosed settlement of prehistoric date, visible as a series of cropmarks on oblique aerial photographs.	Yes	This feature survives as cropmarks visible on oblique aerial photographs. The current setting of each the feature is within modern agricultural fields subject to intense agricultural practices.
SM 5	6622	~2.2km	Mains of Kelly, enclosures and souterrain	The monument comprises the remains of two enclosed settlements and a souterrain of prehistoric date represented by cropmarks visible on oblique aerial photographs.	Yes	This feature survives as cropmarks visible on oblique aerial photographs. The current setting of each the feature is within modern agricultural fields subject to intense agricultural practices.
SM 6	6623	~2.5km	Nether Kelly, ring ditch	The monument comprises the remains of a ring ditch house of prehistoric date represented by cropmarks visible on oblique aerial photographs.	Yes	This feature survives as cropmarks visible on oblique aerial photographs. The current setting of each the feature is within modern agricultural fields subject to intense agricultural practices.
SM 7	6624	~2.8km	Nether Kelly, unenclosed settlement	The monument comprises the remains of an unenclosed settlement of prehistoric date represented by cropmarks visible on oblique aerial photographs.	Yes	This feature survives as cropmarks visible on oblique aerial photographs. The current setting of each the feature is within modern agricultural fields subject to intense agricultural practices.
SM 8	6618	~4.2km	Hatton House, ring ditches	The monument comprises the remains of two ring ditch houses of prehistoric date represented by cropmarks visible on oblique aerial	Yes	This feature survives as cropmarks visible on oblique aerial photographs. The current setting of each the feature is within modern agricultural fields subject to intense agricultural practices.

LB/SM/ GDL no.	HBNUM/ Index no.	Distance from turbine	Name	Listing & Description	Theoretical Visibility	Comments
				photographs.		
SM 9	6617	~4.1km	Hatton Farm, unenclosed settlement	The monument comprises the remains of an unenclosed settlement of prehistoric date represented by cropmarks visible on oblique aerial photographs.	Yes	This feature survives as cropmarks visible on oblique aerial photographs. The current setting of each the feature is within modern agricultural fields subject to intense agricultural practices.
SM 10	6616	~4.4km	East Scryne, souterrain	The monument comprises the remains of a souterrain of later prehistoric date represented by cropmarks visible on oblique aerial photographs.	Yes	This feature survives as cropmarks visible on oblique aerial photographs. The current setting of each the feature is within modern agricultural fields subject to intense agricultural practices.
SM 11	6615	~4.7km	East Scryne Hall, rectangular enclosure	The monument comprises the remains of a sub-rectangular enclosed settlement of prehistoric date represented by cropmarks visible on oblique aerial photographs.	Yes	This feature survives as cropmarks visible on oblique aerial photographs. The current setting of each the feature is within modern agricultural fields subject to intense agricultural practices.
SM 12	6621	~2.4km	Mains of Kelly, enclosure	The monument comprises the remains of a sub-rectangular enclosed settlement of prehistoric date represented by cropmarks visible on oblique aerial photographs.	Yes	This feature survives as cropmarks visible on oblique aerial photographs. The current setting of each the feature is within modern agricultural fields subject to intense agricultural practices.
SM 13	6619	~2.7km	Mains of Kelly, souterrain	The monument comprises the remains of a souterrain of later prehistoric date represented by cropmarks visible on aerial photographs.	Yes	This feature survives as cropmarks visible on oblique aerial photographs. The current setting of each the feature is within modern agricultural fields subject to intense agricultural practices.
SM 14	6619	~2.9km	Mains of Kelly, souterrain	The monument comprises the remains of a souterrain of later prehistoric date represented by cropmarks visible on aerial photographs.	Yes	This feature survives as cropmarks visible on oblique aerial photographs. The current setting of each the feature is within modern agricultural fields subject to intense agricultural practices.

LB/SM/ GDL no.	HBNUM/ Index no.	Distance from turbine	Name	Listing & Description	Theoretical Visibility	Comments
SM 15	6625	~3.3km	Kellyfield, palisaded enclosure	The monument comprises the remains of a palisaded enclosure of prehistoric date represented by cropmarks visible on oblique aerial photographs.	Yes	This feature survives as cropmarks visible on oblique aerial photographs. The current setting of each the feature is within modern agricultural fields subject to intense agricultural practices.
SM 16	6649	~4.0km	David's Hill, enclosure	The monument comprises the remains of an enclosed settlement of prehistoric date represented by cropmarks visible on oblique aerial photographs.	No	The current setting of the SM is within mature woodland that will prevent long distance views either to or from the feature.
SM 17	90272	~3.4km	St Vigean's Museum, symbol stones	Cottages now used as museum, containing a large and most important collection of sculptured stones formerly re-used within the church buildings or displayed within the church. The stones were moved and restored in 1960 by the Ministry of Works.	No	The current localised settings of the stones are within the St Vigean's Museum. The current setting of the stones is not expected to be adversely impacted by the proposed single turbine.
SM 18	6641	~3.3km	Souterrain, Eastern Cemetery, Arbroath	The monument is part of a stone-lined souterrain of the later Iron Age, in use probably between around 250 BC and AD 400. It was discovered in 1932 and partially excavated, but was filled in during the 1990s.	Yes	The localised setting of the souterrain is within a cemetery on the northern periphery of Arbroath. The buildings within the intervening townscape are predicted to prevent long distance views of the proposed development.
SM 19	2874	~4.9km	Dickmount Law, cairn	A large, flat-topped cairn, situated on the top of Dickmount Law and surrounded at base by a modern retaining wall. It measures about 30m overall and is 3m high, the flat top being 12m in diameter and showing signs of excavation.	Yes	The localised setting of the cairn is upon a modern field boundary. The intervening townscape of Arbroath is expected to prevent long distance views in the direction of the single turbine.

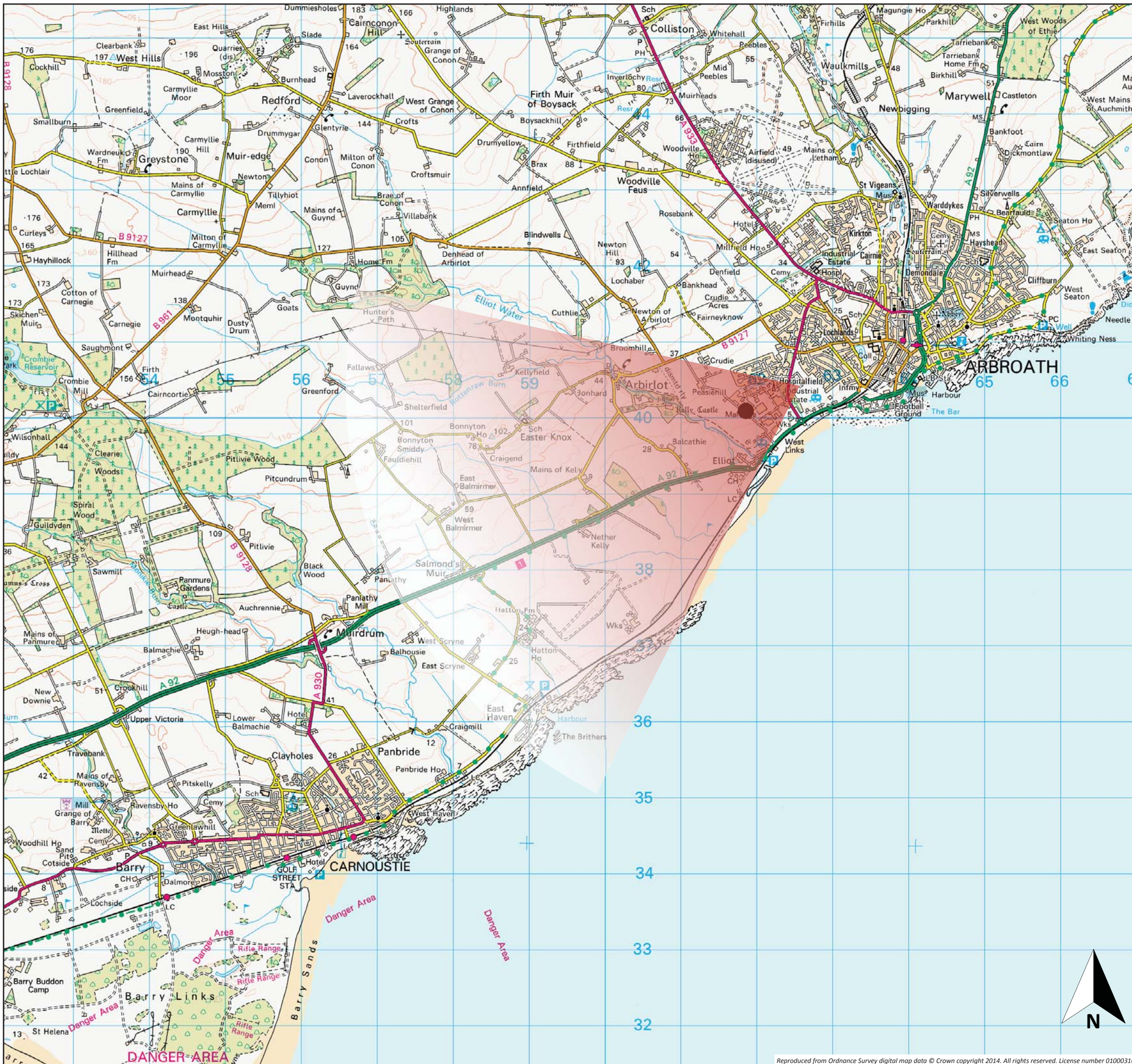
LB/SM/ GDL no.	HBNUM/ Index no.	Distance from turbine	Name	Listing & Description	Theoretical Visibility	Comments
SM 20/ LB 24- 28	90018	~2.7km	Arbroath Abbey and associated buildings	The monument comprises the remains of Arbroath Abbey and associated buildings. It is in the care of the Secretary of State for Scotland and is being re-scheduled to clarify the extent of the protected area.	Yes	The current setting of the abbey is with the heart of the town of Arbroath. The immediate setting of the abbey is encompassed by the surrounding buildings within Arbroath. The localised setting of the historic feature is such that the surrounding buildings will prevent long distance views at ground level.
SM 21	145	~1.8km	Arbirlot, carved stone	The monument is a medieval carved stone, likely to date to between AD 850 and 1600. It is an undressed block of whinstone set vertically in the ground and measures about 1.70m high by 0.85m wide.	Yes	The current localised setting of the SM is within the village of Arbirlot. The surrounding houses within the town are expected to prevent long distance views both to and from the craved stone.
CA 1	N/A	~1.6km	Arbroath Keptie Pond	The conservation area covers the Keptie Pond area in Arbroath. The conservation area is bordered by roads to the north and east and the by the surrounding town to the west. The conservation area is located in the heart of Arbroath.	Yes	The full extent of the conservation area has theoretical views of the proposed development. The conservation area spans the Kepie Pond area within the town of Arbroath. The Kepie Pond lies in the north-western area of the conservation area. The conservation area is bordered by roads to the north and east and by the adjacent built up area within Arbroath to the west.
CA 2	N/A	~1.6km	Arbirlot	The conservation area covers the entirety of the village of Arbirlot. The tree-lined Elliot Water runs through the heart of the conservation area.	Yes	The Arbirlot conservation area is a small village upon the banks of the Elliot Water. The conservation area spans the entirety of the village of Arbirlot. The design of the conservation area is such that the predominant views from the feature are into the conservation area itself. The wider setting of the conservation area is within modern agricultural land ~2km to the west of Arbroath.

LB/SM/ GDL no.	HBNUM/ Index no.	Distance from turbine	Name	Listing & Description	Theoretical Visibility	Comments
GDL 1	N/A	~4.3km	The Guynd	An attractive 19th century parkland and woodland landscape providing the setting for a classical mansion house and other interesting architectural features. Earlier estate plans by James Abercrombie (1775) and Thomas White (1799) exist but were not implemented for more than 100 years. Date of Inclusion: 1987. The gardens have been categorised as 'High' for Architectural and Nature Conservation.	Yes	The gardens are bordered by mature woodlands to the; east, south and west. The gardens mature woodland borders restrict long distance views from the GDL itself. The GDLs associated 'B' listed; 19 th century mansion house is located in the western section of the gardens. The GDL is bound by the B9127 to the north. Modern agricultural fields lie at the heart of the gardens. The Elliot Water flows through the southern periphery of the gardens.

BAIRDS MALT WIND TURBINE



Appendix 4.2 – Cultural Heritage Graphics

December 2014



Project Name: **Bairds Malt Wind Turbine**
 Document Title: **VP01 - Hospital Field (Tower)**
 Scale: **1:50,000 @ A3**

Key:

-  Proposed Turbine Location
-  76° Field of View

Viewpoint Information

Viewpoint Location: **E362569 N740438**
 Viewpoint Elevation: **38m (A.O.D)**
 View Direction: **244°**
 Distance to Turbine: **802m**

Visibility: **1 Nacelle**

Camera Type: **Nikon D3000**
 Focal Length: **35mm**
 Effective Focal Length: **53.34mm**
 Date Taken: **21/01/14**
 Time Taken: **10:00**
 Height above elevation: **1.5m**

Please note for a 76° field of view, a viewing distance of 300mm is recommended.

Client: **Bairds Malt Single turbine Ltd**
 Drawing by: **Green Cat Renewables Ltd**

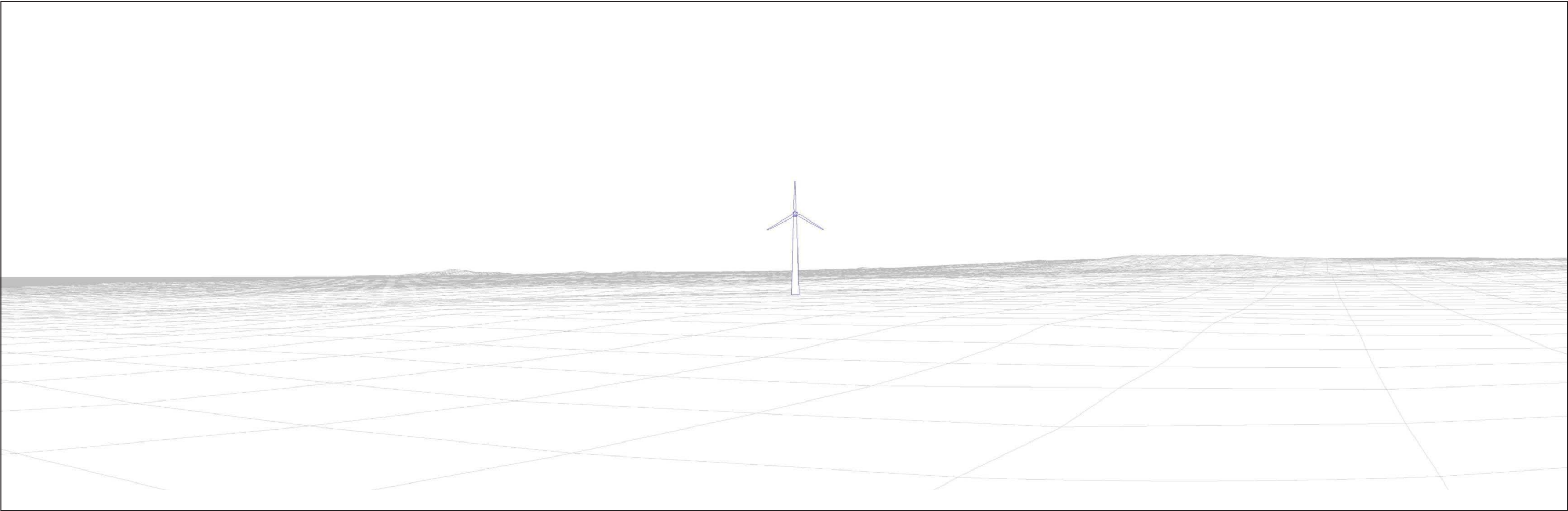
Document Number: **C0621-163/Fig 9.1**
 Version: **1.0**
 Author: **BC**
 Checked by: **RS**
 Approved By: **GM**
 Date: **22/01/14**



VP01 HOSPITAL FIELD (TOWER) - PHOTOGRAPH OF EXISTING VIEW



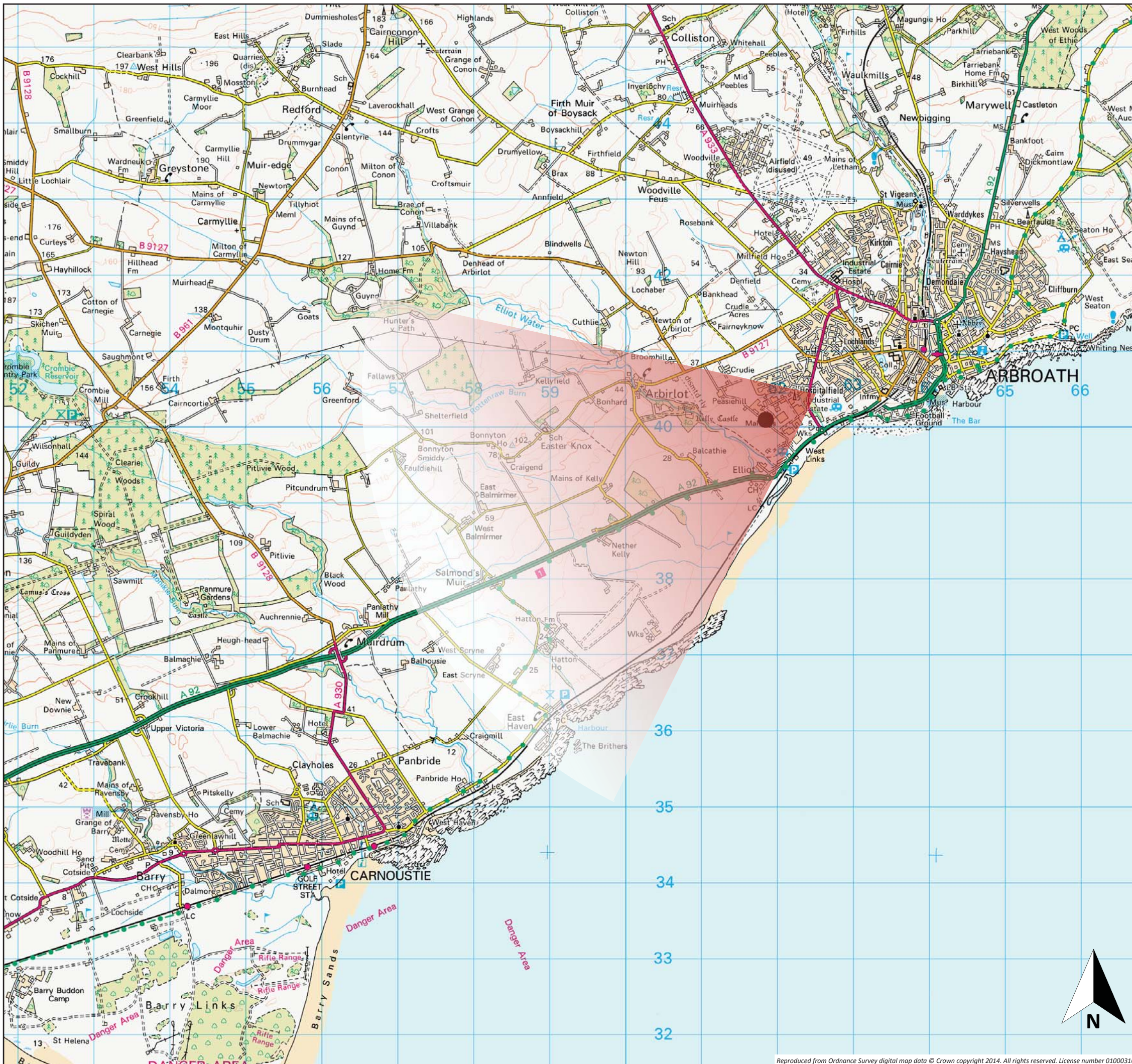
VP01 HOSPITAL FIELD (TOWER) - WIRELINE DRAWING



VP01 HOSPITAL FIELD (TOWER) - PHOTOMONTAGE OF PROPOSAL



**76 VIEWING ANGLE
300MM VIEWING DISTANCE**





Project Name: **Bairds Malt Wind Turbine**
 Document Title: **VP02 - Hospital Field (Grounds)**
 Scale: **1:50,000 @ A3**

Key:

-  Proposed Turbine Location
-  76° Field of View

Viewpoint Information

Viewpoint Location: **E362518 N740412**
 Viewpoint Elevation: **15m (A.O.D)**
 View Direction: **234°**
 Distance to Turbine: **745m**

Visibility: **1 Nacelle**

Camera Type: **Nikon D3000**
 Focal Length: **35mm**
 Effective Focal Length: **53.34mm**
 Date Taken: **21/01/14**
 Time Taken: **10:45**
 Height above elevation: **1.5m**

Please note for a 76° field of view, a viewing distance of 300mm is recommended.

Client: **Bairds Malt Single turbine Ltd**
 Drawing by: **Green Cat Renewables Ltd**

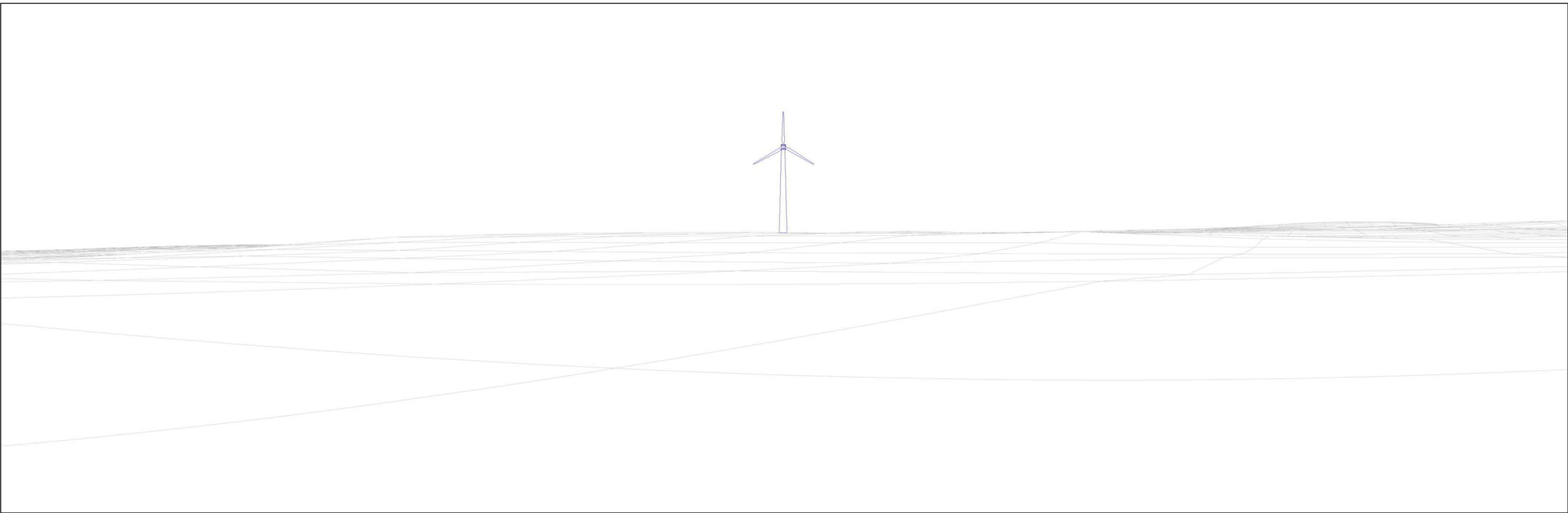
Document Number: **C0621-163/Fig 9.2**
 Version: **1.0**
 Author: **BC**
 Checked by: **RS**
 Approved By: **GM**
 Date: **22/01/14**



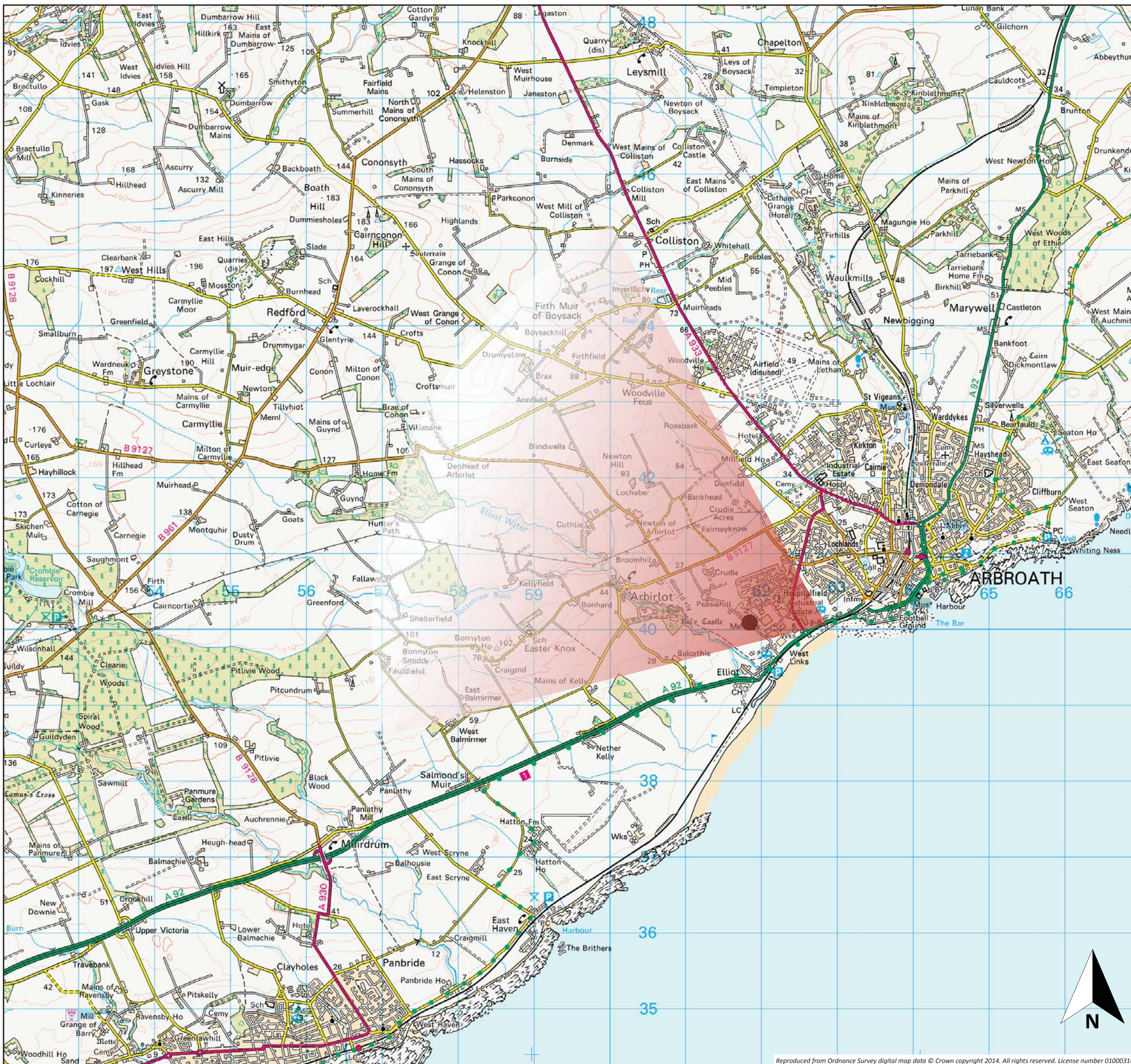
VP02 HOSPITAL FIELD (GROUNDS) - PHOTOGRAPH OF EXISTING VIEW



VP02 HOSPITAL FIELD (GROUNDS) - WIRELINE DRAWING








Project Name: **Bairds Malt Wind Turbine**

Document Title: **VP03 - Hospital Field (A92)**

Scale: **1:50,000 @ A3**

Key:
 Proposed Turbine Location

 76° Field of View

Viewpoint Information

Viewpoint Location: **E362851 N740071**

Viewpoint Elevation: **3m (A.O.D)**

View Direction: **338°**

Distance to Turbine: **1.0km**

Visibility: **1 Nacelle**

Camera Type: **Nikon D3000**

Focal Length: **35mm**

Effective Focal Length: **53.34mm**

Date Taken: **21/01/14**

Time Taken: **12:05**

Height above elevation: **1.5m**

Please note for a 76° field of view, a viewing distance of 300mm is recommended.

Client: **Bairds Malt Single turbine Ltd**

Drawing by: **Green Cat Renewables Ltd**

Document Number: **C0621-163/Fig 9.3**

Version: **1.0**

Author: **BC**

Checked by: **RS**

Approved By: **GM**

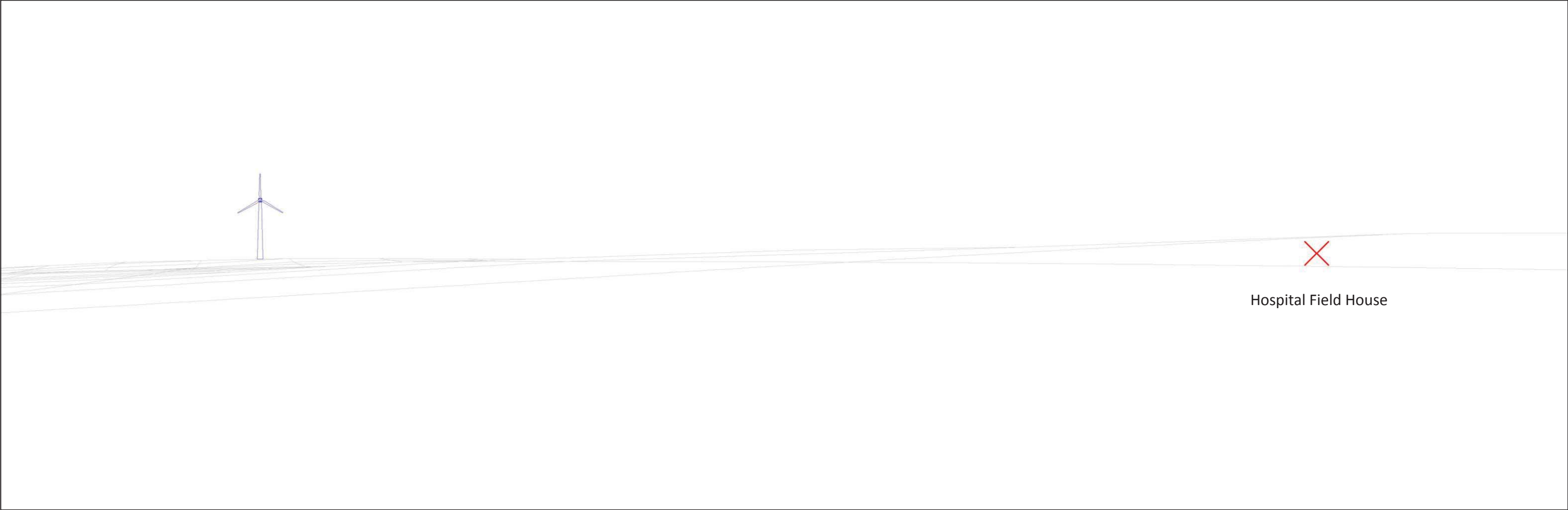
Date: **22/01/14**



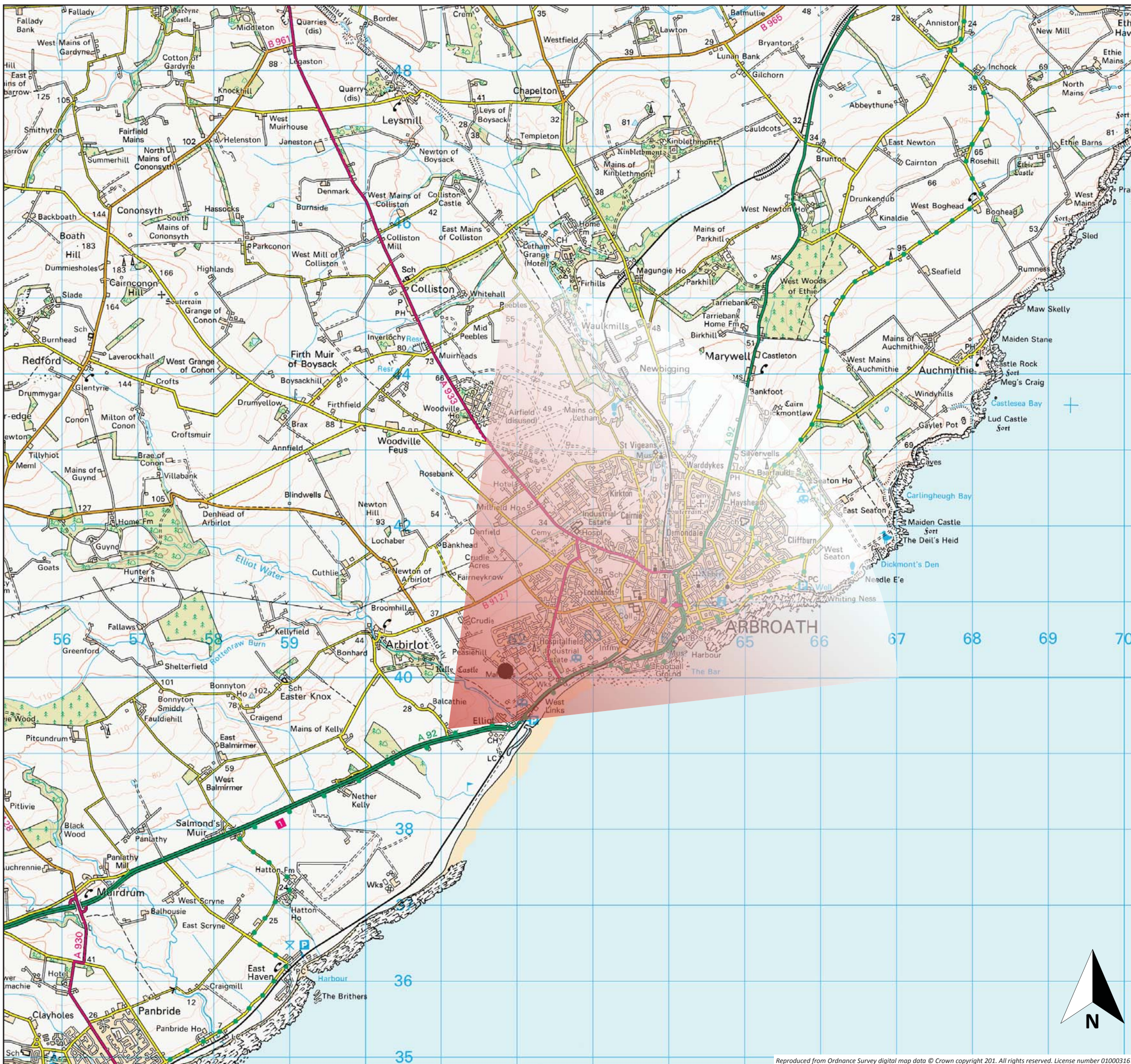
VP03 HOSPITAL FIELD (A92) - PHOTOGRAPH OF EXISTING VIEW



VP03 HOSPITAL FIELD (A92) - WIRELINE DRAWING









Project Name: **Bairds Malt Wind Turbine**
 Document Title: **VP04 - Hospital Field (Arbirlot Road)**
 Scale: **1:50,000 @ A3**

Key:

-  Proposed Turbine Location
-  76° Field of View

Viewpoint Information

Viewpoint Location: **E361092 N739292**
 Viewpoint Elevation: **19m (A.O.D)**
 View Direction: **35°**
 Distance to Turbine: **1.1m**

Visibility: **1 Nacelle**

Camera Type: **D3000**
 Focal Length: **35mm**
 Effective Focal Length: **53.34mm**
 Date Taken: **21/01/14**
 Time Taken: **12:45**
 Height above elevation: **1.5m**

Please note for a 76° field of view, a viewing distance of 300mm is recommended.

Client: **Bairds Malt Single turbine Ltd**
 Drawing by: **Green Cat Renewables Ltd**

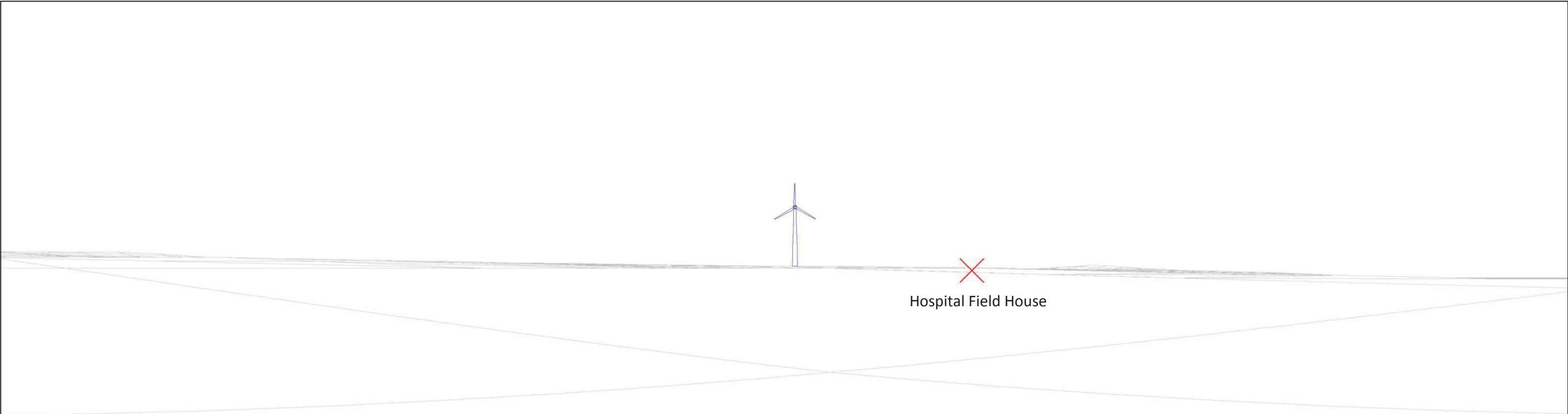
Document Number: **C0621-163/Fig 9.4**
 Version: **1.0**
 Author: **BC**
 Checked by: **RS**
 Approved By: **GM**
 Date: **22/01/14**



VP04 HOSPITAL FIELD (ARBIRLOT ROAD) - PHOTOGRAPH OF EXISTING VIEW



VP04 HOSPITAL FIELD (ARBIRLOT ROAD) - WIRELINE DRAWING



VP04 HOSPITAL FIELD (ARBIRLOT ROAD) - PHOTOMONTAGE OF PROPOSAL

76 VIEWING ANGLE
300MM VIEWING DISTANCE



BAIRDS MALT WIND TURBINE

Appendix 5 – Shadow Flicker Screening Map

December 2014



Project Name: **Baird Malt Wind Turbine**
 Document Title: **Shadow Flicker Assessment - Area of Influence and Assessed Properties**
 Scale: **Not to Scale**

- Key:
- Proposed Wind Turbine Location
 - 10RD (440m) from Wind Turbine
 - Area of Theoretical Shadow Flicker > 30hrs per annum*
 - Assessed Properties
 - Industrial
 - Commercial within Industrial
 - Facade with windows potentially affected by Shadow Flicker

1. Peasiehill Farm Cottages	Residential
2. PAF 1	Residential
3. PAF 2	Residential
4. PAF 3	Residential
5. PAF 4	Residential
6. SRCL	Industrial
7. Tayside Door Factory	Industrial
8. Elliott Buisness Park	Industrial/Commercial
9. Smithy	Industrial
10. Mackays	Industrial
11. NEWDWES Self Storage	Industrial
12. Halliburton 1	Industrial
13. Halliburton 2	Industrial
14. Halliburton 3	Industrial/Commercial
15. Energy Alloys	Industrial/Commercial
16. Masstock	Industrial/Commercial
17. Buildbase	Industrial/Commercial
18. Halliburton 4	Industrial/Commercial
19. PMP Interplex	Industrial/Commercial

* This is indicative only and will vary slightly depending on the number of windows, orientation etc.

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Client: **Bairds Malt Single Turbine Ltd**
 Drawing by: **Green Cat Renewables Ltd**

Document Number: **C0621-163/**
 Version: **1.0**
 Author: **SS**
 Checked by: **GM**
 Approved By: **GM**
 Date: **17/02/2014**



BAIRDS MALT WIND TURBINE

Appendix 6 – Socio-Economic Report

December 2014



Socio-Economic Impact Assessment of Proposed Renewables Development - Bairds Malt, Angus

Final Report for Bairds Malt and the Kilmac
Group

July 2014

EKOS Limited, St. George's Studios, 93-97 St. George's Road, Glasgow, G3 6JA
Reg 145099

Telephone: 0141 353 1994

Web: www.ekos-consultants.co.uk

Direct enquiries regarding this report should be submitted to:

Chris Kelly, Senior Consultant, EKOS

Email: chris.kelly@ekos.co.uk

Tel: 0141 353 8316

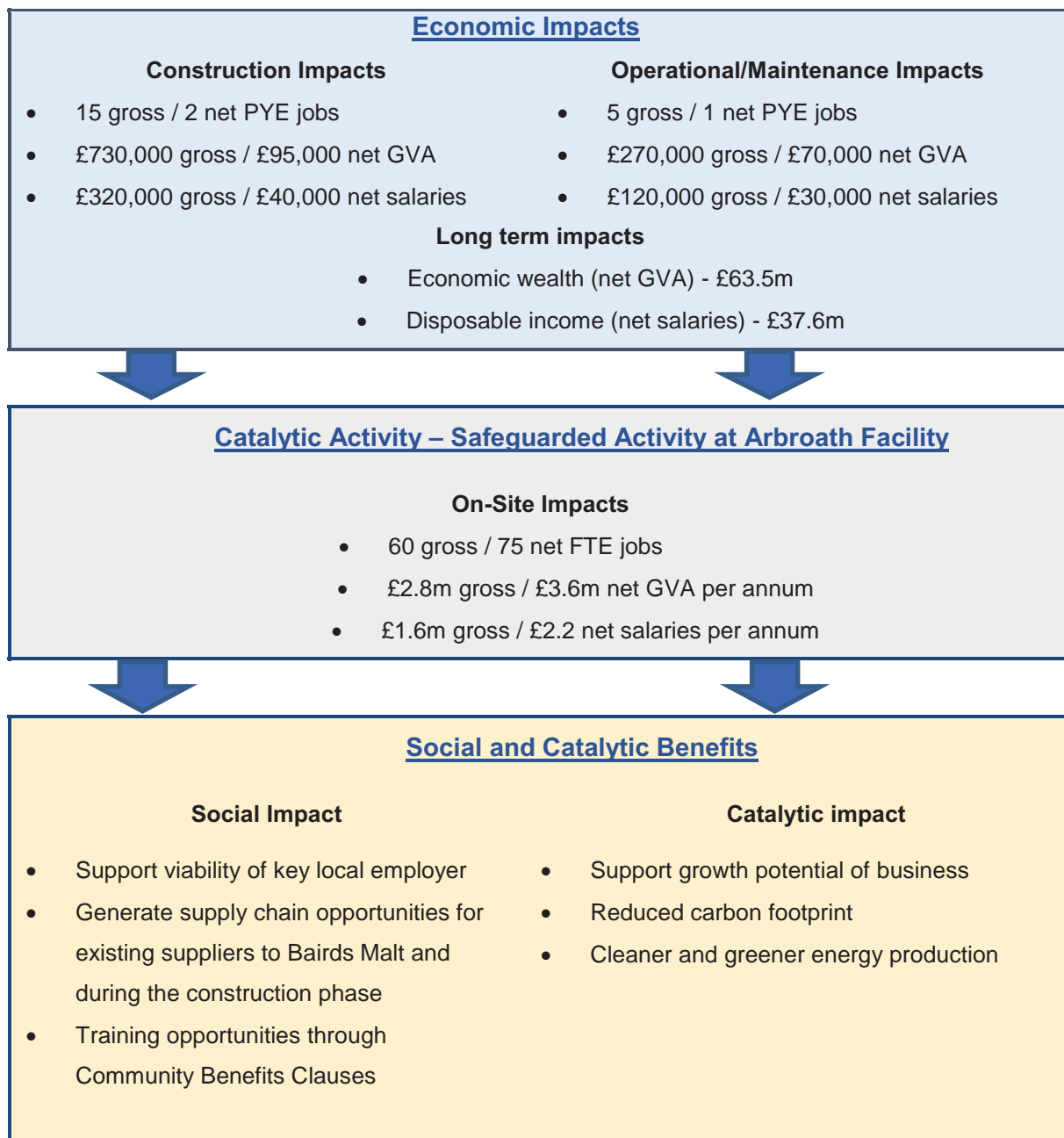
 As part of our green office policy all EKOS reports are printed double sided on 100% sustainable paper

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3. Economic Impacts and Benefits	8
4. Social, Catalytic and Environmental Impacts	15
Technical Appendix	21

Executive Summary

This Executive Summary presents the key economic, social and catalytic impacts predicted to be generated through the proposed wind turbine development at the Bairds Malt facility, Arbroath. All impacts are reported at the Angus Council level.



1. Introduction

The Kilmac Group has commissioned EKOS Ltd to undertake an independent assessment that considers the key economic, social and catalytic impacts predicted to result from the proposed renewables project at, the Bairds Malt facility in Arbroath, Angus.

The development proposal is for a single turbine with a hub height of 55m high (blade height 77m) which will provide a sustainable and more cost-efficient energy source for Bairds Malt. The proposed development is estimated to save around one quarter (23%) of the company's annual £3.5m energy costs¹.

Bairds Malt

Bairds Malt was formed in 1999 as a merger of Murray Firth Maltings and Hugh Bairds and provides malting products to the brewing and distillation sector across the world. However, the plant in Arbroath was originally opened in 1970 and has been a source of local employment for over 40 years.

The Arbroath facility is the company's Scottish hub and employs people across a range of areas including manufacturing, finance, administration and laboratory work.

The proposed location for the turbine is within the existing Bairds Malt site and it would sit alongside the existing Malting infrastructure.

Project Details

The key details of the project are outlined below:

- anticipated output generation of 2.3GWh per annum – equivalent to supplying 530 homes (based on the turbine operating at 29% capacity);
- Construction phase:
 - Timescales: 2017 (five week construction/installation period).
 - Total costs - £1.6 m;
- Operational phase:
 - Timescales: 2017 – 2042.

¹ Information provided by Bairds Malt/the Kilmac Group.

- Total costs (ongoing operation and maintenance) - £0.6m, this represents 1.5% of capital costs on an annual basis; and
- Decommissioning phase:
Timescales: 2042 – 2043.

The assessment is based on information and data available as public records, as well as that supplied by the development team. It provides our estimate of the likely economic and social benefits generated through the proposed development. It does not comment on the need for, or business case for the project which has been developed elsewhere.

The remainder of the report is structured as follows:

- [Section 2](#): Baseline and Policy Review;
- [Section 3](#): Economic Impact;
- [Section 4](#): [Social](#), Catalytic and Environmental Impact;
- [Appendix A](#): Logic Model; and
- Technical Appendix.

2. Economic Baseline and Policy Review

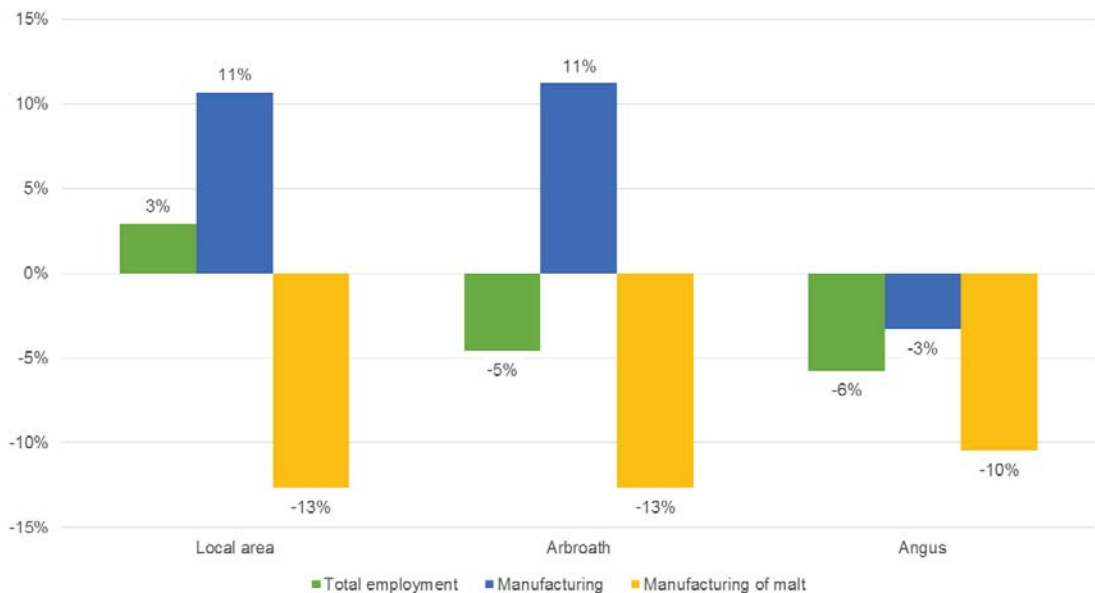
2.1 Economic Baseline

As of 2014, Bairds Malt had 207 employees in the UK, with over one quarter (57 employees, 28% of employment) based at the Arbroath plant.

In 2012, employment in the manufacturing sector across Arbroath stood at 1,800 employees (representing 19% of total employment) – the 57 on-site Bairds Malt employees therefore account for just over 3% of employment within this key sector.

Outside the public sector, manufacturing remains the largest employer across Angus – comprising 15% of all employment. That being said, recent data shows that this key sector has suffered losses across the employment base over the last few years and experienced a decline of -3%, compared with a -6% decline within the employment base more generally., see [Figure 2.1](#).

Figure 2.1: Changes in Key Sector Employment (2009 to 2012)



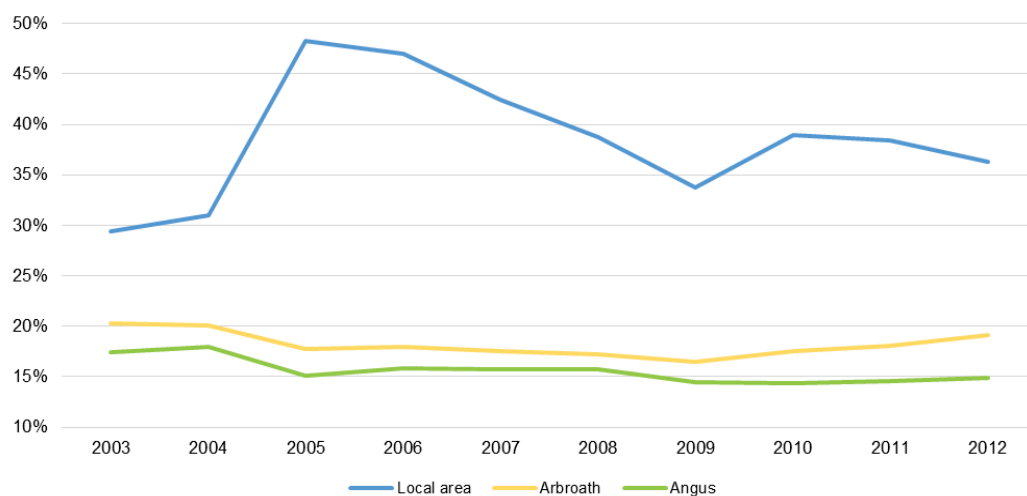
Source: BRES

It should also be noted that there has been a disproportionate decrease in employment in manufacturing of malt across all the comparator areas.

Like many areas of manufacturing, this appears to be a very price sensitive sub-sector and fluctuations in the market can have a significant impact on activity, for example cheaper freight/haulages costs and tax breaks within competing European countries.

The proposed development would help support the sustainability of a well-established manufacturing company that has been operating in the local area for 40+ years and accounts for a notable proportion of the manufacturing sector, see [Figure 2.2](#).

Figure 2.2: Change in manufacturing share of employment (2003 – 2012)



Source: ABI/BRES

Further investigation of the data highlights the reliance the immediate local area² has on the manufacturing sector – in 2005 the sector accounted for almost half the jobs in the local area (48%). Over the years, however, the reliance on the manufacturing sector as a source of employment (across all three areas) has decreased as jobs have been lost.

Wider Businesses Supported

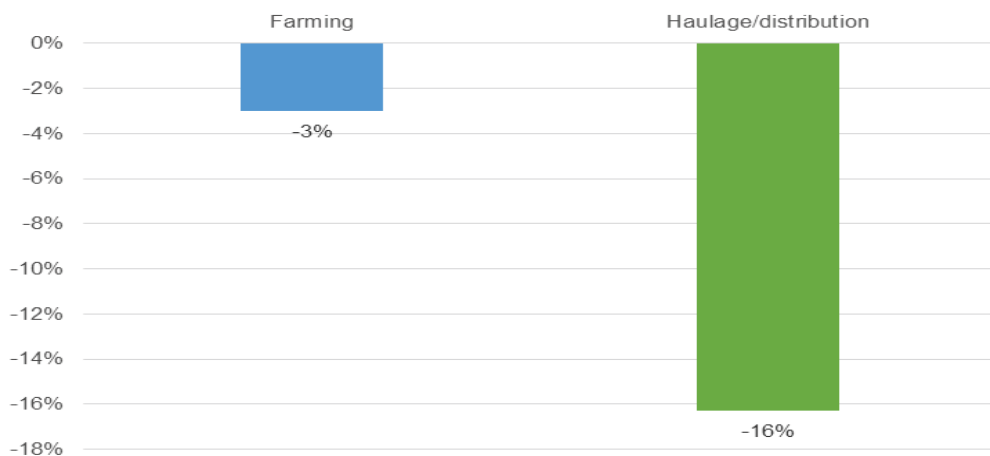
The Bairds Malt facility not only supports local jobs directly, but helps support and sustain other local businesses through supply chain contracts and linkages. In particular the farming of grain crops and seeds, haulage and distribution, and suppliers of agrochemicals.

² Defined as the Census Area Statistic (CAS) 2003 ward, Arbirlot and Hospitalfield.

Bairds Malt has live farm accounts with c. 1,000 farms across the UK - 230 of these farm accounts are within Angus. In addition, they regularly work with eight haulage companies for supply and distribution as well as sub-contracting other local engineering services for plant and machine maintenance, etc.

Through these wider supply chain activities it is apparent that Bairds Malt is very important for supporting and sustaining a number of other locally based businesses - particularly in sectors such as farming/agriculture, and transport and storage, where employment has experienced a decline, see [Figure 2.3](#).

Figure 2.3: Change in Angus Based Employment across Supply Chain Sectors (2009 – 2012)



Source: ABI/BRES

Across Angus, employment in both the farming/agriculture and haulage/distribution sectors have decreased in recent years; (-3%) and (-16%) respectively for the period 2009-2012.

Overview

From a summary review of secondary data, it is apparent that Angus is dependent on a few key sectors – one of which is manufacturing. The continued operation of the Bairds Malt facility will ensure the safeguarding of local jobs directly, but will also help support a number of wider supply chain businesses.

The distilling sector in Scotland is forecast to grow at 5% per annum³, with the Whisky sector in particular a very high growth and profitable sector.

However, there is considerable competition with non-Scottish based companies looking to enter these markets, particularly through the supply chain. Tax breaks and reduced haulage/transport/distribution costs within competitor countries in Europe means that it is therefore important that Scottish based companies can remain competitive on price within other areas of their business.

Therefore, efficiency savings in relation to utilities and energy costs (overheads) is one of a few key areas that will help Scottish businesses remain competitive – the turbine is anticipated to meet 23% of Bairds Malt’s energy requirements, equivalent to savings of c. £0.8m per annum.

2.2 Policy Review

The proposal for a wind turbine development at the Bairds Malt site has a strong strategic fit with key national and local policies across a number of key policy themes, see [Table 2.1](#) over.

³ <http://www.farmersguardian.com/home/arable/increasing-demand-for-malting-barley-as-distilling-sector-expansion-continues/62493.article>

Table 2.1: Fit and Contribution towards Policy

Routemap for Renewable Energy – Scottish Government 2011	
• increased target to an output equivalent of 100% of Scotland's electricity demand to be generated through renewables	✓
• need for 'rapid expansion' of renewable electricity across Scotland	✓
• securing economic benefits which will underpin national and local economic recovery and continued performance	✓
Strategic Development Plan 2012 – 2032 – Tayplan 2012	
• support the switch to a low carbon and zero waste economy by providing for appropriate infrastructure and improvements in our resilience to climate change and other potential risks.	✓
• support an advanced, thriving and diverse economy occupying a competitive position within European and world markets.	✓
• reduce resource consumption through provision of energy management infrastructure...[and] contribute towards greater regional energy self-sufficiency	✓
• promote and enhance places and landscapes as economic drivers and tourist destinations.	✓
Angus Local Development Plan – Angus Council 2012	
• support the region in becoming 'more sustainable, competitive and vibrant, without creating an unacceptable burden on the planet'.	✓
• support all types of renewable energy development in the area	✓
• reduction of greenhouse gas emissions, through the installation of low and zero carbon generating technologies	✓
Angus Community Plan and SOA – Angus Council 2013	
• supporting enterprise and infrastructure in key sectors including tourism & hospitality, and energies	✓
• develop a strong business base within the sustainable energies and tourism sectors over the next 10 years	✓

3. Economic Impacts and Benefits

The economic impacts are reported as jobs (Person Year Equivalent – PYE and Full Time Equivalent – FTE), Gross Value Added (GVA) and salaries, and have been calculated using a bespoke appraisal model and based on HM Treasury ‘Green Book’ guidance. Impacts are reported at the local (Arbroath), regional (Angus) and national (Scotland) level. A full breakdown of the Socio-Economic Impact Assessment (SEIA), including the additionality factors and assumptions used are contained within the [Technical Appendix](#).

Our assessment takes account of a range of economic impacts:

- [construction impacts](#) – captures the one-off impacts associated with the construction of the wind turbine;
- [operational/maintenance impacts](#) – captures the new operational/maintenance jobs that are predicted to be generated. This could include, for example, turbine service works, and insurance costs, etc;
- [safeguarded on-site impacts](#) – captures the activity that will be safeguarded at Bairds Malt as a result of making the business more sustainable in the long term; and
- [cumulative impacts](#) – captures the net discounted impacts of the proposed turbine development over a 25 year appraisal period – the serviceable life expectancy of the turbine.

In addition, there will be economic activity and impacts associated with the decommissioning of the turbine after its serviceable lifetime (25 years). However, given the time lag for these impacts to occur and other unknown variables, we have excluded these potential impacts from our assessment.

Technical Note

Throughout this report a number of technical economic terms are used:

- [gross jobs](#): the direct jobs accommodated on-site at the proposed development. The gross operational on-site jobs and the salary costs have been provided by Bairds Malt. However, the economic output associated with these jobs (GVA) has been taken as the sectoral average from official published data;

- net jobs – the out-turn of the gross jobs taking account of:
 - the impact the development is estimated to have on other businesses and the labour market (displacement)
 - the proportion of impacts that will benefit those outwith the defined spatial areas (leakage)
 - the positive spin off benefits generated through income and supplier multiplier effects;
- PYEs – the construction and on-site (operational/maintenance) jobs are based on Person Year Equivalents (PYE). This method allows the number of people on-site over the 25 year lifetime of the project (which will vary over the period between full-time, part-time, permanent, temporary and contract) to be estimated as an annual equivalent post. Please note, these PYE impacts are one-off;
- FTEs - jobs or posts where the working hours are a minimum of 37 hours a week and last for a period of ten years;
- Gross Value Added – GVA is a measure of the value of goods and services produced before allowing for depreciation or capital consumption. GVA measures the income generated by businesses after the subtraction of input costs but before costs such as wages and capital investment. GVA is the Government's preferred method for measuring economic performance; and
- net cumulative discounted impacts – the total quantified value of the net additional GVA impact over the 25-year project lifetime taking account of the date at which the development will be completed and occupied, and the time value of money i.e. £1 today is worth more than £1 next year. We have used the HM Treasury Social Time Preference Rate (3.5%) to discount the estimated impacts.

Disclaimer Note

Please see Technical Appendix.

3.1 Gross Economic Impacts and Benefits

This section considers the gross economics and impacts associated with the proposed project. Please note that gross impacts are the same across different geographic levels.

3.1.1 Construction Phase

The economic impacts delivered during the construction phase are based on the expenditure profile provided by the Kilmac Group. The total project costs are estimated at £1.6m.

Using a bespoke economic model and industry sector co-efficients to calculate the impact of the capital expenditure, we estimate the turbine development is likely to generate the following gross construction impacts⁴:

- 15 PYE jobs;
- £320,000 in salaries; and
- £725,000 GVA.

Please note that the construction impacts are one-off and will be generated during the estimated 5 weeks construction period.

3.1.2 Operational and Maintenance Phase

During the lifetime of the turbine there will be additional annual expenditure to support the operation and maintenance, for example upgrades to machine parts, and servicing. The total cost of this is estimated at 1.5% per annum of the total capital costs⁵.

$\text{£1.6m} * 1.5\% = \text{£24,000 per annum or £0.6m (unadjusted costs) over the lifetime of the turbine.}$

⁴ Note: Gross impacts are assessed based on the development costs and breakdown outlined in the Technical appendix and are the same at different spatial geographies. Jobs rounded to the nearest 5 and salaries and GVA to the nearest £5,000.

⁵ Please note this is an estimate based on information from the European Wind Energy Association and the Kilmac Group.

The gross economic impacts that are likely to be generated through the operational and maintenance activities are reported below and are new to the economy⁶.

- 5 PYE jobs;
- £120,000 in salaries; and
- £270,000 in GVA.

3.1.3 Safeguarded On-Site Impacts

As highlighted above, the installation of the wind turbine will reduce energy costs by around one quarter (23%), equivalent to c. £0.9m per annum. As the malting facility is a 24/7 operation the overheads costs are significant and an increase in energy prices could have a significant impact. Given the significant power/energy needs of the businesses, any electricity generated through the turbine will be used on-site and not sold back to the grid for profit.

The proposed turbine project could therefore have a significant beneficial impact on enhancing the commercial/financial viability and sustainability of the business over the longer term.

Table 3.1 identifies the jobs that the project will help safeguard.

Table 3.1: Gross Safeguarded On-Site Impacts

	Safeguarded Impacts
FTE jobs	55
Salaries per annum	£1.6m
GVA per annum	£2.8m

3.2 Net Economic Impacts and Benefits

In order to undertake a robust assessment of the potential new activity generated through the proposed turbine project, the gross impacts cannot be considered in isolation and must take account of a range of other factors – displacement, leakage and multiplier effects (as detailed in the **Technical Appendix**).

Please note that gross and net impacts are not cumulative, but that net impacts are the outturn of the gross impacts after accounting for additionality factors.

3.2.1 Construction Phase

The turbines will be sourced and manufactured from outwith Scotland, however, there will be a number of opportunities for Scottish and Angus based suppliers and sub-contractors, for example site preparation, civil engineering works, renting of equipment/machinery etc.

Further, the Kilmac Group have identified that, where possible they will work with local suppliers to ensure economic activity is retained within the local area.

The net construction impacts are reported in **Table 3.2**.

Table 3.2: Net Construction Impacts

	PYE Jobs	Salaries	GVA
Arbroath	3	£70,000	£165,000
Angus	6	£150,000	£340,000
Scotland	11	£260,000	£590,000

Note: Salaries and GVA rounded to the nearest £5,000

3.2.2 Operational and Maintenance Phase

Similar to the construction phase there will be opportunities for local businesses during the lifetime of the project to support the operations and maintenance of the turbine.

The net impacts of the operational and maintenance phase are reported in **Table 3.3**.

Table 3.3: Net Operational and Maintenance Impacts

	PYE Jobs	Salaries	GVA
Arbroath	0	£5,000	£5,000
Angus	1	£30,000	£70,000
Scotland	7	£400,000	£180,000

3.2.3 Safeguarded On-Site Impacts

The majority of on-site jobs are taken by people from the Angus area, therefore a large proportion of the salaries/wages will remain within Angus.

Through supporting efficiency savings (reducing overheads) the turbine will support the longer term viability of Bairds Malt, it is therefore important to consider the impact on securing and safeguarding the current activity generated at the site.

Table 3.4 outlines the impact of safeguarding the current level of activity at the Bairds plant.

Table 3.4: Net Safeguarded On-Site Impacts

	Impacts
Arbroath	
FTE jobs	40
Salaries per annum (£)	£1.1m
GVA per annum (£)	£1.9m
Angus	
FTE jobs	75
Salaries per annum (£)	£2.2m
GVA per annum (£)	£3.6m
Scotland	
FTE jobs	130
Salaries per annum (£)	£3.7m
GVA per annum (£)	£6.3m

3.3 Cumulative Impact

The estimated serviceable lifetime of the turbine is 25 years. Whilst the construction impacts will be one-off, there will be ongoing economic activity associated with the operation and maintenance of the project during the 25 year period, plus the safeguarded activity on-site at the malting facility to consider.

It is therefore important that we measure the longer term cumulative economic impact of the project.

When considering the longer term effects, it is important to understand wider market factors such as the time periods over which new economic activity is generated and the ‘present value’ of impacts i.e. adjusting historical and future impacts into today’s values⁷. Cumulative impacts have therefore been adjusted/discounted the economic and financial impacts using the HM Treasury recommended rate of 3.5%.

Below we have considered the net cumulative effects over a 25 year period - please note that this accounts for both the construction, operational and maintenance, and safeguarded activity⁸.

Table 3.3: Net Cumulative Impacts of Turbine Project (25 years)

	Salaries	GVA
Arbroath	£19.3m	£32.5m
Angus	£37.6m	£63.5m
Scotland	£65.2m	£110.3m

Note: Salaries and GVA rounded to nearest £0.1m

A review of the cumulative impacts identifies the significant scale of the economic activity that the proposals could generate within the Angus economy.

Over the 25-year lifetime the proposed turbine project is estimated to support/safeguard **c 60 Full Time Equivalent jobs** at Bairds Malt, create **20 construction/operational/maintenance PYE jobs** and generate/safeguard **net additional economic output (GVA) of c. £63.5m** and **expendable income (salaries) of c. £37.6m** within the Angus economy.

⁷ See HM Treasury Green Book for more information https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/220541/green_book_complete.pdf

⁸ Please note that for the purposes of our assessment we have assumed that the malting facility will continue to operate at current levels.

4. Social, Catalytic and Environmental Impacts

One of the key issues to consider over and above the quantifiable economic impacts reported above is the likelihood of additional social and catalytic impacts/benefits for the local area, and Angus more generally.

4.1 Social and Catalytic Impacts

Support Viability of Key Local Employer

Key Points

Bairds Malt is an important source of local employment – employing 57 people from the Angus area, which in turn generates disposable income (salaries), a notable proportion of which will be spent in the local economy.

Bairds Malt has been operating from its site in Arbroath for 40+ years and employs 207 people across the UK, including 57 within the immediate Angus region - this helps to demonstrate how important a part of the local area the plant has become. The facility employs people across a range of disciplines/areas including management, engineers, and administration.

Manufacturing remains a key employing sector (2nd largest behind the public sector), and whilst the sector has experienced an overall decline across Angus, Bairds has managed to retain similar levels of activity/employment during, and off the back of the recession (whilst others have lost jobs or closed).

Looking to the future, the company has targets to grow by c. 5% annually (based on UK wide forecasts for the wider distilling industry). These targets however, are dependent on a number of external and internal factors, including production efficiency – of which energy costs will play a significant role.

The plant operates on a 24/7 basis and total site costs are estimated at £5m per annum, with £3.5m of this related to utilities. The proposed turbine project will not only generate significant CO₂ and carbon savings but it is anticipated to reduce energy costs by 23% - around £0.8m per annum.

These efficiency savings will likely have a significant impact on both safeguarding the existing activity and ensuring the plant's longer term financial/commercial viability and sustainability, but also support the growth ambitions of the company. This could potentially lead to further employment opportunities for Angus residents.

This is particularly important as over the next few years there will most certainly be further cuts in public sector spending which will likely lead to further job losses – as highlighted above, the public sector is the largest employer across Angus. There is therefore a key role for the private sector (and in particular those businesses with growth ambitions) in supporting the local economy.

Supply Chain Opportunities

Key Points

Bairds is not only an important part of the local economy through providing direct on-site employment opportunities, the company also works with a number of suppliers from the local area.

In addition, there is an opportunity for local businesses to work with and benefit from the proposed development through supply chain linkages during the construction stage –of the turbine, and during the ongoing operational/maintenance phase during the lifetime of the project.

The Kilmac Group have a strong track record in working with local contractors and suppliers during the assembly and installation stages. Further, they have made a commitment to offer training and apprenticeship schemes to help ensure that local people have access to these employment opportunities – local jobs for local people, in particular targeted at 'hard to reach' groups.

The wider supply chain impacts can be broken down into two separate categories:

- **direct suppliers to Bairds Malt** – companies that are part of the supply chain that provide goods and/or services that supports the operations of the plant facility; and
- **suppliers to the construction phase** – associated with the construction of the turbine this could include site preparation works, site security, civil/electrical/mechanical engineers works, tradesman and labourers.

Direct Suppliers to Bairds Malt

The malting facility has a diverse range of suppliers from both the local area and beyond, this includes: grain and seed crops, fertilizer, agrochemicals, and haulage/distribution.

Information provided by Bairds Malt identifies that company has live farm accounts with around 1,000 business, 230 of which are located in Angus, and in addition regularly sub-contracts a number of local haulage companies.

Bairds Malt is an important locally based company that, through its significant supply chain expenditure supports other businesses within the local economy and helps to retain economic activity in Angus.

Suppliers to the Construction Phase

The total cost of the turbine is estimated at c. £1.6m and there will be an opportunity for local suppliers to support the installation and operation of the turbine throughout the 25 year serviceable lifetime.

Whilst the physical 'working parts' (blades, tower, etc) will come from outside of Scotland, as will the specialist workers for the installation process, there will be sub-contracting opportunities for Angus based suppliers for other key areas such as the site preparation works, landscaping, civil engineering, grid connection and maintenance work will - all likely to be based in Scotland.

This therefore represents a good opportunity for local contractors and suppliers to benefit from the proposed development. The Kilmac Group (along with the turbine manufacturing partner, Enercon) will lead the construction and installation stages. Both companies have a strong track record of working with local businesses – this will support the ambition to retain as much economic value locally as possible.

A key way in which the project can positively impact the local economy is through facilitating local employment training and apprenticeship schemes during the construction, and operational and maintenance phases. These schemes can be targeted at particular groups e.g. young people and, in addition to helping develop new skills etc, will also help to build confidence in supported individuals.

For example, during the South Inch play park project, Kilmac Construction recruited a total of nine apprentices/work experience positions in various construction and engineering disciplines. The apprenticeships were undertaken by young people from the local area that were ex-offenders, and all of whom had previously experienced barriers to accessing employment opportunities.

Subsequently, eight of the apprentices have gone on to access full time employment, six working directly for Kilmac Construction or one of their main sub-contractors. See the following link within the Perth and Kinross Council website for further detail (<http://www.pkc.gov.uk/article/7323/New-South-Inch-play-area-celebrates-environment-and-community>).

While it is too early to comment on the extent of any local training and apprenticeship scheme being employed in the context of the proposed development, it is clear there is an opportunity for the proposed development to work with local employability partners, support the local youth employment agenda and contribute to the objectives of the Single Outcome Agreement through a focused training initiative.

Community Engagement

In addition to being a key local employer, Bairds Malt are active in the local community and have contributed funding, resources and support to a number of local projects, including:

- Arbroath Skate park Project Club;
- Arbroath Year of the Light; and
- The Royal Highland Education Trust.

4.2 Environmental Impacts

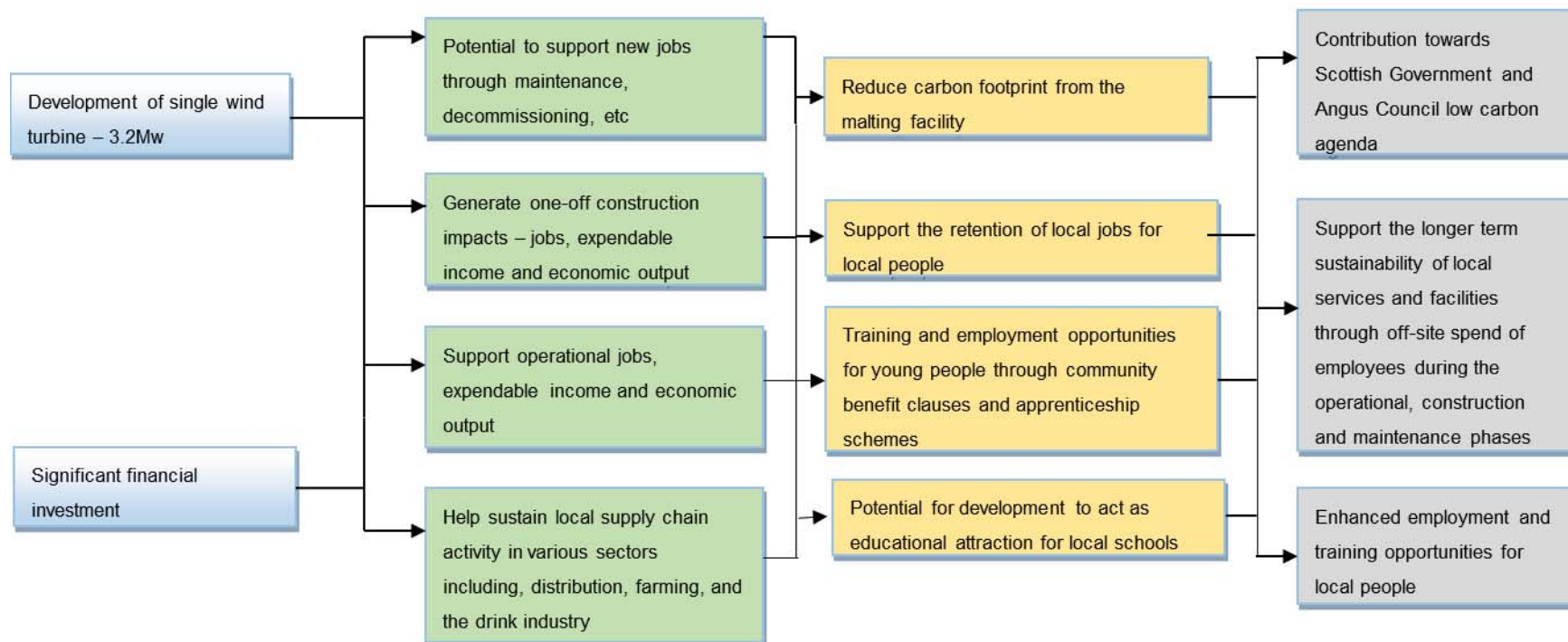
As already considered above, green energy, reducing carbon intensity and CO₂ emissions is a significant policy driver at the national and regional levels.

As already considered above, Bairds have a long term strategy to both reduce their expenditure on utilities and their environmental footprint. As a result they have reviewed a number of green energy projects to support this including; geothermal, solar and biomass. The turbine project, however, makes the greatest contribution towards achieving both environmental and financial sustainability objectives.

The project (when working at the expected operational capacity, 29%) will generate 2.3 Gwh per annum in electricity. This is equivalent to providing electricity for 530 homes every year and will generate CO₂ savings (980 tonnes per annum) and carbon savings (280 tonnes per annum).

Appendix A: Logic Model

Enhance the Economic and Social Sustainability of the Local Arbroath Area



Technical Appendix

Disclaimer Note

The SEIA has been undertaken based on information provided by Kilmac, and based on EKOS' professional judgement and assumptions, outlined below in the Technical Appendix. It does not constitute a detailed market demand assessment but outlines the potential impacts that could be delivered through proposals.

Our review is based on current economic conditions and identifies the potential impacts and benefits that could be generated from the development if completed in full, and occupied as per our detailed assumptions.

The actual results, however, will likely vary from those projected as they will be subject to future market conditions and other economic influences, as well as performance against the assumptions adopted by EKOS.

Variances from our projections could be material (positive or negative), but it should be noted that EKOS has adopted a robust appraisal methodology in the estimation of the economic impacts for this development proposal.

We do not anticipate substantial variation, unless there is major change in the economic structure, change in market profiles, and/or competition from other developments in the local, regional or national area.

Introduction

This appendix provides the detailed socio-economic impact appraisal (SEIA) and assumptions used within our assessment. This assessment has included an ex-ante EIA and has been undertaken in line with HM Treasury 'Green Book' guidance and using a bespoke appraisal model to assess gross and net outputs.

The impact assessment considers the on-site impacts, one-off construction impacts, operational/maintenance impacts, financial impacts and the longer term economic impacts.

A copy of the detailed Excel model used within our assessment can be obtained through contacting the report author direct.

Gross Impacts

The gross economic impacts i.e. jobs, Gross Value Added (GVA) and salaries have been calculated based on information provided by the development team and using sectoral co-efficients, specifically turnover/capital expenditure/ per employee for the wider sector.

Construction and Operational/Maintenance Impacts

The construction phase of the development will generate additional one-off construction impacts associated with the new investment and development, whilst there will also be on-going activity associated with the operation and maintenance of the turbines.

Our analysis of the renewable sector employment impacts are based on Scottish Annual Business Statistics data. The analysis uses an employment co-efficient of £122,478 spend required to sustain one full-time employee for a period of one year – a Person Year Equivalent post (PYE).

The renewables co-efficient is derived from Scottish Annual Business Statistics (2011, and adjusted using the GDP Deflator to reflect 2013/14 prices)⁹, which provides data on the average construction spend per employee.

The jobs are based on PYEs, and this method allows the number of people on-site over the whole delivery period (which will vary over the period between full-time, part-time, permanent, temporary and contract) to be estimated as an annual equivalent post – PYE.

Gross jobs are derived from dividing the total costs, (estimated at £1.6m for the construction element and £0.6m during the operational and maintenances phases respectively) by the renewable sector employment co-efficient (regional figures provided).

Table A1: Gross On-site Job Assumptions

Construction costs	Costs	£ T/O per employee	Gross jobs
Capital cost	£1.6m	£122,478	13
Maintenance costs	£0.6m	£122,478	5

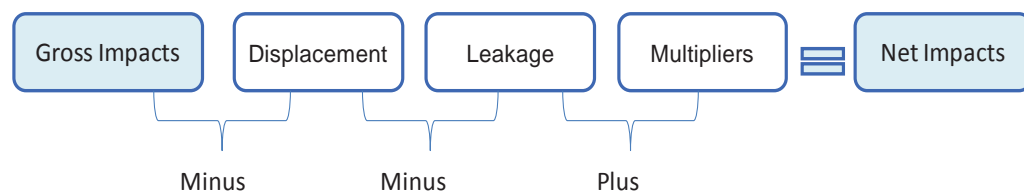
⁹ Please note that at the time of finalising this report, the most up-to-date information with regards price adjustment (using the GDP Deflator) was for 2013 prices (updated on 8 January 2014).

Gross PYE job impacts are then taken through the gross to net calculation as outlined below.

Net Impacts

However, in order to assess the true economic impact, the gross employment is considered in terms of displacement, leakage and multiplier effects – the logic chain, see Figure A1. Please note, the net impacts are assessed at the Arbroath, Angus, and Scotland levels.

Figure A1: Moving From Gross to Net Impacts



Gross Value Added (GVA) and Salaries

Gross Value Added (GVA) is a measure of the value of goods and services produced before allowing for depreciation or capital consumption¹⁰.

GVA measures the income generated by businesses after the subtraction of input costs, but before costs such as wages and capital investment is paid prior to arriving at a figure for profit.

Salaries measure the employment costs (not including employer’s contributions to NI, etc) for labour, this can be considered as the gross expendable income i.e. ‘take home gross pay. .

GVA and salaries per employee are calculated for the renewable sector based on data from the Scottish Annual Business Statistics.

Latest data was for 2011 and therefore, this was adjusted to 2013/14 prices using the GDP Deflator, see Table A2.

¹⁰ Gross Value Added (GVA) is equivalent to Gross Domestic Product (GDP) at basic prices.

Table A2: Average GVA and Salary per Employee Assumptions

	Average	Uprated to 2014
Highland/Skye		
GVA	£53,434	£55,643
Salaries	£23,563	£24,537
Scotland		
GVA	£60,957	£63,477
Salaries	£29,185	£30,391

Source: Scottish Annual Business Statistics

The GVA and salary impact is derived from multiplying the jobs by the average GVA/salary per employee figure – for both gross and net impacts.

Activity at Bairds Malt

The turbine project will help to safeguard and secure the existing activity at the Bairds Malt facility. For the purposes of the appraisal we have calculated the wider impacts that the project will help safeguard.

The gross jobs are based on information provided by Bairds Malt – 57 FTEs at the Arbroath facility. The average salary costs for employees has been provided by Bairds Malt and GVA co-efficients for the food and beverage manufacturing sector have been used to calculate the economic activity associated with these jobs. Figures are for 2011 and therefore have been uprated to 2014 prices and to FTEs, see Table A3.

Table A3: Average GVA and Salary per Employee Assumptions – Bairds Employees

	Average	Uprated to 2014 FTE
GVA	£43,252	£48,478
Salaries	-	£28,733

Long Term Impacts

In order to assess fully the impact of the proposed activity, it is important to consider the longer term impact it is likely to have on the local economy, both directly through the turbine project, but also through safeguarding activity at the Arbroath facility.

In order to accurately gauge the impact we must consider the total quantified value of the development impact over the 25 year serviceable lifetime of the project, taking account of the date at which the development will be completed, and the time value of money i.e. (£1 today is worth more than £1 next year). We have used the HM Treasury Social Time Preference to discount the estimated impacts at 3.5%.

Full details of the cumulative impacts and the adjustments taking account of the 3.5% discounting factor can be obtained by contacting the report author direct.

Bairds Malt Wind Turbine Landscape Figures

to accompany

Bairds Malt Wind Turbine Environmental Report

Chapter 7: Landscape and Visual Impact

for



Bairds malt

Bairds Malt Single Turbine Ltd.

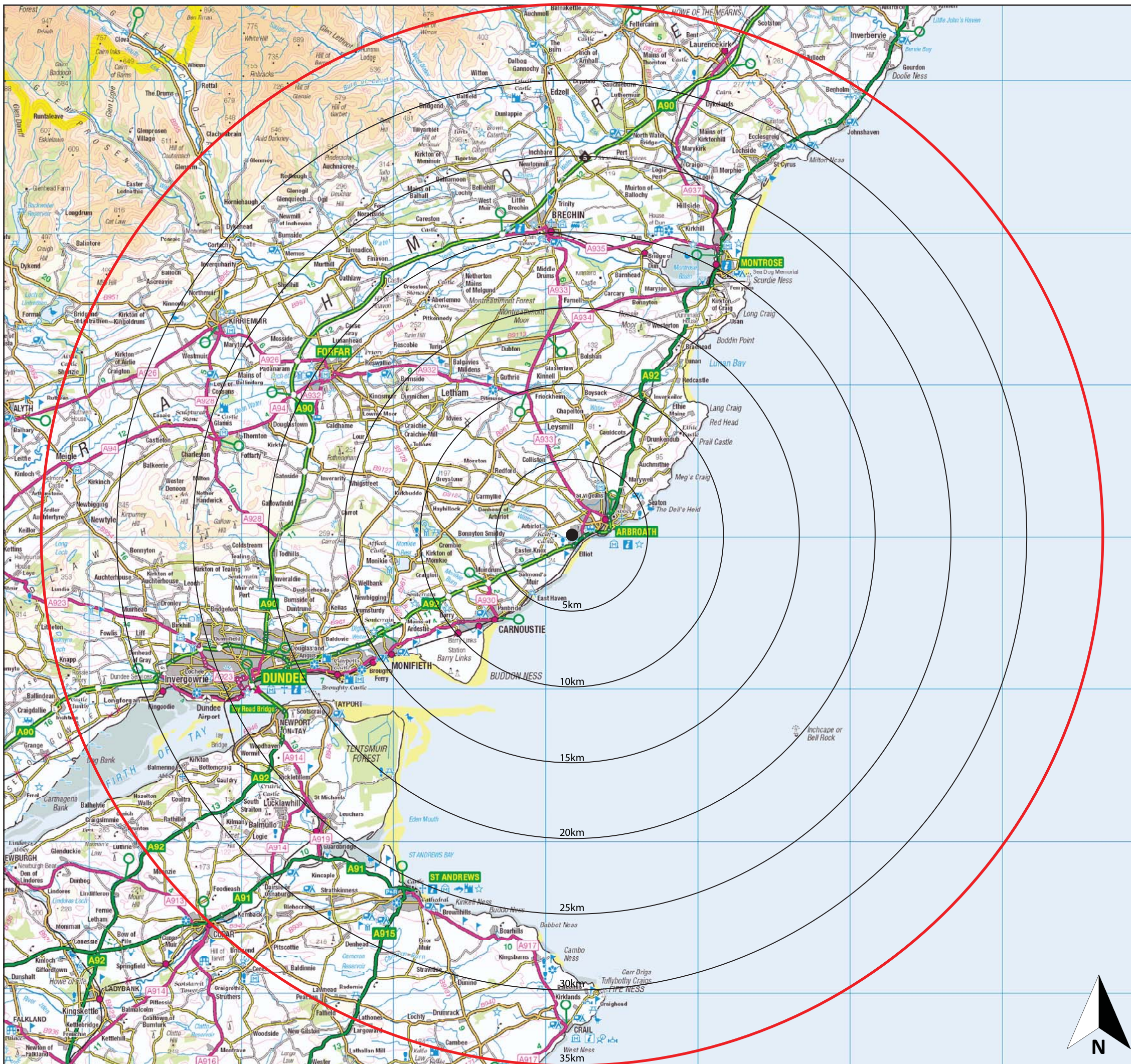


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Bairds Malt Wind Turbine Landscape Figures

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Projects Name: **Bairds Malt Wind Turbine**
 Document Title: **Study Area**
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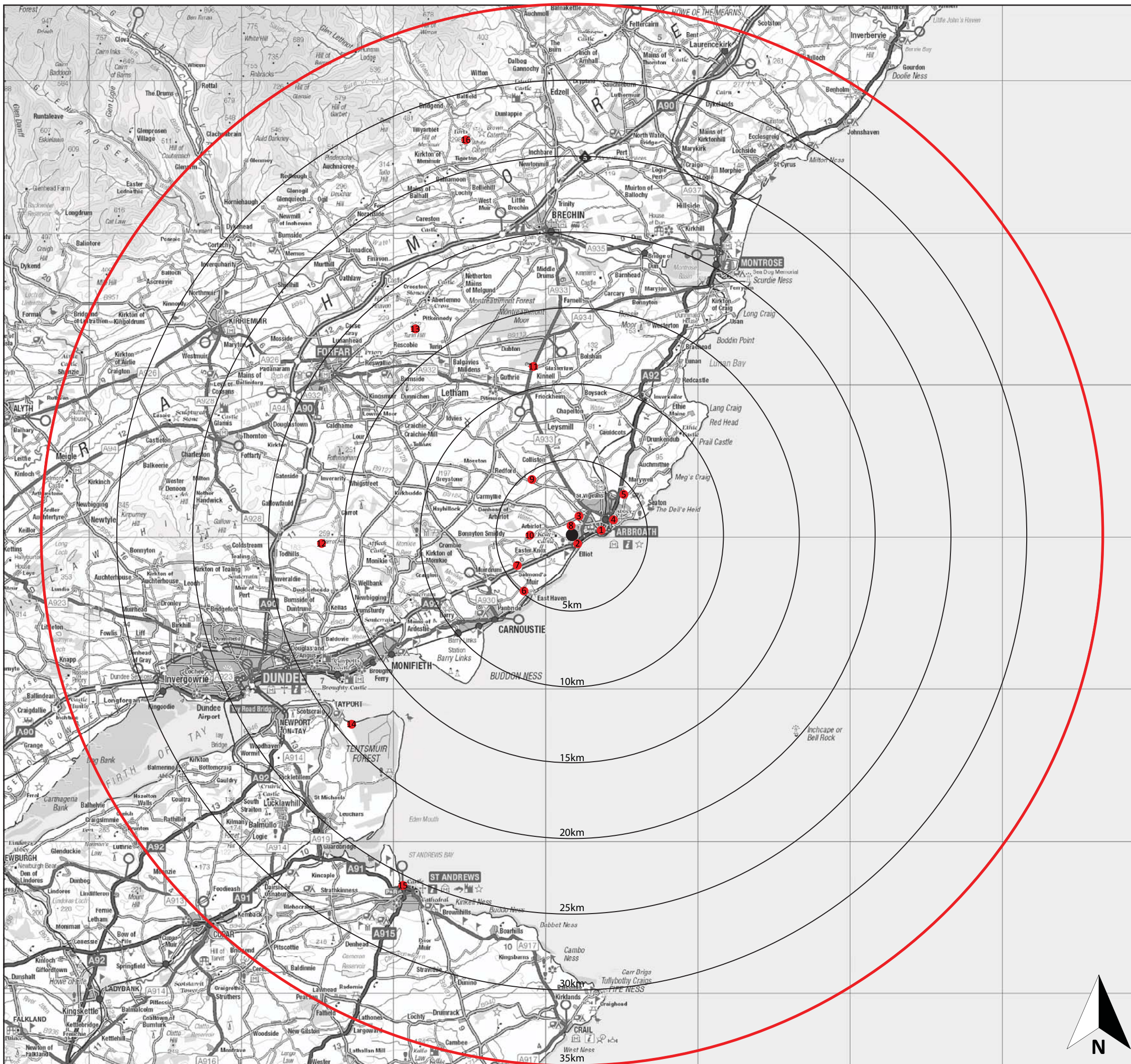
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 ● Proposed Turbine Location
 — 5, 10, 15, 20, 25 & 30km Radii from Proposed Wind Turbine
 — Landscape and Visual Study Area (35km)

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Projects Name: **Bairds Malt Wind Turbine**
 Document Title: **Site and Viewpoint Location Map**
 Scale: **1:250,000 @ A3**

- Key:
- Proposed Turbine Location
 - 5, 10, 15, 20, 25 & 30km Radii from Proposed Wind Turbine
 - Landscape and Visual Study Area (35km)

1 Viewpoint Locator & Identifier

Viewpoint Name:

- 1 - Queen's Drive, Arbroath
- 2 - Elliot Bridge
- 3 - Arbirlot Road West
- 4 - Boulzie Hill
- 5 - Bearfauld Road
- 6 - East Haven
- 7 - A92, Salmond's Muir
- 8 - Patrick Allan Fraser Street
- 9 - Firthfield
- 10 - Braemore
- 11 - A933 Montreathmont
- 12 - Dodd Hill
- 13 - Turin Hill
- 14 - Tentsmuir Recreational Area
- 15 - St Andrews
- 16 - White Caterthun

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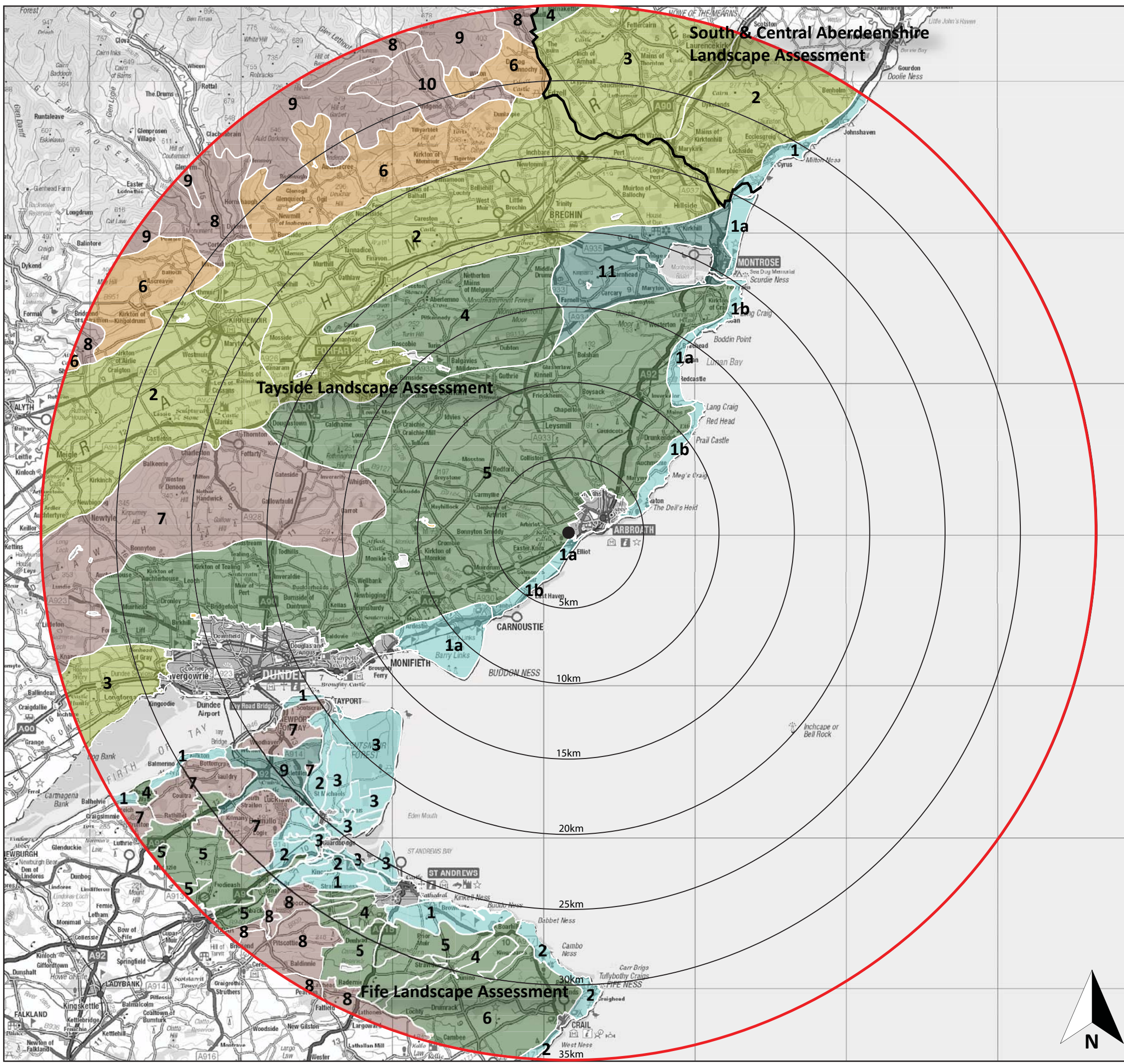
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Projects Name: **Bairds Malt Wind Turbine**
 Document Title: **Landscape Character Types surrounding Bairds Malt**
 Scale: **1:250,000 @ A3**

- Key:
- Proposed Turbine Location
 - 5, 10, 15, 20, 25 & 30km Radii from Proposed Wind Turbine
 - Landscape and Visual Study Area (35km)


- Landscape Character Types:
- Tayside Landscape Assessment:
- | | | | |
|----|-----------------------|----|-----------------------------|
| 1a | Coast with Sand | 6 | Highland Foothills |
| 1b | Coast with Cliffs | 7 | Igneous Hills |
| 2 | Broad Valley Lowlands | 8 | Mid Highland Glens |
| 3 | Firth Lowlands | 9 | Highland Summits & Plateaux |
| 4 | Low Moorland Hills | 10 | Upper Highland Glens |
| 5 | Dipslope Farmland | 11 | Lowland Basins |

- Fife Landscape Assessment:
- | | | | |
|---|-------------------------|---|-----------------------------------|
| 1 | Coastal Hills | 6 | Lowland Sloping Farmland |
| 2 | Coastal Terrace | 7 | Upland Foothills |
| 3 | Coastal Flats | 8 | Volcanic Hills & Craigs |
| 4 | Lowland Dens | 9 | Lowland Glacial Meltwater Valleys |
| 5 | Lowland Hills & Valleys | | |

- South & Central Aberdeenshire Landscape Assessment:
- | | |
|---|----------------------|
| 1 | Kincardine Links |
| 2 | Garvock & Glenbervie |
| 3 | Howe of the Mearns |
| 4 | The Mounth |


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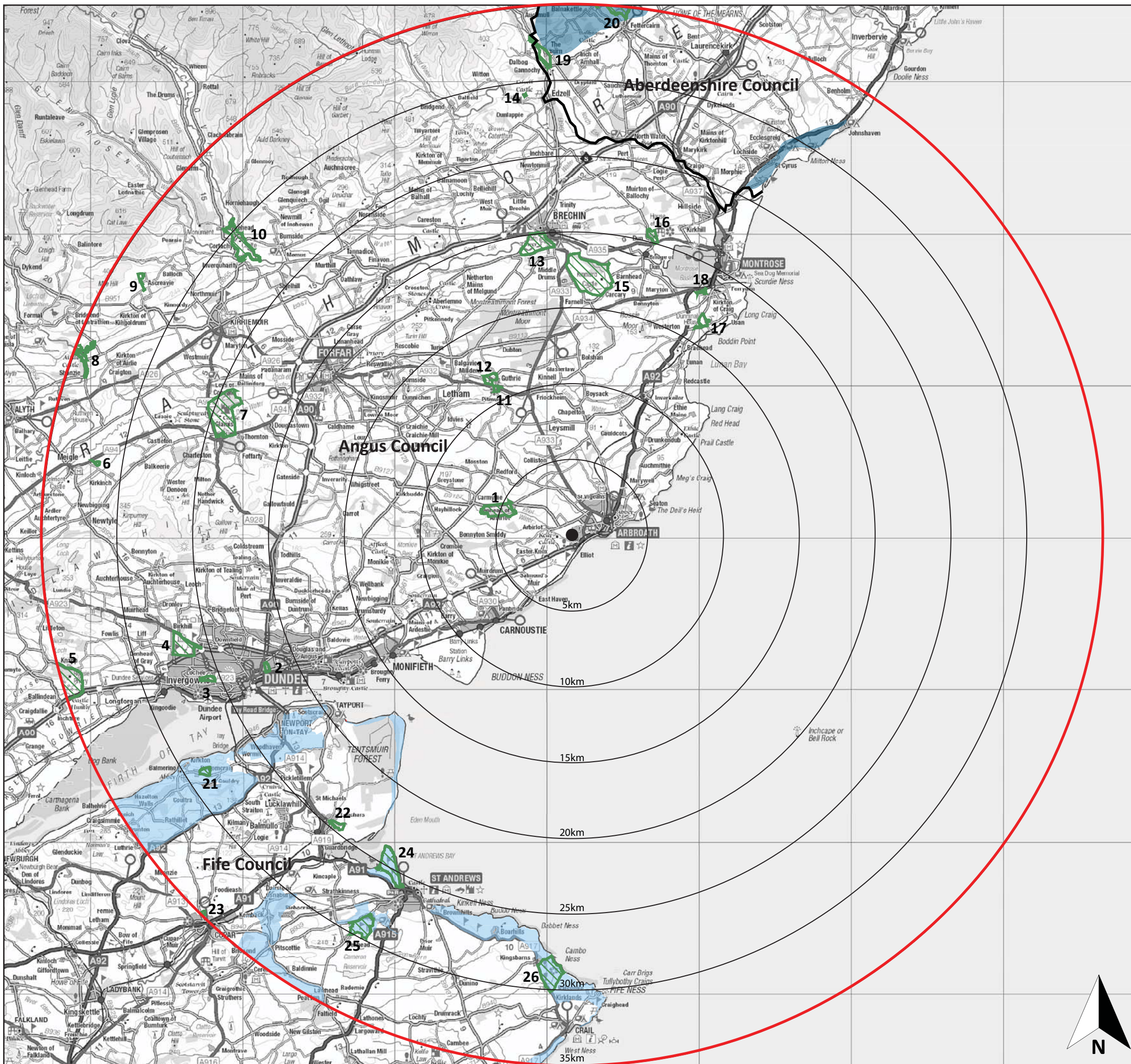
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Projects Name: **Bairds Malt Wind Turbine**
 Document Title: **Landscape Planning Designations Surrounding Bairds Malt**
 Scale: **1:250,000 @ A3**

- Key:
- Proposed Turbine Location
 - 5, 10, 15, 20, 25 & 30km Radii from Proposed Wind Turbine
 - Landscape and Visual Study Area (35km)
 - Local Authority Boundary
 - Areas of Landscape Significance
 - Special Landscape Areas
 - GDL Area and Identifier

- 1 - The Guynd
- 2 - Baxter Park
- 3 - Balgay Park
- 4 - Camperdown House
- 5 - Rossie Priory
- 6 - Drumkilbo
- 7 - Glamis Castle
- 8 - Airlie Castle
- 9 - Ascreavie
- 10 - Cortachy Castle
- 11 - House of Pitmuies
- 12 - Guthrie Castle
- 13 - Brechin Castle
- 14 - Edzell Castle
- 15 - Kinnaird Castle
- 16 - House of Dun
- 17 - Dunninald
- 18 - Craig House
- 19 - The Burn
- 20 - Fasque House
- 21 - Naughton
- 22 - Earlsall
- 23 - Dalgairn
- 24 - St Andrews Links
- 25 - Craigtoun
- 26 - Cambo


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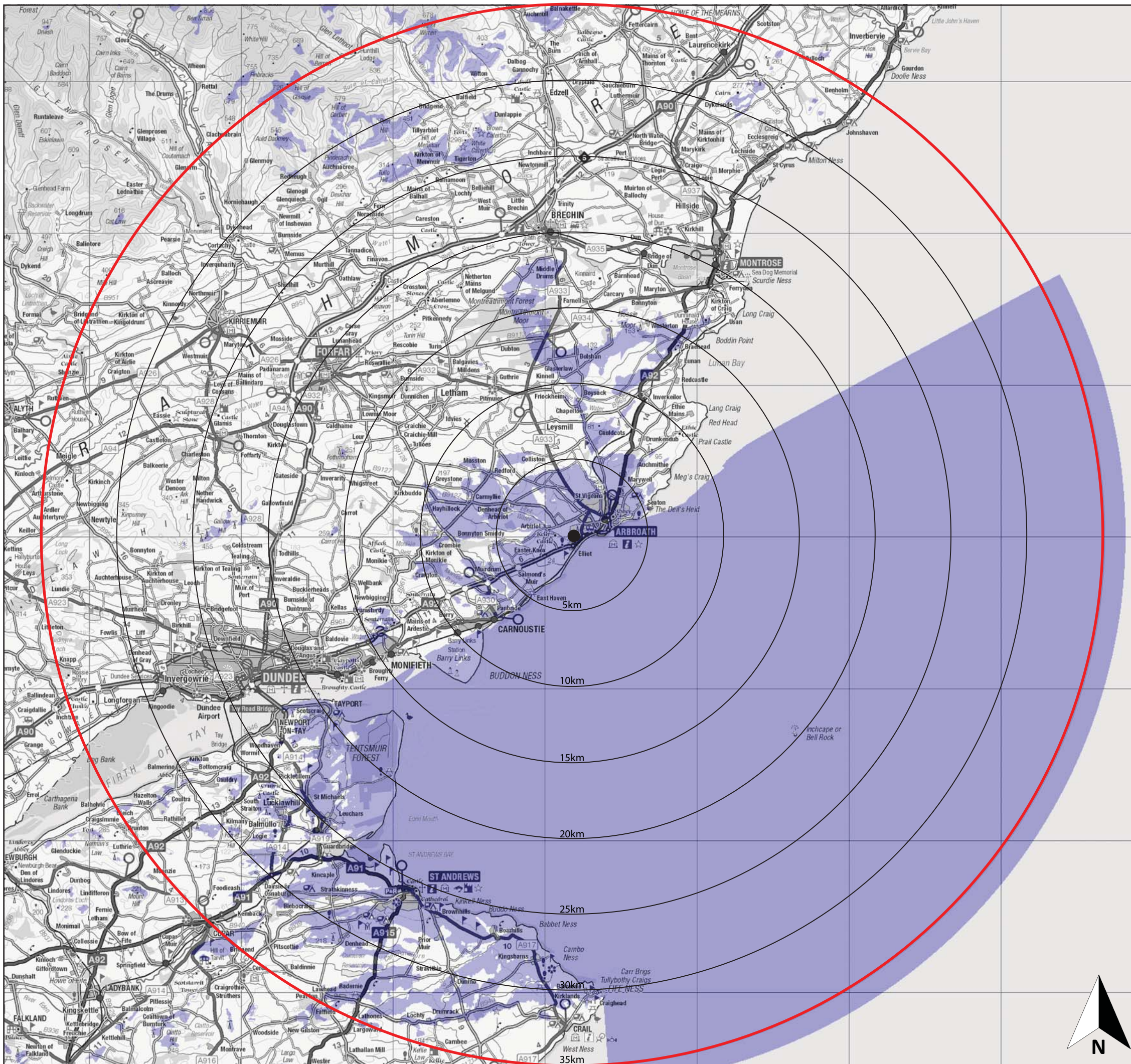
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Projects Name: **Bairds Malt Wind Turbine**
 Document Title: **ZTV to 55m Hub Height and 35km Radius**
 Scale: **1:250,000 @ A3**

- Key:
- Proposed Turbine Location
 - 5, 10, 15, 20, 25, 30km Radii from Proposed Wind Turbine
 - Landscape and Visual Study Area (35km)
 - Turbine Hub Theoretically Visible

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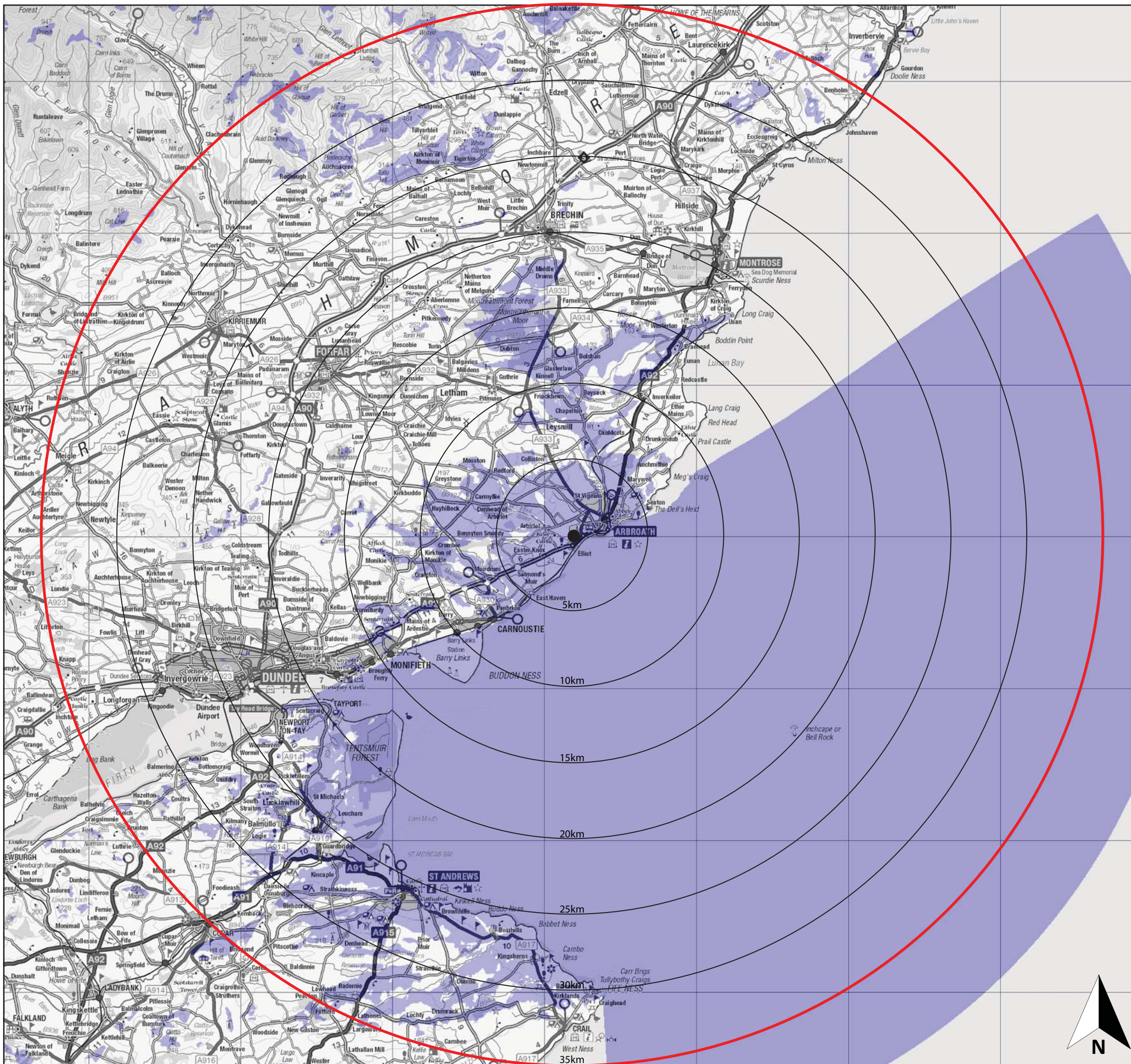
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Projects Name: **Bairds Malt Wind Turbine**
 Document Title: **ZTV to 77m Tip Height and 35km Radius**
 Scale: **1:250,000 @ A3**

- Key:
- Proposed Turbine Location
 - 5, 10, 15, 20, 25, 30km Radii from Proposed Wind Turbine
 - Landscape and Visual Study Area (35km)
 - Turbine Tip Theoretically Visible

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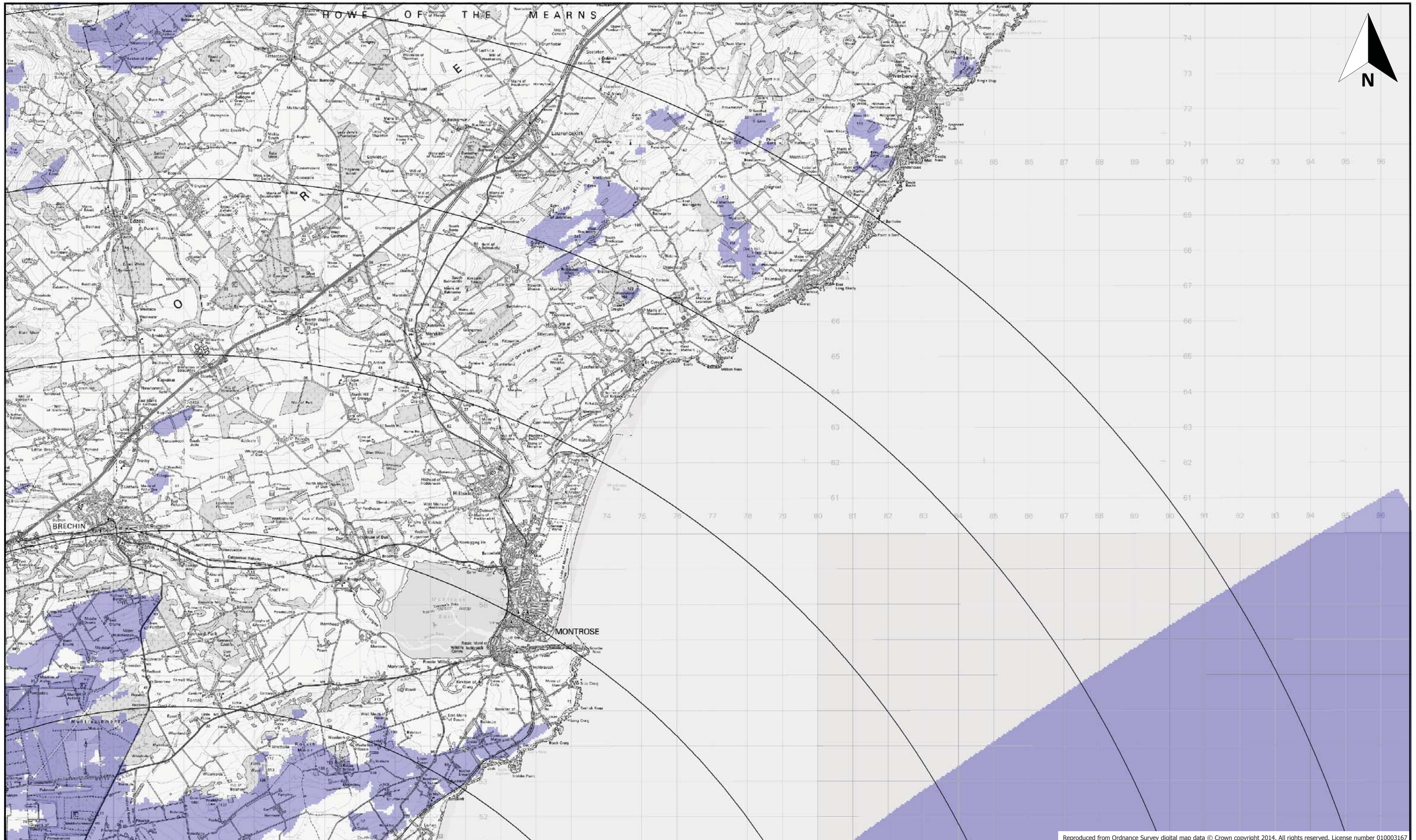
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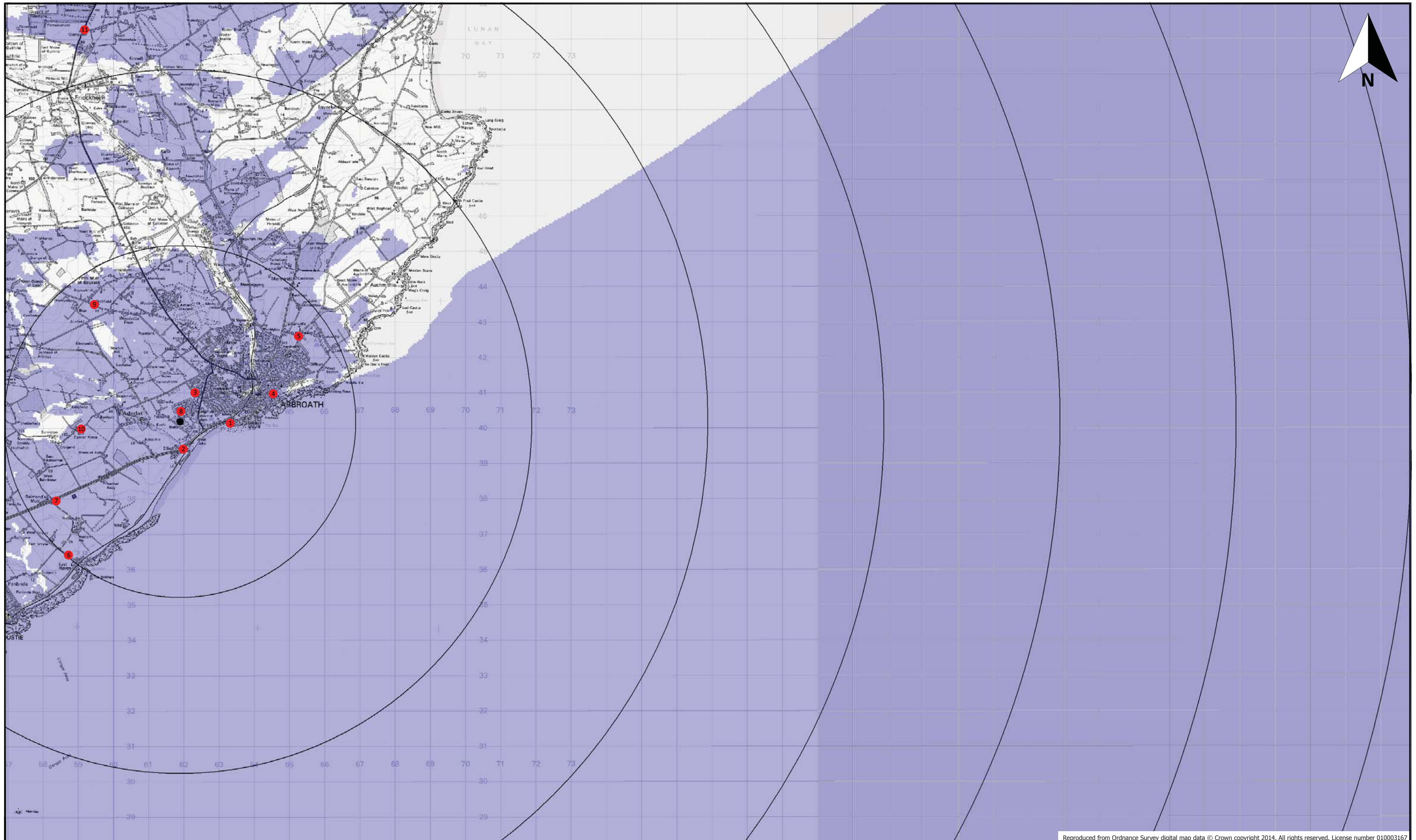
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 Document Title: **Detailed ZTV to 77m Tip Height - North East Zone**
 Scale: **1:100,000 @ A3**

<p>Key:</p> <ul style="list-style-type: none"> ● Proposed Turbine Location ■ Zone of Theoretical Visibility — 5, 10, 15, 20, 25, 30 & 35km Radii from Proposed Wind Turbine 	<p>① Viewpoint Locator & Identifier</p> <p><u>Viewpoint Name:</u></p> <table border="0"> <tr> <td>1 - Queen's Drive, Arbroath</td> <td>6 - East Haven</td> <td>11 - A933 Montreathmont</td> </tr> <tr> <td>2 - Elliot Bridge</td> <td>7 - A92, Salmond's Muir</td> <td>12 - Dodd Hill</td> </tr> <tr> <td>3 - Arbirlot Road West</td> <td>8 - Patrick Allan Fraser Street</td> <td>13 - Turin Hill</td> </tr> <tr> <td>4 - Boulzie Hill</td> <td>9 - Firthfield</td> <td>14 - Tentsmuir Recreational Area</td> </tr> <tr> <td>5 - Bearfauld Road</td> <td>10 - Braemore</td> <td>15 - St Andrews</td> </tr> <tr> <td></td> <td></td> <td>16 - White Caterthun</td> </tr> </table>	1 - Queen's Drive, Arbroath	6 - East Haven	11 - A933 Montreathmont	2 - Elliot Bridge	7 - A92, Salmond's Muir	12 - Dodd Hill	3 - Arbirlot Road West	8 - Patrick Allan Fraser Street	13 - Turin Hill	4 - Boulzie Hill	9 - Firthfield	14 - Tentsmuir Recreational Area	5 - Bearfauld Road	10 - Braemore	15 - St Andrews			16 - White Caterthun
1 - Queen's Drive, Arbroath	6 - East Haven	11 - A933 Montreathmont																	
2 - Elliot Bridge	7 - A92, Salmond's Muir	12 - Dodd Hill																	
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4 - Boulzie Hill	9 - Firthfield	14 - Tentsmuir Recreational Area																	
5 - Bearfauld Road	10 - Braemore	15 - St Andrews																	
		16 - White Caterthun																	

Document Number: **CO621-163/Fig 7.7a**
 Version: **1.0**
 Author: **SS**
 Checked by: **RC**
 Approved By: **GM**
 Date: **17/12/2014**

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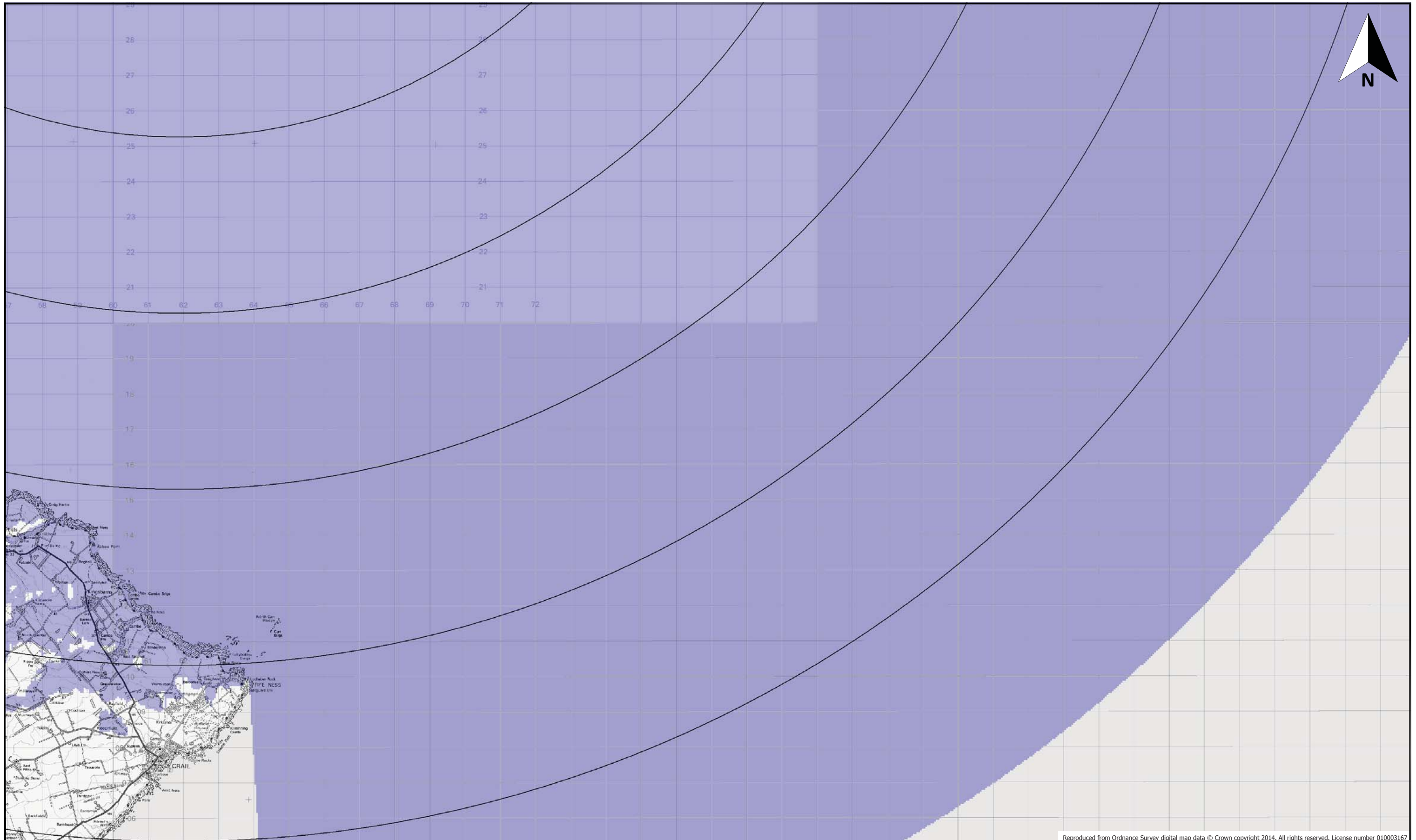
Project Name: **Bairds Malt Wind Turbine**
 Document Title: **Detailed ZTV to 77m Tip Height - East Zone**
 Scale: **1:100,000 @ A3**

<p>Key:</p> <ul style="list-style-type: none"> ● Proposed Turbine Location ■ Zone of Theoretical Visibility — 5, 10, 15, 20, 25, 30 & 35km Radii from Proposed Wind Turbine 	<p>① Viewpoint Locator & Identifier</p> <p><u>Viewpoint Name:</u></p> <table border="0"> <tr> <td>1 - Queen's Drive, Arbroath</td> <td>6 - East Haven</td> <td>11 - A933 Montreathmont</td> </tr> <tr> <td>2 - Elliot Bridge</td> <td>7 - A92, Salmond's Muir</td> <td>12 - Dodd Hill</td> </tr> <tr> <td>3 - Arbirlot Road West</td> <td>8 - Patrick Allan Fraser Street</td> <td>13 - Turin Hill</td> </tr> <tr> <td>4 - Boulzie Hill</td> <td>9 - Firthfield</td> <td>14 - Tentsmuir Recreational Area</td> </tr> <tr> <td>5 - Bearfauld Road</td> <td>10 - Braemore</td> <td>15 - St Andrews</td> </tr> <tr> <td></td> <td></td> <td>16 - White Caterthun</td> </tr> </table>	1 - Queen's Drive, Arbroath	6 - East Haven	11 - A933 Montreathmont	2 - Elliot Bridge	7 - A92, Salmond's Muir	12 - Dodd Hill	3 - Arbirlot Road West	8 - Patrick Allan Fraser Street	13 - Turin Hill	4 - Boulzie Hill	9 - Firthfield	14 - Tentsmuir Recreational Area	5 - Bearfauld Road	10 - Braemore	15 - St Andrews			16 - White Caterthun
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5 - Bearfauld Road	10 - Braemore	15 - St Andrews																	
		16 - White Caterthun																	

Document Number:	CO621-163/Fig 7.7b
Version:	1.0
Author:	SS
Checked by:	RC
Approved By:	GM
Date:	17/12/2014

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Project Name: **Bairds Malt Wind Turbine**

Document Title: **Detailed ZTV to 77m Tip Height - South East Zone**

Scale: **1:100,000 @ A3**

- Key:
- Proposed Turbine Location
 - Zone of Theoretical Visibility
 - 5, 10, 15, 20, 25, 30 & 35km Radii from Proposed Wind Turbine

📍 Viewpoint Locator & Identifier

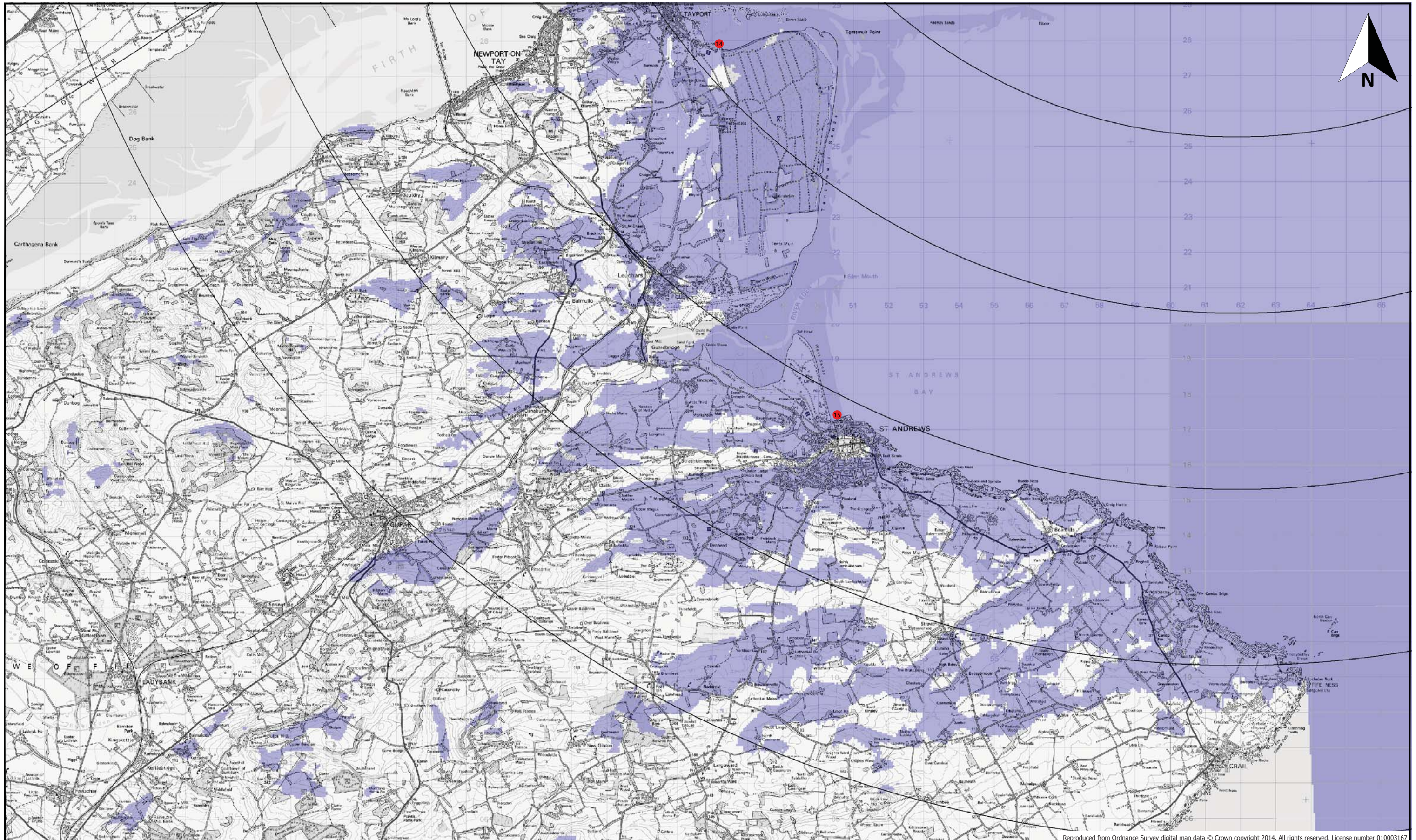
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- | | | |
|-----------------------------|---------------------------------|----------------------------------|
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| 2 - Elliot Bridge | 7 - A92, Salmond's Muir | 12 - Dodd Hill |
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| 5 - Bearfauld Road | 10 - Braemore | 15 - St Andrews |
| | | 16 - White Caterthun |

Document Number: **CO621-163/Fig 7.7c**
 Version: **1.0**
 Author: **SS**
 Checked by: **RC**
 Approved By: **GM**
 Date: **17/12/2014**



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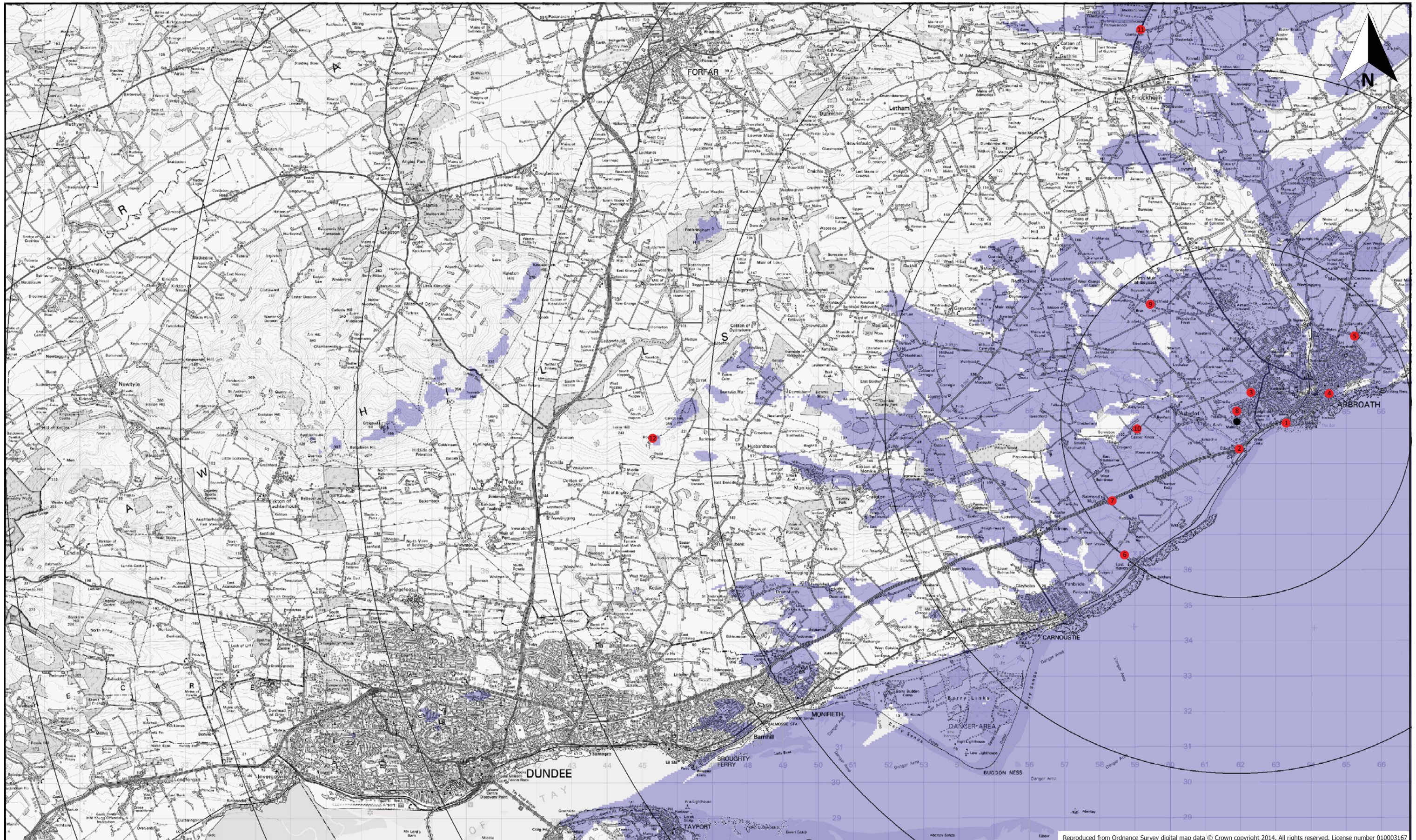
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Project Name: **Bairds Malt Wind Turbine**
 Document Title: **Detailed ZTV to 77m Tip Height - South West Zone**
 Scale: **1:100,000 @ A3**

●	Proposed Turbine Location	①	Viewpoint Locator & Identifier
■	Zone of Theoretical Visibility	<u>Viewpoint Name:</u>	
—	5, 10, 15, 20, 25, 30 & 35km Radii from Proposed Wind Turbine	1 - Queen's Drive, Arbroath	6 - East Haven
		2 - Elliot Bridge	7 - A92, Salmond's Muir
		3 - Arbrilot Road West	8 - Patrick Allan Fraser Street
		4 - Boulzie Hill	9 - Firthfield
		5 - Bearfauld Road	10 - Braemore
			11 - A933 Montreathmont
			12 - Dodd Hill
			13 - Turin Hill
			14 - Tentsmuir Recreational Area
			15 - St Andrews
			16 - White Caterthun

Document Number: **CO621-163/Fig 7.7d**
 Version: **1.0**
 Author: **SS**
 Checked by: **RC**
 Approved By: **GM**
 Date: **17/12/2014**
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Project Name: **Bairds Malt Wind Turbine**

Document Title: **Detailed ZTV to 77m Tip Height - West Zone**

Scale: **1:100,000 @ A3**

<p>Key:</p> <ul style="list-style-type: none"> ● Proposed Turbine Location ■ Zone of Theoretical Visibility — 5, 10, 15, 20, 25, 30 & 35km Radii from Proposed Wind Turbine 	<p>① Viewpoint Locator & Identifier</p> <p><u>Viewpoint Name:</u></p> <table border="0"> <tr> <td>1 - Queen's Drive, Arbroath</td> <td>6 - East Haven</td> </tr> <tr> <td>2 - Elliot Bridge</td> <td>7 - A92, Salmond's Muir</td> </tr> <tr> <td>3 - Arbirlot Road West</td> <td>8 - Patrick Allan Fraser Street</td> </tr> <tr> <td>4 - Boulzie Hill</td> <td>9 - Firthfield</td> </tr> <tr> <td>5 - Bearfauld Road</td> <td>10 - Braemore</td> </tr> <tr> <td></td> <td>11 - A933 Montreathmont</td> </tr> <tr> <td></td> <td>12 - Dodd Hill</td> </tr> <tr> <td></td> <td>13 - Turin Hill</td> </tr> <tr> <td></td> <td>14 - Tentsmuir Recreational Area</td> </tr> <tr> <td></td> <td>15 - St Andrews</td> </tr> <tr> <td></td> <td>16 - White Caterthun</td> </tr> </table>	1 - Queen's Drive, Arbroath	6 - East Haven	2 - Elliot Bridge	7 - A92, Salmond's Muir	3 - Arbirlot Road West	8 - Patrick Allan Fraser Street	4 - Boulzie Hill	9 - Firthfield	5 - Bearfauld Road	10 - Braemore		11 - A933 Montreathmont		12 - Dodd Hill		13 - Turin Hill		14 - Tentsmuir Recreational Area		15 - St Andrews		16 - White Caterthun
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	15 - St Andrews																						
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Document Number: **CO621-163/Fig 7.7e**

Version: **1.0**


Author: **SS**

Checked by: **RC**

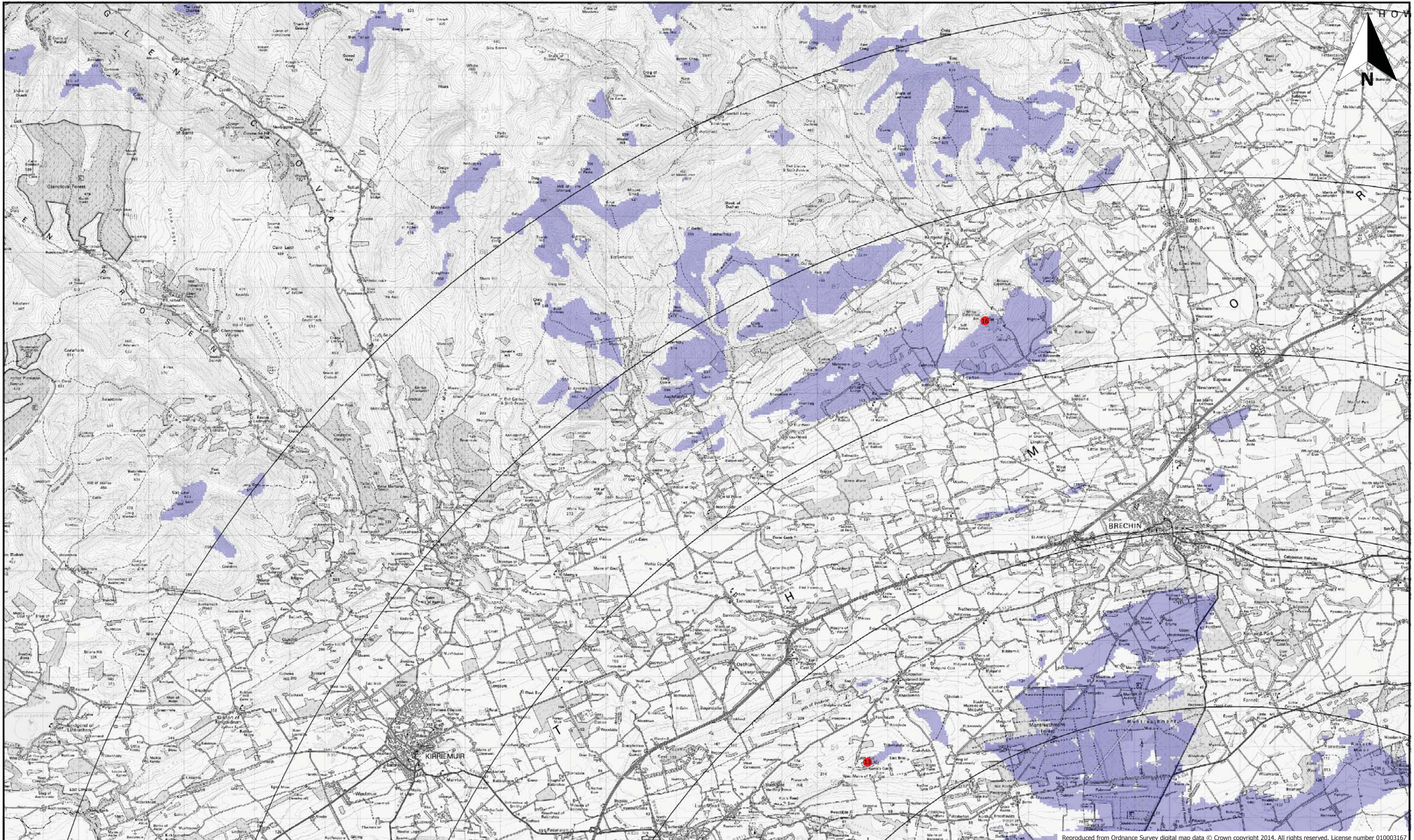
Approved By: **GM**

Date: **17/12/2014**

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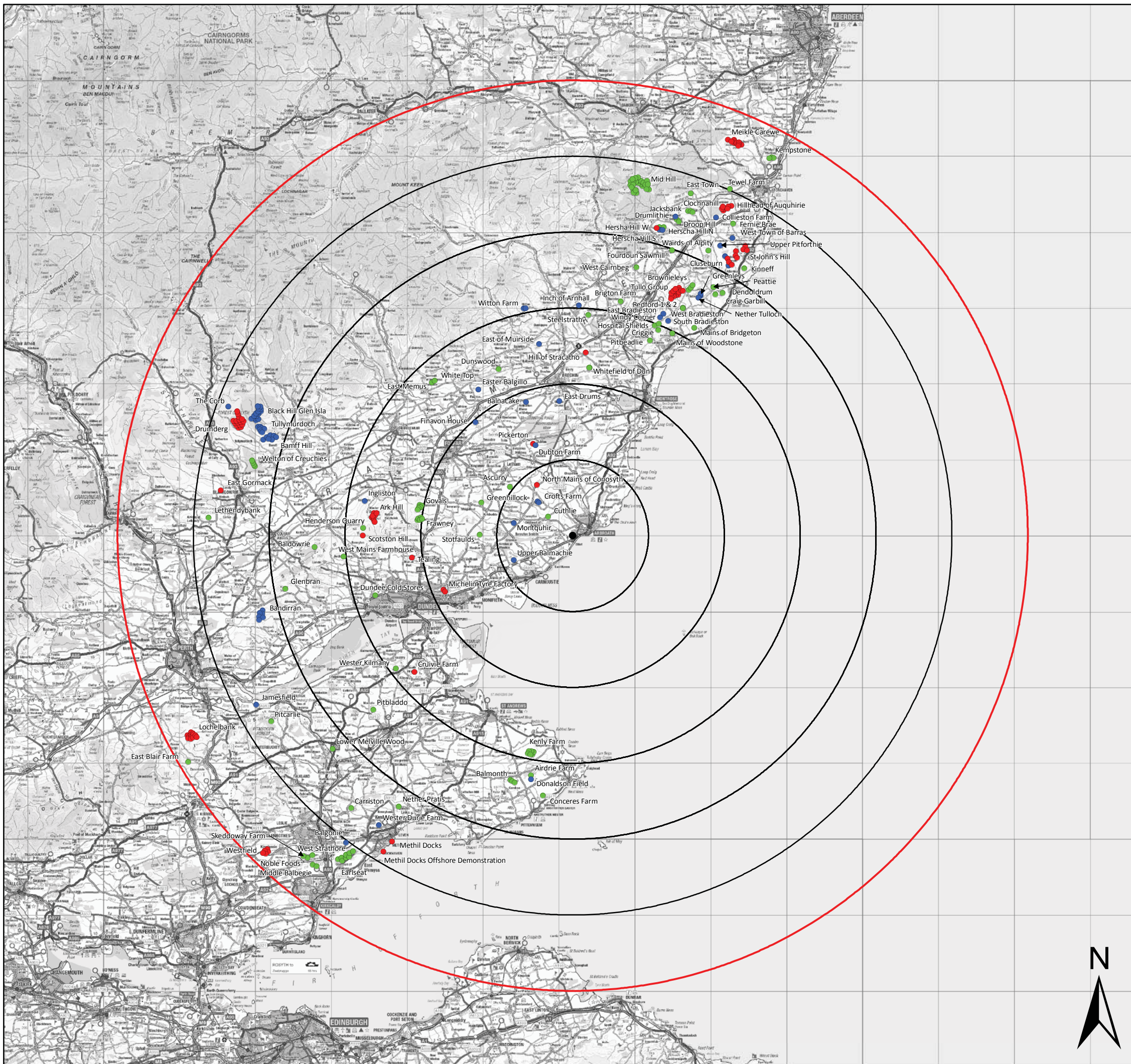
Project Name: **Bairds Malt Wind Turbine**
 Document Title: **Detailed ZTV to 77m Tip Height - North West Zone**
 Scale: **1:100,000 @ A3**

<p>Key:</p> <ul style="list-style-type: none"> ● Proposed Turbine Location ■ Zone of Theoretical Visibility — 5, 10, 15, 20, 25, 30 & 35km Radii from Proposed Wind Turbine 	<p>① Viewpoint Locator & Identifier</p> <p><u>Viewpoint Name:</u></p> <table border="0"> <tr> <td>1 - Queen's Drive, Arbroath</td> <td>6 - East Haven</td> </tr> <tr> <td>2 - Elliot Bridge</td> <td>7 - A92, Salmond's Muir</td> </tr> <tr> <td>3 - Arbirlot Road West</td> <td>8 - Patrick Allan Fraser Street</td> </tr> <tr> <td>4 - Boulzie Hill</td> <td>9 - Firthfield</td> </tr> <tr> <td>5 - Bearfauld Road</td> <td>10 - Braemore</td> </tr> </table>	1 - Queen's Drive, Arbroath	6 - East Haven	2 - Elliot Bridge	7 - A92, Salmond's Muir	3 - Arbirlot Road West	8 - Patrick Allan Fraser Street	4 - Boulzie Hill	9 - Firthfield	5 - Bearfauld Road	10 - Braemore	<table border="0"> <tr> <td>11 - A933 Montreathmont</td> </tr> <tr> <td>12 - Dodd Hill</td> </tr> <tr> <td>13 - Turin Hill</td> </tr> <tr> <td>14 - Tentsmuir Recreational Area</td> </tr> <tr> <td>15 - St Andrews</td> </tr> <tr> <td>16 - White Caterthun</td> </tr> </table>	11 - A933 Montreathmont	12 - Dodd Hill	13 - Turin Hill	14 - Tentsmuir Recreational Area	15 - St Andrews	16 - White Caterthun
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14 - Tentsmuir Recreational Area																		
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Document Number: **CO621-163/Fig 7.7f**
 Version: **1.0**
 Author: **SS**
 Checked by: **RC**
 Approved By: **GM**
 Date: **17/12/2014**

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Project Name: **Bairds Malt Wind Turbine**
 Document Title: **Cumulative Basemap**
 Scale: **1:500,000 @ A3**

- Key:
- Proposed Turbine Location
 - 10, 20, 30, 40 & 50km Radii from Proposed Wind Turbine
 - Cumulative Study Area (60km)

- Status
- Operational
 - Consented
 - In Planning


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Client: **Bairds Malt Single Turbine Ltd**

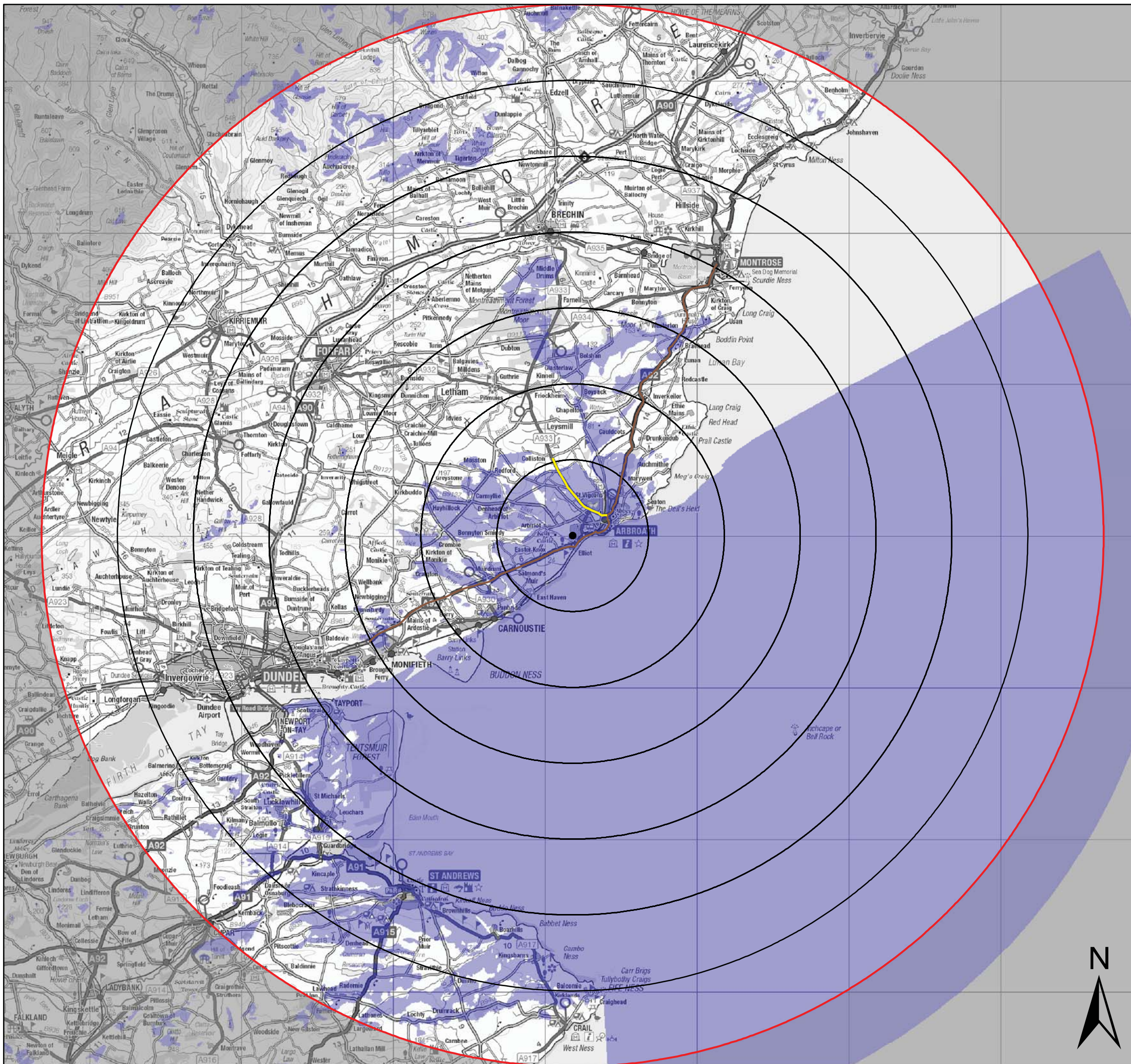


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Document Number: **C0621-163/Fig 7.8**
 Version: **1.0**
 Author: **PL**
 Checked by: **RC**
 Approved by: **GM**
 Date: **11/12/2014**



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Project Name: **Bairds Malt Wind Turbine**
 Document Title: **Route Assessment**
 Scale: **1:250,000 @ A3**

- Key:**
- Proposed Turbine Location
 - 5, 10, 15, 20, 25 & 30km Radii from Proposed Wind Turbine
 - Landscape and Visual Study Area (35km)

- ZTV Key**
- 1 Turbine Tip Theoretically Visible
 - A933, from Arbroath to Colliston
 - A92, from Monifieth to Montrose


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Client: **Bairds Malt Single Turbine Ltd**



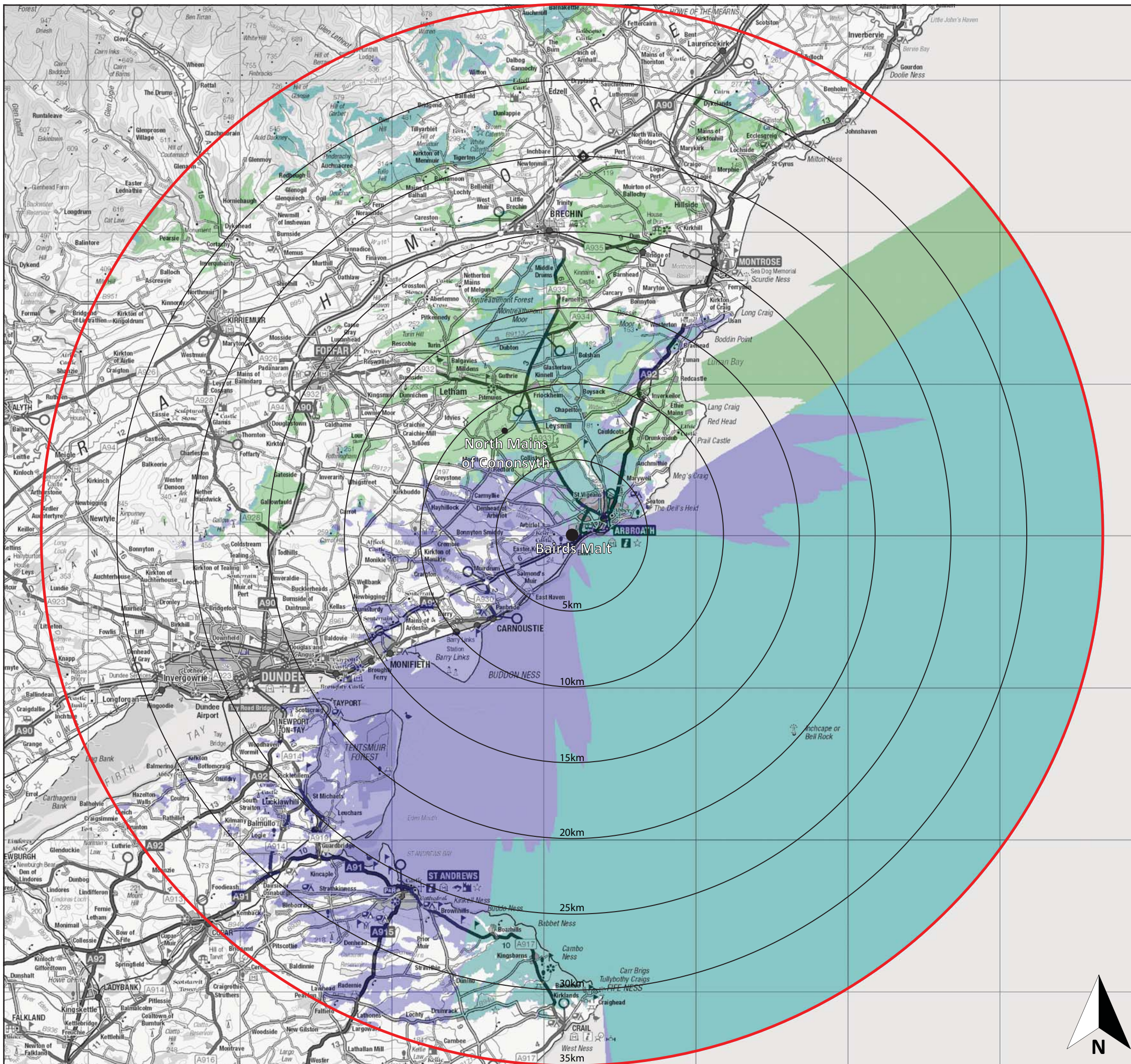
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Document Number: **C0621-163/Fig 7.9**
 Version: **1.0**
 Author: **PL**
 Checked by: **RC**
 Approved by: **GM**
 Date: **18/12/2014**



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Projects Name: **Bairs Malt Wind Turbine**
 Document Title: **Cumulative ZTV to Tip Height - North Mains of Cononsyth (Operational)**
 Scale: **1:250,000 @ A3**

- Key:
- Proposed Turbine Location
 - Other Project Location
 - 5, 10, 15, 20, 25 & 30km Radii from Proposed Wind Turbine
 - Landscape and Visual Study Area (35km)
 - Bairs Malt Visible
 - North Mains of Cononsyth Visible
 - Bairs Malt & North Mains of Cononsyth Visible


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Client: **Bairs Malt Single Turbine Ltd**



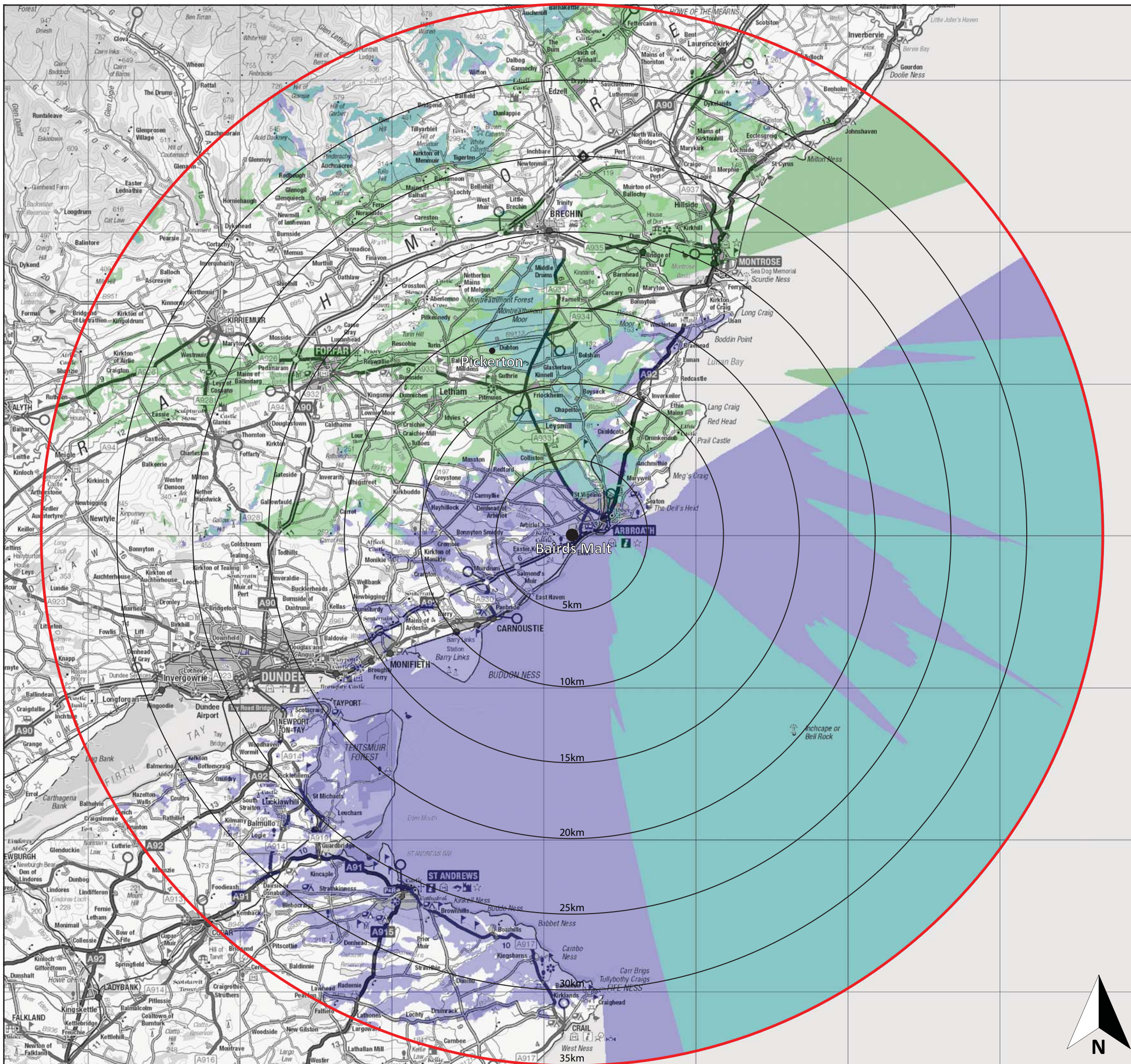
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Document Number: **CO621-163/Fig 7.10a**
 Version: **1.0**
 Author: **SS**
 Checked by: **RC**
 Approved By: **GM**
 Date: **17/12/2014**



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Projects Name: **Bairds Malt Wind Turbine**
 Document Title: **Cumulative ZTV to Tip Height - Pickerton (Operational)**
 Scale: **1:250,000 @ A3**

- Key:
- Proposed Turbine Location
 - Other Project Location
 - 5, 10, 15, 20, 25 & 30km Radii from Proposed Wind Turbine
 - Landscape and Visual Study Area (35km)
 - Bairds Malt Visible
 - Pickerton Visible
 - Bairds Malt & Pickerton Visible


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Client: **Bairds Malt Single Turbine Ltd**



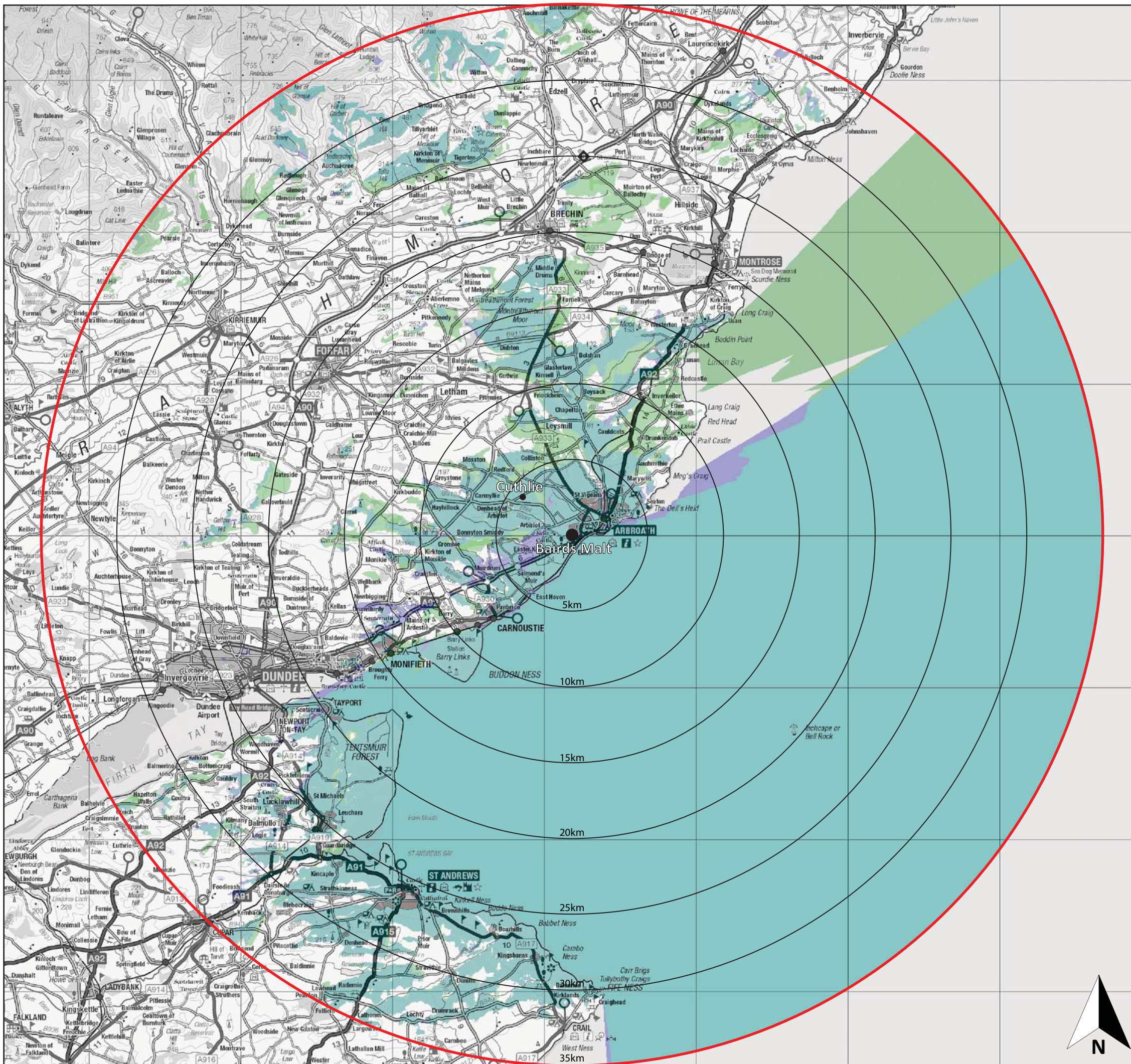
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Document Number: **CO621-163/Fig 7.10b**
 Version: **1.0**
 Author: **SS**
 Checked by: **RC**
 Approved By: **GM**
 Date: **17/12/2014**



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Projects Name: **Bairds Malt Wind Turbine**
 Document Title: **Cumulative ZTV to Tip Height - Cuthlie (Consented)**
 Scale: **1:250,000 @ A3**

- Key:
- Proposed Turbine Location
 - Other Project Location
 - 5, 10, 15, 20, 25 & 30km Radii from Proposed Wind Turbine
 - Landscape and Visual Study Area (35km)
 - Bairds Malt Visible
 - Cuthlie Visible
 - Bairds Malt & Cuthlie Visible


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Client: **Bairds Malt Single Turbine Ltd**



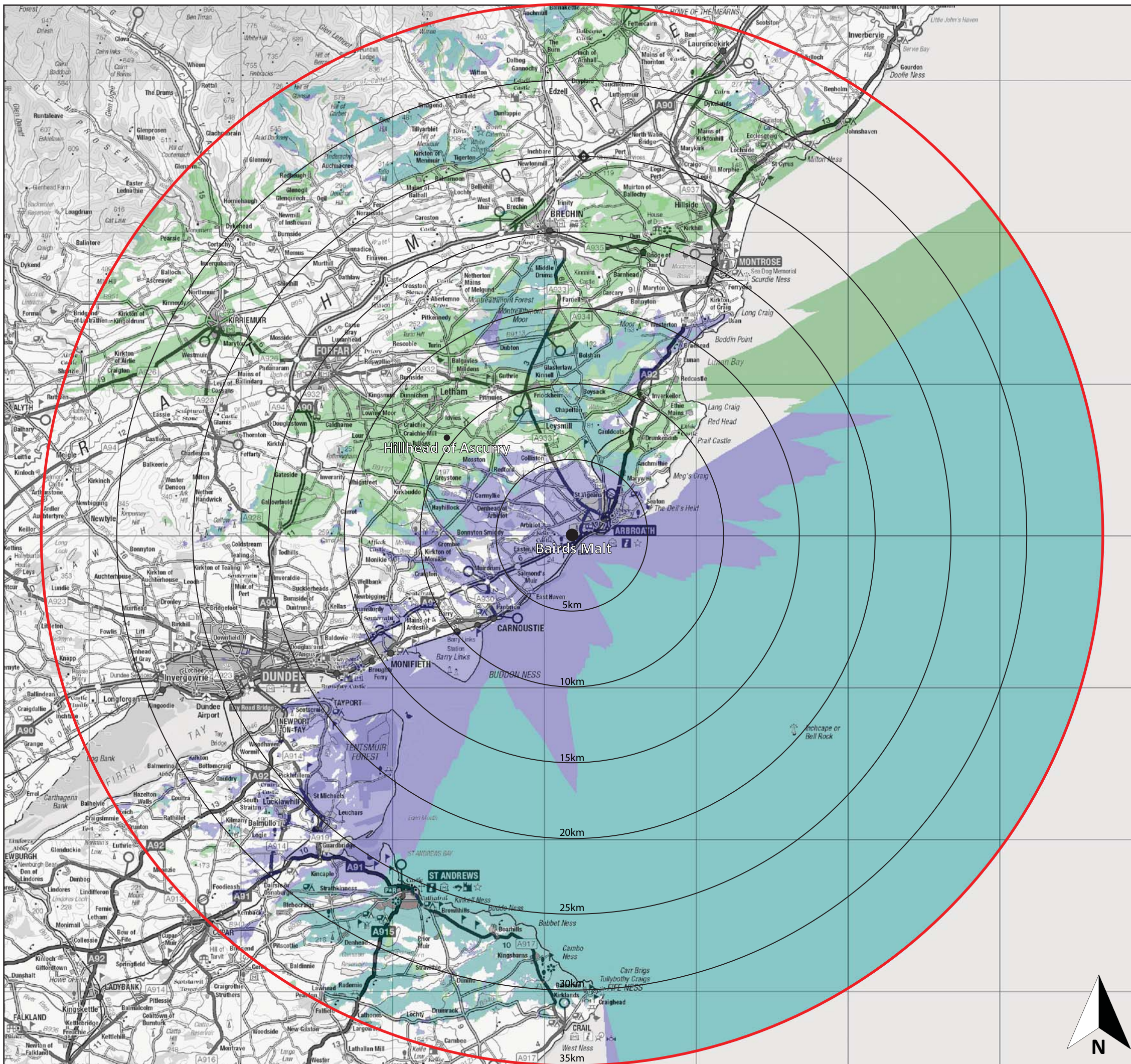
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 Version: **1.0**
 Author: **SS**
 Checked by: **RC**
 Approved By: **GM**
 Date: **17/12/2014**



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Projects Name: **Bairds Malt Wind Turbine**
 Document Title: **Cumulative ZTV to Tip Height - Hillhead of Ascurry (Consented)**
 Scale: **1:250,000 @ A3**

- Key:
- Proposed Turbine Location
 - Other Project Location
 - 5, 10, 15, 20, 25 & 30km Radii from Proposed Wind Turbine
 - Landscape and Visual Study Area (35km)
 - Bairds Malt Visible
 - Hillhead of Ascurry Visible
 - Bairds Malt & Hillhead of Ascurry Visible


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Client: **Bairds Malt Single Turbine Ltd**



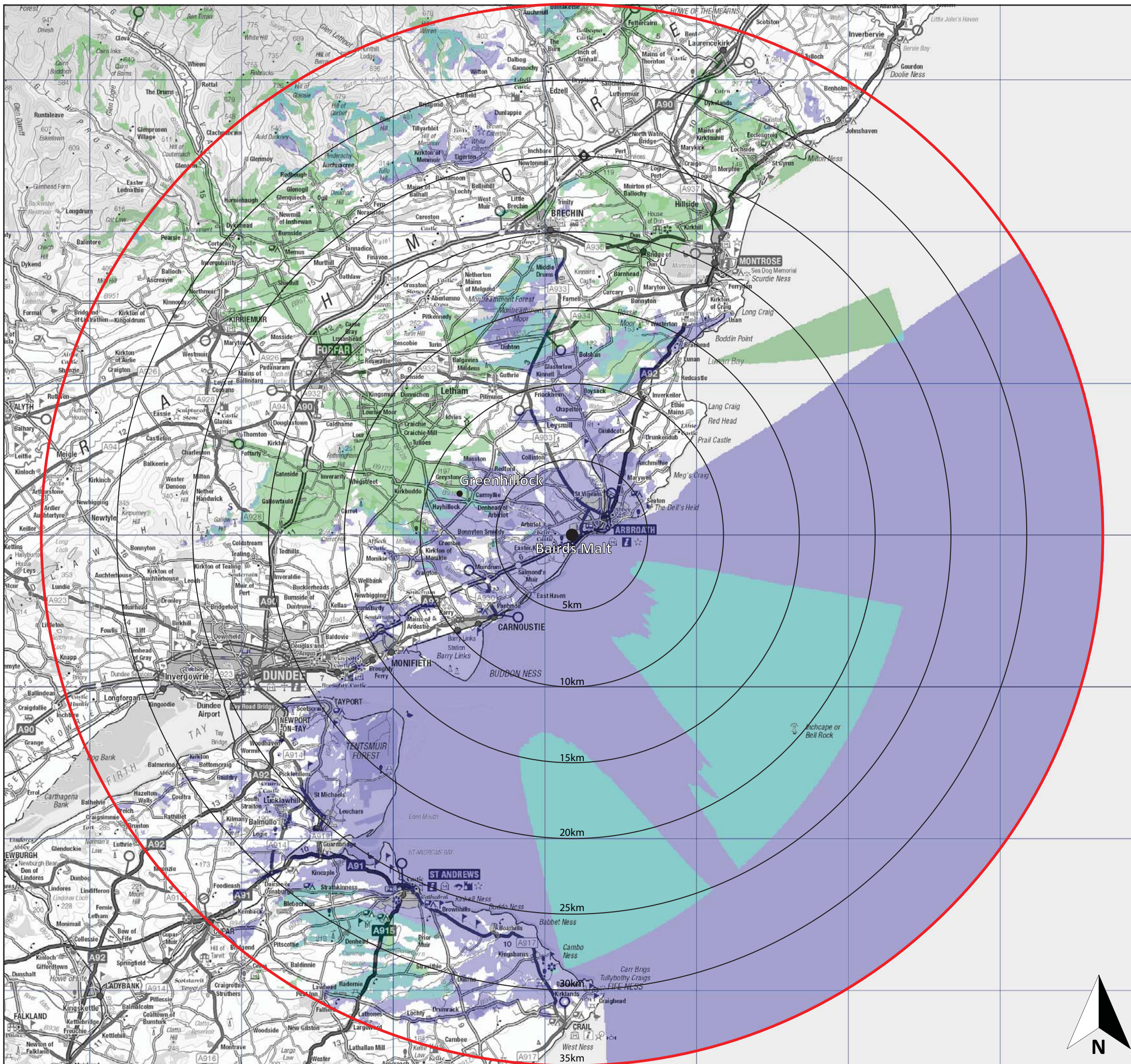
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 Version: **1.0**
 Author: **SS**
 Checked by: **RC**
 Approved By: **GM**
 Date: **17/12/2014**



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Projects Name: **Bairs Malt Wind Turbine**
 Document Title: **Cumulative ZTV to Tip Height - Greenhillock (Consented)**
 Scale: **1:250,000 @ A3**

- Key:
- Proposed Turbine Location
 - Other Project Location
 - 5, 10, 15, 20, 25 & 30km Radii from Proposed Wind Turbine
 - Landscape and Visual Study Area (35km)
 - Bairs Malt Visible
 - Greenhillock Visible
 - Bairs Malt & Greenhillock Visible


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Client: **Bairs Malt Single Turbine Ltd**



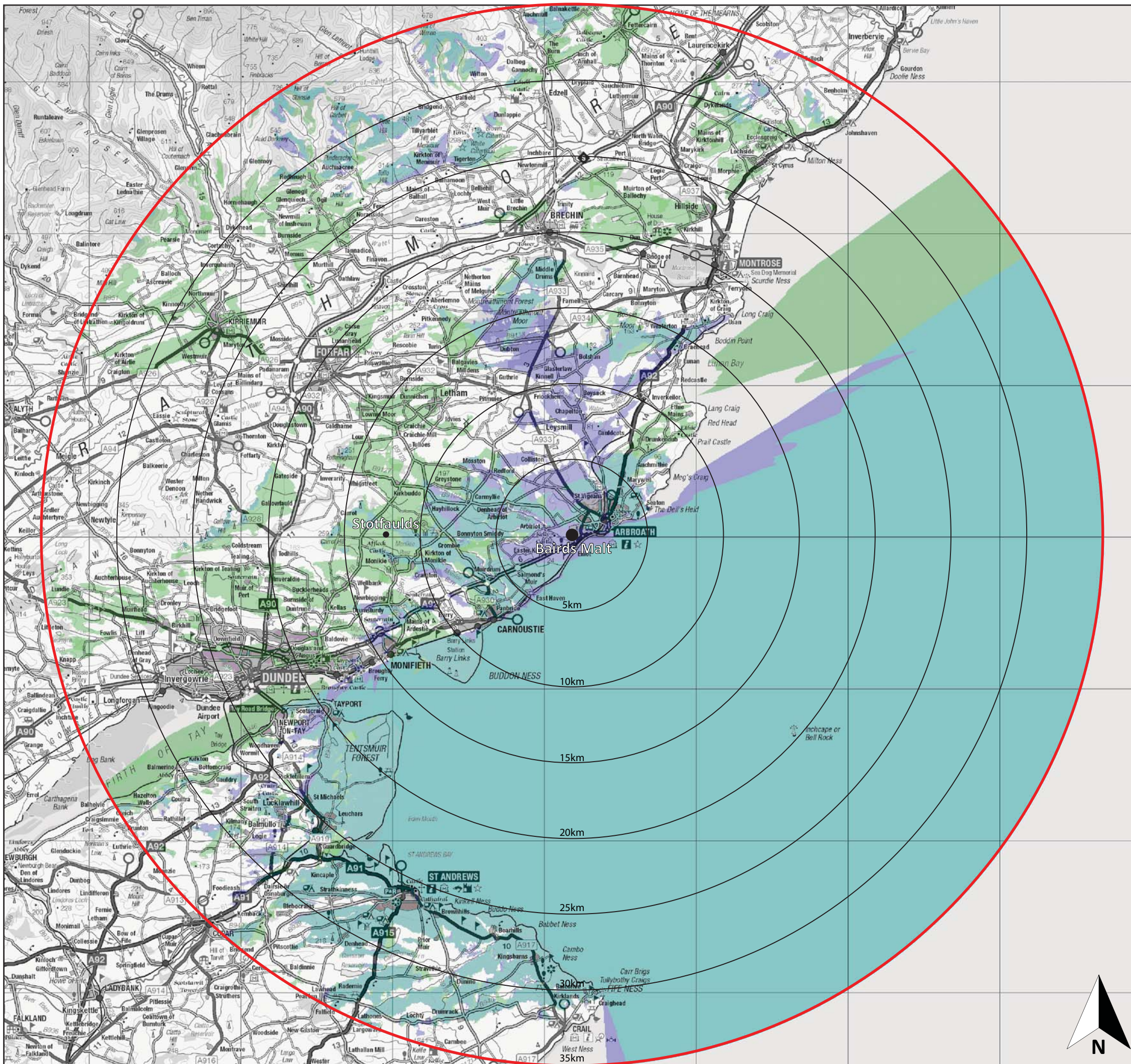
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 Version: **1.0**
 Author: **SS**
 Checked by: **RC**
 Approved By: **GM**
 Date: **17/12/2014**



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Projects Name: **Bairds Malt Wind Turbine**
 Document Title: **Cumulative ZTV to Tip Height - Stotfaulds (Consented)**
 Scale: **1:250,000 @ A3**

- Key:
- Proposed Turbine Location
 - Other Project Location
 - 5, 10, 15, 20, 25 & 30km Radii from Proposed Wind Turbine
 - Landscape and Visual Study Area (35km)
 - Bairds Malt Visible
 - Stotfaulds Visible
 - Bairds Malt & Stotfaulds Visible


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Client: **Bairds Malt Single Turbine Ltd**



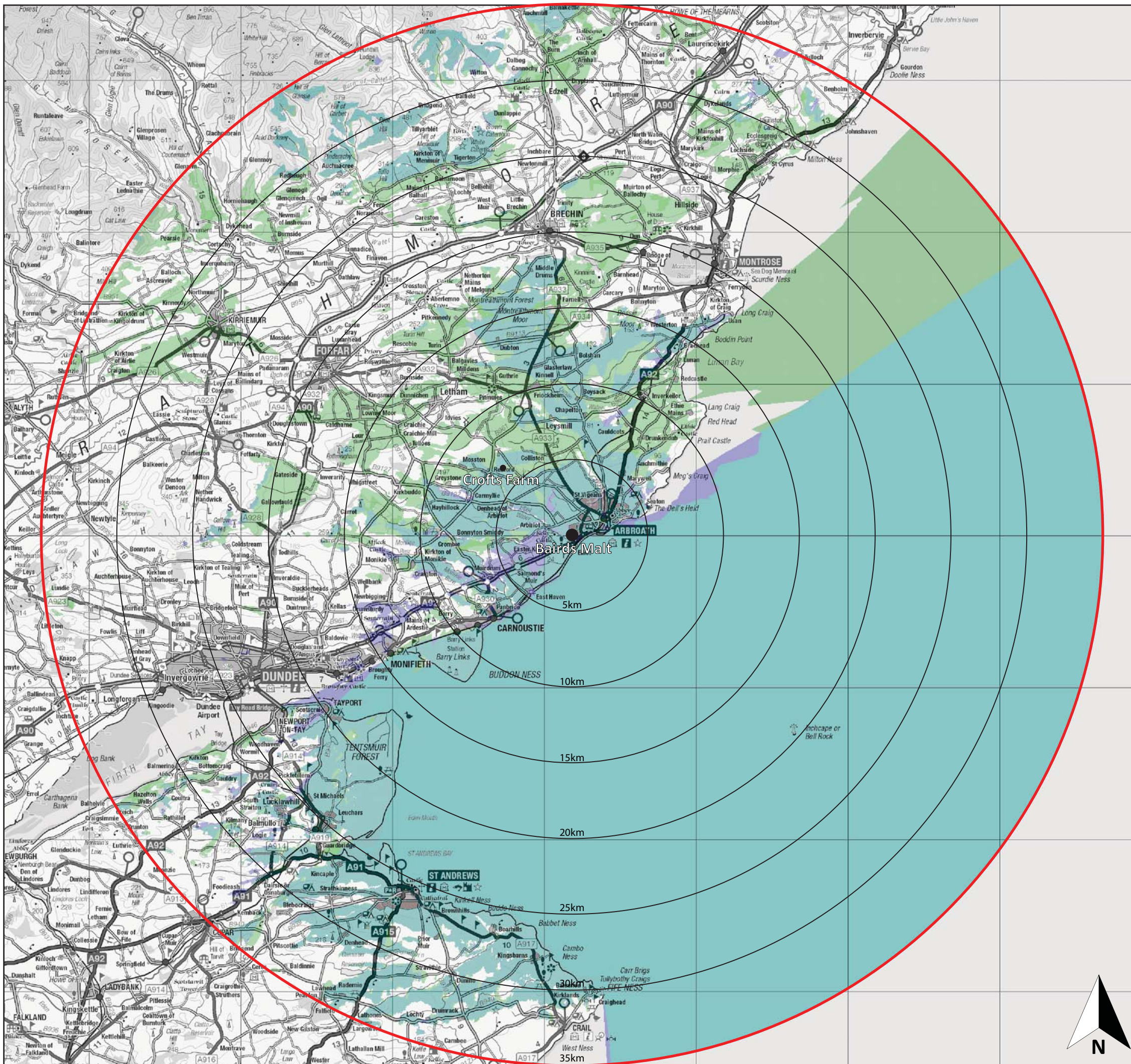
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 Version: **1.0**
 Author: **SS**
 Checked by: **RC**
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 Date: **17/12/2014**



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Projects Name: **Bairds Malt Wind Turbine**
 Document Title: **Cumulative ZTV to Tip Height - Crofts Farm (Planning)**
 Scale: **1:250,000 @ A3**

- Key:
- Proposed Turbine Location
 - Other Project Location
 - 5, 10, 15, 20, 25 & 30km Radii from Proposed Wind Turbine
 - Landscape and Visual Study Area (35km)
 - Bairds Malt Visible
 - Crofts Farm Visible
 - Bairds Malt & Crofts Farm Visible


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Client: **Bairds Malt Single Turbine Ltd**



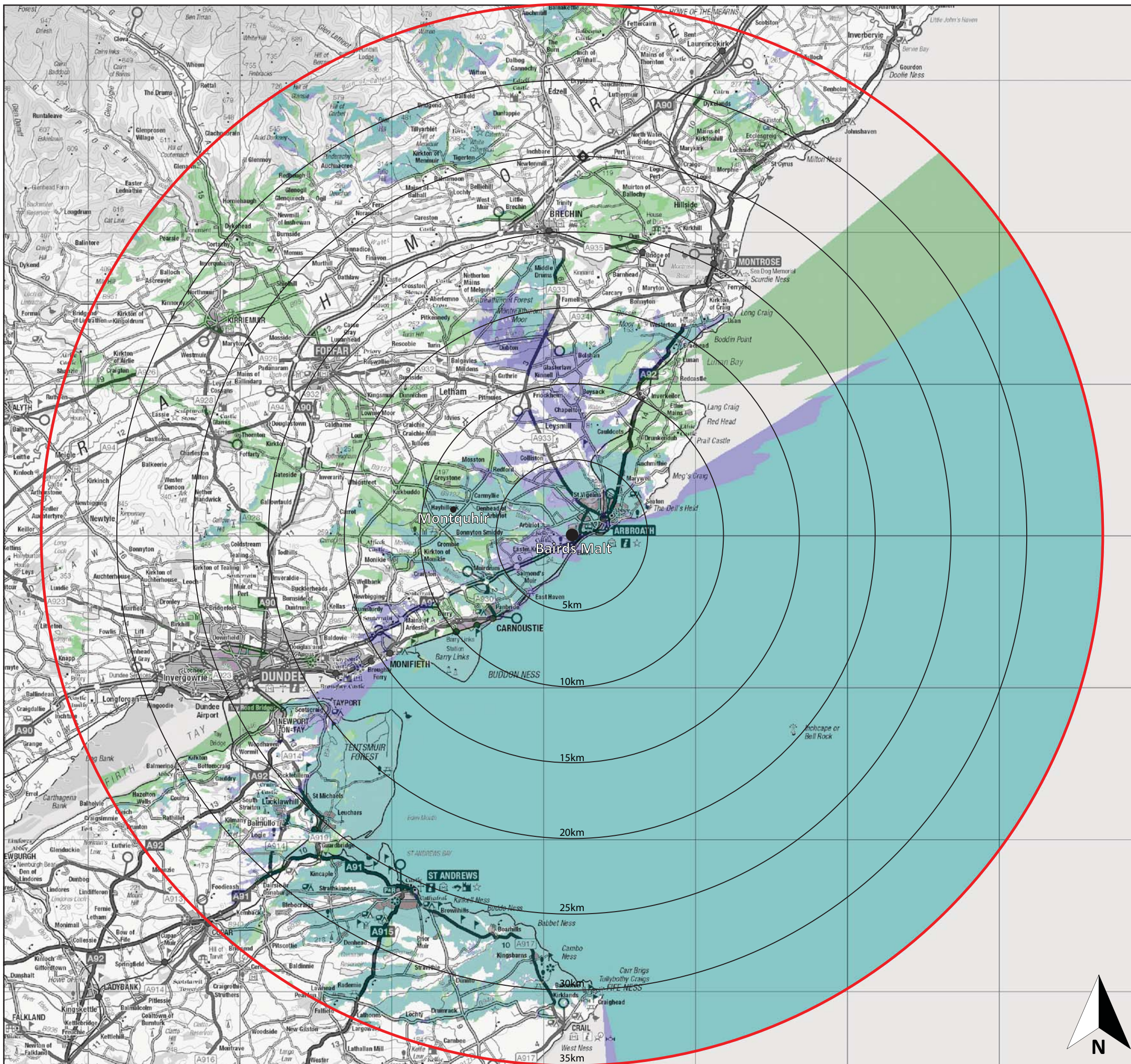
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 Version: **1.0**
 Author: **SS**
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Projects Name: **Bairs Malt Wind Turbine**

Document Title: **Cumulative ZTV to Tip Height - Montquhir (Planning)**

Scale: **1:250,000 @ A3**

Key:

- Proposed Turbine Location
- Other Project Location
- 5, 10, 15, 20, 25 & 30km Radii from Proposed Wind Turbine
- Landscape and Visual Study Area (35km)
- Bairs Malt Visible
- Montquhir Visible
- Bairs Malt & Montquhir Visible

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Version: **1.0**

Author: **SS**

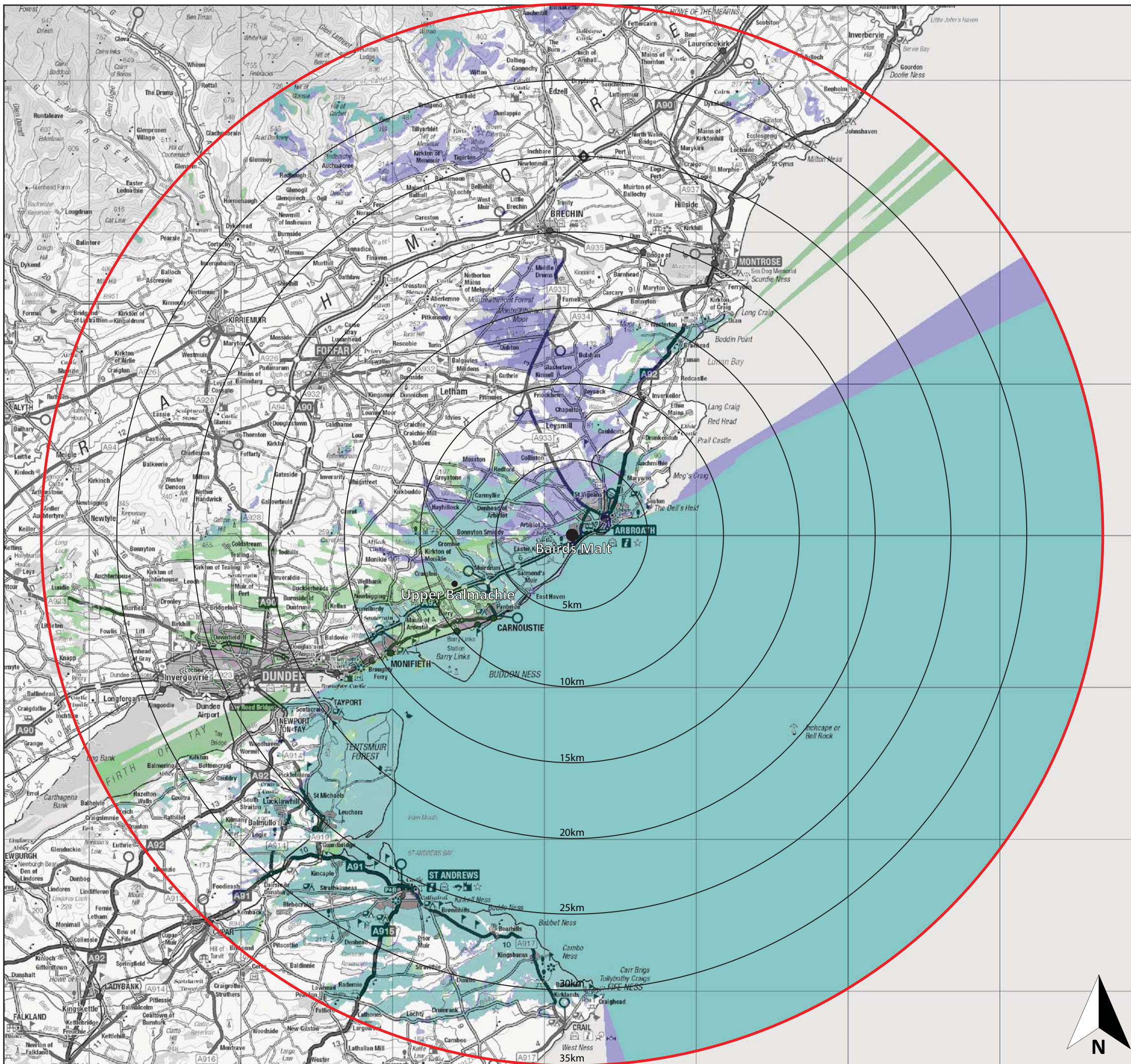
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Approved By: **GM**

Date: **17/12/2014**

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Projects Name: **Bairds Malt Wind Turbine**
 Document Title: **Cumulative ZTV to Tip Height - Upper Balmachie (Planning)**
 Scale: **1:250,000 @ A3**

- Key:
- Proposed Turbine Location
 - Other Project Location
 - 5, 10, 15, 20, 25 & 30km Radii from Proposed Wind Turbine
 - Landscape and Visual Study Area (35km)
 - Bairds Malt Visible
 - Upper Balmachie Visible
 - Bairds Malt & Upper Balmachie Visible


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Client: **Bairds Malt Single Turbine Ltd**



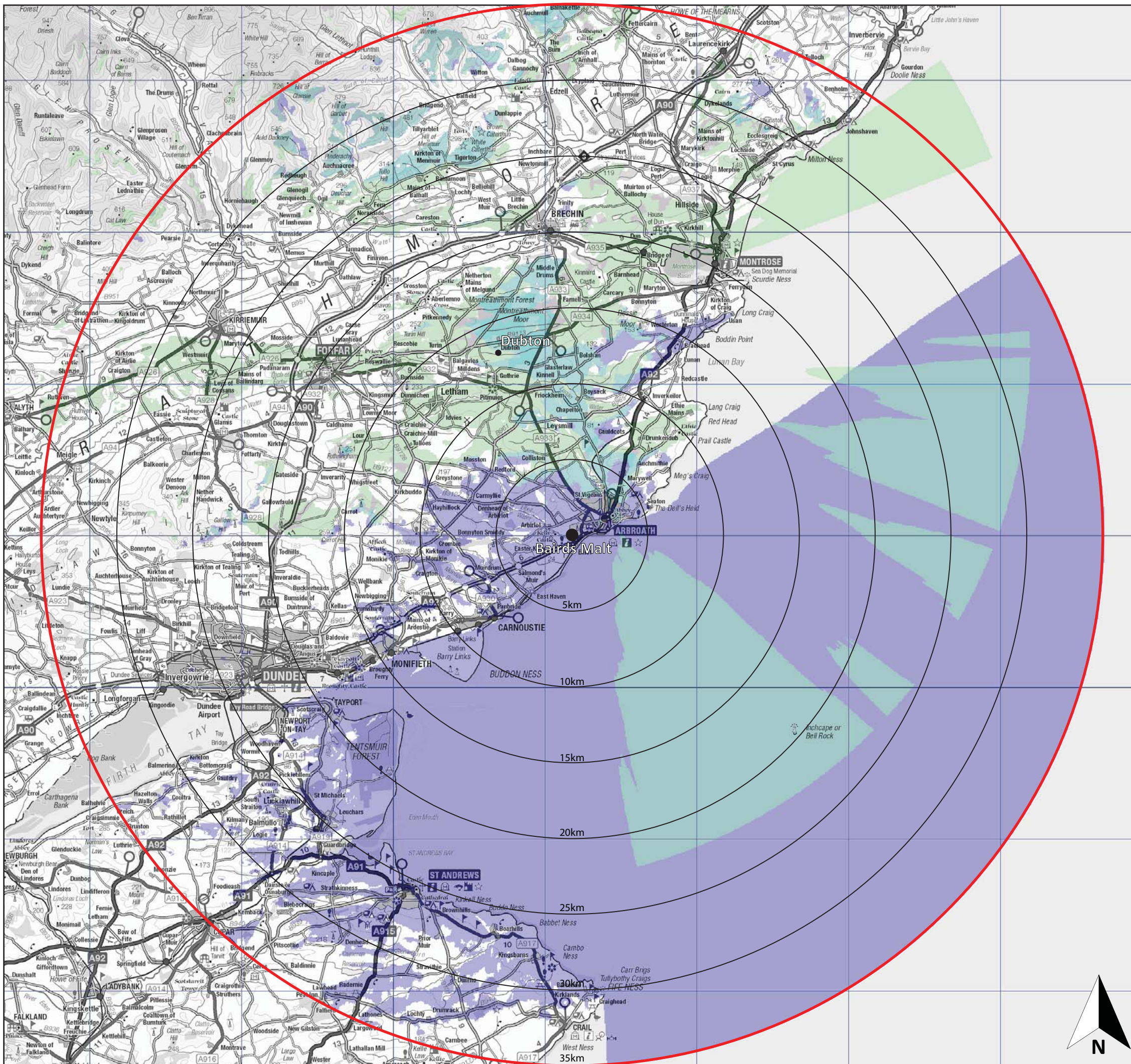
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 Version: **1.0**
 Author: **SS**
 Checked by: **RC**
 Approved By: **GM**
 Date: **17/12/2014**



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Projects Name: **Bairds Malt Wind Turbine**
 Document Title: **Cumulative ZTV to Tip Height - Dubton Farm (Planning)**
 Scale: **1:250,000 @ A3**

- Key:
- Proposed Turbine Location
 - Other Project Location
 - 5, 10, 15, 20, 25 & 30km Radii from Proposed Wind Turbine
 - Landscape and Visual Study Area (35km)
 - Bairds Malt Visible
 - Dubton Farm Visible
 - Bairds Malt & Dubton Farm Visible


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Client: **Bairds Malt Single Turbine Ltd**



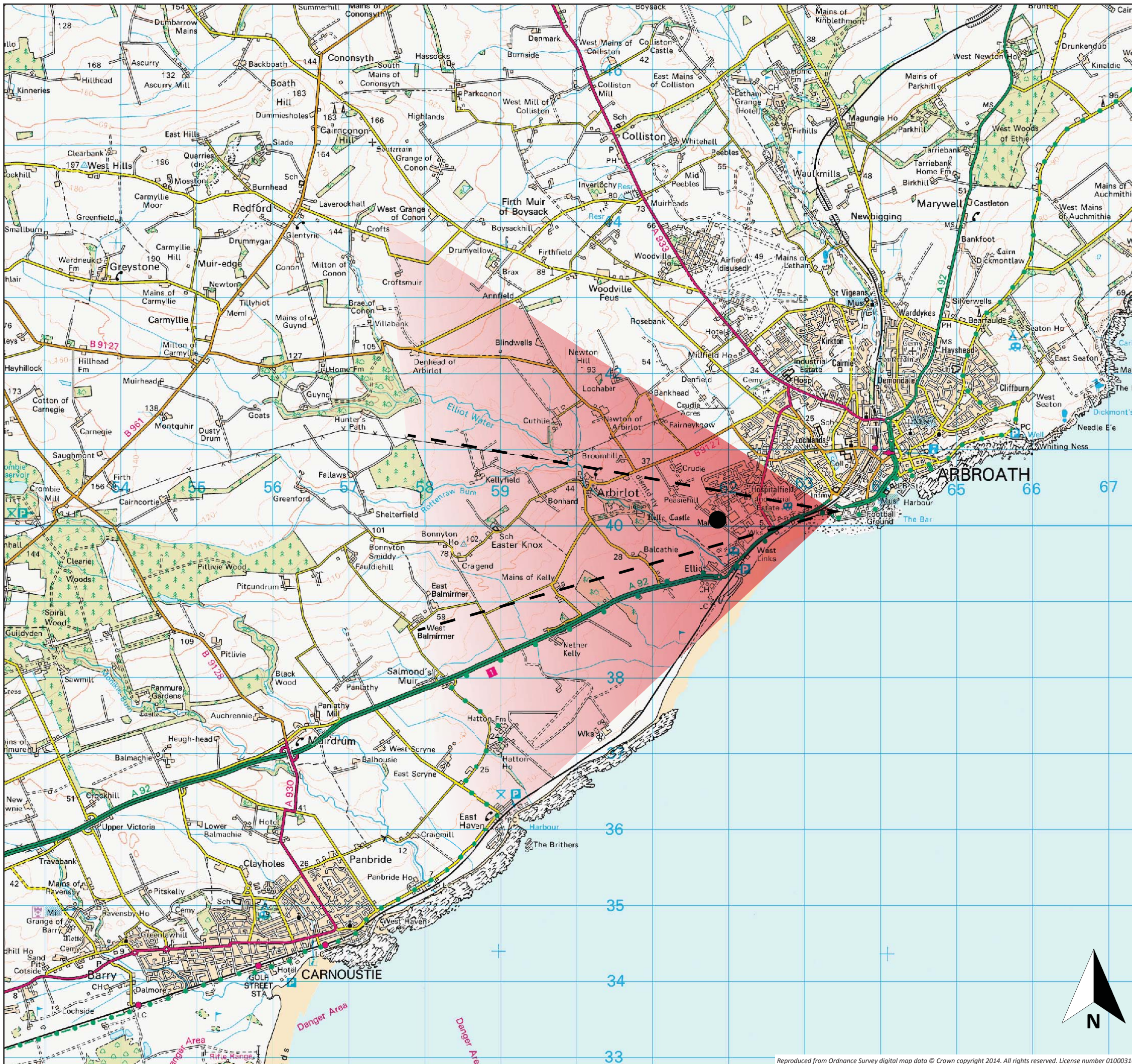
Drawing by: **Green Cat Renewables Ltd**

Document Number: **CO621-163/Fig 7.12d**
 Version: **1.0**
 Author: **SS**
 Checked by: **RC**
 Approved By: **GM**
 Date: **17/12/2014**





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Project Name: **Bairds Malt Wind Turbine**
 Document Title: **VP01 - Queens Drive, Arbroath**
 Scale: **1:50,000 @ A3**

Key:
 Proposed Turbine Location
 76 and 26° Field of View

Viewpoint Information

Viewpoint Location: **E363270 N740128**
 Viewpoint Elevation: **0m (A.O.D)**
 View Direction: **268°**
 Distance to Turbine: **1.4km**
 Visibility: **6 Projects**
 Camera Type: **Nikon D3100**
 Focal Length: **35mm**
 Effective Focal Length: **54.6mm**
 Date Taken: **30/01/2013**
 Time Taken: **14:37**
 Height above elevation: **1.5m**

Visual Impact

Magnitude: **High**
 Sensitivity: **Medium**
 Overall: **Major/Moderate**

Please note for a 76° field of view, a viewing distance of 300mm is recommended.

Client: **Bairds Malt Single Turbine Ltd**



Drawing by: **Green Cat Renewables Ltd**

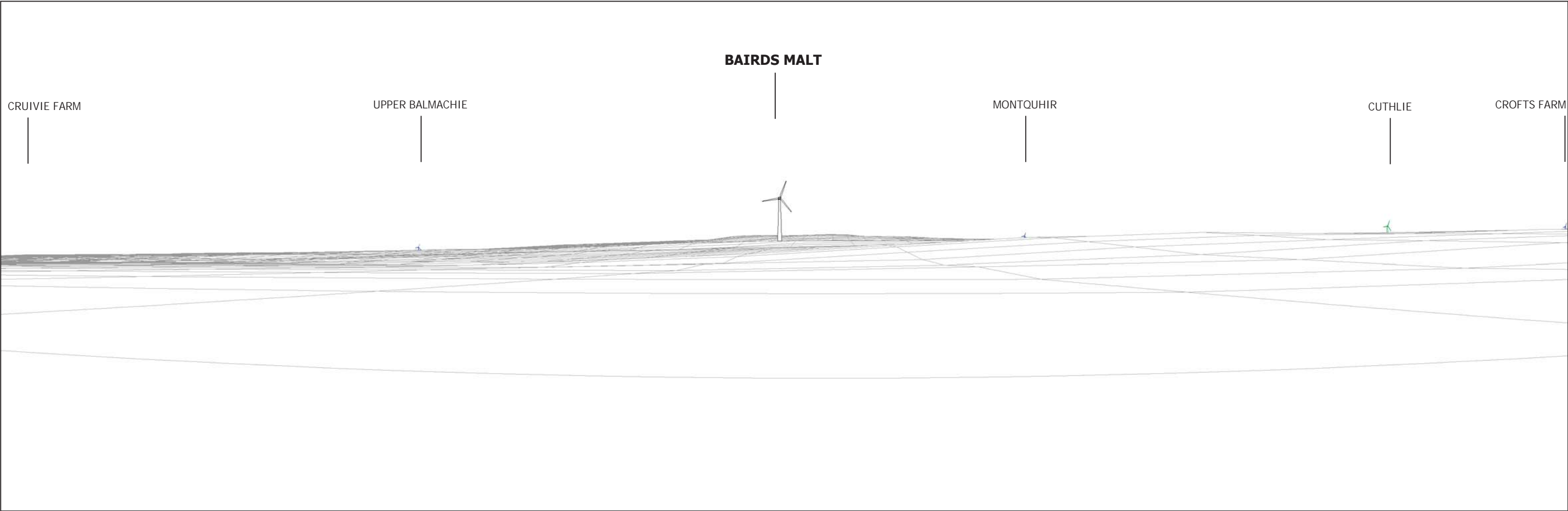
Document Number: **CO621-163/Fig 7.13**
 Version: **1.0**
 Author: **SS**
 Checked by: **RC**
 Approved By: **GM**
 Date: **17/12/2014**



VP01 - PHOTOGRAPH OF EXISTING VIEW



VP01 - WIRELINE DRAWING

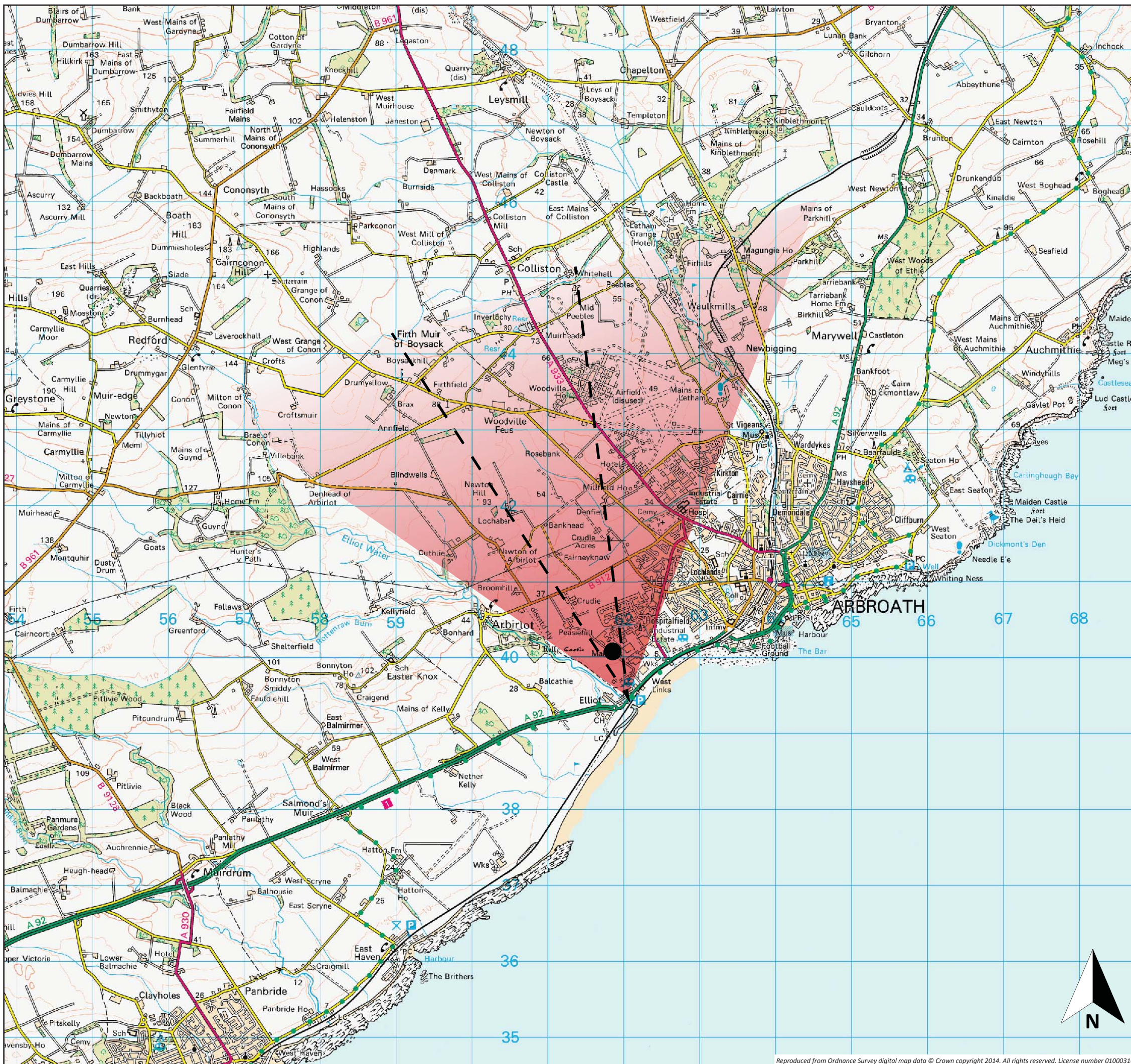




VP01 - 70MM PHOTOMONTAGE OF PROPOSAL



**26° VIEWING ANGLE
500MM VIEWING DISTANCE**




Project Name: **Bairds Malt Wind Turbine**

Document Title: **VP02 - Elliot Bridge**

Scale: **1:50,000 @ A3**

Key:
 Proposed Turbine Location

 76 and 26° Field of View

Viewpoint Information

Viewpoint Location: **E362001 N739451**

Viewpoint Elevation: **2m (A.O.D)**

View Direction: **346°**

Distance to Turbine: **0.7km**

Visibility: **3 Projects**

Camera Type: **Nikon D3100**

Focal Length: **35mm**

Effective Focal Length: **54.6mm**

Date Taken: **01/03/2013**

Time Taken: **14:03**

Height above elevation: **1.5m**

Visual Impact

Magnitude: **High**

Sensitivity: **High**

Overall: **Major**

Please note for a 76° field of view, a viewing distance of 300mm is recommended.

Client: **Bairds Malt Single Turbine Ltd**



Drawing by: **Green Cat Renewables Ltd**

Document Number: **CO621-163/Fig 7.14**

Version: **1.0**

Author: **SS**

Checked by: **RC**

Approved By: **GM**

Date: **17/12/2014**

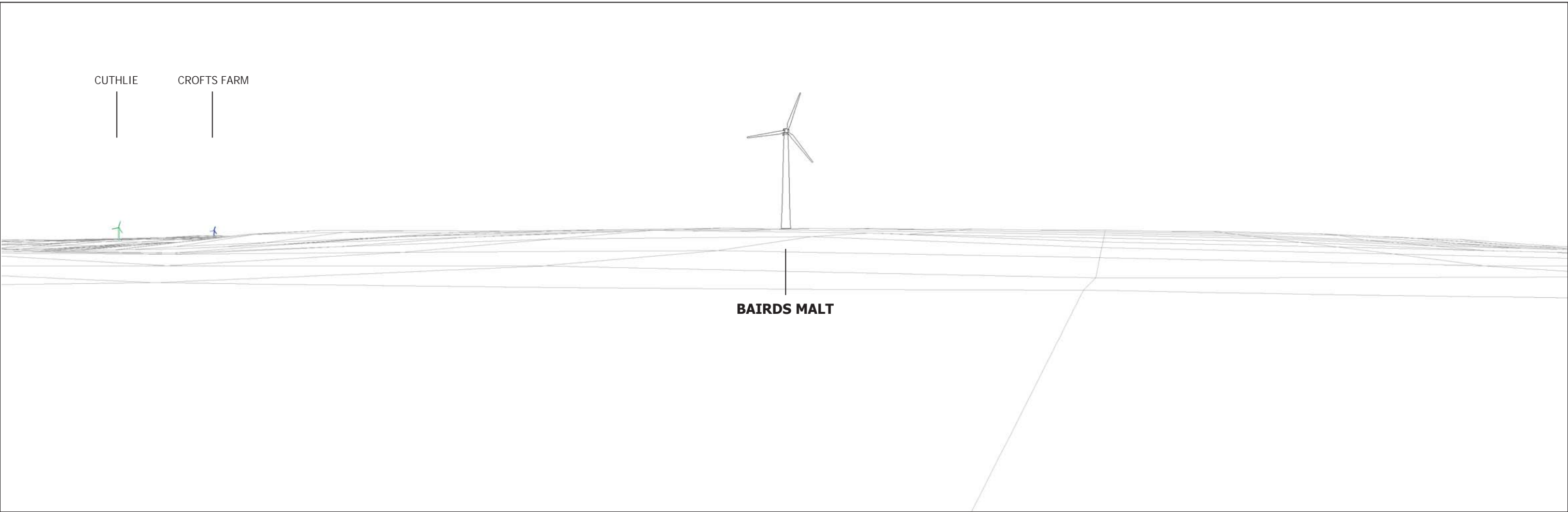


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VP02 - PHOTOGRAPH OF EXISTING VIEW



VP02 - WIRELINE DRAWING

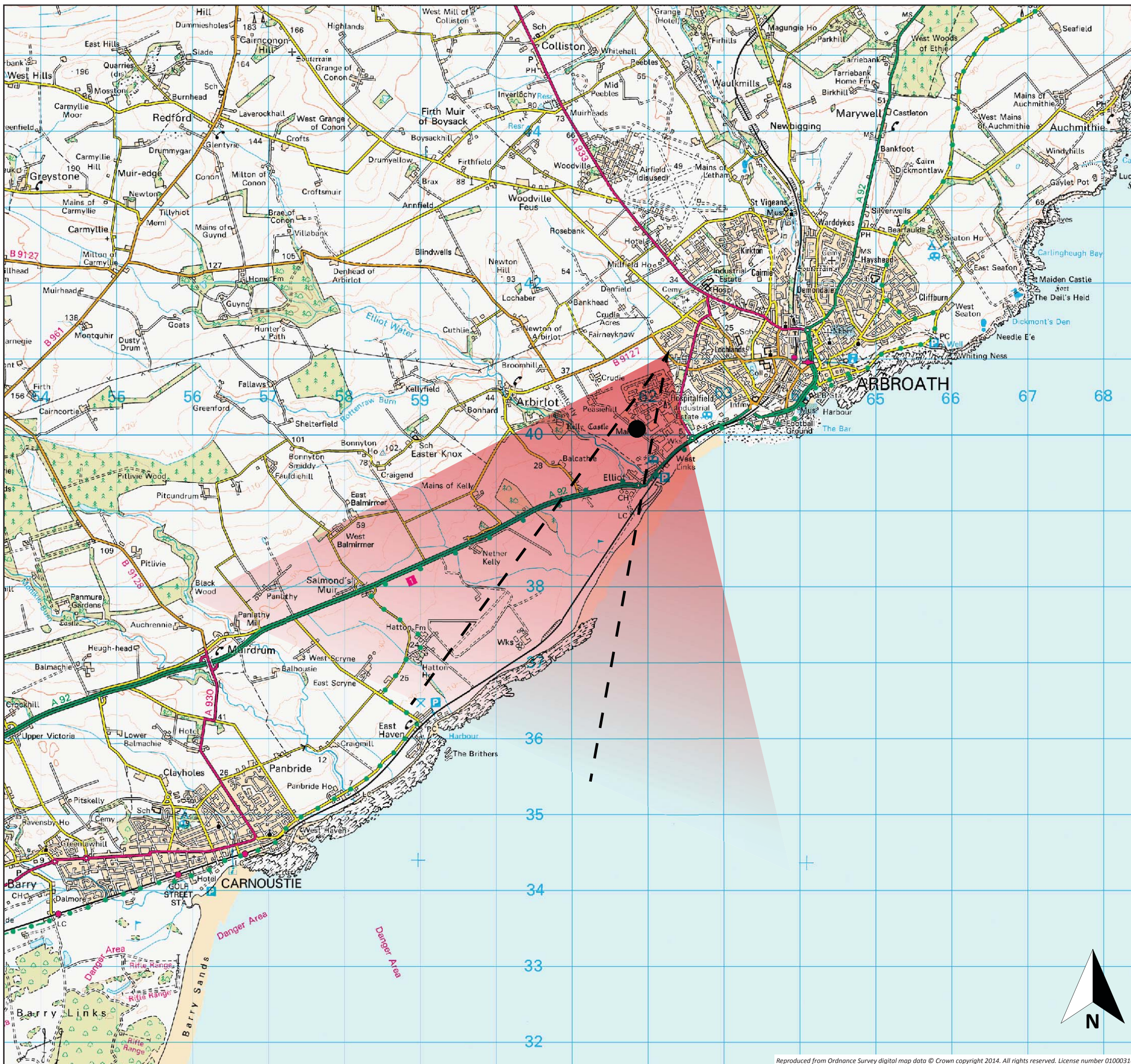




VP02 - 70MM PHOTOMONTAGE OF PROPOSAL



**26° VIEWING ANGLE
500MM VIEWING DISTANCE**



Project Name: **Bairds Malt Wind Turbine**

Document Title: **VP03 - Arbriol Road West**

Scale: **1:50,000 @ A3**

- Key:
- Proposed Turbine Location
 - ◀ 76 and 26° Field of View

Viewpoint Information

Viewpoint Location: **E362203 N741066**
 Viewpoint Elevation: **28m (A.O.D)**
 View Direction: **200°**
 Distance to Turbine: **1km**

Visibility: **3 Projects**

Camera Type: **Nikon D3100**
 Focal Length: **35mm**
 Effective Focal Length: **54.6mm**
 Date Taken: **04/04/2013**
 Time Taken: **12:09**
 Height above elevation: **1.5m**

Visual Impact

Magnitude: **High**
 Sensitivity: **Medium**
 Overall: **Major/Moderate**

Please note for a 76° field of view, a viewing distance of 300mm is recommended.

Client: **Bairds Malt Single Turbine Ltd**



Drawing by: **Green Cat Renewables Ltd**

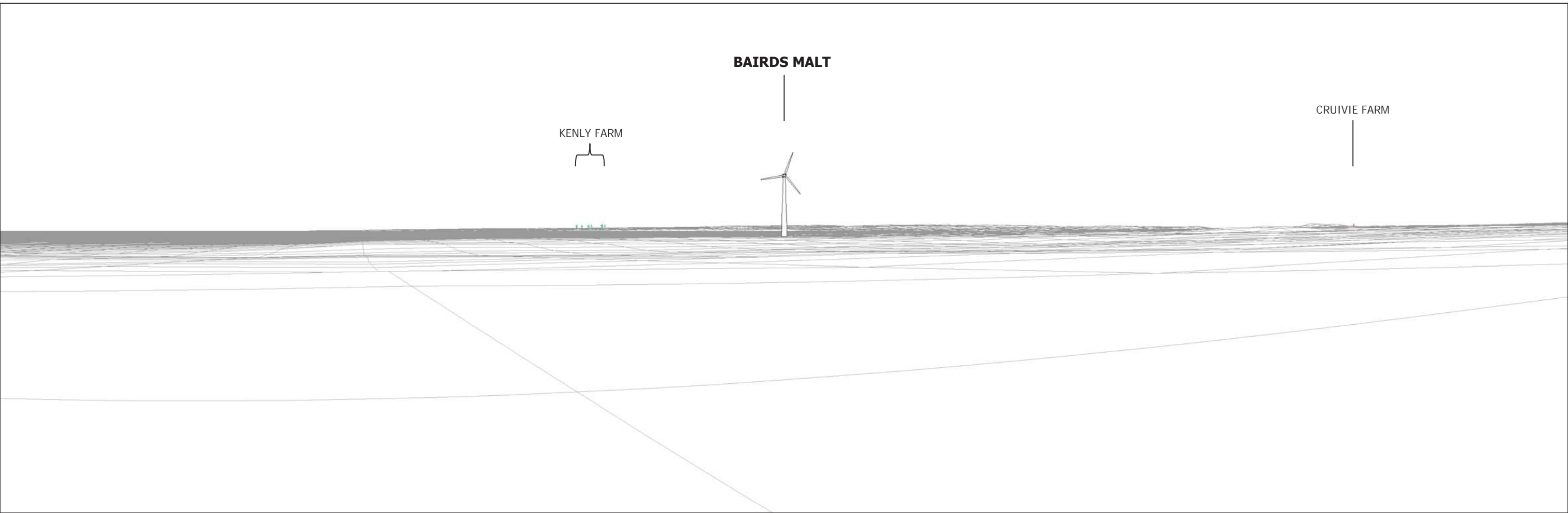
Document Number: **CO621-163/Fig 7.15**
 Version: **1.0**
 Author: **SS**
 Checked by: **RC**
 Approved By: **GM**
 Date: **17/12/2014**



VP03 - PHOTOGRAPH OF EXISTING VIEW



VP03 - WIRELINE DRAWING

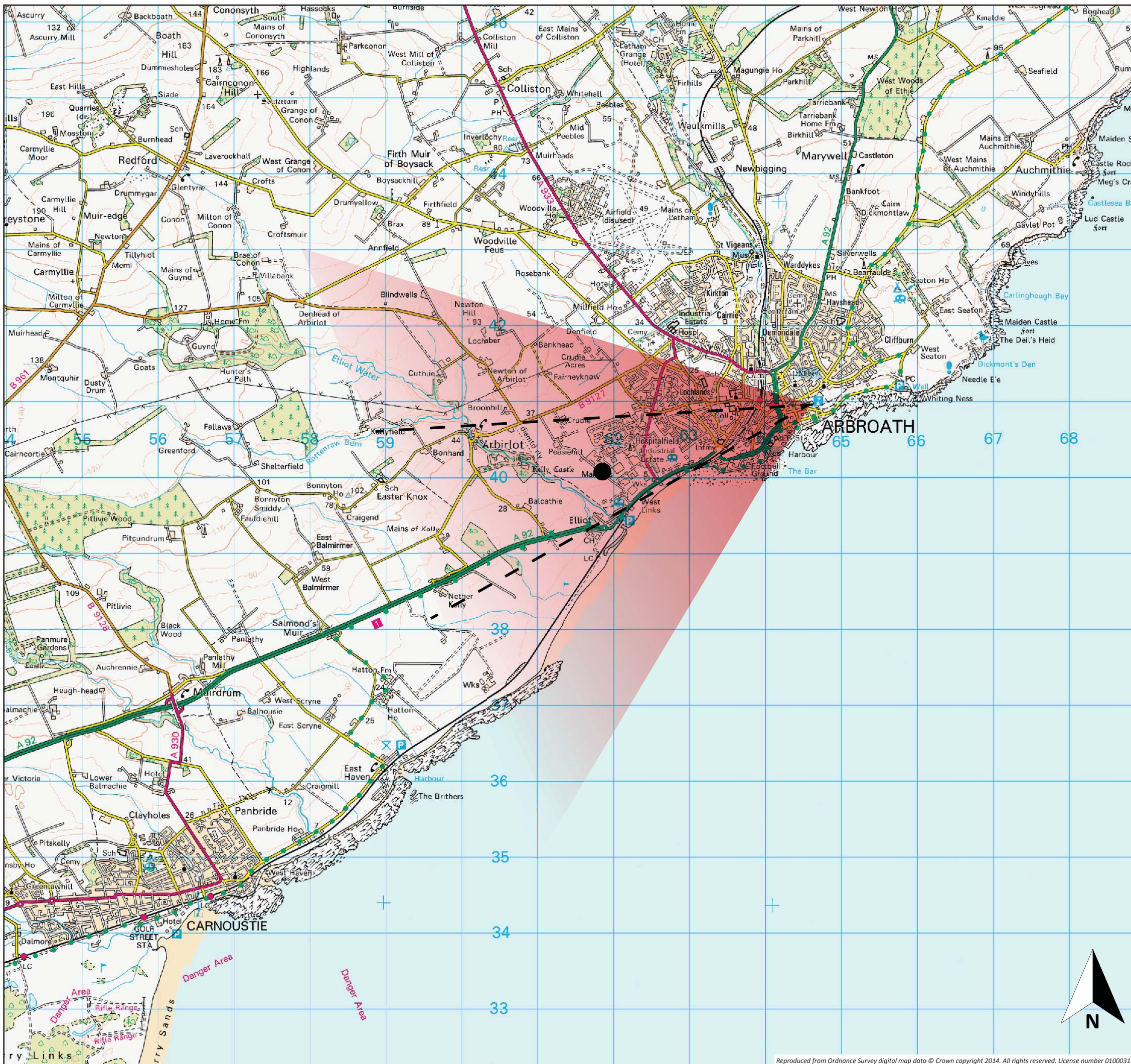




VP03 - 70MM PHOTOMONTAGE OF PROPOSAL



**26° VIEWING ANGLE
500MM VIEWING DISTANCE**

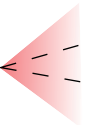


Project Name: **Bairds Malt Wind Turbine**

Document Title: **VP04 - Boulzie Hill**

Scale: **1:50,000 @ A3**

Key:
 Proposed Turbine Location

 76 and 26° Field of View

Viewpoint Information

Viewpoint Location: **E364569 N740924**
 Viewpoint Elevation: **15m (A.O.D)**
 View Direction: **252°**
 Distance to Turbine: **2.8km**

Visibility: **10 Projects**

Camera Type: **Nikon D3100**
 Focal Length: **35mm**
 Effective Focal Length: **54.6mm**
 Date Taken: **01/03/2013**
 Time Taken: **13:23**
 Height above elevation: **1.5m**

Visual Impact

Magnitude: **High**
 Sensitivity: **Medium**
 Overall: **Major/Moderate**

Please note for a 76° field of view, a viewing distance of 300mm is recommended.

Client: **Bairds Malt Single Turbine Ltd**



Drawing by: **Green Cat Renewables Ltd**

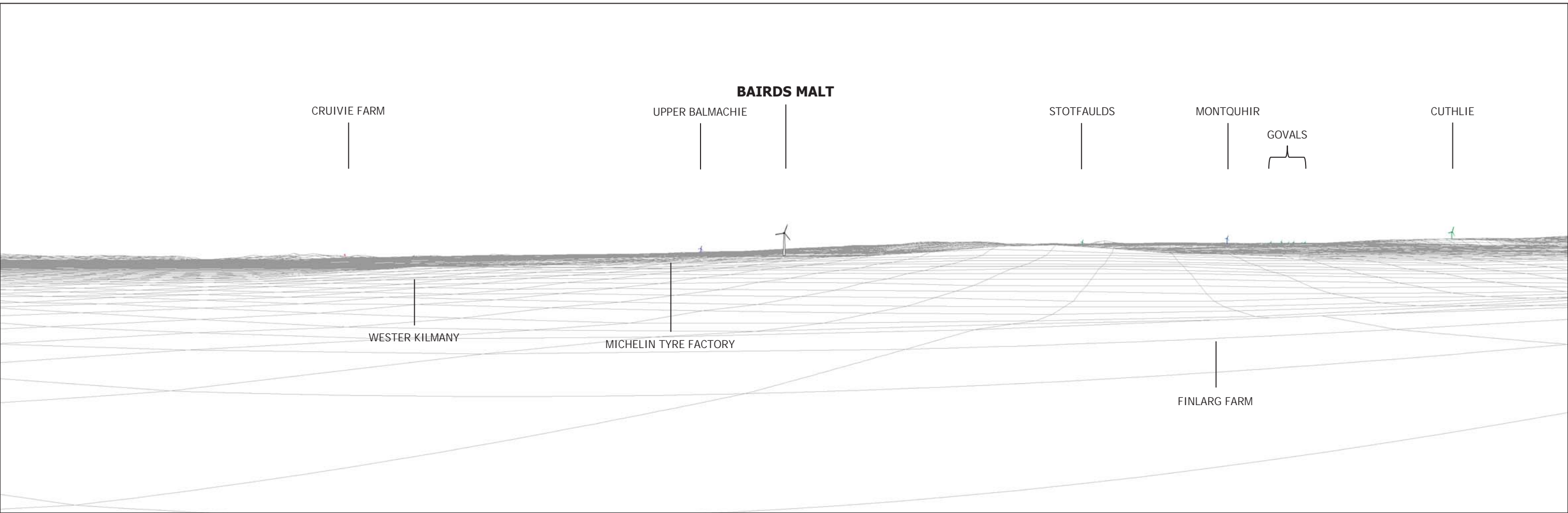
Document Number: **CO621-163/Fig 7.16**
 Version: **1.0**
 Author: **SS**
 Checked by: **RC**
 Approved By: **GM**
 Date: **17/12/2014**



VP04 - PHOTOGRAPH OF EXISTING VIEW



VP04 - WIRELINE DRAWING



VP04 - PHOTOMONTAGE OF PROPOSAL

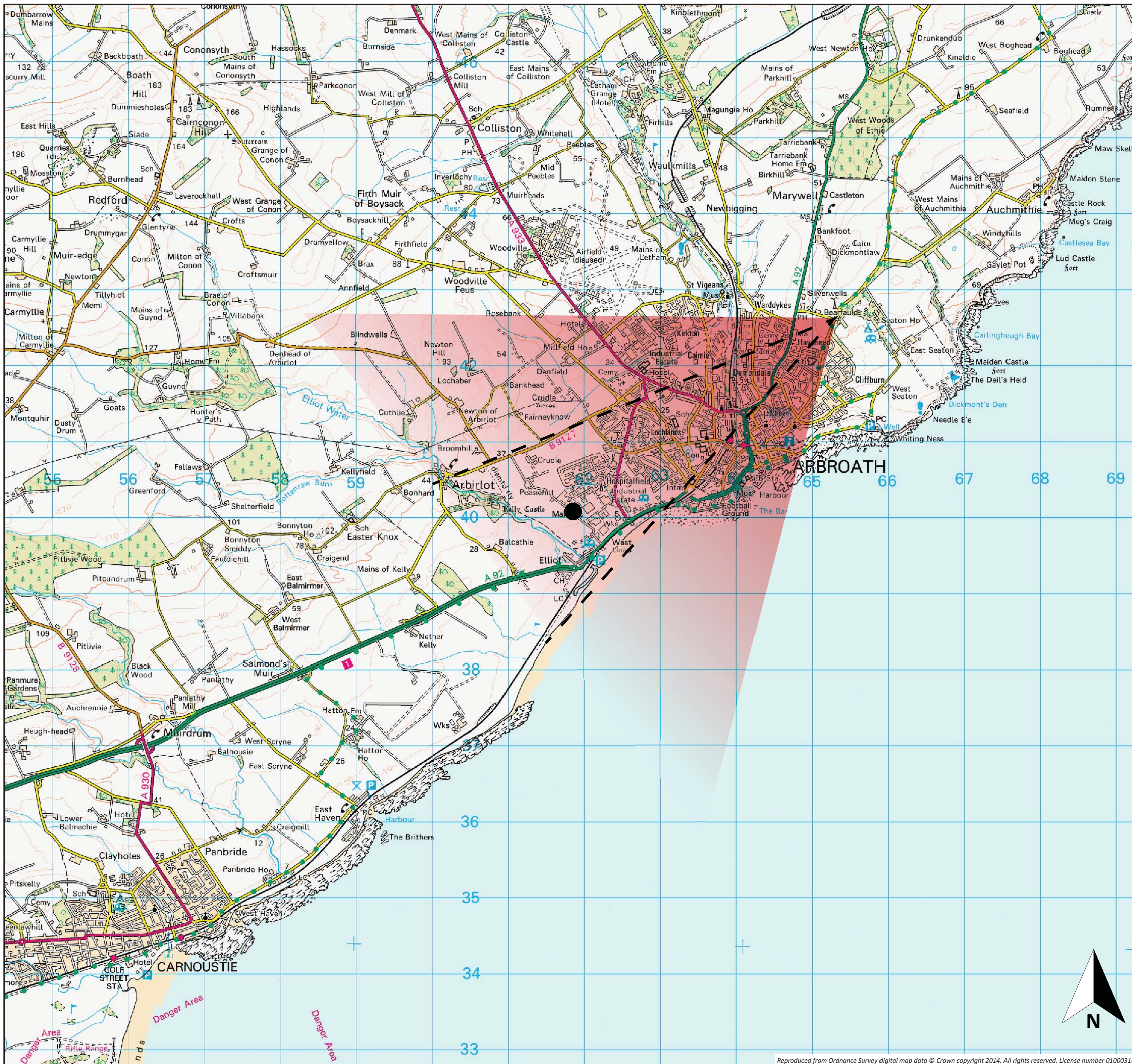
76° VIEWING ANGLE
300MM VIEWING DISTANCE



VP04 - 70MM PHOTOMONTAGE OF PROPOSAL



**26° VIEWING ANGLE
500MM VIEWING DISTANCE**




Project Name: **Bairds Malt Wind Turbine**

Document Title: **VP05 - Bearfauld Road**

Scale: **1:50,000 @ A3**

Key:
 Proposed Turbine Location

 76 and 26° Field of View

Viewpoint Information

Viewpoint Location: **E365244 N742573**
 Viewpoint Elevation: **54m (A.O.D)**
 View Direction: **234°**
 Distance to Turbine: **4.2km**

Visibility: **12 Projects**

Camera Type: **Nikon D3100**
 Focal Length: **35mm**
 Effective Focal Length: **54.6mm**
 Date Taken: **01/03/2013**
 Time Taken: **14:21**
 Height above elevation: **1.5m**

Visual Impact

Magnitude: **High**
 Sensitivity: **Low**
 Overall: **Moderate**

Please note for a 76° field of view, a viewing distance of 300mm is recommended.

Client: **Bairds Malt Single Turbine Ltd**



Drawing by: **Green Cat Renewables Ltd**

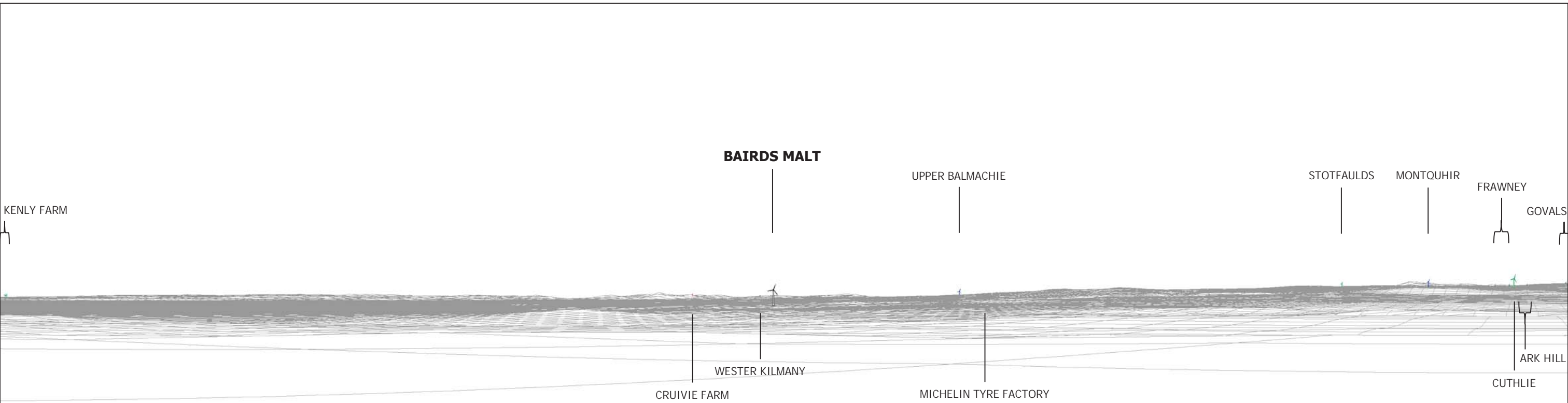
Document Number: **CO621-163/Fig 7.17**
 Version: **1.0**
 Author: **SS**
 Checked by: **RC**
 Approved By: **GM**
 Date: **17/12/2014**



VP05 - PHOTOGRAPH OF EXISTING VIEW



VP05 - WIRELINE DRAWING



VP05 - PHOTOMONTAGE OF PROPOSAL

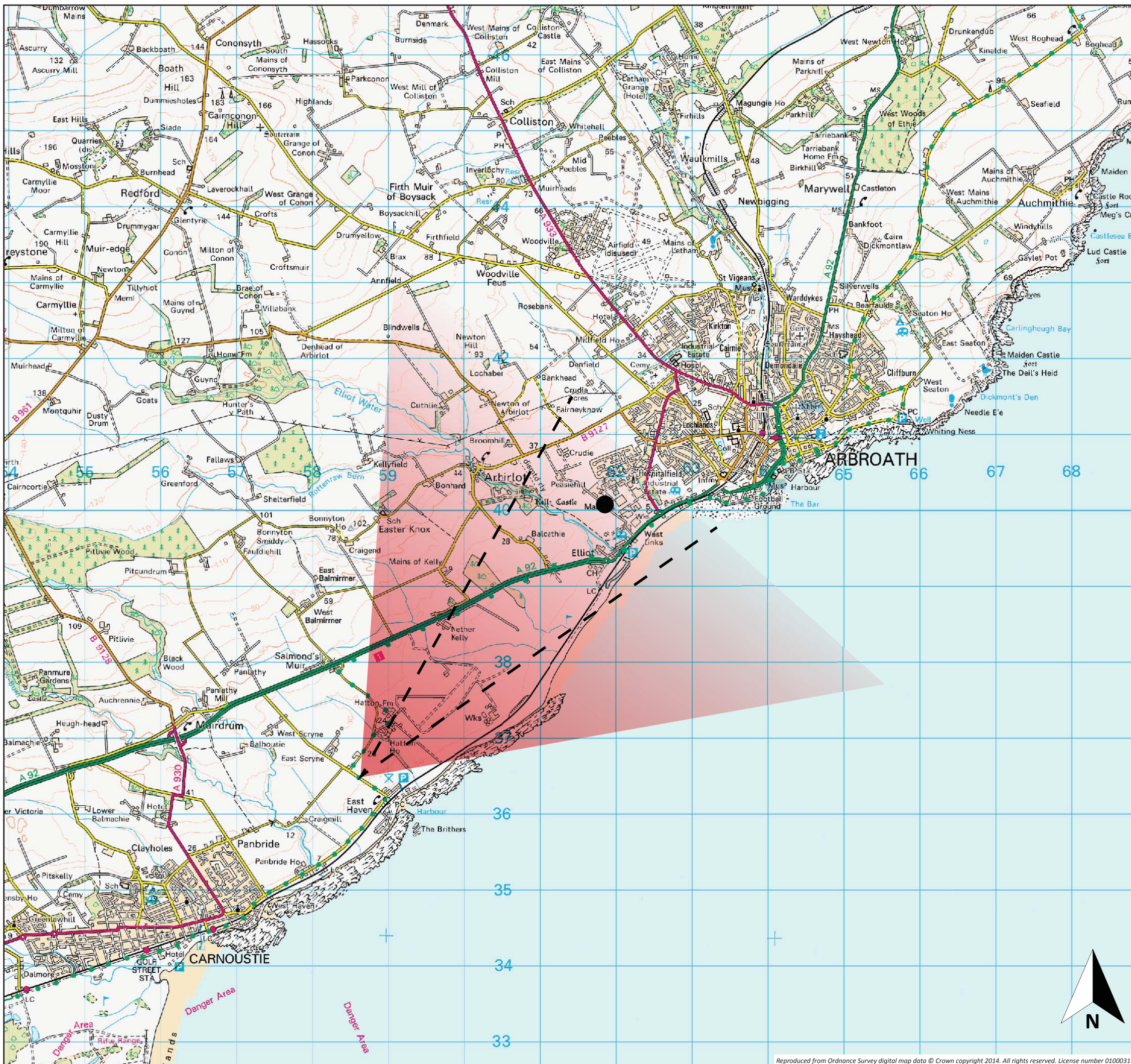
**76° VIEWING ANGLE
300MM VIEWING DISTANCE**



VP05 - 70MM PHOTOMONTAGE OF PROPOSAL



**26° VIEWING ANGLE
500MM VIEWING DISTANCE**



Project Name: **Bairds Malt Wind Turbine**

Document Title: **VP06 - East Haven**

Scale: **1:50,000 @ A3**

Key:

- Proposed Turbine Location
- ◀ 76 and 26° Field of View

Viewpoint Information

Viewpoint Location: **E358631 N736475**
 Viewpoint Elevation: **21m (A.O.D)**
 View Direction: **42°**
 Distance to Turbine: **4.8km**

Visibility: **5 Projects**

Camera Type: **Nikon D3100**
 Focal Length: **35mm**
 Effective Focal Length: **54.6mm**
 Date Taken: **01/03/2013**
 Time Taken: **15:25**
 Height above elevation: **1.5m**

Visual Impact

Magnitude: **High**
 Sensitivity: **Low**
 Overall: **Moderate**

Please note for a 76° field of view, a viewing distance of 300mm is recommended.

Client: **Bairds Malt Single Turbine Ltd**



Drawing by: **Green Cat Renewables Ltd**

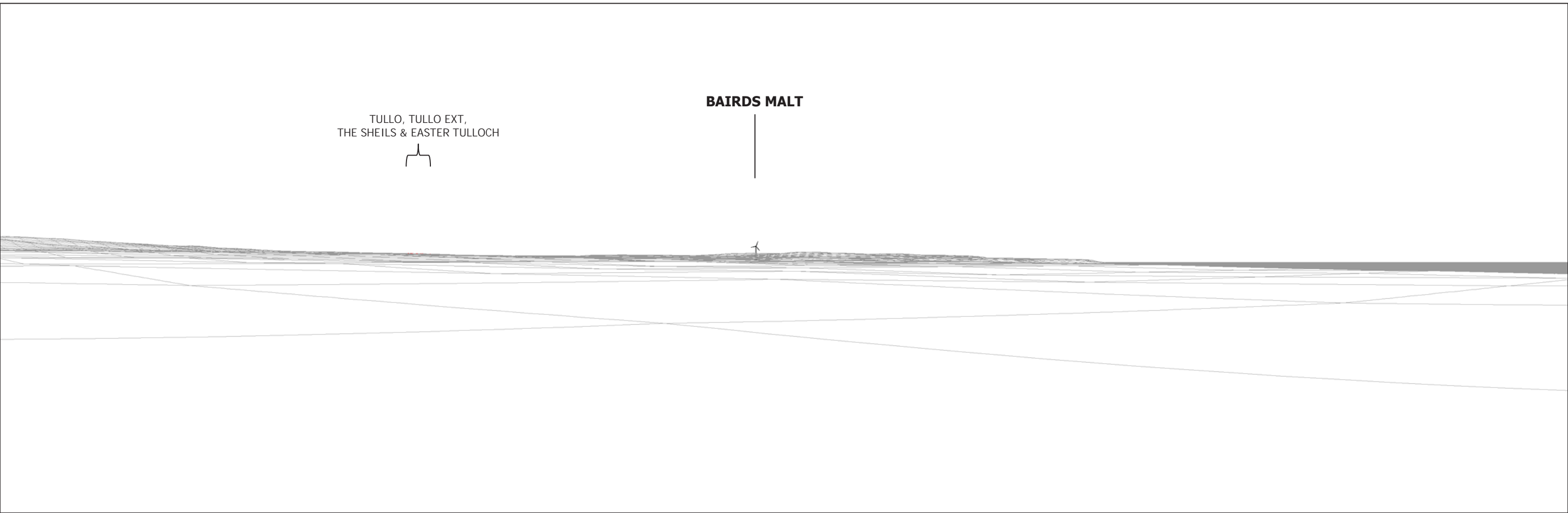
Document Number: **CO621-163/Fig 7.18**
 Version: **1.0**
 Author: **SS**
 Checked by: **RC**
 Approved By: **GM**
 Date: **17/12/2014**



VP06 - PHOTOGRAPH OF EXISTING VIEW



VP06 - WIRELINE DRAWING

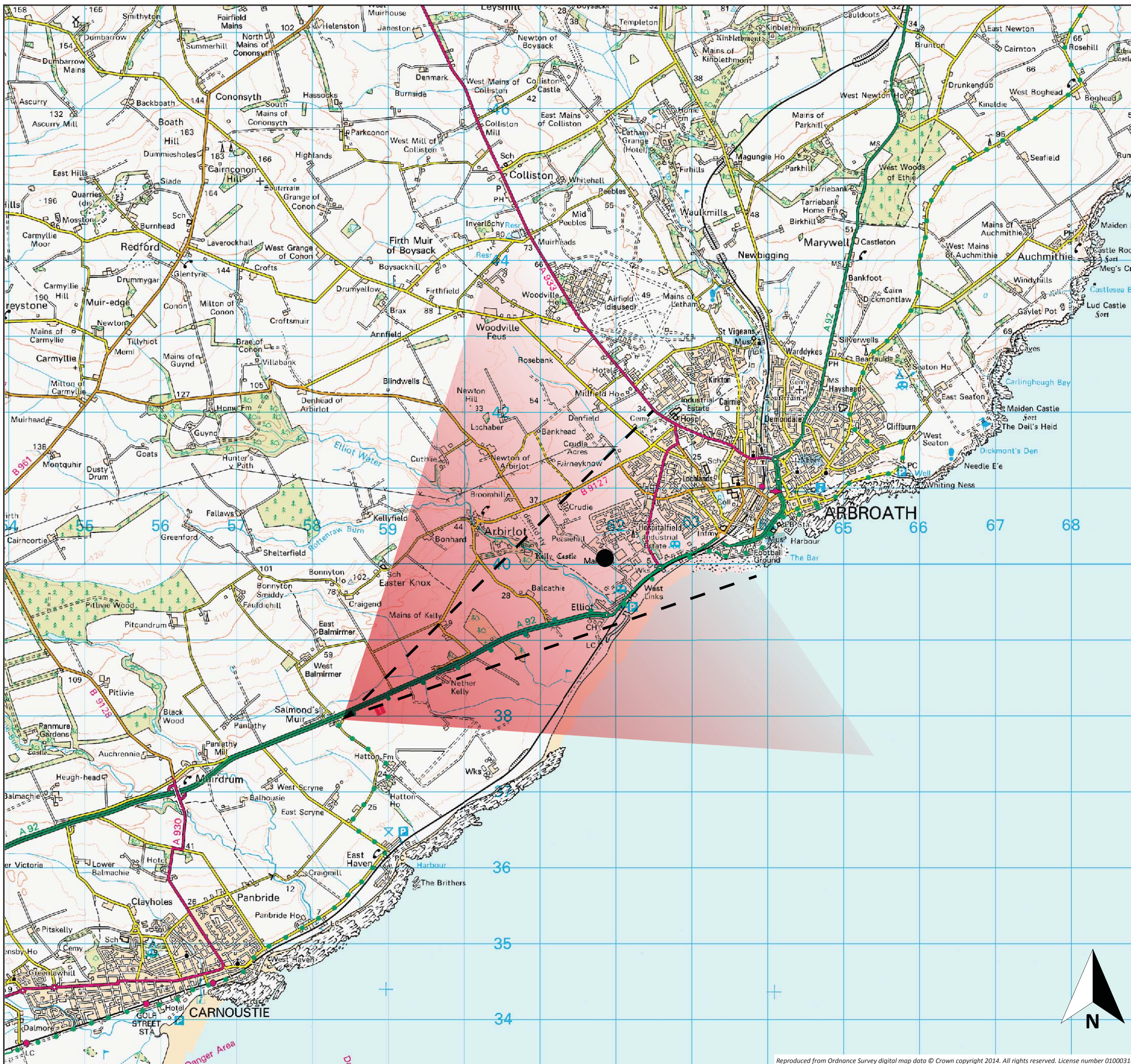





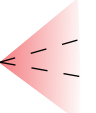
VP06 - 70MM PHOTOMONTAGE OF PROPOSAL



**26° VIEWING ANGLE
500MM VIEWING DISTANCE**



Project Name: **Bairds Malt Wind Turbine**
 Document Title: **VP07 - A92, Salmonds Muir**
 Scale: **1:50,000 @ A3**

Key:
 Proposed Turbine Location
 76 and 26° Field of View

Viewpoint Information

Viewpoint Location: **E358388 N737974**
 Viewpoint Elevation: **39m (A.O.D)**
 View Direction: **53°**
 Distance to Turbine: **4.0km**
 Visibility: **Hub**
 Camera Type: **Nikon D3100**
 Focal Length: **35mm**
 Effective Focal Length: **54.6mm**
 Date Taken: **01/03/2013**
 Time Taken: **15:13**
 Height above elevation: **1.5m**

Visual Impact

Magnitude: **Medium**
 Sensitivity: **Low**
 Overall: **Moderate/Minor**

Please note for a 76° field of view, a viewing distance of 300mm is recommended.

Client: **Bairds Malt Single Turbine Ltd**



Drawing by: **Green Cat Renewables Ltd**

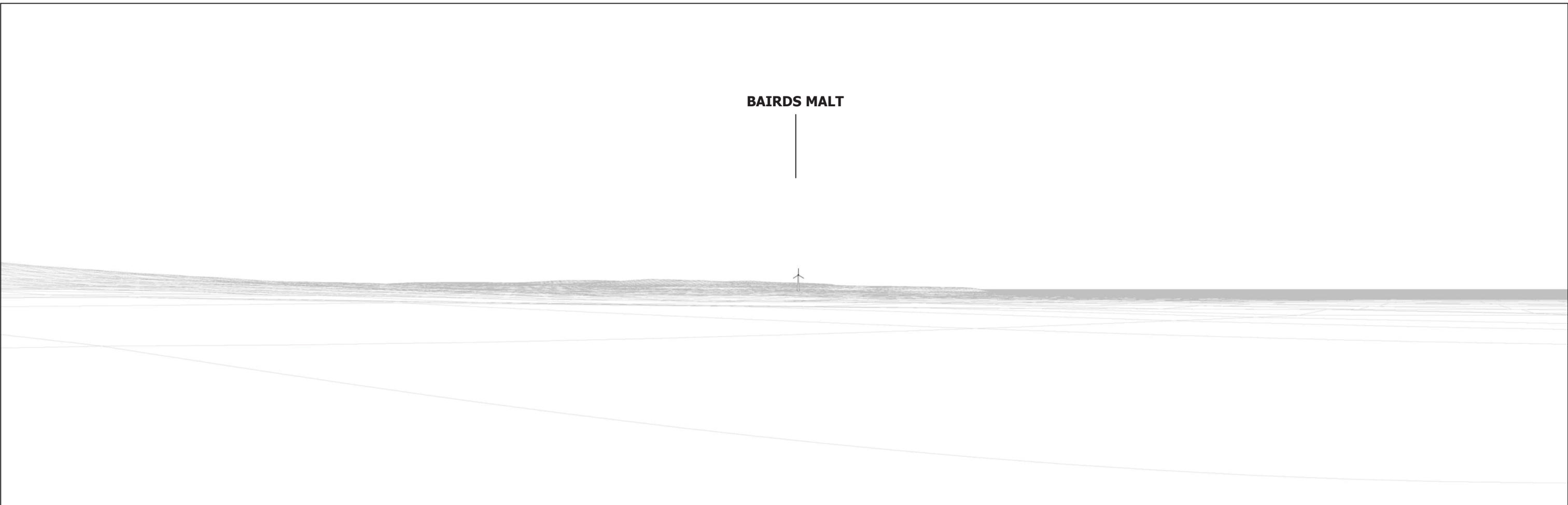
Document Number: **CO621-163/Fig 7.19**
 Version: **1.0**
 Author: **SS**
 Checked by: **RC**
 Approved By: **GM**
 Date: **17/12/2014**



VP07 - PHOTOGRAPH OF EXISTING VIEW



VP07 - WIRELINE DRAWING

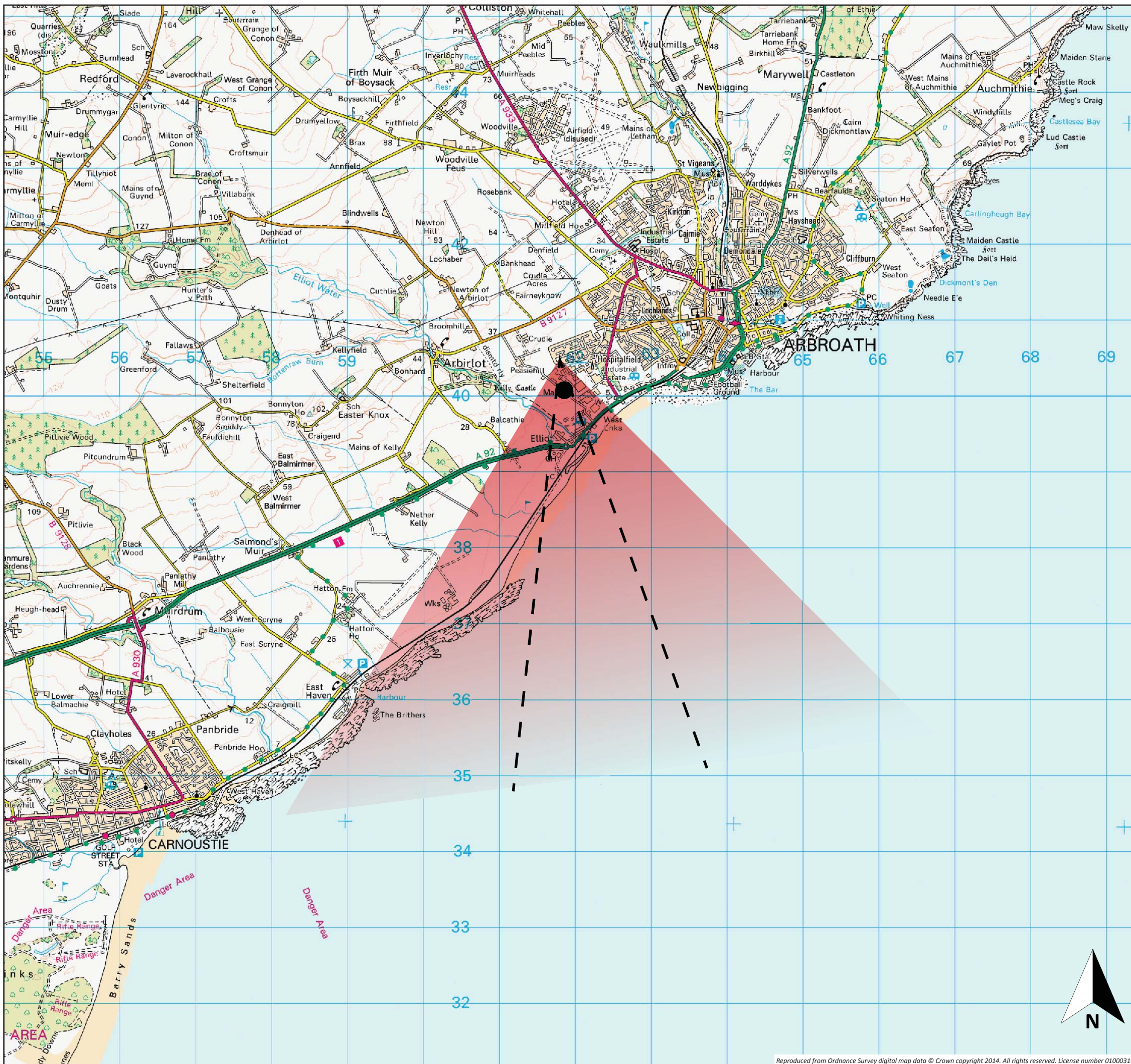




VP07 - 70MM PHOTOMONTAGE OF PROPOSAL


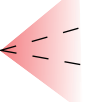


**26° VIEWING ANGLE
500MM VIEWING DISTANCE**



Project Name: **Bairds Malt Wind Turbine**
 Document Title: **VP08 - Patrick Allan Fraser Street**
 Scale: **1:50,000 @ A3**

Key:

-  Proposed Turbine Location
-  76 and 26° Field of View

Viewpoint Information

Viewpoint Location: **E361793 N740492**
 Viewpoint Elevation: **21m (A.O.D)**
 View Direction: **172°**
 Distance to Turbine: **0.4km**

Visibility: **Hub**

Camera Type: **Nikon D3100**
 Focal Length: **35mm**
 Effective Focal Length: **54.6mm**
 Date Taken: **04/04/2013**
 Time Taken: **09:52**
 Height above elevation: **1.5m**

Visual Impact

Magnitude: **High**
 Sensitivity: **High**
 Overall: **Major**

Please note for a 76° field of view, a viewing distance of 300mm is recommended.

Client: **Bairds Malt Single Turbine Ltd**



Drawing by: **Green Cat Renewables Ltd**

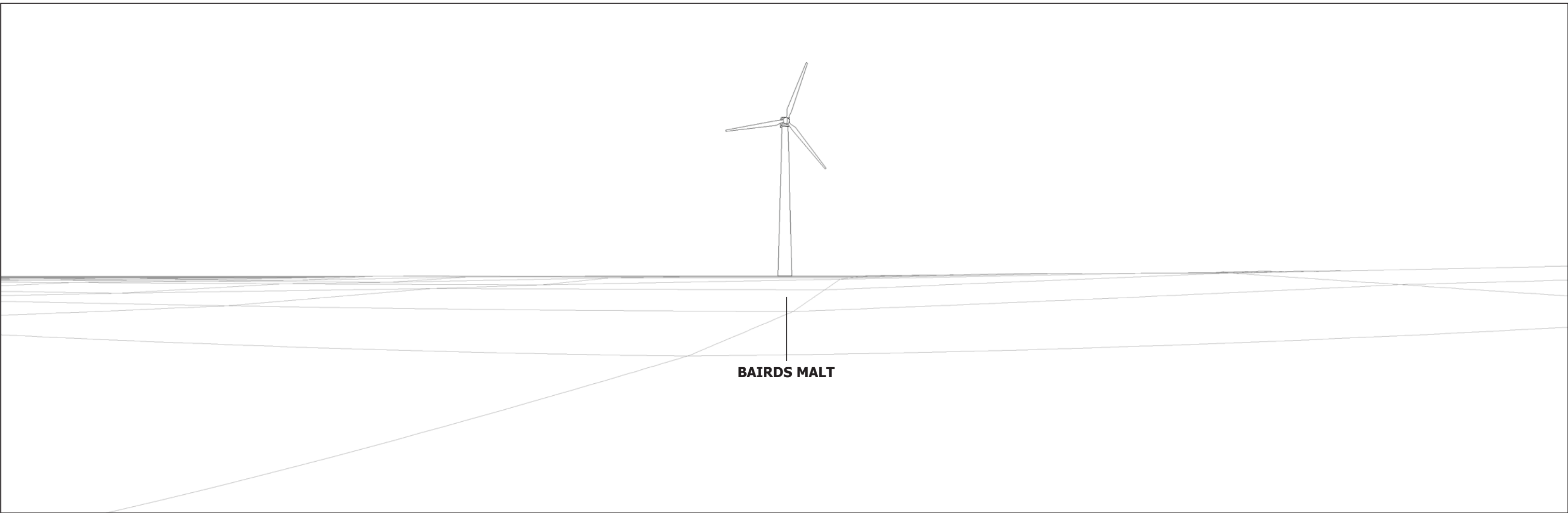
Document Number: **CO621-163/Fig 7.20**
 Version: **1.0**
 Author: **SS**
 Checked by: **RC**
 Approved By: **GM**
 Date: **17/12/2014**



VP08 - PHOTOGRAPH OF EXISTING VIEW



VP08 - WIRELINE DRAWING

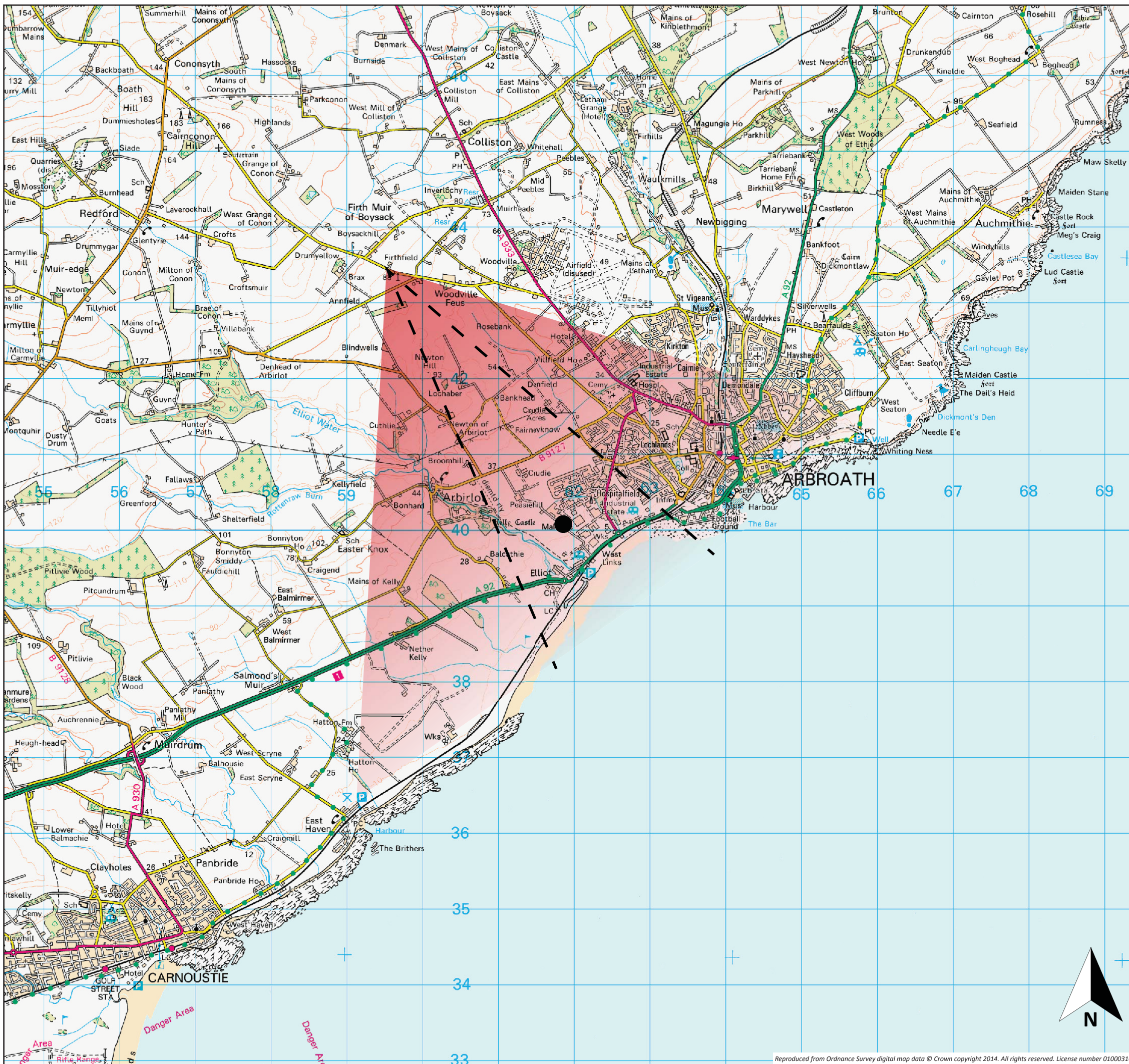




VP08 - 70MM PHOTOMONTAGE OF PROPOSAL



**26° VIEWING ANGLE
500MM VIEWING DISTANCE**

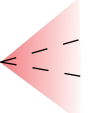


Project Name: **Bairds Malt Wind Turbine**

Document Title: **VP09 - Firthfield**

Scale: **1:50,000 @ A3**

Key:
 Proposed Turbine Location

 76 and 26° Field of View

Viewpoint Information

Viewpoint Location: **E359546 N743455**
 Viewpoint Elevation: **89m (A.O.D)**
 View Direction: **144°**
 Distance to Turbine: **4.1km**

Visibility: **Hub**

Camera Type: **Nikon D3100**
 Focal Length: **35mm**
 Effective Focal Length: **54.6mm**
 Date Taken: **04/04/2013**
 Time Taken: **11:57**
 Height above elevation: **1.5m**

Visual Impact

Magnitude: **High**
 Sensitivity: **Low**
 Overall: **Moderate**

Please note for a 76° field of view, a viewing distance of 300mm is recommended.

Client: **Bairds Malt Single Turbine Ltd**



Drawing by: **Green Cat Renewables Ltd**

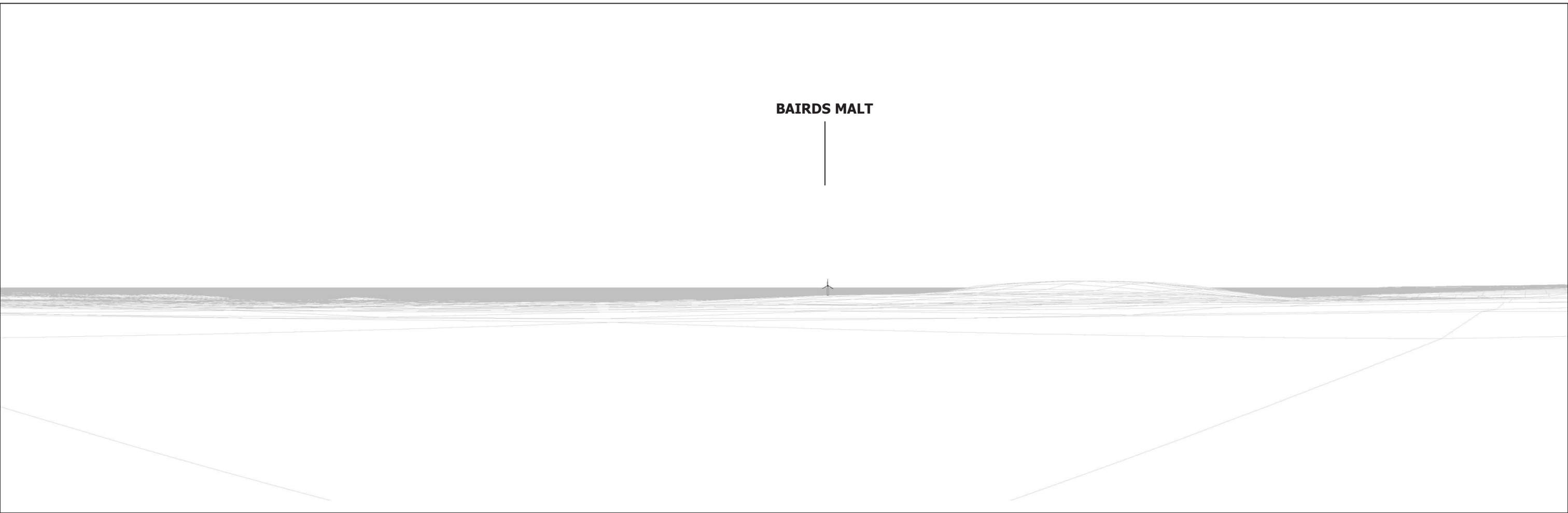
Document Number: **CO621-163/Fig 7.21**
 Version: **1.0**
 Author: **SS**
 Checked by: **RC**
 Approved By: **GM**
 Date: **17/12/2014**



VP09 - PHOTOGRAPH OF EXISTING VIEW



VP09 - WIRELINE DRAWING



VP09- PHOTOMONTAGE OF PROPOSAL

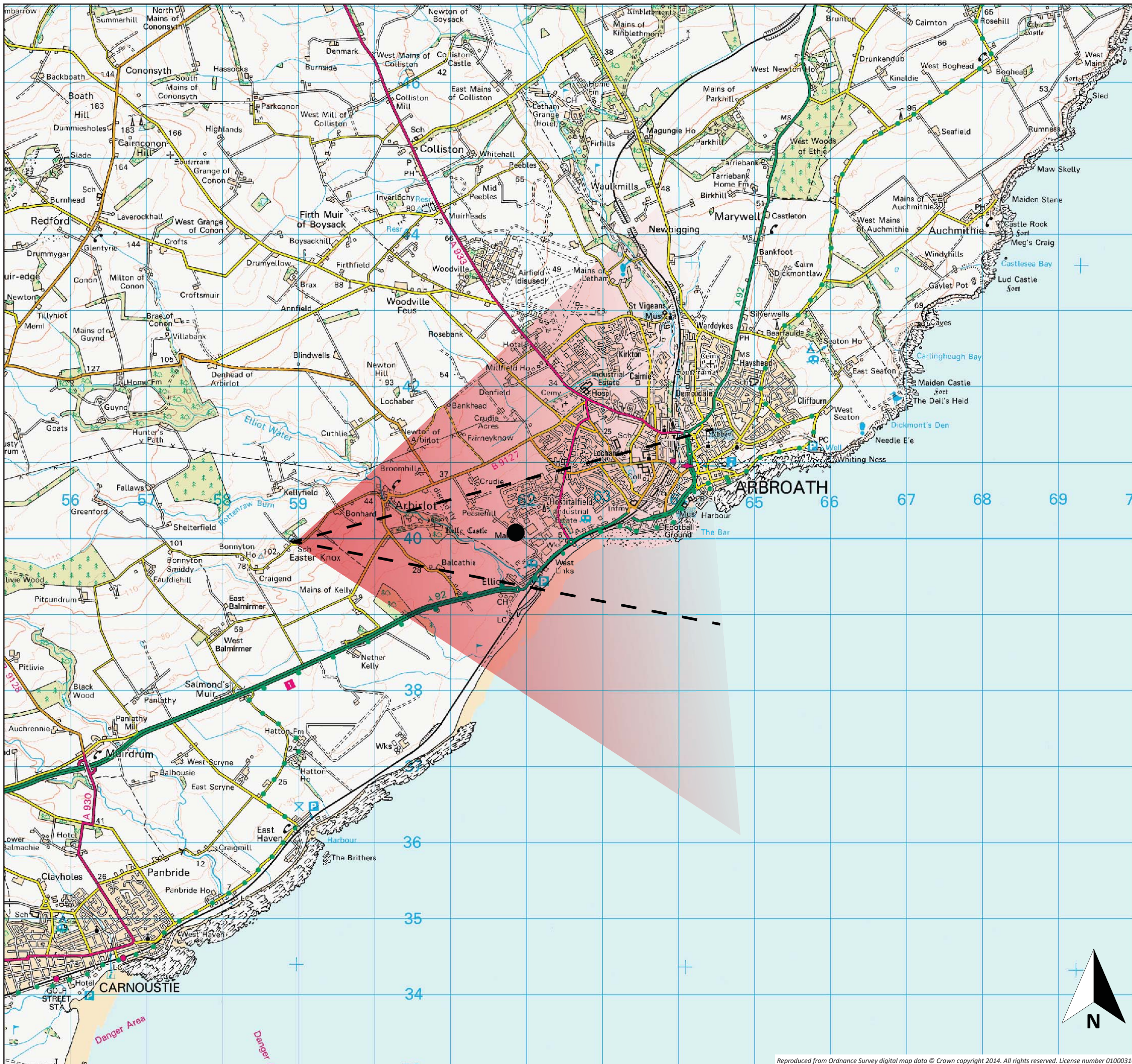
**76° VIEWING ANGLE
300MM VIEWING DISTANCE**



VP09 - 70MM PHOTOMONTAGE OF PROPOSAL



**26° VIEWING ANGLE
500MM VIEWING DISTANCE**



Project Name: **Bairds Malt Wind Turbine**

Document Title: **VP10 - Braeside**

Scale: **1:50,000 @ A3**

- Key:
- Proposed Turbine Location
 - ◀ 76 and 26° Field of View

Viewpoint Information

Viewpoint Location: **E359045 N739953**
 Viewpoint Elevation: **81m (A.O.D)**
 View Direction: **91°**
 Distance to Turbine: **2.8km**

Visibility: **Hub**

Camera Type: **Nikon D3100**
 Focal Length: **35mm**
 Effective Focal Length: **54.6mm**
 Date Taken: **22/05/2013**
 Time Taken: **10:48**
 Height above elevation: **1.5m**

Visual Impact

Magnitude: **High**
 Sensitivity: **Low**
 Overall: **Moderate**

Please note for a 76° field of view, a viewing distance of 300mm is recommended.

Client: **Bairds Malt Single Turbine Ltd**



Drawing by: **Green Cat Renewables Ltd**

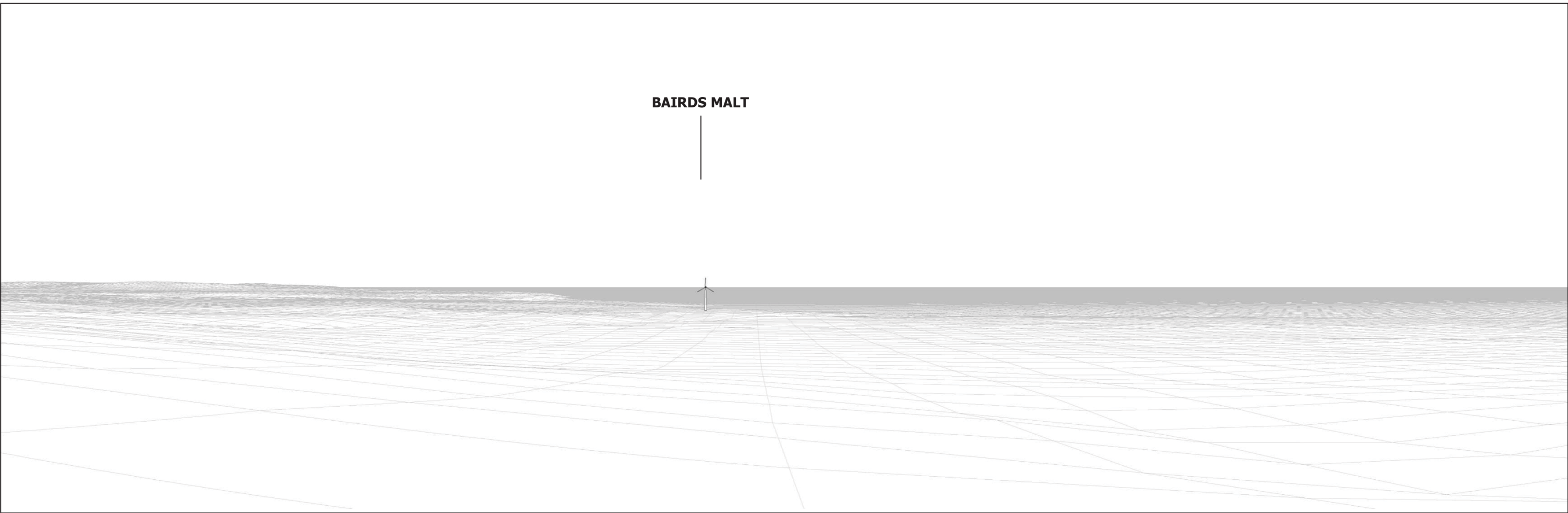
Document Number: **CO621-163/Fig 7.22**
 Version: **1.0**
 Author: **SS**
 Checked by: **RC**
 Approved By: **GM**
 Date: **17/12/2014**



VP10 - PHOTOGRAPH OF EXISTING VIEW



VP10 - WIRELINE DRAWING



VP10 - PHOTOMONTAGE OF PROPOSAL

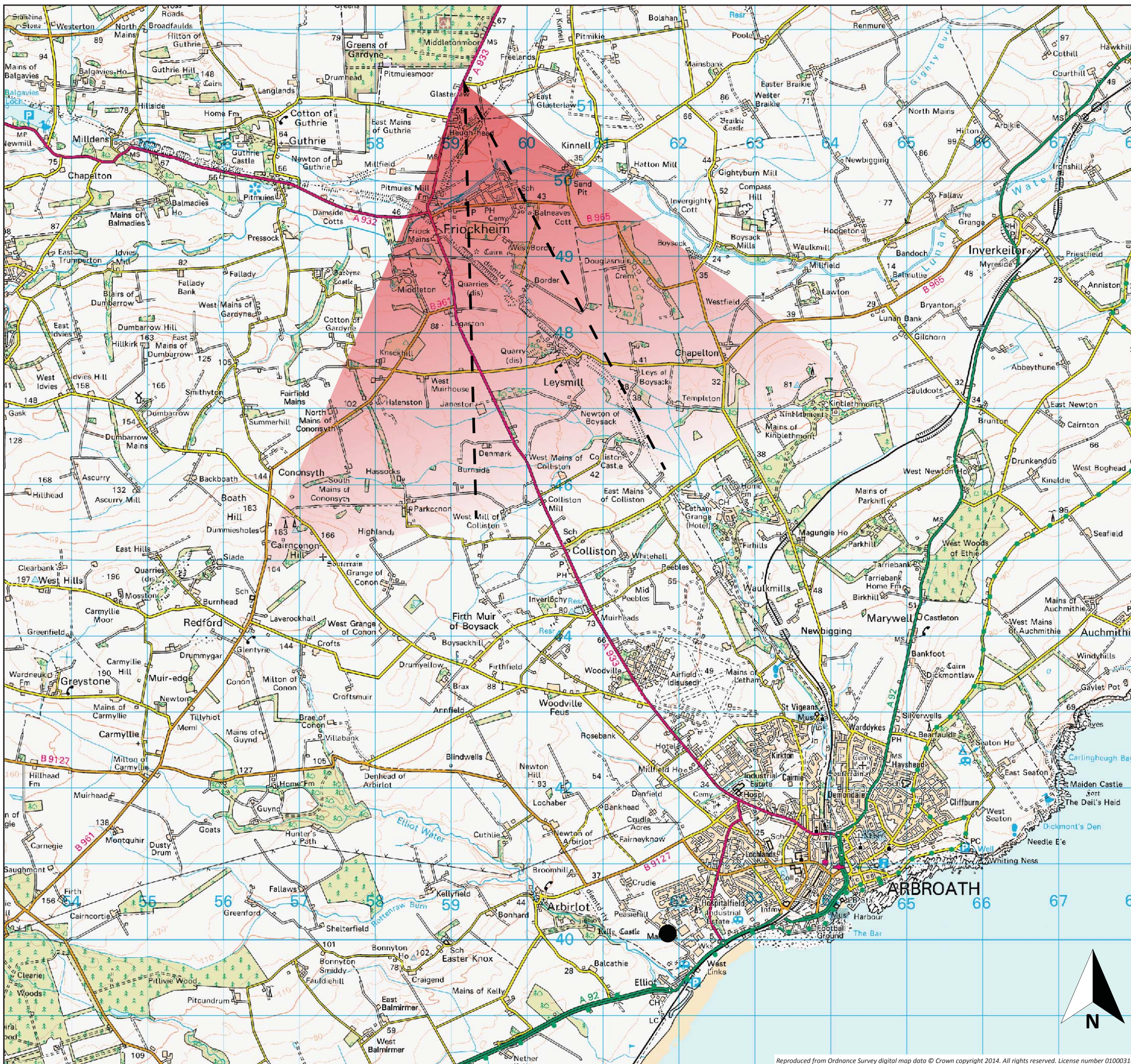
**76° VIEWING ANGLE
300MM VIEWING DISTANCE**




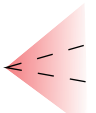
VP10 - 70MM PHOTOMONTAGE OF PROPOSAL



**26° VIEWING ANGLE
500MM VIEWING DISTANCE**



Project Name: **Bairds Malt Wind Turbine**
 Document Title: **VP11 - A933 Montreathmont**
 Scale: **1:50,000 @ A3**

Key:
 Proposed Turbine Location
 76 and 26° Field of View

Viewpoint Information

Viewpoint Location: **E359107 N751263**
 Viewpoint Elevation: **61m (A.O.D)**
 View Direction: **174°**
 Distance to Turbine: **11.5km**
 Visibility: **4 Projects**
 Camera Type: **Nikon D3100**
 Focal Length: **35mm**
 Effective Focal Length: **54.6mm**
 Date Taken: **17/06/2014**
 Time Taken: **15:30**
 Height above elevation: **1.5m**

Visual Impact

Magnitude: **Medium**
 Sensitivity: **Negligible**
 Overall: **Minor**

Please note for a 76° field of view, a viewing distance of 300mm is recommended.

Client: **Bairds Malt Single Turbine Ltd**



Drawing by: **Green Cat Renewables Ltd**

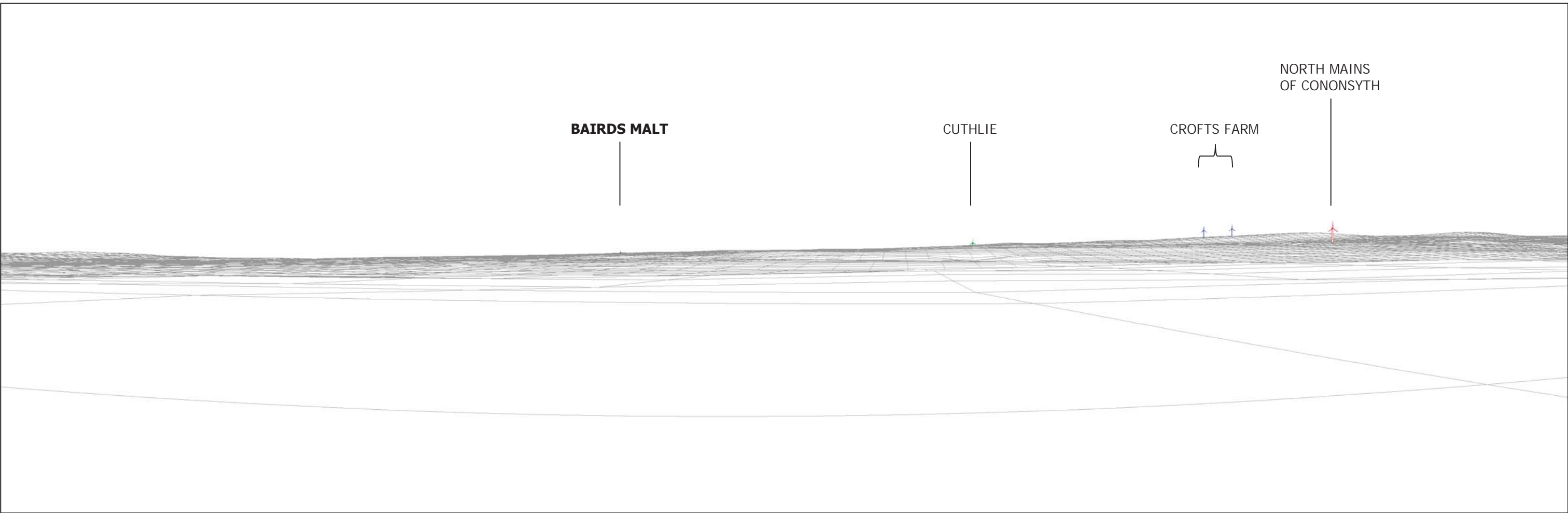
Document Number: **CO621-163/Fig 7.23**
 Version: **1.0**
 Author: **SS**
 Checked by: **RC**
 Approved By: **GM**
 Date: **17/12/2014**



VP11 - PHOTOGRAPH OF EXISTING VIEW



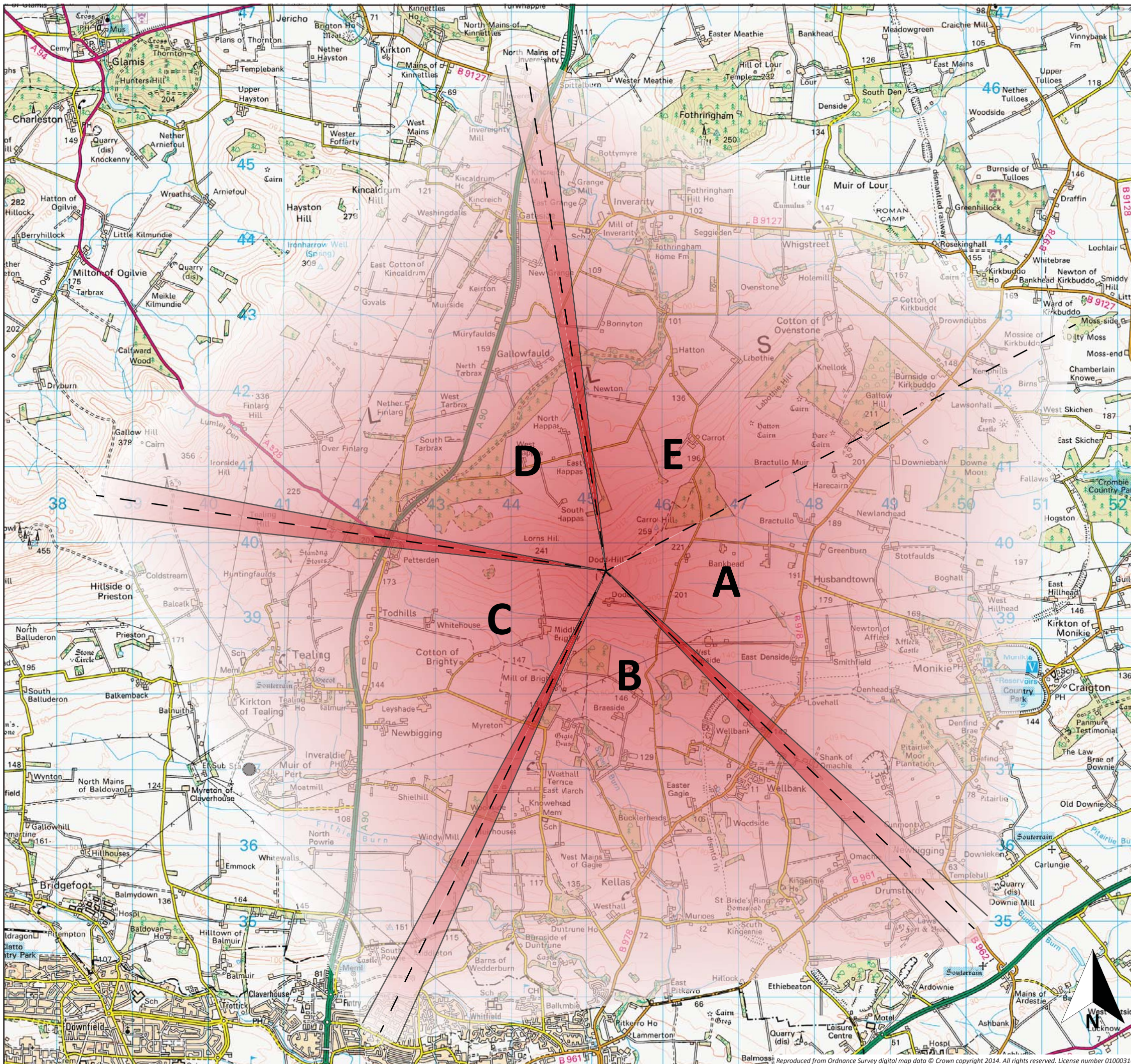
VP11 - WIRELINE DRAWING



VP11- PHOTOMONTAGE OF PROPOSAL




**76° VIEWING ANGLE
300MM VIEWING DISTANCE**





Project Name: **Bairds Malt Wind Turbine**
 Document Title: **VP12 - Dood Hill**
 Scale: **1:50,000 @ A3**

Key:

-  Proposed Turbine Locations
-  76° Field of View
-  5° Overlap

Viewpoint Information

Viewpoint Location: **E345256 N739618**
 Viewpoint Elevation: **251m (A.O.D)**
 View Direction: **A. 93° B. 164° C. 235°
 D. 306° E. 17°**
 Distance to Turbine: **16.6km**
 Visibility: **A. 7 Projects B. 4 Projects
 C. 4 Projects D. 2 Projects
 E. 15 Projects**


Camera Type: **Nikon D70s**
 Focal Length: **35mm**
 Effective Focal Length: **53.4 mm**
 Date Taken: **01/11/2008**
 Time Taken: **14:00**
 Height above elevation: **1.5m**

Visual Impact

Sensitivity: **High**
 Magnitude: **Negligible**
 Overall: **Moderate/Minor**


Please note for a 76° field of view, a viewing distance of 300mm is recommended.

Client: **Bairds Malt Single Turbine Ltd**



Drawing by: **Green Cat Renewables Ltd**

Document Number: **CO621-163/Fig 7.24**
 Version: **1.0**
 Author: **SS**
 Checked by: **RC**
 Approved By: **GM**
 Date: **17/12/2014**



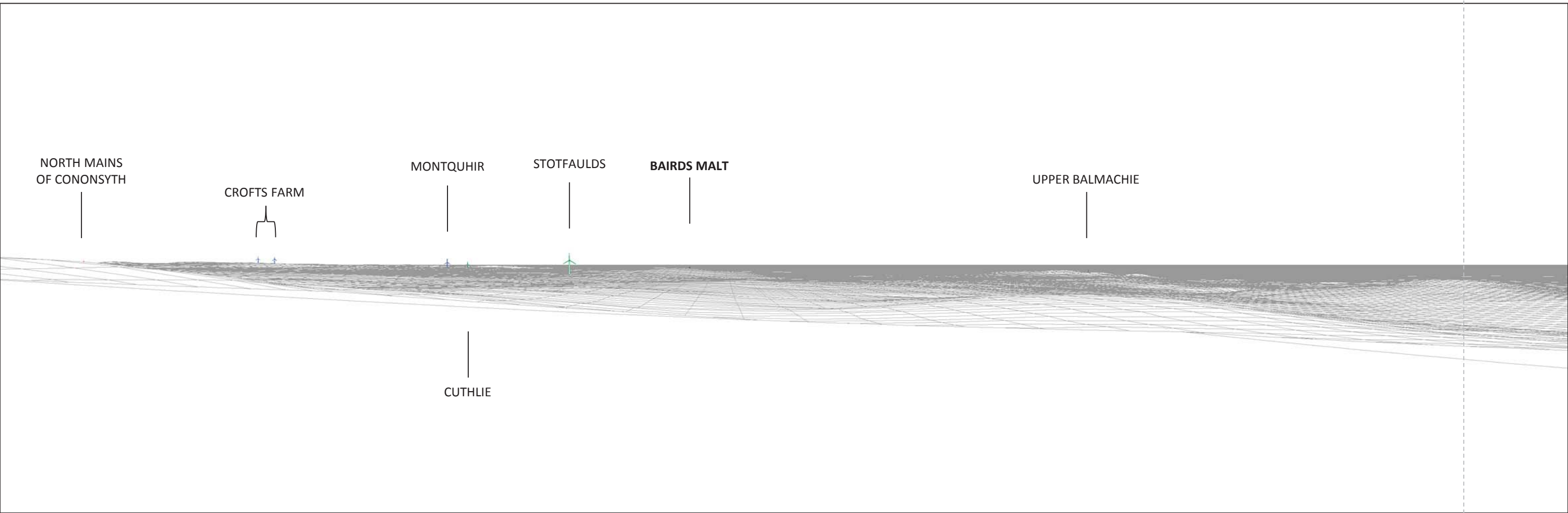
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VP12A DODD HILL - PHOTOGRAPH OF EXISTING VIEW



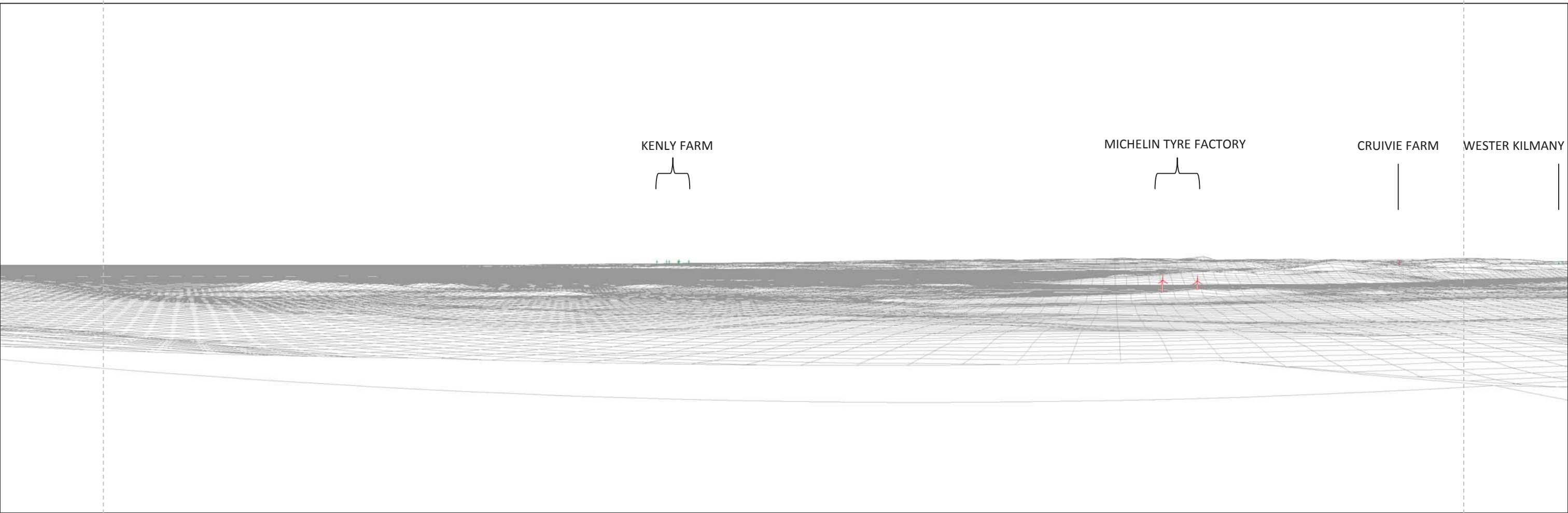
VP12A DODD HILL - WIRELINE DRAWING



VP12B DODD HILL - PHOTOGRAPH OF EXISTING VIEW



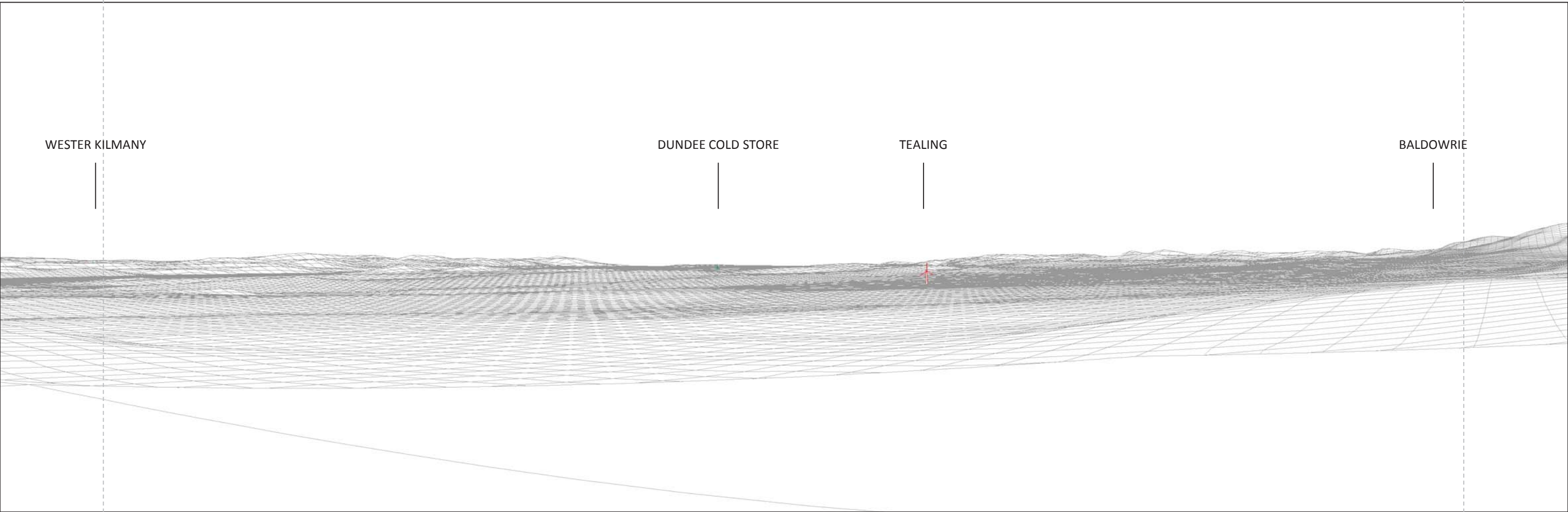
VP12B DODD HILL - WIRELINE DRAWING



VP12C DODD HILL - PHOTOGRAPH OF EXISTING VIEW



VP12C DODD HILL - WIRELINE DRAWING



WESTER KILMANY

DUNDEE COLD STORE

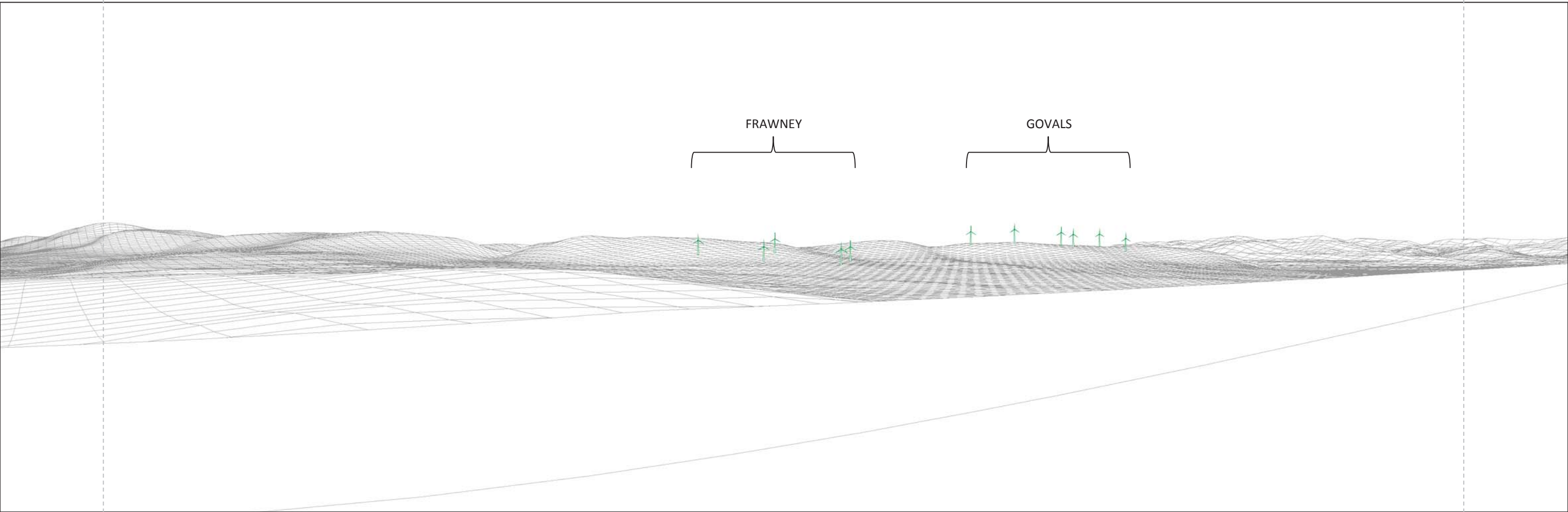
TEALING

BALDOWRIE

VP12D DODD HILL - PHOTOGRAPH OF EXISTING VIEW



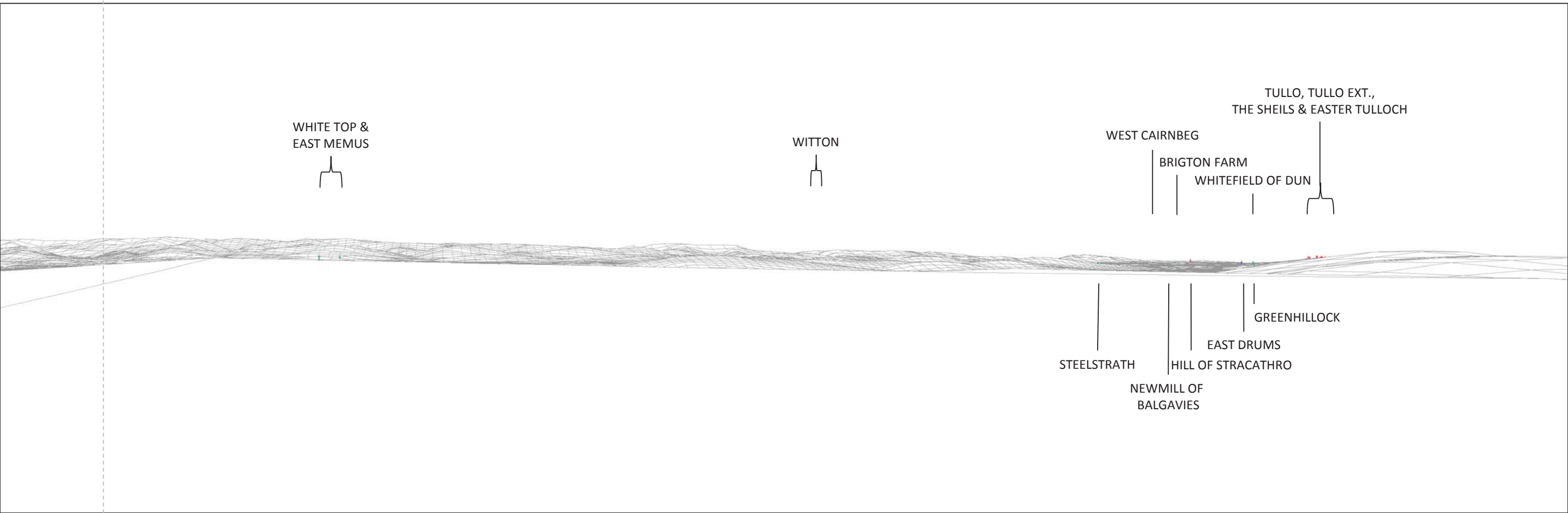
VP12D DODD HILL - WIRELINE DRAWING

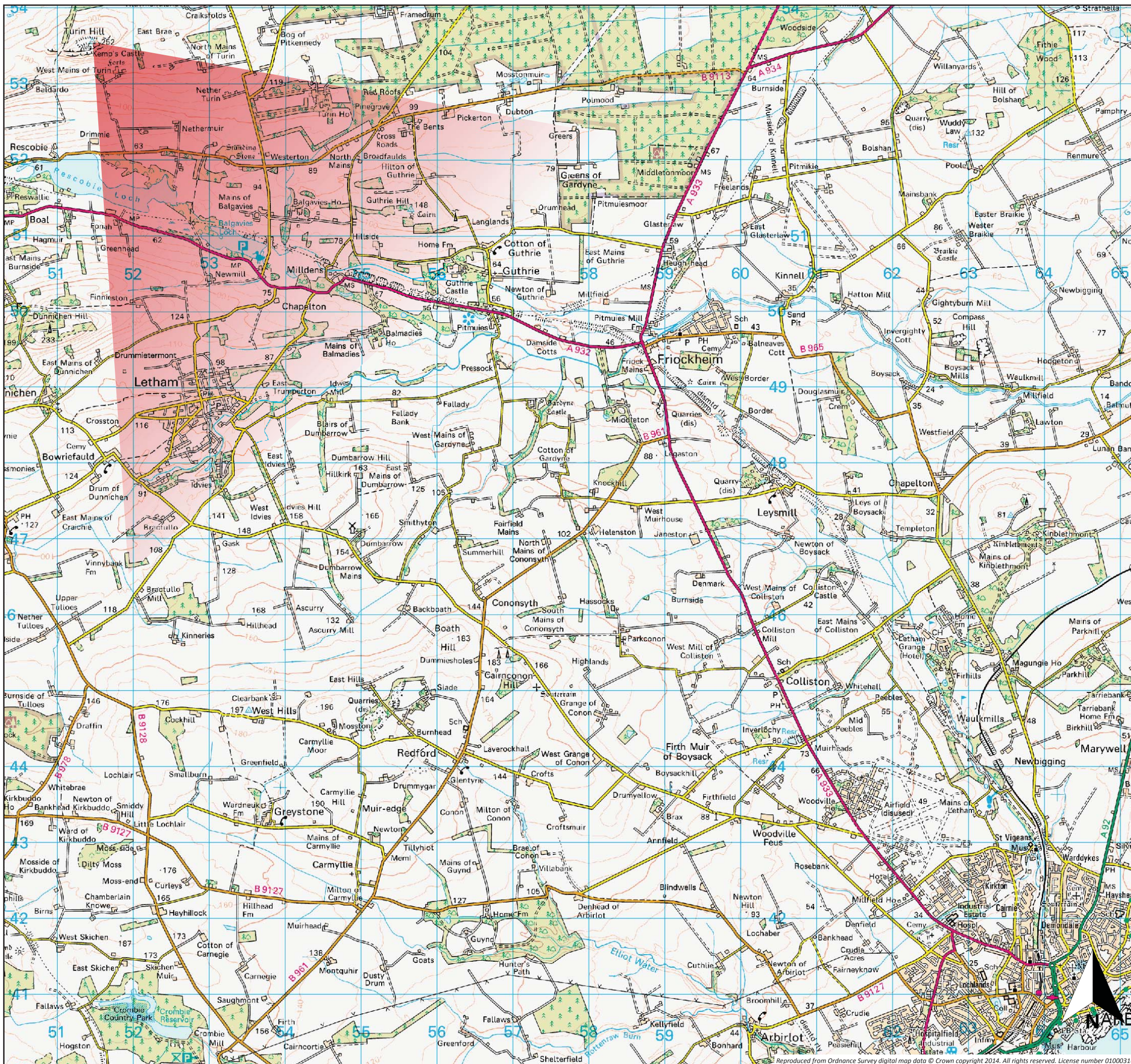


VP12E DODD HILL - PHOTOGRAPH OF EXISTING VIEW



VP12E DODD HILL - WIRELINE DRAWING






Project Name: **Bairds Malt Wind Turbine**

Document Title: **VP13 - Turin Hill**

Scale: **1:50,000 @ A3**

Key:
 Proposed Turbine Location

 76° Field of View

Viewpoint Information

Viewpoint Location: **E351395 N753524**
 Viewpoint Elevation: **241m (A.O.D)**
 View Direction: **148°**
 Distance to Turbine: **17.1km**

Visibility: **7 Projects**

Camera Type: **Nikon D70S**
 Focal Length: **35mm**
 Effective Focal Length: **53.4mm**
 Date Taken: **26/07/2011**
 Time Taken: **10:18**
 Height above elevation: **1.5m**

Visual Impact

Magnitude: **High**
 Sensitivity: **Negligible**
 Overall: **Moderate/Minor**

Please note for a 76° field of view, a viewing distance of 300mm is recommended.

Client: **Bairds Malt Single Turbine Ltd**



Drawing by: **Green Cat Renewables Ltd**

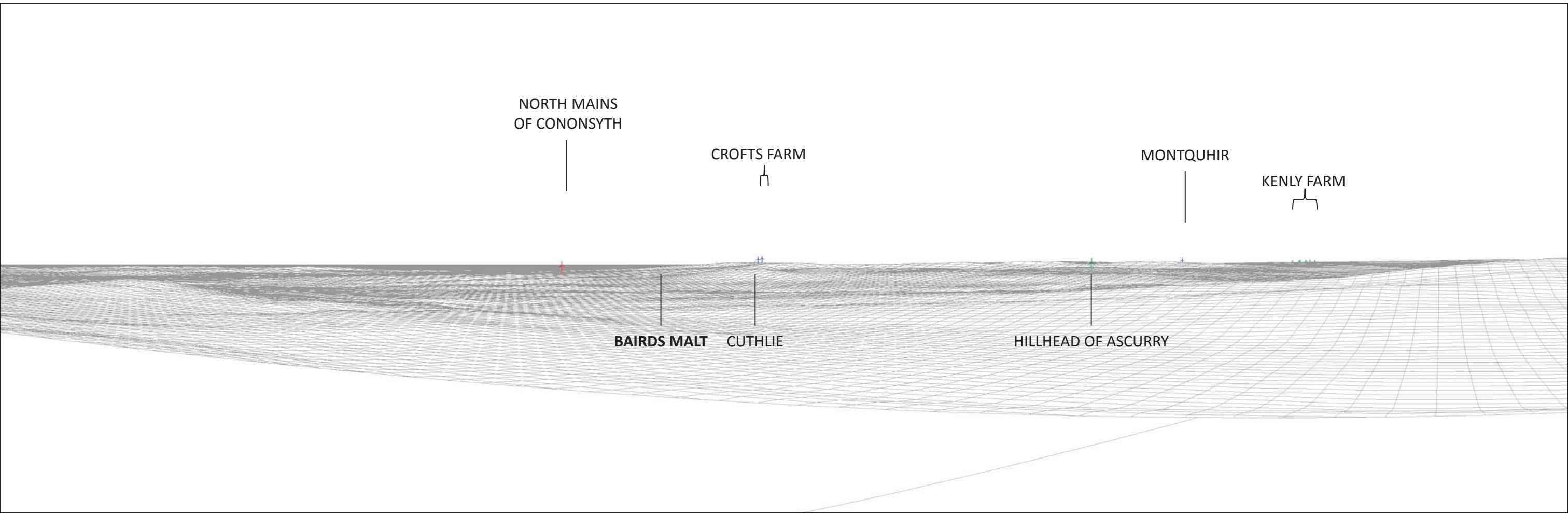
Document Number: **CO621-163/Fig 7.25**
 Version: **1.0**
 Author: **SS**
 Checked by: **RC**
 Approved By: **GM**
 Date: **17/12/2014**



VP13 - PHOTOGRAPH OF EXISTING VIEW



VP13 - WIRELINE DRAWING





Project Name: **Bairds Malt Wind Turbine**
 Document Title: **VP14 - Tentsmuir Recreational Area**
 Scale: **1:50,000 @ A3**

Key:
 ● Proposed Turbine Location
 ◀ 76 and 26° Field of View

Viewpoint Information

Viewpoint Location: **E347170 N727786**
 Viewpoint Elevation: **1m (A.O.D)**
 View Direction: **37°**
 Distance to Turbine: **19.1km**
 Visibility: **5 Projects**
 Camera Type: **Pentax K100D Super**
 Focal Length: **35mm**
 Effective Focal Length: **52mm**
 Date Taken: **29/10/2009**
 Time Taken: **14:53**
 Height above elevation: **1.5m**

Visual Impact

Magnitude: **High**
 Sensitivity: **Negligible**
 Overall: **Moderate/Minor**

Please note for a 76° field of view, a viewing distance of 300mm is recommended.

Client: **Bairds Malt Single Turbine Ltd**



Drawing by: **Green Cat Renewables Ltd**

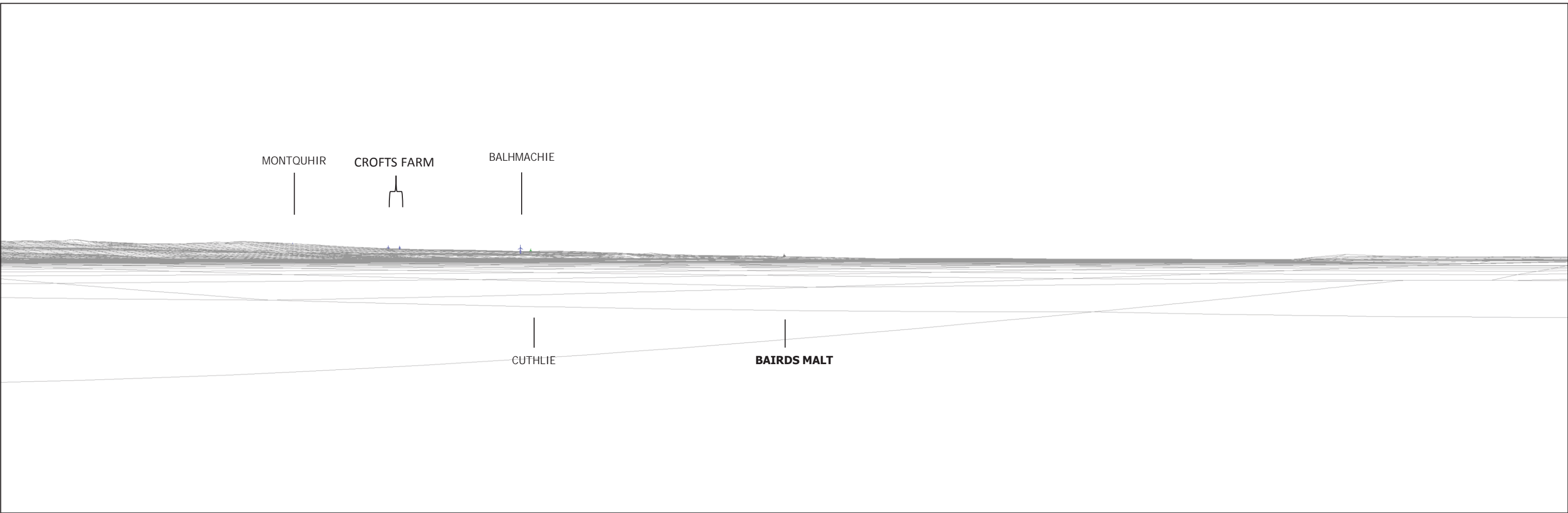
Document Number: **CO621-163/Fig 7.26**
 Version: **1.0**
 Author: **SS**
 Checked by: **RC**
 Approved By: **GM**
 Date: **17/12/2014**



VP14 - PHOTOGRAPH OF EXISTING VIEW



VP14 - WIRELINE DRAWING



VP14 - PHOTOMONTAGE OF PROPOSAL

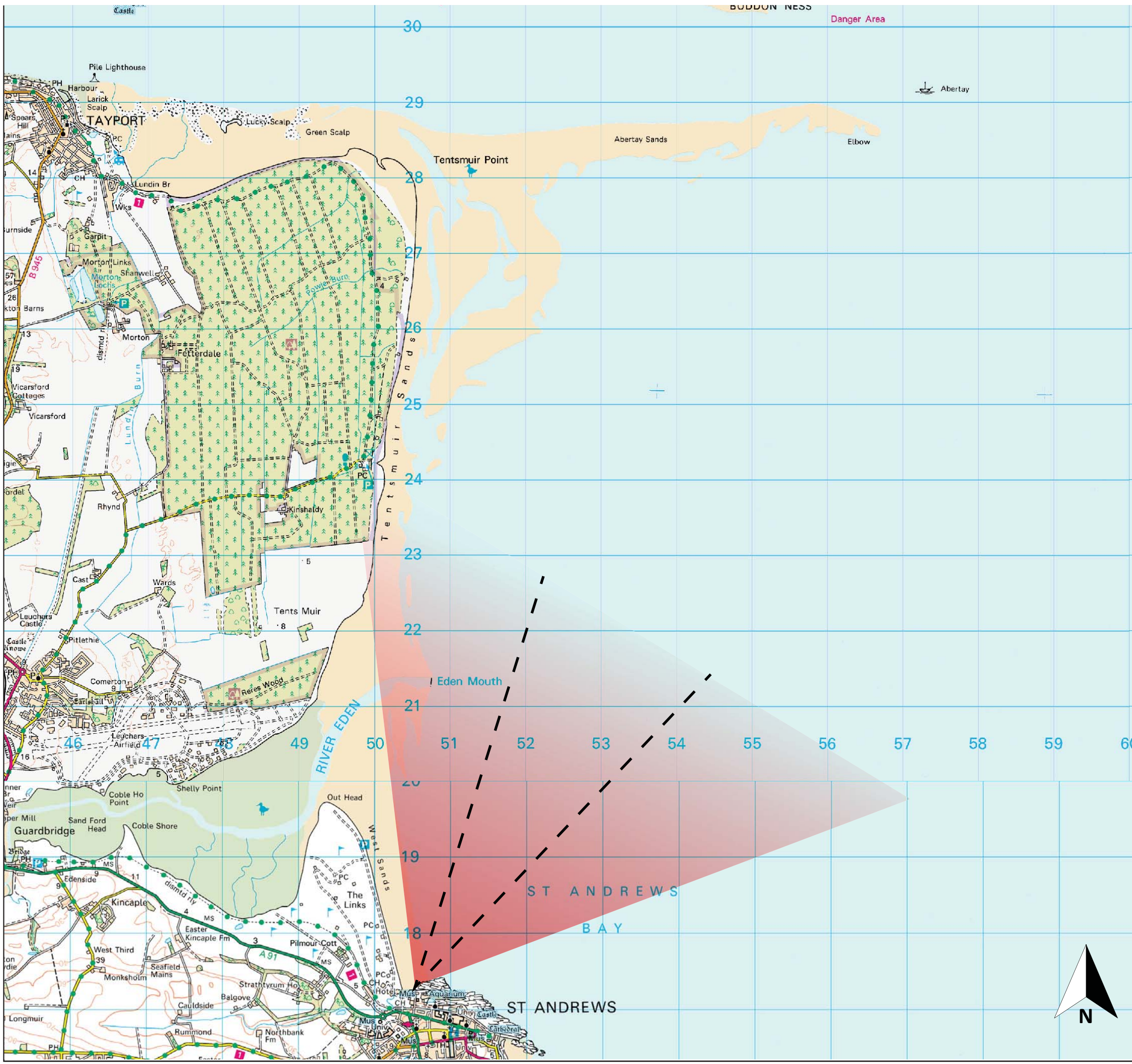
**76° VIEWING ANGLE
300MM VIEWING DISTANCE**



VP14 - 70MM PHOTOMONTAGE OF PROPOSAL



**26° VIEWING ANGLE
500MM VIEWING DISTANCE**



Project Name: **Bairds Malt Wind Turbine**
 Document Title: **VP15 - St Andrews**
 Scale: **1:50,000 @ A3**

Key:

- Proposed Turbine Location
- ◀ 76 and 26° Field of View

Viewpoint Information

Viewpoint Location: **E350539 N717240**
 Viewpoint Elevation: **2m (A.O.D)**
 View Direction: **26.7°**
 Distance to Turbine: **25.5km**

Visibility: **17 Projects**


Camera Type: **Pentax K100D Super**
 Focal Length: **35mm**
 Effective Focal Length: **52mm**
 Date Taken: **29/10/2009**
 Time Taken: **12:40**
 Height above elevation: **1.5m**

Visual Impact

Magnitude: **High**
 Sensitivity: **Negligible**
 Overall: **Moderate/Minor**


Please note for a 76° field of view, a viewing distance of 300mm is recommended.

Client: **Bairds Malt Single Turbine Ltd**



Drawing by: **Green Cat Renewables Ltd**

Document Number: **CO621-163/Fig 7.27**
 Version: **1.0**
 Author: **SS**
 Checked by: **RC**
 Approved By: **GM**
 Date: **17/12/2014**



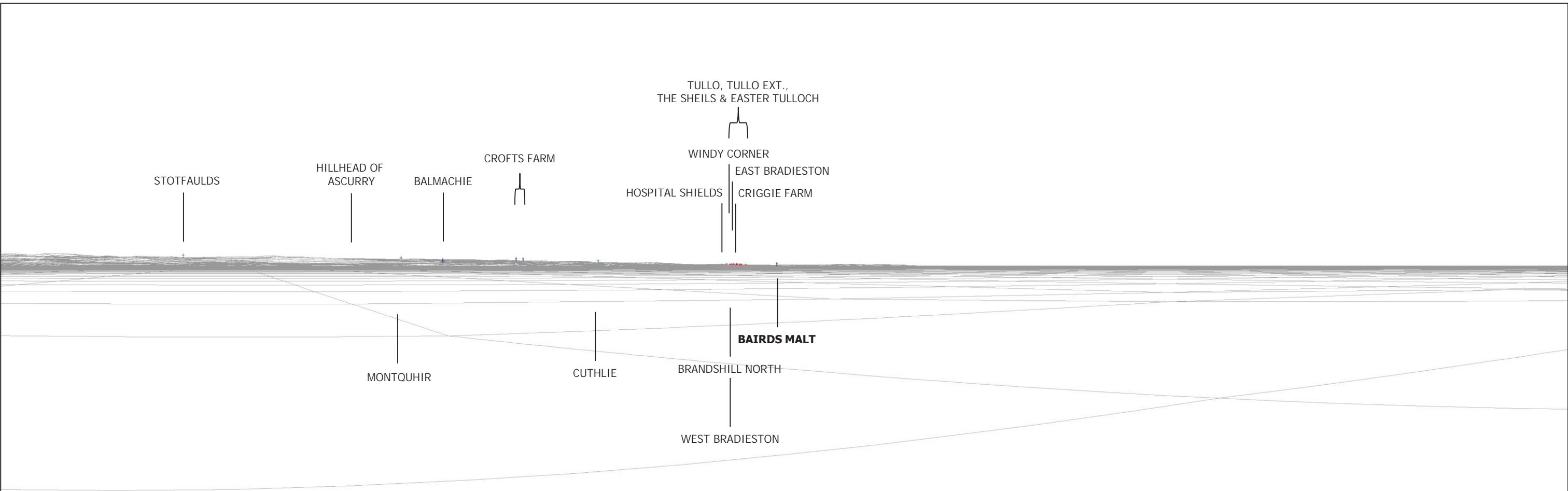
©Green Cat Renewables Ltd



VP15 - PHOTOGRAPH OF EXISTING VIEW



VP15 - WIRELINE DRAWING

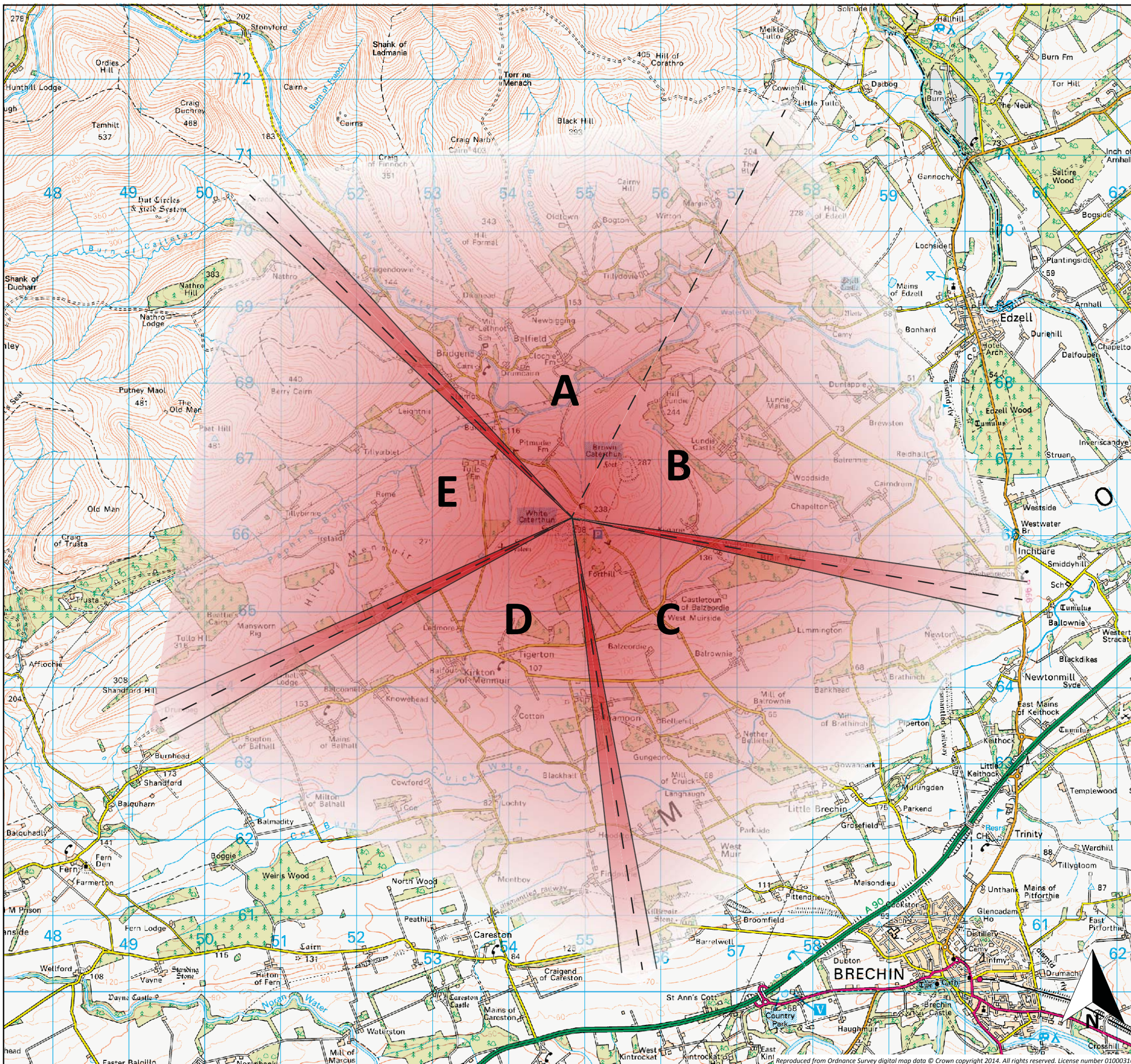




VP15 - 70MM PHOTOMONTAGE OF PROPOSAL




**26° VIEWING ANGLE
500MM VIEWING DISTANCE**




Project Name: **Bairds Malt Wind Turbine**

Document Title: **VP16 - White Caterthun**

Scale: **1:50,000 @ A3**

Key:
 Proposed Turbine Locations

 76° Field of View

 5° Overlap

Viewpoint Information

Viewpoint Location: **E354782 N766029**
 Viewpoint Elevation: **292m (A.O.D)**
 View Direction: **A. 354° B. 65° C. 136°
 D. 207° E. 278°**
 Distance to Turbine: **26.9km**
 Visibility: **A. 0 Projects B. 18 Projects
 C. 9 Projects D. 20 Projects
 E. 2 Projects**

Camera Type: **Nikon D70s**
 Focal Length: **35mm**
 Effective Focal Length: **53.4 mm**
 Date Taken: **15/07/2013**
 Time Taken: **13:52**
 Height above elevation: **1.5m**

Visual Impact

Sensitivity: **High**
 Magnitude: **Negligible**
 Overall: **Moderate/Minor**

Please note for a 76° field of view, a viewing distance of 300mm is recommended.

Client: **Bairds Malt Single Turbine Ltd**



Drawing by: **Green Cat Renewables Ltd**

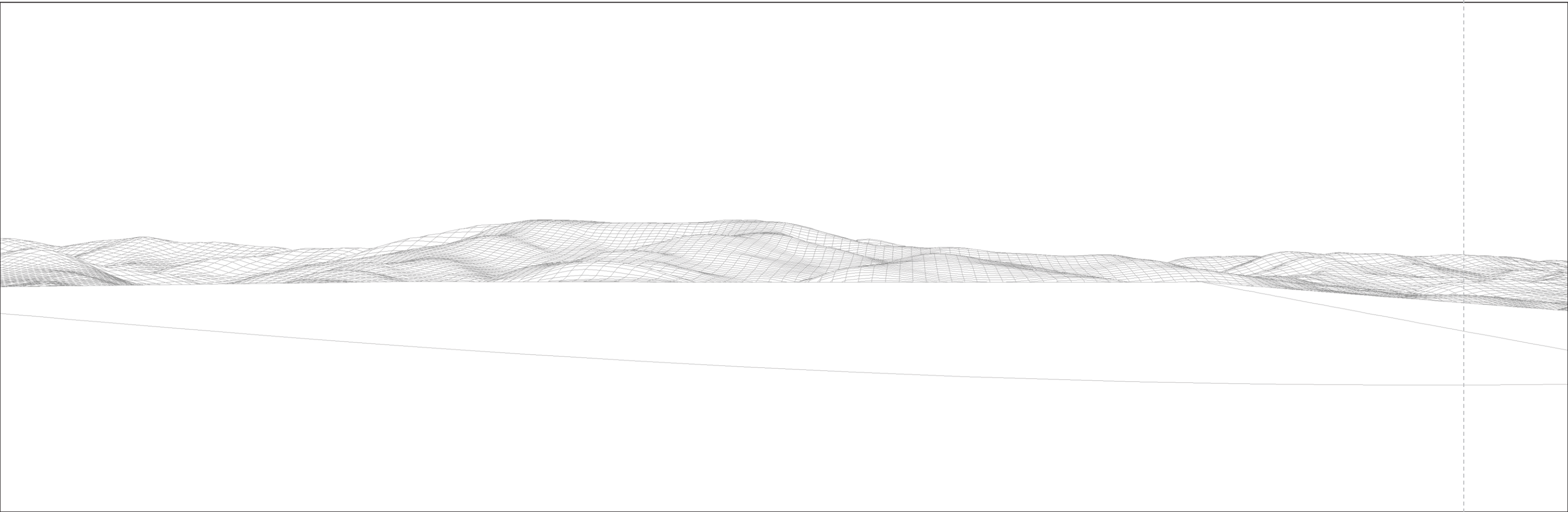
Document Number: **CO621-163/Fig 7.28**
 Version: **1.0**
 Author: **SS**
 Checked by: **RC**
 Approved By: **GM**
 Date: **17/12/2014**



VP16A WHITE CATERTHUN - PHOTOGRAPH OF EXISTING VIEW



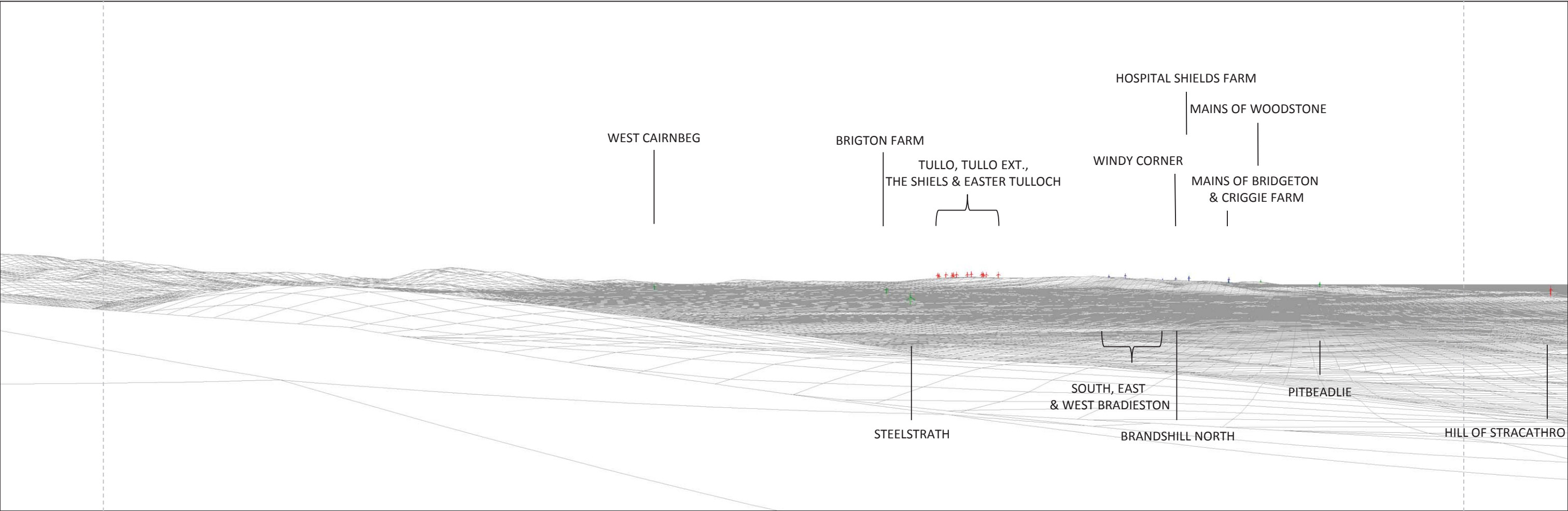
VP16A WHITE CATERTHUN - WIRELINE DRAWING



VP16B WHITE CATERTHUN - PHOTOGRAPH OF EXISTING VIEW



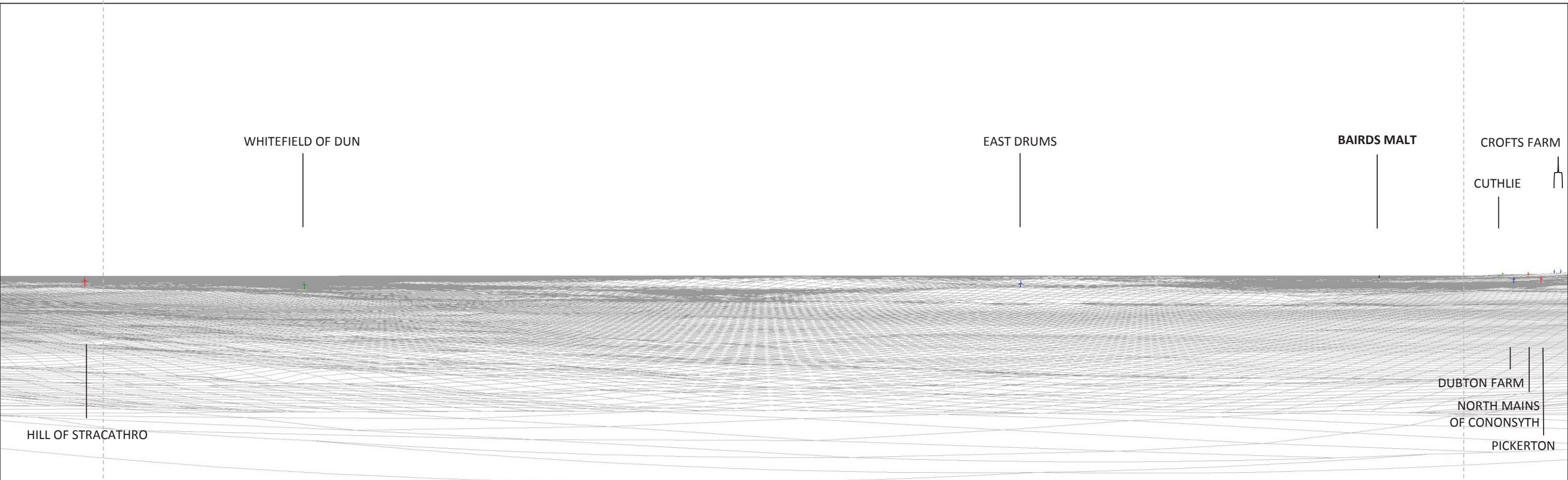
VP16B WHITE CATERTHUN - WIRELINE DRAWING



VP16C WHITE CATERTHUN - PHOTOGRAPH OF EXISTING VIEW



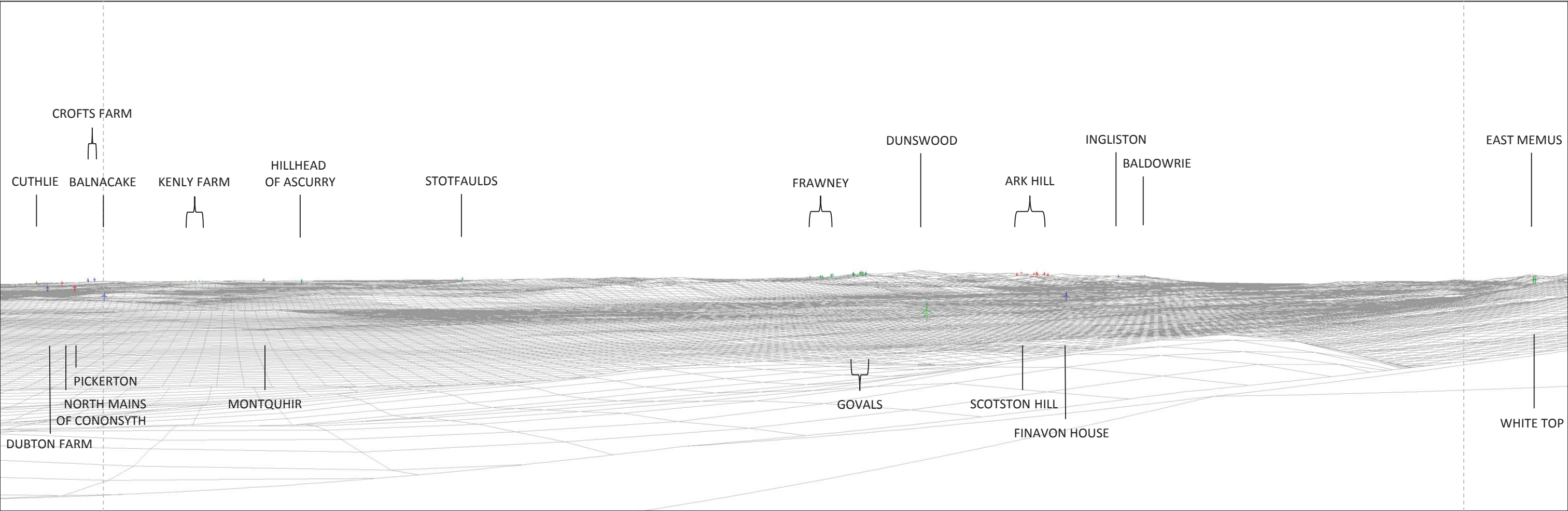
VP16C WHITE CATERTHUN - WIRELINE DRAWING



VP16D WHITE CATERTHUN - PHOTOGRAPH OF EXISTING VIEW



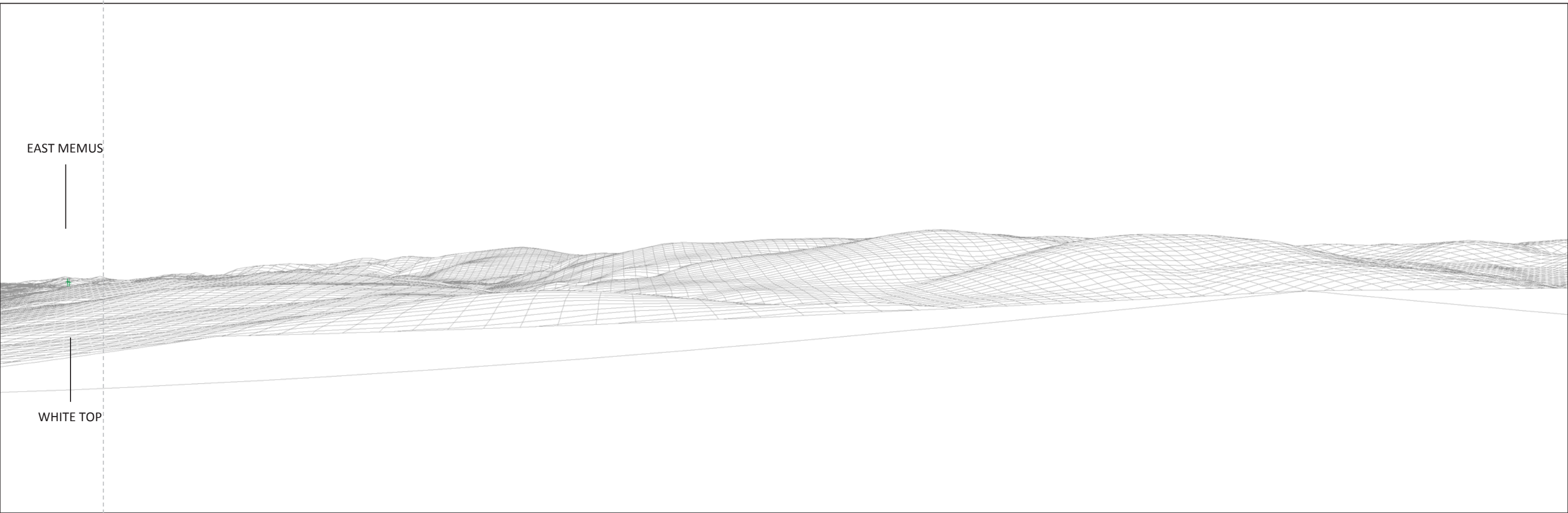
VP16D WHITE CATERTHUN - WIRELINE DRAWING

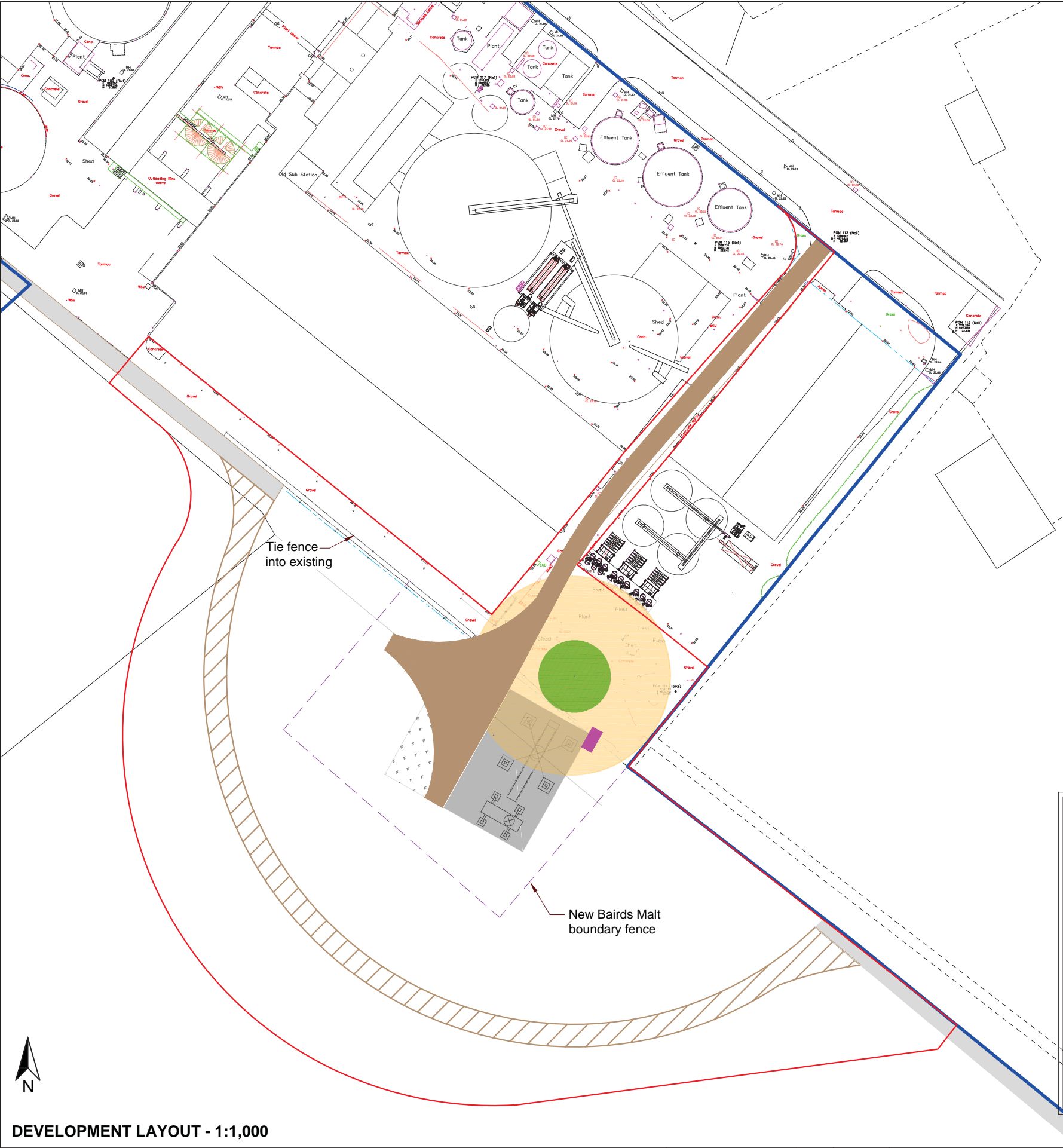


VP16E WHITE CATERTHUN - PHOTOGRAPH OF EXISTING VIEW



VP16E WHITE CATERTHUN - WIRELINE DRAWING

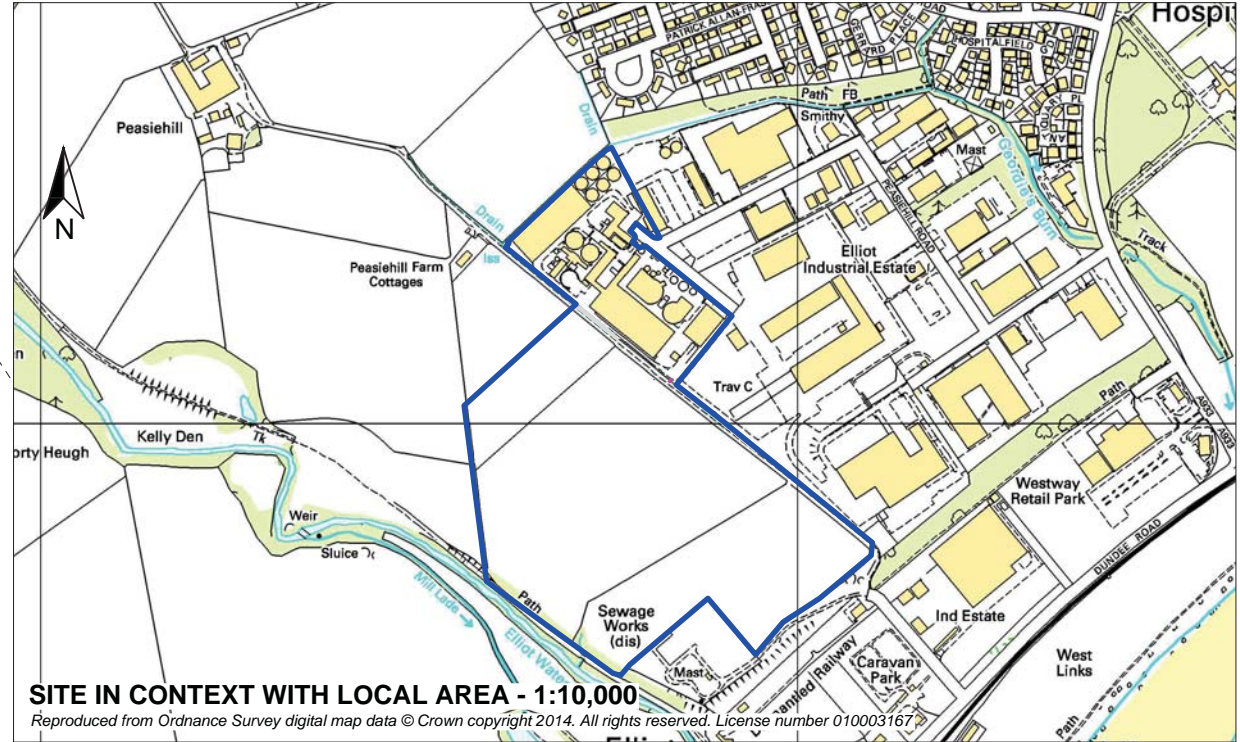




DEVELOPMENT LAYOUT - 1:1,000



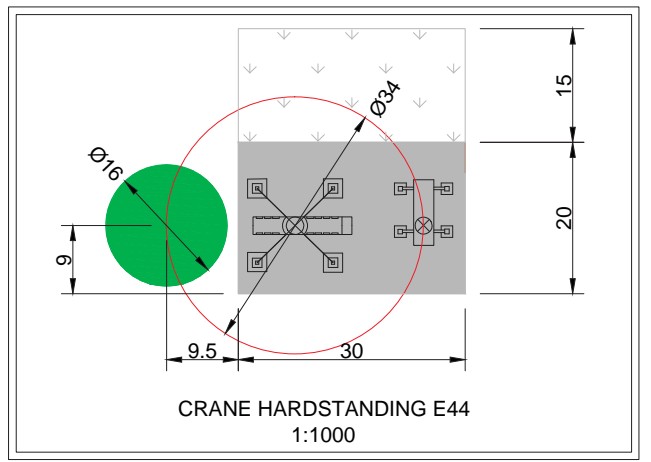
SITE IN CONTEXT WITH WIDER AREA - 1:50,000
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SITE IN CONTEXT WITH LOCAL AREA - 1:10,000
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KEY

- PROPOSED TURBINE / FOUNDATION CENTRED ON: 361828, 740071
- CRANE HARDSTANDING
- NEW ACCESS TRACK
- TURBINE BLADE SWEEP AREA (22m RADIUS)
- LAND OWNERSHIP BOUNDARY
- PLANNING APPLICATION BOUNDARY (1.7Ha)
- EXISTING TRACK
- REALIGNED TRACK
- SUBSTATION



Project Title: Bairds Malt Wind Turbine		Date drawn: 17.12.14	Rev.	Date	Description	Chk'd	Clients: Bairds Malt Single Turbine Ltd
Drawing Title: Site Layout		Stage: Planning					
Scale: SHOWN @ A3		Drawn by: LS					
		Checked by: GM					
		Approved by: SE					

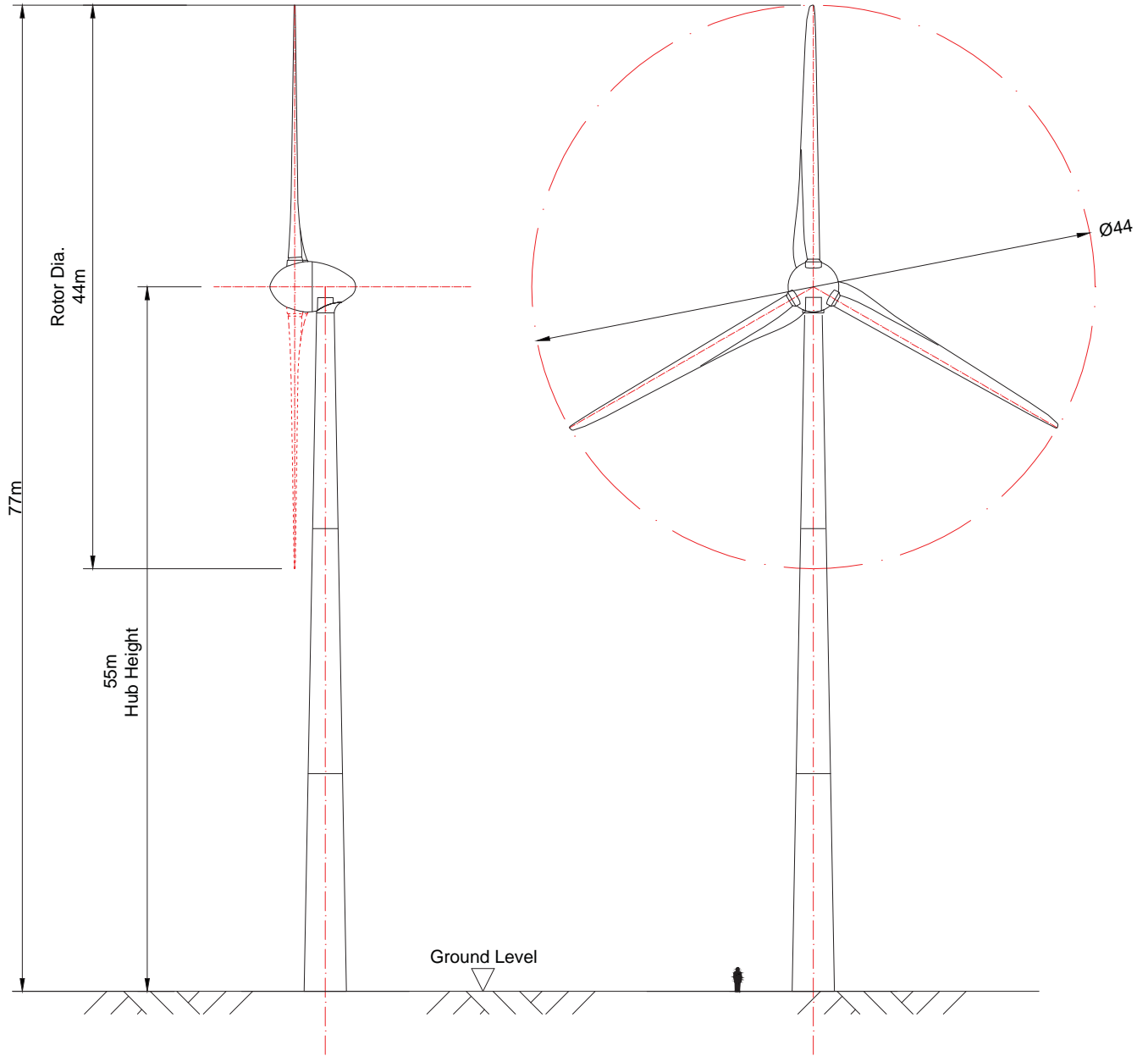
Date drawn: 17.12.14	Rev.	Date	Description	Chk'd
Stage: Planning				
Drawn by: LS				
Checked by: GM				
Approved by: SE				


Job No. C0621-163	Drng No. App-001
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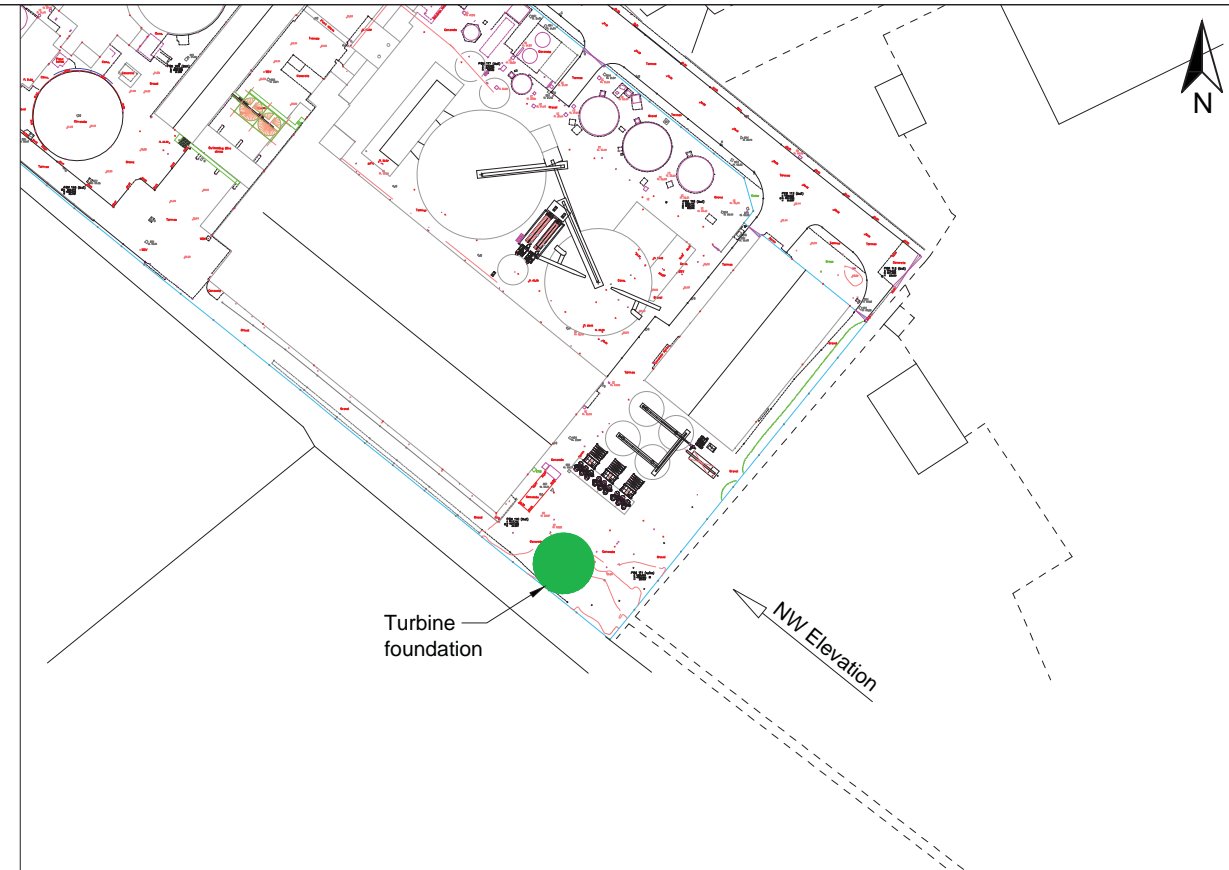
GREEN CAT RENEWABLES LTD

Midlothian Innovation Centre,
Pentlandfield, Edinburgh,
EH25 9RE.

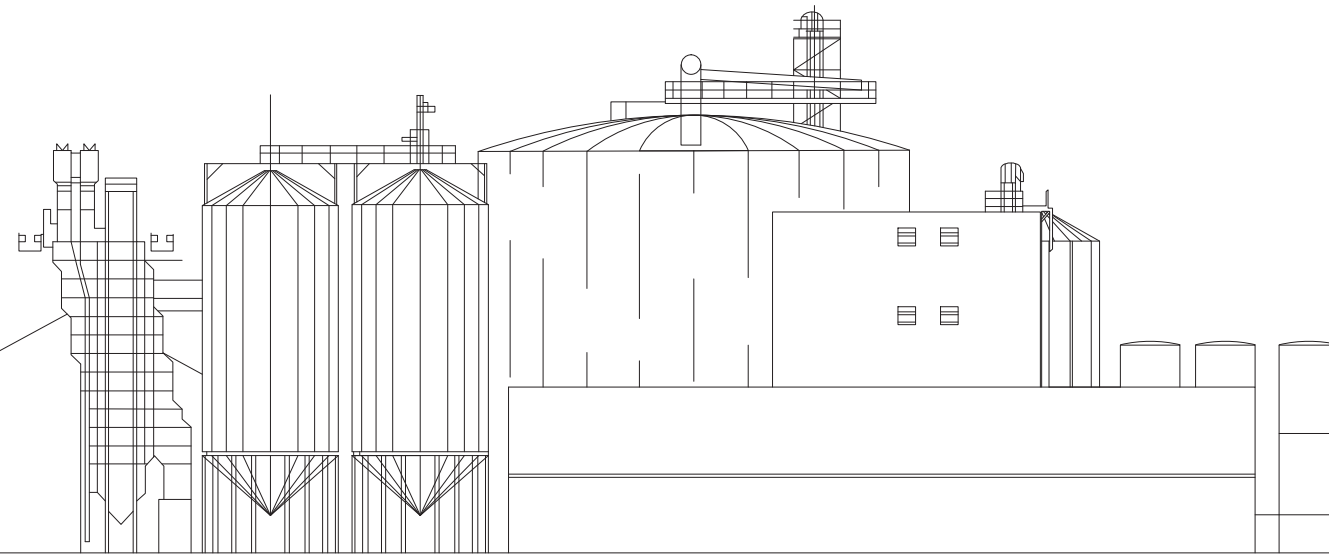
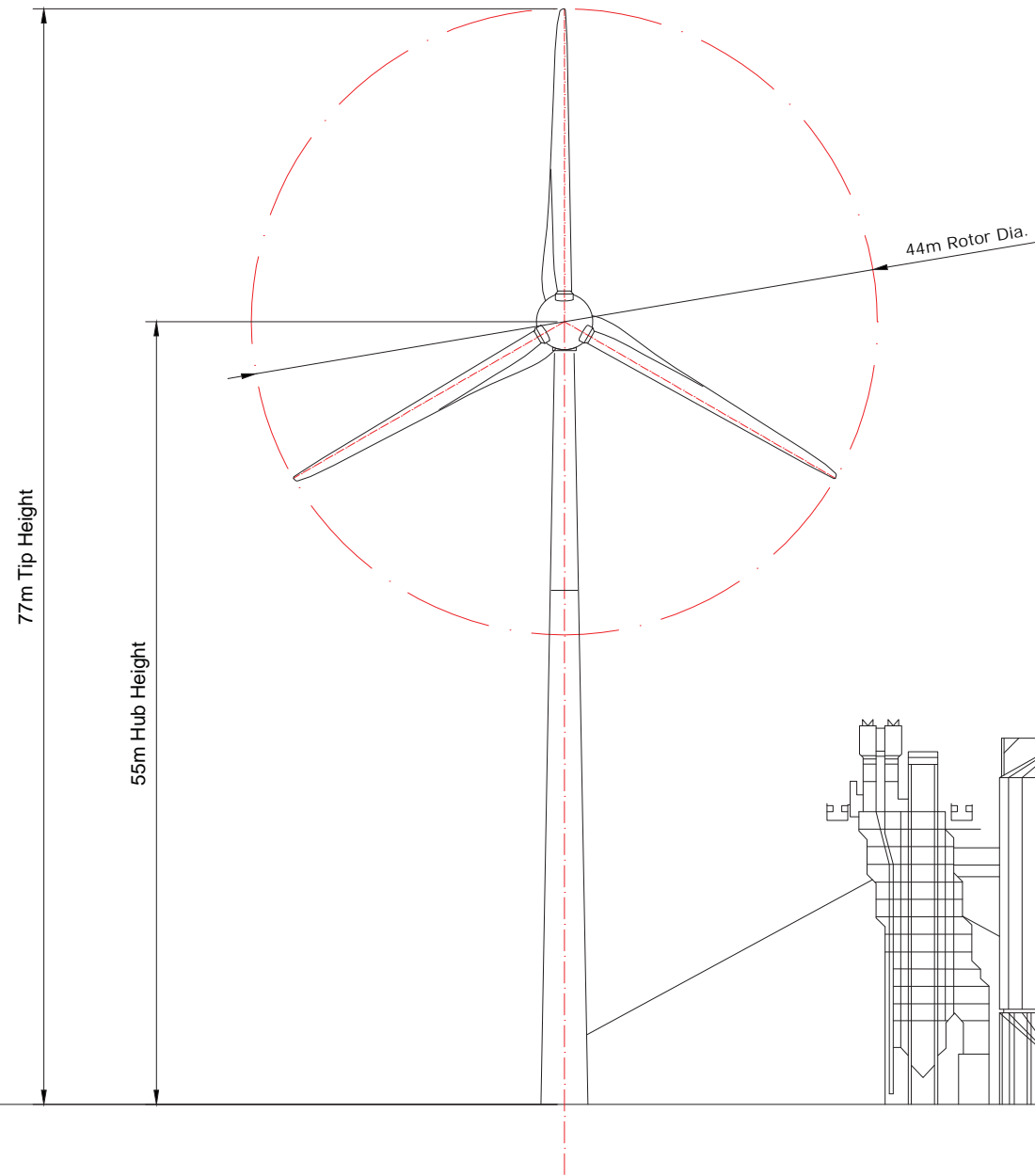
Tel: 0131 440 9053
www.greencatrenewables.co.uk




Project Title: Bairds Malt Wind Turbine			Date drawn: 17.12.14	Client: Bairds Malt Single Turbine Ltd	GREEN CAT RENEWABLES LTD  Midlothian Innovation Centre, Pentlandfield, Edinburgh, EH25 9RE. Tel:0131 440 9053 www.greencatrenewables.co.uk
Drawing Title: Turbine Elevation			Stage: Planning		
Job No. C0621-163	Drawing No. App-002	Scale: 1:500 @ A4	Drawn by: AF		
			Checked by: GM		
			Approved by: SE		



Location Plan - 1:2,000



SCALE BAR (m)

Project Title: Bairds Malt Wind Turbine		Date drawn: 17.12.14		Rev.	Date	Description	Chk'd	Client: Bairds Malt Single Turbine Ltd		 GREEN CAT RENEWABLES LTD Midlothian Innovation Centre, Pentlandfield, Edinburgh, EH25 9RE. Tel:0131 440 9053 www.greencatrenewables.co.uk
		Stage: Planning								
Drawing Title: Turbine Elevation Looking North-West		Drawn by: AF						Job No. C0621-163 Drng No. App-003		
		Checked by: GM								
Scale: 1:500 @ A3		Approved by: SE								

- Grain Silos
- Storage Bins
- Kiln
- G.V.
- Drying Tower
- Vehicle Movements
- Substation Building
- Site Boundary
- Steep House
- Office / Laboratories



Project Title:
Bairds Malt Wind Turbine

Drawing Title:
Existing Site Layout

Scale: 1:1250 @ A3

Date drawn:	Rev.	Date	Description	Chk'd
04.03.14				
Stage:				
Planning				
Drawn by: AF				
Checked by: GM				
Approved by: SE				

Clients:
Bairds Malt Single
Turbine Ltd

Job No. C0621-163 Drng No. App-004

GREEN CAT RENEWABLES LTD



Midlothian Innovation Centre,
Pentlandfield, Edinburgh,
EH25 9RE.
Tel: 0131 440 9053
www.greencatrenewables.co.uk

APPLICATION FOR PLANNING PERMISSION

Town and Country Planning (Scotland) Act 1997
 The Town and Country Planning (Development Management Procedure) (Scotland) Regulations 2013

**Please refer to the accompanying Guidance Notes when completing this application
 PLEASE NOTE IT IS FASTER AND SIMPLER TO SUBMIT PLANNING APPLICATIONS
 ELECTRONICALLY VIA <https://eplanning.scotland.gov.uk>**

1. Applicant's Details		2. Agent's Details (if any)	
Title	Mr	Ref No.	
Forename	Derek	Forename	Glen
Surname	Ross	Surname	Moon
Company Name	Bairds Malt Single Turbine Ltd	Company Name	Green Cat Renewables Ltd
Building No./Name	Bairds Malt	Building No./Name	Midlothian Innovation Centre
Address Line 1	Elliot Industrial Estate	Address Line 1	
Address Line 2		Address Line 2	
Town/City	Arbroath	Town/City	Edinburgh
Postcode	DD11 2NB	Postcode	EH25 9RE
Telephone		Telephone	0131 440 8350
Mobile		Mobile	
Fax		Fax	
Email	derek@kilmac.co.uk	Email	glen@greencatrenewables.co.uk
3. Postal Address or Location of Proposed Development (please include postcode)			
Bairds Malt Ltd, Elliot Industrial Estate, Arbroath, DD11 2NB.			
NB. If you do not have a full site address please identify the location of the site(s) in your accompanying documentation.			
4. Type of Application			
What is the application for? Please select one of the following:			
Planning Permission		<input checked="" type="checkbox"/>	
Planning Permission in Principle		<input type="checkbox"/>	
Further Application*		<input type="checkbox"/>	
Application for Approval of Matters Specified in Conditions*		<input type="checkbox"/>	
Application for Mineral Works**		<input type="checkbox"/>	
NB. A 'further application' may be e.g. development that has not yet commenced and where a time limit has been imposed a renewal of planning permission or a modification, variation or removal of a planning condition.			
*Please provide a reference number of the previous application and date when permission was granted:			
Reference No:	<input style="width: 150px;" type="text"/>	Date:	<input style="width: 150px;" type="text"/>

****Please note that if you are applying for planning permission for mineral works your planning authority may have a separate form or require additional information.**

5. Description of the Proposal

Please describe the proposal including any change of use:

Erection of a single wind turbine of no greater than 77m to tip height, and associated infrastructure including access and a crane hardstanding.

Is this a temporary permission?

Yes No

If yes, please state how long permission is required for and why:

Have the works already been started or completed?

Yes No

If yes, please state date of completion, or if not completed, the start date:

Date started:

Date completed:

If yes, please explain why work has already taken place in advance of making this application

6. Pre-Application Discussion

Have you received any advice from the planning authority in relation to this proposal?

Yes No

If yes, please provide details about the advice below:

In what format was the advice given?

Meeting Telephone call Letter Email

Have you agreed or are you discussing a Processing Agreement with the planning authority? Yes No

Please provide a description of the advice you were given and who you received the advice from:

Name:

Date:

Ref No.:

A meeting to discuss scoping advice and assessment details. EIA is not required for this project.

7. Site Area

Please state the site area in either hectares or square metres:

Hectares (ha):

Square Metre (sq.m.)

8. Existing Use

Please describe the current or most recent use:

The turbine is located within the Bairds Malt facility, and a small area of adjacent farmland.

9. Access and Parking

Are you proposing a new altered vehicle access to or from a public road? Yes No

If yes, please show in your drawings the position of any existing, altered or new access and explain the changes you propose to make. You should also show existing footpaths and note if there will be any impact on these.

Are you proposing any changes to public paths, public rights of way or affecting any public rights of access? Yes No

If yes, please show on your drawings the position of any affected areas and explain the changes you propose to make, including arrangements for continuing or alternative public access.

How many vehicle parking spaces (garaging and open parking) currently exist on the application site?

How many vehicle parking spaces (garaging and open parking) do you propose on the site? (i.e. the total number of existing spaces plus any new spaces)

Please show on your drawings the position of existing and proposed parking spaces and specify if these are to be allocated for particular types of vehicles (e.g. parking for disabled people, coaches, HGV vehicles, etc.)

10. Water Supply and Drainage Arrangements

Will your proposals require new or altered water supply or drainage arrangements? Yes No

Are you proposing to connect to the public drainage network (e.g. to an existing sewer?)

Yes, connecting to a public drainage network
No, proposing to make private drainage arrangements
Not applicable – only arrangement for water supply required

What private arrangements are you proposing for the new/altered septic tank?

Discharge to land via soakaway
Discharge to watercourse(s) (including partial soakaway)
Discharge to coastal waters

Please show more details on your plans and supporting information

What private arrangements are you proposing?
Treatment/Additional treatment (relates to package sewer treatment plants, or passive sewage treatment such as a reed bed)
Other private drainage arrangement (such as a chemical toilets or composting toilets)

Please show more details on your plans and supporting information.

Do your proposals make provision for sustainable drainage of surface water? Yes No

Note:- Please include details of SUDS arrangements on your plans

Are you proposing to connect to the public water supply network? Yes No

If no, using a private water supply, please show on plans the supply and all works needed to provide it (on or off site)

11. Assessment of Flood Risk

Is the site within an area of known risk of flooding? Yes No

If the site is within an area of known risk of flooding you may need to submit a Flood Risk Assessment before your application can be determined. You may wish to contact your planning authority or SEPA for advice on what information may be required.

Do you think your proposal may increase the flood risk elsewhere? Yes No Don't Know

If yes, briefly describe how the risk of flooding might be increased elsewhere.

12. Trees

Are there any trees on or adjacent to the application site? Yes No

If yes, please show on drawings any trees (including known protected trees) and their canopy spread as they relate to the proposed site and indicate if any are to be cut back or felled.

13. Waste Storage and Collection

Do the plans incorporate areas to store and aid the collection of waste? (including recycling) Yes No

If yes, please provide details and illustrate on plans.

If no, please provide details as to why no provision for refuse/recycling storage is being made:

14. Residential Units Including Conversion

Does your proposal include new or additional houses and/or flats? Yes No

If yes how many units do you propose in total?

Please provide full details of the number and types of units on the plan. Additional information may be provided in a supporting statement.

15. For all types of non housing development – new floorspace proposed

Does your proposal alter or create non-residential floorspace?

Yes No

If yes, please provide details below:

Use type:

If you are extending a building, please provide details of existing gross floorspace (sq.m):

Proposed gross floorspace (sq.m.):

Please provide details of internal floorspace(sq.m)

Net trading space:

Non-trading space:

Total net floorspace:

16. Schedule 3 Development

Does the proposal involve a class of development listed in Schedule 3 of the Town and Country Planning (Development Management Procedure) (Scotland) Regulations 2008?

Yes No Don't Know

If yes, your proposal will additionally have to be advertised in a newspaper circulating in your area. Your planning authority will do this on your behalf but may charge a fee. Please contact your planning authority for advice on planning fees.

17. Planning Service Employee/Elected Member Interest

Are you / the applicant / the applicant's spouse or partner, a member of staff within the planning service or an elected member of the planning authority?

Yes No

Or, are you / the applicant / the applicant's spouse or partner a close relative of a member of staff in the planning service or elected member of the planning authority?

Yes No

If you have answered yes please provide details:

DECLARATION

I, the applicant/agent certify that this is an application for planning permission The accompanying plans/drawings and additional information are provided as part of this application. I hereby confirm that the information given in this form is true and accurate to the best of my knowledge.

I, the applicant/agent hereby certify that the attached Land Ownership Certificate has been completed

I, the applicant/agent hereby certify that requisite notice has been given to other land owners and /or agricultural tenants

Yes No N/A

Signature



Name:

Glen Moon

Date:

18/12/2014

Any personal data that you have been asked to provide on this form will be held and processed in accordance with the requirements of the 1998 Data Protection Act.

LAND OWNERSHIP CERTIFICATES

Town and Country Planning (Scotland) Act 1997
Regulation 15 of the Town and Country Planning (Development Management Procedure) (Scotland)
Regulations 2013

CERTIFICATE A, B, C, D OR CERTIFICATE E MUST BE COMPLETED BY ALL APPLICANTS

CERTIFICATE A

Certificate A is for use where the applicant is the only owner of the land to which the application relates and none of the land is agricultural land.

I hereby certify that -

- (1) No person other than myself _____ was owner of any part of the land to which the application relates at the beginning of the period of 21 days ending with the date of the application.
- (2) None of the land to which the application relates constitutes or forms part of agricultural land.

Signed: _____

On behalf of: _____

Date: _____

CERTIFICATE B

Certificate B is for use where the applicant is not the owner or sole owner of the land to which the application relates and/or where the land is agricultural land and where all owners/agricultural tenants have been identified.

I hereby certify that -

- (1) The applicant has served notice on every person other than the applicant who, at the beginning of the period of 21 days ending with the date of the application was owner of any part of the land to which the application relates. These persons are:

Name	Address	Date of Service of Notice
Mr Brian Soutar	Peasiehill Farm, Arbirlot, Arbroath, DD11 2NR	18/12/2014

- (2) None of the land to which the application relates constitutes or forms part of agricultural land
- or
- (3) The land or part of the land to which the application relates constitutes or forms part of agricultural land and the applicant has served notice on every person other than the applicant who, at the beginning of the period of 21 days ending with the date of the application was an agricultural tenant. These persons are:

Name	Address	Date of Service of Notice

Signed: [REDACTED]

On behalf of: / Green Cat Renewables Ltd.

Date: 8.1.15

CERTIFICATE C

Certificate C is for use where the applicant is not the owner or sole owner of the land to which the application relates and/or where the land is agricultural land and where it has not been possible to identify ALL or ANY owners/agricultural tenants.

(1) I have been unable to serve notice on **every** person other than myself who, at the beginning of the period of 21 days ending with the date of the application was owner of any part of the land to which the application relates.

or

(2) I have been unable to serve notice on **any** person other than myself who, at the beginning of the period of 21 days ending with the date of the accompanying application, was owner of any part of the land to which the application relates.

(3) None of the land to which the application relates constitutes or forms part of an agricultural holding.

or

(4) The land or part of the land to which the application relates constitutes or forms part of an agricultural holding and I have been unable to serve notice on any person other than myself who, at the beginning of the period of 21 days ending with the date of the accompanying application was an agricultural tenant.

or

(5) The land or part of the land to which the application relates constitutes or forms part of an agricultural holding I have served notice on each of the following persons other than myself who, at the beginning of the period of 21 days ending with the date of the application was an agricultural tenant. These persons are:

Name	Address	Date of Service of Notice

- (6) I have _____ taken reasonable steps, as listed below, to ascertain the names and addresses of all other owners or agricultural tenants and have _____ been unable to do so.

Steps taken:

Signed:

On behalf of:

Date:

CERTIFICATE D

Certificate D is for use where the application is for mineral development.

- (1) No person other than myself _____ was an owner of any part of the land to which the application relates at the beginning of the period of 21 days ending with the date of the accompanying application.

or

- (2) I have _____ served notice on each of the following persons other than myself _____ who, at the beginning of the period of 21 days ending with the date of the accompanying application, was to the applicant's knowledge, the owner, of any part of the land to which the application relates. These persons are:

Name	Address	Date of Service of Notice

- (3) None of the land to which the application relates constitutes or forms part of an agricultural holding.

or

- (4) The land or part of the land to which the application relates constitutes or forms part of an agricultural holding and I have _____ served notice on each of the following persons other than myself _____ who, at the beginning of the period of 21 days ending with the date of the application, was an agricultural tenant.

- (5) Notice of the application as set out below has been published and displayed by public notice

Signed:

On behalf of:

Date:

CERTIFICATE E

Certificate E is required where the applicant is the sole owner of all the land and the land to which the application relates is agricultural land and there are or are not agricultural tenants.

I hereby certify that -

(1) No person other than myself _____ was the owner of any part of the land to which the application relates at the beginning of the period 21 days ending with the date of the application.

(2) The land to which the application relates constitutes or forms part of an agricultural holding and there are no agricultural tenants.

or

(1) No person other than myself _____ was the owner of any part of the land to which the application relates at the beginning of the period 21 days ending with the date of the application.

(2) The land to which the application relates constitutes or forms part of an agricultural holding and there are agricultural tenants. These people are:

Name	Address	Date of Service of Notice

(3) I have _____ taken reasonable steps, as listed below, to ascertain the names and addresses of the other agricultural tenants and have _____ been unable to do so.

Steps taken:

Signed:

On behalf of:

Date:

Any personal data that you have been asked to provide on this form will be held and processed in accordance with the requirements of the 1998 Data Protection Act

NOTICE TO OWNERS AND AGRICULTURAL TENANTS

Town and Country Planning (Scotland) Act 1997
Regulation 15 (1) of the Town and Country Planning (Development Management Procedure)
(Scotland) Regulations 2013

Name [Note 1]	Mr Brian Soutar
Address	Peasiehill Farm
	Arbirlot
	Arbroath
	DD11 2NR

Proposed development at [Note 2]	Bairds Malt Ltd
	Elliot, Industrial Estate, Arbroath
	DD11 2NB

Notice is hereby given that an application is being made to

[Note 3]	Angus	Council by	Bairds Malt Single Turbine Ltd
----------	-------	------------	--------------------------------

For planning permission to [Note 4]

Erect 1no Wind Turbine measuring 77m to tip height and ancillary infrastructure.
--

If you wish to obtain further information on the application or to make representations about the application, you should contact the Council at [Note 5]

Development Standards, County Blds, Market Street, Forfar, DD8 3LG
--

(The grant of planning permission does not affect owners' rights to retain and dispose of their property unless there is some provision to the contrary in an agreement or lease. The grant of planning permission for non-agricultural development may affect agricultural tenants security of tenure.)

Signed	
On behalf of	Bairds Malt Single Wind Turbine Ltd
Date	18/12/2014

*Delete where appropriate

[Note 1] – Insert name and address of owner or agricultural tenants

[Note 2] – Insert address or location of proposed development.

[Note 3] – Insert name of planning authority.

[Note 4] – Insert description of proposed development.

[Note 5] - Insert planning authority address.



Green Cat Renewables

BAIRDS MALT

NOISE ASSESSMENT

**Compliance with noise
management criteria**

November 2015

Green Cat Renewables Ltd

Report prepared for:
Richard Broadbent

BAIRDS MALT

NOISE ASSESSMENT

Prepared By:
Merlin Garnett

November 2015



Green Cat Renewables
Bethany Hall 29A High Street
Biggar
ML12 6DA
Tel. 01899 309100

\\BIGGAR\Environmental\New Projects\Noise Work__Completed
Work_\C0621-163 Bairds Malt Background Noise\Compliance
Work\Bairds Noise Assessment - v1.0.docx

Checked By: Merlin Garnett	Date: 24/11/2015
Approved By: Cameron Sutherland	Date: 26/11/2015

1 Introduction

1.1 Overview

A noise audit of the plant installed at Bairds Malt during 2007 was requested by Angus Council Environmental Health. The audit should assess whether this plant is likely to be operating within guideline noise limits stated at the time of planning consent. The survey is conducted within the context of a proposal, under consideration by the Council, to construct a medium scale wind turbine at the site. Bairds Malt engaged Green Cat Renewables to conduct the audit.

Attended noise measurements took place during two site visits that occurred on the 20th September and the 5th of November 2015, the former taking place in the company of Steve Thompson representing Angus Council and Richard Broadbent representing Bairds Malt and who assisted in identifying the relevant noise sources.

2 Baseline

2.1 Noise sources

The 2007 plant was identified via Section 2 of a Noise Management Plan commissioned on behalf of the Malting's and dated 6 August 2008:

The plant comprises:

- a) Barley driers and associated wet barley storage silos.*
- b) Combined steeps and germination vessels with associated barley storage and washing plant.*
- c) A malt kiln and associated malt storage bins.*
- d) Barley and malt handling and transfer plant.*
- e) An electrical sub-station.*

2.2 Assessment positions within the site

Section 6 of the plan recommends monitoring locations within the site. These are suggested with the aim of minimising the influence of the noise emissions of pre-2007 plant, impinging on the measurements. Noise limits are given for these monitoring locations based on predicted noise levels of the 2007 plant at nearby sensitive receptors, corrected for distance using: $20\text{Log}(r_2/r_1)$, as shown in Appendix 4 of the noise management plan.

Noise monitoring location	Maximum noise level to comply with planning consent noise limit
A: 15 m west of the barley drier towers, and 5 m inside the site boundary	56dBA
B: A point 40m equidistant from the steep/germination plant service building and kiln fan house and 5m inside the east site boundary	51dBA

Location A was not considered as the barley driers were not in use. It became apparent during the initial site visit that the noise level at Position B due to the grain washers alone would be significantly above the 51dB criterion. The criterion was derived assuming no

barrier attenuation between source and receptor and does not appear to account for noise produced by the grain washing process. It should be noted that the appropriateness of the application of criterion B was questioned in the Noise Management Plan which stated that other methods could be considered:

‘These noise measurement locations should be regarded as tentative and subject to alteration following post-commissioning noise measurement experience. Additional in-plant locations may be required. It should be noted that no allowance has been made for screening of noise by existing buildings in the derivation of maximum noise levels.’

The level of residual noise generated by pre-2007 plant, in the areas around the newer plant, make the identification of further in-plant locations impractical therefore this approach was not explored further.

2.3 Noise sensitive receptors

Section 4 of the Noise Management Plan identifies two separate representative receptors:

- a) ***residents of properties in Patrick Allan-Fraser Street, particularly those (Nos 103–107) whose houses back on to a stream and strip of woodland immediately to the north-east of the Bairds Malt site;***
- b) ***residents of Peasiehill Cottages, located close to the western site boundary and immediately to the west of the existing barley storage silo 3.***

2.4 Noise constraints

The noise limits given for the two off-site assessment positions are given in the following table and *‘refer to daytime noise levels arising from operation of the new plant, as measured as 1 hour L_{eqS} , in accordance with BS4142.’*

Location	At rear of Nos 103-107 Patrick Allan-Fraser Street	At front of Peasiehill Cottages
Background noise level, L_{A90} (dB)	34	42
Ambient noise level, L_{Aeq} (dB)	37	43
Predicted noise level from new plant, L_{Aeq} (dB)	35	37
Noise limit applying, L_{Aeq} (dB)	35	39

For night-time noise (between 2200 and 0700), the noise level should not exceed 45dBA L_{max} or 35dBA L_{eq} (5 minutes) in any bedroom, measured in accordance with BS8233.

2.5 GPS Positions

Noise sources were identified and located on the 20th of September 2015. Relative positions and horizontal distances of plant and assessment positions are given in the following table. The positions have been derived by cross-referencing GPS measurements, high resolution mapping and satellite imagery. Measurements were deemed to be accurate to $\pm 5m$.

Plant	E	N	Distance from PHC (m)	Distance from PAF (m)
Washing plant				
Motor 1	361819	740157	275	252
Motor 2	361822	740154	278	255
Germination plant				
CO2 extract fan 1	361831	740150	288	261
CO2 extract fan 2	361848	740135	307	279
Louvered Intake fans	361851	740161	306	254
Malt kiln				
Vertical vent 1	361787	740197	240	210
Vertical vent 2	361783	740192	236	215
Vertical vent 3	361778	740187	231	220
Assessment positions				
PHC	361547	740197	Representing Peasiehill Cottages	
PAF	361787	740407	Representing the nearest dwellings on the estate	

No significant noise was observed due to the operation of the barley / malt handling and transfer plant or electrical sub-station. The barley driers were not operational and were therefore not assessed.

3 Methodology

The approach agreed with Steve Thompson on the 20th of September 2015 was to determine sound power levels of the relevant plant through measurement in close proximity, then to propagate that source back to the two off-site assessment positions using conservative assumptions for attenuation.

3.1 Determination of sound power

Sound power was determined for the specific noise sources using a method analogous to *BS:4142-2014* but implemented in close proximity to the sources rather than at far field assessment positions. Many of the sources are variable, ramping up and down as required; all sources were set to operate at full capacity for testing so that worst case levels could be assessed. Residual noise was assessed in the absence of the specific source or via attenuation of the active specific source using a nearby barrier. Noise measurements were corrected for residual noise by logarithmic subtraction; all workings are shown.

As all noise sources were located above ground, to varying degrees, spherical divergence from point sources was assumed. Sound power was therefore calculated using:

$$L_w = L_p + 20 \log r + 11$$

where L_p is measured $L_{Aeq,T}$ at distance r from the centre of the noise source having sound power L_w .

3.2 Propagation model

Noise levels at the defined off-site assessment positions were assessed using *ISO:9613 - Attenuation of sound during propagation outdoors*. The method of calculation is based on the following expression:

$$L_p = L_w - 20 \log r - 11 + D - A_{air} - A_{ground} - A_{turbulence} - A_{refraction} - A_{barrier}$$

Attenuation (A) via ground effect, turbulence or refraction are not included as they are unlikely to be significant factors in this context (distances of less than 300m).

Directivity (D) was determined through measurement or estimated using conservative assumptions. Atmospheric absorption (A_{air}) has been assessed using measured octave band sound powers and the following absorption coefficients which assume atmospheric conditions; 10°C and 70% humidity:

Octave Band (Hz)	63	125	250	500	1000	2000	4000	8000
Attenuation Coefficient (dB/m)	0.0001	0.0004	0.001	0.0019	0.0037	0.0097	0.0328	0.117

Barrier attenuation ($A_{barrier}$) was assessed using calculated path difference for single or double diffraction using the equations given in ISO:9613 Section 7 – Screening. Barrier attenuation is frequency dependent and was therefore calculated using measured octave band sound powers as input values. The actual barrier attenuation offered by the various on-site obstacles may be less than calculated due to atmospheric effects or multiple noise pathways, therefore the calculated value is not used directly in the propagation calculation but is used instead to inform and justify the selection of a more conservative nominal value.

3.3 Assessment method

All the noise sources measured were observed to be relatively stable in both amplitude and frequency content having a maximum periodicity of no more than a few seconds duration and producing amplitude modulation of no more than 3dB. Consequently, $L_{Aeq,T}$ values measured with values of T between 25 and 45 seconds were deemed of sufficient length to be representative of the $L_{Aeq,1hour}$ values listed as daytime noise constraints in accordance with BS:4142. Noise sources were initially monitored to establish the extent of their near field thereby determining a representative measurement position. For the purposes of calculation, a notional measurement distance of 1m was ascribed to all sources except the germination intake fans where the near field of the source could not be accessed. This approach was deemed to be appropriate by Angus Council.

In the case of the louvered air intake fans on the germination building, directivity was determined by taking a series of off axis measurements with particular attention paid to angles relevant to the assessment positions. In the case of the CO₂ fans at the top of the germination building, the directional hoods were deemed to provide a minimum attenuation of 5dB to the directly measured noise level.



The path difference calculations, necessary to assess barrier attenuation required the size and position of barriers to be determined. Height information was obtained from details in the noise measurement plan or from the production manager. Relative positions on the ground were obtained from high resolution plans and mapping. These calculations are given at Appendix 1.

Where the barrier obscures line of sight but not much more (small path differences) a nominal -5dB barrier attenuation has been deemed appropriate. Where a single barrier significantly obscures a noise source (single diffraction), a -10dB attenuation is allocated and when there is a long barrier or when there are two barriers separated by 20m or more (double diffraction), a -15dB attenuation has been deemed appropriate. These nominal attenuation values are conservative (low) when compared to ISO calculations.

At all stages, calculations were made and reported to the nearest whole decibel.

3.4 Noise sources

3.4.1 Grain Washer motors



Measurements were taken of the two motors from various angles at distances of between 0.5 – 1.0m. A representative position for Motor 1 (pictured) was found using the southern access gangway. The two motors were in close agreement (± 1 dB) in terms of $L_{Aeq,T}$ and so spectra taken for Motor 1 were deemed to be representative of Motor 2. Residual measurements were made with the motors switched off at ground level.

3.4.2 Germination CO₂ Fans



Located on the roof of the germination vessel, Fan 1 (pictured) was measured at a distance of 1m. Residual measurements were made in approximately the same position just before the source was activated. The fans were set to operate at full power.

3.4.3 Germination intake fans



Measurements were made at a horizontal distance of 8m with all four fans operating at full power. An overall sound power was determined for the fans but this was then divided between two equal sources deemed representative of the upper and lower fans so they could be treated independently.

Directivity was assessed by measuring levels in the direction of Patrick Allan Fraser St relative to the on axis measurements. A reduction of 5dB was observed at the same distance. Barrier attenuation was also preliminarily tested by measuring at a position beyond the corner of the building thereby blocking line of site. A reduction of 8dB was observed for the same distance and applied as a directivity adjustment relevant for Peasiehill Cottages, rather than barrier attenuation.

3.4.1 Kiln Flues



Measurements were made from the access walkway at a height equal to the top of the flues. The noise meter was moved as close to individual flues as could be safely achieved (approximately 1.3m). No significant increase in level were observed as the measurement distance reduced below ~1.5m indicating that this measurement range approximated the extent of the source near field.

Flue 1 (pictured) was significantly louder and had a more even frequency distribution relative to the other two, which exhibited significant sound pressure levels in the 250Hz octave band. The residual measurement was taken at the eastern extent of the access walkway with all flues active. This provided an indication of how much the noise from each flue may have impinged on the measurement of its neighbour. The flues carry exhaust air from large gas boilers.

The sound power derived for Flue 1 was 2dB less than that measured during the previous site visit on the 20th of September when the barley plant opposite was in full operation, but potentially contributing to the measured level. Given the operation of the Barley plant, the results would appear reasonably comparable providing some assurance that the measurement approach taken was appropriate.

4 Results

4.1 Sound Power

Source	Washer Motor 1	Germination CO2 Fan 1	Germination Intake Fans (Total)	Kiln Flue 1	Kiln Flue 2	Kiln Flue 3
Measured level ($L_{Aeq,T}$)	93	71	64	85	78	76
Period T (seconds)	26	35	74	22	49	62
Residual level ($L_{Aeq,T}$)	61	55	52	69	69	69
Period T (seconds)	20	10	27	27	27	27
Residual Correction	0	0	0	0	-1	-1
Measurement distance (m)	1	1	11 ¹	1	1	1
Sound Power (LWA)	104 dB	82 dB	96 dB	96 dB	88 dB	86 dB

4.2 Octave band spectra

Octave band (A weighted)	Washer Motor 1 (dB)	Germination CO2 Fan 1 (dB)	Germination Intake Fans (dB)	Kiln Flue 1 (dB)	Kiln Flue 2 (dB)	Kiln Flue 3 (dB)
63 Hz	65	60	75	73	71	69
125 Hz	72	63	81	79	75	71
250 Hz	88	69	85	94	89	88
500 Hz	95	78	89	96	86	82
1 kHz	101	76	93	93	86	81
2 kHz	98	75	84	92	81	76
4 kHz	95	69	79	82	71	67
8 kHz	86	58	69	70	61	58

4.3 Assessment positions

Results are shown in dB(A) and give decibel reductions attributed to spherical divergence, directivity and attenuation by atmospheric absorption and barriers. The noise level of the individual sources is summed to produce a worst case scenario and compared with the relevant criterion.

¹ Distance to notional centre of source given that the lower fans will dominate when measured from ground level

4.3.1 Peasiehill Cottages

Peasiehill Cottages	Washer Motor 1	Washer Motor 2	Germ CO2 Fan 1	Germ CO2 Fan 2	Upper intake fans	Lower Intake fans	Kiln Flue 1	Kiln Flue 2	Kiln Flue 3
Sound Power	104	104	82	82	93	93	96	88	86
Horizontal Distance (m)	275	278	288	307	306	306	240	236	231
Divergence	-60	-60	-60	-61	-61	-61	-59	-58	-58
Directivity - D	0	0	-5	-5	-8	-8	0	0	0
A _{air}	-2	-2	-1	-1	-1	-1	-1	-1	0
ISO A _{barrier}	-25	-25					-17	-16	-15
Nominal A _{barrier}	-15	-15	0	0	0	0	-5	-5	-5
Noise Level	27	27	16	15	23	23	31	24	23
PHC Total	35	Criterion	39						
PHC Exceedence	-4								

4.3.1 Patrick Allan Fraser Street

Patrick Allan Fraser Street	Washer Motor 1	Washer Motor 2	Germ CO2 Fan 1	Germ CO2 Fan 2	Upper intake fans	Lower Intake fans	Kiln Flue 1	Kiln Flue 2	Kiln Flue 3
Sound Power	104	104	82	82	93	93	96	88	86
Horizontal Distance (m)	252	255	261	279	254	254	210	215	220
Divergence	-59	-59	-59	-60	-59	-59	-57	-58	-58
Directivity	0	0	-5	-5	-5	-5	0	0	0
A _{air}	-2	-2	-1	-1	-1	-1	-1	-1	0
ISO A _{barrier}	-25	-25					-17		
Nominal A _{barrier}	-15	-15	0	0	0	-5	0	0	0
Noise Level	28	28	17	16	28	23	38	29	28
PAF Total	40	Criterion	35						
PAF Exceedence	5								

5 Discussion

The sound power levels computed meet the daytime criterion for Peasiehill Cottages by a margin of 4dB. Meanwhile, the daytime criterion for Patrick Allan Fraser St is exceeded by a margin of 5dB; the cause of non-compliance can clearly be identified as Kiln Flue 1, estimated to be 9dB louder than any other relevant source at the off-site assessment position. The worst case levels in each case meet the night-time noise criterion.

Although care has been taken to minimise error, measurement uncertainty should be considered alongside the results shown. The most significant sources of error are considered to be the potential instability of sound pressure measurements made in the near field of the noise source and in the estimation of distance measurements. Total measurement uncertainty is given by taking the 'root mean square' of independently contributing factors.

Factor	Value (dB)
Source near field	1.5
Estimated distances	1.0
Class 1 SLM tolerance	0.7
Total measurement uncertainty	1.9

Barrier attenuation in each case was ascribed a nominal value and therefore has a significant margin for error, but it should be noted that; a) the ISO calculated attenuation in all cases is at least 10dB greater than the nominal value ascribed, b) the result shown at Patrick Allen Fraser St is not dependent on barrier attenuation.

6 Conclusions

This assessment clearly indicates a particular issue with Kiln Flue 1 which, even in isolation, is assessed to exceed the 35dB(A) daytime criterion. The gas heaters attached to Flues 1 and 3 are of the same type and are set to operate in tandem. Assuming that this was the case on the day of measurement, there would appear to be significant scope for noise abatement at Flue 1. By calculation it can be seen that if Flue 1 was to operate at the same level as Flue 3, the result would be a 4dB reduction in level at the assessment position giving a revised level of 36dB.

It is recommended that the flue mounts are inspected for signs of deterioration and any other differences between the mounting of the flues be noted. Vibration may be transmitted from the boiler to flue if the two are connected without isolation.

If gas consumption of the boilers is individually metered, it may be possible to determine whether boiler 1 is working harder than boiler 3, allowing adjustment if necessary.

7 Appendix

7.1 Path difference calculations

7.1.1 Peasiehill Cottages

Path difference	Washer Motor 1	Washer Motor 2	Germ CO2 Fan 1	Germ CO2 Fan 2	Upper intake fans	Lower Intake fans	Kiln Flue 1	Kiln Flue 2	Kiln Flue 3
Horizontal distance	275	278	288	307	306	306	240	236	231
Source height	3	3	34	34	14	4.6	18	18	18
Receiver height	4	4	4	4	4	4	4	4	4
Slant distance	275	278	290	308	306	306	240	236	231
Barrier distance	10	10			1	1	25	25	25
Barrier height	15	15			20	20	22	22	22
Barrier length	75	75			100	100	25	25	25
Path difference	5.9	5.9			5.5	15.1	0.8	0.8	0.8

7.1.2 Patrick Allan Fraser St

Path difference	Washer Motor 1	Washer Motor 2	Germ CO2 Fan 1	Germ CO2 Fan 2	Upper intake fans	Lower Intake fans	Kiln Flue 1	Kiln Flue 2	Kiln Flue 3
Horizontal distance	252	255	261	279	254	254	210	215	220
Source Height	3	3	34	34	14	4.6	18	18	18
Receiver height	4	4	4	4	4	4	4	4	4
Slant distance	252	255	263	281	254	254	210	215	220
Barrier distance	10	5				5			
Barrier height	15	15				7			
Barrier length	20	20				10			
Path difference	5.9	8.3				0.6			



Green Cat Renewables

BAIRDS MALT WIND TURBINE

NOISE - 14/01067/FULL

Noise Assessment Addendum

December 2015

Green Cat Renewables Ltd

Noise Assessment Prepared for:

Bairds Malt Ltd

BAIRDS MALT WIND TURBINE

Prepared By: Merlin Garnett

14/01067/FULL

Noise Assessment Addendum



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December 2015

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Noise\Reporting\Bairds Malt Turbine Addendum v1.0.docx

Checked By: Merlin Garnett	Date: 16/12/2015
Approved By: Cameron Sutherland	Date: 16/12/2015

1 Executive Summary

Concern was raised that the high background levels measured during the noise monitoring exercise conducted in support of the turbine application 14/01067/FULL may not be typical. Further that the high levels may be due to noise generated by the maltings while in breach of noise conditions.

A noise assessment was conducted to establish whether the plant operating under Condition 5 of the noise management plan was in compliance with those limits. An exhaust flue associated with the operation of the kiln at the maltings was found to be operating at higher than expected levels which contributed to a cumulative level at Patrick Allan Fraser Street in breach of Condition 5.

This assessment has investigated the potential impact of kiln noise on the background noise levels measured in January and February 2014 at Patrick Allan Fraser Street. The assessment concluded that, while noise attributable to the kiln produced a measurable increase in background levels, the increase was not sufficient to materially affect the outcome of the assessment; that predicted turbine noise is shown to meet calculated constraints by a comfortable margin.

The impact of noise produced by the steep-house on the background noise levels measured at Peasihill Cottages was also investigated as a 'worst case' scenario. Again, the impact was measurable but did not affect the outcome of the assessment.

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2 Introduction

Following the submission of planning application 14/01067/FULL for a single wind turbine at Bairds Malt, Angus Council appointed an acoustic consultant (Dick Bowler) to review Green Cat Renewables' (GCRs') methodology. Of the seven points raised, all but Point 2 were addressed to the satisfaction of Angus Council within the 'Supporting Information' document that formed the response to Angus Council queries arising from Mr Bowler's independent review.

Point 2

In response to Point 2 of the review, Angus Council requested that a noise assessment be conducted at the maltings to determine whether the plant subject to the operational noise limits set out in 'the noise management plan' was operating within those limits; Point 2 is given below:

2) The existing maltings site generates relatively high levels of noise when compared to the normal rural location for a wind turbine. As background noise levels are used to derive appropriate criteria for the assessment of wind turbine noise in line with ETSU-R-97; the assessment and rating of noise from wind farms (ETSU-R-97) it is important to ensure that the data used is typical. The applicant's consultant has taken reasonable steps to ensure this is the case. They have not however done an assessment to ensure that the existing operations are complying with the extant noise limits applicable to the maltings site to ensure that existing operations are within limits. It is requested that the applicant carry out an appropriate assessment of this aspect.

Documentation provided by Environmental Health^{1 2} covers the equipment consented under 08/00469/FUL and installed during 2009. Condition 5 states:

"That noise arising from plant associated with the proposed development as detailed in drawing GC19677-00-006 shall not exceed the following noise limits:

- a) Between 0700 and 2200hrs and as determined in accordance with the procedure contained in BS4142 35 dB(A) $L_{eq,1hour}$ at 103-107 Patrick Allan Fraser Street and 39 dB(A) $L_{eq,1hour}$ at Peasiehill Cottages*
- b) Between 2200 and 0700hrs and as determined in accordance with the procedure contained in BS8233 45 dB(A) L_{max} or 35 dB(A) $L_{eq,5mins}$ within any bedroom."*

08/00469/FUL included a new kiln complex incorporating two large diameter cylinder structures and the grain driers.

A compliance assessment was conducted in consultation with Angus Council that reported in November 2015. The assessment found that an exhaust flue associated with the kiln complex was operating above expected levels. By calculation, the flue was shown to result in a breach of the 35 dB(A) $L_{eq,1hour}$ limit relevant to the properties at 103-107 Patrick Allan Fraser Street (PAFS). Bairds Malt Ltd has carried out some modifications to the flue fans since the compliance assessment and has requested that the noise level of this equipment be tested again; scheduled for early January 2016.

¹ FULL PLANNING PERMISSION APPROVAL Ref: 08/00469/FUL

² site plan 08_00469.pdf

Following the submission of the compliance assessment, Angus Council requested that the background noise data, measured during January 2104 in support the turbine application, be re-examined to assess whether the levels measured at PAFS could have been unduly elevated; should the exhaust flue have been operating in breach of Condition 5 at the time. After some initial investigation of the 2014 background data, a method was proposed to Angus Council that would remove all the influence of noise associated with the kiln from the measured background levels whether the plant was in breach of the limit or not; the kiln may legitimately contribute to background levels so long as it operates within Condition 5. The approach was considered by Angus to be sufficiently conservative to put the issue beyond doubt and the investigation proceeded on that basis.

Steep House

Angus Council raised a separate query during the compliance assessment when it was requested that, in order to assess a 'worst case' scenario of the impact of turbine noise on the residents of Peasiehill Cottages (PHC), the influence of the steep-house on background levels measured at this location be assessed and removed from the background levels measured in January 2014. The resulting background levels would then be representative of the quietest few weeks of the year when the steep-house was not in operation and would allow an assessment of turbine noise under these conditions to be made. The steep-house does not operate under Condition 5 (above).

3 Method

Assessing kiln noise

The operational schedule of the kiln is regular and predictable: active at all times other than for a 12 hour period during every other night from ~21:30 until 09:30 the next morning, when operation resumes. This 48 hour cycle is repeated for 365 days per year.

Night hours relevant to the noise limits for the proposed turbine are: 23:00 until 07:00. Given the above schedule, it was established with a high degree of certainty that the kiln was active and then inactive during successive night hours during the January 2014 background noise survey. Background data measured between 23:00 and 07:00 was divided into two sets, those measured during odd or even numbered days as they occurred following the start of the noise monitoring period; day 1 being the 15th January 2014.

The two sets of noise data, plotted against standardised 10m wind speeds, were compared to establish whether the operation of the kiln was apparent in the measured data. The difference between the two data was deemed to be attributable to noise from the kiln (L) and found through logarithmic subtraction of the lower background trend (L_2) from the higher (L_1), thereby correcting for other sources making up the ambient noise environment. It should be noted that the logarithmic subtraction method, given below, is unreliable where the level difference between trends reduces below ~1.5dB. Level difference was greatest in the absence of wind driven sources that dominate at higher wind speeds.

Equation 1:
$$L = 10 \log_{10} \left(10^{\frac{L_1}{10}} - 10^{\frac{L_2}{10}} \right)$$

Data measured during the nights when the kiln was inactive were deemed to represent the revised night hours background trend from which a night hours noise constraint for the proposed turbine was calculated. Noise levels measured during quiet daytime hours, that were assumed to include a component of kiln noise, were corrected for attributable kiln noise by subtracting that level from the established trend values at each integer wind speed by logarithmic subtraction. Quiet daytime criteria were then calculated from the new values inclusive of the downward adjustment. Predicted turbine noise was then re-assessed against the revised criteria. The implications of kiln noise on background noise measurements at the other three monitoring positions was considered.

The above analysis focussed on data already filtered for wind directions downwind of the proposed turbine location as the direction of the kiln flues corresponded well with that of the proposed turbine relative to the noise monitoring position at PAFS. Once the kiln noise level was established, this level was also subtracted from omni-directional backgrounds and the tabulated results reported.

Assessing steep house noise

From the perspective of PHC, noise from the steep-house is barrier attenuated by the steep-house structure. Noise from the steep-house was measured during a site visit on the 20th October 2015. An assessment position at the western boundary of the site at a position between the steep-house and PHC was established. The on-site assessment position was selected to be representative of the barrier attenuated noise level leaving the site in the direction of PHC.

Figure 1 shows the nearest steep-house fans (circled in blue) in relation to the cottages at Peasiehill. The fans face in a downward direction, limiting the scope for the reflection of noise by nearby buildings.



Figure 1 – Steep house fans in relation to Peasiehill Cottages.

Once the assessment position was established, measurements were made of the prevailing noise levels. After a few minutes the steep-house fans were activated and allowed to run at full capacity while a second set of measurements were made. Extraneous noises, visible in the time histories and

evident in the audio recording, were eliminated from both measurements and the $L_{eq,T}$ of the steep-house at the on-site assessment position determined through logarithmic subtraction.

A distance correction was then applied to the $L_{eq,T}$ on the basis of geometric divergence from a point source to determine the level of the steep-house at the January 2014 noise monitoring position. A 2dB reduction in level was applied to the $L_{eq,T}$ level so that a comparison could be made with the established $L_{90,10minutes}$ background trends following the same procedure as for predicted turbine noise. This L_{90} level was then deducted from the omni-directional background trend values at integer v_{10} wind speeds, measured at PHC during January 2014, resulting in revised trend values from which to calculate revised constraints.

Predicted turbine noise levels were assessed against the revised criteria, the result being representative of a 'worst case' scenario rather than one that could be described as typical. This scenario is therefore offered as additional information but should not replace the previous assessment of turbine noise levels at PHC.

4 Results

Kiln Noise

Table 1 sets out the calculation process to determine the level of the kiln noise within the data measured during night hours and its removal from quiet daytime data.

Table 1 – Calculation of kiln noise level

Standardised 10m wind speeds (ms^{-1})	4	5	6	7	8	9	10	11	12
Night hours Kiln on (dB(A) – $L_{90,10min}$)	41.9	42.3	42.9	43.7	44.8	46.2	47.7	49.5	51.3
Night hours Kiln off (dB(A) – $L_{90,10min}$)	39.5	40.2	41.2	42.4	44.1	46.0	48.0	49.7	50.8
Night hours Level difference (dB)	-2.4	-2.1	-1.7	-1.3	-0.7	-0.2	0.2	0.2	-0.5
Kiln Level (dB(A) – $L_{90,10min}$)	38.1	38.1	38.1	37.8	36.7	32.1	-	-	41.4
Quiet Daytime hours (dB(A) – $L_{90,10min}$)	42.3	42.7	43.3	44.2	45.5	47.0	48.7	50.4	51.8
Revised Quiet Daytime hours (dB(A) – $L_{90,10min}$)	40.2	40.8	41.7	43.0	44.6	46.4	48.4	50.2	51.7
Resulting Quiet Daytime Level difference (dB)	-2.1	-1.9	-1.6	-1.2	-0.9	-0.6	-0.4	-0.3	-0.2

Where level difference is greater than 1.5dB, the results show a very consistent L_{90} level of 38.1dB(A). As the wind speed increases, wind driven noise sources dominate, limiting the level difference between data sets and resulting in levels for kiln noise that are unreliable.

The L_{90} level attributable to the kiln is established as 38.1dB(A) which is broadly consistent with the results of the compliance assessment. This level is deducted from the measured quiet daytime values at integer v_{10} wind speeds giving the revised quiet daytime trend shown in Table 1. The revision produces a maximum reduction of 2.1dB at $4ms^{-1}$. 'Night Hours Kiln Off' is now deemed to represent the night hours levels in the absence of kiln noise.

The following figures and associated tables show the measured $L_{A90,10min}$ background noise levels and predicted turbine levels as a function of v_{10} wind speeds. The data are represented by best fit polynomial regression functions from which the noise limits are derived. The figures show the predicted turbine noise levels in relation to the derived limits.

Figure 2 shows background levels, calculated constraint and predicted turbine noise levels for PAFS during night-time hours.

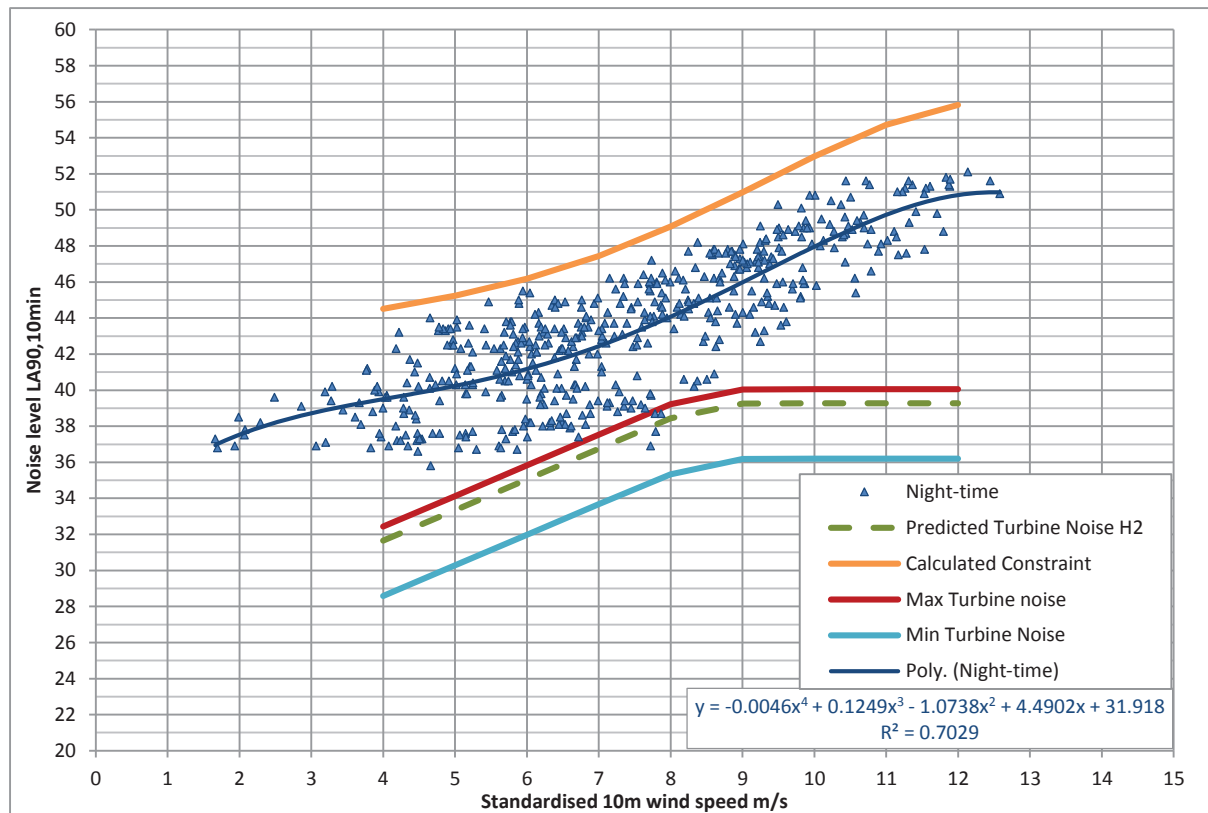


Figure 2 – Background levels, calculated constraint and predicted turbine noise levels for PAFS during night-time

Table 1 shows the tabulated results for PAFS during night time hours.

Table 2 - Background levels, calculated constraint and predicted turbine noise levels for PAFS during night-time.

Standardised wind speed	ms ⁻¹	4	5	6	7	8	9	10	11	12
Reference electric power	kW	63	133	232	372	543	699	803	866	902
Background Noise										
Number of values (total)	(478)	38	50	98	73	62	74	44	27	12
Average value L _{A90,10min}	dB(A)	39.5	40.2	41.2	42.4	44.1	46.0	48.0	49.7	50.8
Calculated Constraint										
Average value L _{A90,10min}	dB(A)	44.5	45.2	46.2	47.4	49.1	51.0	53.0	54.7	55.8
Max Predicted Turbine Noise										
Average value L _{A90,10min}	dB(A)	32.4	34.1	35.8	37.5	39.2	40.0	40.1	40.1	40.1
Level Difference										
Exceedence	dB(A)	-12.1	-11.1	-10.3	-9.9	-9.9	-11.0	-12.9	-14.7	-15.8

Figure 3 shows background levels, revised background trend with calculated constraint and predicted turbine noise levels for PAFS during quiet daytime hours.

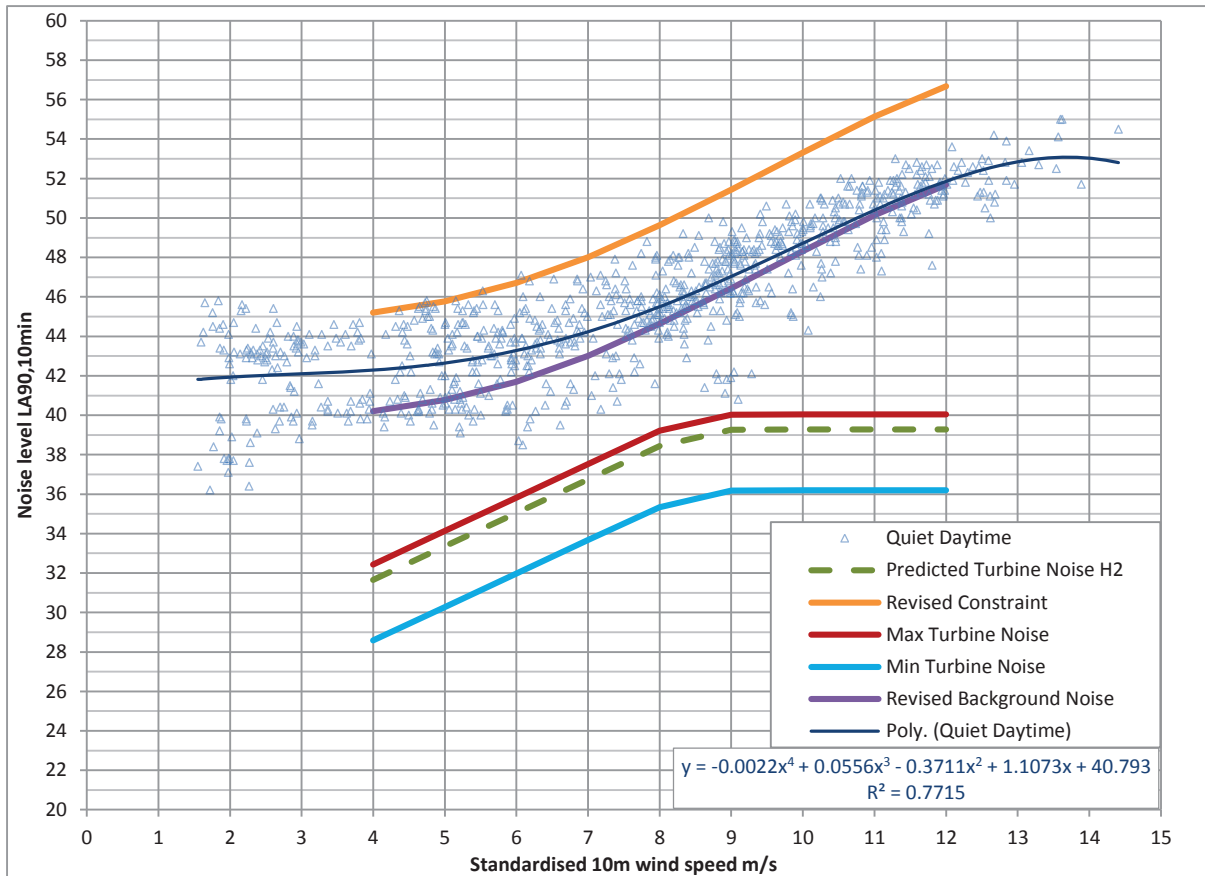


Figure 3 - Background levels, revised constraint and predicted turbine noise levels for PAFS during quiet daytime

Table 2 shows the tabulated results for PAFS during quiet daytime.

Table 3 - Background levels, calculated constraint and predicted turbine noise levels for PAFS during quiet daytime

Standardised wind speed	ms ⁻¹	4	5	6	7	8	9	10	11	12
Reference electric power	kW	63	133	232	372	543	699	803	866	902
Revised Background Noise										
Number of values (total)	(478)	38	50	98	73	62	74	44	27	12
Average value L _{A90,10min}	dB(A)	40.2	40.8	41.7	43.0	44.6	46.4	48.3	50.1	51.7
Revised Constraint										
Average value L _{A90,10min}	dB(A)	45.2	45.8	46.7	48.0	49.6	51.4	53.3	55.1	56.7
Max Predicted Turbine Noise										
Average value L _{A90,10min}	dB(A)	32.4	34.1	35.8	37.5	39.2	40.0	40.1	40.1	40.1
Level Difference										
Exceedence	dB(A)	-12.8	-11.6	-10.9	-10.5	-10.4	-11.4	-13.3	-15.1	-16.6

Predicted turbine noise is shown to meet the revised criteria by a comfortable margin.

Impact of kiln noise on other monitoring locations.

The compliance assessment found that the plant subject to the noise management plan was operating within Condition 5 at PHC. Noise from Exhaust Flue 1, found to be producing elevated levels at PAFS, was assessed to produce 31dB(A) $L_{eq,1hour}$ at PHC. This level, being more than 10dB below the L_{90} background trends for both night and quiet daytime hours, is deemed not to have made any significant impact on background levels measured at PHC.

On the Hospitalfield estate, noise from the kiln was assessed to produce 38.1dB(A) $L_{90,10min}$ at the noise monitoring position at PAFS. Taking Exhaust Flue 1 as the nominal noise source position representative of the kiln, relative distances are established and the $L_{90,10min}$ level at the other two noise monitoring positions calculated assuming:

Equation 2 -
$$L_2 = L_1 - 20 \text{ Log } (R_2/R_1).$$

Where L is the noise level at distance R from the noise source, and are shown in **Table 4**.

Table 4 – Positions and their distances from the kiln

Location	Easting	Northing	Distance from kiln (m)	Kiln Noise ($L_{90,10min}$)
Exhaust Flue 1	361787	740197	-	-
H2-PAF St (mon pos)	361843	740432	242	38.1
H3-Kinghorn St (mon pos)	361872	740615	427	33.2
H4-Gerrard St (mon pos)	362049	740525	420	33.3

It should be noted that the above levels are representative of kiln noise as a whole, rather than that portion of kiln noise deemed to be in breach of Condition 5, and does not include any barrier or atmospheric attenuation. However, to maintain a consistent and conservative approach to that adopted for PAFS, the background trends measured at Kinghorn St and Gerrard St were also revised downwards to remove the noise levels deemed attributable to the kiln by logarithmic subtraction at integer v_{10} wind speeds.

Table 5 summarises all resulting adjustments to background levels resulting from the removal of kiln noise.

Table 5 – Effect of removal of kiln noise on background noise trends

Standardised V_{10} wind speeds	ms^{-1}	4	5	6	7	8	9	10	11	12
H1 Night	dB	0	0	0	0	0	0	0	0	0
H1 Quiet Day	dB	0	0	0	0	0	0	0	0	0
H2 Night	dB	-1.4	-1.1	-0.7	-0.5	-0.2	0.1	0.2	-0.1	-0.7
H2 Quiet Day	dB	-2.1	-1.9	-1.6	-1.2	-0.9	-0.6	-0.4	-0.3	-0.2
H3 Night	dB	-1.3	-1.2	-1.0	-0.9	-0.6	-0.5	-0.3	-0.2	-0.2
H3 Quiet Day	dB	-1.1	-0.9	-0.7	-0.6	-0.4	-0.3	-0.2	-0.2	-0.1
H4 Night	dB	-2.3	-1.7	-1.2	-0.8	-0.6	-0.4	-0.3	-0.2	-0.2
H4 Quiet Day	dB	-1.4	-1.1	-0.8	-0.6	-0.5	-0.3	-0.2	-0.2	-0.1

Revised noise assessment

Table 6 shows revised exceedence of worst case turbine noise for all locations; no lower fixed limit has been applied when calculating constraints.

Table 6 – Exceedence of maximum predicted turbine noise from revised constraints

Standardised 10m wind speeds	ms ⁻¹	4	5	6	7	8	9	10	11	12
H1 Night	dB	-15.9	-14.4	-13.0	-11.9	-11.1	-11.4	-12.8	-14.6	-16.8
H1 Quiet Day	dB	-17.4	-16.0	-14.8	-13.9	-13.3	-13.7	-15.0	-16.3	-17.6
H2 Night	dB	-12.1	-11.1	-10.3	-9.9	-9.9	-11.0	-12.9	-14.7	-15.8
H2 Quiet Day	dB	-12.8	-11.6	-10.9	-10.5	-10.4	-11.4	-13.3	-15.1	-16.6
H3 Night	dB	-13.5	-12.4	-11.3	-10.6	-10.2	-10.9	-12.7	-14.4	-16.0
H3 Quiet Day	dB	-14.6	-13.7	-12.9	-12.4	-12.0	-12.6	-14.1	-15.5	-16.7
H4 Night	dB	-10.2	-10.4	-10.4	-10.3	-10.2	-10.8	-12.2	-13.6	-15.2
H4 Quiet Day	dB	-13.0	-12.6	-12.1	-11.7	-11.4	-12.1	-13.5	-15.0	-16.2

The results shown in **Table 6** are on the basis of adjustments to the background trends detailed in the noise assessment accompanying the planning application. They do not therefore include the marginal differences in noise level presented in the ‘supporting information’ response between the downwind background trends and omni-directional background trends. Those differences may be applied to the results shown in **Table 6** such that exceedence from omni-directional background derived constraints be calculated; shown in **Table 7**.

Table 7 - Exceedence of maximum predicted turbine noise from omni-directional constraints

Standardised 10m wind speeds	ms ⁻¹	4	5	6	7	8	9	10	11	12
H1 Night	dB	-15.0	-13.3	-11.8	-10.8	-10.2	-10.8	-12.5	-14.5	-16.7
H1 Quiet Day	dB	-16.8	-15.1	-13.6	-12.6	-12.0	-12.6	-14.1	-15.7	-17.4
H2 Night	dB	-11.9	-11.2	-10.3	-9.8	-9.8	-10.9	-13.0	-14.9	-16.0
H2 Quiet Day	dB	-12.4	-11.3	-10.7	-10.4	-10.3	-11.4	-13.3	-15.1	-16.6
H3 Night	dB	-13.2	-12.4	-11.3	-10.6	-10.2	-10.9	-12.7	-14.5	-16.1
H3 Quiet Day	dB	-14.1	-13.3	-12.6	-12.1	-11.8	-12.5	-14.1	-15.5	-16.7
H4 Night	dB	-9.5	-10.1	-10.1	-10.0	-10.0	-10.8	-12.5	-14.1	-15.5
H4 Quiet Day	dB	-12.9	-12.6	-12.1	-11.7	-11.3	-12.0	-13.5	-15.0	-16.2

Predicted turbine noise is shown to meet all the revised criteria by a comfortable margin.

Amenity assessment

An amenity assessment formed part of the response to Mr Bowdlers comments that assumed the following BS4142-1997 scenario: That predicted turbine noise L_{eq} levels with an additional 5dB character correction be assessed against L_{90} background levels. This effectively increases the values in **Table 7** by 7dB and results in the values given in **Table 8**:

Table 8 - Amenity assessment

Standardised wind speed	ms ⁻¹	4	5	6	7	8	9	10	11	12
H1 Night	dB	-8.0	-6.3	-4.8	-3.8	-3.2	-3.8	-5.5	-7.5	-9.7
H1 Quiet Day	dB	-9.8	-8.1	-6.6	-5.6	-5.0	-5.6	-7.1	-8.7	-10.4
H2 Night	dB	-4.9	-4.2	-3.3	-2.8	-2.8	-3.9	-6.0	-7.9	-9.0
H2 Quiet Day	dB	-5.4	-4.3	-3.7	-3.4	-3.3	-4.4	-6.3	-8.1	-9.6
H3 Night	dB	-6.2	-5.4	-4.3	-3.6	-3.2	-3.9	-5.7	-7.5	-9.1
H3 Quiet Day	dB	-7.1	-6.3	-5.6	-5.1	-4.8	-5.5	-7.1	-8.5	-9.7
H4 Night	dB	-2.5	-3.1	-3.1	-3.0	-3.0	-3.8	-5.5	-7.1	-8.5
H4 Quiet Day	dB	-5.9	-5.6	-5.1	-4.7	-4.3	-5.0	-6.5	-8.0	-9.2

Table 8 shows that under this scenario, turbine noise meets the criteria by a minimum of 2.5dB.

Steep House

Figure 4 shows the relative positions of the steep-house fans (A), the on-site assessment position (B) and the noise monitoring position at PHC (C).



Figure 4 – Steep house fans, assessment position and noise monitoring position at PHC

Relative distances (*R*) are given in Table 9. The steep-house fans are estimated to be a maximum of 20m above both the on-site assessment position and the noise monitoring position at PHC. Given the proximity of the assessment position to the fans, slant distances were calculated and used to adjust noise level for distance in the calculations that follow (a larger distance from A to B implies a higher noise level at C).

Table 9 – Positions and separation distances

Location	Easting	Northing	Distance <i>R</i> from fans (m)	<i>R</i> slant distance (m)
Steep fans (nearest fan)	361686	740200	-	-
PHC Proxy for steep fans	361657	740199	29	35
PHC (mon pos)	361546	740192	140	142
PAF (mon pos)	361843	740432	280	281

Figure 5 shows the time history of noise levels measured in two 1/3 octave bands over a period of about 5 minutes at the on-site assessment position. The 63Hz plot provided a clear indication of the point in time that the steep-house became active; typical levels increasing at 29:27. The 6.3kHz plot proved to be particularly sensitive to noise produced by the pellet manufacturing process that was intermittently active at the time of measurement, and assisted with the identification and removal of affected data. These events and other less prominent features of the noise environment were also cross referenced with the audio recording such that all significant extraneous noise was removed from the analysis.

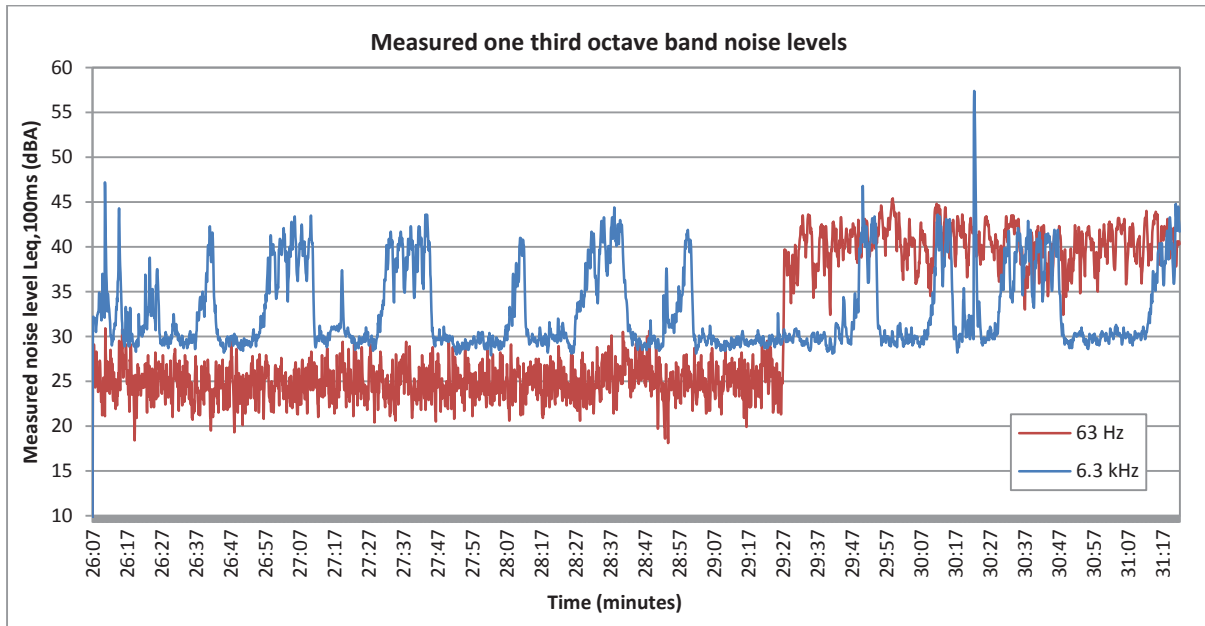


Figure 5 – Time history

A logarithmic average was calculated from the remaining $L_{eq,100ms}$ data, measured before and after the activation of the steep-house, and the noise level deemed attributable to the fans obtained via logarithmic subtraction; given in **Table 10**.

Table 10 – Calculation of steep-house noise level

Measure	$L_{eq,T}$	T (seconds)
Residual Noise (dBA)	54.1	71
Operational Noise (dBA)	56.1	70
Level difference (dB)	2.0	-
Steep-house Noise (dBA)	51.8	-

Table 10 shows the level of steep-house noise reaching the noise monitoring position at PHC adjusted for distance using equation 2; a 2dB reduction in the conversion of $L_{eq,T}$ to $L_{90,10min}$ is assumed. Equivalent levels for PAFS are also included for information; this level is a minimum of 7.5dB below the revised background trend and therefore deemed not to be a significant component of data measured at PAFS.

Table 11 – Calculation of steep-house noise at noise monitoring positions

Location	Slant distance R (m)	$L_{eq,T}$ (dBA)	L_{90} (dBA)
Steep fans (nearest fan)	-	-	-
Assessment Position	35	51.8	49.8
PHC (mon pos)	142	39.6	37.6
PAF (mon pos)	281	33.7	31.7

The steep-house is assessed to produce 37.6dB(A) $L_{90,10min}$ at the noise monitoring position at PHC. To assess predicted turbine noise in the absence of steep-house noise, this level is logarithmically subtracted from the omni-directional $L_{90,10min}$ background trends providing the following analysis.

Figure 6 shows background levels, revised background trend with calculated constraint and predicted turbine noise levels for PHC during night hours.

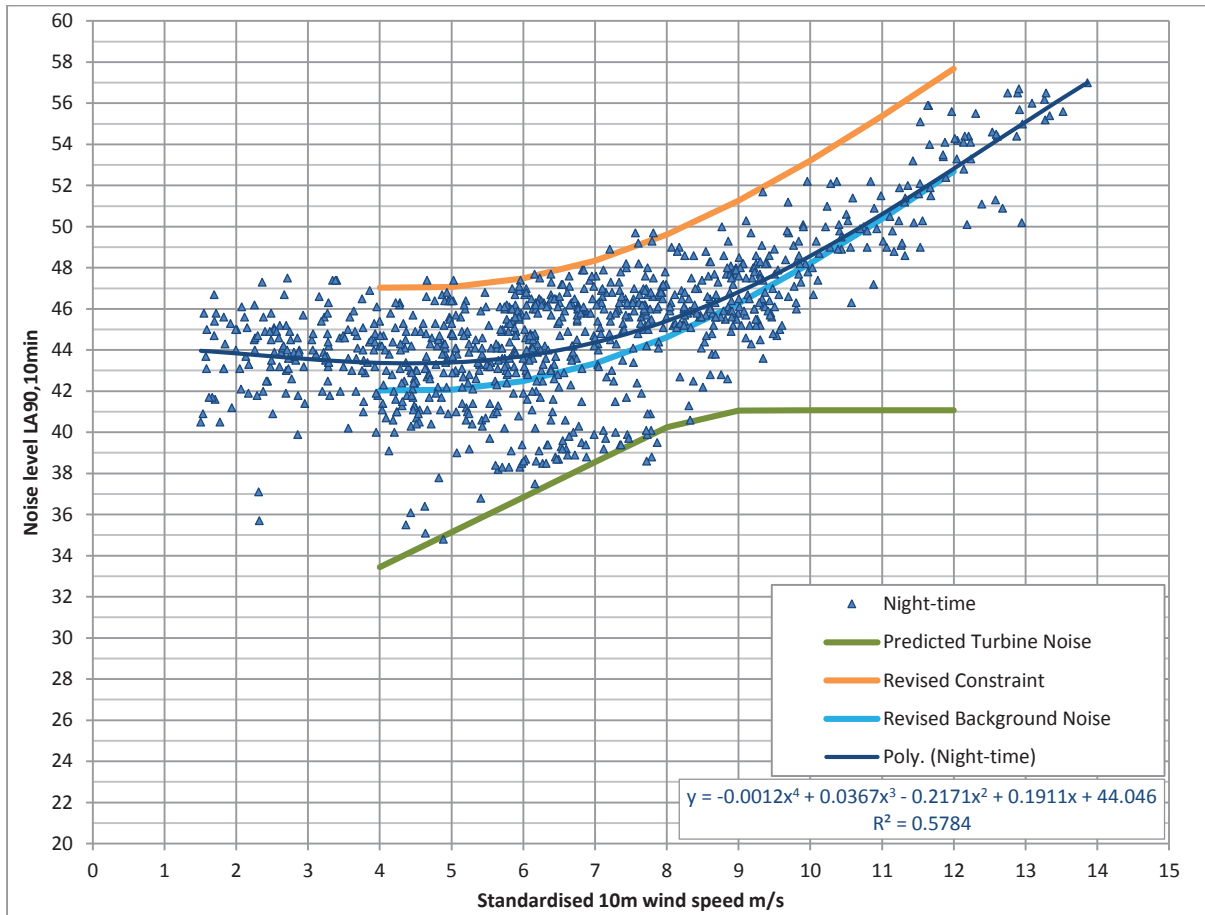


Figure 6 - background levels, revised background trend with calculated constraint and predicted turbine noise levels for PHC during night hours

Table 12 shows the tabulated results for PHC during night time hours.

Table 12 - Tabulated results for PHC during night time hours

Standardised wind speed	ms ⁻¹	4	5	6	7	8	9	10	11	12
Reference electric power	kW	63	133	232	372	543	699	803	866	902
Revised Background Noise										
Number of values (total)	(805)	90	116	166	121	107	107	42	29	27
Average value LA90,10min	dB(A)	42.0	42.1	42.5	43.3	44.6	46.3	48.2	50.4	52.7
Revised Constraint										
Average value LA90,10min	dB(A)	47.0	47.1	47.5	48.3	49.6	51.3	53.2	55.4	57.7
Max Predicted Turbine Noise										
Average value LA90,10min	dB(A)	33.4	35.1	36.8	38.5	40.2	41.1	41.1	41.1	41.1
Level Difference										
Exceedence	dB(A)	-13.6	-11.9	-10.6	-9.8	-9.4	-10.2	-12.1	-14.3	-16.6

Figure 6 shows background levels, revised background trend with calculated constraint and predicted turbine noise levels for PHC during night hours.

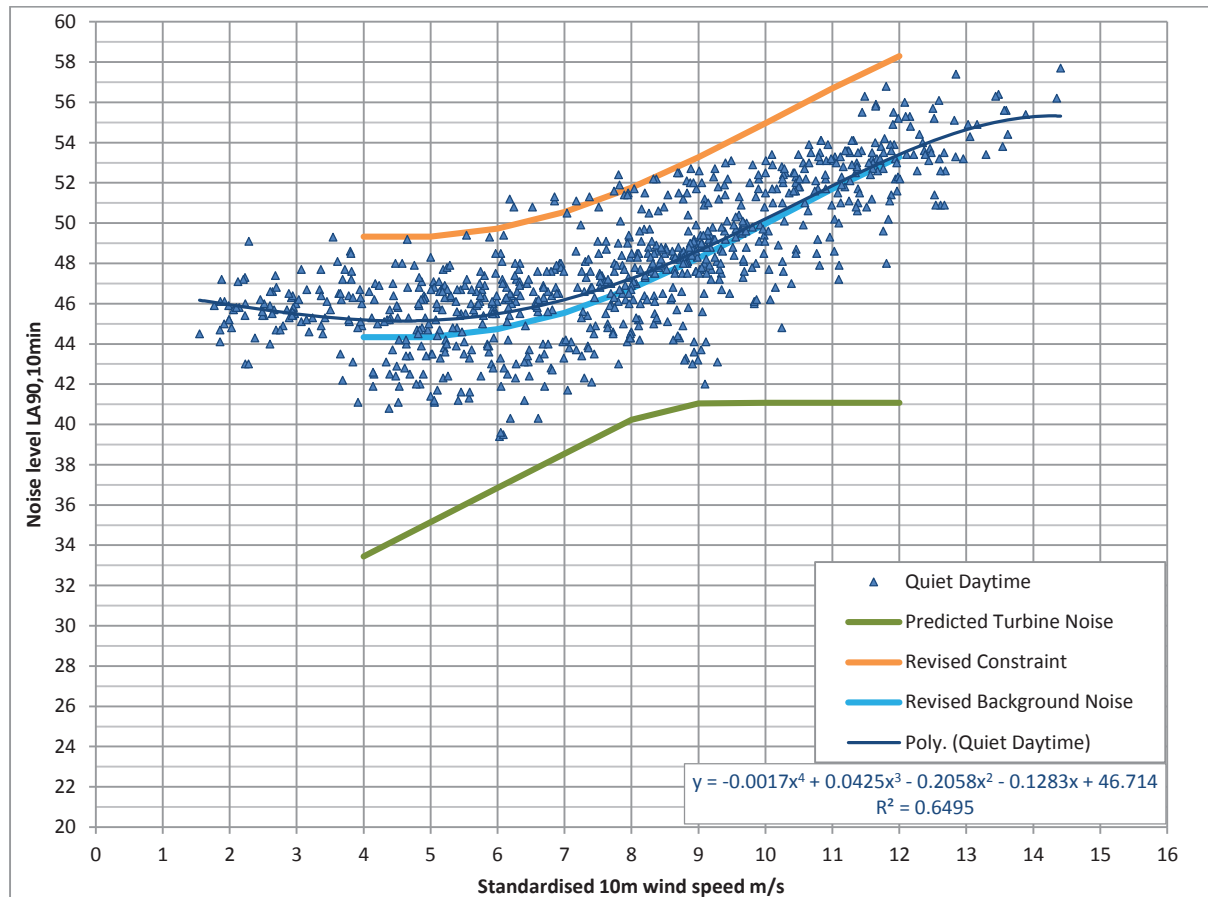


Figure 7 - background levels, revised background trend with calculated constraint and predicted turbine noise levels for PHC during quiet daytime

Table 13 shows the tabulated results for PHC during quiet daytime.

Table 13 - Tabulated results for PHC during quiet daytime

Standardised wind speed	ms ⁻¹	4	5	6	7	8	9	10	11	12
Reference electric power	kW	63	133	232	372	543	699	803	866	902
Revised Background Noise										
Number of values (total)		737	50	86	96	73	116	122	76	67
Average value L _{A90,10min}	dB(A)	44.3	44.3	44.7	45.5	46.8	48.3	50.0	51.7	53.3
Revised Constraint										
Average value L _{A90,10min}	dB(A)	49.3	49.3	49.7	50.5	51.8	53.3	55.0	56.7	58.3
Max Predicted Turbine Noise										
Average value L _{A90,10min}	dB(A)	33.4	35.1	36.8	38.5	40.2	41.1	41.1	41.1	41.1
Level Difference										
Exceedence	dB(A)	-15.9	-14.2	-12.9	-12.0	-11.5	-12.2	-13.9	-15.6	-17.2

The impact of steep-house noise at PHC is greatest during night hours, but even then, its removal has not resulted in significantly change to the noise assessment.

5 Discussion

Kiln Noise

The regularity of the kiln schedule provided an opportunity to assess noise levels produced by the kiln during night hours. The contribution of noise from the kiln was clearly apparent once ambient noise from other sources had been removed. Any noise produced by ancillary noise sources, should they operate in synchronisation with the kiln, would also be removed by the applied method; this would lead to an over estimate of kiln noise.

Confidence in the noise level calculated to be attributable to the kiln is gained from the consistency of the result across the lower integer v_{10} wind speeds; where level difference between operational and non-operational noise levels was greatest. The result of 38.1dB(A) $L_{90,10min}$, deemed to be equivalent to an $L_{eq,1hour}$ of 40.1dB(A), is consistent with the results of the compliance assessment at PAFS and where kiln noise was assessed to be the dominant noise producing source of the plant listed under Condition 5.

The high level of consistency between the two separate measurement results supported the assertion that all noise associated with the operation of the kiln and its influence on measured background trends had been accounted for and that the revised background trends provided necessary basis for re-assessment that was demonstrably conservative.

Steep House

Through measurement of the steep-house in relatively close proximity, a $L_{90,10min}$ noise level was calculated to occur at the 2014 noise monitoring position at PHC. This level was removed from the omni-directional background noise trend providing a revised trend from which to calculate noise constraints. The steep-house has the following weekly schedule which was active during the 2014 noise monitoring period:

Mon 19:00 until Tues 15:00.
Tues 21:00 until Weds 11:00.
Thurs 14:00 until Fri 02:00.
Fri 06:00 until Fri 12:00.

Effectively removing steep-house noise from all measured background data (from which the trends are derived) is therefore bound to provide a conservative assessment of its impact on the noise levels measured at PHC.

6 Conclusions

The levels assessed for the kiln and steep-house corroborate with the empirical experience of the noise environment in and around the maltings, in that:

- a) The plant that operates under Condition 5 appears to produce less noise than the pre-existing plant.
- b) It is difficult to pick out the contribution of individual plant from overall ambient noise when observing from the perspective of the noise monitoring positions at PAFS and PHC as

operational noise is largely produced by fans and therefore similar in nature and there are many of them.

More generally, it appears that the high background levels measured can be attributed to a large number of sources both on and off the site at Bairds and, while the removal of an individual source produces a measurable effect, no one source dominates. This diversity of masking sources (transport, coastline, industrial) means that it is less likely that all sources stop producing noise simultaneously, potentially allowing noise from the wind turbine to become audible above background noise.

The measured spectra of noise sources listed in the compliance assessment were dominant in the same octave bands (500Hz – 1kHz) as turbine noise is predicted to be and these sources therefore have the potential to provide efficient masking noise.

The removal of noise attributable to the kiln and steep-house from the background trend levels provide clarity that noise due to the operation of these sources does not significantly change the outcome of the assessment. This assessment concludes that predicted turbine noise meets all the revised constraints by a comfortable margin and further, that the concerns raised under Point 2 of the external review have been fully investigated; all other points were previously addressed.

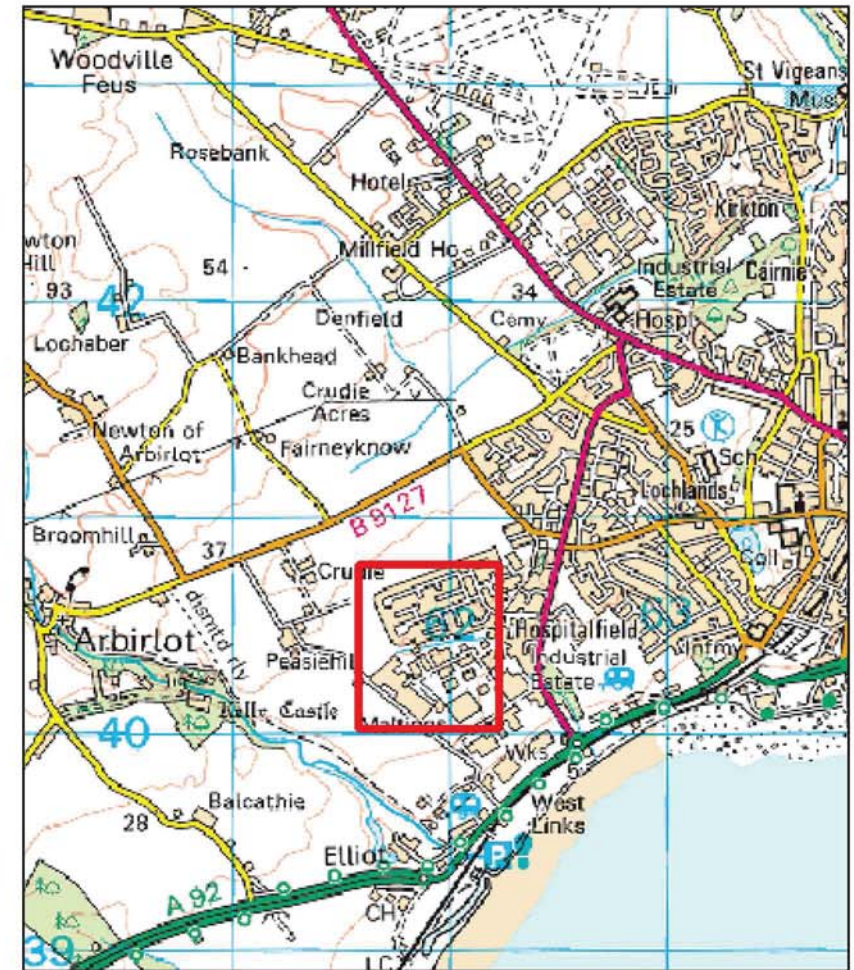
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Baird's Malt, Arbroath

Table A and B Zones



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Green Cat Renewables

BAIRDS MALT WIND TURBINE

NOISE - 14/01067/FULL

Supporting Information

January 2016

Green Cat Renewables Ltd

Noise Assessment Prepared for:

Bairds Malt Single Turbine Ltd

BAIRDS MALT WIND TURBINE

Prepared By: Merlin Garnett

14/01067/FULL

Supporting Information



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Checked By: <i>Merlin Garnett</i>	Date: 12/01/2016
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1 Introduction

Following the submission of planning application 14/01067/FULL for a single wind turbine at Bairds Malt, Angus Council appointed an acoustic consultant (Dick Bowdler) to review Green Cat Renewables' (GCRs') methodology. Following this, the Council requested further information in document: 14_01067_FULL-ENVIRONMENTAL_HEALTH-2475903[1].pdf dated 17/04/2015.

2 Response

The points raised by Environmental Health are addressed in turn through the following sections.

1) The applicant is requested to provide the following additional information:

a) Calibration certificates for the sound level meters.

Calibration certificates have been submitted.

b) On site calibration and calibration drift records.

Location	SLM	17/01/2014	21/01/2014	29/01/2014	05/02/2014	19/02/2014
Peasie Hill Cottages	01283511	94.0	94.0	94.1	94.1	93.9
Gerrard St	00603864	94.0	94.0	94.0	94.1	94.0
Patrick Allan Fraser St	01283510	94.0	94.0	94.1	94.1	94.0
Kinghorne St	00903982	94.0	94.0	94.1	94.1	94.0

c) Manufacturers sound power levels used in the calculations.

Enercon E44	7	8	9	10+
Warrantied 55m	101.1	102.6	103.0	103.0
Octave Band (Hz)	Scaled 55m OB			
63	80.9	83.9	84.6	84.4
125	87.7	89.4	91.1	90.1
250	92.7	93.0	93.3	93.5
500	93.7	95.1	96.2	96.5
1000	95.0	97.1	97.7	97.6
2000	92.2	94.4	94.2	94.3
4000	85.5	87.1	86.9	87.0
8000	80.8	81.0	80.6	80.1

Predicted levels for lower wind speeds were obtained by extrapolating the typical reduction in predicted noise levels at the assessment positions between 8ms^{-1} and 7ms^{-1} e.g. at Peasiehill the prediction falls from 40.2dB(A) to 38.5dB(A). This rate of reduction (1.7dB) was then assumed for decreasing integer wind speeds. The approach is analogous to assuming a 1.5dB reduction that is obtained by subtracting the warrantied broadband values for 7 and 8ms^{-1} ; 101.1dB(A) from 102.6dB(A). It should be noted that the most sensitive wind speed identified in the noise assessment for all locations is 8ms^{-1} .

2) The existing maltings site generates relatively high levels of noise when compared to the normal rural location for a wind turbine. As background noise levels are used to derive appropriate criteria for the assessment of wind turbine noise in line with ETSU-R-97; the assessment and rating of noise from wind farms (ETSU-R-97) it is important to ensure that the data used is typical. The applicant's consultant has taken reasonable steps to ensure this is the case. They have not however done an assessment to ensure that the existing operations are complying with the extant noise limits applicable to the maltings site to ensure that existing operations are within limits. It is requested that the applicant carry out an appropriate assessment of this aspect.

A compliance assessment on behalf of Bairds Malt was submitted separately addressing this point. One element of the new plant was found to be in breach of criteria. The implications of the breach on measured background levels was fully investigated and reported in December 2015 via submitted document 'Noise Assessment Addendum'. The results of that investigation were given in table 5 – reproduced below.

Table 1 – Effect of removal of kiln noise on background noise trends

Standardised V ₁₀ wind speeds	ms ⁻¹	4	5	6	7	8	9	10	11	12
H1 Night	dB	0	0	0	0	0	0	0	0	0
H1 Quiet Day	dB	0	0	0	0	0	0	0	0	0
H2 Night	dB	-1.4	-1.1	-0.7	-0.5	-0.2	0.1	0.2	-0.1	-0.7
H2 Quiet Day	dB	-2.1	-1.9	-1.6	-1.2	-0.9	-0.6	-0.4	-0.3	-0.2
H3 Night	dB	-1.3	-1.2	-1.0	-0.9	-0.6	-0.5	-0.3	-0.2	-0.2
H3 Quiet Day	dB	-1.1	-0.9	-0.7	-0.6	-0.4	-0.3	-0.2	-0.2	-0.1
H4 Night	dB	-2.3	-1.7	-1.2	-0.8	-0.6	-0.4	-0.3	-0.2	-0.2
H4 Quiet Day	dB	-1.4	-1.1	-0.8	-0.6	-0.5	-0.3	-0.2	-0.2	-0.1

3) No assessment has been made for properties to the south despite some of these being within the original 35dBA contour. An appropriate assessment is requested for these properties.

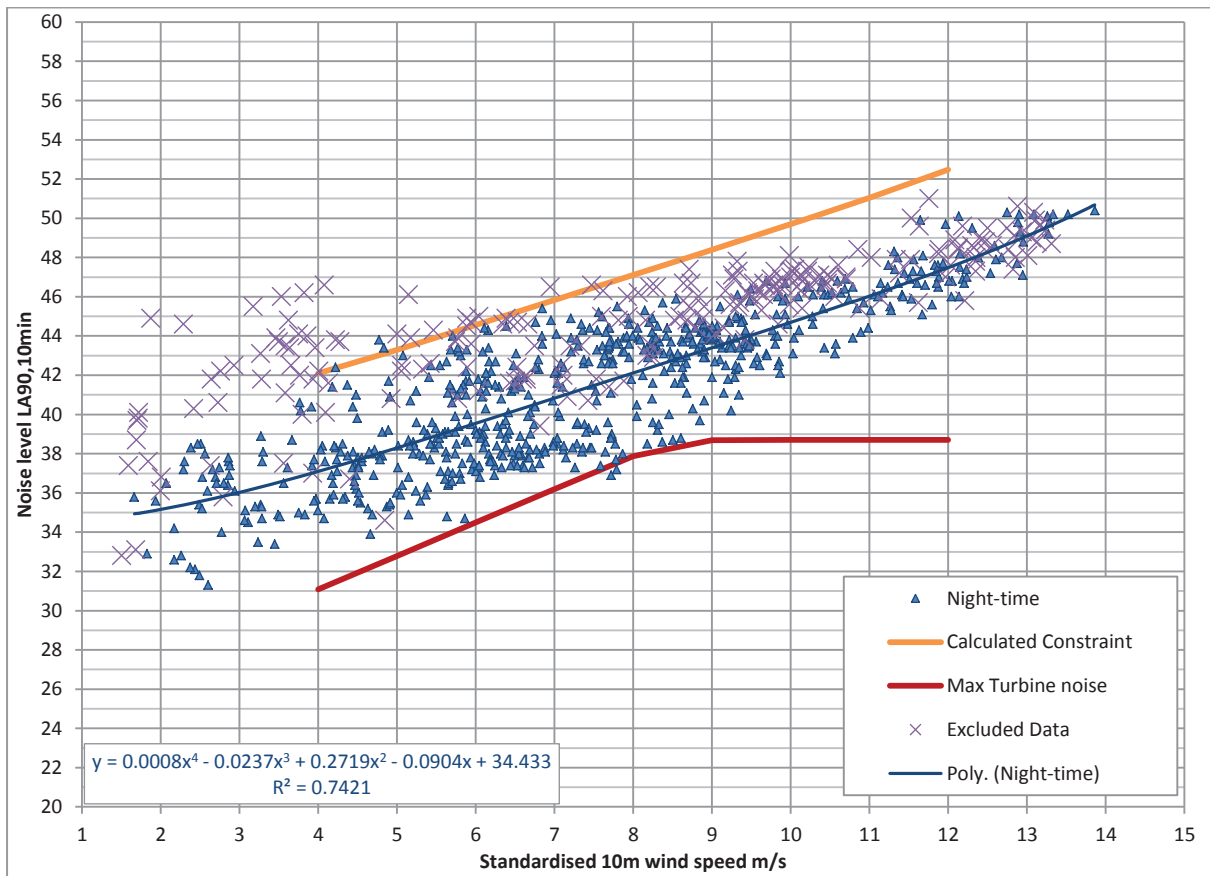
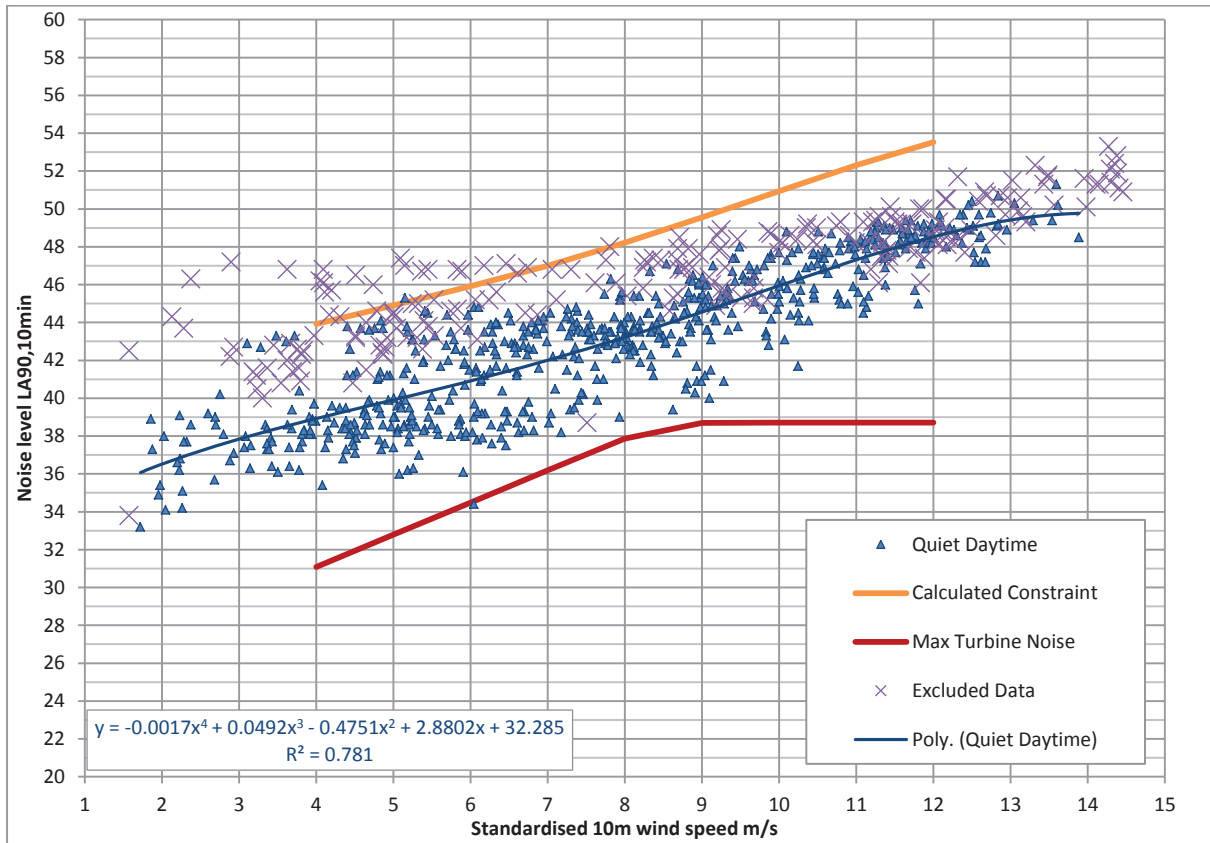
The nearest noise sensitive part of the caravan park is 100m more distant than the nearest noise sensitive property to the north of Bairds Malt (PHC) and, consequently, predicted levels are 2.4dB lower.

During measurements in and around the caravan park, L_{A90,1min} levels of 40-45dB(A) were typical during the working day. Passing traffic registered an L_{A10,1min} of 76dB during a typical weekday afternoon. Other than the busy A92, noise from the coastline and railway were observed. Measurements were also taken at various points along the track joining PHC with the caravan park on four separate occasions. At each end of the run of measurements, marked by the orange arrows, L_{A90,1min} levels at PHC were typically between 2 and 4dB lower than those close to the caravan park.



The quietest backgrounds were measured at H4 – Gerrard Street where levels reached 31dB $L_{A90,10min}$ under low wind conditions. This location is more distant from the sources that dominate the noise environment at the caravan park yet marginally nearer the maltings. H4 does benefit from some barrier attenuation of noise at the maltings which is not applicable at the caravan park. Therefore, H4 is deemed a suitable and potentially conservative proxy location to use in assessing predicted turbine noise at the caravan park.

The following plots assess worst case predicted turbine noise for the caravan park against the criteria derived at H4 – Gerrard Street for quiet daytime periods and night time periods respectively. Turbine noise is assessed to be more than 4dB below the measured background trend at all wind speeds. The detached properties south of the caravans lie on the 35dB(A) noise contour and could be subject to a standard 35dB(A) condition.



4) It appears that the background noise data may have been filtered for wind direction but this is not clear. If the data has been filtered in this way potentially this will exclude quiet periods depending on wind directions that have been removed. It is requested that the applicant clarify this point giving full justification for any filtering.

Measured background data was directionally filtered to include only data associated wind winds arriving from $\pm 80^\circ$ from a line between the proposed turbine position and the monitoring position. These conditions were considered to be those most favourable for the propagation of turbine noise.

Propagation directivity is discussed in the Good Practice Guide¹ at section 4.4: Paragraph 4.4.2 suggests upwind reductions of at least 10dB and crosswind reductions of 2dB as per the ‘Joule Project’. In practice, it is suggested that such reductions ‘..progressively come into play at distances of between 5 and 10 turbine tip heights’; in this case 220m – 440m. Peasiehill Cottages are the nearest properties at around 300m from the proposed turbine, so even here, diffraction effects are likely to be present during upwind conditions. The nearest properties on Patrick Allan Fraser street are ~350m from the turbine and the nearest caravans, ~400m.

For completeness, the data set was checked to see if omni-directional data was any quieter. The following table shows differences in the derived background trend between the directionally filtered data presented and the unfiltered, omni-directional data; negative values show where the omni data was quieter.

Standardised wind speed	ms ⁻¹	4	5	6	7	8	9	10	11	12
H1 Night	dB	-0.9	-1.1	-1.2	-1.1	-0.9	-0.6	-0.3	-0.1	-0.1
H1 Quiet Day	dB	-0.6	-0.9	-1.2	-1.3	-1.3	-1.1	-0.9	-0.6	-0.2
H2 Night	dB	-0.2	0.1	0.0	-0.1	-0.1	-0.1	0.1	0.2	0.2
H2 Quiet Day	dB	-0.4	-0.3	-0.2	-0.1	-0.1	0.0	0.0	0.0	0.0
H3 Night	dB	-0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1
H3 Quiet Day	dB	-0.5	-0.4	-0.3	-0.3	-0.2	-0.1	0.0	0.0	0.0
H4 Night	dB	-0.7	-0.3	-0.3	-0.3	-0.2	0.0	0.3	0.5	0.3
H4 Quiet Day	dB	-0.1	0.0	0.0	0.0	-0.1	-0.1	0.0	0.0	0.0

Omni-directional background levels are marginally quieter at Peasiehill Cottages and broadly similar at other locations.

5. The applicant has suggested that a daytime lower limit of 38db is used however no justification is given for this. A daytime lower limit of 36db is considered to be more appropriate taking into account the factors suggested in ETSU-R-97 especially the number of properties potentially affected and the effect on power generation. A re-assessment based on a daytime lower limit of 36db is requested.

The following comments were made in support of an increase to the minimum 35dB(A) lower fixed limit in an email to environmental health on the 4th December 2013:

¹ Good Practice Guide on Wind Turbine Noise – IoA, May 2013, 4.4.2, p22

'RE: p65 of ETSU-R-97....It is the level of exposure that presents the strongest argument in favour of a higher than minimum 35dB limit as the proportion of time that background noise levels are low is predicted to be small in the context of a typical year of operation. As can be seen from the data previously submitted that, even at what was considered to be an annual minimum, levels were rarely below 30dB(A) during amenity periods at either monitoring location and where average levels were above 36dB(A). This gives a strong positive indication that levels of exposure during amenity periods will be very limited especially during the more frequent periods where standardised 10m wind speeds are below 7ms⁻¹ given a typical coastal wind speed distribution.'

Notwithstanding the above discussion, the developer would be willing to accept the recommended lower fixed limit of 36dB; applicable during quiet daytime periods. It has already been shown that the project would comply with the proposed lower fixed limit of 38dB(A) by at least 2dB(A), ensuring compliance with an amenity period 36dB(A) lower fixed limit.

6. There is no assessment of the impact of the noise on the amenity of residents as required by policy ER35 of the Angus Local Plan Review. The comment on page 100 that there is a low likelihood of audibility is not robustly demonstrated. Factors such as amplitude modulation (swish) which will not start to fall off, either upwind or downwind of the turbine, until about 300m and the background noise tonal content will be influential in this. An assessment of the impact on residential amenity is requested.

WHO guidance on Community Noise

The recommendation for the maximum internal night hours amenity level is 30dB L_{Aeq} . The façade of a property with an open window is deemed to provide at least 10dB attenuation. This leads to the adoption of a lower fixed night hours limit for external noise of 40dB L_{Aeq} or 38dB $L_{A90,10min}$ rather than the 43dB $L_{A90,10min}$ provision under ETSU-R-97. While turbine noise predictions show levels up to 3dB above 38dB $L_{A90,10min}$, these levels are predicted to occur when background noise rather than turbine noise is dominant.

Likelihood of complaints

Using BS4142:1997 methodology, an assessment can be made of whether complaints are likely in response to a particular industrial noise. The standard uses a penalty system that adds 5dB to noise sources that exhibit a tonal or impulsive noise character in determining the rating level of the noise source (L_{Aeq}). The rating level is compared with the background noise level ($L_{A90,10min}$) and consequently, exceedence is increased by 2dB relative to ETSU-R-97 (where $L_{A90,10min}$ source is compared with $L_{A90,10min}$ background).

Turbine noise character

Characteristics of turbine noise that have the potential to increase audibility or attract attention are tonality and amplitude modulation. Tonal noise has the potential to be audible if tones are sufficiently prominent. In document 'SA-04-SPL Guarantee E-44-Rev1_2-ger-eng.pdf' the turbine manufacturer states that 'A tonal audibility of $\Delta L_{a,k} < 2dB$ can be expected over the whole operational range (valid in the near vicinity of the turbine according to IEC 61400-11 ed.2).' Tonal noise is therefore not considered to be a feature of this turbine.

Amplitude modulation (AM) is an integral feature of wind turbine noise that occurs at blade passing frequency due to the size and the motion of the noise producing elements of the turbine blades. There are however particular atmospheric conditions that may change the character and increase the AM depth of turbine noise; this phenomenon is referred to by the IoA as 'Other AM' or OAM and is not yet sufficiently well understood for a prediction of the likelihood of OAM occurring on a particular site to be made.

Assessment of amenity

OAM is considered to be the result of atypical atmospheric conditions, so the scenario being assessed is an absolute worst case and likely to be uncommon if it occurs at all. A +5dB penalty is added to predicted levels as an OAM character penalty. This is consistent with RenewableUK's 'Template Planning Condition on Amplitude Modulation' that describes a method for determining whether site specific amplitude modulation warrants a penalty of up to 5dB; given in guidance note 3 and 4 and ascribed in a very similar way to penalties for audible tones under ETSU-R-97. In combination with the L_{Aeq} prediction for turbine noise; the cumulative effect is a 7dB increase relative to the submitted ($L_{A90,10min}$) turbine noise levels.

Peasiehill Cottages

The noise environment at PHC was observed to be strongly influenced by the activities at the maltings, but at times when this activity subsided, traffic noise from the A92 became noticeable. Constant residual lower level processes at the maltings appeared to prevent background levels reaching below 30dB $L_{A90,10min}$. The quietest background levels measured at Peasiehill were those during night-time hours when all wind directions were included.

Turbine noise levels exceed the background trend by a maximum of 1.8dB at $8ms^{-1}$ and by 1.2dB at 7 and $9ms^{-1}$. These worst case exceedences are significantly less than 5dB which the method would determine was of marginal significance. Under this scenario, turbine noise may be audible though not prominent. Turbine noise does not exceed the background trend during daytime hours.

Patrick Allan Fraser Street

The background noise environment around Patrick Allan Fraser St is influenced by activity from the industrial estate; noise sources observed include equipment incorporating electric motors, aerodynamic noise from fans and flues, vehicle movements and various intermittent impulsive noises. The underlying background noise was observed to be more energetic in the 250Hz – 500Hz octave bands than is typical of a rural environment therefore turbine noise can be expected to be masked more effectively being weighted towards these octave bands.

The amenity assessment for the nearest property on Patrick Allan Fraser street is comparable to Peasiehill Cottages showing a 2.1dB exceedence of the night hours background trend at $8ms^{-1}$ with more marginal exceedence for integer wind speeds 6, 7 and $9ms^{-1}$. Turbine noise exceeds the background trend by a maximum of 0.8dB during daytime hours. These results are also below those described as being of marginal significance.

The nearest properties to the turbine represented by background levels at Kinghorne street and Gerrard street show exceedence of background trend of 1.2dB and 1.4dB respectively for night hours and -0.3dB and 0.2dB respectively for daytime hours. These levels are also assessed as being of less than marginal significance.

Caravan Park

Road and rail traffic were prominent at the caravan park along with a backdrop of wave noise from the shoreline that became more noticeable from time to time. As stated under question 2 above, measurements taken at the site indicated that background levels at the caravan park were 2 - 4dB louder than Peasiehill Cottages. However, so that amenity can be assessed at the park during quieter periods, the background levels measured at H4 have again been used as a conservative proxy with the same justifications.

The amenity assessment for the nearest caravan on the park is a 2.8dB exceedence of the night hours background trend at 8ms^{-1} and a maximum exceedence of 1.7dB during daytime hours. These results are also below those described as being of marginal significance.

Factors affecting the occurrence of amplitude modulation

OAM appears to occur during conditions when either wind shear is particularly high and/or the wind has high turbulence intensity. Under these conditions, the turbine blades cannot maintain optimal performance over their entire rotation causing increased trailing edge noise. High wind shear and high turbulence intensity most commonly occur as a result of the interaction of obstacles causing drag on the air column moving over it. Wind shear also occurs more at night when vertical wind components are at a minimum, causing atmospheric stratification above the boundary layer.

The buildings at the maltings to the north of the proposed turbine location are likely to have the most significant effect on wind shear at the site. The buildings are expected to affect winds arriving from approximately $315^\circ - 60^\circ$. Wind arriving from the east to south west ($60^\circ - 225^\circ$) are expected to be relatively low, largely arriving from seaward directions where wind shear is low due to the lack of obstacles. The remaining directions ($225^\circ - 315^\circ$) are typical of a rural site consisting of relatively flat farmland with occasional trees, the nearest of which are more than 10 rotor diameters to the west and therefore not likely to have a significant influence on wind shear.

The potential for OAM will be mitigated on-site by the prevailing wind conditions which will arrive at the turbine from across the firth and therefore can reasonably be expected to exhibit relatively low wind shear and turbulence. On the other hand, winds arriving from directions $315^\circ - 60^\circ$ are much less frequent. Higher wind shear tends to occur at night when residents are likely to be indoors, reducing the likelihood of them being disturbed by noise.

The Enercon E44 is a Class I machine meaning that it is designed to cope with a more extreme range of conditions than are likely to occur on this site. It can be argued that this should lower the probability of OAM occurring. The size of the rotor is also a factor, larger rotors tend to encounter more OAM due to the large range of atmospheric conditions they sweep through on each rotation; in this case the 44m diameter rotor is relatively small. Should OAM be found to occur at the site,

Green Cat Renewables has experience of making adjustments to the operations of turbines of this scale such that the frequency of occurrence is significantly reduced and the modulation depth of OAM reduced to levels deemed to be acceptable under current guidance.

7. The land west of the proposed turbine has been granted planning permission for the formation of a new business park (11/00428/FULM). No assessment of the impact of turbine noise on potential business use has been reported in the ER and the applicant is requested to carry this out including taking into account amplitude modulation (swish) and any possible mitigation.

Assessment work submitted to the Council on 04/06/2013 via email in regard to the business park concluded that, due to the high noise levels from the maltings currently observed on the border with the consented business park, sound insulation and mechanical ventilation would be required if any office space was to be located there such that internal noise levels were within recommended limits.

It was calculated that the turbine may increase noise levels here by ~3dB (worst case). In the context of the existing noise sources, any additional noise insulation required to mitigate turbine noise would be minor (equating to an increase of 3dB in the insulation specification (SRI) of building facades). Dick Bowdler draws a similar conclusion: *“This might make the closest of the adjacent site marginally less attractive to some users but I do not think, bearing in mind there is already noise of a similar level from Bairds at times, the impact would be significant.”*

Factors affecting the occurrence of higher amplitude modulation depth are covered under point 6. Should amplitude modulation occur at an unacceptable level, the mitigation described under point 6 could equally be applied in this case, if required.

3 Summary

Criteria are required that reflect the revisions under points 2 and 4. These were obtained by combining the adjustments and applying these to the directionally filtered background curves as submitted in the noise assessment. The resulting criteria are shown below:

Revised night-hours criteria.

Standardised wind speed	ms-1	4	5	6	7	8	9	10	11	12
Peasiehill Cottage	dB(A)	48.4	48.4	48.7	49.4	50.4	51.8	53.6	55.6	57.8
Patrick Allan Fraser	dB(A)	44.3	45.3	46.2	47.3	49.0	50.9	53.1	54.9	56.0
Kinghorne	dB(A)	42.4	43.2	43.9	44.8	46.2	47.7	49.5	51.3	52.8
Gerrard	dB(A)	39.1	41.3	43.0	44.7	46.3	48.0	49.7	51.3	52.6

Revised quiet daytime criteria.

Standardised wind speed	ms-1	4	5	6	7	8	9	10	11	12
Peasiehill Cottage	dB(A)	50.2	50.2	50.4	51.2	52.2	53.7	55.2	56.8	58.4
Patrick Allan Fraser	dB(A)	44.8	45.4	46.5	47.9	49.5	51.4	53.3	55.1	56.7
Kinghorne	dB(A)	43.3	44.2	45.2	46.3	47.8	49.3	50.9	52.2	53.5
Gerrard	dB(A)	42.4	43.8	45.1	46.4	47.6	49.1	50.7	52.1	53.4

The above criteria do not include a lower fixed limit.

For completeness, the following exceedence of the above criteria reflects the most conservative option under Point 1c (which assumes a 1.5dB reduction in sound power per integer wind speed for standardised 10m wind speeds below 7ms⁻¹).

Night hours exceedence.

Standardised wind speed	ms-1	4	5	6	7	8	9	10	11	12
Peasiehill Cottage	dB(A)	-14.4	-12.9	-11.6	-10.8	-10.2	-10.8	-12.5	-14.5	-16.7
Patrick Allan Fraser	dB(A)	-11.3	-10.7	-10.2	-9.8	-9.7	-10.9	-13.1	-14.8	-15.9
Kinghorne	dB(A)	-10.2	-9.5	-8.7	-8.0	-7.7	-8.4	-10.2	-12.1	-13.5
Gerrard	dB(A)	-9.9	-10.6	-10.9	-11.1	-11.0	-11.8	-13.5	-15.1	-16.4

Quiet daytime exceedence.

Standardised wind speed	ms-1	4	5	6	7	8	9	10	11	12
Peasiehill Cottage	dB(A)	-16.2	-14.7	-13.4	-12.6	-12.0	-12.6	-14.1	-15.7	-17.4
Patrick Allan Fraser	dB(A)	-11.8	-10.9	-10.4	-10.4	-10.3	-11.4	-13.3	-15.0	-16.6
Kinghorne	dB(A)	-11.0	-10.4	-10.0	-9.5	-9.3	-10.0	-11.6	-12.9	-14.2
Gerrard	dB(A)	-13.2	-13.1	-12.9	-12.7	-12.3	-13.0	-14.5	-15.9	-17.2

Although not considered typical, criteria for Peasiehill derived in the absence of Steepphouse noise are given in the 'Noise Assessment Addendum'.

BAIRDS MALT WIND TURBINE

**Environmental Report – Shadow Flicker
Supplementary Information**

Bairds Malt Single Turbine Ltd

August 2015



1 Introduction

A planning application for a single wind turbine at Bairds Malt was submitted in January 2015 (REF: 14/01067/FULL).

This short report provides additional shadow flicker information related to the consultee response from the Environmental Health team (dated 17th April 2015).

2 Shadow Flicker

2.1 Response from EHO

“This is covered in Section 12 and Appendix 5 of the ER. The assessment, based on meteorological factors, suggests that shadow flicker should not be significant and mitigation is not proposed unless problems become apparent. The following matters require to be clarified in order to aid the determination of this application;

- 1. The criterion used in the assessment, namely 30 hrs per year, is not robust as it ignores potentially short term significant events. A 30 minute per day limit is also advocated by guidance from Northern Ireland, Germany and PREDAC as referenced in the DECC report; update of UK shadow flicker evidence base. The same report also suggests that assessments against these limits should be based on astronomic factors and not meteorological factors. It is requested that Shadow flicker is reassessed against astronomic worst case criteria of 30 hours per year and 30 minutes per day.*
- 2. The accuracy of Figure 12.2 Appendix 5 should be checked as receptor 2R is shown outside the theoretical zone yet table 12.3 quotes a calculated impact of 32.7 hours. Figure 12.2 should also be updated with a 30 minute per day contour to reflect the additional criteria.*
- 3. The applicant states that a watching brief will be under taken for the first year of operation. However this is again not considered to be robust enough as impacts are weather dependant. The applicant is requested to propose a detailed Shadow flicker management scheme including a complaint investigation procedure.*

This service objects to this application due to the lack of information relating to shadow flicker as detailed above. We will review this objection if these issues are adequately addressed by the applicant”.

2.2 Response

Updated results

Table 2.1 below shows the total number of theoretical hours per year of shadow flicker, which assumes the worst case astronomical scenario, namely that:

- The turbine is facing the sun at all times of the day;

- It is always sunny;
- The turbine is always operating; and
- There is no local screening.

Receptors are as shown in **Appendix 2** (attached), which was originally supplied with the ER.

Table 2.1 – Results and Impact Assessment

Shadow Flicker Impact Assessment					
ID	Name	Sensitivity	Number of days	Mean hours per day	Total hours per year (Astronomical worst case)
1R	Peasiehill Cottages (S)	High	50	0.50	25.7
2R	PAF1	High	59	0.55	32.7
3R	PAF2	High	50	0.44	22.0
4R	PAF3	High	62	0.48	29.8
5R	PAF4	High	30	0.31	9.3
7I	Tayside Doors	Low	113	1.05	118.6
8C	Elliott Business Park	High	104	1.20	124.6
9I	Smithy	Low	84	0.41	34.2
13I	Halliburton 2	Low	183	1.26	231.3
14C	Halliburton Offices	High	77	0.80	61.9
15C	Energy Alloys	High	55	0.43	23.6
19C	PMP Interplex	High	67	0.55	36.5
20R	Peasiehill Cottages (N)	High	50	0.51	25.7

R=Residential, I=Industrial, C=Commercial

As set out in the ER, taking meteorological factors into account, actual shadow flicker impacts are likely to be significantly less than presented above, ~20% of the totals presented in **Table 2.1**.

Table 2.1 also does not take into account local screening. For example the most southerly row of properties on Patrick Allan Fraser Street lies to the north of a shelter belt of trees, which would be expected to provide significant screening, particularly in the summer months.

The drawing in **Appendix 1** shows an updated shadow flicker map showing:

- The area where properties can theoretically experience more than 30 hours per year of shadow flicker.
- Identified residential properties predicted to experience shadow flicker for 30 minutes on at least one day.

The ReSoft Windfarm software does not allow contour maps to be drawn to show properties experiencing more than 30 minutes of theoretical shadow flicker on any one day. These results have been produced manually (by looking at detailed result listings) and displayed on the map.

The results show that most residential properties within ten rotor diameters distance of the turbine (440m) are expected to experience more than 30 minutes of theoretical shadow flicker on at least one day per year.

This ties in with the Scottish Government's online planning guidance for renewable energy, specifically the 'Onshore Wind Turbines' note last updated in October 2012, states that,

"Where this (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..."

Angus Council's Implementation Guide (2009) references this online planning guidance.

In addition to the properties within 440m, the analysis shows that the following eight properties may potentially experience shadow flicker in excess of 30 minutes on at least one day during the year:

- Properties 21, 23, 25, 27 and 29 on Patrick Allan Fraser Street; and
- Properties 7, 9 and 11 on Gerrard Place.

Mitigation Measures

There are three main mitigation measures that can be applied to reduce shadow flicker effects.

- Implementation of a turbine shut-down strategy;
- Landscaping or the planting of vegetation to provide screening; or
- The installation of blinds at affected properties,

Rather than defining an area of influence and specifying individual properties, the applicant's approach would be to mitigate shadow flicker effects at properties that are affected by shadow flicker for more than 30 minutes on any one day, or that experience more than 30 hours shadow flicker per year. This would be established once the turbine was operational, and implemented quickly if found to be problematic.

The trigger for the provision of this mitigation would be as set out in the draft complaints procedure below, and would rely on affected properties contacting Bairds Malt directly (who would inform the Council). The issue would then be investigated promptly and fully addressed within one month of a complaint being received.

For **residential properties** the turbine would be programmed to automatically shut-down during periods when shadow flicker is theoretically possible and climatic conditions are such that shadow flicker can occur, as set out in the next section of this report.

It should be noted that shutting down the turbine for the front row of properties on the PAF estate would automatically provide shadow flicker protection to those properties situated to the north of the front row.

For **commercial or industrial premises** the preferred option for the applicant would be for screening vegetation or blinds to be provided. However if this is not feasible / agreeable to the owner / occupier then the fallback would be to program the turbine to shut-down, as set out above.

Prior to turbine construction the applicant would pro-actively engage with residents and businesses that could potentially be affected to:

1. Discuss potential shadow flicker impacts and to advise them of the potential mitigation measures.
2. Provide contact details should shadow flicker be an issue.

Turbine shut-down mechanism

Upon construction the wind turbine will be fitted with a shadow shut off system integrated into its control system. The predicted theoretical times of shadow flicker nuisance, as modelled using ReSoft's WindFarm software, can be programmed into the control system as a table, which includes the daily start and end times of theoretical shadow flicker.

The turbine would be fitted with three light sensors spaced at 120° angles to ensure that one sensor is always exposed towards the orientation of the sun, and one is always on the shaded side of the turbine. Based on the measured values of the sensors, the control system determines the ratio between the level of highest and lowest illumination, known as the 'shut-off intensity'.

The shutdown procedure is activated under the following conditions:

- When luminance from the sun is 120 W/m² or greater; and
- Shut-off intensity is 36% or less.

When both of these criteria are met within the timeframes programmed into the turbine from the shadow flicker model, the turbine will proceed to shut down.

Draft Complaints Procedure

It is proposed that the agreement of a procedure similar to the one below would be required as a condition of planning.

Protocol for Assessing Complaints of Shadow Flicker

Following a complaint from a resident or occupier who has experienced shadow flicker whilst within their property / premises, the developer will write to the affected person to request the following information:

- List of rooms and windows affected;
- Time and duration of effect; and
- Weather conditions during effect.

The letter will also provide contact details for the relevant contact / department within Angus Council, should mitigation not proceed to the occupier's satisfaction.

Within one month of receiving the information from the resident, the developer will

1. Investigate the complaint to confirm the duration and nature of the event to see if the property would qualify for mitigation.
2. Determine whether the shadow flicker is due to the operation of the Bairds turbine.
3. If the shadow flicker is determined to be caused by the Bairds turbine, then:
 - a. For residential properties the turbine will be programmed to automatically shut down during periods when shadow flicker is theoretically possible and when climatic conditions are such that shadow flicker can occur.
 - b. For commercial or industrial premises the developer will discuss with the occupier whether the planting of vegetative screening or the provision of blinds / curtains is appropriate. Should neither of these options be feasible / agreeable to the occupier then an automatic shutdown mechanism will be permanently instigated as above.

The developer will make best endeavours to investigate and resolve all issues as quickly as possible. In the event that the matter is not resolved to the satisfaction of the resident of the affected dwellings, adjudication by a suitably qualified person and/or the local planning authority will be sought, at the expense of the developer.

Conclusion

Further information has been provided in relation to shadow flicker, specifically the identification of properties predicted to theoretically experience more than 30 minutes of shadow flicker on any one day.

Assessment has shown that shadow flicker impacts of >30 hours per year and / or 30 minutes on any one day are primarily limited to the areas within ten rotor diameters (440m) of the proposed turbine location.

In order to provide residents, occupiers and the local authority with certainty on this issue, the developer is proposing to offer mitigation at properties that are affected by shadow flicker for more than 30 minutes on any one day, or that experience more than 30 hours shadow flicker per year.

If investigation shows that these thresholds are being exceeded then this will take the form of the instigation of a turbine shut-down procedure, or the provision of vegetative screening or the installation of suitable blinds or curtains.

It is suggested that the instigation of a Complaints Procedure could be made a condition of planning, and a Draft Complaints Procedure has been included within the information provided.

The applicant would pro-actively engage with businesses and residents prior to the turbine being commissioned to advise them of these potential measures, and to provide contact details should shadow flicker be an issue.








Project Name:
Bairds Malt Wind Turbine








Document Title:
Appendix 1 – Shadow Flicker Map

Scale:
NTS

Map Key:

-  Proposed Turbine Location
-  10 Rotor Diameters (440m)
-  Property with >30mins shadow flicker per day for at least one day
-  Property predicted to experience shadow flicker <30 mins on any one day
-  Property with no modelled shadow flicker

Shadow Key:

- Annual hours of theoretical shadow flicker
-  210h+
 -  180-210h
 -  150-180h
 -  120-150h
 -  90-120h
 -  60-90h
 -  30-60h

Client:
Bairds Malt Single Turbine Ltd

Drawing By:
Green Cat Renewables Ltd

Version: 1.0
 Checked by: BS
 Approved by: GM
 Date: 19/05/2015





Project Name: **Baird Malt Wind Turbine**
 Document Title: **Shadow Flicker Assessment - Area of Influence and Assessed Properties**
 Scale: **Not to Scale**

- Key:
- Proposed Wind Turbine Location
 - 10RD (440m) from Wind Turbine
 - Area of Theoretical Shadow Flicker > 30hrs per annum*
 - Assessed Properties
 - Industrial
 - Commercial within Industrial
 - Facade with windows potentially affected by Shadow Flicker

1. Peasiehill Farm Cottages	Residential
2. PAF 1	Residential
3. PAF 2	Residential
4. PAF 3	Residential
5. PAF 4	Residential
6. SRCL	Industrial
7. Tayside Door Factory	Industrial
8. Elliott Buisness Park	Industrial/Commercial
9. Smithy	Industrial
10. Mackays	Industrial
11. NEWDWES Self Storage	Industrial
12. Halliburton 1	Industrial
13. Halliburton 2	Industrial
14. Halliburton 3	Industrial/Commercial
15. Energy Alloys	Industrial/Commercial
16. Masstock	Industrial/Commercial
17. Buildbase	Industrial/Commercial
18. Halliburton 4	Industrial/Commercial
19. PMP Interplex	Industrial/Commercial

* This is indicative only and will vary slightly depending on the number of windows, orientation etc.

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Client: **Bairds Malt Ltd / Kilmac Energy Ltd**
 Drawing by: **Green Cat Renewables Ltd**

Document Number: **C0621-163/**
 Version: **1.0**
 Author: **SS**
 Checked by: **GM**
 Approved By: **GM**
 Date: **17/02/2014**

BAIRDS MALT WIND TURBINE

Response to Landscape Officer

Bairds Malt Single Turbine Ltd

June 2015



Green Cat Renewables

1 Landscape and Visual Response

A planning application for a single wind turbine at Bairds Malt was submitted in January 2015 (REF: 14/01067/FULL).

This short note provides additional information in relation to response from the Council's Landscape Officer (dated 17th April 2015). The response raised concerns relating to the landscape and visual impact of the development.

This section sets out Green Cat Renewables (GCR) response to the comments received from the Council's Landscape Officer.

For convenience these are presented on a point-by-point basis in the following table.

Our Ref	Angus Council Countryside Officer - Points of Note	Response/ Action
Landscape Effects		
01	<i>The site is located in the Elliot Industrial Estate towards the western edge of Arbroath close to the division between Dipslope Farmland and Coast with Sand LCTs of the TLCA.</i>	<p>Agree. The turbine is located within the settlement boundary of Arbroath, and would closely associated with the existing industrial elements of the Maltings. An extension to the Peasiehill Industrial Estate into the fields to the west of Bairds Malt has received outline planning permission, which would extend the settlement boundary further.</p> <p>On a general note, the GCR believes that the response from the Landscape Officer does not give sufficient weight to the impact of the existing industrial elements already visible on site. The turbine will be viewed alongside other industrial elements within this section of the landscape, including the Maltings infrastructure, elements of which are over 30m in height. It would therefore not be viewed as an isolated industrialised feature in this area of the landscape.</p>
02	<i>The Dipslope Farmland LCT closest to Arbroath has lower capacity for turbines than other parts of the LCT.....Accordingly it is considered that there is no capacity in this area for turbines greater than 50m.</i>	<p>The proposed turbine is not located within the Dipslope Farmland LCT, as such any impact upon this area will be indirect. The turbine is located within the Development Boundary for Arbroath and as such does not have a capacity assigned within the capacity study. Page 46 of the Implementation Guide for Renewable Energy states:</p> <p><i>"Within Development Boundaries (as defined in the ALPR) it is not possible to define maximum turbine heights. Proposals for turbine development in towns and villages will be considered in the context of the ALPR policies and take account of the following considerations:</i></p> <ul style="list-style-type: none"> • <i>Scale and location</i> – It is considered that the turbine is of a suitable scale for this location, providing a balance between energy generation and landscape & visual impact. The ER demonstrates that the turbine is the smallest possible to provide sufficient clearance between the bottom of the blade sweep and the nearest Maltings buildings. • <i>Landscape setting</i> – The proposed development is sited within the footprint of the Maltings. This is an industrialised site, and the turbine would be viewed against industrial

Our Ref	Angus Council Countryside Officer - Points of Note	Response/ Action
		<p>elements, which is in contrast to a turbine located on a greenfield site.</p> <ul style="list-style-type: none"> • <i>Residential amenity including noise, shadow flicker, visual impact etc</i> – A full and robust assessment of these features has been carried out as part of the planning application. While there are some significant visual effects arising from the addition of the turbine, it is in keeping with the industrial operations at the site. Noise and shadow flicker results are presented elsewhere in the ER. • <i>Historic environment including townscape</i> – Again a townscape assessment has been carried out as part of the submission, impacts on Arbroath were considered to be minimal outwith the immediate surrounding areas, and these include the area of promenade to the east and the neighbouring housing estate. Historic Scotland has not raised an objection in terms of adverse impact upon the setting of any features within the study area, which including Arbroath Abbey, Keptie Hill Water Tower and the Hospitalfield complex. • <i>Compatibility with adjacent uses</i> – This is an industrial site with a high energy usage and the development has been brought forward as there is a demonstrable need for power on site. The two developments are therefore extremely compatible. • <i>Proximity to sensitive receptors such as educational buildings, open space and leisure facilities, hospitals, residential care homes, cemeteries, visitor facilities and accommodation and proposed development areas</i> - There are no prominent views of the development from local schools, hospitals etc. The only proposed development area in the vicinity of the site is the extension of the industrial area to the west. • <i>Access</i> – Not applicable in terms of LVIA, access would utilize current roads where possible. • <i>Design</i> – The ER sets out the design process followed. The turbine has been sited within the optimal location within the Maltings site. • <i>Security of equipment/facility</i> – Not applicable in terms of LVIA • <i>Ancillary works</i> – All ancillary works will be contained within the existing compound and will not have any visual impact.
02	<p><i>Contrary to the opinions within the Environmental Report, it is considered that the proposed turbine would have significant impact upon the Coast with Sand LCT. This LCT has low capacity for turbine development, with only low capacity for turbines up to 30m in height.</i></p>	<p>The Coast with Sand LCT occurs in four distinct areas within the study area. The Environmental Report concedes that views from the nearest area of 'Coast with Sand' will be more prominent than those areas located to the south-east and north-east (which are at 7.5km and 11.7km distance).</p> <p>An overall magnitude of change was applied to the LCT as a whole, which considers the overall impact to be low. The nearest area of the LCT would experience a higher level of impact than those wider outlying areas. Within the ER, the views are likened to those within Viewpoint 2, which was</p>

Our Ref	Angus Council Countryside Officer - Points of Note	Response/ Action
		<p>assigned a high magnitude of change. The development is not located within the Coast with Sand LCT, and impacts would therefore be indirect, as opposed to direct. Views have been considered, and due to the built up nature around the waterfront, impacts were found to be limited to the eastern section of the LCT, immediately adjacent to the proposed turbine.</p>
03	<p><i>A turbine of the size proposed would become a landmark for this part of the Angus coast. It is therefore considered that the proposed turbine would have a significant effect upon the Coast with Sand LCT.</i></p>	<p>GCR would dispute whether the turbine would become a landmark for this part of the coast,</p> <p>Impacts on the A92, the settlement of Arbroath, neighbouring settlements and surrounding areas have been assessed and while there would be some localised significant impacts these were not found from the wider surrounding areas. If the turbine was to become a landmark feature, it would be expected to form a prominent landmark on the skyline from across the wider Angus area. The assessment does not support this summation.</p> <p>GCR notes that landmark features can be positive additions to the landscape. The Oxford English Dictionary defines a landmark as, “An object or feature of a landscape or town that is easily seen and recognized from a distance, especially one that enables someone to establish their location”.</p>
04	<p><i>Arbroath Abbey is an important part of the Arbroath skyline. It is not much taller than other buildings in Arbroath and is therefore vulnerable to being out-competed by taller structures. Similar issues apply to the Keptie Pond Water Tower. The size and prominent location of the proposed turbine on the edge of Arbroath would adversely affect the setting of Arbroath and historic landmarks within it.</i></p>	<p>Viewpoint 10 highlights the industrialised section of the landscape that the proposed turbine occupies and while it would be the most prominent vertical feature it is viewed against the sea and does not interfere with the sightlines across the settlement.</p> <p>Viewpoint 4 shows the turbine more in scale with the tallest features of the water tower and church spire. The Abbey is located to the north of the view, in a separate area, and there would be no interference from this location as the Abbey is not visible.</p> <p>Viewpoint 5 gives a view overlooking the settlement from the north, The turbine again sits separately to the water tower, with no visual confusion between the features. Indeed from this view the turbine is clearly visible with the Maltings buildings tying the industrial elements together.</p> <p>There are also no views predicted from within the Abbey and surrounds due to the screening features presented by the remaining walls and wider features. It is also noted that Historic Scotland raised no objection regarding the impact on the setting or character of the Abbey or the Keptie Water Tower, both of which fall within their remit.</p>
05	<p><i>The size of the turbine would be out of scale relative to smaller scale landscape features such as houses; trees and Kelly Den (see VP1, 2, 5, 8, 9, 10).</i></p>	<p>It is not considered that the turbine appears out of scale with the existing features from many of the views listed. Particularly Viewpoints 1, 9 and 10 where it appears in keeping with scale of the existing features. The turbine from the wider areas appears in a separate section of the landscape to the wider settlement, and it does not interfere with the most prominent vertical elements in these views.</p>

Our Ref	Angus Council Countryside Officer - Points of Note	Response/ Action
Visual Effects		
06	<p><i>The location of the proposed turbine on the coastal plain notably influences the pattern and extent of visibility. Theoretical visibility extends is more extensive along the coastal plain south, south-west and north of the turbine.</i></p> <p><i>Hub visibility extends are far south as Fife Ness; as far south-west as Carnoustie and as far north as the higher ground west of Lunan Bay. To the west, visibility is generally restricted by higher ground around Carmyllie. As expected, blade tip visibility would be more extensive.</i></p>	<p>As discussed in Point 3. The turbine is located adjacent to the coastal plain, not within the coastal plain, however, the generally flatter topography of the surrounding area is highlighted by the ZTV which shows the theoretical visibility of the proposed turbine at both hub height and to blade tip. Visibility from the wider coastal areas is not considered to be overtly prominent with vegetation and other built features providing screening.</p> <p>The area shown by the ZTV describes theoretical visibility only, describing a bare earth scenario with no built features or vegetation. The Maltings themselves do not appear in views out with the local area, the highest point of the existing buildings reaching ~33m. With this in mind it is unlikely that a 77m tall structure will be an easily discernible feature from these areas as far south as Carnoustie and the other areas highlighted.</p>
07	<p><i>Much of the views of the proposed turbine would be along the open and relatively flat coastal plain; across the Firth of Tay or from higher ground. These factors together, lead to not only higher levels of visibility, but higher levels of prominence in views. This in part, contributes towards an overall lower underlying landscape capacity for wind turbine development on the coastal area. The size of the turbine together with the prominent location would inevitably lead to significant visual effects.</i></p>	<p>As per point 6. The theoretical visibility across the flat coastal plain is shown in the ZTV. Visual prominence of the turbine is quickly diminished beyond 5km. While views from the wider area, as evidenced in Viewpoint 14 & 15 show the turbine as a barely discernible feature from these wider views.</p> <p>Views from the areas around the A92 are predicted to occur for ~6km on the approach to Arbroath. This highlights the intervening screening features which limit visibility of the project from the wider areas, the assertion that there would be widespread significant visual effects in this case is not considered to be accurate.</p>
Houses		
08	<p><i>The closest affected houses are the 2 cottages at Peasiehill Farm Cottages to the north-west (326m/ 4 times turbine height). Given the size and proximity of the proposed turbine, I would agree with the ER that the houses would experience effects of major significance. At this proximity, the turbine is likely to be over-bearing and oppressive.</i></p>	<p>The Residential Assessment concedes that the turbine would be an obvious feature in the views from these neighbouring properties. It should also be noted that the view from these dwellings already contains the significant industrial development of the Maltings, and the more direct views to the east would be impacted by the consented extension to the Peasiehill Industrial Estate. The Peasiehill Cottages and Peasiehill Farm itself, are owned by a party with a financial interest in the turbine development.</p>
09	<p><i>There are further houses to the north-west at Peasiehill and Crudie (650m to 810m/ 8 to 11 times turbine height). The ER assesses the magnitude of effects as being medium. This is considered an under-assessment given the size of the turbine and its proximity. The turbine is likely to be a dominant feature in views from these houses and therefore would also create effects of major significance.</i></p>	<p>Similar to the cottages described above, although these properties are located slightly further away, the primary views are considered to encompass but not face primarily towards the Maltings buildings, hence the reason for a medium magnitude of change as opposed to high.</p>
10	<p><i>To the south the closest houses are 10 houses at Elliot Cottages (578m/ 7.5 times turbine height). (Appendix 2.3 VP1). The ER assesses the magnitude as high and significance major. I would concur. Impacts would further be increased by the elevated position of the turbine</i></p>	<p>Agreed. Where significant effects occur these are clearly presented within the ER. Although the properties are located in proximity to the coast, it is argued that the views to the rear are more enclosed than and not quite as picturesque as those to the front away from the turbine (although these views do also include the A92).</p>

Our Ref	Angus Council Countryside Officer - Points of Note	Response/ Action
	<i>relative to the houses. The turbine would dominate the setting of the houses.</i>	
11	<i>To the north of the site, beyond the industrial estate, the closest houses within Arbroath are at Patrick Allan Fraser Street. This area is not included in the Residential Assessment, but Appendix 2.3 includes visualisations and a summary assessment. The closest houses are around 370m/ almost 5 times turbine height. Whilst there are intervening trees and buildings, Appendix 2.3 VP05 helpfully shows the proposed turbine typically protruding above these by around the rotor diameter (24m). Whilst, the Appendix assesses magnitude as high, it considers sensitivity as being low. Houses are typically high sensitivity, which would revise this assessment to major. Given the size and proximity of the turbine it is likely that the turbine would dominate houses and have an overbearing effect.</i>	<p>The sensitivity presented in the assessment table is incorrect, and this is a typing error. It is agreed that the sensitivity of this view would be high due to the local residents. Within the townscape assessment, the modern residential Estates, which cover more than one area, is considered to have a medium magnitude of change with an overall major/moderate level of effect.</p> <p>The closest receptors at Patrick Alan Fraser Street have been considered in significant detail throughout the application, as some of the key visual receptors. A number of site visits were undertaken, visiting individual properties following on from the public consultation meeting. As well as these visits, numerous photomontages were taken at locations throughout the estate to inform the assessment.</p> <p>The turbine has been described as prominent in views from the area, the assessment has not underplayed the potential impacts, however, it is considered that the turbine is in keeping with the scale of the local features, primarily the Maltings and is similar in type, being a vertical industrial feature.</p>
Cumulative Landscape Effects		
12	<i>Figure 7.14 of the ER lists nearby wind turbines either operational, consented or in planning. The closest turbine would be the consented 77m turbine at Cuthlie (4km). Overall there are a number of operational or approved turbines to the west and north-west or the proposed turbine. Together, they will create a wind turbine typology of "landscape with wind turbines". The current proposed turbine, in part due to its size, would extend this typology up to the edge of Arbroath. This would be beyond the underlying landscape capacity for this part of Angus. The proposal would therefore have significant adverse cumulative landscape effects.</i>	<p>The closest operating turbine is located over 8km inland at North Mains of Cononsyth. The Capacity study suggests a medium capacity for up to 50m turbines, however, as the ER notes the Bairds Turbine would be associated more closely with the industrialised Maltings buildings and at 77m does fit with the existing features. There was little in the way of cumulative impact found through the assessment, and as such the addition of the turbine at this location would not create a "landscape with wind turbines". It is considered that cumulative impact is not a significant issue in for this proposal.</p>
Cumulative Visual Effects		
13	<i>The paired ZTVs within the ER demonstrate that the proposed turbine would be likely to be commonly viewed "in combination", "in succession," and "in sequence" with other wind turbines. Again, the frequency of which such interactions occur would extend towards Arbroath and the coast, leading to significant cumulative visual effects.</i>	<p>This is certainly not the impression given within the ER, with only 9 of the 16 viewpoints having any cumulative impacts, where these do occur they have been considered in all but one viewpoint to be negligible. Cumulative impacts are not significant in relation to this application.</p>
Conclusion		
14	<i>Unfortunately, the proposed size of turbine close to the coast; Arbroath and a number of houses would lead to significant adverse landscape, visual and cumulative effects.</i>	<p>Impacts on the coast are not considered to be overbearing outwith a small section of the landscape within the adjacent area. The views considered from the wider area highlight the relative minimal impacts on the coastal areas. In general the views from the coastal areas are appreciated for their expansive uninterrupted views along the coastline and far-reaching views out to sea, none of which will be altered or affected by the addition of the Bairds Malt turbine.</p>

Our Ref	Angus Council Countryside Officer - Points of Note	Response/ Action
		<p>The impacts on the settlement of Arbroath have been considered, and while some of the closest receptors, primarily local residents will experience some views in which the turbine will be a prominent feature, these views are tempered by the presence of the Maltings which already exists within these views. Wider views have been considered in the residential assessment, which highlights impacts on the closest visual receptors.</p> <p>There are no significant cumulative impacts arising from this proposal, the Environmental Report has not highlighted any areas of concern in regard to cumulative impacts.</p>

To conclude, whilst there are some significant impacts predicted with the construction and operation of a 77m tall wind turbine on the south-eastern edge of Arbroath, these impacts were found to be relatively localised. The turbine would be viewed alongside existing industrial elements and located within the existing footprint of the Maltings.

The impacts on Arbroath, residents, visitors and commuters has been assessed as part of a robust Landscape and Visual Impact Assessment. The findings of the LVIA show the turbine would add to the industrialised section of the landscape but would not become a dominant or overbearing feature across the wider countryside.

Similarly there were no significant cumulative impacts predicted from any of the selected viewpoints, chosen to represent the local and wider area. The turbine would be more closely associated with the industrial Maltings plant alongside features such as grain towers than any operating wind development within the local area.

We would ask that the Council carefully considers all of the above points alongside the wider benefits of the proposed scheme.

10 February 2016

Mr Ed Taylor
Senior Planning Officer
Planning Service
Angus Council
County Buildings
Market Street
Forfar
DD8 3LG

Dear Ed,

Bairds Malt Wind Turbine – Supporting Letter

As the above application is now approaching determination, I thought it would be useful to provide a summary of the benefits of the proposal, and why we feel that it should be supported.

The need for the development

Bairds Malt is Scotland's leading malt producer, and has invested significantly in its Arbroath facility since its construction in 1970. The site employs 57 people who are drawn from the local area and the business has contracts with over 1000 farms, 230 of which are within Angus. This demonstrates its importance to the local and regional economy.

In constant operation for seven days a week, the Malt has an extremely high energy usage and requires in the region of 10GWh of electricity per year, which contributes to annual energy costs in the region of £2.5m. The main aims of the project are to:

- **Generate clean electricity.** The proposed turbine is expected to generate 2.3GWh of electricity per year, equivalent to around 20% of the plant's usage.
- **Reduce business costs** through the direct use of electricity generated on site, and through the sale of any electricity not used by the plant. This will have the added bonus of insulating the business against any future price rises in electricity.
- **Reduce the businesses' carbon footprint**, which is of increasing importance to major suppliers.

The overall outcome of the project will be to increase the market competitiveness of the business and thus safeguard local jobs.

This is firmly in line with the Scottish Government's aspirations concerning local renewable energy ownership and use, with the turbine directly supplying electricity to a company with strong local connections and suppliers throughout the region.

Wider Economic Benefits

As well as providing direct cost savings to the business the turbine will also provide wider economic benefits. Over its 25 year lifetime the project is expected to:

- Support / safeguard the equivalent of 60 full time jobs;
- Generate ~20 new full time jobs relating to construction, operation and maintenance; and
- Generate / safeguard net additional economic output (GVA) of c. £63.5m and expendable income (salaries) of c. £37.6m within the regional economy¹.

The business operates in a sector which the Local Plan notes has seen contraction in recent years and is coming under pressure from competitors both within the UK and abroad.

The proposed wind turbine is therefore an important element in consolidating and strengthening one of the largest manufacturing businesses and employers within Arbroath.

Landscape and Visual

The acceptability of the scheme is likely to hinge upon whether the economic benefits outlined above outweigh the visual impacts upon the nearest residential areas. This has been given extremely careful consideration within the ER, which includes:

- A residential assessment which considered the impact upon all residential properties within the 2km of the turbine.
- A townscape assessment that examined the impact upon different areas of Arbroath.
- A landscape assessment looking at potential impacts upon landscape character.

The ER provides a fair appraisal of the impacts, and is supported by 23 photomontages.

The Council has raised concerns regarding the perceived impact upon residential amenity and the wider landscape. Green Cat Renewables provided a detailed response to these comments (15/06/15), which we would ask are given full consideration in the determination process.

¹ A full Socio-Economic Assessment is included as Appendix 6 of the ER

We believe that the response from the Landscape Officer did not give sufficient weight to the impact of the existing industrial elements already visible on site.

The turbine alongside tall vertical elements, such as the grain drying towers which are over 30m in height, and other large structures of the Maltings Plant, which has been a feature of the skyline in Arbroath for over 40 years.

The main impacts upon local amenity will be visual impacts upon the nearest residential receptors, which already have views of the industrial Maltings site.

Views from Peasiehill, Crudie, Elliot Cottages and some parts of the Patrick Allan Estate were deemed to be significant, but crucially not unacceptable. Although prominent in some views the turbine would not be an overbearing feature which dominates views.

The turbine relates well to the scale and industrial of the surrounding buildings and would add a vertical feature of similar colour to the views which already contain several industrial elements, and take up only a small extent of the horizontal view.

It should be noted that the selected turbine is the smallest turbine that can fitted onto the site due to the need for a minimum clearance height above the grain drying towers.

The graphic in **Annex 1** shows the proposed turbine in comparison to the operational Michelin turbines in Dundee, and the turbine type previously proposed by Glaxo-Smith Kline in Montrose.

The proposed model, the Enercon E44, is 43m smaller than the operational Michelin turbines in Dundee, and 55m smaller than the proposed GSK turbines.

Noise and Shadow Flicker

We are still awaiting formal confirmation from Steve Thomson, but expect that the updated noise and shadow flicker assessments will address the points that were previously raised.

Conclusion

All of the other planning issues such as aviation, noise, shadow flicker, ecology and cultural heritage have been addressed through the application process, and no objections have been received from any statutory consultees.

As originally set out in the Environmental Report, the acceptability of the development hinges upon the perceived landscape and visual impact of the proposal. We contend that although there will be significant impacts at some residential properties in close proximity to the turbine that overall the impacts are acceptable given the industrial setting of the Maltings – this is not a turbine that will be viewed in isolation in a rural setting.

The scheme will support an important and long-established employer in the area, and help to safeguard local jobs both at the Maltings and throughout its supply chain. We believe that it provides the right balance between energy generation and landscape and visual impacts, as well as bringing significant economic benefits to the region.

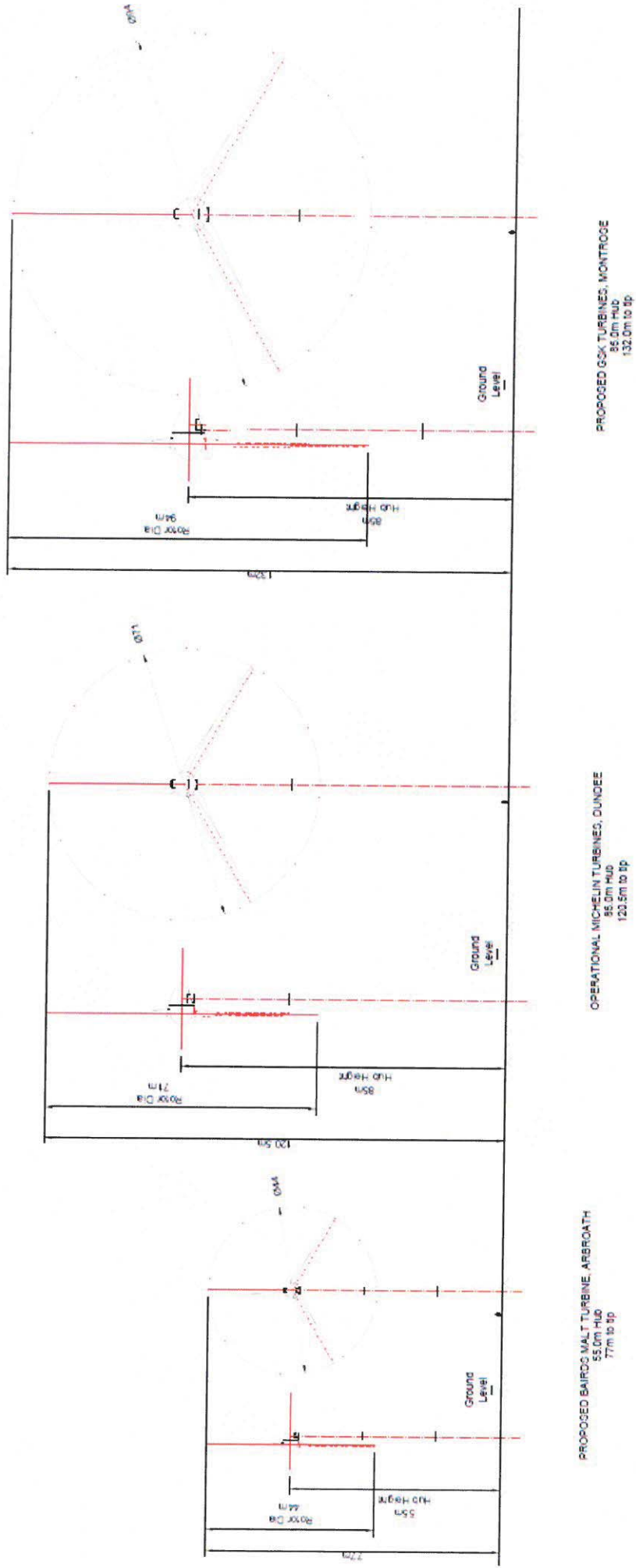
In light of the above and given the comprehensive information provided throughout the planning process, I hope that you can recommend that the application be approved.

Kind Regards,



Derek Ross
Director, Kilmac Energy

Annex 1 – Comparison between the proposed turbine and the Michelin (operational) and GSK turbines (proposed)



Renmuir Farm - Committee this month

PRODUCTION B01



Our Ref: Screening Request 12/00922/EIASC/R/MA/IAL

Your Ref:

19 November 2012

Green Cat Renewables
Midlothian Innovation Centre
Room 106
Roslin
EH25 9RE
FAO Glen Moon

INFRASTRUCTURE SERVICES

Director: Eric S Lowson

Planning & Transport

County Buildings
Market Street
Forfar
Angus DD8 3LG

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Ask for: Murray Agnew

Direct Line: 01307 473165

Dear Mr Moon

**TOWN AND COUNTRY PLANNING (SCOTLAND) ACT 1997 (AS AMENDED)
THE TOWN AND COUNTRY PLANNING (ENVIRONMENTAL IMPACT ASSESSMENT)
(SCOTLAND) REGULATIONS 2011
SCREENING OPINION REQUEST FOR THE ERECTION OF A 900 KW WIND TURBINE
AT BAIRDS MALT, ARBROATH**

I refer to the above and to your request for a screening opinion in terms of Regulation 6 of The Town and Country Planning (Environmental Impact Assessment) (Scotland) Regulations 2011. I apologise for the delay in my response that falls outwith the expected timescale given by the aforementioned regulations.

My Council has considered the type of development proposed; its nature, scale, location and potential impact on the environment. Account has also been taken of the criteria outlined in Circular 3/2011: The Town and Country Planning (Environmental Impact Assessment) (Scotland) Regulations 2011. Schedule 2 of the 2011 Regulations states that the likelihood of significant effects will generally depend upon the scale of the development, and its visual impact, as well as potential noise impacts. EIA may be required for developments of two or more turbines, or where the hub height of a turbine exceeds 15 metres.

In this case the proposal is for one wind turbine, with an overall height of around 80 metres to blade tip to produce approximately 900kW of new generating capacity each. The proposed turbines would be sited within the existing Elliot Industrial Estate.

The Regulations and supplementary guidance indicate that EIA should only be required where it is judged that a development is likely to have significant environmental effects. In screening the proposal regard has been had to the location and characteristics of the development and the characteristics of potential impacts as required by Schedule 3 of the Regulations. The screening opinion follows the flow chart for establishing whether a proposed development requires EIA found within Planning Circular 3/2011.

In this case, Angus Council has determined that the proposal does not require an EIA for the following reasons:-

1. The proposed development does not fall within Schedule 1 of the above Regulations;
2. The proposal falls within Schedule 2 under (3) Energy Industry, (i) installations for the harnessing of wind power for energy production (wind farms);
3. The proposal does not fall within a sensitive area, e.g. SAC, SPA, SSSI, National Park, World Heritage Site or Scheduled Monument etc;
4. The proposal exceeds the threshold of 3(i) of Schedule 2 because the hub height of the turbine exceeds 15 metres (ii);
5. The proposed turbine is not likely to have "significant environmental effects" having regard to its nature, scale and location. In coming to this view, it is noted that the development does not appear to involve unusually complex or potentially hazardous operations.

Accordingly, in terms of Regulation 6(4) of the 2011 Regulations my Council is of the opinion that the proposal does not constitute Environmental Impact Assessment development and will not require the submission of a full Environmental Statement as required by regulation 2(1) and Schedule 4 of the Regulations.

Prior to the submission of a formal planning application I would request that agreement is reached with this Authority in respect of the scope of the supporting information required to support the proposed development. Should an application be submitted without appropriate supporting information then there is every likelihood that the application will attract a recommendation for refusal and be determined within statutory timescales.

This Authority has given consideration to the type of issues that would be relevant to the proposal and the following observations on the attached documentation should be considered prior to the submission of a formal planning application.

I trust the above/attached proves helpful and clarifies the situation for you.

Yours sincerely



MURRAY AGNEW
PLANNING OFFICER (DEVELOPMENT STANDARDS)

Enc

ANGUS COUNCIL

WIND TURBINE DEVELOPMENT – ERECTION OF ONE 900KW WIND TURBINES AT LAND AT BAIRDS MALT, ELLIOT INDUSTRIAL ESTATE, ARBROATH

In terms of the type of development proposed and the level of pre-application consultation to be carried out, the Town and Country Planning (Hierarchy of Developments) (Scotland) Regulations 2009, at Regulation 2(1) indicates Electricity Generation where the capacity of the generating station is or exceeds 20 megawatts will be classed as a Major Development. This proposal comprises a wind turbine, with an overall height of around 80 metres to produce approximately 900kW of new generating capacity. Comparing your proposal against the 2009 Hierarchy of Developments Regulations the proposal would not be classed as a Major Development and would therefore be classed as a Local Development and there would be no requirement to carry out statutory pre-application consultation.

At this stage I would confirm that the supporting information to be submitted with an application should consider the Development Plan. This comprises the approved TAYplan Strategic Development Plan 2012 and the Angus Local Plan Review 2009. An application would be determined against the following policies:

TAYplan Strategic Development Plan

Policy 3: Managing TAYplans Assets
Policy 6: Energy and Waste/Resource Management Infrastructure

Angus Local Plan Review

Policy S1: Development Boundaries
Policy S6: Development Principles
Policy ER5: Conservation of Landscape Character
Policy ER16: Development Affecting the Setting of a Listed Building
Policy ER18: Archaeological Sites of Local Importance
Policy ER19: Gardens and Designed Landscapes
Policy ER34: Renewable Energy Development
Policy ER35: Wind Energy Development

I am afraid that it is not possible to identify all relevant policies and there are likely to be general policies that may be of relevance in considering your proposal.

I would also advise you that due cognisance should be provided to the Tayside Landscape Character Assessment (available at <http://www.snh.org.uk/publications/on-line/LCA/tayside.asp>) and the Angus Windfarms Landscape Capacity and Cumulative Impacts Study (available at <http://www.angus.gov.uk/DevControl/LandscapeCapacityandCumulativeImpactAssessmentFinal.pdf>.) This comprises a strategic level study which investigates the capacity of landscapes in Angus to accommodate wind energy developments and as such provides a context for the consideration of the effects of existing and potential future wind energy developments.

The topics detailed below are considered to have a major bearing on the determination of your proposal therefore the supporting information to accompany a proposed application should address each of these topics.

Site Selection

The submitted information does not identify any alternative sites that have been discounted or whether other options such as offsetting have been considered therefore it is difficult to provide any observations on the location of the turbine. The supporting information should include an assessment of alternative sites and a justification for why the application site was selected over other options. It should also demonstrate how the siting and appearance of the apparatus has been chosen to minimise impacts on amenity.

Wind turbines are considered to fall within Category 5 (Plant and Machinery) for fee calculation and should be charged according to the area of the site at a rate of £319 per 0.1 hectare or part thereof. The red line application site should therefore incorporate all the land over which the blades of each turbine can rotate the area of the footprint of any ancillary structures; engineering works (include any new or upgraded access track, substation and hardstanding areas etc) and the cable trenches.

Description of Project

- Description and detailed specification of turbines proposed;
- Construction program;
- Pollution control measures;
- Access track specifications;
- Identification of the source of materials for the construction of access tracks, including definition of extraction/operational areas, extent and re-instatement of borrow pits and timing of works;
- Methods for disposal and/or storage of excavated material;
- Location, design and colour of any substations, transformers and permanent offices;
- Location of cables (underground and overground). An indication of the depths and/or heights at which cables will be located and associated installation works should be included;
- Details of all likely grid connection routes;
- Extent and location of construction site huts, vehicle equipment and materials compound;
- Operational lifespan of the wind turbine and associated infrastructure, including access tracks and operational details (e.g. site visits and maintenance);
- Future expansion requirements;
- Timing, duration and phasing details of construction work;
- Timing and phasing details of decommissioning works for both the wind turbine and its associated infrastructure; and
- Full site restoration and re-instatement details at both post-wind turbine construction and decommissioning stages.

Landscape and Visual Assessment

This should be undertaken in accordance with the "Guidelines for Landscape and Visual Impact Assessment (LI-IEMA, 2002). It should address the impact of the proposal on the local and wider landscape and on locally designated sites. It should also address the impact of the proposal on local properties particularly in relation to visual dominance. The Assessment should consider the guidance on the location of wind energy development provided in the Tayside Landscape Character Assessment (LUC, 1999) and should have regard to relevant SNH publications including:

- Visual Analysis of Windfarms, Good Practice Guidance – SNH, 2007;
- Cumulative Effects of Windfarms, SNH Guidance Note
- Natural Heritage Assessment of Small Scale Wind Energy Projects which do not Require Formal Environmental Impact Assessment – SNH, 2008.

As your proposal does not require a formal EIA; in accordance with SNH's publication 'Natural Heritage Assessment of Small Scale Wind Energy Projects which do not Require Formal Environmental Impact Assessment' the LVIA would be likely to, as a minimum, require:

- a) A Zone of Theoretical Visibility to both hub and blade tip height, on a 1:50k Ordnance Survey base;
- b) Wireline drawings and/ or photomontages from a limited number of key viewpoints (Each viewpoint should be a single frame image produced at a focal length equivalent to a 70mm lens on a SLR 35mm film camera. The image should be shown at size A3)

(N. B. Images from Google Street View will not be accepted by this Authority).

An assessment should be made of the sensitivity of the landscape to change in terms of landscape character and its components. This should include consideration of the impact on the character and perception of adjacent character types and how the wind turbine is seen in relation to other character types. Reference should be made to the Tayside Landscape Character Assessment.

With regards to (b) above the selection of viewpoints should reflect the range of landscape and visual receptors affected by the proposals and should include views from relatively close and further away from all directions the proposal is visible. Final selection of viewpoints should be agreed in consultation with Angus Council's Planning and Transport Division and SNH.

Cumulative Impact Assessment

This should consider the potential cumulative impact of the development in respect of all relevant subject areas identified in this scoping opinion for any site within an initial search distance of 60km that are either subject to a planning or Section 36 application/ permission or at screening/ scoping opinion stage. A list of current wind farm developments/proposals in Angus is available from Angus Council Planning & Transport Division.

Cumulative effects should be separated into:

- Effects in combination - where two or more features are seen together at the same time from the same place, in the same arc of view, where their visual effects are combined.
- Effects in succession - where two or more features are present in views from the same viewpoint but cannot be seen at the same time together, because the observer has to turn to see the other features in succession. In effect, this means that windfarms 50km apart will be assessed, if their ZTVs overlap at one key viewpoint.
- Effects in sequence - where two or more features are not present in views from the same viewpoint and the observer therefore has to move to another viewpoint to see the second or more of them, so they will then appear in sequence

The applicant should check with relevant Authorities to ascertain if there are other proposals within 30km of the proposed application site that should be considered as part of any cumulative assessment. Any cumulative impact assessment should take cognisance of the published SNH guidance on cumulative effect of windfarms.

The Statement should provide baseline information for each of the areas identified above and will be expected to assess and quantify direct and indirect, positive and negative impacts and where appropriate detail any proposed mitigation.

For any impact predictions made in the assessment it would be helpful if you could indicate whether effects are:-

Temporary/permanent;
Adverse/beneficial;
Direct/indirect;
Duration/over project life span etc.;
(Ir)reversible;
Probable/improbable.

It would also be used to indicate:-

Confidence in prediction/basis for prediction (case studies) etc.;
Quantify impacts;
Description of remedies to avoid or reduce negative impacts;
Estimate of type and quantity of expected residues and emissions.

Noise Assessment

With regards to noise Angus Council's Economic Development and Environmental & Consumer Protection (EDECP) have considered the scale of turbine proposed and the likely noise issues. In light of this a full noise assessment using the methodology in the publication 'The Assessment and Rating of Noise from Wind Farms, ETSU-R-97' should be carried out. In respect of whether background noise readings should be carried out at the neighbouring properties if these properties are in the ownership of the applicant EDECP would advise that ETSU-R-97 allows a higher noise limit of 45dbA to apply to properties occupied by people who have a financial interest in the project. This raises two issues which should be considered by the applicant firstly do the occupiers of these properties have a

financial interest; if not then background readings are required. If they do then the second consideration is how the financial benefit is ensured for the life of the project. At one other similar development this was dealt with by way of a formal option agreement registered with the register of sasines. In progressing your proposal I would recommend that you consult with Angus Council's Economic Development and Environmental & Consumer Protection (EDECP) with regards to noise issues. The relevant officer to contact is Steve Thomson, Senior Environmental Health Officer on 01307 473906 or ThomsonSD@angus.gov.uk.

With regards to shadow flicker it is thought to be able to affect properties 130 degrees either side of north so due cognisance would have to be taken of this. Once an application site has been identified further contact should be made with EDECP as a detailed shadow flicker mitigation strategy may be required as part of a formal application.

Ecological Assessment

As indicated in SNH's publication 'Natural Heritage Assessment of Small Scale Wind Energy Projects which do not Require Formal Environmental Impact Assessment' the ecology assessment should consist of a site visit by a trained ecologist, a brief description of the site, its context and the habitat, flora and fauna present and identification of the presence of any protected species and identification of any required mitigation. SHN can provide advice on the timing of such surveys and the appropriate format for dissemination of the information.

Pollution Prevention Measures

All potential sources of pollution should be identified. The supporting information should assess the potential impact these sources will have on the environment and detail any mitigation measures. The key areas of potential pollution are likely to be siltation of surface water from road and hardstanding construction and subsequent erosion, borrow pits, waste material generated by the proposal, chemical/fuel storage and management, and foul effluent disposal. Construction and decommissioning statements and contingency plans should be produced for all aspects of the development likely to effect the environment.

Transportation and Access

This should assess the impact of the proposal on the road network, including trunk roads, during both construction and operation. It should identify the preferred route options for delivering the turbines and for other construction traffic. Secondary environmental impacts as a consequence of any improvements to access roads/tracks should be fully examined and quantified.

Cultural Heritage

This should identify designated sites within the vicinity of the proposal and address the impact of the development on any sites. It should assess the level and significance of any impact and detail any mitigation, as detailed in the Scoping Study.

Electromagnetic Interference / air traffic safety

This should address the potential impact of the proposed development on television and radio reception, microwave communications and air traffic/radio installations. The potential impact should be assessed and quantified and details of any mitigation provided.

The MOD have made safeguarding objections to a number of wind turbine proposals of varying scales within the southern area of Angus, close to the proposed site on the basis of unacceptable interference to Air Traffic Control Radar at RAF Leuchars. **I would accordingly encourage you to consult fully with the MOD prior to submitting an application to ensure that the proposed site will not raise similar safeguarding issues.** In respect of other communication links this Authority would only consult with organisations on receipt of an application. Should you seek to investigate possible links within proximity of the turbine site I would advise you to contact: Keith Brogden, Wind Farm Team, The Joint Radio Company Limited, Dean Bradley House, 52 Horseferry Road, London, SW1P 2AF, Telephone: +44 20 7706 5197.

Your Ref
Our Ref 14/01067/FULL

9 January 2015



Green Cat Renewables
Edinburgh Office
Midlothian Innovation Centre
Room 106
Roslin
EH25 9RE

COMMUNITIES
Strategic Director:
Alan McKeown

Dear Sir/Madam

Town and Country Planning (Scotland) Act 1997 (As Amended)
Planning Application Reference : 14/01067/FULL

I acknowledge receipt of your application for planning permission received on **24 December 2014** and registered on **9 January 2015** for **Erection Of Wind Turbine Of 55M To Hub Height And 77M To Blade Tip And Ancillary Development** at **Maltings Peasiehill Road Elliot Industrial Estate Arbroath DD11 2NJ**. I acknowledge receipt of your planning fee of **£6817**.

In addition your application requires to be advertised. The Town and Country Planning (Charges for Publication of Notices) Regulations 2009 indicate that the Council is required to charge the cost of that advertisement to the applicant. The Council has determined that the cost of the advertisement is £100.

You should note that the Council is not permitted to determine the application until such time as payment is made. You can pay now but no later than 21 days after the application has been registered. The application will be dispatched for advertising on the day of registration.

If you require any assistance or information on the progress of your application, please contact **David Gray** on telephone number **01307 473374** approximately four weeks after the date of this letter. Your application will be assessed in relation to National and Council policies subject to any necessary consultations being carried out. Applications cannot be determined by the Authority until this process has been completed. Your application cannot be determined in less than 21 days of its registration in order to allow neighbours and other interested parties a period of time to comment. This time period may be extended in some cases e.g. if there is a requirement to advertise the application.

You may expect a determination on your application within two months of registration. The target date for this application is **8 March 2015**. It is intended that your application will be determined by delegated decision however in certain circumstances your application may require to be considered by the Development Standards Committee. If it does you will be advised of the date of the meeting at which it will be considered approximately one week in advance.

If you have not received formal notification of the decision on your application by **8 March 2015** and your application is to be determined by delegated decision, you may ask for the application to be reviewed by the Council's Local Review Body. The local review should be made in accordance with Section 43A of the above Act by notice sent within three months of the target date specified above. The target date cannot be extended. Further information on the relevant means of an appeal in respect of applications will be provided when the application is decided and can also be made available on request.

You can apply for a review on the basis of non-determination by downloading the forms from www.angus.gov.uk. Alternatively please telephone Committee Services on 01307 476265.

Before applying for a review on the basis of non-determination you are advised to contact the case officer to ensure that your application is of a category that can be considered by the Council's Local Review Body.

If contacting please ask for David Gray on 01307 473374 or e-mail GrayRD@Angus.gov.uk

Yours faithfully,



Iain Mitchell
Service Manager
Planning

17 April 2015

14/01067/full: Maltings, Peasiehill Road, Elliot Industrial Estate, Arbroath

Comments of Countryside Officer on Landscape & Visual Effects

Landscape Effects

The site is located in the Elliot Industrial Estate towards the western edge of Arbroath close to the division between Dipslope Farmland and Coast with Sand LCTs of the TLCA. The proposed turbine would be 55m to hub and 77m to blade tip.

The Dipslope Farmland LCT closest to Arbroath has lower capacity for turbines than other parts of the LCT. The area comprises modest scale landforms and features such as Kelly Den; together with the Arbirlot Conservation Area. The setting of Arbroath and coastal sensitivities further reduces capacity for wind turbines locally. Accordingly, it is considered that there is no capacity in this area for turbines greater than 50m. Closest to the coast, capacity is typically lowest.

Contrary to the opinions within the Environmental Report, it is considered that the proposed turbine would have a significant impact upon the Coast with Sand LCT. This LCT has low capacity for turbine development, with only low capacity for turbines up to 30m in height. The Environmental Report considers that the proposed turbine would be a prominent element from the Coast with Sand LCT. The proposed 77m turbine by virtue of its proximity to the coast would inevitably affect the character of the Coast with Sand LCT. Despite being outwith the Coast with Sand LCT, the turbine would be located within the open relatively flat coastal plain between Carnoustie and Arbroath. A turbine of the size proposed would become a landmark for this part of the Angus coast. It is therefore considered that the proposed turbine would have a significant effect upon the Coast with Sand LCT.

Arbroath Abbey is an important part of the Arbroath skyline. It is not much taller than other buildings in Arbroath and is therefore vulnerable to being out-competed by taller structures. Similar issues apply to the Keptie Pond Water Tower. The size and prominent location of the proposed turbine on the edge of Arbroath would adversely affect the setting of Arbroath and historic landmarks within it. The size and location of turbine relative to Arbirlot Conservation Area may adversely affect the setting of the village. There is however no visualisation which satisfactorily explores this (VP10 is closest and ZTVs show theoretical hub visibility).

The size of the turbine would be out of scale relative to smaller scale landscape features such as houses; trees and Kelly Den (see VP1, 2, 5, 8, 9, 10).

Accordingly, significant and adverse landscape effects are considered likely.

Visual Effects

The location of the proposed turbine on the coastal plain notably influences the pattern and extent of visibility. Theoretical visibility extends is more extensive along the coastal plain south, south-west and north of the turbine. Hub visibility extends are far south as Fife Ness; as far south-west as Carnoustie and as far north as the higher ground west of Lunan Bay. To the west, visibility is generally restricted by higher ground around Carmyllie. As expected, blade tip visibility would be more extensive. Much of the views of the proposed turbine would be along the open and relatively flat coastal plain; across the Firth of Tay or from higher ground. These factors together, lead to not only higher levels of visibility, but higher levels of prominence in views. This in part, contributes towards an overall lower underlying landscape capacity for wind turbine development on the coastal area.

The size of the turbine together with the prominent location would inevitably lead to significant visual effects.

Houses

The closest affected houses are the 2 cottages at Peasiehill Farm Cottages to the north-west (326m/ 4 times turbine height). Given the size and proximity of the proposed turbine, I would agree with the ER that the houses would experience effects of major significance. At this proximity, the turbine is likely to be over-bearing and oppressive.

There are further houses to the north-west at Peasiehill and Crudie (650m to 810m/ 8 to 11 times turbine height). The ER assesses the magnitude of effects as being medium. This is considered an under-assessment given the size of the turbine and its proximity. The turbine is likely to be a dominant feature in views from these houses and therefore would also create effects of major significance.

To the south the closest houses are 10 houses at Elliot Cottages (578m/ 7.5 times turbine height). (Appendix 2.3 VP1). The ER assesses the magnitude as high and significance major. I would concur. Impacts would further be increased by the elevated position of the turbine relative to the houses. The turbine would dominate the setting of the houses.

To the north of the site, beyond the industrial estate, the closest houses within Arbroath are at Patrick Allan Fraser Street. This area is not included in the Residential Assessment, but Appendix 2.3 includes visualisations and a summary assessment. The closest houses are around 370m/ almost 5 times turbine height. Whilst there are intervening trees and buildings, Appendix 2.3 VP05 helpfully shows the proposed turbine typically protruding above these by around the rotor diameter (24m). Whilst, the Appendix assesses magnitude as high, it considers sensitivity as being low. Houses are typically high sensitivity, which would revise this assessment to major. Given the size and proximity of the turbine it is likely that the turbine would dominate houses and have an over-bearing effect.

Cumulative Landscape Effects

Figure 7.14 of the ER lists nearby wind turbines either operational, consented or in planning. The closest turbine would be the consented 77m turbine at Cuthlie (4km). Overall there are a number of operational or approved turbines to the west and north-west of the proposed turbine. Together, they will create a wind turbine typology of "landscape with wind turbines". The current proposed turbine, in part due to its size, would extend this typology up to the edge of Arbroath. This would be beyond the underlying landscape capacity for this part of Angus. The proposal would therefore have significant adverse cumulative landscape effects.

Furthermore, extending the "landscape with wind turbines" typology to the coast would likely lead to cumulative seascape effects with approved offshore windfarms.

Cumulative Visual Effects

The paired ZTVs within the ER demonstrate that the proposed turbine would be likely to be commonly viewed "in combination", "in succession," and "in sequence" with other wind turbines. Again, the frequency of which such interactions occur would extend towards Arbroath and the coast, leading to significant cumulative visual effects.

Conclusion

Unfortunately, the proposed size of turbine close to the coast; Arbroath and a number of houses would lead to significant adverse landscape, visual and cumulative effects.

TaylorE

From: RobertsS
Sent: 29 June 2015 17:08
To: TaylorE
Subject: RE: Bairds Malt - Landscape Response

Ed

I would comment as follows (by the numbering on the Greencat submission):

01: Disagree. No change to opinion.

02: It is noted that the Environmental Report states that the turbine would be located within Dipslope Farmland LCT. I however did not say that the turbine would be on Dipslope Farmland. However the technical distinction referred to in the Greencat submission is accepted. Notwithstanding this, my comments on the impact upon the LCT remain unchanged.

02 (second): The built-up nature of the location is accepted, however this does not substantially mitigate effects which would result from a turbine of this size.

03: The OED definition confirms my opinion.

04: No change to opinion.

05: No change to opinion.

06: No change to opinion. My reference to coastal plain relates to the relatively flat open area parallel with the coast. It is distinct from the coastal LCTs.

07: No change to opinion.

08 -10: No change to opinion

11: Error in ER noted. No change to opinion

12: If you only consider operating turbines the assessment will be different! No change to opinion.

13: No change to opinion

14: No change to opinion

Regards

Stewart

SJ Roberts, Countryside Officer

Planning Service, Communities, Angus Council, County Buildings, Market Street, Forfar, DD8 3LG

From: Glen Moon [<mailto:glen@greencatrenewables.co.uk>]

Sent: 15 June 2015 14:41

To: TaylorE

Subject: Bairds Malt - Landscape Response

Dear Ed,

Please find attached a response to the Landscape Officer's comments.

I will send across further information on noise and shadow flicker to Steve Thomson directly today. The idea is to give him a draft to look at to check that he is happy with it before we formally submit – hopefully this will speed up the process.

I hope this is OK.

Thanks,

Glen

Glen Moon

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TOWN AND COUNTRY PLANNING (SCOTLAND) ACT 1997
(AS AMENDED)
TOWN AND COUNTRY PLANNING (DEVELOPMENT MANAGEMENT PROCEDURE)
(SCOTLAND)
REGULATIONS 2013

PLANNING PERMISSION REFUSAL
REFERENCE 14/01067/FULL

To **Bairds Malt Single Turbine Ltd**
c/o Green Cat Renewables
Edinburgh Office
Midlothian Innovation Centre
Room 106
Roslin
EH25 9RE

With reference to your application dated 9 January 2015 for planning permission under the above mentioned Acts and Regulations for the following development, viz.:-

Erection Of Wind Turbine Of 55M To Hub Height And 77M To Blade Tip And Ancillary Development at Bairds Malt Peasiehill Road Elliot Industrial Estate Arbroath DD11 2NJ for Bairds Malt Single Turbine Ltd

The Angus Council in exercise of their powers under the above mentioned Acts and Regulations hereby **Refuse Planning Permission (Delegated Decision)** for the said development in accordance with the particulars given in the application and plans docquetted as relative hereto in paper or identified as refused on the Public Access portal.

The reasons for the Council's decision are:-

- 1 That the application is contrary to policies S1 criterion (a), S6 criteria (b), and ER34 criterion (a) of the Angus Local Plan Review (2009) as the proposed development would give rise to unacceptable impacts on the occupants of residential property by virtue of the height of the wind turbine and its proximity to residential properties.
- 2 That the application is contrary to Policy 6 of TAYplan and policies ER5 and ER34 criterion (b) of the Angus Local Plan Review (2009) as the proposed development would result in unacceptable adverse landscape impacts having regard to landscape character and setting within the immediate and wider landscape.

Amendments:

The application has not been subject of variation.

Dated this **1 March 2016**


Iain Mitchell - Service Manager
Angus Council
Communities
Planning
County Buildings
Market Street
FORFAR
DD8 3LG

Planning Decisions – Guidance Note

Please retain – this guidance forms part of your Decision Notice

You have now received your Decision Notice. This guidance note sets out important information regarding appealing or reviewing your decision. There are also new requirements in terms of notifications to the Planning Authority and display notices on-site for certain types of application. You will also find details on how to vary or renew your permission.

Please read the notes carefully to ensure effective compliance with the new regulations.

DURATION

This permission will lapse 3 years from the date of this decision, unless there is a specific condition relating to the duration of the permission or development has commenced by that date.

PLANNING DECISIONS

Decision Types and Appeal/Review Routes

The 'decision type' as specified in your decision letter determines the appeal or review route. The route to do this is dependent on the how the application was determined. Please check your decision letter and choose the appropriate appeal/review route in accordance with the table below. Details of how to do this are included in the guidance.

Determination Type	What does this mean?	Appeal/Review Route
Development Standards Committee/Full Council	National developments, major developments and local developments determined at a meeting of the Development Standards Committee or Full Council whereby relevant parties and the applicant were given the opportunity to present their cases before a decision was reached.	DPEA (appeal to Scottish Ministers) – See details on attached Form 1
Delegated Decision	Local developments determined by the Service Manager through delegated powers under the statutory scheme of delegation. These applications may have been subject to less than five representations, minor breaches of policy or may be refusals.	Local Review Body – See details on attached Form 2
Other Decision	All decisions other than planning permission or approval of matters specified in condition. These include decisions relating to Listed Building Consent, Advertisement Consent, Conservation Area Consent and Hazardous Substances Consent.	DPEA (appeal to Scottish Ministers) – See details on attached Form 1

NOTICES

Notification of initiation of development (NID)

Once planning permission has been granted and the applicant has decided the date they will commence that development they must inform the Planning Authority of that date. The notice must be submitted before development commences – failure to do so would be a breach of planning control. The relevant form is included with this guidance note.

Notification of completion of development (NCD)

Once a development for which planning permission has been given has been completed the applicant must, as soon as practicable, submit a notice of completion to the planning authority. Where development is carried out in phases there is a requirement for a notice to be submitted at the conclusion of each phase. The relevant form is included with this guidance note.

Display of Notice while development is carried out

For national, major or 'bad neighbour' developments (such as public houses, hot food shops or scrap yards), the developer must, for the duration of the development, display a sign or signs containing prescribed information.

The notice must be in the prescribed form and:-

- displayed in a prominent place at or in the vicinity of the site of the development;
- readily visible to the public; and
- printed on durable material.

A display notice is included with this guidance note.

Should you have any queries in relation to any of the above, please contact:

Angus Council
Communities
Planning
County Buildings
Market Street
Forfar
Angus
DD8 3LG

Telephone 01307 473212 / 473207 / 473335

E-mail: planning@angus.gov.uk

Website: www.angus.gov.uk



TOWN AND COUNTRY PLANNING (SCOTLAND) ACT 1997 (AS AMENDED)

The Town & Country Planning (Development Management Procedure) (Scotland) Regulations 2013 – Schedule to Form 1

*Notification to be sent to applicant on refusal of planning permission
or on the grant of permission subject to conditions decided by Angus Council*

1. If the applicant is aggrieved by the decision of the planning authority-

- a) to refuse permission for the proposed development;
- b) to refuse approval, consent or agreement required by condition imposed on a grant of planning permission;
- c) to grant planning permission or any approval, consent or agreement subject to conditions,

the applicant may appeal to the Scottish Ministers to review the case under section 47 of the Town and Country Planning (Scotland) Act 1997 within three months beginning with the date of this notice. The notice of appeal should be addressed to Directorate for Planning & Environmental Appeals, 4 The Courtyard, Callendar Business Park, Falkirk, FK1 1XR. Alternatively you can submit your appeal directly to DPEA using the national e-planning web site <https://eplanning.scotland.gov.uk>.

2. If permission to develop land is refused or granted subject to conditions and the owner of the land claims that the land has become incapable of reasonably beneficial use in its existing state and cannot be rendered capable of reasonably beneficial use by the carrying out of any development which has been or would be permitted, the owner of the land may serve on the planning authority a purchase notice requiring the purchase of the owner of the land's interest in the land in accordance with Part 5 of the Town and Country Planning (Scotland) Act 1997.



TOWN AND COUNTRY PLANNING (SCOTLAND) ACT 1997 (AS AMENDED)

The Town & Country Planning (Development Management Procedure) (Scotland) Regulations 2013 – Schedule to Form 2

*Notification to be sent to applicant on refusal of planning permission
or on the grant of permission subject to conditions decided through
Angus Council's Scheme of Delegation*

1. If the applicant is aggrieved by the decision of the planning authority-
 - a) to refuse permission for the proposed development;
 - b) to refuse approval, consent or agreement required by condition imposed on a grant of planning permission;
 - c) to grant planning permission or any approval, consent or agreement subject to conditions,

the applicant may require the planning authority to review the case under section 43A of the Town and Country Planning (Scotland) Act 1997 within three months beginning with the date of this notice. The notice of review should be addressed to Committee Officer, Angus Council, Resources, Legal & Democratic Services, Angus House, Orchardbank Business Park, Forfar, DD8 1AN.

A Notice of Review Form and guidance can be found on the national e-planning website <https://eplanning.scotland.gov.uk>. Alternatively you can return your Notice of Review directly to the local planning authority online on the same web site.

2. If permission to develop land is refused or granted subject to conditions and the owner of the land claims that the land has become incapable of reasonably beneficial use in its existing state and cannot be rendered capable of reasonably beneficial use by the carrying out of any development which has been or would be permitted, the owner of the land may serve on the planning authority a purchase notice requiring the purchase of the owner of the land's interest in the land in accordance with Part 5 of the Town and Country Planning (Scotland) Act 1997.

COMMUNITIES **Your experience with Planning**

Please indicate whether you agree or disagree with the following statements about your most recent experience of the Council's handling of the planning application in which you had an interest.

Q.1 I was given the advice and help I needed to submit my application/representation:-

Strongly Agree	Agree	Neither Agree nor Disagree	Disagree	Strongly Disagree	It does not apply
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Q.2 The Council kept me informed about the progress of the application that I had an interest in:-

Strongly Agree	Agree	Neither Agree nor Disagree	Disagree	Strongly Disagree	It does not apply
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Q.3 The Council dealt promptly with my queries:-

Strongly Agree	Agree	Neither Agree nor Disagree	Disagree	Strongly Disagree	It does not apply
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Q.4 The Council dealt helpfully with my queries:-

Strongly Agree	Agree	Neither Agree nor Disagree	Disagree	Strongly Disagree	It does not apply
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Q.5 I understand the reasons for the decision made on the application that I had an interest in:-

Strongly Agree	Agree	Neither Agree nor Disagree	Disagree	Strongly Disagree	It does not apply
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Q.6 I feel that I was treated fairly and that my view point was listened to:-

Strongly Agree	Agree	Neither Agree nor Disagree	Disagree	Strongly Disagree	It does not apply
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

OVERALL SATISFACTION: Overall satisfaction with the service:

Q.7 Setting aside whether your application was successful or not, and taking everything into account, how satisfied or dissatisfied are you with the service provided by the council in processing your application?

Very satisfied	Fairly satisfied	Neither Satisfied nor Dissatisfied	Fairly Dissatisfied	Very Dissatisfied
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

OUTCOME: Outcome of the application:

Q.8 Was the application that you had an interest in:-

Granted Permission/Consent	<input type="checkbox"/>	Refused Permission/Consent	<input type="checkbox"/>	Withdrawn	<input type="checkbox"/>
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Q.9 Were you the:- Applicant Agent Third Party objector who made a representation

Please complete the form and return in the pre-paid envelope provided.
Thank you for taking the time to complete this form.

Angus Council

Application Number:	14/01067/FULL
Description of Development:	Erection Of Wind Turbine Of 55M To Hub Height And 77M To Blade Tip And Ancillary Development
Site Address:	Bairds Malt Peasiehill Road Elliot Industrial Estate Arbroath DD11 2NJ
Grid Ref:	361829 : 740071
Applicant Name:	Bairds Malt Single Turbine Ltd

Report of Handling

Site Description

The application site is located at the south west of Arbroath in and adjacent to the existing Elliot Industrial Estate. The site lies partly within the existing Baird's Malt site and extends beyond in to the adjacent agricultural land to the west (which has planning permission for an extension to Elliot Industrial Estate – ref: 14/00577/FULM). The site would extend over the Core Path 152 which lies west of the existing industrial premises. The land on which the turbine is proposed is currently hardstanding to the south of an industrial building and west of an area of grain drying apparatus. A line of trees runs to the immediate south of the site which forms the boundary enclosure between Baird's Malt and the industrial premises to the south. The nearest residential property to the proposed turbine would be at Peasiehill Farm Cottages, approximately 300m to the northwest.

Proposal

The application is for the erection of a single wind turbine of 77m with associated infrastructure including access, substation and crane hardstanding. The drawings submitted identify a monopole style of turbine tower extending to a hub at 55m above ground and a maximum blade tip height of 77m. The rotor diameter is identified as being 44m. The proposal also includes diversion of the core path so that it curves around the edge of the site.

The application has not been subject of variation.

Publicity

The application was subject to normal neighbour notification procedures.

The application was advertised in the Dundee Courier on 16 January 2015 for the following reasons:

- Schedule 3 Development

The nature of the proposal did not require a site notice to be posted.

Planning History

The wider Bairds Malt site has benefitted from a number of planning permissions in recent years. These permissions include 07/01141/FUL for the erection of maltings production buildings and barley drying facilities; 08/00469/FUL for the erection of maltings production buildings and barley drying facilities (Re-Application); and 11/00987/FULL for the erection of supplemental malt unloading silos and malt storage silos and associated mechanical handling plant.

12/00922/EIASCRC for Screening Opinion for Wind Turbine was determined as "EIA NOT Required" on 19 November 2012.

Part of the application site benefits from planning permission for the formation of a new business park (ref: 11/00428/FULM as amended by 14/00577/FULM) which allows uses falling under Use Classes 4 (business), 5 (general industry) and 6 (storage and distribution) as identified in the Town and Country Planning (Use Classes) (Scotland) Order 1997.

Applicant's Case

The applicant has submitted the following information in support of the proposal:-

An **Environmental Report** (ER) which describes the development proposed and includes an environmental and policy context; a description of local economic benefits associated with the proposed development (including a socio economic assessment); an assessment of ecology and ornithology; landscape and visual impacts; noise; cultural heritage and archaeology; surface and groundwater hydrology; infrastructure, telecoms and aviation; shadow flicker; carbon balance; and safety. The ER is supported by visual representations of the proposed turbine. The ER reaches the following conclusions:-

- The turbine would be viewed within the current industrial setting of the area, appearing alongside tall vertical elements such as the grain drying towers and large structures of the Maltings Plant. The main impacts upon local amenity will be visual impacts upon the nearest residential receptors, which currently have views of the Maltings site.
- The proposed development at Bairds Malt is deemed to comply with national, regional and local policies relating to wind energy.
- The smallest turbine possible on the site is dictated by the vertical constraints of the site. Sufficient clearance needs to be allowed between the lowest height of the blade sweep and the buildings throughout the site, the tallest of which are the grain drying towers which are 27m in height.
- The ecological and ornithological assessments have shown that the proposal would not adversely impact on protected species or sites.
- The proposed Bairds Malt Wind Turbine is located within urban fringe of Arbroath, within the Elliot Industrial Estate adjacent to the Dipslope Farmland Landscape Character Area, and would affect a proportion of part of this area. As an urban area on the edge of this character area, which is heavily man-modified and busy with activity, there would be very little direct effects on the character, although there would be indirect effects relating to its visibility across the landscape character area to the south-west and west.
- The proposed turbine is located within an industrial zone on the south-western edge of Arbroath. The turbine appears predominately in views alongside the Maltings Plant infrastructure and would be seen alongside these industrial features already present within the view. The turbine may appear slightly more prominent in vertical scale, however, it will fit well with the industrial cladding of the buildings in the surrounding landscape.
- Considering the wider area, the assessment has concluded that there would be no significant indirect effects from any of the other landscape character types or within the study area.
- The viewpoint analysis is contained in Appendix 2.1 and indicates that there would be no Major or Major / Moderate visual effects occurring beyond ~3km from the proposed turbine. The conclusions from the viewpoint assessment have been used to form a view as to the level of overall visual effects within the study area.
- Views of the proposed turbine would be limited from within the neighbouring settlement of Arbroath. The turbine appears as part of the skyline from some of the more elevated open locations within the settlement, appearing in views alongside the Maltings Plant. The two developments appear similar in type with the turbine a fairly industrial feature, similar in colour to the concrete and metal cladding that makes up the Maltings Plant buildings. The majority of the settlement will gain little or no views of the proposed development with the majority of the residential areas located to the north and west of the settlement. The vegetation and built features which surround these areas screening potential views.

The neighbouring Hospitalfield housing estate will experience some views from the areas around the properties, with the turbine appearing alongside the Maltings Plant which is already an easily discernible feature in the views from these more open areas around the housing scheme.

- The Bairds Malt Wind Turbine would rarely be seen in conjunction with other wind developments. The nearest operating turbine is located over 6km inland from the coastal settlement of Arbroath, with the nearest consented development over 10km from the settlement. It is considered that the overall level of cumulative effect due to Bairds Malt Wind Turbine would be negligible.
- It is concluded that the addition of a single turbine to the industrial zone on the south-western edge of Arbroath would have some potentially significant effects, relating to some of the nearest residential receptors, views from some areas of Arbroath and from five of the sixteen viewpoints. While views from some of the residential properties are deemed significant, the impact would not be unacceptable and although prominent in views the turbine would not be an overbearing feature which dominates the receptor nor would it be an overbearing structure that is consistently visible. The turbine appears in views which already contain strong industrial elements from the neighbouring maltings and does not open up any new areas of visibility that may be deemed as scenic or picturesque.
- Typically the turbine is visible along with the infrastructure associated with the Maltings which has been a feature of the skyline in Arbroath for over 40 years. The turbine relates well to the scale of the surrounding buildings and would add a vertical feature to the views which already contain several industrial elements, and take up only a small extent of the horizontal view. As well as the vertical scale, the turbine will fit well with the industrial nature of the buildings with a similar colour palette. These effects are fairly localised occurring within 2-3km of the turbine, with much of the settlement remaining free from views due to the built up nature of the settlement. The addition of a 77m wind turbine to these features will have a low level of impact from a landscape and visual perspective when considered within the wider townscape and landscape setting.
- It has been demonstrated that the project would comfortably meet ETSU-R-97 guidance derived noise constraints at the nearest properties in the absence of any mitigating factors. The information collated here strongly suggests that the proposed turbine would have a low level of noise impact in the context of the noise environment characterised at this location. It is expected that the proposed wind project would rarely be audible, and could therefore be accommodated in this area in noise terms without unacceptable impact on surrounding properties.
- No direct impact has been identified on any feature of cultural heritage interest. In the event that archaeological features are encountered, a suitable program of archaeological works will be implemented to the satisfaction of the planning authority. The proposed single turbine has been assessed as having an overall low impact upon Hospitalfield House. With regards to the other features of historical significance within 5km, the proposed development is expected to have a negligible or low level of effect upon their current settings. Therefore the proposed development is not predicted to cause significant adverse impact on the cultural heritage assets within the surrounding area.
- Surface and groundwater hydrology - The drainage of the small area of the development outside the current Bairds boundary will be tied back into the Bairds Malt drainage system.
- An independent aviation study commissioned by the client has established that there are not expected to be any conflicts with civil aviation.
- An independent aviation study has identified that the turbine is likely to be visible to the radar at RAF Leuchars, which may trigger an initial objection. It is proposed that an in-fill radar solution be developed by a specialist aviation consultancy and agreed with the MoD. This approach was successfully adopted for the Govals Wind Farm, with the MoD content to make the successful implementation of such a scheme a condition of planning.
- Impact on television is unlikely. There are a number of technical solutions available should interference be proven as an issue as a result of the turbine.
- A detailed assessment of potential shadow flicker impacts has been undertaken in the area around the proposed Bairds Malt turbine. This has considered the impact on residential, commercial and industrial premises. Taking into account realistic assumptions relating to actual sunlight hours and turbine orientation, shadow flicker impacts are not expected to exceed 6.5 hours per year at the nearest residential properties to the proposed Bairds Malt turbine. Given these results, shadow flicker is not expected to be a nuisance at any residential properties.
- Only turbines with a proven record of safety and reliability will be selected for this site. The risk of ice

throw (ice falling or being thrown from a turbine during particular circumstances) is also low. An ice detection system on the turbines will ensure they are deactivated if there is a risk of ice throw.

The Socio Economic Assessment details economic impacts arising from the project including (1) construction impacts of 15 gross / 2 net PYE jobs, £730,000 gross / £95,000 net GVA, £320,000 gross / £40,000 net salaries; (2) operational/maintenance impacts of 5 gross/1 net PYE jobs, £270,000 gross / £70,000 net GVA, £120,000 gross / £30,000 net salaries; and (3) long terms impacts of economic wealth (net GVA) of £63.5m and disposable income (net salaries) of £37.6m. It indicates catalytic activity – safeguarding activity at Arbroath facility including on site impacts of 60 gross / 75 net FTE jobs; £2.8m gross / £3.6m net GVA per annum; £1.6m gross / £2.2 net salaries per annum. It indicates social and catalytic benefits include social impacts of supporting viability of key local employer, generate supply chain opportunities for existing suppliers to Bairds Malt and during construction phase, and training opportunities through community benefits clauses; and catalytic impacts including supporting growth potential of business, reduced carbon footprint, and cleaner and greener energy production.

Protected Species Report: the report indicates that the proposed wind turbine would have a negligible impact on the integrity of designated sites including Montrose basin. It indicates that no bats were recorded and the survey area has no potential to support any protected species. It concludes that no further works would be required.

Supplementary Shadow Flicker Information (August 2015) which includes mitigation for any property that may be affected by flicker including the implementation of a turbine shut-down strategy; landscaping or the planting of vegetation to provide screening; or the installation of blinds at affected properties. The information also proposes a protocol for assessing any flicker complaints.

Noise Compliance Report (November 2015) which identifies an issue with the noise level coming from Kiln Flue 1 of the existing operation when measured from Patrick Allen Fraser Street. The report recommends measures to reduce noise from that flue to ensure that the existing operation meets established noise limits.

Noise - Supporting Information (January 2016) provides further noise information including information to assess the existing noise levels generated by activities at the site, additional information relating to noise impacts on property to the south, a fuller assessment of amplitude modulation (blade swish) and information to assess the impact of the proposal on the adjacent business park expansion.

Supporting Letter (Kilmac, 10 February 2016) Bairds Malt is Scotland's leading malt producer and has invested significantly in its Arbroath facility since its construction in 1970. The site employs 57 people from the local area and the business has contracts with over 1000 farms, 230 of which are within Angus. The operation consumes in the region of 10GWh of electricity per year, with annual energy costs in the region of £2.5m. The proposed turbine is expected to generate 2.3GWh per year, which equates to around 20% of the plants usage and would reduce business costs and the carbon footprint of the operation. The letter comments on the balancing exercise that takes place in weighing economic and environmental benefits against adverse environmental impacts and indicates that the applicant considers overall impacts to be acceptable.

Consultations

Community Council - There was no response from this consultee at the time of report preparation.

Angus Council - Roads - It is noted that the supporting information suggests that the turbine would be landed at Montrose Port and transported south along the A92. The Roads Authority has no objection subject to conditions including the provision of a construction traffic management and routing plan.

Scottish Water - There was no response from this consultee at the time of report preparation.

Ministry Of Defence - MOD objects to the proposal. MOD has indicated that it would be prepared to remove its objection subject to appropriate conditions requiring (i) the installation of an Air Traffic Control Radar Mitigation Scheme to mitigate the impact of the development on the Primary Surveillance Radar at RAF Leuchars prior to the turbine becoming operational; and (ii) requiring the installation of aviation lighting at the highest practical point of the turbine.

MOD has commented that the turbine would be 24.18 km from, detectable by, and will cause unacceptable interference to the ATC radar at RAF Leuchars without appropriate mitigation. MOD has commented that the applicant submitted a technical proposal to mitigate the unacceptable impacts of the proposed development on the Air Traffic Control (ATC) radar at RAF Leuchars. The proposal has been accepted by the MOD, and a planning condition has been proposed.

MOD has indicated that it is unaware of any proposed mitigation schemes within the military ATC environment which have been successfully implemented to date.

Angus Council Environmental Health - Has considered the environmental information submitted in respect of noise and flicker as well as additional information more recently submitted by the applicant in respect of (i) noise impact associated with the proposed turbine; (ii) noise compliance of the existing operation in respect of existing noise limits; and (iii) shadow flicker impacts. Environmental Health has offered no objection to the application on the basis of noise or flicker impact subject to planning conditions to regulate these matters. Environmental Health has indicated that derived noise limits for the turbine are heavily influenced by the existing factory noise levels and has indicated that consideration should be given to prohibiting use of the turbine should the existing noise generating activities at Bairds Malt cease because the background noise environment in which they would be operating would be significantly changed.

Historic Environment Scotland - A turbine at this location and of this height will have an impact on the setting of the A-listed Hospitalfield House. Visualisations produced by the agent demonstrate the turbine will be visible in certain views from the house and its grounds. The main elevations and rooms of Hospitalfield look to the west and south where the turbine is proposed. We recognise that existing industrial features, including a telecommunications mast, are part of the established setting of Hospitalfield. The impact of any turbine in this location is therefore likely to be moderate. We agree with the general conclusion of the Environmental Report in relation to Hospitalfield and don't consider that this application raises issues of national significance that warrant an objection.

NERL Safeguarding - NATS (En Route) Public Limited Company ("NERL") has no safeguarding objection to the proposal.

Spectrum - No objection.

Joint Radio Co Ltd - In the case of this proposed wind energy development, JRC does not foresee any potential problems based on known interference scenarios and the data you have provided.

RSPB Scotland - RSPB does have some knowledge of the ornithological interest of this area but does not consider that significant negative impacts on birds are likely to occur if this proposal is consented. However, there are several proposals for similar sized turbines in this general area, in addition to the already operational turbines in the wider landscape. Post construction monitoring linked to some form of cumulative impact assessment would assist understanding of potential issues connected to the build up of turbines on birds.

Civil Aviation Authority - has raised no objection to the proposal.

Dundee Airport Ltd - There was no response from this consultee at the time of report preparation.

Aberdeenshire Council Archaeology Service - There was no response from this consultee at the time of report preparation.

Angus Council - Economic Development Unit (EDU) – The socio-economic report submitted with the application has been reviewed and the findings of the economic impact assessment are agreed. The EDU has commented that Bairds Malt provides a valuable input to the local and wider economy, operating in a price sensitive marketplace where it is desirable to reduce energy costs and remain competitive. The EDU response notes that while the proposed turbine would be very beneficial to Bairds Malt and the Angus economy and it is desirable to see the company prosper; it also recognises that there are other planning matters that need to be considered in determining the application.

Representations

195 letters of representation were received, of which 1 offered comments which neither supported nor objected to the proposal, 141 objected to the proposal and 53 supported the proposal.

The main points of objection were as follows:

- **noise impact**
- **shadow flicker impact**
- **landscape and visual impact**
- **impact on residential amenity (already experience air and noise pollution)**
- **impact on natural heritage including wildlife**
- **impact on cultural heritage**
- **road safety impact/distraction to road users**
- **impact on aviation**
- **adverse impact on tourism**
- **adverse impact on recreation**

These matters are discussed in the planning assessment later in this report.

- **Devaluation of property** Comment:- this is not a valid planning objection.
- **EIA should be undertaken** Comment:- the application has been screened under the Town and Country Planning (Environmental Impact Assessment) Regulations 2011. The screening opinion (ref: 12/00922/EIASCR) concluded that the proposed development is not an EIA development.
- **The setting of an undesirable precedent** – Comment:- there is no concept of binding precedent in planning law and every application is considered on its own merits against relevant development plan policies and other material planning considerations. The acceptability of this application is assessed later in this report.
- **Health and safety & danger to walkers/cyclists/equestrian activities using path network** Comment:- The Government's Specific Advice Sheet on Onshore Wind Turbines indicates that companies supplying products and services to the wind energy industry operate to a series of international, European and British Standards. In the context of these factors I do not consider safety to be a determining factor in the assessment of this application. I have no reason to believe other than that health or safety issues have been properly considered and the risks found to be acceptable.
- **Loss of agricultural land** Comment:-The site is partly contained within the existing Bairds Malt complex and partly within the adjacent agricultural field. I have explained elsewhere in this report that the adjacent agricultural field forms part of an employment land allocation in the current and future land use strategy for Arbroath and benefits from planning permission for employment use. On that basis I do not consider the loss of the small area of agricultural land raises any significant land use planning issues.

The main points of support were as follows:-

- **It is an important development for local business and it is vital that it goes ahead to safeguard existing and future jobs at the operation**
- **It is an industrial setting and the turbine would not detract from its surroundings**
- **The turbine is a suitable distance from residential property and the noise data shows that**

amenity would be protected

- **The site has no landscape designation**
- **On site use of electricity generated from renewable sources is in line with government policy**

Comment – The desirability of supporting schemes that generate renewable energy is recognised by development plan policy and those policies provide criteria against which schemes require to be assessed in order to determine their acceptability. This assessment is undertaken later in this report. Similarly the benefit of supporting the economic development in Arbroath is a material consideration and this is also discussed later in this report.

Development Plan Policies

Angus Local Plan Review 2009

Policy S1 : Development Boundaries
Policy S3 : Design Quality
Policy S5 : Safeguard Areas
Policy S6 : Development Principles (Schedule 1)
Policy ER5 : Conservation of Landscape Character
Policy ER11 : Noise Pollution
Policy ER16 : Development Affecting the Setting of a Listed Building
Policy ER18 : Archaeological Sites of National Importance
Policy ER19 : Archaeological Sites of Local Importance
Policy ER20 : Historic Landscapes and Designed Landscapes
Policy SC16 : Employment Land Supply
Policy ER34 : Renewable Energy Developments
Policy ER35 : Wind Energy Developments

TAYplan Strategic Development plan

Policy 3 : Managing TAYplan's Assets
Policy 6 : Energy and Waste/Resource Management Infrastructure

The full text of the relevant development plan policies can be viewed at Appendix 1 to this report.

Assessment

Sections 25 and 37(2) of the Town and Country Planning (Scotland) Act 1997 require that planning decisions be made in accordance with the development plan unless material considerations indicate otherwise.

Angus Council is progressing with preparation of a Local Development Plan to provide up to date Development Plan coverage for Angus. When adopted, the Angus Local Development Plan (ALDP) will replace the current adopted Angus Local Plan Review (ALPR). The Proposed Angus Local Development Plan was approved by Angus Council at its meeting on 11 December 2014 and subsequently published for a statutory period for representations. The statutory period for representation has now expired and unresolved representations have been submitted to Scottish Ministers for consideration at an Examination. The Proposed ALDP sets out policies and proposals for the 2016-2026 period consistent with the strategic framework provided by the approved TAYplan SDP(June 2012) and Scottish Planning Policy (SPP) published in June 2014. The Proposed ALDP represents Angus Council's settled view in relation to the appropriate use of land within the Council area. As such, it is a material consideration in the determination of planning applications. The Proposed ALDP is, however, at a stage in the statutory process of preparation where it may be subject to further modification. Limited weight can therefore currently be attached to policies and proposals of the plan that are subject to unresolved objection. The policies of the Proposed Plan are only referred to where they would materially alter the recommendation or decision.

In addition to the development plan a number of matters are also relevant to the consideration of the application and these include: -

- National Planning Framework for Scotland 3 (NPF3);
- Scottish Planning Policy (SPP);
- Scottish Government 'Specific Advice Sheet' on Onshore Wind Turbines;
- Tayside Landscape Character Assessment;
- Angus Council Implementation Guide for Renewable Energy Proposals (2012);
- Strategic Landscape Capacity Assessment for Wind Energy in Angus (Ironsides Farrar - 2014);
- Angus Wind farms Landscape Capacity and Cumulative Impacts Study (Ironsides Farrar, 2008);
- Siting and Designing Wind Farms in the Landscape (SNH, Version 2 May 2014);
- 'Assessing The Cumulative Impact of Onshore Wind Energy Developments' (SNH, March 2012)
- Planning Advice Note 1/2011: Planning and Noise.
- Planning Advice Note 52 'Planning in Small Towns'.
- Angus Settlements Landscape Capacity Study - Arbroath (2014)

NPF3 states that the government is committed to a low carbon Scotland and through the priorities identified in the spatial strategy set a clear direction to tackling climate change through national planning policy. Renewable energy technologies, including onshore wind, are identified as key aspects to realising this aim whilst recognising that a planned approach to development is required to find the correct balance between safeguarding assets which are irreplaceable while facilitating change in a sustainable way.

The **Scottish Planning Policy** (SPP, June 2014) represents a statement of government policy on land use planning. In relation to onshore wind, the SPP states that 'planning authorities should set out in the development plan a spatial framework identifying areas that are likely to be most appropriate for onshore wind farms... The spatial framework is complemented by a more detailed and exacting development management process where the merits of an individual proposal will be carefully considered against the full range of environmental, community and cumulative impact. Proposals for onshore wind should continue to be determined while spatial frameworks are and local policies are being prepared and updated'. Proposals for energy infrastructure developments should always take account of spatial frameworks for wind farms and heat maps where these are relevant. Considerations will vary relative to the scale of the proposal and area characteristics but are likely to include:

- net economic impact, including local and community socio-economic benefits such as employment, associated business and supply chain opportunities;
- the scale of contribution to renewable energy generation targets;
- effect on greenhouse gas emissions;
- cumulative impacts - planning authorities should be clear about likely cumulative impacts arising from all of the considerations below, recognising that in some areas the cumulative impact of existing and consented energy development may limit the capacity for further development;
- impacts on communities and individual dwellings, including visual impact, residential amenity, noise and shadow flicker;
- landscape and visual impacts, including effects on wild land;
- effects on the natural heritage, including birds;
- impacts on carbon rich soils, using the carbon calculator;
- public access, including impact on long distance walking and cycling routes and scenic routes identified in the NPF;
- impacts on the historic environment, including scheduled monuments, listed buildings and their settings;
- impacts on tourism and recreation;
- impacts on aviation and defence interests and seismological recording;
- impacts on telecommunications and broadcasting installations, particularly ensuring that transmission links are not compromised;
- impacts on road traffic;

- impacts on adjacent trunk roads;
- effects on hydrology, the water environment and flood risk;
- the need for conditions relating to the decommissioning of developments, including ancillary infrastructure, and site restoration;
- opportunities for energy storage; and
- the need for a robust planning obligation to ensure that operators achieve site restoration.

The Scottish Government's Planning Advice Notes relating to renewable energy have been replaced by Specific Advice Sheets (SAS). The '**Onshore Wind Turbines SAS**' identifies typical planning considerations in determining planning applications for onshore wind turbines. The considerations identified in the SAS are similar to those identified by policies ER34 and ER35 of the ALPR and the SPP as detailed above.

Angus Council has produced an **Implementation Guide for Renewable Energy Proposals**. It provides guidance for development proposals ranging from small single turbines to major windfarms. It indicates that within development boundaries it is not possible to define maximum turbine heights and that turbine developments within towns and villages will be considered in the context of ALPR policies and take account of the following considerations: scale and location; landscape setting; residential amenity including noise, shadow flicker, visual impact etc; historic environment including townscape; compatibility with adjacent uses; proximity to sensitive receptors such as educational buildings, open space and leisure facilities, hospitals, residential care homes, cemeteries, visitor facilities and accommodation and proposed development areas; access; design; security of equipment/facility; and ancillary works.

Scottish Natural Heritage in conjunction with Angus and Aberdeenshire Councils commissioned Ironside Farrar to review current landscape sensitivity and capacity guidance in relation to wind energy development. The **Strategic Landscape Capacity Assessment for Wind Energy in Angus** (March 2014) provides updated information on landscape capacity for wind energy development and the potential cumulative impact of proposals in the context of operational and consented developments. In respect of development within built up areas, it indicates that *whilst it is recognised that some parts of built up areas and settlements may be able to accommodate wind turbines, and indeed do, they have not been included in this landscape character based capacity assessment*. It states that *factors specific to townscape and urban planning are likely to guide location. Consequently urban areas have been left out of the constraints and opportunities map in 6.4, Table 6.1 and the guidance. Nevertheless it is noted in this study that the setting of settlements and the presence of settlements within a wider landscape type has a bearing on landscape character and on capacity for development*.

Scottish Natural Heritage's **Siting and Designing Windfarms in the Landscape** (May 2014) indicates that generally speaking, large wind turbines will appear out of scale and visually dominant in lowland, settled, or smaller-scale landscapes, which are often characterised by the relatively 'human scale' of buildings and features. It states that settlements and buildings within a landscape tend to be sensitive to the development of a wind farm for three main reasons:

- by being places from which people will view a wind farm and within which a key quality may be the provision of shelter and a sense of refuge that may seem impinged upon by the movement and proximity of a wind turbine;
- because buildings act as a size indicator in views that may emphasise the much greater scale of wind turbines in comparison; and
- because the settlement itself often forms a focal feature / landscape pattern to which a development would need to relate.

The SNH publication states that it is important that wind farms do not dominate or negatively affect settlements. The threshold for this effect will vary in different landscapes, for different settlements and with different wind farm and wind turbine designs. The aim should be to minimise the sense of imposition upon buildings and more intimate spaces. This can be achieved by setting the turbines against an open background and avoiding the creation of a visually complex image. In these circumstances, careful

consideration of the nature of views in and out of these areas is needed, along with appreciation of the nature of impacts from recreational areas and residences.

Due to the focus of views along coastlines and the typical concentration of settlements within these areas, a wind farm located near the coast will tend to create a new focal feature or landmark. For this reason, it is important that they do not detract from existing landmarks like historical or navigational features (such as lighthouses), distinctive coastal landforms, coastal settlements and areas valued for recreation.

Planning Advice Note 52 'Planning in Small Towns' acknowledges that some development that has taken place, in terms of scale or design in small towns has not been particularly sympathetic to the character of the towns; and encourages local councils and their partners to work together to retain, restore and enhance what is best as well as removing, improving or rehabilitating what is worst. It provides advice on topics including setting and townscape. It indicates that scale and setting in the landscape are key areas to address in considering the scope for and possible direction in which a town could expand and what form development should take. It indicates that matters such as skyline and landmarks should be considered and indicates that from a distance landmark buildings or structures can be easily identified including those which appear out of character; the positive features should act as a reference and control on the height, massing and scale of future development.

Angus Settlements Landscape Capacity Study - Arbroath (2014) indicates that:-

- The landscape setting of Arbroath is formed by the valley of the Brothock water in which the town is set. Over time Arbroath expanded out of the valley onto the higher ground, and today its larger settlement area is bounded by the two wooded Dens, the Seaton Den to the north-east and the Den of the Elliot Water to the south-west.
- Arbroath Abbey is the most prominent and famed historical features of the town, with the "Arbroath Eye" of the Abbey tower forming the iconic skyline landmark of the town. The medieval town grew around the Abbey following the landform land inward rather than spreading along the coast.
- The location of Arbroath on low ground surrounded by higher ground on its landward sides ensures that despite its relative size, Arbroath is not extensively visible from a distance.
- The vegetation of the Elliot Water/Kelly Den screens initial views of the town when approaching via the A92. The entry of Arbroath is marked by the view of the Elliot Industrial Estate Grain Silos which are a landmark that is visible over the woodland of the escarpment along the Elliot Burn.
- The most sensitive landscape areas around Arbroath includes the area directly adjacent to the Elliot River Kelly Den.
- In discussing development to the west of the town, it indicates that it would be desirable that any future development is restricted to lower ground and create a permanent edge defined by topography or other landscape features such as watercourses and vegetation.

Proposals for wind turbine developments and associated infrastructure are primarily assessed against policies ER34 and ER35 of the ALPR although other policies within the plan are also relevant. The policy position provides a presumption in favour of renewable energy developments recognising the contribution wind energy can make in generating renewable energy in Scotland. These policies also require consideration of impacts on ecology including birds; cultural heritage including listed buildings, scheduled monuments, designed landscapes and archaeology; aviation; amenity in the context of shadow flicker, noise and reflected light; landscape and visual impact including cumulative impacts; future site restoration; transmitting or receiving systems; any associated works including transmissions lines, road and traffic access/safety and the environmental impact of this. These policy tests overlap matters contained in other policies and therefore these matters are discussed on a topic by topic basis.

Environmental and Economic Benefits

Policy 6 of TAYplan indicates that one of its aims for the city region is to deliver a low/zero carbon future and contribute to meeting Scottish Government energy and waste targets. The local plan indicates that Angus Council supports the principle of developing sources of renewable energy in appropriate locations. The SPP sets out a "commitment to increase the amount of electricity generated from renewable sources" and

includes a target for the equivalent of 100% of Scotland's electricity demand to be generated from renewable sources by 2020 along with a target of 30% of overall energy demand from renewable sources by 2020. Paragraph 154 of the SPP indicates that planning authorities should help to reduce emissions and energy use in new buildings and from new infrastructure by enabling development at appropriate locations that contributes to electricity and heat from renewable sources.

The proposed wind turbine would offset the emission of CO₂ and supply electricity. The Environmental Report (ER), Socio Economic Assessment and other supporting information submitted indicates that Bairds Malt is Scotland's leading malt producer and has invested significantly in its Arbroath facility since its construction in 1970. It is said to process 255,000 tonnes of malt per year, which is destined primarily for distilling and whisky production. The operation is said to consume in the region of 10GWh of electricity per year (the equivalent amount of 2,200 homes), with annual energy costs in the region of £2.5m. The proposed turbine is expected to generate 2.3GWh per year, which equates to around 20% of the plants usage and would reduce business costs and the carbon footprint of the operation. The ER suggests that the overall outcome of the project would be to deliver production and cost efficiencies that would increase the market competitiveness of the business and thus safeguard local jobs. The Socio Economic Assessment identifies numerous worthwhile benefits (listed earlier in this report) and its findings have been confirmed by the Council's Economic Development Unit.

I note the concerns raised by third parties regarding the potential impact of the development on the tourist industry. Whilst there have been a number of surveys undertaken to assess the impact of wind farm development on the tourist industry there does not appear to be definitive information on the impact of existing developments. Although I cannot discount the possibility that some visitors might be deterred from making return visits to holiday accommodation or visitor attractions in the vicinity of the site because of the presence of the wind turbine, I find no persuasive evidence to suggest that it would have an overall adverse effect on tourism in this part of Angus.

It is accepted that the proposed turbine could make a contribution towards renewable energy generation and carbon reduction and as such the proposals attract in principle support from the development plan. It is also accepted that the proposed development would improve the operational efficiency of the Bairds Malt operation and would make it more financially viable going forward, which is a significant benefit to the local economy. I have had regard to the environmental and economic benefits described in the supporting information in undertaking my assessment of the proposal.

Landscape Impact

Policy 6 of TAYplan indicates that in determining proposals for energy development consideration should be given to landscape sensitivity. Local plan Policy ER5 (Conservation of Landscape Character) requires development proposals to take account of the guidance provided by the Tayside Landscape Character Assessment (TLCA), prepared for Scottish Natural Heritage (SNH) in 1999, and indicates that, where appropriate, sites selected should be capable of absorbing the proposed development to ensure that it fits into the landscape. Policy ER34 of the local plan indicates that proposals for renewable energy development will be assessed on the basis of *no unacceptable adverse landscape and visual impacts having regard to landscape character, setting within the immediate and wider landscape, and sensitive viewpoints.*

The application site sits on the fringe of the urban area of Arbroath, close to the boundary between the area defined in the local plan as 'coast' (zone 3) and close to the area defined as 'lowland and hills' (zone 2). The local plan indicates that the coast area is *sensitive to the potential landscape and visual impact of large turbines.* It indicates that *the possibility of satisfactorily accommodating turbines in this area should not be discounted* but suggests that *locations associated with the coast are likely to be less suitable.* It further indicates that *in all cases, the scale, layout and quality of design of turbines will be an important factor in assessing the impact on the landscape.* The lowland and hills area *comprises a broad swathe extending from the Highland boundary fault to the coastal plain, much of which is classified as lowest sensitivity.* Within this area there are important examples of higher natural heritage sensitivity such as small scale landscapes and skylines. It states that good siting and design should show respect for localised interests.

The Tayside Landscape Character Assessment (TLCA) identifies that the application site lies within an 'urban' area, but in very close proximity to the Dipslope Farmland LCT and the Coast with Sand LCT.

- The Dipslope Farmland LCT key characteristics are described as an extensive area of land, generally sloping from north-west to south-east; dominated by productive agriculture with a dispersed settlement pattern, including some suburban development. The landscape is described as of medium scale, with semi-enclosed to open enclosure and no notable landscape features. In terms of Forces for Change, the TLCA indicates that this low-lying area is comparatively free from tall structures with the exception of the electricity transmission lines which serve Dundee and Arbroath. It is possible that there may be pressure for additional masts, particularly in the vicinity of major roads, as telecommunications traffic grows.
- The Coast with Sand LCT key characteristics are described as areas of marine alluvium and windblown sand along lower sections of coast; sand dunes inland; ever changing landscape of shifting sands, erosion and deposition and tidal fluctuation; golf courses and limited settlement. The landscape is described as of medium scale, with exposed enclosure and no notable landscape features. In terms of Forces for Change, the TLCA indicates many of the sections of coast are free from signs of modern development and retain an almost timeless character. The erection of masts in areas visible from these or the development of shoreline wind power schemes could have an adverse effect on this character. Any proposals should be assessed carefully in these terms.

PAN 52 'Planning in Small Towns' provides advice on topics including setting and townscape. It indicates that matters such as skyline and landmarks should be considered and indicates that from a distance landmark buildings or structures can be easily identified including those which appear out of character. It indicates that the positive features should act as a reference and control on the height, massing and scale of future development.

The applicant's townscape and landscape assessment within the ER suggests that the turbine is located on the urban fringe of Arbroath, within the Elliot Industrial Estate adjacent to the Dipslope Farmland Landscape Character Area, and would affect a proportion of part of this area. *As an urban area on the edge of this character area, which is heavily man-modified and busy with activity, there would be very little direct effects on the character, although there would be indirect effects relating to its visibility across the landscape character area to the south-west and west.* It states that *the turbine appears predominately in views alongside the Maltings Plant infrastructure and would be seen alongside these industrial features already present within the view. The turbine may appear slightly more prominent in vertical scale, however, it will fit well with the industrial cladding of the buildings in the surrounding landscape. Considering the wider area, the assessment has concluded that there would be no significant indirect effects from any of the other landscape character types or within the study area.*

The location of Arbroath on low ground surrounded by higher ground on its landward sides ensures that despite its relative size, the town is not extensively visible from a distance. The visualisations submitted show that from a distance to the northeast, north, northwest and west the settlement sits down in the landscape with little by way of vertical structures punctuating the skyline (including the existing grain silos). The impact of the existing grain silos is greater in views closer to Arbroath, where they do appear in the skyline without a landscape backcloth. VP05 at Bearfauld Road, VP07 at Salmonds Muir, VP09 at Firthfield and VP10 at Braeside shows that there is little evidence of existing structures rising above the landscape backcloth of the town in views towards and across Arbroath while also demonstrating that the 77m turbine would rise above that landscape backcloth, appearing as a new and prominent skyline feature. In VP10, the turbine also rises above the horizon of the sea which would further increase its contrast to the existing scale of landscape elements within the town.

SLCA guidance indicates that in the Dipslope Farmland Southeast Angus Lowland subarea (iv) Letham, Lunan and Arbroath has medium capacity for turbines up to 50m and no capacity for turbines exceeding 50m. The SLCA guidance indicates that in the Coast with Sand LCA there is low capacity for small/medium turbines and no capacity for turbines exceeding 30m. While the site is located within an urban area it is close to both of those landscape character areas and the development would impact on both of those

areas. Accordingly, the guidance in relation to height is of some relevance and does not support a turbine of this height in this general location.

The site has an urban character falling within the Elliot industrial complex and adjacent to the large grain silos and drying equipment located within the Bairds Malt site. While the site lies on the western periphery of the developed edge of Arbroath, the agricultural land to the immediate west (which is clearly visible on approaches to Arbroath from the west and north west) is allocated for and has planning permission for a western expansion of employment land which is likely to reinforce the industrial context which immediately surrounds the application site. The existing apparatus contained within the Bairds site is said in the supporting information to measure around 27m (with other references in the documentation to 'exceeding 30m'). This information states that the turbine has been designed so that the lowest part of the blades remains above the highest part of the adjacent structure.

The overall height of the turbine at 77m is significantly taller than the tallest buildings within the complex. Those buildings as well as the trees along the southern site boundary provide a vertical scale reference for the turbine, particularly in views from the south (VP02 of Landscape Figures, VP01 of the Residential Assessment Graphics), west (VP02 of the Residential Assessment Graphics), north (VP04 of the Residential Assessment Graphics) and north east (VP03 of Landscape Figures) but also in some views from the east (VP01 of Landscape Figures). Those existing vertical scale references emphasise that the turbine is substantially larger than surrounding elements in the landscape. The size of the turbine would be out of scale relative to smaller scale landscape features such as houses; trees and Kelly Den (see VP1, 2, 5, 8, 9, 10).

The applicants ER indicates that the proposed turbine would be a prominent element from the Coast with Sand LCT. I agree with that general conclusion. Although outwith the Coast with Sand LCT, the turbine would be located within the open relatively flat coastal plain between Carnoustie and Arbroath and a turbine of the size proposed would become a landmark for this part of the Angus coast. It is therefore considered that the proposed turbine would have a significant effect upon the Coast with Sand LCT.

Bringing together the above, while the site selected is within an industrial complex close to existing industrial buildings, it is located on the western periphery of Arbroath in a prominent position on higher ground close to the coast. A 77m turbine in this location would be out of scale when viewed against existing landscape features and would significantly and adversely affect the landscape and townscape in this area. I consider those impacts to be contrary to aims of local plan policies ER5 and ER34.

Visual Impact

Policy S6 of the Angus Local Plan Review requires that proposals should not give rise to unacceptable visual impacts. Policy ER34 of the Local Plan also indicates that renewable energy development will be assessed on the basis of *no unacceptable adverse landscape and visual impacts having regard to landscape character, setting within the immediate and wider landscape, and sensitive viewpoints.*

The application is supported by Zone of Theoretical Visibility (ZTV) information to help understand the would-be visibility of the turbine. ZTVs have been submitted based on both the hub height of the proposed turbine (55m) and the maximum height of the blade (77m). The ZTVs submitted are based on landform modelling and a bare earth analysis and thus do not take account of intervening screening provided by buildings and woodland, for example. They represent a worst case scenario of visibility rather than actual visibility.

The 77m ZTV provided (Figure 7.6) identifies that the turbine would be extensively visible within 5km of the application site. That area includes the settlement of Arbroath, the A92 as far north as Marywell, the A933 to the north to an area south of Colliston, the B9127 to the north west to Denhead of Arbirlot, the coastal area extending west to East Haven and the A92 to an area west of Salmond's Muir. That ZTV also identifies theoretical visibility up to 10km including the rural areas around Friockheim and Leysmill, eastern parts of Carnoustie, Muirdrum, the rural area close to Kirkton of Monikie, Hayhillock, Redford and Carmyllie. Beyond 10km, the ZTV identifies theoretical visibility from areas north of and within Monifieth, Monikie

Country Park, Dubton, Montreathmont, Bolshan, Usan and Braehead. Theoretical visibility is also shown to include St Andrews, Tentsmuir and Tayport in Fife and well as Brown and White Catterthun hillforts. The 55m hub height ZTV presents similar results of theoretical visibility to the 77m maximum height ZTV.

The ER summarises the visual effects during the operational period of the turbine and states *views of the proposed turbine would be limited from within the neighbouring settlement of Arbroath. The turbine appears as part of the skyline from some of the more elevated open locations within the settlement, appearing in views alongside the Maltings Plant. The two developments appear similar in type with the turbine a fairly industrial feature, similar in colour to the concrete and metal cladding that makes up the Maltings Plant buildings. The majority of the settlement will gain little or no views of the proposed development with the majority of the residential areas located to the north and west of the settlement. The vegetation and built features which surround these areas screening potential views. The neighbouring Hospitalfield housing estate will experience some views from the areas around the properties, with the turbine appearing alongside the Maltings Plant which is already an easily discernible feature in the views from these more open areas around the housing scheme.*

In assessing visual impact I consider that it is appropriate to have regard to recent appeal decisions within Angus where this issue has been considered in order to secure a degree of consistency in the decision making process. Planning appeal decisions have generally accepted that residents should be treated as of high sensitivity in assessing the significance of visual impact. The magnitude of change (and, thus, the significance of the impact they will experience) will vary with the context of the house that they occupy: its distance from the proposed wind turbine and orientation in relation to it; the presence of intervening screening from vegetation and other buildings; and the presence of other significant visual features. However it is not only the views from principal rooms that are of importance as residents also use the space around their house and the impact on occupiers and visitors approaching or leaving the properties must also be considered.

The ER includes a residential assessment supported by viewpoints from 7 residential receptors close to the site. It indicates that 63 properties within a radius of 2km of the turbine have been included in the assessment. Of the 24 properties listed in Table 7.13 of the ER, 7 properties are attributed a major or major/moderate level of effect. The ER assessment indicates that when visible the turbine is never an overbearing feature and is not assessed as constituting an unacceptable change to the quality of living for residents.

I do not accept the findings of the residential assessment and consider that the number of properties which would experience significant adverse effects would be greater than stated in the supporting information:-

- From the north west, the properties at Peasiehill Farm Cottages (300m to north west, which the supporting information suggests has a financial interest, but at least one of which was tenanted by a party with no financial interest in the development when I visited the site), Peasiehill Farmhouse (640m to north west), Peasiehill Farm Bungalow (710m to north west), Krojan Cottages (700m to north west) and properties at Crudie (820m to north west) all lie within 1km of the site. Residential viewpoint VP04 Peasiehill is illustrative of the view these properties would experience. Each of these properties would experience views of the proposed turbines from windows, garden areas and/or on approaches and the change in view would be prominent with the addition of an uncharacteristic 77m high vertical and dynamic element in close proximity. Residential receptors are attributed a high level of sensitivity and all would experience a level of effect which is significant.
- From the north/ north east, the housing area including Patrick Allan-Fraser Street (350m to north), Kinghorn Street (515m to north), Glamis Road (500m to north), Hospitalfield Road (600m north east), School Road (620m north east) and Gerrard Place (460m north east) would experience views of the proposed turbines from windows, garden areas and/or on approaches as illustrated by residential viewpoints VP05 (71 Patrick Allen-Fraser Street), VP06 (5 Patrick Allan-Fraser Street) and VP07 (24 School Road). The change in view would be prominent with the addition of an uncharacteristic 77m high vertical and dynamic element in close proximity. Residential receptors are attributed a high level of sensitivity and occupants of properties in this area would experience a level of effect which is significant.

- From the east, there are large housing areas between 1km and 2km from the proposed site with varying degrees of view of the proposed turbine from windows, garden areas and/or on approaches. Such areas include Arbirlot Road West (1.1km north east) and Bankhead Road/Crescent (1km to east). This is illustrated in VP03 Arbirlot Road West of the Landscape and Visual Impact Assessment figures. There are a significant number of properties in this area, including flatted dwellings that would have relatively unobstructed views of the turbine from main windows. The change in view would be prominent for some households with the addition of an uncharacteristic 77m high vertical and dynamic element in reasonably close proximity. Significant effects would occur at a number of these properties including those facing west or south west on Arbirlot Road West and Bankhead Road. Residential receptors are attributed a high level of sensitivity and occupants of properties in this area would experience a level of effect which is significant.
- From the south the properties at Elliot (within 700m to the south) would experience views of the proposed turbines from windows, garden areas and/or on approaches as illustrated by Residential Assessment VP01 A92, Elliot. The change in view would be prominent with the addition of an uncharacteristic 77m high vertical and dynamic element in close proximity. Residential receptors are attributed a high level of sensitivity and occupants of properties in this area would experience a high magnitude of change and as such would experience a level of effect which is significant.

There are a large number of residential properties identified above that would experience a significant level of visual impact as a consequence of the turbine. A significant number of third parties that live in the affected houses have raised concern regarding the visual impact of the wind turbine on their amenity.

The ER contains an assessment of major tourist and transport routes including the A92 (Monifieth to Montrose), A933 (Arbroath to Colliston) and Core Paths 151 and 152. For the A92, the assessment indicates visibility of the turbine primarily over a 6km stretch of the road from Muirdrum to Arbroath which is illustrated by VP07 Salmond's Muir and VP02 Elliot (from the Landscape and Visual Impact Assessment figures). The magnitude of change for the route is assessed in the ER as being medium, resulting in a moderate/minor level of effect. For the Core Paths, the assessment notes that Path 152 passes to the west of the Maltings and the Hospitalfield industrial estate. It states that views of the proposed turbine would occur regardless of direction of travel over the whole section of the path, with the turbine appearing amongst the industrial units. It indicates that the magnitude of change for the route as a whole would be high, resulting in a major/moderate level of effect. The level of effect attributed to Path 151 along the Elliot Water is moderate.

The close proximity of the proposed turbine to core path 152 (as identified in the Angus Council Core Paths Plan, adopted 23 November 2010) is likely to have a detrimental impact on the amenity of the route for recreational walkers. However, the character of that path would change in the event that the adjacent land is developed for employment land as proposed by the local plan. The proposed relocation of the path, to provide a separation distance equivalent to the blade tip height, would help make the proposed turbine less intimidating to path users.

In summary, the ZTV and photomontages from viewpoints illustrate that the impact on residential property within 2km of the site would be significant and adverse. For some properties close to the site the turbine is likely to be over-bearing and oppressive. A significant number of third parties have raised concern regarding the adverse effect that the wind turbine would have on their amenity by virtue of its visual impact. Similar impacts have been found to be unacceptable elsewhere in Angus and I cannot reasonably conclude that they would be acceptable at this location, particularly given the number of properties affected. I do not consider that the proposal satisfies the aims of local plan policies S6 (Schedule 1, criterion b) or ER34 (b) and the proposal would result in significant and adverse visual impacts.

Cumulative Landscape and Visual Impact

An assessment of cumulative landscape and visual effects is also required by local and national policy. SNH Guidance on 'Assessing The Cumulative Impact of Onshore Wind Energy Developments' (March 2012) indicates that cumulative landscape effects can include effects on the physical aspects of the landscape and effects on landscape character. Cumulative visual effects can be caused by combined

visibility and/or sequential effects. Combined visibility may be in combination i.e. where several wind farms are in the observers arc of vision or in succession where the observer has to turn to see various wind farms. Sequential effects occur when the observer has to move to another viewpoint to see different developments.

Wind turbines exceeding 20m in height are approved and/or operational in the following locations within 10km:-

- 4km to north west - 77m turbine at Rosebank, Cuthlie (13/00758/FULL);
- 6.6km to north west – 45.5m turbine at Parkconnon (12/00706/FULL)
- 6.8km to north - 25m turbine at West Mains of Kinblethmont (10/01145/FULL)
- 7.5km to north west - 2 x 20m turbines at Muirhouses Farm (11/00720/FULL)
- 8.1km to north west – 67m at Cononsyth (10/00603/FULL)
- 8.5km to west - 77m turbine at Upper Balmachie (13/00501/FULL);
- 9.8km to north - 45.9m turbine Walkmill Quarry, Inverkeilor (13/00722/FULL)

The ER indicates that the Bairds Malt Wind Turbine would rarely be seen in conjunction with other wind developments. The nearest operating turbine is located over 6km inland from the coastal settlement of Arbroath, with the nearest consented development over 10km from the settlement. Cumulative landscape and visual effects are assessed as being negligible in the ER including certain, likely and uncertain impacts.

SLCA guidance indicates that in the Dipslope Farmland Southeast Angus Lowland subarea (iv) *Letham, Lunan and Arbroath* has medium capacity for turbines up to 50m and no capacity for turbines exceeding 50m. It seeks separation distances of 3-6km between medium sized turbine groups and indicates that the future wind energy landscape type is 'Dipslope Farmland with Occasional wind turbines/ with wind turbines'. SLCA guidance indicates that in the Coast with Sand LCA there is low capacity for small/ medium turbines and no capacity for turbines exceeding 30m. It seeks separation distances of 2-4km between small/medium sized turbine groups and indicates that the future wind energy landscape type is 'Coast with Occasional wind turbines'.

The proposed turbine is within an urban area but is close to both Dipslope farmland and Coast with Sand LCT's. Accordingly the identified separation distances and future wind energy landscape type guidance for both areas has some relevance. The proposal would not comply with the indicated separation distances identified by the SLCA. The paired ZTVs within the ER demonstrate that the proposed turbine would likely be commonly viewed "in combination", "in succession," and "in sequence" with other wind turbines. The frequency of which such interactions occur would extend towards Arbroath and the coast, leading to significant cumulative visual effects.

While I consider that cumulative landscape and cumulative visual impacts of some significance would result from the proposed turbine when considered against other existing or approved turbines; I do not consider that these impacts warrant refusal of planning permission.

Amenity (Noise/Shadow Flicker/Reflected Light)

Criterion (a) of Policy ER34 requires the siting and appearance of renewable energy apparatus to be chosen to minimise its impact on amenity, while respecting operational efficiency. Policy ER35(c) indicates wind energy developments must have no unacceptable detrimental effect on residential amenity, existing land uses or road safety by reason of shadow flicker, noise or reflected light. Policy S6 Schedule 1 also refers to amenity impacts whilst Policy ER11 deals specifically with noise pollution.

I have identified issues in connection with visual impacts on residential amenity earlier in this report. Those impacts are considered to be significant and adverse.

The application is supported by noise and flicker assessments which have been more recently supplemented by additional noise and flicker information (including a noise compliance report relating to the

existing Bairds Malt operation). This information has been assessed by the Council's Environmental Health Service which has commented that the *revised shadow flicker assessment meets with the requirements of this service and demonstrates that any impact caused by shadow flicker should be capable of being mitigated to a satisfactory level, subject to an appropriate condition being attached to any permission.* In respect of noise, Environmental Health has indicated that the issues raised in its consultation response have been resolved and in addition the applicant has also looked at the potential impact of seasonal changes in background plant noise due to non-operation of the fans. A revised assessment including a slight reduction of certain derived noise limits has been carried out and this has demonstrated that operational turbine noise is predicted to be within the revised limits. Taking all the submitted information into consideration Environmental Health is now satisfied that the methodology used for the assessment follows the appropriate guidance for this type of development and does not object to this application on the grounds of noise, subject to appropriate conditions being attached to any permission. I have no reason to consider that the proposal would result in adverse impacts in terms of reflected light.

It is noted that representation has been received regarding noise and flicker impacts. Taking account of the information submitted and the advice provided by Environmental Health (which included a review of the noise assessment information by an independent noise consultant), I am satisfied that the proposal raises no issues which cannot be satisfactorily mitigated in respect of noise, flicker and reflected light.

Natural Heritage

The development plan framework contains a number of policies that seek to protect important species and sites designated for their natural heritage interest and to ensure that proposals that may affect them are properly assessed. It also indicates that the Local Biodiversity Action Plans will constitute material considerations in determining development proposals. Policy ER35 specifically requires that proposals should demonstrate that there is no unacceptable interference to birds. Policy ER4 requires safeguarding of habitats protected under British and European law or other valuable habitats and species.

The 'Onshore Wind Turbines SAS' indicates wind turbine developments have the capacity to have both positive and negative effects on the wildlife, habitats, ecosystems and biodiversity of an area. There is also the potential for negative environmental effects, with possible loss of or damage to valuable habitat resulting from construction of turbine bases, access tracks or other works. Such impacts can be significant particularly if they relate to habitats that are difficult to replicate. There is also the potential of collision risk, displacement or disturbance by forcing birds or bats to alter flight paths. Wind farms should not adversely affect the integrity of designated sites protected under EU and UK legislation (Special Protection Areas (SPAs), Special Areas of Conservation (SACs) and Sites of Special Scientific Interest (SSSIs)) or wider conservation interests. Planning guidance produced by Scottish Natural Heritage (SNH) indicates that experience suggests that many bird species and their habitats are unaffected by wind turbine developments and the impact of an appropriately designed and located wind farm on the local bird life should, in many cases, be minimal.

The applicants ER indicates that survey work was completed across the site and the immediately surrounding area, following best practice and industry guidance to identify the species and habitats present. It indicates that no suitable breeding or foraging habitat exists for badger, otter, water vole or protected bird species. Bat surveys were carried out following BCT guidelines and no bats were recorded. It indicates that it is unlikely that the development would have any long-term impact on the integrity of the area's ornithological features or the conservation status of the species found in the area. It also comments that the integrity of qualifying species and habitats for the identified designated sites (Montrose Basin and Firth of Tay SPAs and Elliot Links SSSI) would not be impacted upon.

The site contains no ecological designation and is currently partly in industrial use and partly an agricultural field which has planning permission for an extension to the existing industrial estate. RSPB has been consulted and has indicated some knowledge of the ornithological interest of this area and does not consider that significant negative impacts on birds are likely to occur if this proposal is consented. I have no reason to question the findings of the applicants ER in respect of impacts on natural heritage and note the comments provided by the RSPB. The proposal is considered to be compatible with the natural heritage

protection policies contained within the development plan.

Cultural Heritage

The development plan provides a number of policies that seek to safeguard cultural heritage. Policy ER34 requires proposals for renewable energy development to have no unacceptable detrimental effect on any sites designated for natural heritage, scientific, historic or archaeological reasons. Impacts on cultural heritage can include impacts on Schedule Ancient Monuments (SAM's), Historic Gardens and Designed Landscapes (HGDL's), listed buildings, conservation areas and undesignated archaeology. The development could potentially have direct impacts on cultural heritage features or indirect effects such as impacts on setting.

There are no assets located within the application site that are designated for their cultural heritage interest and the proposal would not directly impact on any known cultural heritage. In terms of indirect impacts, the ER contains a 5km study radius which identifies conservation areas, listed buildings, Scheduled Monuments and a Garden and Designed Landscape. The ER identifies only one 'Moderate' impact at the closest feature of high sensitivity to the turbine – Hospitalfield House, which has an associated Fernery and Doocot. The ER asserts that the current setting of the house is such that the Elliot Industrial Estate, the Westway Retail Park and modern residential areas are all features of current views to the south-west. The ER does not consider the proposal would detract from the current setting of the Hospitalfield House, which is also characterised by the belt of mature trees that surround the house and grounds to the west. Historic Environment Scotland was consulted on the proposal and has agreed with the general conclusion of the ER that the impact on Hospitalfield is moderate and offer no objection to the proposal, commenting that it raises no issues of national significance.

The ER suggests that the conservation area of Arbirlot spans the village and encompasses a number of 'B' listed buildings. It suggests that the layout of the conservation area is such that the predominant views from the features are contained within the surrounding buildings of the village. The ER indicates that of the other features of historical significance within 5km, the proposed development is expected to have a negligible or low level of effect upon their current setting. It indicates that the proposed development is not predicted to cause significant adverse impact on the cultural heritage assets within the surrounding area.

I have had regard to the potential impact of the development on cultural heritage assets in the surround area. The proposal would have some impact on a number of those assets, including Hospitalfield House. However, having regard to the advice from Historic Environment Scotland and from my own assessment I am satisfied that those impacts are not unacceptable.

Impact on aviation

Policy ER35 of the Angus Local Plan Review indicates that wind farm development should not interfere with authorised aircraft activity. MOD has commented that the turbine would be 24.18 km from, detectable by, and would cause unacceptable interference to the ATC radar at RAF Leuchars without appropriate mitigation. MOD has commented that the applicant submitted a technical proposal to mitigate the unacceptable effects of the proposed development on the Air Traffic Control (ATC) radar at RAF Leuchars. MOD has however cautioned that it is unaware of any proposed mitigation schemes within the military ATC environment which have been successfully implemented to date. Notwithstanding that, the proposed mitigation has been accepted by the MOD and a planning condition could be used to achieve it as well as aviation lighting. This approach has been taken for other approved wind farm developments in Angus including the Govals and Frawney wind proposals which were approved by a Scottish Government appointed Reporter. No objection to the proposal has been received from CAA, Dundee Airport or NATS and I am satisfied that aviation issues could be addressed through to planning conditions.

Other Development Plan Considerations

No objections have been received from technical consultees regarding the impact of the development on any existing transmitting or receiving systems. Impacts on television are understood to be less problematic

as a result of the digital switchover and the ER suggests that there are a number of technical solutions available should interference be proven as an issue as a result of the turbines. This matter could be addressed by planning condition.

In terms of road safety, the supporting information suggests that the turbine would be landed at Montrose Port and transported south along the A92. The Roads Service has offered no objection subject to conditions including the provision of a satisfactory construction traffic management and routing plan. Site decommissioning is a matter that could be addressed by planning condition requiring a restoration scheme and associated financial guarantee for the restoration works.

The ER suggests that a grid connection has been secured with the utilities company and from the transformer, underground cable runs would link to the existing substation located within the premises. This aspect of the proposal raises no issues and the aim of Policy ER34 to ensure no unacceptable effects of transmissions lines would be met.

Other Material Considerations

Scottish Government policy supports the provision of renewable energy development including wind farms. The SPP confirms that planning authorities should support the development of wind farms in locations where the technology can operate efficiently and environmental and cumulative impacts can be satisfactorily addressed. The SPP also indicates that planning authorities should respond to the diverse needs and locational requirements of different sectors and sizes of businesses and take a flexible approach to ensure that changing circumstances can be accommodated and new economic opportunities realised.

The wind turbine would contribute to meeting government targets and in this regard attracts some support from national policy and from the development plan. However, as discussed above I consider that this proposal would result in significant adverse landscape impacts on the setting of Arbroath as well as significant adverse visual impact on residential receptors close to the site. Whilst wind farms are necessary to meet government energy targets and I accept that this is a location where the technology could operate efficiently, I do not consider that the environmental impacts have or can be satisfactorily addressed. Accordingly I do not consider that the proposal receives unqualified support from the SPP.

I recognise the benefit of producing electricity by renewable means, particularly where this would increase the viability of a local employer, but I do not consider that there is anything in government policy that suggests this should be at the expense of other environmental considerations or the amenity of those that live nearby. In the particular circumstances of this case, I do not consider that the environmental or economic benefit of the production of renewable energy outweighs the very direct harm that this proposal would cause to the amenity of occupants of nearby residential property or to the wider landscape setting of the town. For these reasons I do not consider that it justifies granting planning permission contrary to the provisions of the development plan.

Comparison has been made by the applicant between the scale of the turbine proposed in this application to the proposed wind turbines at GSK, Montrose (2 x 132m - refused by Angus Council and on appeal) and the operational turbines at Michelin in Dundee (2 x 120m). While the proposed turbine is smaller than those considered unacceptable at GSK, the current application does give rise to similar issues i.e. significant and adverse visual impacts on residential property and significant and adverse impacts on the landscape setting of the town.

The Reporter who refused the planning appeal for the seven 126m turbines on land at Nether Kelly, Arbroath (PPA-120-2021, decision dated 31 January 2013) approximately 2.5km west of Arbroath commented that he was concerned about the *impact of that development on the setting of Arbroath, which combines elements of landscape, seascape and townscape*. He cautioned against the impact of the town appearing against a backdrop of wind turbines and noted that *they would be viewed against the sky and their rotation would draw the eye, heavily influencing the perceived character of the town's coastal setting*. He was concerned that those *turbines would also strongly influence perceptions of Arbroath for visitors by road or rail coming from the direction of Dundee, who would pass within one kilometre of the wind farm on*

their approach to the town. Wind turbines could thereby become a defining characteristic of Arbroath, much in the way that the two turbines of similar height at Baldovie are a major defining element of the eastern approach to Dundee. This proposal is for a smaller, single turbine but it is closer to the town and I am concerned about the impact it would have on its character.

I have had regard to appeal decisions for other wind farm development in Angus. I have taken account of these decisions in so far as they relate to assessment of the acceptability of visual impacts. As detailed above I consider that the current proposal gives rise to visual impacts that are similar to impacts that were considered unacceptable at other appeal sites in Angus. I have used the judgments made by the Reporters in those appeal decisions to assist my assessment and on the basis of my assessment conclude that visual impacts at a large number of properties in the locality of the wind turbines would be unacceptable.

Conclusion

I have had regard to the environmental information provided in relation to the application and comments received from consultees. I have also taken account of all relevant representations made both in support and in opposition to these proposals and to relevant appeal decisions that have given rise to similar issues. As discussed above I have concluded that although the proposed wind turbines would comply with some of the relevant policies and criteria in the development plan, this must be balanced against the significant adverse landscape impacts on the setting of Arbroath and the significant adverse visual impacts for residents in and around Arbroath and close to the site. I accept that the development would contribute towards meeting government energy targets but government guidance confirms that schemes should be supported where the technology can operate efficiently and environmental and cumulative impacts can be satisfactorily addressed. In this case while the technology would operate efficiently environmental impacts would not be satisfactorily addressed.

I am very conscious that the applicant is a valued employer in the local area and I am sympathetic to their desire to increase the competitiveness of the site and reduce its carbon emissions. However, notwithstanding the benefits that would be derived to the applicant and the economy of the area, for the environmental and amenity reasons identified above I consider that the proposed development is contrary to development plan policy and there are no material considerations that justify approval of the application contrary to the provisions of the development plan.

Human Rights Implications

The recommendation in this report for refusal of this application has potential implications for the applicant in terms of his entitlement to peaceful enjoyment of his possessions (First Protocol, Article 1). For the reasons referred to elsewhere in this report justifying the present recommendation in planning terms, it is considered that any actual or apprehended infringement of such Convention Rights, is justified. Any interference with the applicant's right to peaceful enjoyment of his possessions by refusal of the present application is in compliance with the Council's legal duties to determine this planning application under the Planning Acts and such refusal constitutes a justified and proportionate control of the use of property in accordance with the general interest and is necessary in the public interest with reference to the Development Plan and other material planning considerations as referred to in the report.

Equalities Implications

The issues contained in this report fall within an approved category that has been confirmed as exempt from an equalities perspective.

Decision

The application is refused.

Reason(s) for Decision:

1. That the application is contrary to policies S1 criterion (a), S6 criteria (b), and ER34 criterion (a) of the Angus Local Plan Review (2009) as the proposed development would give rise to unacceptable impacts on the occupants of residential property by virtue of the height of the wind turbine and its proximity to residential properties.
2. That the application is contrary to Policy 6 of TAYplan and policies ER5 and ER34 criterion (b) of the Angus Local Plan Review (2009) as the proposed development would result in unacceptable adverse landscape impacts having regard to landscape character and setting within the immediate and wider landscape.

Notes:

Case Officer: Ed Taylor
Date: 29 February 2016

Appendix 1 - Development Plan Policies

Policy S1 : Development Boundaries

(a) Within development boundaries proposals for new development on sites not allocated on Proposals Maps will generally be supported where they are in accordance with the relevant policies of the Local Plan.

(b) Development proposals on sites outwith development boundaries (i.e. in the countryside) will generally be supported where they are of a scale and nature appropriate to the location and where they are in accordance with the relevant policies of the Local Plan.

(c) Development proposals on sites contiguous with a development boundary will only be acceptable where there is a proven public interest and social, economic or environmental considerations confirm there is an overriding need for the development which cannot be met within the development boundary.

Policy S3 : Design Quality

A high quality of design is encouraged in all development proposals. In considering proposals the following factors will be taken into account:-

- * site location and how the development fits with the local landscape character and pattern of development;
- * proposed site layout and the scale, massing, height, proportions and density of the development including consideration of the relationship with the existing character of the surrounding area and neighbouring buildings;
- * use of materials, textures and colours that are sensitive to the surrounding area; and
- * the incorporation of key views into and out of the development.

Innovative and experimental designs will be encouraged in appropriate locations.

Policy S5 : Safeguard Areas

Planning permission for development within the consultation zones of notifiable installations, pipelines or hazards will only be granted where the proposal accords with the strategy and policies of this Local Plan and there is no objection by the Health & Safety Executive, Civil Aviation Authority or other relevant statutory agency.

Policy S6 : Development Principles (Schedule 1)

Proposals for development should where appropriate have regard to the relevant principles set out in Schedule 1 which includes reference to amenity considerations; roads and parking; landscaping, open space and biodiversity; drainage and flood risk, and supporting information.

Schedule 1 : Development Principles

Amenity

- (a) The amenity of proposed and existing properties should not be affected by unreasonable restriction of sunlight, daylight or privacy; by smells or fumes; noise levels and vibration; emissions including smoke, soot, ash, dust, grit, or any other environmental pollution; or disturbance by vehicular or pedestrian traffic.
- (b) Proposals should not result in unacceptable visual impact.
- (c) Proposals close to working farms should not interfere with farming operations, and will be expected to accept the nature of the existing local environment. New houses should not be sited within 400m of an existing or proposed intensive livestock building. (Policy ER31).

Roads/Parking/Access

- (d) Access arrangements, road layouts and parking should be in accordance with Angus Council's Roads Standards, and use innovative solutions where possible, including 'Home Zones'. Provision for cycle parking/storage for flatted development will also be required.
- (e) Access to housing in rural areas should not go through a farm court.
- (f) Where access is proposed by unmade/private track it will be required to be made-up to standards set out in Angus Council Advice Note 17 : Miscellaneous Planning Policies. If the track exceeds 200m in length, conditions may be imposed regarding widening or the provision of passing places where necessary.
- (g) Development should not result in the loss of public access rights. (Policy SC36)

Landscaping / Open Space / Biodiversity

- (h) Development proposals should have regard to the Landscape Character of the local area as set out in the Tayside Landscape Character Assessment (SNH 1998). (Policy ER5)
- (i) Appropriate landscaping and boundary treatment should be an integral element in the design and layout of proposals and should include the retention and enhancement of existing physical features (e.g. hedgerows, walls, trees etc) and link to the existing green space network of the local area.
- (j) Development should maintain or enhance habitats of importance set out in the Tayside Local Biodiversity Action Plan and should not involve loss of trees or other important landscape features or valuable habitats and species.
- (k) The planting of native hedgerows and tree species is encouraged.
- (l) Open space provision in developments and the maintenance of it should be in accordance with Policy SC33.

Drainage and Flood Risk

- (m) Development sites located within areas served by public sewerage systems should be connected to that system. (Policy ER22)
- (n) Surface water will not be permitted to drain to the public sewer. An appropriate system of disposal will be necessary which meets the requirements of the Scottish Environment Protection Agency (SEPA) and Angus Council and should have regard to good practice advice set out in the Sustainable Urban Drainage Systems Design Manual for Scotland and Northern Ireland 2000.
- (o) Proposals will be required to consider the potential flood risk at the location. (Policy ER28)
- (p) Outwith areas served by public sewerage systems, where a septic tank, bio-disc or similar system is proposed to treat foul effluent and /or drainage is to a controlled water or soakaway, the consent of SEPA and Angus Council will be required. (Policy ER23).
- (q) Proposals should incorporate appropriate waste recycling, segregation and collection facilities (Policy ER38)
- (r) Development should minimise waste by design and during construction.

Supporting Information

- (s) Where appropriate, planning applications should be accompanied by the necessary supporting information. Early discussion with Planning and Transport is advised to determine the level of supporting information which will be required and depending on the proposal this might include any of the following: Air Quality Assessment; Archaeological Assessment; Contaminated Land Assessment; Design Statement; Drainage Impact Assessment; Environmental Statement; Flood Risk Assessment; Landscape Assessment and/or Landscaping Scheme; Noise Impact Assessment; Retail Impact Assessment; Transport

Assessment.

Policy ER5 : Conservation of Landscape Character

Development proposals should take account of the guidance provided by the Tayside Landscape Character Assessment and where appropriate will be considered against the following criteria:

- (a) sites selected should be capable of absorbing the proposed development to ensure that it fits into the landscape;
- (b) where required, landscape mitigation measures should be in character with, or enhance, the existing landscape setting;
- (c) new buildings/structures should respect the pattern, scale, siting, form, design, colour and density of existing development;
- (d) priority should be given to locating new development in towns, villages or building groups in preference to isolated development.

Policy ER11 : Noise Pollution

Development which adversely affects health, the natural or built environment or general amenity as a result of an unacceptable increase in noise levels will not be permitted unless there is an overriding need which cannot be accommodated elsewhere.

Proposals for development generating unacceptable noise levels will not generally be permitted adjacent to existing or proposed noise-sensitive land uses. Proposals for new noise-sensitive development which would be subject to unacceptable levels of noise from an existing noise source or from a proposed use will not be permitted.

Policy ER16 : Development Affecting the Setting of a Listed Building

Development proposals will only be permitted where they do not adversely affect the setting of a listed building. New development should avoid building in front of important elevations, felling mature trees and breaching boundary walls.

Policy ER18 : Archaeological Sites of National Importance

Priority will be given to preserving Scheduled Ancient Monuments in situ. Developments affecting Scheduled Ancient Monuments and other nationally significant archaeological sites and historic landscapes and their settings will only be permitted where it can be adequately demonstrated that either:

- (a) the proposed development will not result in damage to the scheduled monument or site of national archaeological interest or the integrity of its setting; or
- (b) there is overriding and proven public interest to be gained from the proposed development that outweighs the national significance attached to the preservation of the monument or archaeological importance of the site. In the case of Scheduled Ancient Monuments, the development must be in the national interest in order to outweigh the national importance attached to their preservation; and
- (c) the need for the development cannot reasonably be met in other less archaeologically damaging locations or by reasonable alternative means; and
- (d) the proposal has been sited and designed to minimise damage to the archaeological remains.

Where development is considered acceptable and preservation of the site in its original location is not possible, the excavation and recording of the site will be required in advance of development, at the developer's expense

Policy ER19 : Archaeological Sites of Local Importance

Where development proposals affect unscheduled sites of known or suspected archaeological interest, Angus Council will require the prospective developer to arrange for an archaeological evaluation to determine the importance of the site, its sensitivity to development and the most appropriate means for preserving or recording any archaeological information. The evaluation will be taken into account when determining whether planning permission should be granted with or without conditions or refused.

Where development is generally acceptable and preservation of archaeological features in situ is not feasible Angus Council will require through appropriate conditions attached to planning consents or through a Section 75 Agreement, that provision is made at the developer's expense for the excavation and recording of threatened features prior to development commencing.

Policy ER20 : Historic Landscapes and Designed Landscapes

Sites included in the "Inventory of Gardens and Designed Landscapes in Scotland", and any others that may be identified during the plan period, will be protected from development that adversely affects their character, amenity value and historic importance. Development proposals will only be permitted where it can be demonstrated that:

- (a) the proposal will not significantly damage the essential characteristics of the garden and designed landscape or its setting; or
- (b) there is a proven public interest, in allowing the development, which cannot be met in other less damaging locations or by reasonable alternative means.

Protection will also be given to non-inventory historic gardens, surviving features of designed landscapes, and parks of regional or local importance, including their setting.

Policy SC16 : Employment Land Supply

Angus Council will maintain a supply of employment land to which proposals for business and industry will be directed as follows:-

- * Arbroath, Elliot and Kirkton, (minimum 10 ha);
- * Forfar, Orchardbank (minimum 10 ha);
- * Montrose, Forties Road and Broomfield (minimum 10 ha);
- * Brechin, Business Park (minimum 5 ha);
- * Carnoustie (up to 5 ha);
- * Kirriemuir (up to 5 ha).

At these locations, and other established employment areas, planning permission will not normally be granted for uses other than Class 4* (business), Class 5* (general industry), and Class 6* (storage and distribution), but may be considered where they are small scale, complementary and ancillary to the existing or proposed use. Development proposals will require to demonstrate there is no detriment to the surrounding amenity.

* As defined in the Town and Country Planning (Use Classes) (Scotland) Order 1997.

Policy ER34 : Renewable Energy Developments

Proposals for all forms of renewable energy developments will be supported in principle and will be assessed against the following criteria:

- (a) the siting and appearance of apparatus have been chosen to minimise the impact on amenity, while respecting operational efficiency;
- (b) there will be no unacceptable adverse landscape and visual impacts having regard to landscape character, setting within the immediate and wider landscape, and sensitive viewpoints;
- (c) the development will have no unacceptable detrimental effect on any sites designated for natural heritage, scientific, historic or archaeological reasons;
- (d) no unacceptable environmental effects of transmission lines, within and beyond the site; and
- (e) access for construction and maintenance traffic can be achieved without compromising road safety or causing unacceptable permanent change to the environment and landscape, and
- (f) that there will be no unacceptable impacts on the quantity or quality of groundwater or surface water resources during construction, operation and decommissioning of the energy plant.

Policy ER35 : Wind Energy Developments

Wind energy developments must meet the requirements of Policy ER34 and also demonstrate:

- (a) the reasons for site selection;
- (b) that no wind turbines will cause unacceptable interference to birds, especially those that have statutory protection and are susceptible to disturbance, displacement or collision;
- (c) there is no unacceptable detrimental effect on residential amenity, existing land uses or road safety by reason of shadow flicker, noise or reflected light;
- (d) that no wind turbines will interfere with authorised aircraft activity;
- (e) that no electromagnetic disturbance is likely to be caused by the proposal to any existing transmitting or receiving system, or (where such disturbances may be caused) that measures will be taken to minimise or remedy any such interference;
- (f) that the proposal must be capable of co-existing with other existing or permitted wind energy developments in terms of cumulative impact particularly on visual amenity and landscape, including impacts from development in neighbouring local authority areas;
- (g) a realistic means of achieving the removal of any apparatus when redundant and the restoration of the site are proposed.

TAYplan Strategic Development plan

Policy 3 : Managing TAYplan's Assets

Employment land:

- Identifying and safeguarding at least five years supply of employment land within principal settlements to support the growth of the economy and a diverse range of industrial requirements;
- safeguarding areas identified for Class 4 office type uses in principal settlements; and
- further assisting in growing the year-round role of the tourism sector.

Greenbelts:

- Continuing to designate green belt boundaries at both St. Andrews and Perth to preserve their settings, views and special character including their historic cores; assist in safeguarding the countryside from encroachment; to manage long term planned growth including infrastructure in this Plan's Proposals Map and Strategic Development Areas in Policy 4; and define appropriate forms of development within the green belt based on Scottish Planning Policy;
- Using Perth green belt to sustain the identity of Scone, and provide sufficient land for planned development around key villages and settlements

Finite Resources:

Using the location priorities set out in Policy 1 of this Plan to:-

- safeguard minerals deposits of economic importance and land for a minimum of 10 years supply of construction aggregates at all times in all market areas; and
- protect prime agricultural land, new and existing forestry areas, and carbon rich soils (where identified) where the advantages of development do not outweigh the loss of productive land.

Natural and Historic Assets:

Understanding and respecting the regional distinctiveness and scenic value of the TAYplan area through:-

- ensuring development likely to have a significant effect on a designated or proposed Natura 2000 sites (either alone or in combination with other sites or projects), will be subject to an appropriate assessment. Appropriate mitigation requires to be identified where necessary to ensure there will be no adverse effect on the integrity of Natura 2000 sites in accordance with Scottish Planning Policy;
- safeguarding habitats, sensitive green spaces, forestry, watercourses, wetlands, floodplains (in-line

with the water framework directive), carbon sinks, species and wildlife corridors, geo-diversity, landscapes, parks, townscapes, archaeology, historic buildings and monuments and allow development where it does not adversely impact upon or preferably enhances these assets; and

- identifying and safeguarding parts of the undeveloped coastline along the River Tay Estuary and in Angus and North Fife, that are unsuitable for development and set out policies for their management; identifying areas at risk from flooding and sea level rise and develop policies to manage retreat and realignment, as appropriate.

Transport:

- Safeguarding land at Dundee and Montrose Ports, and other harbours, as appropriate, for port related uses to support freight, economic growth and tourism; and
- Safeguarding land for future infrastructure provision (including routes), identified in the Proposal Map of this Plan or other locations or routes, as appropriate, or which is integral to a Strategic Development Area in Policy 4 of this Plan, or which is essential to support a shift from reliance on the car and road-based freight and support resource management objectives

Policy 6 : Energy and Waste/Resource Management Infrastructure

Local Development Plans should identify areas that are suitable for different forms of renewable heat and electricity infrastructure and for waste/resource management infrastructure or criteria to support this; including, where appropriate, land for process industries (e.g. the co-location/proximity of surplus heat producers with heat users).

Beyond community or small scale facilities waste/resource management infrastructure is most likely to be focussed within or close to the Dundee and/or Perth Core Areas (identified in Policy 1).

Local Development Plans and development proposals should ensure that all areas of search, allocated sites, routes and decisions on development proposals for energy and waste/resource management infrastructure have been justified, at a minimum, on the basis of these considerations:-

- The specific land take requirements associated with the infrastructure technology and associated statutory safety exclusion zones where appropriate;
- Waste/resource management proposals are justified against the Scottish Government's Zero Waste Plan and support the delivery of the waste/resource management hierarchy;
- Proximity of resources (e.g. woodland, wind or waste material); and to users/customers, grid connections and distribution networks for the heat, power or physical materials and waste products, where appropriate;
- Anticipated effects of construction and operation on air quality, emissions, noise, odour, surface and ground water pollution, drainage, waste disposal, radar installations and flight paths, and, of nuisance impacts on of-site properties;
- Sensitivity of landscapes (informed by landscape character assessments and other work), the water environment, biodiversity, geo-diversity, habitats, tourism, recreational access and listed/scheduled buildings and structures;
- Impacts of associated new grid connections and distribution or access infrastructure;
- Cumulative impacts of the scale and massing of multiple developments, including existing infrastructure;
- Impacts upon neighbouring planning authorities (both within and outwith TAYplan); and,

- Consistency with the National Planning Framework and its Action Programme.

Angus Local Plan Review

GENERAL POLICIES

BACKGROUND

1.28 Several of the policies in this part of the Plan may be relevant to some development proposals. Development boundaries differentiate between built-up areas and the countryside and are used as a tool to guide the application of policies in the Plan which apply to particular locations. The policies on integration of land use and transport, design matters, environmental protection, safeguard areas and Development Guidelines provide guidance for the consideration of relevant development proposals in the first instance before referring to detailed policies and proposals elsewhere in the Plan.

DEVELOPMENT BOUNDARIES

1.29 Angus Council has defined development boundaries around settlements to protect the landscape setting of towns and villages and to prevent uncontrolled growth. The presence of a boundary does not indicate that all areas of ground within that boundary have development potential.

Development boundaries:
Generally provide a definition between built-up areas and the countryside, but may include peripheral areas of open space that are important to the setting of settlements.

Policy S1 : Development Boundaries

- (a) Within development boundaries proposals for new development on sites not allocated on Proposals Maps will generally be supported where they are in accordance with the relevant policies of the Local Plan.**
- (b) Development proposals on sites outwith development boundaries (i.e. in the countryside) will generally be supported where they are of a scale and nature appropriate to the location and where they are in accordance with the relevant policies of the Local Plan.**
- (c) Development proposals on sites contiguous with a development boundary will only be acceptable where there is a proven public interest and social, economic or environmental considerations confirm there is an overriding need for the development which cannot be met within the development boundary.**

Public interest:
Development would have benefits for the wider community, or is justifiable in the national interest. Proposals that are solely of commercial benefit to the proposer would not comply with this policy.

ACCESSIBLE DEVELOPMENT

1.30 A key element in the creation of sustainable communities is how well new development is integrated with the existing form of development and transport networks. The Local Plan allocates land for new development within the main settlements, in locations that are well related to the existing form and pattern of development and therefore the existing transport network.

1.31 New transport provision should take account of existing and planned growth in particular locations and form part of the overall planning of the layout of new development.

SPP17 : Planning for Transport
The planning system is a key mechanism for integration through supporting:

- **a pattern of development and redevelopment that:**
 - **supports economic growth and regeneration;**
 - **takes account of identified population and land use changes in improving accessibility to public services, including health services jointly planned with health boards;**

Policy S5 : Safeguard Areas

Planning permission for development within the consultation zones of notifiable installations, pipelines or hazards will only be granted where the proposal accords with the strategy and policies of this Local Plan and there is no objection by the Health & Safety Executive, Civil Aviation Authority or other relevant statutory agency.

DEVELOPMENT PRINCIPLES

1.44 The principles in Schedule 1 provide a ‘checklist’ of factors which should be considered where relevant to development proposals. They include amenity considerations; roads and parking; landscaping, open space and biodiversity; drainage and flood risk, and supporting information. The Local Plan includes more detailed policies relating to some of the principles set out. Not all development proposals will require to comply with all of the principles.

Policy S6 : Development Principles

Proposals for development should where appropriate have regard to the relevant principles set out in Schedule 1 which includes reference to amenity considerations; roads and parking; landscaping, open space and biodiversity; drainage and flood risk, and supporting information.

(See page 15 for Schedule 1: Development Principles)

3.13 Where appropriate, development proposals will be considered in the context of the guidance provided by the Tayside Landscape Character Assessment. The assessment identifies different landscape character zones, considers their capacity to absorb change, and indicates how various types of development might best be accommodated to conserve characteristic landscape features and to strengthen and enhance landscape quality. Particular attention is focussed on the location, siting and design of development and the identification of proposals which would be detrimental to the landscape character of Angus.

Policy ER5 : Conservation of Landscape Character

Development proposals should take account of the guidance provided by the Tayside Landscape Character Assessment and where appropriate will be considered against the following criteria:

- (a) sites selected should be capable of absorbing the proposed development to ensure that it fits into the landscape;**
- (b) where required, landscape mitigation measures should be in character with, or enhance, the existing landscape setting;**
- (c) new buildings/structures should respect the pattern, scale, siting, form, design, colour and density of existing development;**
- (d) priority should be given to locating new development in towns, villages or building groups in preference to isolated development.**

Trees, Woodlands and Hedgerows

3.14 Trees, woodlands, hedgerows and treelines make valuable contributions to nature conservation and recreational activity and are integral to the landscape and townscape of Angus. Ancient woodland is of particular ecological value and is an irreplaceable resource. Such woodland requires special protection as once destroyed it cannot be recreated. Where appropriate, the Council will use Tree Preservation Orders to ensure the protection of an individual tree or group of trees considered important to the amenity value of the surrounding area. In addition and wherever possible the opportunity should be taken to strengthen woodland cover with local native species, either as part of a development proposal, or through the establishment of urban forestry and community woodland initiatives. Angus Council has established the Angus Millennium Forest (AMF) which covers around 83 ha of Council land in the main towns. The AMF makes a significant contribution to biodiversity, urban wildlife conservation and the provision of green spaces in these towns and should be protected from development.

Treeline (lowland)

As defined in The Local Biodiversity Action Plan this is a row of standard trees growing in a hedgerow or as a separate avenue of trees.

Tree Preservation Order(TPO):

An order made by the Planning Authority to preserve trees or woodlands in their area which are considered to have a high amenity value.

3.69 Angus Council supports the Government policy to address the causes of climate change, and has adopted an Environmental Policy Statement along with a draft Local Agenda 21 Strategy for Angus. The effective conservation and management of energy resources is important for economic, environmental and ecological reasons. The production of energy from renewable sources prevents the production of emissions in power generation, while the reduction of energy consumption reduces the demand for electricity from all sources and should make homes and businesses more cost efficient. In terms of sustainable development, energy efficiency and non-polluting power generation are fundamental to establishing a stable and environmentally acceptable energy policy.

Energy Efficiency

3.70 Energy efficiency, the reduction of pollution and the use of renewable resources are elements of the sustainable principles on which this plan is based. The key factors that impact on the energy efficiency of a building are site location and building design. The gradient and orientation of a site, together with the spacing between buildings and the height of possible obstructions have an impact on the amount of exposure a building has to direct sunlight and therefore its potential for solar energy gain. Heat loss is influenced by the number and/or construction of external walls and, on exposed sites, by the presence of planting and other types of windbreaks.

3.71 The choice of materials, amount of insulation, use of renewable energy sources and the installation of energy efficient heating/cooling systems can contribute to the wise use of resources. Energy generation and conservation technologies using renewable sources and energy efficient systems can reduce demand for fossil fuels and reduce running costs of domestic and commercial properties. Re-use of building materials and/or the local sourcing of materials also contributes to the conservation of resources and should be incorporated into development proposals wherever possible.

**Securing a Renewable Future,
Scottish Executive 2003**

Energy efficiency has a crucial role to play if we are to achieve significant cuts in carbon emissions. ...It is also vital to improving Scotland's economic performance and business competitiveness.

Policy ER33 : Energy Efficiency

Angus Council will encourage energy efficiency through the promotion of:

- **siting, form, orientation and layout of buildings to maximise the benefits of solar energy, passive solar gain, natural ventilation and natural light;**
- **the use of landscaping and boundary treatment to modify temperature extremes, minimise heat loss due to exposure and create shelter on inner faces and entrances to buildings;**
- **optimum provision of insulation and the use of energy efficient heating/cooling systems;**
- **the re-use of building materials;**
- **local sourcing of materials;**

- the use of a flexible design to facilitate possible future adaptation for other uses;
- renewable energy generation and energy efficient systems in domestic and commercial buildings where appropriate, which reduce demand for power from non-renewable sources.

Renewable Energy

3.72 The Scottish Executive is strongly supportive of renewable energies and has set a target of 17-18% of Scotland's electricity supply to come from renewable sources by 2010. NPPG6: Renewable Energy Developments (Revised 2000) considers a range of renewable energy technologies and encourages the provision of a positive policy framework to guide such developments. The Scottish Executive's aspiration is for renewable sources to contribute 40% of electricity production by 2020, an estimated total installed capacity of 6GW (Minister for Enterprise, July 2005). This will require major investment in commercial renewable energy production and distribution capacity throughout Scotland.

3.73 The Dundee and Angus Structure Plan acknowledges the advantages of renewable energy in principle but also recognises the potential concerns associated with development proposals in specific locations. Angus Council supports the principle of developing sources of renewable energy in appropriate locations. Large-scale developments will only be encouraged to locate in areas where both technical (e.g. distribution capacity and access roads) and environmental capacity can be demonstrated.

3.74 Developments which impinge on the Cairngorms National Park will be considered within the context of the National Park Authority's Planning Policy No1: Renewable Energy.

Renewable Energy Sources

3.75 Offshore energy production, including wind and tidal methods, has the potential to make a significant contribution to the production of renewable energy in Scotland. Other than small-scale onshore support buildings, such developments currently fall outwith the remit of the planning system.

3.76 All renewable energy production, including from wind, water, biomass, waste incineration and sources using emissions from wastewater treatment works and landfill sites will require some processing, generating or transmission plant. Such developments, that can all contribute to reducing emissions will have an impact on the local environment and will be assessed in accordance with Policy ER34.

Policy ER34 : Renewable Energy Developments

Proposals for all forms of renewable energy development will be supported in principle and will be assessed against the following criteria:

NPPG6: Renewable Energy Developments (Revised 2000)

The Scottish Ministers wish to see the planning system make positive provision for renewable energy whilst at the same time:

- meeting the international and national statutory obligations to protect designated areas, species, and habitats of natural heritage interest and the historic environment from inappropriate forms of development; and
- minimising the effects on local communities.

Large-scale projects which may or will require an Environmental Assessment. These are defined as hydroelectric schemes designed to produce more than 0.5MW and wind farms of more than 2 turbines or where the hub height of any turbine or any other structure exceeds 15m.

SNH's EIA Handbook identifies 6 types of impact which may require an assessment:

- Landscape and visual;
- Ecological;
- Earth heritage;
- Soil;
- Countryside access; and
- Marine environment.

- (a) the siting and appearance of apparatus have been chosen to minimise the impact on amenity, while respecting operational efficiency;
- (b) there will be no unacceptable adverse landscape and visual impacts having regard to landscape character, setting within the immediate and wider landscape, and sensitive viewpoints;
- (c) the development will have no unacceptable detrimental effect on any sites designated for natural heritage, scientific, historic or archaeological reasons;
- (d) no unacceptable environmental effects of transmission lines, within and beyond the site; and
- (e) access for construction and maintenance traffic can be achieved without compromising road safety or causing unacceptable permanent and significant change to the environment and landscape.

Wind Energy

3.77 Onshore wind power is likely to provide the greatest opportunity and challenge for developing renewable energy production in Angus. Wind energy developments vary in scale but, by their very nature and locational requirements, they have the potential to cause visual impact over long distances. Wind energy developments also raise a number of environmental issues and NPPG 6 advises that planning policies should guide developers to broad areas of search and to establish criteria against which to consider development proposals. In this respect, Scottish Natural Heritage Policy Statement 02/02, Strategic Locational Guidance for Onshore Wind Farms in Respect of the Natural Heritage, designates land throughout Scotland as being of high, medium or low sensitivity zones in terms of natural heritage. Locational guidance is provided to supplement the broad-brush zones.

3.78 A range of technical factors influence the potential for wind farm development in terms of location and viability. These include wind speed, access to the distribution network, consultation zones, communication masts, and proximity to radio and radar installations. Viability is essentially a matter for developers to determine although annual average wind speeds suitable for commercially viable generation have been recorded over most of Angus, other than for sheltered valley bottoms. Environmental implications will require to be assessed in conjunction with the Council, SNH and other parties as appropriate.

Strategic Locational Guidance for Onshore Windfarms in Respect of the Natural Heritage - Scottish Natural Heritage Policy Statement No 02/02

Zone 3 – high natural heritage sensitivity. Developers should be encouraged to look outwith Zone 3 for development opportunities

Zone 2 – medium natural heritage sensitivity. ...while there is often scope for wind farm development within Zone 2 it may be restricted in scale and energy output and will require both careful choice of location and care in design to avoid natural heritage impacts.

Zone 1 - ...inclusion of an area in Zone 1 does not imply absence of natural heritage interest. Good siting and design should however enable such localised interests to be respected, so that overall within Zone 1, natural heritage interests do not present a significant constraint on wind farm development

Figure 3.4 : Geographic Areas



1 Highland

2 Lowland and Hills

3 Coast

TLCA Designation

- 1a Upper Highland Glens
- 1b Mid Highland Glens
- 3 Highland Summits & Plateaux
- 5 Highland Foothills

TLCA Designation

- 8 Igneous Hills
- 10 Broad Valley Lowland
- 12 Low Moorland Hills
- 13 Dipslope Farmland

TLCA Designation

- 14a Coast with sand
- 14b Coast with cliffs
- 15 Lowland Basin

3.79 Scottish Natural Heritage published a survey of Landscape Character, the Tayside Landscape Character Assessment (TLCA), which indicates Angus divides naturally into three broad geographic areas – the Highland, Lowland and hills and the Coast. The Tayside Landscape Character Assessment provides a classification to map these areas based on their own particular landscape characteristics (Fig 3.4).

Area	TLCA Classification	Landscape Character
1 Highland	1a, 1b, 3, 5	Plateaux summits, glens and complex fault line topography
2 Lowland and hills	8, 10, 12, 13	Fertile strath, low hills and dipslope farmland.
3 Coast	14a, 14b, 15	Sand and cliff coast and tidal basin

The impact of wind farm proposals will, in terms of landscape character, be assessed against the TLCA classifications within the wider context of the zones identified in SNH Policy Statement 02/02.

3.80 The open exposed character of the Highland summits and the Coast (Areas 1 and 3) is sensitive to the potential landscape and visual impact of large turbines. The possibility of satisfactorily accommodating turbines in parts of these areas should not be discounted although locations associated with highland summits and plateaux, the fault line topography and coast are likely to be less suitable. The capacity of the landscape to absorb wind energy development varies. In all cases, the scale layout and quality of design of turbines will be an important factor in assessing the impact on the landscape.

3.81 The Highland and Coast also have significant natural heritage value, and are classified in SNH Policy Statement 02/02 as mainly Zone 2 or 3 - medium to high sensitivity. The development of large scale wind farms in these zones is likely to be limited due to potential adverse impact on their visual character, landscape and other natural heritage interests.

3.82 The Lowland and Hills (Area 2) comprises a broad swathe extending from the Highland boundary fault to the coastal plain. Much of this area is classified in Policy Statement 02/02 as Zone 1- lowest sensitivity. Nevertheless, within this wider area there are locally important examples of higher natural heritage sensitivity such as small- scale landscapes, skylines and habitats which will influence the location of wind turbines. In all cases, as advocated by SNH, good siting and design should show respect for localised interests.

3.83 Wind farm proposals can affect residential amenity, historic and archaeological sites and settings, and other economic and social activities including tourism. The impact of wind farm developments on these interests requires careful assessment in terms of sensitivity and scale so that the significance can be determined and taken into account.

3.84 Cumulative impact occurs where wind farms/turbines are visually interrelated e.g. more than one wind farm is visible from a single point or sequentially in views from a road or a footpath.

Landscape and visual impact can be exacerbated if wind turbines come to dominate an area or feature. Such features may extend across local authority, geographic or landscape boundaries and impact assessments should take this into account. Environmental impacts can also be subject to cumulative effect – for example where a number of turbine developments adversely affect landscape character, single species or habitat type.

3.85 SNH advise that an assessment of cumulative effects associated with a specific wind farm proposal should be limited to all existing and approved developments or undetermined Section 36 or planning applications in the public domain. The Council may consider that a pre-application proposal in the public domain is a material consideration and, as such, may decide it is appropriate to include it in a cumulative assessment. Similarly, projects outwith the 30km radius may exceptionally be regarded as material in a cumulative context.

Policy ER35 : Wind Energy Development

Wind energy developments must meet the requirements of Policy ER34 and also demonstrate:

- (a) the reasons for site selection;**
- (b) that no wind turbines will cause unacceptable interference to birds, especially those that have statutory protection and are susceptible to disturbance, displacement or collision;**
- (c) there is no unacceptable detrimental effect on residential amenity, existing land uses or road safety by reason of shadow flicker, noise or reflected light;**
- (d) that no wind turbines will interfere with authorised aircraft activity;**
- (e) that no electromagnetic disturbance is likely to be caused by the proposal to any existing transmitting or receiving system, or (where such disturbances may be caused) that measures will be taken to minimise or remedy any such interference;**
- (f) that the proposal must be capable of co-existing with other existing or permitted wind energy developments in terms of cumulative impact particularly on visual amenity and landscape, including impacts from development in neighbouring local authority areas;**
- (g) a realistic means of achieving the removal of any apparatus when redundant and the restoration of the site are proposed.**

NPPG6 : Renewable Energy Developments (Revised 2000)

Large-scale projects which may or will require an Environmental Assessment. These are defined as hydroelectric schemes designed to produce more than 0.5MW and wind farms of more than 2 turbines or where the hub height of any turbine or any other structure exceeds 15m.

Local Community Benefit

3.86 Where renewable energy schemes accord with policies in this local plan there may be opportunities to secure contributions from developers for community initiatives. Such contributions are not part of the planning process and as such will require to be managed through other means than obligations pursuant to Section 75 Planning Agreement. Community contributions are separate from planning gain and will not be considered as part of any planning application.



PRODUCTION C02



TAYplan: Scotland's SusTAYnable Region
Strategic Development Plan
 2012 - 2032

Approved
June 2012

TAYplan
 The Strategic Development Planning Authority
 for Dundee, Angus, Perth and North Fife



Scotland's SusTAYnable Region

Strategic Development Plan

2012 - 2032

Energy and Waste/Resource Management Infrastructure: Ensures that energy and waste/resource management infrastructure are in the most appropriate locations.

This Plan seeks to reduce resource consumption through provision of energy and waste/resource management infrastructure* in order to contribute to Scottish Government ambitions for the mitigation of and adaptation to climate change and to achieve zero waste. It also aims to contribute towards greater regional energy self-sufficiency.

This requires us to use less energy and to generate more power and heat from renewable sources and resource recovery; and, to consider waste from start to finish; becoming better at resource management. This is strongly tied into resource security and living within environmental limits. It also presents opportunities to grow the renewable energy and waste/resource management sector as a whole within the TAYplan region. The issue is no longer about whether such facilities are needed but instead about helping to ensure they are delivered in the most appropriate locations.

Land use planning is only one of the regulatory requirements that energy and waste/resource management operators must consider. This Plan does not provide the locations for energy infrastructure; this role is for Local Development Plans. It sets out a series of locational considerations for all energy and waste/resource management infrastructure as the impacts and operations of these share similar characteristics.

This Plan ensures consistency between Local Development Plans in fulfilling Scottish Planning Policy requirements to define areas of search for renewable energy infrastructure and it applies this to a wide range of energy and waste/resource management infrastructure.

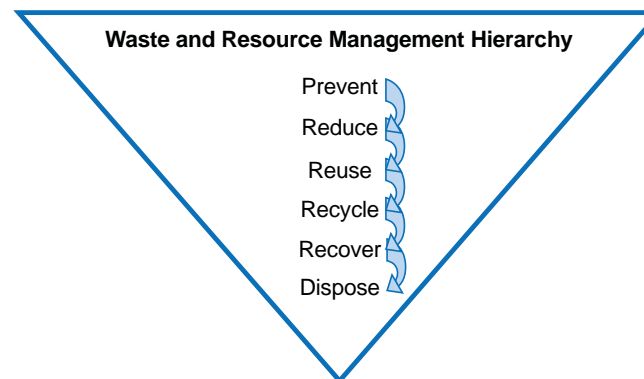
It recognises the different scales – property (eg micro-renewables or individual waste facilities), community (eg district heating and power or local waste facilities) and regional/national (eg national level schemes and waste facilities for wide areas) at which this infrastructure can be provided and both the individual and cumulative contribution that can be made, particularly by community and property scale infrastructure, to Scottish Government objectives for greater decentralisation of heat and energy.

Changes in the law allowing surplus power to be sold back to the national grid and other incentives could stimulate interest from local authorities, businesses, householders, community land trusts and other groups to obtain loans for energy infrastructure to enable development to meet local or individual needs in future. Similarly the price of materials in the global market place may continue to stimulate business interests in resource recovery.

Many of the region's existing waste management facilities have additional capacity or could be expanded in situ, including the strategic scale facilities at Binn Farm near Glenfarg and DERL at Baldovie in Dundee. No requirement for new landfill sites has been identified before 2024 and successful implementation of the Scottish Government's Zero Waste Plan and expansion of other treatment facilities could extend this to and beyond 2032.

This Plan encourages new strategic scale waste/resource management infrastructure to be within or close to the Dundee and Perth Core Areas reflecting the proximity of materials and customers for heat and other products.

Modern waste/resource management infrastructure is designed and regulated to high standards and is similar to other industrial processes. Subject to detailed site specific considerations, waste management facilities can be considered appropriate land uses within industrial and employment sites.



*Energy and waste management infrastructure: Infrastructure for heat and power generation and transmission; and, collection, separation, handling, transfer, processing, resource recovery and disposal of waste. This includes recycling plants, anaerobic waste digesters, energy from waste plants, wind turbines, biomass plants, combined heat and power plants, solar power, hydro electric power plants and similar facilities.

Policy 6: Energy and Waste/Resource Management Infrastructure

To deliver a low/zero carbon future and contribute to meeting Scottish Government energy and waste targets:

A. Local Development Plans should identify areas that are suitable for different forms of renewable heat and electricity infrastructure and for waste/resource management infrastructure or criteria to support this; including, where appropriate, land for process industries (e.g. the co-location/proximity of surplus heat producers with heat users).

B. Beyond community or small scale facilities waste/resource management infrastructure is most likely to be focussed within or close to the Dundee and/or Perth Core Areas (identified in Policy 1).

C. Local Development Plans and development proposals should ensure that all areas of search, allocated sites, routes and decisions on development proposals for energy and waste/resource management infrastructure have been justified, at a minimum, on the basis of these considerations:

- The specific land take requirements associated with the infrastructure technology and associated statutory safety exclusion zones where appropriate;
- Waste/resource management proposals are justified against the Scottish Government's Zero Waste Plan and support the delivery of the waste/resource management hierarchy;
- Proximity of resources (e.g. woodland, wind or waste material); and to users/customers, grid connections and distribution networks for the heat, power or physical materials and waste products, where appropriate;
- Anticipated effects of construction and operation on air quality, emissions, noise, odour, surface and ground water pollution, drainage, waste disposal, radar installations and flight paths, and, of nuisance impacts on off-site properties;
- Sensitivity of landscapes (informed by landscape character assessments and other work), the water environment, biodiversity, geo-diversity, habitats, tourism, recreational access and listed/scheduled buildings and structures;
- Impacts of associated new grid connections and distribution or access infrastructure;
- Cumulative impacts of the scale and massing of multiple developments, including existing infrastructure;
- Impacts upon neighbouring planning authorities (both within and outwith TAYplan); and,
- Consistency with the National Planning Framework and its Action Programme.