AGENDA ITEM NO 4

REPORT NO 232/14

ANGUS COUNCIL

DEVELOPMENT MANAGEMENT REVIEW COMMITTEE – 15 MAY 2014

FIELD 500M NORTH WEST OF ASCURRY FARM, LETHAM

REPORT BY THE HEAD OF LEGAL AND DEMOCRATIC SERVICES

ABSTRACT:

The Committee is asked to consider an application for a Review of the non-determination of application No 13/01029/FULL in respect of Erection of Wind Turbine of 50m to Hub Height and 77m to Blade Tip and Associated Sub-Station and Transformer Kiosk, Hardstanding Areas and Access Road at Field 500m North West of Ascurry Farm, Letham.

1. RECOMMENDATIONS

It is recommended that the Committee:-

(i) review the case submitted by the Planning Authority (Appendix 1);

(ii) review the case submitted by the Applicant (Appendix 2);

(iii) consider further lodged representations by interested parties (Appendix 3); and

(iv) consider the applicant's response to further representations (Appendix 4).

2. ALIGNMENT TO THE ANGUS COMMUNITY PLAN/SINGLE OUTCOME AGREEMENT/CORPORATE PLAN

This Report contributes to the following local outcomes contained within the Angus Community Plan and Single Outcome Agreement 2013-2016:

- Our communities are developed in a sustainable manner
- Our natural and built environment is protected and enjoyed

3. CURRENT POSITION

The Development Management Review Committee is required to determine if they have sufficient information from the Applicant and the Planning Authority to review the case. Members may also wish to inspect the site before full consideration of the Appeal.

4. FINANCIAL IMPLICATIONS

There are no financial implications arising directly from the recommendations in the Report.

5. CONSULTATION

In accordance with Standing Order 47(3), this Report falls within an approved category that has been confirmed as exempt from the consultation process.

NOTE: No background papers, as defined by Section 50D of the Local Government (Scotland) Act 1973, (other than any containing confidential or exempt information) were relied on to any material extent in preparing the above Report.

Report Author: Sarah Forsyth
E-Mail: LEGDEM@angus.gov.uk

List of Appendices:

Appendix 1 – Submission by Planning Authority
Appendix 2 – Submission by Applicant
Appendix 3 – Further Lodged Representations by Interested Parties
Appendix 4 – Applicant’s Response

APPLICATION NO. 13/01029/FULL
APPLICANT: A M MCEWAN
FIELD 500M NORTH WEST OF ASCURRY FARM
ASCURRY, LETHAM

ANGUS COUNCIL'S SUBMISSION

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AC1

From: Windfarms [windfarms@atkinsglobal.com]
Sent: 13 November 2013 05:49
To: PLNProcessing
Subject: WF 25570 - 13/01029/FULL - Field 500M North West Of, Ascurry Farm - NO 53539 46476

Dear Sirs,

I am responding to an email of 12-Nov-13, regarding the above named proposed development.

The above application has now been examined in relation to UHF Radio Scanning Telemetry communications used by our Client in that region and we are happy to inform you that we have **NO OBJECTION** to your proposal.

Please note that this is not in relation to any Microwave Links operated by Scottish Water

Atkins Limited is responsible for providing Wind Farm/Turbine support services to the Telecommunications Association of the UK Water Industry (TAUWI).

Atkins Limited is responsible for providing Wind Farm/Turbine support services to the Telecommunications Association of the UK Water Industry. Web: www.tauwi.co.uk

Windfarm Support
ATKINS
The official engineering design services provider
for the London 2012 Olympic and Paralympic Games
Web: www.atkinsglobal.com/communications

From: Spectrum Licensing [Spectrum.Licensing@ofcom.org.uk]
Sent: 13 November 2013 10:09
To: KennedyPD
Cc: 'windfarms@atkinsglobal.com'; 'windfarms@jrc.co.uk'
Subject: RE: e consultation

Attachments: MOD Info Ascurry.doc; e consultation ascurry.rtf

AC2

Fixed Link Report for Windfarm Co-ordination Area:

Dear Sir/Madam

Search Radius 0m at Centre NGR NO5353946476 NO Links Identified. Search includes an additional 500m of requested radius.

Links	Company	Contact	Telephone	Email

These details are provided to Ofcom by Fixed Link operators at the time of their licence application and cannot verified by Ofcom for accuracy or currency and Ofcom makes no guarantees for the currency or accuracy of information or that they are error free. As such, Ofcom cannot accept liability for any inaccuracies or omissions in the data provided, or its currency however so arising. The information is provided without any representation or endorsement made and without warranty of any kind, whether express or implied, including but not limited to the implied warranties of satisfactory quality, fitness for a particular purpose, non-infringement, compatibility, security and accuracy.

Our response to your co-ordination request is only in respect of microwave fixed links managed and assigned by Ofcom within the bands and frequency ranges specified in the table below. The analysis identifies all fixed links with either one link leg in the coordination range or those which intercept with the coordination range. The coordination range is a circle centred on your provided national grid reference. We add an additional 500 metres to the coordination range that you request. Therefore if you have specified 500 metres the coordination range will be 1km.

If you should need further information regarding link deployments and their operation then you will need to contact the fixed link operator (s) identified in the table above directly.

Additional coordination is also necessary with the band managers for the water, electricity and utilities industries which operate in the frequency ranges 457-458 MHz paired with 463-464 MHz band. You should contact both the following:

- Atkins Ltd at windfarms@atkinsglobal.com.
- Joint Radio Company (JRC) at windfarms@jrc.co.uk. Additionally, you can call the JRC Wind Farm Team on 020 7706 5197.

For self coordinated links operating in the 64-66GHz, 71-76GHz and 81-86GHz bands a list of current links can be found at: http://www.ofcom.org.uk/radiocomms/ifi/licensing/classes/fixed/

Regarding assessment with respect to TV reception, the BBC has an online tool available on their website: http://www.bbc.co.uk/reception/info/windfarm_tool.shtml . Ofcom do not forward enquiries to the BBC.

Please note other organisations may require coordination with regard to your request. More information regarding windfarm planning

is available on the British Wind Energy Association website www.bwea.com .

AC2

Table of assessed fixed links bands and frequency ranges

Band (GHz)	Frequency Range (MHz)
1.4/1.5	1350 -1375 1450 -1452 1492 -1530
1.6	1672 – 1690
1.7	1764 – 1900
2	1900 – 2690
4	3600 – 4200
6	5925 – 7110
7.5	7425 – 7900
11	10700 – 11700
13	12750 – 13250
14	14250 – 14620
15	14650 – 15350
18	17300 – 19700
22	22000 – 23600
25	24500 – 26500
28	27500 – 29500
38	37000 – 39500
50	49200 – 50200
55	55780 – 57000

Regards

Duty Engineering Officer
Spectrum Management Centre
Spectrum Operations

:: Ofcom
Radio Monitoring Station
Royston Road
Baldock
Hertfordshire
SG7 6SH
www.ofcom.org.uk

From: KennedyPD [mailto:KennedyPD@angus.gov.uk]
Sent: 12 November 2013 12:42
To: NATSsafeguarding@nats.co.uk; Spectrum Licensing; windfarms@jrc.co.uk; claire.b.smith@rspb.org.uk; windfarms@caa.co.uk; Safeguarding@hial.co.uk; dioopsnorth-lms7b@mod.uk; windfarms@atkinsglobal.com
Subject: e consultation

Planning application 13/01029/FULL

Field 500M North West Of
Ascurry Farm
Ascurry
Letham

AC2

Erection Of Wind Turbine Of 50 Metres To Hub Height And 77 Metres To Blade Tip And Associted Sub-Station And Transformer Kiosk, Hardstanding Areas And Access Road

Phyllis Kennedy Communities Planning & Place County Buildings Market Street Forfar DD8 3LG
Telephone 01307 473394
E Mail Kennedypd@angus.gov.uk

AC3

From: ALLEN, Sarah J [Sarah.ALLEN@nats.co.uk] on behalf of NATS Safeguarding [NATSSafeguarding@nats.co.uk]
Sent: 14 November 2013 15:15
To: PLNProcessing
Subject: Your Ref: 13/01029/FULL (Our Ref: W(F)18213)

The proposed development has been examined from a technical safeguarding aspect and does not conflict with our safeguarding criteria. Accordingly, NATS (En Route) Public Limited Company ("NERL") has no safeguarding objection to the proposal.

However, please be aware that this response applies specifically to the above consultation and only reflects the position of NERL (that is responsible for the management of en route air traffic) based on the information supplied at the time of this application. This letter does not provide any indication of the position of any other party, whether they be an airport, airspace user or otherwise. It remains your responsibility to ensure that all the appropriate consultees are properly consulted.

If any changes are proposed to the information supplied to NERL in regard to this application which become the basis of a revised, amended or further application for approval, then as a statutory consultee NERL requires that it be further consulted on any such changes prior to any planning permission or any consent being granted.

Yours faithfully,

Sarah Allen
Technical Administrator
On behalf of NERL Safeguarding Office

AC4

KellyR

From: AkroydL
Sent: 18 November 2013 14:44
To: KellyR
Cc: ThomsonSD
Subject: 13/01029/FULL - Erection of Wind Turbine, Field 500m North West of Ascurry Farm, Ascurry, Letham

Ruari,

13/01029/FULL
Erection of Wind Turbine
Field 500m North West of Ascurry Farm, Ascurry, Letham

I refer to the above application and can advise that I have visited the site and reviewed the information submitted which indicates that the proposed turbine does not exceed the recognised noise limit for this type of development.

I would therefore, not object to this proposal subject to the following conditions:

1. The turbine shall be a EWT Direct Wind 54 500kW, unless otherwise agreed in writing by the Planning Authority.

2. At any property lawfully existing at the date of this planning permission the rating level of noise emissions, including any tonal correction from the wind turbine when measured in accordance with the guidance in ''The assessment and Rating of noise from wind farms, ETSU-R-97'', shall not exceed 35 dB(LA90) at wind speeds up to 10 ms^{-1} at 10m height.

3. At the reasonable request of the Planning Authority following a complaint, the operator of the development shall, at its expense, measure and assess the level of noise emissions from the wind turbine following the procedures described in ''The assessment and Rating of noise from wind farms, ETSU-R-97'' or other method as maybe agreed in writing by the Planning Authority.

If you have any queries please do not hesitate to contact me.

Regards

Louise Akroyd, **Environmental Health Officer**, **Angus Council, Communities, Regulatory Protective & Prevention Services, County Buildings, Market Street, Forfar, Tel: 01307 473382**

AC5

From: Anne Phillips [APhillips@hial.co.uk]
Sent: 22 November 2013 12:08
To: PLNProcessing
Subject: Plan App 13/01029/FULL - Erect Single Wind Turbine NW of Ascurry Farm Letham
Your Ref: 13/01029/FULL

Dear Sir/Madam,

PROPOSAL: Erect Single Wind Turbine (max height 77m to blade tip)
LOCATION: 500m North West of Ascurry Farm Letham

With reference to the above proposed development, it is confirmed that our calculations show that, at the given position and height, this development would not infringe the safeguarding surfaces for **Dundee Airport.**

Therefore, Dundee Airport Limited has no objections to the proposal.

Anne Phillips
Operations Manager
on behalf of Dundee Airport Limited
c/o Highlands and Islands Airports Limited
Head Office, Inverness Airport, Inverness IV2 7JB
' 01667 464244 (DIRECT DIAL)
* safeguarding@hial.co.uk þ www.hial.co.uk

AC6

Memorandum

Communities
(Roads)

TO: HEAD OF PLANNING & PLACE

FROM: HEAD OF TECHNICAL & PROPERTY SERVICES

YOUR REF:

OUR REF: GH/AG/ /TD1.3

DATE: 22 November 2013

SUBJECT: PLANNING APPLICATION REF. NO. 13/01029/FULL – PROPOSED 77m WIND TURBINE TO BLADE AT HILLHEAD OF ASCURRY FARM LETHAM FOR A.M.McEWAN

I refer to the above planning application.

The site is located on the east side of U465 Kinneries Road which is single track with two right angled bends on approach to site.

I have considered the application in terms of the traffic likely to be generated by it, and its impact on the public road network. As a result, I do not object to the application but would recommend that any consent granted shall be subject to the following condition:

1 That, prior to the commencement of development, a Construction Traffic Management and Routing Plan shall be submitted for the written approval of the Planning Authority. The details of the plan should consider arrangements for the following:

(i) agreement with the Roads Authority on the routing for abnormal loads;

(ii) the type and volume of vehicles to be utilised in the delivery of construction materials;

(iii) assessment of the suitability of the proposed routes, including bridge capacities, to accommodate the type and volume of traffic to be generated by the development. The assessment shall include details of swept path analyses and include DVD video route surveys;

(iv) mitigating measures on public roads, including, carriageway widening, junction alterations, associated drainage works, protection to public utilities,

temporary or permanent traffic management signing, and temporary relocation or removal of other items of street furniture;

(v) the restriction of delivery traffic to agreed routes;

(vi) the timing of construction traffic to minimise impacts on local communities, particularly at school start and finish times, during refuse collection, at weekends and during community events;

(vii) a code of conduct for HGV drivers to allow for queuing traffic to pass;

(viii) liaison with the roads authority regarding winter maintenance;

(ix) contingency procedures, including names and telephone numbers of persons responsible, for dealing with vehicle breakdowns;

(x) a dust and dirt management strategy, including sheeting and wheel cleaning prior to departure from the site;

(xi) the location, design, erection and maintenance of warning/information signs for the duration of the works, at site accesses and crossovers on private haul roads or tracks used by construction traffic and pedestrians, cyclists or equestrians;

(xii) contingencies for unobstructed access for emergency services;

(xiii) co-ordination with other major commercial users of the public roads on the agreed routes in the vicinity of the site;

(xiv) traffic management, in the vicinity of temporary construction compounds;

(xv) the provision of data from traffic counters, installed at locations and at intervals to be agreed with the Roads Authority, at the applicant's expense;

(xvi) arrangements for the monitoring, reviewing and reporting on the implementation of the approved plan; and

(xvii) procedures for dealing with non-compliance with the approved plan.

The Construction Traffic Management and Routing Plan shall be implemented in accordance with the approved details.
Reason: to ensure the free flow of traffic, in the interests of road safety and for the convenience of road users.

I trust the above comments are of assistance but should you have any further queries, please contact Adrian Gwynne on extension 3393.

AC7

26/11/2013

Angus Council
Angus House Orchardbank Business Park
Forfar
Angus
DD8 1AX

SCOTTISH WATER

Customer Connections
419 Balmore Road
Glasgow
G22 6NU

Customer Support Team
T: 0141 355 5511
F: 0141 355 5386
W: www.scottishwater.co.uk
E: connections@scottishwater.co.uk

Dear Sir Madam

PLANNING APPLICATION NUMBER: 13/01029/FULL
DEVELOPMENT: Letham Ascurry
OUR REFERENCE: 637579

Please quote our reference in all future correspondence

Scottish Water has no objection to this planning application. This response is made based on the information available to us at this time and does not guarantee a connection to Scottish Water's infrastructure. A separate application should be submitted to us made for connection to our infrastructure after full planning has been granted.

Should the developer require information regarding the location of Scottish Water infrastructure they should contact our Property Searches Department, Bullion House, Dundee, DD2 5BB. Tel – 0845 601 8855.

If the developer requires any further assistance or information on our response, please contact me on the above number or alternatively additional information is available on our website: www.scottishwater.co.uk.

Yours faithfully

Janine Franssen
Customer Connections Administrator

From: Windfarms [Windfarms@caa.co.uk]
Sent: 12 November 2013 12:46
To: KennedyPD
Cc: PLNProcessing
Subject: RE: e consultation

Dear Sir/Madam

Request for Comment under the Town and Country Planning Act 1990 and the Town and Country Planning (Scotland) Act 1997

There is currently a high demand for CAA comment on wind turbine applications which exceeds the capacity of the available resource to respond to requests within the timescales required by Local Planning Authorities. The CAA has no responsibilities for safeguarding sites other than its own property, and a consultation by a Council is taken as a request for clarification of procedural matters. Councils are reminded of their obligations to consult in accordance with ODPM/DfT Circular 1/2003 or Scottish Government Circular 2/2003, and in particular to consult with NATS and the Ministry of Defence as well as any aerodromes listed in Annex 3 of the above documents, taking note of appropriate guidance and policy documentation. Should the Council be minded to grant consent to an application despite an objection from one of the bodies listed in the circular, then the requisite notifications should be made.

Whilst the CAA recommends all aerodrome operators/license holders develop associated safeguarding maps and lodge such maps with local planning authorities, the CAA additionally encourages councils/planning authorities to undertake relevant consultation with known local aerodromes regardless of status or the existence of any aerodrome/council safeguarding agreement, including local emergency service Air Support Units (e.g. Police Helicopter or Air Ambulance).

There is an international civil aviation requirement for all structures of 300 feet (91.4 metres)* or more to be charted on aeronautical charts. However, on behalf of other non-regulatory aviation stakeholders, in the interest of Aviation Safety, the CAA requests that any feature/structure 70 feet in height, or greater, above ground level is notified to the Defence Geographic Centre (CGDGC-ProdAISAFDb@mod.uk, including the location(s), height(s)* and lighting status of the feature/structure, the estimated and actual dates of construction and the maximum height of any construction equipment to be used, at least 6 weeks prior to the start of construction, to allow for the appropriate notification to the relevant aviation communities.

Any structure of 150 metres* or more must be lit in accordance with the Air Navigation Order and should be appropriately marked. Although if an aviation stakeholder (including the MOD) made a request for lighting it is highly likely that the CAA would support such a request, particularly if the request falls under Section 47 of the Aviation Act.

Cumulative effects of turbines may lead to unacceptable impacts in certain geographic areas.

The Ministry of Defence will advise on all matters affecting military aviation.

Should the Council still have a specific query about a particular aspect of this application the CAA will help in the clarification of aviation matters and regulatory requirements. Site operators remain responsible for providing expert testimony as to any impact on their operations and the lack of a statement of objection or support from the CAA should not be taken to mean that there are no aviation issues, or that a comment from an operator lacks weight.

Guidance relating to the impact of wind turbines upon aviation can be found at http://www.caa.co.uk/docs/33/Cap764.pdf. More generic comment relating to the CAA involvement in the planning process is described at http://www.caa.co.uk/docs/33/DAP_GuidanceOnCAAPlanningConsultationRequirements.pdf.

Yours Faithfully

[redacted]
K LIGHTOWLER
Squadron Leader (RAF)
Surveillance and Spectrum Management
Directorate of Airspace Policy
Civil Aviation Authority
45-59 Kingsway London WC2B 6TE
Tel: 020 7453 6534 Fax: 020 7453 6565
windfarms@caa.co.uk

*The effective height of a wind turbine is the maximum height to blade tip.

From: KennedyPD [mailto:KennedyPD@angus.gov.uk]
Sent: 12 November 2013 12:42
To: NATSsafeguarding@nats.co.uk; Spectrum.LicensingEnquiries@ofcom.org.uk; windfarms@jrc.co.uk; claire.b.smith@rspb.org.uk; Windfarms; Safeguarding@hial.co.uk; dioopsnorth-lms7b@mod.uk; windfarms@atkinsglobal.com
Subject: e consultation

Planning application 13/01029/FULL

Field 500M North West Of
Ascurry Farm
Ascurry
Letham

Erection Of Wind Turbine Of 50 Metres To Hub Height And 77 Metres To Blade Tip And Associted Sub-Station And Transformer Kiosk, Hardstanding Areas And Access Road

Phyllis Kennedy Communities Planning & Place County Buildings Market Street Forfar DD8 3LG
Telephone 01307 473394
E Mail Kennedypd@angus.gov.uk

Comments for Planning Application 13/01029/FULL

Application Summary

Application Number: 13/01029/FULL
Address: Field 500M North West Of Ascurry Farm Ascurry Letham
Proposal: Erection Of Wind Turbine Of 50 Metres To Hub Height And 77 Metres To Blade Tip And Associted Sub-Station And Transformer Kiosk, Hardstanding Areas And Access Road
Case Officer: Ruari Kelly

Customer Details

Name: Mr Hugh Black
Address: Backboath Forfar

Comment Details

Commenter Type: Miscellaneous
Stance: Customer made comments in support of the Planning Application
Comment Reasons:
Comment:As a local resident and rural business owner I am in strong support of the wind development. Knowing the very high energy use for fresh produce production that the consumers demand and expect, off setting the carbon usage is a must. The elegance of the turbines across Scotland is an asset to the countryside and tourism and will have only positive influences in the agricultural industry.
I am in favour of the Wind Turbine at Ascurry

Letter from Mr & Mrs M Macari, Ascurry Farm Bungalow, Letham, Forfar, DD8 2QQ received 28 November 2013, reads as follows:-

> "This is a letter to register my support for Mr McEwan's application for a turbine at Ascurry Farm. I live about 500m from the site and do not have any concerns about it.
>
> I have a view straight down to Lunan Bay and the turbine at Cononsyth was built there. It hasn't detracted from our view at all. The turbine at Ascurry will have no effect on my families quality of life. Farming is an important part of the Angus economy, this turbine will support that. I would like Angus Council to approve this application."

Comments for Planning Application 13/01029/FULL

Application Summary

Application Number: 13/01029/FULL
Address: Field 500M North West Of Ascurry Farm Ascurry Letham
Proposal: Erection Of Wind Turbine Of 50 Metres To Hub Height And 77 Metres To Blade Tip And Associted Sub-Station And Transformer Kiosk, Hardstanding Areas And Access Road
Case Officer: Ruari Kelly

Customer Details

Name: Mrs K Allison
Address: The Bungalow Ovenstone Forfar

Comment Details

Commenter Type: Member of Public
Stance: Customer made comments in support of the Planning Application
Comment Reasons:
Comment:I write in support of the above application. I pass by the turbine at Cononsyth on a daily basis when I travel to my work. I can honestly say that I hardly notice the turbine now and I feel it has now become part of the landscape. The turbine at Ascurry is further away from houses and roads than the Conosyth turbine and i feel that this one after a very short time will also become part of the landscape. I would like to see Angus Council encourage the supply of green energy from using the wind resource available here in Scotland. I hope Angus Council go on to support this application

Comments for Planning Application 13/01029/FULL

Application Summary

Application Number: 13/01029/FULL
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Case Officer: Ruari Kelly

Customer Details

Name: Mr John Craig
Address: Quarryknowe Braehead road Letham

Comment Details

Commenter Type: Member of Public
Stance: Customer made comments in support of the Planning Application
Comment Reasons:
Comment:I have looked at the proposal and read all the comments both for and against the siting of the turbine. While there may be some cause for concern from some of the residents who live closest to the proposal, I think that a great deal of thought has went into the site in question, in order to try to minimize the visual impact from local roads, whilst trying to respect those living in the near vicinity. Progress for the future of farming is inevitable, and although some may not like change , it remains a fundamental part of the future of farming. I back the proposal for the turbine and think within a year or so of construction, that it will blend in and go largely unnoticed by the community.

Comments from Andrew Milne, 8 Burnhead Terrace, Redford, Carmyllie, Arbroath, DD11 2RB, received 6 December 2013, reads as follows:-

> "As a local resident, I am in strong support of wind development, knowing of the very high use of energy on farms at present.
>
> I already drive past two wind turbines (large) and two (small), all situated on local farms, plus another 1 large recently brought into use.
>
> The single turbine proposed is very efficient.
>
> I would therefore encourage Angus Council to support applications for single more efficient and quieter turbines.
>
> The clean supply of energy such as this turbine will provide, and which uses such a small area of land, should be encouraged by Angus Council.
>
> This supply of energy is a far better option than fossil or nuclear power."

Letter received from D Lamond, 27 Cairnie Crescent, Arbroath, DD11 4DZ, dated 2 December 2013, reads as follows:-

> "I am writing to support the above application for a wind turbine on my employer's farm at Ascurry Letham. I have worked for the McEwan's for years and have no problem in carrying out my work going forward in the field that the turbine will be located in. Farming continues as normal around the turbine on the nearby farm at Cononsyth and it will be just the same here with this one. The turbine will help with job security for me and the many others employed by this family business. This is a great way to help supply Scotland with a clean source of power. I would like to see Angus Council give the go ahead for this application for this modern efficient wind turbine."

George Lamond
Abbeythune Farm Cottage
Inverkeilor
By Arbroath

5th December 2013

Dear Mr Kelly

Application Number 13/01029/FULL Erection of a Wind Turbine at Ascurry Farm, Letham

I have been an employee of AM McEwan for over 8 years. I write this letter in support of the above application to put up a wind turbine at Ascurry Farm, Ascurry, Letham. The wind turbine will be another source of income for this local family farming business which will help in securing my job along with all the other employees on the farm. Many people are employed in the other local companies that are used by AM McEwan such as electrical firms, tractor maintenance and feed suppliers. AM McEwan have employed people in Angus for decades and the turbine will help in making sure that this continues and at the same time help towards the supply of clean energy.

Please note my support for the above application.

Yours sincerely

[redacted]

Comments for Planning Application 13/01029/FULL

Application Summary

Application Number: 13/01029/FULL
Address: Field 500M North West Of Ascurry Farm Ascurry Letham
Proposal: Erection Of Wind Turbine Of 50 Metres To Hub Height And 77 Metres To Blade Tip And Associted Sub-Station And Transformer Kiosk, Hardstanding Areas And Access Road
Case Officer: Ruari Kelly

Customer Details

Name: Mr John Reid
Address: Newmill of Balgavies Forfar

Comment Details

Commenter Type: Member of Public
Stance: Customer made comments in support of the Planning Application
Comment Reasons:
Comment:I wish to register my support for this application. I believe the environmental and economic benefits of wind energy projects which compliment farming activities are of more significance than perceived impacts on visual amenity.

AC17

BRAESIDE
ARBIRLOT
BY ARBROATH

4th December 2013

Planning & Transport Division
Angus Council
County Buildings
Market Street
FORFAR DD8 3LG

For the attention of: Mr Ruari Kelly

Dear Mr Kelly

Application for a wind turbine at Ascurry Farm, Ascurry, Letham
Application Number 13/01029/FULL. 77 metres to the tip

I am writing to voice my support for the above application. I fully support and commend the development of sustainable methods of electricity generation. I think Angus Council should support this application and help towards meeting targets set by the Scottish Government in terms of reducing dependence on fossil fuels and supporting locally owned green energy products. I have just read this week in Monday's Courier a statement from The Health and Environment Alliance stating that fumes from coal-fired power stations are having a direct effect on health and as a result more than 350,000 working days are lost each year. It is quite re-assuring when passing near to these turbines that are already in operation, that there are no emissions or pollutants coming from them.

I feel that it is worth stating that this turbine will generate a sizeable amount of green electric power and by using such a small area of land. After looking through the photo illustrations in the application it seems to fit into the area well. It certainly looks very similar to the one or two that have already been consented around here with plenty of space around them and have become part of the present farming landscape.

On a final note it is comforting on watching just how quickly these single turbines are constructed with little or no disruption to anyone, the crops continue to be planted as normal and indeed livestock just continue to happily graze around them.

Yours sincerely

[redacted]

Kenneth Burnett

The Slade
Redford
Carmyllie
By Arbroath
05/12/13

NKW

Dear Mr Kelly

I would like to register my support to the application for a wind turbine reference 13/01029/FULL at Ascurry Farm, Letham.

My house is just over a mile and a half from proposed site for this turbine. I will see the turbine on a regular basis travelling in and around the surrounding area but after a short space of time, like many others, I am sure that I will hardly notice it at all.

A medium scale turbine such as the one proposed here is in keeping with the Scottish Government policy on renewable energy and rural development and also fits in with the official guidance as to the acceptable scale of a single wind turbine within this type of landscape.

We all see wildlife such as rabbits, hares, deer, pheasants and smaller birds killed on our roads on a regular basis but I have yet to see anything lying dead or injured around the clearly visible base of the turbine of similar size which is local to me. This newly proposed turbine at Ascurry is also positioned on open arable ground and because of this will obviously not threaten any wildlife.

On looking closely at where the turbine is to be sited, it appears that all the houses nearby the turbine either look away from the turbine or past the turbine at an angle and as result I would point out that it has been positioned in a way that minimises effect to local properties.

This is a good way for local farmers to help in the supply of green energy, diversify into another income stream, help secure on-going employment (resulting in money being spent locally) and give Scottish firms involved with this development a much needed boost.

While any development has the potential to impact on the environment, I am of the opinion that this single turbine application does not pose a significant landscape impact and should be recommended for approval.

Yours Sincerely

[redacted]

Richard Burnett

Comments for Planning Application 13/01029/FULL

Application Summary

Application Number: 13/01029/FULL
Address: Field 500M North West Of Ascurry Farm Ascurry Letham
Proposal: Erection Of Wind Turbine Of 50 Metres To Hub Height And 77 Metres To Blade Tip And Associted Sub-Station And Transformer Kiosk, Hardstanding Areas And Access Road
Case Officer: Ruari Kelly

Customer Details

Name: Mr PAUL BASFORD
Address: BALHALL LODGE MENMUIR BRECHIN

Comment Details

Commenter Type: Member of Public
Stance: Customer made comments in support of the Planning Application
Comment Reasons:
Comment:I would like to register my support for this application for a wind turbine at Ascurry Farm. I am very impressed by the detail contained in the supporting environmental document, it is obvious that the land owner has gone to great expense in order to consider the location of the turbine on his property to ensure that the turbine will have no negative impact on the environment or any neighboring properties. The farms high usage of electricity is mentioned on page 6 of this document at a staggering £120,000 per annum so this wind turbine is a fantastic opportunity for the applicant to provide not only a substantial reduction in his own carbon footprint but to save a huge amount of money by generating his own electricity which will surely have a massive impact on the sustainability of the farm and protect jobs for the future.

AC20

Michael Morison
Friock Mains
Friockheim
By Arbroath

16th December 2013

IL|KW

Dear Mr Kelly

Wind Turbine Application at Ascurry Farm, Ascurry, Letham,. Application number 13/01029/FULL 77Metres to the tip of blade.

I live at Friockheim and I am writing to register my support for the above application for a single wind turbine at Ascurry Farm, Letham.

Wind turbines are now an accepted part of the Scottish Landscape and the turbines of similar size to this one that are already constructed at Pickerton Farm and Connonsyth prove that they now play an important part of modern day farming. The phrase "business as usual" for me seems to be the best way to describe just how well they exist side by side with daily life. People continue to commute to work past the turbines as per usual and farmers continue to farm around the turbine as per usual.

It is quite evident that turbines have no affect on local wildlife or livestock as wildlife continues to live around them and livestock continue to graze around them. I think harnessing this natural resource for the production of power is a great way forward for reducing the burning of fossil fuels.

It can be seen in the documentation that this turbine is of a very modern design and is clearly much quieter than smaller turbines that produce less power. The larger blades when rotating are much more pleasing on the eye as well. The production of clean, safe green energy that this turbine will produce is something that should be embraced by the community.

I believe that Angus Council should allow this turbine to be built and give the green light for the application to be consented.

Yours truly

[redacted]

Michael Morison

Comments for Planning Application 13/01029/FULL

Application Summary

Application Number: 13/01029/FULL
Address: Field 500M North West Of Ascurry Farm Ascurry Letham
Proposal: Erection Of Wind Turbine Of 50 Metres To Hub Height And 77 Metres To Blade Tip And Associted Sub-Station And Transformer Kiosk, Hardstanding Areas And Access Road
Case Officer: Ruari Kelly

Customer Details

Name: Mr Paddy Graham-Jones
Address: Albert Bartlett & Sons (Airdrie) Ltd 251 Stirling Road Airdrie

Comment Details

Commenter Type: Miscellaneous
Stance: Customer made comments in support of the Planning Application
Comment Reasons:
Comment:I am commenting on behalf of Albert Bartlett & Sons, Potato Packers, in support of this application for a wind turbine. McEwan Farms are key members of our our Angus Potato Grower Group. In making this application to erect a wind turbine the business will reduce their carbon footprint for the grading and storage of potatoes produced at West Mains of Colliston. As Scotlands largest supplier of potatoes, we are under pressure from our retail customers to demonstrate a reduction in our Grower Group's non renewable energy consumption. This in turn comes from the pressure put on our retail customers by Government to respond to the climate change agenda. Our main customers, including Sainsburys, Tesco, ASDA, and Morrisons have all set challenging targets to reduce carbon emissions across their supply chains, and increase their use of renewable energy. These targets are passed onto their suppliers such as Albert Bartlett, and in turn we pass these onto our grower group members. To illustrate this 'downward' pressure, I quote Sainsburys 20 by 2020 Environmental targets. 'Target 8 - By 2020 our suppliers will be leaders in meeting or exceeding our environmental standards. If over the long term, suppliers do not meet our environmental standards, we will cease to do business with them. Target 14 - By 2020 we will have worked with our own brand suppliers to reduce carbon emissions across all our products by 50%'
Other customers are making similar demands, with our own, and our growers performance under intense and competitive scrutiny. We have to work hard to remain competitive in this competitive market, and we risk losing business, if these targets are not achieved. The actions of our suppliers such as McEwan Farms, and their success in contributing to these carbon use reduction targets are imperative in retaining business in a very competive environment.

Letter received from Gavin & Viv Nicol, Mair View, Park Road, Letham, Forfar, DD8 2PX, dated 26 January 2014, reads as follows:-

> “We are writing in connection to an application for a wind turbine at Ascurry Farm. Our house and property is situated at the end of Park Road and has great views towards Ascurry Farm. We both feel that the erection of a wind turbine would NOT be detrimental to the views of the surrounding area and therefore have no objection.”

13/01029/FULL (Gavin & Viv Nicol)

AC23

TILLYHOIT
CARMYLLIE
BY ARBROATH
DD11 2QZ

23 December 2013

Angus Council
County Buildings
Market Street
Forfar
DD8 3LG
For the attention of: Ruari Kelly

RK
RECEIVED
03 FEB 2014
IM
Ack 4/2/14
IAL

Dear Mr Kelly

Application for a wind turbine at Ascurry Farm 13/01029/FULL

I would like to register my support for the erection of a wind turbine at Ascurry Farm Letham. I live about 2 miles from where the turbine is to be built and no doubt I will see the turbine when out and about but this will not worry me at all. It is really good to see local farms diversifying into the production of clean and safe electricity.

A medium scale turbine such as this one is in keeping with Scottish Government policy on renewable energy. The work during the construction phase of the turbine will be well received by local firms employed to carry out this project.

This is a long established farming family business that employs local people and uses local firms when investing in their company.
This goes on to benefit may people in the community of Angus.

The turbine will generate a substantial amount of energy without emitting any pollution, it uses a very small area of farm land which will be farmed again when it is taken down at the end of its use.

I hope Angus Council will therefore approve this application.

[redacted]

Ron Gardiner

Comments for Planning Application 13/01029/FULL

Application Summary

Application Number: 13/01029/FULL
Address: Field 500M North West Of Ascurry Farm Ascurry Letham
Proposal: Erection Of Wind Turbine Of 50 Metres To Hub Height And 77 Metres To Blade Tip And Associted Sub-Station And Transformer Kiosk, Hardstanding Areas And Access Road
Case Officer: Ruari Kelly

Customer Details

Name: MR BRUCE MENZIES
Address: LEWISTON COTTAGE ASCURRY FARM LETHAM

Comment Details

Commenter Type: Member of Public
Stance: Customer objects to the Planning Application
Comment Reasons:
Comment:I STRONGLY OBJECT TO THIS PROPOSED DEVELOPMENT!!
BEING THE CLOSEST RESIDENT TO THIS PROPOSED DEVELOPMENT (544 METRES! BUT STILL DO NOT HAVE TO BE NOTIFIED!).MY PROPERTY BEING REFERRED TO ON NUMEROUS OCCASIONS AS H7 IN THE 185 PAGE REPORT AS PART OF THE APPLICATION,IT IS ME WHO WILL EXPERIENCE THE NOISE AND SHADOW FLICKER GREATEST AND MY QUALITY OF LIFE WILL BE GREATLY DEMINISHED HAVING MOVED TO THIS AREA FOR THE BEAUTIFUL COUNTRYSIDE VIEWS AND PEACE AND QUIET. I AM APPALLED AT THE SIZE AND SCALE OF THIS PROPOSED WIND TURBINE, HAVING A DRAMATIC IMPACT BOTH VISUALLY AND AUDIBLY ON MY PROPERTY AND ALSO THE SURROUNDING NEIGHBOURHOOD. THE RASH OF THESE MONSTROSITIES IN ANGUS IS BECOMING WAY BEYOND AN ACCEPTABLE LEVEL AND QUITE SIMPLY ENOUGH IS ENOUGH. THE VIEW TO THE REAR OF MY PROPERTY HAS ALREADY BEEN RUINED BY A 67METRE TURBINE AT CONONSYTH AND MOST RECENTLY A 47.5METRE TURBINE HAS BEEN ERECTED TO THE NORTH OF MY PROPERTY BOTH OF WHICH WOULD HAVE BEEN OBJECTED TO IF I HAD KNOWN ABOUT THEM EARLIER IN THE PLANNING PROCESS. THIS ONCE BEAUTIFUL COUNTY IS RAPIDLY BECOMING OVER-RUN WITH THESE UGLY AND INEFFICIENT MEANS OF POWER GENERATION. THEY ARE BUILT MAINLY FOR NOTHING MORE THAN FINANCIAL GAIN BY THE LANDOWNER CONCERNED TO THE DETRIMENT OF EVERYONE ELSE IN THE SURROUNDING AREA, SPOILING ALMOST EVERY VIEW OF OPEN COUNTRYSIDE IN THE COUNTY. BEING AN AVID OUTDOOR PERSON ENJOYING BOTH WILDLIFE AND LANDSCAPE PHOTOGRAPHY I AM FINDING OUR PRESENT SITUATION WITH THESE WINDTURBINES TO BE GETTING BEYOND AN ACCEPTABLE LEVEL AND DREAD TO THINK WHAT IMPACT THIS HAS ON VISITORS AND TOURISTS TO THIS AREA. A FULL OBJECTION TO THIS PROPOSAL WILL BE SUBMITTED AT THE FIRST

AVAILABLE OPPORTUNITY!

From:	PLANNING
To:	PLNProcessing
Subject:	FW: Objection to ref 13/01029/FULL
Date:	03 December 2013 11:27:03
Attachments:	Bruce Objection.rtf

From: BRUCE MENZIES [mailto:bruce.menzies@btinternet.com]
Sent: 02 December 2013 22:45
To: PLANNING
Subject: Objection to ref 13/01029/FULL

Having read further into the application for this proposal I am finding some points to my concern that I want to raise.

The wildlife survey that was undertaken for this proposal, which was probably the statutory minimum, seems wholly inadequate. Being predominantly mixed arable farmland, a very warm day in late summer is not the most ideal time to view wildlife as most of their activities are at dawn and dusk. Taking evening strolls most days in the vicinity I can personally testify to the existence of a varied abundance of wildlife including red squirrels, deer, bats, foxes, hares, woodpeckers, buzzards, sparrowhawks, swallows, owls and other more common species eg rabbits, blackbirds etc. Also the surrounding fields are used by large amounts of migratory geese. This proposed development is sited directly in between two close woodlands and would cause a major obstruction to what is a natural corridor between these woodlands.

I also found that the photo montages seem to have been taken from very subjective viewpoints with no clear indication of the properties closest to the proposed turbine offering no real sense of scale or the dramatic impact it will have on the views from the closest properties.

The Visual Assessment documentation is also disconcerting as although I am recognised as being the closest property to the development, there is no mention in the table as to the impact from my property.

The section regarding shadow flicker is also causing concern as in one instance there does seem to be a recognised effect on my property but then swiftly concludes that there is to be none.

The section relating to turbine noise seems to have been collated from facts and figures obtained from a desk-based survey and does not take into account the change of elevation from the turbine to my property as the turbine would be sited significantly lower.
With regards to the noise and visual impact potentially impacting on my property, I feel a more detailed site based analysis would be more appropriate rather than some desk-based survey facts and figures.

Due to the close proximity of the proposed development to numerous residential properties, I also have concerns regarding impacts on health to both humans and wildlife alike. Recent evidence suggests that turbines of this size and smaller can have detremental effects on both. Symptoms can include sleep deprivation,headaches,dizziness,epilepsy,mental health issues,depression and long term stress. The effects on wildlife can be greater causing haemorrhaging,birth defects and still births in wildlife, livestock and pets.

I feel a great deal more research should be carried out into the effects of these industrial machines in our countryside before any more are considered to be erected as other countries seem to be doing.
We all have a duty of care regarding our countryside and I think we may look back in years to come and wonder why we allowed so many of these developments to be built while we dont know enough about the possible harm associated, much in the same way as nuclear power was sold to us in years gone by.
I am at a loss to explain why our democratic government is pursuing its obsession with the creation of these small and large scale wind turbine developments to the detrement of the surrounding landscape and which are undoubtedly inefficient in harnessing energy (to which most people are not in favour of and certainly not aware of the possible dangers) other than financial greed. Most supporters of these developments are either unaware of the possible negative effects or are directly or indirectly involved in businesses relating to these developments with potential massive profits.

I feel this proposal is wholly inappropriate in size and scale in its surroundings with a major cumulative effect with regards to recent turbine erections in the surrounding area.
This proposal offers no direct benefits to anyone in the vicinity other than financial gain and a split

of the profits generated for the landowner and the developer concerned.

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I am at a loss to explain why our democratic government is pursuing its obsession with the creation of these small and large scale wind turbine developments to the detrement of the surrounding landscape and which are undoubtedly inefficient in harnessing energy (to which most people are not in favour of and certainly not aware of the possible dangers) other than financial greed. Most supporters of these developments are either unaware of the possible negative effects or are directly or indirectly involved in businesses relating to these developments with potential massive profits.

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Comments for Planning Application 13/01029/FULL

Application Summary

Application Number: 13/01029/FULL
Address: Field 500M North West Of Ascurry Farm Ascurry Letham
Proposal: Erection Of Wind Turbine Of 50 Metres To Hub Height And 77 Metres To Blade Tip And Associted Sub-Station And Transformer Kiosk, Hardstanding Areas And Access Road
Case Officer: Ruari Kelly

Customer Details

Name: Mr Bruce Menzies
Address: Lewiston Cottage Ascurry Farm Letham

Comment Details

Commenter Type: Member of Public
Stance: Customer objects to the Planning Application
Comment Reasons:
Comment:I would like to further my objection to this application by highlighting the following information from the Strategic Landscape Capacity Assesment for Wind Energy in Angus (Final Report 2013 Nov). This document makes very interesting reading with a general theme on limiting numbers of medium/large wind turbines of which this proposal is, within the Angus area.
I would like to bring particular attention to section 6.5.4 (Areas Where Cumulative Impact Limits Further Development). This proposal is identified as being in an area marked in Fig6.4 where cumulative impact limits development. Further details are in Table 6.2.4 with particular reference to spacing between individual turbines and unacceptable proximity of larger turbines to settlements.I sincerely hope that the planning committee will take their own guidelines, assessments and policies into consideration on making the correct decision to reject this application with regards to the size and scale of this proposal and the cumulative effect it will have on the surrounding landscape.

Comments for Planning Application 13/01029/FULL

Application Summary

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Case Officer: Ruari Kelly

Customer Details

Name: Mr Alex Crichton
Address: 68 Old Craigie Road Dundee

Comment Details

Commenter Type: Member of Public
Stance: Customer objects to the Planning Application
Comment Reasons:
Comment:I am a frequent visitor to the dwelling house which is nearest to the proposed wind turbine. I am very distressed when I realise the impact that this wind turbine will have on the residents there and I know that they will be even more distressed than I am. It will have a severe impact on the view from their house and garden and it will also produce noise which is bound to penetrate the fabric of their home. I also understand that the turbine blades will cause a "flicker" effect which cannot be good for anyone in the immediate vicinity.
I strongly object therefore to this proposal.

Comments for Planning Application 13/01029/FULL

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Case Officer: Ruari Kelly

Customer Details
Name: Mr andrew vivers
Address: 1 Access From ZU360-1 To Arniefoul Cottages, Arniefoul, Glamis, Angus DD8 1UD

Comment Details
Commenter Type: Member of Public
Stance: Customer objects to the Planning Application
Comment Reasons:
Comment:In August 2013, the United Nations Economic Commission Europe (UNECE) declared that the UK government's National Renewable Energy Action Plan (NREAP) violates the laws that transpose the Aarhus Convention into the UK legal framework, in that it is not abiding by Article 7 of the Convention. In particular the public have not been given full access to information on the established unacceptable negative impacts on people and the environment, nor have the public been given decision-making powers over their approval.

Also, a recent ruling by Lady Clark of Calton has deemed that unless applicants who wish to connect to the national grid (and receive payments), have the relevant OFGEM licence (or DECC exemption), their application is incompetent (unlawful), and planning consent should not be given. This licence is required by law and puts the holder under obligation to safeguard the environment, landscape, wildlife and human beings.
Lady Clark argues that this applies to almost all turbines.

For these two reasons alone there should be an immediate moratorium an all wind turbine applications and decisions.

Further to the above, the term Wind Farm is a disingenuous spin on the words farm and farming. My dictionary describes farming as: the husbandry or cultivation of animals, plants, fungi and other life forms, for food, fibre, bio-fuel and other products, in order to sustain human life.

Wind turbine applications often state that the turbine(s) are required for farming diversification. This is obviously incorrect. What it is, is an industrialisation and sterilisation of huge areas of land and sea.

When two or more turbines are gathered together, it should be called a wind factory.

Firstly, wind turbines are certainly not life forms, and therefore it can not be a farm nor farming. And secondly, there is no conclusive evidence that they sustain human life, or the lives of any other life form (except perhaps a few carrion feeders until they are killed by the impact of a blade or suffer internal haemorrhaging and death).
In fact the opposite is probably true.
For example, there is mounting evidence that the end result of wind turbine manufacture and use is an increase in CO2 emissions. Furthermore, there is mounting evidence that wind turbine use is harmful to humans, livestock, and other life forms.
In the last 12 months approximately 100 million birds and bats were killed world wide by wind turbines. It is estimated that 90% of the bats drown in their own blood when their lung capillaries rupture as a result of the pressure changes near turning blades. Only around 10% of bats are killed by the impact of a blade.
(Small turbines are also lethal to bats and birds as they are usually sited near buildings that provide roosting and nesting sites.)
At several locations, dead insects and spiders have to be power washed off turbine blades because the dead weight further decreases turbine efficiency. Spiders, caught on the wing, are about 90% of the diet of migrating swallows and swifts.

There is also growing concern over the stress, internal haemorrhaging, birth defects and still births, of livestock and pets that are kept near wind turbines. These same harmful affects are no doubt occurring to our wild life, and other life forms.

Humans are reported to suffer depression, dizziness and insomnia and I am sure that internal haemorrhaging, birth defects and still births will follow as the years go by.
I understand that in recent years there has been an acknowledged and unexplained increase in cases of insomnia, dizziness and headaches in Dundee. There have been two large wind turbines operating in Dundee since 2006.

The harm is caused by emissions of both ground hugging Infrasound, and Low Frequency Noise. These are accumulative (ie. the longer the exposure, the worse the symptoms), have a range of around 10km, and are mostly at vibrations below the human hearing range. The use of directed sound (including Infrasound) is a known military interrogation aid and weapon.

From my own observations, hares, which live and breed on open ground, would appear to be one of the first terrestrial animals to succumb to this internal haemorrhaging and death out to a distance of at least 5km.

With regard to the effect of off-shore wind factories on marine life, we can be sure that it is considerable. Water is an excellent conductor of sound vibrations, and fish have the ability to

detect minute pressure changes (0.5%), and in some cases down to less than 1mb (millibar). Standard atmospheric pressure at sea level is about 1,013 mb.
Also, I fail to see how the quarrying and transport of huge quantities of granite and other stone in order to stabilise offshore turbines, can possibly reduce CO2 emissions.

Recently, the cities of Kolding and Sønderborg in Denmark decided to not erect further wind turbines (in their 500 km2+ jurisdictions) until the uncertainty about the health impacts on neighbours is settled.
Mr Mauri Johansson (Specialist in Community and Occupational Medicine) recently stated that: "During the last 12 months, several smaller municipalities had done the same, in spite of strong pressure from government. They are not satisfied with the noise regulations, and demand that genuinely independent studies be done concerning the effects of wind turbines on health.
Last year, retired Danish High Court judge Peter Roerdam stated that wind power is an industry which has thoroughly corrupted the political system Further, Mr Mauri Johansson has this year added that: It is clear the institutional political corruption, and the lack of professional ethics on the part of wind industry acousticians and public health researchers, who ignore or deny the existence of the sleep and health problems and the consequent serious long term damage to health, is not limited to Denmark.
Indeed, in 1987 a report, led by N.D.Kelley from the Solar Energy Research Institute in Colorado, found impulsive infrasound caused health problems. This report has been ignored for 25 years.
In July the Czech Government approved a law to stop subsidies for new renewables projects at the end of 2013, in order to maintain the countrys international competitiveness.
1,257 towns and 20 villages from the State of Wisconsin, USA, have demanded a windfarm moratorium.
In Poland, President Komorowski wants a moratorium on local wind farms.
The Dutch province of North Holland has realised that windparks are a complete and useless eyesore that blight the landscape, and they save very little CO2. Therefore, the province has decided to forbid their construction.
Last year, Litchfield Town Council (New York) passed in a 4 - 1 vote a local law that will ban construction of industrial wind turbines.
The President of the italian/german speaking region of South Tyrol (Alto Agide), Luis Durnwalder said that his region will be wind energy free, with the exception of a small plant close to the Brennero Pass (which will be dismantled in a few years).
Wind electricity is one of the most expensive forms of electricity to be produced. Each turn of a blade adds to our electricity charges. This is as a result of their abysmal efficiencies and the huge subsidies. It has been calculated that the average turbine only produces between 15 - 28% of its rated capacity over a year, and the kilowatts of electricity produced per square kilometre, or cubic kilometre, of a wind factory is equally abysmal.

The way these huge subsidies and costs (Renewables Obligation [RO], Feed In Tariffs [FIT], extra pylon and infrastructure construction, and other `upgrades`) are arbitrarily added to our electricity bills, and the profits kept by a select few, is worse than the illegal chain letter scam.

I say worse because one has to actually opt in to be scammed by a chain letter. This is not the case with wind energy. However, it would be a simple matter to contact all electricity users and ask them if they wish to pay for wind electricity - and if so, could they tick the opt in to be scammed` box. The cost of wind electricity could then be proportioned fairly between those willing and able to pay for it.
Even small turbines increase our electricity prices, since turbines up to 6KW can be very easily connected to the grid to export electricity and receive an income (through FITs for example).

I understand that thousands of diesel generators are being prepared all over Britain to provide emergency back-up when wind power fails - in order to prevent the National Grid collapsing. Under this hugely costly scheme, the National Grid is set to pay up to 12 times the normal wholesale market rate for the electricity they generate. Currently the wholesale price for electricity is around £50 per megawatt hour (MWh) but diesel-generator owners will be paid £600 per MWh. These generator owners will also be paid enormous sums for just having them available to be switched on.

Any suggestions that:
1. because there are already turbines or pylons in the area, then it is somehow OK to compound the problem with these turbines is ludicrous! You do not solve a problem by creating an even bigger problem.

2. because there is already a commercial business in the area and therefore it is somehow OK to compound the problem with these turbines is similarly ludicrous. Why enhance an eye sore with an even larger eye sore?

3. if we have to have wind factories, then this is as good a place as any to have one is again ludicrous. We are meant to be living in a democracy and nobody should have to have anything; particularly when it is against the wish of the majority of the population. There are probably now as many, if not more, opinion polls against wind turbines as there are for them. One thing is certain though, those against are growing rapidly as more and more people realise the true nature and cost, both financially and environmentally, of wind turbines, be they individual or factory units.

4. the county has somehow missed out on tens of millions of pounds worth of investment money by the rejection of several wind factory applications is, once again, ludicrous. Very little of that supposed investment would ever benefit the county, as is proven time and again, where the local business to gain the most is probably the fencing contractor!

5. communities would somehow gain from the so-called Community Fund, or community bribe as more and more people are calling it, is .ludicrous - although there is an argument that this is merely another disingenuous misleading spin. The value of the `fund` is often only equivalent to the concessions and exemptions a landowner receives for having a wind factory on his land, and

therefore the net gain to local county and therefore community, is probably zero.

6. jobs would be increased by this application is misleading, if not ludicrous. The majority of the workforce in the construction, erection and maintenance of turbines comes from abroad, and if the American example is anything to go by, any UK jobs come at a cost of $12m per job. There is also the valid argument that they are not green jobs anyway, since they cause harm to humans and the environment, and raise CO2 emissions.

7. it is somehow OK to empty properties and effectively sterilise huge areas of the Scotland so that wind factories can be built is outrageous and is reminiscent of the Highland Clearances. We have much to be proud of in our history with our determination to fight for, and support, freedom and democracy. This renewable energy policy is certainly not something to be proud of.

8. there is a silent majority in favour of wind turbines - that harm their neighbours and cause great financial hardship through the exorbitant increases to our electricity bills, is yet again, ludicrous. The silent majority are silent because they have not been told about the harm (to humans, environmentally and financially) that wind turbines and wind factories cause. This comment is supported by the UNEC decision mentioned above.

9. the exorbitant cost of wind energy is justified by CO2 reduction is incorrect. The majority of the huge amounts of money we pay for wind electricity is kept by the developer and land owner as profit, very little is used for CO2 reduction or research into CO2 reduction. Recently I was speaking to a friend who has three small turbines on his land, and he said `They` pay me around £40,000 direct into my bank account every year just for having the turbines. I replied that in fact he was adding £40,000 to our electricity bills, and that I didn`t know what split of the profits he had agreed with the developer, but if it was 50:50, then he was directly responsible for adding £80,000 to our electricity bills (or £1 onto 80,000 bills) every year. My friend has not employed anyone new as a result of these small (not `industrial`) turbines, does not commission any CO2 reduction research, and keeps the money for his own benefit. I am sure this is the case with most land owners and developers.

Any arrangement which pays millions of pounds to wind factories to NOT produce electricity when the wind is blowing, is beyond belief. If this was applied to every business, I dread to think where the money would come from to pay for all the surplus production and services.

Should Scotland gain its independence, one wonders if the electricity users of the rest of Great Britain will continue to be prepared to pay the exorbitant price for Scottish wind power, even if it is later sold back to them at a ridiculously reduced price. If not, and if these costs are placed solely on Scottish electricity users, it will cause great hardship, financial difficulty, fuel poverty and bankruptcy to many people and businesses in Scotland, and Scotland will swiftly follow in the

footsteps of countries like Spain and others who have fallen for the wind power scam. (Spain is a particularly cautionary tale. By failing to control the cost of guaranteed subsidies, Spanish electricity users have been saddled with 126bn of obligations to renewable-energy developers.)

In theory would take about 1,500 wind turbines of around 100m tall spread over 20km2 to produce the same electricity as a 1,000 megawatt (1GW) power station even then the wind farm could not provide a steady supply. Wind varies considerably, and thus the power station is still required or maybe we need to cover over 100sq km with turbines to possibly provide something near the power from one power station.
Another way of looking at it: if we are to achieve this energy policy, nearly 40% of rural Scotland will be covered with wind turbines (or more accurately, 40% of rural Scotland will be within 2km of a turbine).

In Denmark there are over 6000 turbines for 5.4m people, yet wind power only counts for less than 19% of their electricity requirements, has not resulted in the closure of any power stations, and they have one of the highest electricity prices in Europe.

Germany has the most expensive electricity in Europe and it is estimated that up to 800,000 German households have had their power cut off because they couldnt pay the countrys rising electricity bills.
In the UK there are around 5 million households that are struggling to pay their ever rising electricity bills (mainly as a result of wind turbines).
With the potential increase in wind turbines, it has been forecast that by 2017, the rapidly rising UK electricity prices will be almost double German prices.

German CO2 emissions have been rising for two years in a row as coal is experiencing a renaissance, and they are building 20 new coal-fired power stations to provide power when there is no wind or sun usually in the winter when the power is most needed.

CO2 emissions in the EU as a whole are likely to rise because of increased coal burning at power stations.
The import of vast amounts of wood, from countries such as America, to power biomass power stations can not possibly be good for the environment or help reduce CO2 emissions, and no doubt will cause further unnecessary price increases for our electricity.

There are very few good wind turbines. By good I mean ones which comply with a few simple, common-sense criteria such as:

a) where the electricity produced helps to supplement the power requirements of the landowner without taking money from every other electricity user in the country to do so;
b) where they do not cause continuous harm to humans and other life forms;
c) where the CO2 emissions caused by the construction, erection and maintenance of the turbines

is accurately assessed and the result (either increased or decreased), is justified;
d) where the loss of revenue to other local businesses caused by the location of the turbines is justified.

If one applies just these few criteria to wind factories, then there are no good wind factories, either onshore or offshore (the financial cost and CO2 emissions caused by offshore factories are considerably greater than onshore factories), and very few good turbines.

If we are to have renewable energy providers for our national requirements, then we should be considering systems that guarantee to provide a steady supply of power at more than 30% efficiency, do no harm, and help save the environment. Wind power can never achieve this.

On a more personal level, we run a holiday cottage business, and many of our visitors have stated that, with regret, they will not return if Angus over-run with turbines. This will greatly affect our livelihood and many other businesses in the area which rely on tourism. I am sure this growing dislike and rejection of turbines applies to other areas of the country.

I would like at this stage to add that:
1. The Scottish Natural Heritage (SNH) wind farm map for August 2013 http://www.snh.gov.uk/docs/A1055080.pdf is disgracefully and inherently inaccurate. It has no definition of what it is mapping (ie, what SNH consider a wind farm), and should not be used for any accurate analysis.
SNH state that we seek to map all developments of more than 1 turbine but we arent consulted on all of these, so the map is a subset of the applications actually within the system. So, a single turbine over 100m high, or even a cluster of single turbines might not be shown even if SNH had been consulted! It is therefore a totally useless map as most Councils will quickly verify by a comparison with their own maps and/or Renewables Datasheets.
If SNH use information such as this for their consultations, it suggests that their consultations and recommendations are of little value.

2. Paragraphs 4.15 to 4.21 of: http://www.scotland.gov.uk/Publications/2009/07/03153034/7 states that there is a minimum notification of 21 days for individuals to make representations.
This is a totally inadequate timescale to allow the public to raise suitable site/application specific representations. Most of us are in full time employment with busy family schedules, and it is difficult to find the time to:
a. find out about turbine applications in the area - especially when the applicants only notify the minimum possible, and often not even the household(s) that is highlighted as being most affected according to their own proposal documentation.
b. find, read and understand the application documentation.
c. find, read and understand any planning legislation or regulations for wind turbines.
d. prepare and submit a suitable site specific representation.

It also does not allow for incidents when people may be away on holiday, or for work or health reasons.

3. Similarly, the 20m boundary notification is totally inadequate since:

a. a turbine could be built that could potentially topple onto a neighbouring property.

b. neighbouring property could be at risk of ice or turbine blade throw.

c. it does not allow for neighbour notification regarding the very real health risks to humans out to at least 2 km.

d. it does not allow for neighbour notification regarding the known negative effects on property prices.

e. it does not allow for neighbour notification regarding the known negative effects on local tourist and other businesses.

A much more responsible solution for Councils would surely be to adopt a minimum of 3 to 4 months deadline for representations, and a direct notification (by post, not newspaper) of all `Owner, Lessee or Occupier` at the address of the neighbouring land within a minimum of 2 to 3 km. This would at least bring us more in line with the UNECE decision quoted at the beginning of this objection.

One hopes that something along these lines is being actively suggested to Councils and Scottish Government.

Comments for Planning Application 13/01029/FULL

Application Summary

Application Number: 13/01029/FULL
Address: Field 500M North West Of Ascurry Farm Ascurry Letham
Proposal: Erection Of Wind Turbine Of 50 Metres To Hub Height And 77 Metres To Blade Tip And Associted Sub-Station And Transformer Kiosk, Hardstanding Areas And Access Road
Case Officer: Ruari Kelly

Customer Details

Name: Mrs Jean Crichton
Address: 68 Old Craigie Road Dundee

Comment Details

Commenter Type: Member of Public
Stance: Customer objects to the Planning Application
Comment Reasons:
Comment:I often visit the couple who live in the house closest to this proposed development and know how distressed and upset they are at this time. It is clear that this wind turbine if approved will dominate their home in more ways than one. The size, the location, the noise and the flicker from the blades will all play their part in ruining their views and the tranquillity they chose when they bought the property not so many years ago.
I must object most strongly to this proposed development.

Comments for Planning Application 13/01029/FULL

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Case Officer: Ruari Kelly

Customer Details

Name: Mr & Mrs B Menzies
Address: 16 Rescobie Avenue Dundee

Comment Details

Commenter Type: Member of Public
Stance: Customer objects to the Planning Application
Comment Reasons:
Comment:Being regular visitors to this area we are thoroughly opposed to this proposed wind turbine. We regularly visit this area and feel this proposal will have a major impact on the quality of time we spend in the area visiting family and using local amenities. We enjoy the area for the peace and quiet and open country views which this proposal will have a severe impact on. We are very concerned with the impact this will have on local wildlife and birdlife as well as the impact it have on the residents in close proximity to this wind turbine both audibly and visually.

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Customer Details

Name: Mr Ed Nicoll
Address: 9 Sunnyside Kirriemuir

Comment Details

Commenter Type: Member of Public
Stance: Customer objects to the Planning Application
Comment Reasons:
Comment:I strongly object to any more wind turbines being erected in Angus. The ecological effect on wildlife is widely ignored. These things have been proved to induce high levels of stress to animals within their nearby locality.

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Case Officer: Ruari Kelly

Customer Details

Name: mr john snelling
Address: 5 the den letham forfar

Comment Details

Commenter Type: Member of Public
Stance: Customer objects to the Planning Application
Comment Reasons:
Comment:We do not need any more of these wind turbines They are a blot on the landscape. No good for the wildlife or the enviroment. We must stop the errection of these the only people who benefit are the ones that get paid crazy money from the electric companies and the government.

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Customer Details

Name: mr robin paterson
Address: 18 logan terrace sidlaw fields dundee

Comment Details

Commenter Type: Member of Public
Stance: Customer objects to the Planning Application
Comment Reasons:
Comment:Do we really need more of these hideous objects.

Comments for Planning Application 13/01029/FULL

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Case Officer: Ruari Kelly

Customer Details

Name: Mr Colin MENZIES
Address: 11 Crichie Place Fettercairn

Comment Details

Commenter Type: Member of Public
Stance: Customer objects to the Planning Application
Comment Reasons:
Comment:While fully understanding the issues cited by the applicant regarding fuel offset and current government policy, I am extremely concerned that the longer term impact of such developments is simply not being given enough consideration. While those who live close to such installations have a choice to move, this comes at both a financial and emotional cost which must be weighed very carefully against the stated benefits. Similarly, while occupants of properties are transient, the building remain and will be impacted by the noise, aesthetics and wildlife issues arising from wind turbines as long as they are there. In this particular case, I believe the proposed installation is situated too close to domestic dwellings and could reasonably be expected to be sighted elsewhere. I therefore object to the proposal.

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Case Officer: Ruari Kelly

Customer Details

Name: Mr Iain G Richmond
Address: Guildy House Kirkton of Monikie Monikie

Comment Details

Commenter Type: Member of Public
Stance: Customer objects to the Planning Application
Comment Reasons:
Comment:I think it goes without saying that living your life for decades in a particular location one can become blind to the natural beauty that surrounds us and it needs a fresh pair of eyes to actually waken us from a complacent attitude towards our environment which sometimes unbeknown enriches our life. We experienced first hand this wake up call when relatives from Australia visited this summer. It was their first trip to Angus and as we travelled around the County on a sight seeing trip, their ecstatic praise of our wonderful countryside was soon replaced by groans of anguish at the number and size of Wind Turbines that now can be seen in almost every vista. "What's going on here?" They would say, "why are you ruining this fabulous Country?
I think more and more people are coming to the same conclusion. There is of course no good reason why these wretchedly alien industrial structures should be imposed on our countryside unless ,of course, you're potentially in receipt of the obscenely generous subsidies on offer. Not a single Government document has explained how these uselessly inefficient machines, which generate the most expensive electricity, can help lower Co2 emissions nor mitigate Climate Change aka 'Global Warming' though I can quote at least two studies (le Pair, Udi) which prove beyond doubt that their contribution to reducing Co2 emissions and mitigating Global warming is ZERO. I strongly object to this outrageous development which not only will blight the iconic Angus countryside but also the amenity and health of residents in the vicinity. I sincerely hope this application will be refused.

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Case Officer: Ruari Kelly

Customer Details

Name: Mr + Mrs Chris Langworth
Address: Windyhill Bankhead of kirkbuddo Nr Forfar

Comment Details

Commenter Type: Member of Public
Stance: Customer objects to the Planning Application
Comment Reasons:
Comment:I strongly object to this proposal on the basis of the close proximity of the turbine to a third party dwelling. I believe not only could this affect the residents quality of life but also have a severe detrimental affect on the market value of the property and therefore affecting the lively-hood of the residents. I would suggest a possible solution may be to increase the minimum distance of turbines from dwellings.

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Case Officer: Ruari Kelly

Customer Details

Name: Mrs Anne Ferrier
Address: 8 Challum Place Broughty Ferry Dundee

Comment Details

Commenter Type: Member of Public
Stance: Customer objects to the Planning Application
Comment Reasons:
Comment:I am extremely concerned about the long term negative impact that the erection of this wind turbine will have on the surrounding landscape and on the lives of the nearby residents.
I believe that the proposed turbine is too close to nearby properties. Current recommendations throughout Europe state that there should be a 2km buffer zone between properties and turbines, not least because of noise and health implications.
Many residents living near to wind turbines report a 'strobing or flickering effect' caused when the sun is behind the turbine blades. This effect has been associated with epilepsy, migraine, nausea and psychological distress.
The current ambient sound level in the area is very low, especially at night. For the closest residences this could mean an increase in intermittent noise level during the night.
Furthermore, it is logical to assume that there will be a negative impact on the value of residences in close proximity to the turbine.
There will also be a negative impact on the wildlife in the area. Spinning blades of turbines are known to cause the deaths of many birds and bats.
I therefore object to the proposed wind turbine since the negative impact on the area will outweigh the reasons cited by the applicant regarding fuel offset and current government policy.

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Case Officer: Ruari Kelly

Customer Details

Name: Mr Stuart Wright
Address: 11 Kinloch Street Ladybank By Cupar

Comment Details

Commenter Type: Member of Public
Stance: Customer objects to the Planning Application
Comment Reasons:
Comment:I strongly object to this turbine being erected due to the damage to the countryside and wildlife it will entail. I also have concerns on the stress turbines can cause on all living creature within it range. DO NOT ALLOW THIS TO GO AHEAD>

Comments for Planning Application 13/01029/FULL

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Customer Details

Name: Mrs Liane Beattie
Address: 19B Burnett Drive Arbroath

Comment Details

Commenter Type: Member of Public
Stance: Customer objects to the Planning Application
Comment Reasons:
Comment:I wish to strongly object to this 77 metre high turbine. It will affect nearby residence, wildlife and the landscape. The pulsating sound, vibrates and flickering affect caused by the sun causes distress to humans and animals so we must consider those who are going to be immediately affected by the turbine if this proposal goes ahead. I see numerous turbines of various sizes all around as I travel past this area regularly and one tends not to notice the beauty of the landscape because ones eyes are always drawn towards these ugly monstrous structures. Is this really what once beautiful scenic county of Angus wants to be known best for???

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Case Officer: Ruari Kelly

Customer Details
Name: Mrs Patricia Powell
Address: Broadlands Loanhead By FORFAR,

Comment Details
Commenter Type: Member of Public
Stance: Customer objects to the Planning Application
Comment Reasons:
Comment:Dear Sirs,
Please note my very strong objection to the above planning application.

Any 77m tall industrial machine placed in an open, undulating landscape of fields, small woodlands and gentle hills would never fit into such a background but would dominate the countryside for miles around.

Already there are operational wind turbines within view of Ascurry at Cononsyth, Pickerton, and Idvies, approval at Dumbarrow and Parkconon, and a further pending application at Dubton Farm. Enough is surely enough. These enormous, incongruous white structures in an agricultural setting constantly intrude into the tranquil rural panorama.
For yet another wind turbine to be situated in such an area, in very close proximity to private properties, would be intolerable. It would be completely dominant and overwhelming in its size and would cause continual distress of those residents unfortunate enough to live within a few hundred metres.

I contend that very few people would elect to live within sight of a huge machine with rotating blades that catch the light and create shadow flicker and glint, all of which can cause considerable stress.

The proposed turbine is very close to private properties and the likelihood of noise nuisance in such a peaceful location must not be under-estimated.

Such a dominating machine would breach Article 1, Protocol 1 of the EU convention on Human

Rights which states that every person is entitled to peaceful enjoyment of their property. This machine would negate that ruling. Peoples lives would be constantly dominated by this wind turbine and they would undoubtedly suffer the ill-effects of noise and shadow flicker. I urge you to refuse this application and protect the lives of local residents as well as our beautiful Angus landscape before it is finally ruined for ever by the increasing number of inappropriately sited enormous wind turbines that are rapidly turning our countryside into one big industrial wind farm.

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Case Officer: Ruari Kelly

Customer Details
Name: Miss Andrea Grey
Address: The Bungalow Gask Farm Letham

Comment Details
Commenter Type: Member of Public
Stance: Customer objects to the Planning Application
Comment Reasons:
Comment:I wish to object strongly to this application for a 77 metre high turbine.

If approved, it will destroy the beautiful skyline which the area enjoys, and will feature prominently from far further afield. Whilst I appreciate that a case can be made for sustainable power generation, this can surely be achieved via other methods which will not blight the beautiful Angus countryside. This turbine would dominate the skyline for miles around.

The proposed turbine would have a very adverse effect on nearby residences (some in very close proximity to the turbine itself), the local wildlife and the landscape. The pulsating sound, vibration and flickering effect will have a detrimental effect on humans, animals, birds and bats. The proposed site for this turbine is very close to private properties and the likelihood of stress to local residents and noise pollution cannot be ignored.

Please note my very strong objection to the above planning application.

Letter received from Owner / Occupier, 2 Gask Farm Cottages, Gask, Letham, Forfar, DD8 2QR, dated 26 November 2013, reads as follows:-

> "We really object to this proposal as its going to be in our back garden. The noise will be extremely distressing and we will be affected by shadow flicker in the mornings and the quality of our lives will be ruined.
>
> Please do not let this build take place."

Comments for Planning Application 13/01029/FULL

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Customer Details

Name: mrs marlene sim
Address: 15 westfield gardens forfar

Comment Details

Commenter Type: Member of Public
Stance: Customer objects to the Planning Application
Comment Reasons:
Comment:I strongly object to the proposed wind turbine at Ascurry. I am a regular visitor at Lewiston Ctg which would be alarmingly close to this monster and find it unbelievable that the owners of this idyllic home were not even notified of the application although it would devastate their lives! I won't even go into the detrimental effects of such a blot on the landscape, as planners you should be more than aware of them. I have spent the last few days in Aberdeenshire and am appalled at the proliferation of turbines in the landscape of a previously beautiful rural area. I was unable to find a stretch of road without at least a couple of turbines in close proximity and many more on the horizon. I would recommend a drive through that county and think you will be shocked at the amount and rapid spread of this menace. PLEASE PLEASE DONT LET ANGUS FOLLOW ABERDEENSHIRE IN LEAVING A TERRIBLE LEGACY THAT OUR CHILDREN WILL LIVE TO REGRET.

Mrs S. Menzies,
Lewison Cottage,
Ascurry Farm, Letham
DD8 2QQ

1st Dec. 2013

Re: Planning App 13/01029/FULL

Dear Sirs/Madam,

I wish to strongly object to this planning application cited above.

I have lived in this area for 5 years and chose to live here especially for the tranquility - day and night, the wildlife, the opportunity to go walking and cycling and for the location of nearby shops and businesses. If the proposed turbine was allowed to be built the tranquility would end, the enjoyment of walking and cycling in the area would be taken away and the wildlife close by would be greatly affected and numbers would decline.
Also when I chose to live in this area I accepted the additional cost of travelling to work for the enjoyment of the open countryside and the peace and tranquility it brings, but this proposal will impair all of the above mentioned significantly for the next 25 years or more.
Each and every person has a responsibility to protect and nurture the landscapes around for those that come after us.
The once picturesque uninterrupted view towards Lunan Bay to the rear of my property is now ruined by the Cononsyth 67metre high wind turbine which is approximately 3.5km away, the view to the north has a 47.5metre high turbine at Newton of Idvies approximately 1.4km away and now to the front of my property only 0.5km away I may have a 77metre high turbine blocking the view towards Forfar, the Angus hills and beyond into Perthshire.

I have studied the applicants documentation and would like to raise the following points:

Noise

The UK Noise Association recommends that wind turbines are not sited within 1 mile (1.6km) of houses. Please note that my property would only be 0.5km away from the proposed turbine. Evidence suggests other families have experienced serious health problems with smaller turbines at a greater distance from their homes. There is a potential risk of sleep disturbance and related health issues from this proposed turbine e.g impairment of mental health and long term stress.
Wind energy developers claim that turbines do not emit noise pollution but the simple fact is that they can and do emit audible noise such as turbine infrasound, low frequency noise, aerodynamic noise from movement of the blades through the air and mechanical noise from the operation of the turbine engine components in the nacelle and in the documentation for this proposed development Locogen state these facts. So while all nearby residents would have to live with this noise day in day out, night after night, the landowner would enjoy the peace and tranquility of his own residence many miles away from the proposed turbine whilst reaping all the benefits with no negative affect to him.
Noise from wind turbines is currently subject to ETSU-R-97 guidelines but this is now widely discredited outside the wind energy industry. In the report there are predictions made only from a **desk-based exercise**. This **should** be done by a Member of the Institute of Acoustics who can personally visit the proposed site and be able to give a more accurate assessment of the potential levels of disturbance.
I have also noticed in the report that the proposed development is sited at a much lower elevation than that of my property and as such, because we will not be at ground level with the turbine, my property will be in

direct line with the top half of the turbine therefore being in such close proximity I feel a more accurate assessment of this potential risk is required.

Shadow Flicker

The effects of shadow flicker are mentioned especially to the property nearest to the proposed turbine. Again, may I point out this property would only be 0.5km away and the proposed turbine would be directly in line with the setting sun during summer months causing shadow flicker. The shadow flickering would be an unacceptable nuisance which again is linked to medical conditions including long term stress. On page 106 of the report, it indicates shadow flicker will affect the **whole** of property H7 by way of a pixelated image then it says that only a **small** section would affect the garden which, I would like to add, is where I would most probably be - outside enjoying my garden in the evening sun!! but **strangely** and one may say **conveniently** the report on shadow flicker **then** concludes that H7 would **NOT** experience shadow flicker at all!! The report also mentions that 'the effect of shadow flicker can be assessed using specialist software which takes into consideration the size and orientation of the windows that may be affected' which begs the question, did someone come and measure my windows?? I think not. My living room and dining room are at the front of my property therefore if I am not outside enjoying the last of the evening sun, then I would be inside in either of the above mentioned rooms. Would I then be expected to close my blinds and curtains on a lovely sunny evening so I wouldn't be affected by shadow flicker?? I think not.

Wildlife

A Habitat Site Survey and Protected Species Survey was carried out during **ONE** very warm day on 30th August 2013. The survey included a search for suitable habitat for, and evidence of, protected species e.g badgers, red squirrels, bats and birds. It reported that although suitable habitat for a range of these species was identified within the site, no direct field evidence was recorded. That's not surprising seeing as it was a very warm day! By living in such close proximity to this surveyed site for the past 5 years I can report that there **are** red squirrels, foxes, bats, barn owls, tawny owls, deer, brown hares, buzzards, woodpeckers, swallows and sparrowhawks **all** in the area. Also last year a Hen Harrier frequented the area. Buzzard flights at the site would predominantly be at the height of the turbine therefore creating an unacceptably high collision risk and please note thousands of migrating geese fly over this area each year and land and rest in nearby fields. According to the RSPB 'the available evidence suggests that wind turbines can harm birds in 3 possible ways - disturbance, habitat loss or damage (both direct or indirect) and collision'. At Ascurry it is predominatly commercial arable farmland and there is already very little natural habitat left to support wildlife so to have this proposed turbine built so close to 2 nearby woodlands (1 being particularly close only 0.23km away and the other being 0.72km away), the affect on the local wildlife would be devastating.

Nearby properties

Numerous properties are mentioned indicating in great detail distance from the proposed turbine, sensitivity, magnitude of change, the effect and how significant it would be for that property. I would like to point out that the property closest to the proposed turbine has been **completely omitted!!** Why has my property not been included ?? It is interesting to note that the Landscape Architect who assessed this area **did** report that the proposed development would be of medium to high visual sensitivity to those properties that have been mentioned, **specifically H7** but as I mentioned before, H7 has not been written about in detail.

Also the Photo Montages that are available to view, **specifically photos 1-10** have not given a clear enough picture of actually how close the proposed turbine would be to the nearest properties. Why is there a photo taken as far back as Ascurry Mill when they could have taken one much closer from property H7 where there

is **no** 'intervening vegetation and buildings'?? (page 55). Why aren't there any photos taken of the houses at Gask where it would clearly show what the turbine would look like towering over their properties??

Therefore I feel there are various points in this report that are misleading, subjective and incorrect.

So to conclude - the proposed development does **not** respect the landscape character of the area resulting in **more** visual damage and intrusion due to its size and position which is too close to the villages of Letham and Bowriefauld and **far** too close to the dwellings at Gask and Ascurry.
The height of the proposed turbine at 77metres is wholly inappropriate for such a picturesque and prominent setting.

It is **my** home. I have **every** right to a decent quality of life. What benefit is it for me? Nothing, other than potential noise, loss of view and reduced property value. Why should I be worse off in order that a landowner and developer (both of who live **nowhere** in the vicinity) can benefit.

Yours sincerely,
Susan Menzies

Comments for Planning Application 13/01029/FULL

Application Summary

Application Number: 13/01029/FULL
Address: Field 500M North West Of Ascurry Farm Ascurry Letham
Proposal: Erection Of Wind Turbine Of 50 Metres To Hub Height And 77 Metres To Blade Tip And Associted Sub-Station And Transformer Kiosk, Hardstanding Areas And Access Road
Case Officer: Ruari Kelly

Customer Details

Name: Mrs Susan Menzies
Address: Lewiston Cottage Ascurry Farm Letham

Comment Details

Commenter Type: Member of Public
Stance: Customer objects to the Planning Application
Comment Reasons:
Comment:I would like to further my objection to this proposed development.
Having read the recent report by Angus Council and SNH (Strategic Landscape Capacity Assessment for Wind Energy in Angus Nov. 2013) this proposal breaches many of the guidelines set out in this document with regards to size, scale and cumulative effect. With regards to the guidelines within this assessment this proposal should clearly not be allowed to be given approval.

Comments for Planning Application 13/01029/FULL

Application Summary

Application Number: 13/01029/FULL
Address: Field 500M North West Of Ascurry Farm Ascurry Letham
Proposal: Erection Of Wind Turbine Of 50 Metres To Hub Height And 77 Metres To Blade Tip And Associted Sub-Station And Transformer Kiosk, Hardstanding Areas And Access Road
Case Officer: Ruari Kelly

Customer Details

Name: MR EDDIE STUART
Address: 92 LINEFIELD ROAD CARNOUSTIE

Comment Details

Commenter Type: Member of Public
Stance: Customer objects to the Planning Application
Comment Reasons:
Comment:Far Too many of these inefficient monstrosities dotted about the county, for who's benefit?

Comments for Planning Application 13/01029/FULL

Application Summary
Application Number: 13/01029/FULL
Address: Field 500M North West Of Ascurry Farm Ascurry Letham
Proposal: Erection Of Wind Turbine Of 50 Metres To Hub Height And 77 Metres To Blade Tip And Associted Sub-Station And Transformer Kiosk, Hardstanding Areas And Access Road
Case Officer: Ruari Kelly

Customer Details
Name: Mr Craig Mitchell
Address: Dunnichen View Craichie Road Bowriefauld

Comment Details
Commenter Type: Member of Public
Stance: Customer objects to the Planning Application
Comment Reasons:
Comment:I would respectfully enter an objection to this development.

The main reason for the objection is the size of the turbine which will have a direct impact on the current view from my home. Unlike some letters of support for this development which I note appear to be from fellow farmers, who would most likely be keen to have similar developments approved elsewhere in Angus, members of the farming supply services and employees/relations of the director of A M McEwan, this development will have a direct impact on my visual amenity. I will have a direct line of sight from my living room to the turbine. From the photographs supplied in the aplication, noting that none have been taken from Craichie Road, Bowriefauld, the turbine will clearly dominate the vista.

With regard to the visual impact of this turbine, I remind the planning department of the planning conditions imposed on the new build homes at Kirk View and Dunnichen View. Planning ref 06/01001/OUT.
Condition 13: That the house(s) have a traditional pitched roof of not less than 40 degrees
Condition 14: That the roof(s) be finished in slate
Condition 15: That the building(s) be single or one and a half storeys in height
The conditions being imposed for the following reason; In the interests of visual amenity and that the visual amenity of the area is not adversely affected.
Now having complied with these conditions despite the extensive cost involved it was of little consequence when afforded an unadulterated view of the rolling Angus countryside.
This view will be ruined if this development is approved and the visual amenity that the council endeavoured and succeeded to protect will be changed dramatically by an out of place monstrosity.

Now although on the whole I support the principal of wind power generation by farms, I would prefer that they had a direct impact with regard to the Farm concerned. This is most definitely not the case in this instance as there are few if any items of electri

AC45

LeslieIA

From: StewartLS on behalf of PLANNING
Sent: 08 January 2014 11:11
To: PLNProcessing
Subject: FW: Comments for Planning Application 13/01029/FULL

From: publicaccess@angus.gov.uk [mailto:publicaccess@angus.gov.uk]
Sent: 08 January 2014 10:06
To: PLANNING
Subject: Comments for Planning Application 13/01029/FULL

Planning Application comments have been made. A summary of the comments is provided below.

Comments were submitted at 10:07 AM on 08 Jan 2014 from Mr David Craig.

Application Summary

Address:	Field 500M North West Of Ascurry Farm Ascurry Letham
Proposal:	Erection Of Wind Turbine Of 50 Metres To Hub Height And 77 Metres To Blade Tip And Associted Sub-Station And Transformer Kiosk, Hardstanding Areas And Access Road
Case Officer:	Ruari Kelly

[redacted]

Customer Details

Name:	Mr David Craig

[redacted]

Address:	2 HELENSBURGH

Comments Details

Commenter Type:	Member of Public
Stance:	Customer objects to the Planning Application
Reasons for comment:	
Comments:	My wife and I have just returned from a few days' break in Angus, the County in which we were brought up and educated. Until fairly recently, my wife's mother lived not far from where this proposed turbine is to be sited. We are dismayed at the alterations made to the Angus countryside by the siting of a number of large wind turbines spoiling the beauty of the rolling Angus countryside. We are aware of efforts to reduce emissions of greenhouse gases but until it is proved beyond any doubt that these turbines do not have any harmful health effect to residents nearby, there should be no more applications considered.

Comments for Planning Application 13/01029/FULL

Application Summary

Application Number: 13/01029/FULL
Address: Field 500M North West Of Ascurry Farm Ascurry Letham
Proposal: Erection Of Wind Turbine Of 50 Metres To Hub Height And 77 Metres To Blade Tip And Associted Sub-Station And Transformer Kiosk, Hardstanding Areas And Access Road
Case Officer: Ruari Kelly

Customer Details

Name: Mrs G Ingram
Address: Park Road Letham Angus

Comment Details

Commenter Type: Member of Public
Stance: Customer objects to the Planning Application
Comment Reasons:
Comment:I object to this application of a HUGE turbine, yet another in beautiful angus which bring no benefit to any body apart from the greedy farmer who makes money from ruining the lives of all who live near, or in Angus.

Comments for Planning Application 13/01029/FULL

Application Summary

Application Number: 13/01029/FULL
Address: Field 500M North West Of Ascurry Farm Ascurry Letham
Proposal: Erection Of Wind Turbine Of 50 Metres To Hub Height And 77 Metres To Blade Tip And Associted Sub-Station And Transformer Kiosk, Hardstanding Areas And Access Road
Case Officer: Ruari Kelly

Customer Details

Name: Mrs K Gray
Address: Meadowlea Clocksbriggs Forfar

Comment Details

Commenter Type: Member of Public
Stance: Customer objects to the Planning Application
Comment Reasons:
Comment:I am writing to object to the monstrosity of a turbine that is being considered for Askerry Farm. The immense hight of this wind turbine will cause an absolute eye sore for miles around but more importantly it will cause great distress to those who live near, or even not so near, as it will have a huge impact on their lives. It will cause a huge shadow flicker and loud noise which those living near will have to live with EVERY SINGLE HOUR OF EVERY DAY.
I read Mr Andrew Vivers comments which were very interesting and informative. I suggest you read his comments again and all other many objections to this proposal very carefully and then make the correct decision and OBJECT this application.

Comments for Planning Application 13/01029/FULL

Application Summary

Application Number: 13/01029/FULL
Address: Field 500M North West Of Ascurry Farm Ascurry Letham
Proposal: Erection Of Wind Turbine Of 50 Metres To Hub Height And 77 Metres To Blade Tip And Associted Sub-Station And Transformer Kiosk, Hardstanding Areas And Access Road
Case Officer: Ruari Kelly

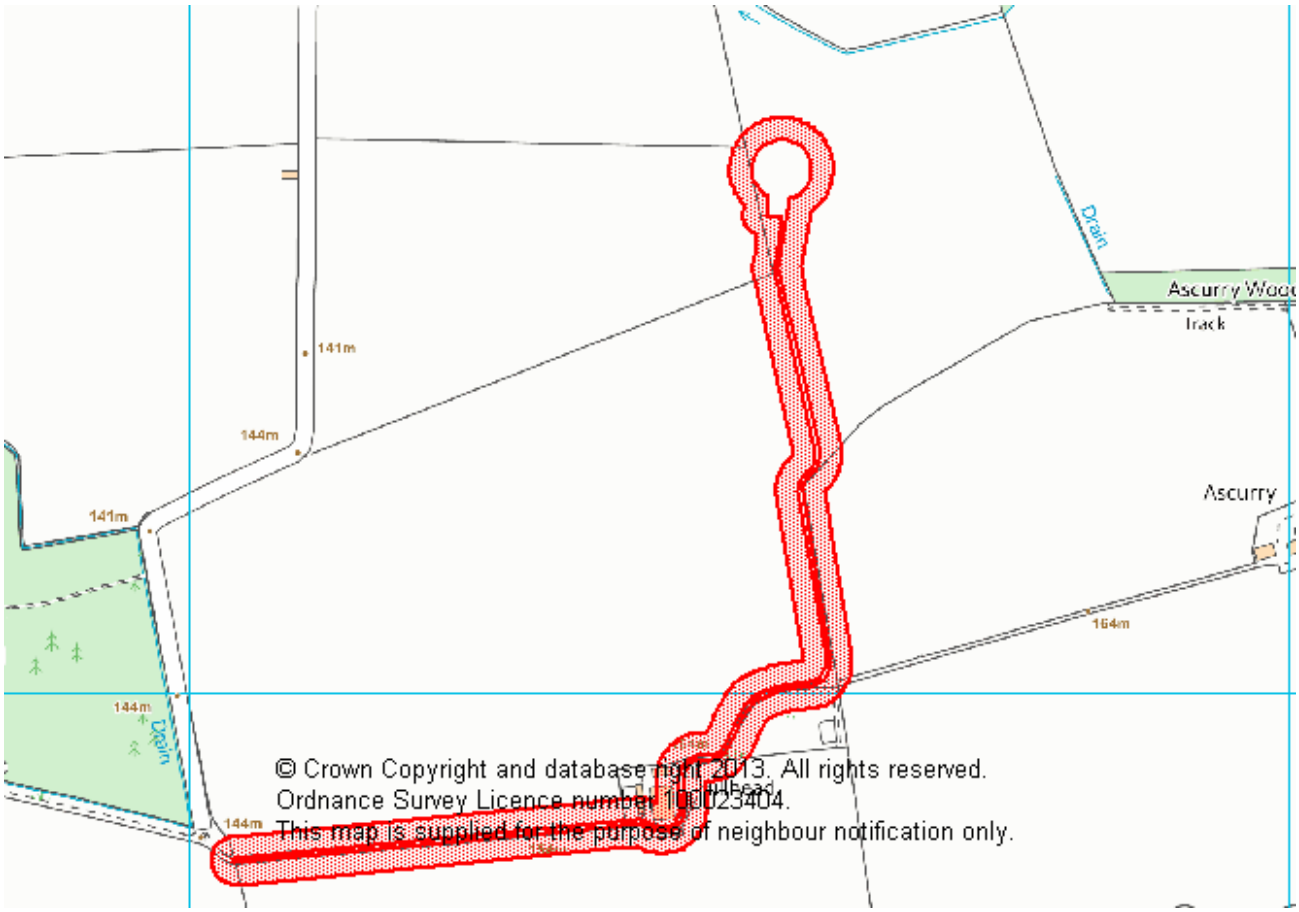
Customer Details

Name: MRs W Gray
Address: Meadowlea Clocksbriggs Forfar

Comment Details

Commenter Type: Member of Public
Stance: Customer objects to the Planning Application
Comment Reasons:
Comment:I OBJECT TO YET ANOTHER HUGE BLIGHT ON OUR BEAUTIFUL LANDSCAPE. THEY DO NOT WORK AND ONLY BENEFIT THE PERSON WHO IS APPLYING! THE EFFECTS OF THE SHADOW FLICKER AND NOISE LEVEL ON THOSE LIVING CLOSE ARE DEVASTATING. ALSO THE EFFECT ON OUR LOCAL WILD LIFE WILL BE HUGE.

AC49


Drain
Ascurry Wood
Track
141m
144m
141m
Ascurry
164m
144m
Drain
144m
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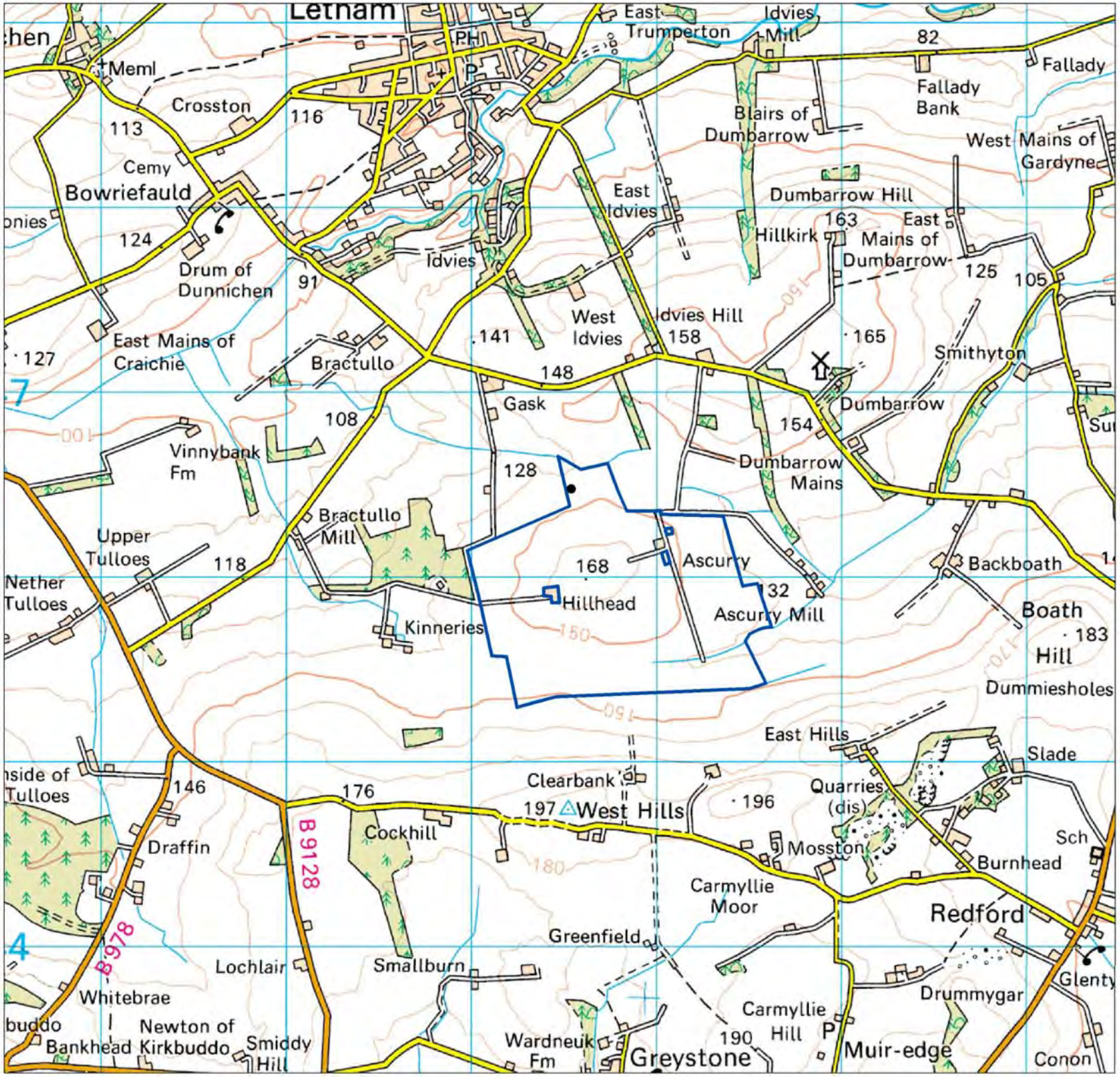
This map is supplied for the purpose of neighbour notification only.



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AC50

Locogen Ltd, 44 Constitution St, Edinburgh, EH6 6RS
Tel: +44 (0) 131 555 4745; Email: info@locogen.com
Company Number: SC370060; VAT Number: 983 3836 77

Project Description

Number of Turbine(s):	1
Turbine Model:	EWT Directwind 54
Hub Height:	50m
Blade diameter:	54m
Total height to blade tip:	77m
Turbine location:	353539 746476

Notes

This map shows the proposed turbine location in black and the boundary of land ownership in blue.

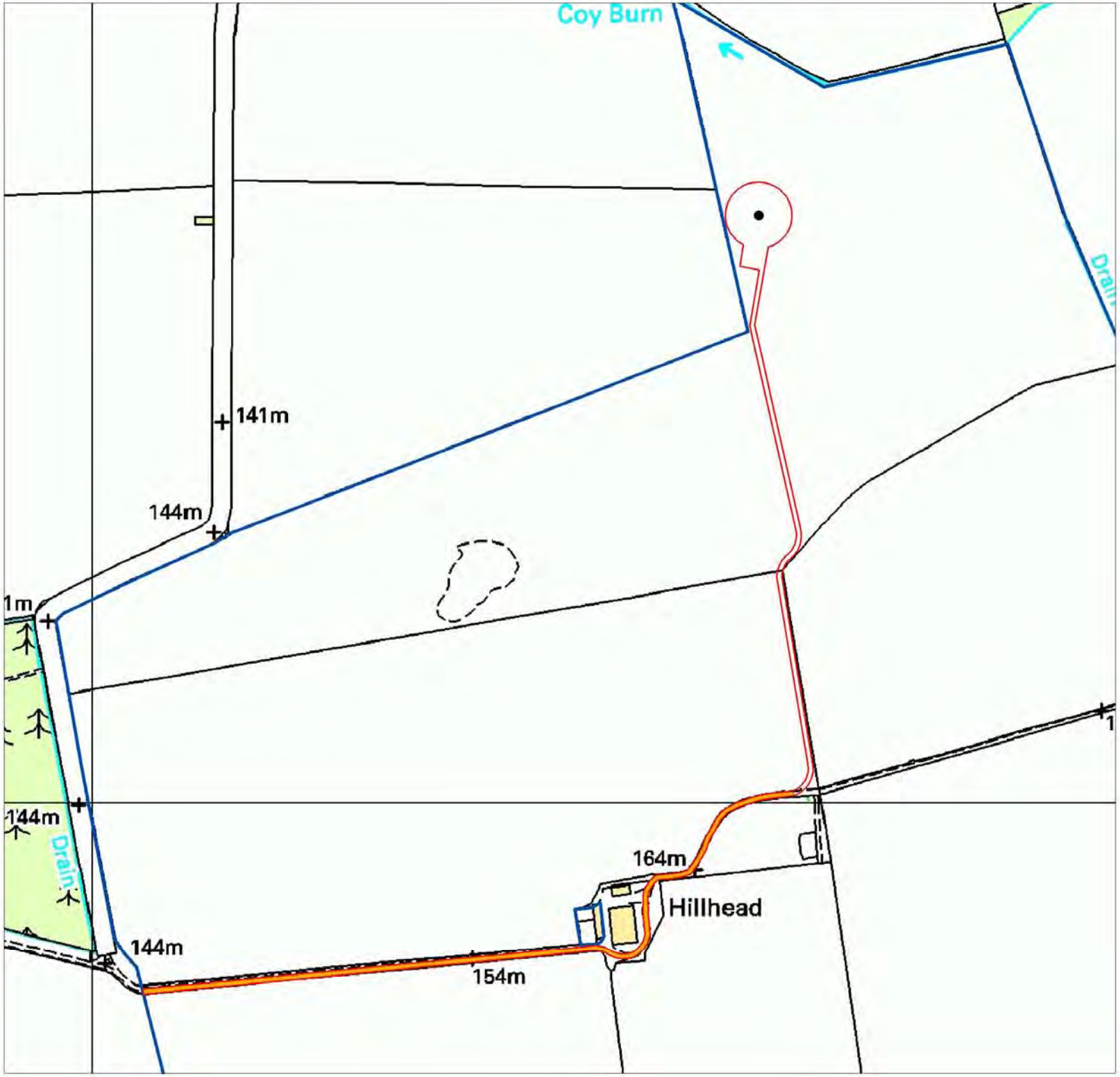
Legend

- Turbine Location
- Boundary of Land Ownership

PROJECT:	**Hillhead of Ascurry**
DRAWING TITLE:	Location Plan
DRAWING NO:	HOA001
DOCUMENT SIZE:	A3
SCALE:	1:20,000
DATE:	05/10/2013
DRAWING BY:	Franco Giovanetti
APPROVED BY:	Andy Lowe

N

0 500 1,000 1,500 m



AC50 Loco2gen

Locogen Ltd, 44 Constitution St, Edinburgh, EH6 6RS
Tel: +44 (0) 131 555 4745; Email: info@locogen.com
Company Number: SC370060; VAT Number: 983 3836 77

Project Description

Number of Turbine(s):	1
Turbine Model:	EWT Directwind 54
Hub Height:	50m
Blade diameter:	54m
Total height to blade tip:	77m
Turbine location:	353539 746476

Notes

This map shows the proposed turbine site layout.

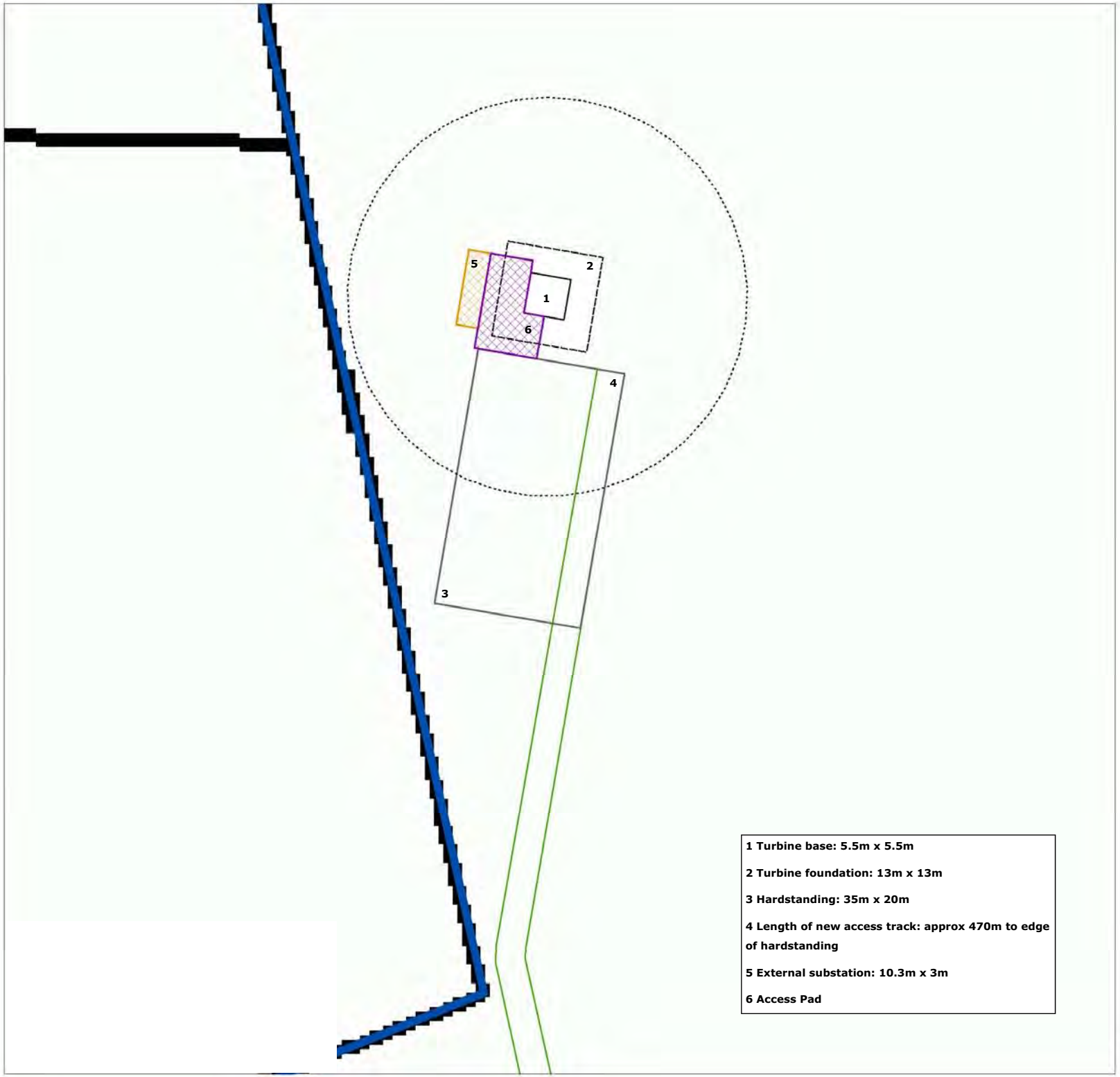
Legend

- Turbine Location
- Existing track requiring minor upgrades
- Application Area : 6,794 m^2
- Boundary of Land Ownership

PROJECT:	**Hillhead of Ascurry**
DRAWING TITLE:	Site Layout
DRAWING NO:	HOA002
DOCUMENT SIZE:	A3
SCALE:	1:3,000
DATE:	05/10/2013
DRAWING BY:	Franco Giovanetti
APPROVED BY:	Andy Lowe

N

0 50 100 150 200 m



1 Turbine base: 5.5m x 5.5m

2 Turbine foundation: 13m x 13m

3 Hardstanding: 35m x 20m

4 Length of new access track: approx 470m to edge of hardstanding

5 External substation: 10.3m x 3m

6 Access Pad

AC50 Locogen

Locogen Ltd, 44 Constitution St, Edinburgh, EH6 6RS
Tel: +44 (0) 131 555 4745; Email: info@locogen.com
Company Number: SC370060; VAT Number: 983 3836 77

Project Description

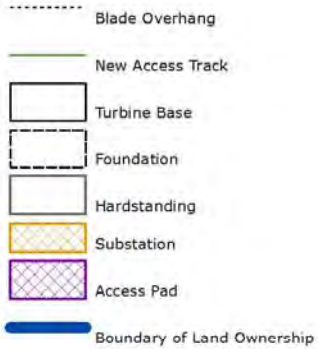
Number of Turbine(s):	1
Turbine Model:	EWT Directwind 54
Hub Height:	50m
Blade diameter:	54m
Total height to blade tip:	77m
Turbine location:	353539 746476

Notes

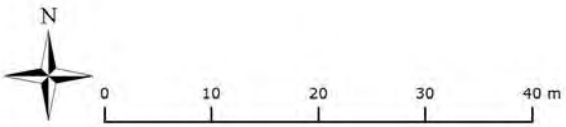
This drawing displays the block plan of the proposed wind turbine project at Hillhead of Ascurry.

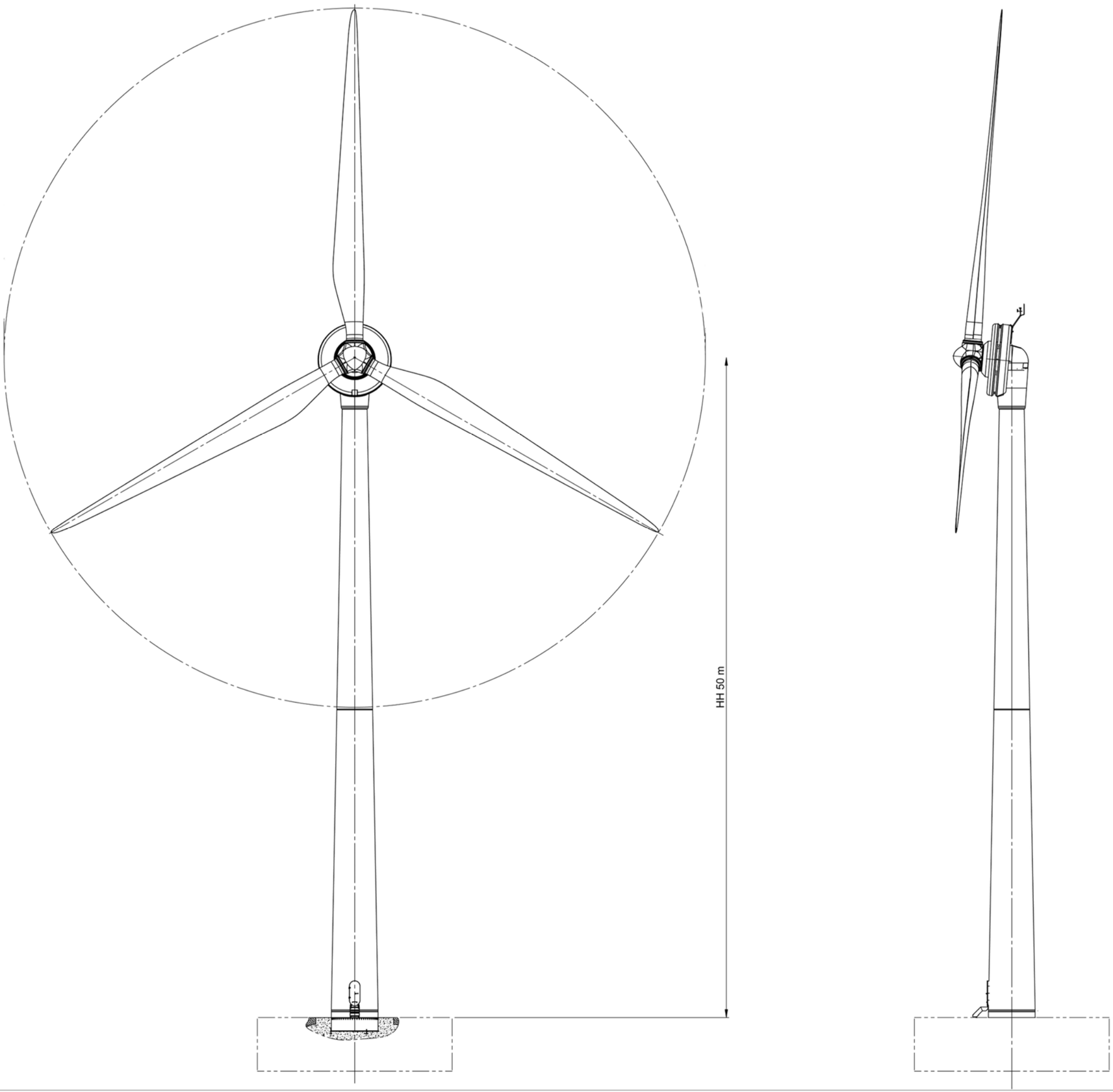
The application site includes the turbine foundation, hardstanding, external substation, access track to the site and access pad.

Legend



PROJECT:	**Hillhead of Ascurry**
DRAWING TITLE:	Block Plan
DRAWING NO:	HOA003
DOCUMENT SIZE:	A3
SCALE:	1:500
DATE:	05/10/2013
DRAWING BY:	Franco Giovanetti
APPROVED BY:	Andy Lowe





AC50

Locogen Ltd, 44 Constitution St, Edinburgh, EH6 6RS
Tel: +44 (0) 131 555 4745; Email: info@locogen.com
Company Number: SC370060; VAT Number: 983 3836 77

Project Description

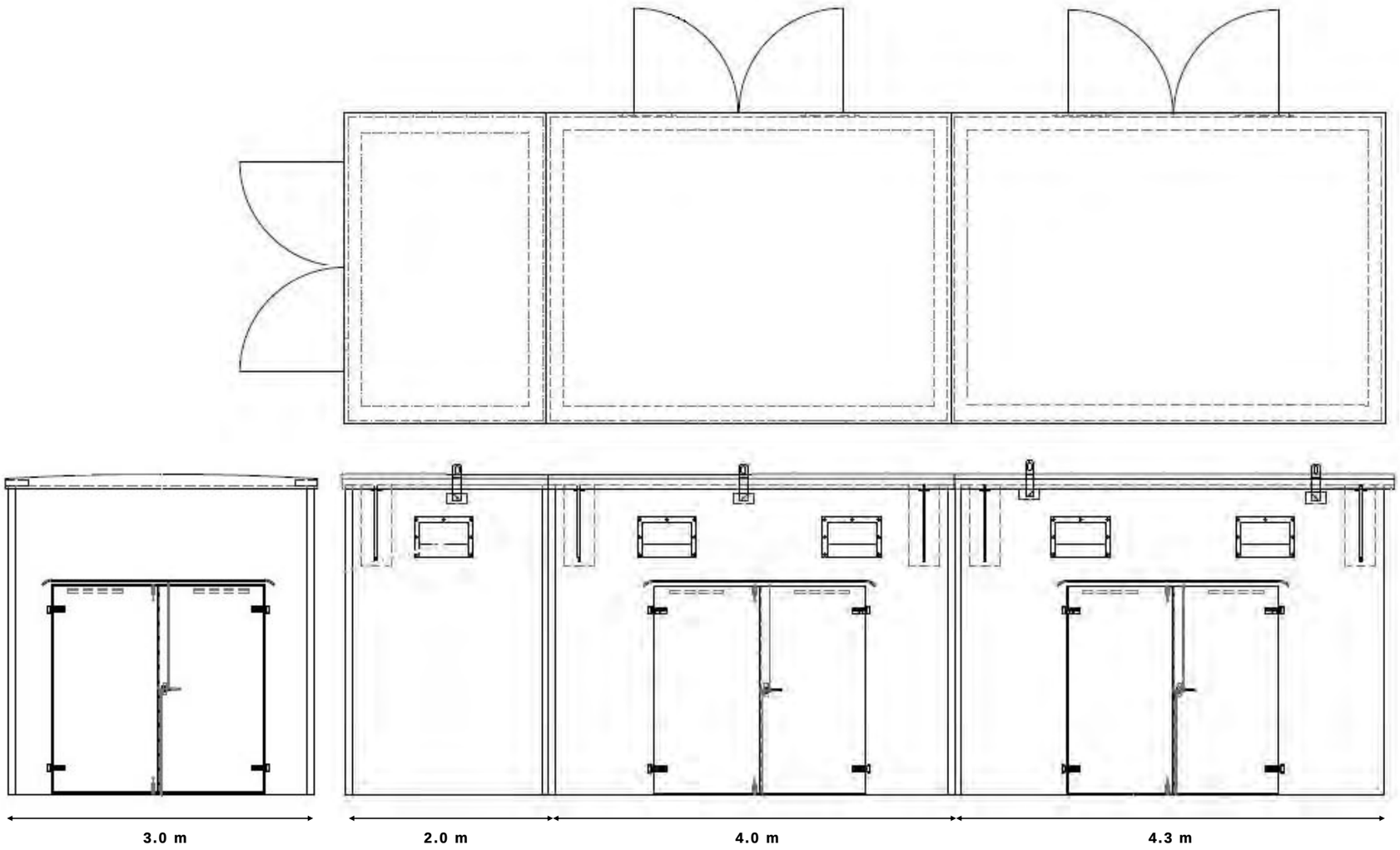
Number of Turbine(s):	1
Turbine Model:	EWT Directwind 54
Hub Height:	50m
Blade diameter:	54m
Total height to blade tip:	77m
Turbine location:	353539 746476

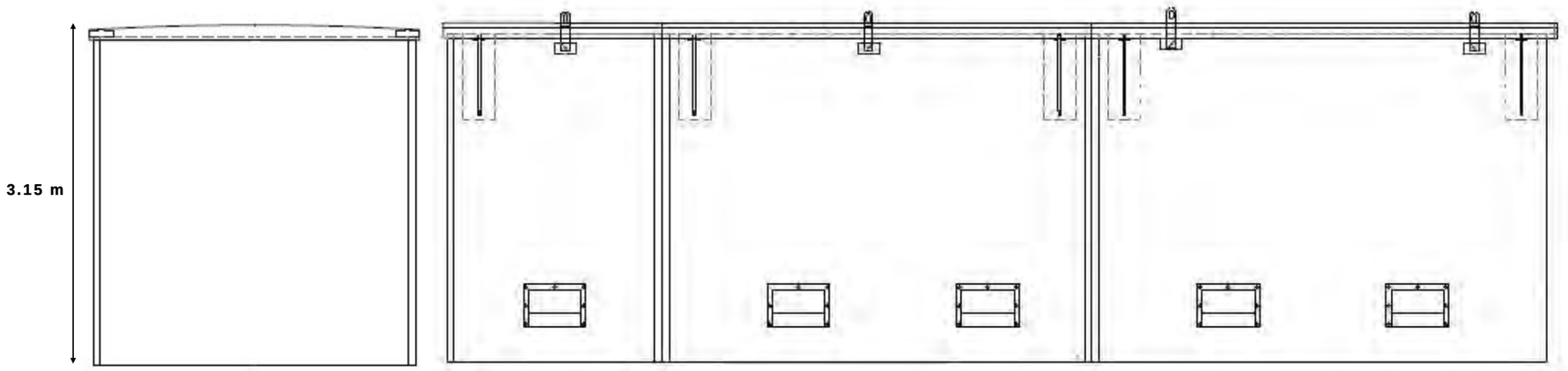
Notes

This drawing details the elevation of the proposed wind turbine.

PROJECT:	**Hillhead of Ascurry**
DRAWING TITLE:	Wind Turbine Elevation Drawings
DRAWING NO:	HOA004
DOCUMENT SIZE:	A3
SCALE:	1:300
DATE:	05/10/2013
DRAWING BY:	Franco Giovanetti
APPROVED BY:	Andy Lowe

0 5 10 15 20 m





AC50

Locogen Ltd, 44 Constitution St, Edinburgh, EH6 6RS
Tel: +44 (0) 131 555 4745; Email: info@locogen.com
Company Number: SC370060; VAT Number: 983 3836 77

Project Description

Number of Turbine(s):	1
Turbine Model:	EWT Directwind 54
Hub Height:	50m
Blade diameter:	54m
Total height to blade tip:	77m
Turbine location:	353539 746476

Notes

This drawing shows the elevation and floor plan of the external sub-station building, as required by Scottish and Southern Energy.

The building will house the transformer, switch gear and safety equipment. The building will be constructed from Glass Reinforced Plastic (GRP) and painted green.

PROJECT:	**Hillhead of Ascurry**
DRAWING TITLE:	External Substation
DRAWING NO:	HOA005
DOCUMENT SIZE:	A3
SCALE:	1:50
DATE:	05/10/2013
DRAWING BY:	Franco Giovanetti
APPROVED BY:	Andy Lowe

0 1 2 3 4 m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Locogen Ltd
44 Constitution Street
Edinburgh, EH6 6RS

20/12/2013

Mr Ruari Kelly
Development Standards
Angus Council
County Buildings
Market Street
Forfar
DD8 3LG

13/01029/FULL – Strategic Landscape Capacity Assessment for Wind Energy in Angus (2013)

Dear Mr Kelly,

With regard to the above application, I am pleased to see that the recently published Strategic Landscape Capacity Assessment for Wind Energy in Angus has concluded that the proposed wind turbine at Hillhead of Ascurry lies within the Redford Farmland sub-area, classified as having medium capacity for 50m – <80m turbines. I also note that the proposed location is within an area classified as having the highest underlying capacity for development, as outlined in the attached drawing.

Such areas are judged to have the capacity to accommodate larger sizes of turbine and/or greater numbers and concentrations relative to other areas of landscape in Angus. This is based on a combination of one or more factors including suitable landscape character, lower visual sensitivity or lower value.

Located within the Redford Farmland sub-area, the assessment describes the landscape and landscape capacity as:

"This sub-area is the largest scale, highest and most open within the Dipslope Farmland and this is partly reflected in the scale of farms and field sizes. There are areas with minimal settlement and roads although it borders the populated coastal area in the south. This has the highest capacity for wind energy in the Dipslope Farmland and can accommodate medium/large turbines, subject to local constraints."

"The largest size turbines (medium/large) would be most suitable in the largest scale areas located in the centre and north of the sub-area."

I appreciate the proposed turbine is located within an area where cumulative impact is considered to limit some development, however the location is close to the edge of this area, and is located a significant distance from the cluster of wind turbines which are considered to result in this classification. Indeed, the detailed Landscape and Visual Assessment included within our Supporting Environmental Document concluded that minimal cumulative effects are predicted as a result of the proposed development.

I also note that the following is included within the assessment, with regard to the outlined separation distances between turbines:

"In all cases the distances are an approximate range intended for guidance. Separation distances between specific proposals should therefore be considered in more detail on a case by case basis."

Reviewing the recent Strategic Landscape Capacity Assessment alongside the other conclusions within our Supporting Environmental Document, I am confident that a development of the size proposed at Hillhead of Ascurry will be of an acceptable scale given both the landscape capacity and other local considerations.

I hope the above proves useful. Please let me know if you need anything additional from me at this stage.

Yours sincerely,

[redacted]

Andy Lowe
Senior Wind Developer

Locogen Ltd.

Supporting Environmental Document

for

Hillhead of Ascurry Wind Turbine

Prepared by:	Andy Lowe
Telephone:	0131 555 4745
Email:	Andy.Lowe@locogen.com
Issued to:	Angus Council – Planning
Contact address:	County Buildings, Market St, Forfar, Angus, DD8 3LG.
Telephone:	01307 461 460
Email:	planning@angus.gov.uk
Date of issue:	29/10/2013

Version	Date	Purpose of amendment
0430RRev1	29/10/2013	Final planning submission to LPA

Table of Contents

Abbreviations

AGL	Above Ground Level
AOD	Above Ordnance Datum
ALS	Area of Landscape Significance
ASL	Above Sea Level
ATC	Air Traffic Control
BAA	British Airports Authority
CAA	Civil Aviation Authority
CO_2	Carbon dioxide
EIA	Environmental Impact Assessment
GHG	Greenhouse Gas
GRP	Glassfibre Reinforced Plastic
GDL	Gardens and Designed Landscapes
HGV	Heavy Goods Vehicle
HBT	Height to Blade Tip
IPCC	Inter-governmental Panel on Climate Change
kW	Kilowatt (a unit of power)
kWh	Kilowatt-hour (a unit of energy generation)
LCA	Landscape Character Assessment
LCT	Landscape Character Type
LPA	Local Planning Authority
LVIA	Landscape and Visual impact Assessment
MOD	Ministry of Defence
MW	Megawatt
NATS	National Air Traffic Services
NSA	National Scenic Areas
Ofcom	Office of Communications
RSPB	Royal Society for the Protection of Birds
SINC	Site of Importance for Nature Conservation
SNH	Scottish Natural Heritage
SPA	Special Protection Area
SSSI	Site of Special Scientific Interest
ZTV	Zone of Theoretical visibility

1. Introduction

This Supporting Environmental Document describes and quantifies the potential environmental and social impacts associated with the construction, operation and decommissioning of a medium scale wind turbine at Hillhead of Ascurry, near Letham. It also provides further information on the proposed development, its compliance with planning policy and the reasons for development. It is to be read alongside the formal planning application submitted to Angus Council.

The remainder of this chapter provides background information on the Hillhead of Ascurry site and the drivers that led to the proposed development being put forward.

1.1. Turbine site

The proposed turbine will be situated at the edge of an arable field, approximately 2km south of Letham, 3km north of Greystone and 3.2km north west of Redford. The area that comprises the Hillhead of Ascurry site is illustrated in Figure 1 below with the boundary of the agricultural land owned by the applicant shown in blue. The proposed turbine location is highlighted by the black circle.

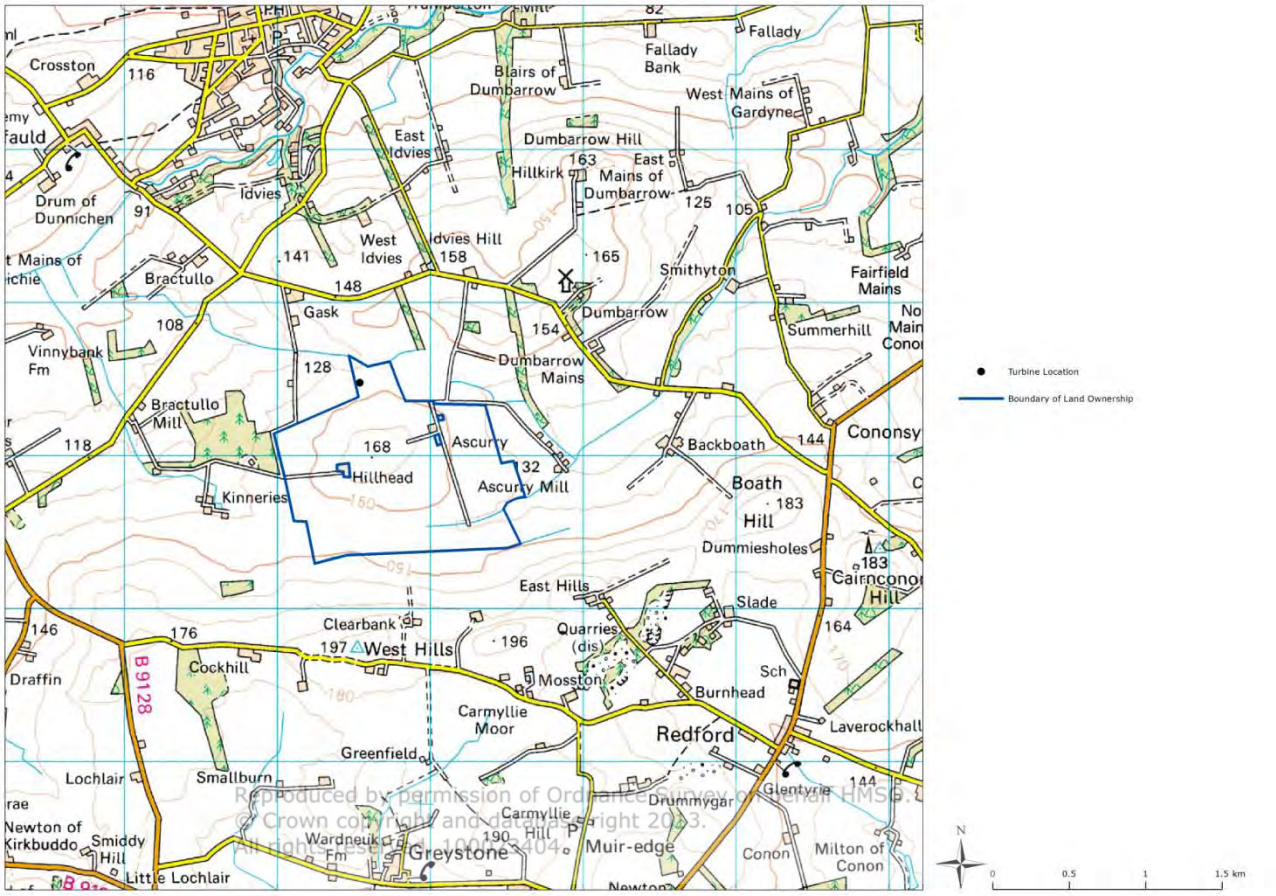

Figure 1: Map showing the land comprising the Hillhead of Ascurry site

1.2. Project Benefits

There are three core drivers for the applicant to develop wind energy on the farm:

1. Diversification of farming business;
2. Improve environmental performance; and
3. Combating climate change.

These drivers are discussed further in the chapters below.

1.2.1. Diversification

The development of a wind turbine at Hillhead of Ascurry would lead to an additional sustainable source of income for the family farming business, A. M. McEwan. Concerns have been raised over the poor weather conditions experienced in recent years and the significant impact this has had on the farming business. This has prompted the applicant to explore alternative areas of income to help support his farming business. A. M. McEwan currently employs 10 full time staff and 12 part-time and seasonal staff.

The proposed wind turbine will provide a source of additional income over the 25 years of expected operation. Agriculture incomes can differ significantly year to year due to variations in weather conditions, crop quality and yield, market prices, exchange rates and operational costs for fertiliser, fuel etc. The operation of the wind turbine will provide an income stream that is separate from these variables and the project therefore demonstrates best practice diversification. The development will also have a minimal footprint and allow for the continuation of the current farming operation on the vast majority of the land.

The main objectives of the proposed income diversification are as follows:

- To increase direct business revenue and thus support the continued viability of the existing farming business;
- To improve attractiveness of food produce to suppliers through improved sustainability credentials;
- To support existing employment;
- To create new employment;
- To provide renewable energy to meet demand;
- To reduce the overall carbon footprint of the farm through offsetting energy usage;
- To promote the use of renewable energy generation in the area and contribute towards achieving national and regional renewable energy targets; and
- To spread the farmer's risk into a non-agricultural sector.

The development of wind energy at the site by the applicant will also maximise the local benefits from renewable development as the revenue from the project will stay in the local economy. The additional benefits of locally developed and owned renewable energy projects are described in further detail in the socioeconomic chapter of this document but is considered to lead to a greater opportunity for retained benefits and local job creation.

1.2.2. Improve Environmental Performance

Hillhead of Ascurry is an arable farm comprising approximately 380 acres of farm land. Hillhead of Ascurry is one of 11 farms owned by A. M. McEwan, with the wider farming business totalling approximately 2,200 acres across Angus.

Arable cropping across the farming estate includes malting barley, feed wheat, oilseed rape, ware potatoes, seed potatoes and a small area of permanent grazing. In addition 250 – 300 cattle per annum are finished for the beef trade on the permanent grazing and in a cattle store at one of A. M. McEwan's farms.

The farming business comprises a number of farm buildings, including 4 cold stores capable of storing 5,300 tonnes of potatoes, 2 ambient stores capable of storing 6,200 tonnes of produce, a grain drier, a potato grader and a hammer mill.

All of A. M. McEwan's ware potatoes are sold to Albert Bartlett & Sons (Airdrie) Ltd. These in turn end up in most of the major supermarkets throughout the UK. These businesses demand high quality and the best way to maintain quality over a long period of time is through cold storage. Whilst potatoes are being stored on the farm this requires an ambient temperature of 2 – 3 degrees.

The seed potatoes grown across the farming business are sold to Grampian Growers Ltd, the cattle to McIntosh Donald, and the oilseed rape, malting barley and feed wheat to WN Lindsay, DM Carnegie and East Coast Viners Grain LLP. All of these are local businesses.

Given the above operations the farming business has a significant carbon footprint from normal operations and this is primarily linked to the energy consumption required to run the business.

Electricity usage across the farming business is also high, costing in the region of £120,000 per annum. This is therefore a significant cost to the business and a source of associated carbon emissions, and this will only increase as the farm business continues to grow and energy prices increase.

In addition it is estimated that the A. M. McEwan business annually consumes ~350,000 litres of red diesel and this is considered to directly lead to 934 tonnes of CO_2[1] emitted per annum.

As a high energy user, a supplier to local and national food companies, and a supplier of British produce, the farm is seeking to improve its sustainability credentials and reduce its carbon footprint. The requirement to demonstrate a tangible commitment to sustainability is increasing, with markets demanding higher environmental standards from their supply chain, and buyers requesting support from suppliers to help meet their environmental commitments. In a competitive market the ability to demonstrate that the farm business is working hard to support buyers' environmental strategies is becoming increasingly important to maintain business. Energy prices are also increasing and to ensure farming remains viable, both environmentally and financially, a sustainable energy supply is essential.

Given the strong expected wind resource at the proposed location the operation of 1 No. 500kW wind turbine is expected to generate in the region of 1,650MWh per annum[2]. This would directly offset the emission of approximately 866 tonnes of CO_2 for every year of operation[3]. This would be a significant step towards reducing the carbon footprint of the

[1] Using current figures from DECC and the Carbon Trust each litre of diesel used emits 2.6676 kg of CO_2.
[2] This figure is based on a turbine capacity factor of 38%.
[3] Using current figures from DECC and the Carbon Trust each kWh of electricity generated offsets 0.5246kg of CO_2.

farming business and meeting A. M. McEwan's desire to achieve environmentally friendly farming practices.

1.2.3. Combating Climate Change

In addition to the above local drivers the development will also be a positive towards combating climate change. It is now generally accepted that there is an important requirement to reduce the emission of harmful Greenhouse Gases (GHG's) – specifically carbon dioxide (CO_2) – in order to mitigate the worst impacts of human-induced global climate change. To this end there are global and national targets in place that address this requirement for a move to a low carbon way of life.

The UK has signed up to targets to reduce total CO_2 emissions. Over and above the terms laid out in the UK, Scotland has set further ambitious targets. Around 20% of the UK's CO_2 emissions are caused by the production of electricity from conventional burning of fossil fuels (coal, oil and gas). Therefore the increased development of renewable energy technologies – such as wind energy – is a key part of the strategy to meet the UK's legal requirements. To this end a number of national and regional targets have been set out for the increased provision of electricity from renewable sources and these are summarised for Scotland and the UK in Table 1 below.

	Scotland	**UK**
CO_2 emissions reduction targets by 2020[4]	42%	34%
Proportion of electricity demand to be met by renewable technologies by 2020	100%	15%
Estimated renewable electricity generation required to meet target	45TWh	>100TWh
Expected proportion of the above to be met by onshore wind	50%	40%
Equivalent GW capacity required from onshore wind to meet this target	~9.5GW	~15-19GW
Actual onshore installed capacity as of October 2012	3.4GW	5.0GW

Table 1: Overview of energy related CO_2 emission reduction targets

From the above table it can be seen that Scotland and the UK are a considerable way from achieving the scale of on-shore wind development considered necessary to meet their wider renewable targets. This proposed development is therefore a positive step towards meeting the Scottish and UK goals regarding a low carbon economy.

This locally owned development will also contribute to the target of 500MW community and locally-owned renewable energy schemes by 2020, as laid out in the 2011 document, the '2020 Routemap for Renewable Energy in Scotland'. This target was put forward with the aim of generating local revenue and sustaining local economies and it is considered that the applicant is well placed to support these aims through his farming business.

1.3. Remainder of the Document

This Environmental Supporting Document is divided into separate chapters. The environmental assessment chapters describe the subject being addressed, summarise relevant background and guidance documentation, state the relevance to the Hillhead of Ascurry project and discuss the methodologies used in the assessment. The results of each impact assessment are

[4] From 1990 levels

then presented and, where appropriate, mitigation measures are suggested. A brief overview of the contents of each chapter is provided below:

2. **The Wind Turbine Proposal –** A description of the proposed development, including turbine description, site layout, access, grid connection, delivery routes etc.

3. **Planning & Environmental Policy** – An introduction and overview of the national, regional and local planning legislation relevant to the project.

4. **Work to Date** – An outline of the development works completed prior to this planning submission.

5. **Landscape & Visual –** This chapter uses ZTVs, photomontages and wireframe analysis to demonstrate and assess the landscape and visual impacts associated with the proposed development.

6. **Soils & Hydrology –** Provides a description of the hydrological and the hydrogeological features surrounding the site and the expected impact of the development.

7. **Socioeconomic –** Provides a description of the activity of the local economy and tourism and the expected impacts of the development on these areas.

8. **Cultural Heritage –** Provides an assessment of the effects of the wind development on the setting of cultural sites in the area such as Listed Buildings and Scheduled Ancient Monuments.

9. **Ecology –** Provides a description of the flora and fauna within the surrounding region of the turbine and the expected impact of development.

10. **Shadow Flicker –** Industry software has been used to identify dwellings which may be subject to the effect of shadow flicker. The exact times and durations are calculated and, should any shadow flicker impact be expected, mitigation measures are suggested.

11. **Noise –** A noise assessment was carried out to assess the effect of background noise on the nearby residential areas.

12. **Telecommunications –** Relevant industry bodies have been contacted to assess any potential impact on communication signals and infrastructure.

13. **Aviation –** Considers any potential impacts on civil and military aviation operations in the area.

14. **Public Safety –** Based on national planning guidelines, this chapter outlines the public safety issues associated with the proposed development. The proximity of the turbine locations to pipeline consultation zones is also discussed in this chapter.

15. **Summary & Mitigation –** Summarises the main conclusions of the Supporting Environmental Document and provides justification as necessary for the proposal.

2. The Wind Turbine Proposal

This chapter provides an overview of the proposed location of the medium scale turbine at the site, given the existing constraints and the available space within the surrounding area. A single medium scale turbine was deemed suitable for this site to ensure maximum utilisation of the available wind resource, whilst ensuring a minimal impact on the local environment.

2.1. Site Selection

The primary criteria to consider for the feasible installation of a medium scale wind turbine are as follows:

- **Distance from residential buildings** – It is important to maximise the distance between the turbine and nearby residential dwellings to mitigate potential issues such as noise, shadow flicker and a loss of visual amenity. Satisfactory residential exclusion zones were applied to mitigate these key issues from those properties not in the ownership of the applicant;
- **Avoidance of key environmental areas** – In choosing the most suitable location, efforts were made to avoid environmentally sensitive areas. Ecological studies undertaken at the site identified it as being a low sensitivity site in terms of the habitats and species noted within or adjacent to the development area;
- **Available wind resource** – The best available wind resource for the turbine was sought through maximising the height of the location without significantly impacting upon visual concerns. The wind resource for the area was assessed through desk based models and the suitable areas (to maximise generation) were considered to be on the higher areas of land within the centre of the land ownership area;
- **Access to site** – Efforts were made to minimise the need for additional civil works. The preferred access utilises as much of the existing road network as possible and this in turn will minimise the footprint and associated environmental impact of the development. Direct access to the turbine location will be provided via approximately 1.1km of access track. Approximately 620m of this will be an existing farm track which will require some minor upgrades (see Figure 2). This current farm track provides access to and between the Hillhead and Ascurry farmsteads. The remaining 470m will be a new access track which will provide direct access to the turbine location. This track will also provide the farmer with permanent access to the field in which the turbine will be located;
- **Avoidance of culturally sensitive areas** – The disturbance of archaeological or historical sites, including stone walls and ruins of interest was avoided through the sympathetic selection of the site; and
- **Clearance from public roads** – The required clearance distance for a turbine from public roads is dependent on the Local Planning Authority (LPA) but a conservative distance of 84.7 m (equal to fall-over distance plus 10%) was used as a minimum to ensure public health and safety.

When examining the above criteria, the key concerns were to maximise the distance from residential properties, minimise visual impact whilst still ensuring sufficient wind resource and avoid areas of higher ecological sensitivity.

The next section discusses the development components in further detail.

2.2. Site Layout

The proposed position of the turbine is in an arable field. The proposed installation will include the following components:

- **Wind turbine** – The candidate turbine is discussed in further detail in Chapter 2.3 below;
- **Foundation** – For the chosen turbine the foundation will be a square structure with expected dimensions of 13m x 13m. Once constructed this structure will be backfilled so that only the tower base pedestal will be visible;
- **Electrical substation kiosk** – It is proposed that the required turbine transformer be located in a GRP building located next to the base of the tower along with the necessary switchgear and protection equipment. In addition this building would have space for the Distribution Network Operator's (DNO's) electrical equipment. This building will have maximum dimensions of 10.3m x 3m, and will have a maximum elevation of 3.15m;
- **Access road** – Direct access to the turbine location will be provided via approximately 1.1km of access track. Approximately 620m of this will be an existing farm track which will require some minor upgrades (see Figure 2). This current farm track provides access to and between the Hillhead and Ascurry farmsteads. The remaining 470m will be a new access track which will provide direct access to the turbine location. This track will also provide the farmer with improved access to the field in which the turbine will be located;
- **Construction compound** – There will be a requirement for the construction of a hardstanding area for the assembly of the crane and rotor. This would measure an estimated 20m x 35m with an adjacent temporary compacted area for lay down of turbine components during construction; and
- **Underground cable** – The 11kV cable connecting the turbine to the proposed grid connection point will be buried, where possible, to minimise visual impacts.

The proposed layout of the construction components is illustrated in Figure 2 and Figure 5 below, with further information provided in Drawings HOA002 and HOA003 which are attached to this Supporting Environmental Document.

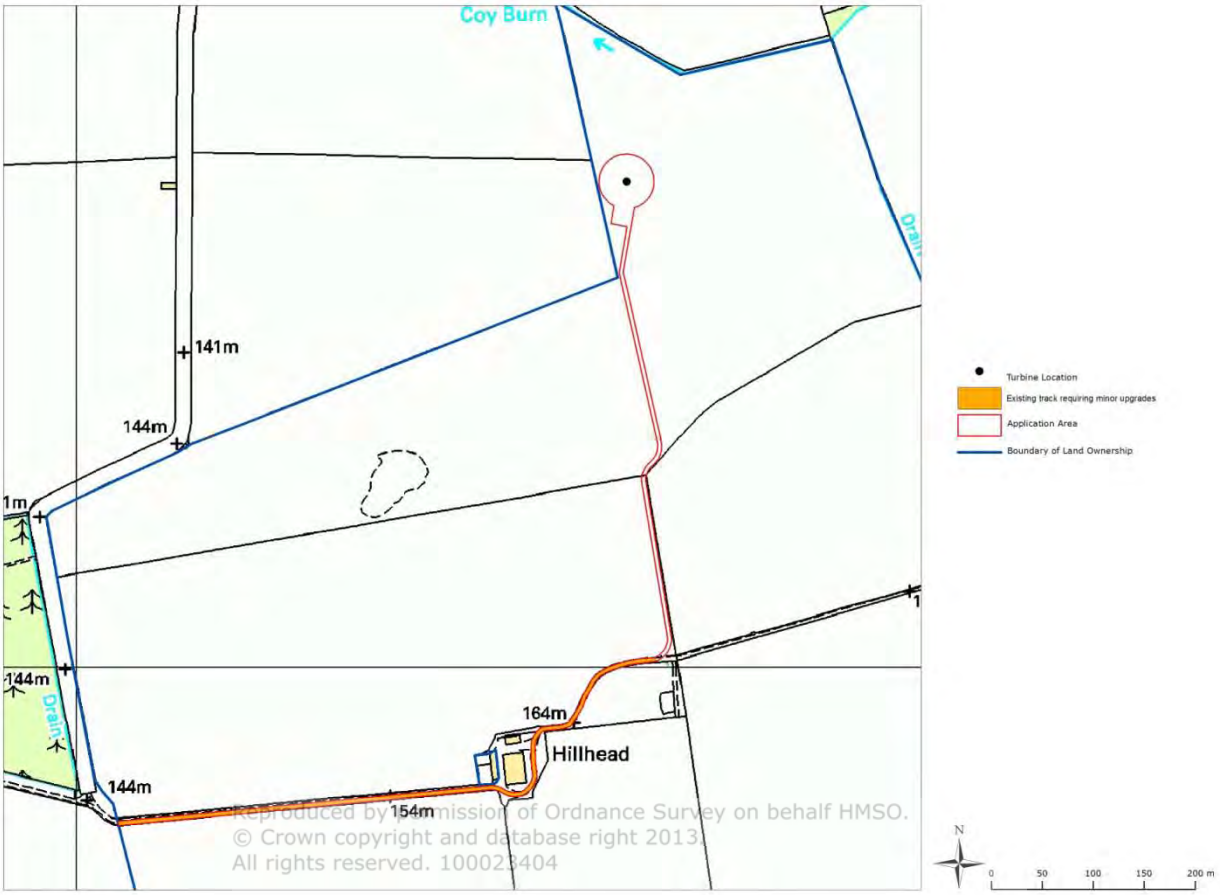

Figure 2: Proposed layout of application site

From the above information it can be seen that all works for this application will take place on the applicant's land. The requirement for ancillary structures will be minimal with limited additional permanent structures required alongside the turbine. The only visible aspects of the development once construction is complete will be the retained access road, crane pad, turbine and substation kiosk. The next chapters discuss the various components of the development in further detail.

2.3. Turbine Specification

The proposed choice of turbine for development is a medium scale turbine with a capacity of up to 500kW. At this time the preferred choice of turbine is the EWT Directwind 54 model. The final choice of turbine may differ but would not increase in size from what is proposed or vary significantly in design (e.g. all considered turbine options would be 3 bladed upwind designs as used in commercial wind farms).

The outline technical specifications for the Directwind 54 are provided in Figure 3 below alongside a photograph of an operational EWT turbine.

	Directwind 54
Rated Capacity	500kW
Status	New
IEC Wind Class	IIIa
Proposed Hub Height	50m
Rotor diameter	54m
Distance from ground to blade tip	77m
IEC Maximum Rotational Speed	12 – 28rpm
Rated wind speed	10m/s
Operational turbine life	25 years

Figure 3: Technical specifications and photograph of the proposed turbine option

2.4. Transport to Site

It is intended that the wind turbine components will be delivered to site from a suitable port on the east coast from where they will be loaded onto road vehicles. The access road requirement for a turbine of the scale proposed is provided in Table 2 below. The longest single load will be the blades themselves which are each approximately 26m in total length, while the tower will be delivered in two sections of approximately 23m.

Consideration	Requirement
Useful width of carriageway	4m
Clearance width	5.7m
Clearance height	4.6m
Radius of curve, external	20m
Maximum longitudinal slope	8°
Maximum lateral slope	0 - 2°
Maximum axle load	16.5t

Table 2: Minimum access considerations for the proposed scale of wind turbine

At this time it is proposed that the turbine components are transported to site from Dundee Port. The delivery vehicles will utilise the A92 to Muirdrum and then the B9128 which would lead to Forfar. Approximately 2km south south east of Craichie the delivery vehicles will turn right and from here will utilise the minor road network to access the site. Direct access to the turbine location will be provided via approximately 1.1km of access track. Approximately 620m of this will be an existing farm track which will require some minor upgrades (see Figure 2). This current farm track provides access to and between the Hillhead and Ascurry farmsteads. The remaining 470m will be a new access track which will provide direct access to the turbine location. This track will also provide the farmer with permanent access to the field in which the turbine will be located. The proposed access route from Dundee Port is shown in Figure 4 below.

Figure 4: Proposed transport route (shown pink).

From an initial assessment of the route, the junctions can generally be considered to be suitable to allow for the safe movement of the turbine delivery vehicles. This assumes that front and rear axle steered vehicles would be used to allow for increased manoeuvrability. If consented a full transport assessment can be provided to Angus Council's Roads Department for discussion and approval.

2.5. Construction Traffic

The turbine components will be delivered in approximately 8 individual loads. Extendable trailers will be employed to transport the larger turbine components. All vehicles carrying abnormally long loads will have rear wheel steering to facilitate delivery down minor roads. The axle loading of the heaviest delivery vehicle is 16.5 tonnes. Two cranes are required for the offloading and construction of the turbine, the main crane is expected to be a 250 – 500 tonne mobile crane. The tailing crane is likely to be a 90 tonne, rear wheel steering crane. Additional construction traffic would be necessary for the construction of the hardstanding area. There will also be small vehicle access for site workers/individual contractors throughout the construction program.

2.6. Construction Compound

The construction hardstanding area will comprise an area of suitably firm footing for the cranes to operate. There will also be levelled lay down and assembly area to allow for the set down of components, rotor blade assembly and for general installation works. The proposed construction area is shown in Figure 5 below (this is also provided in Drawing HOA003).

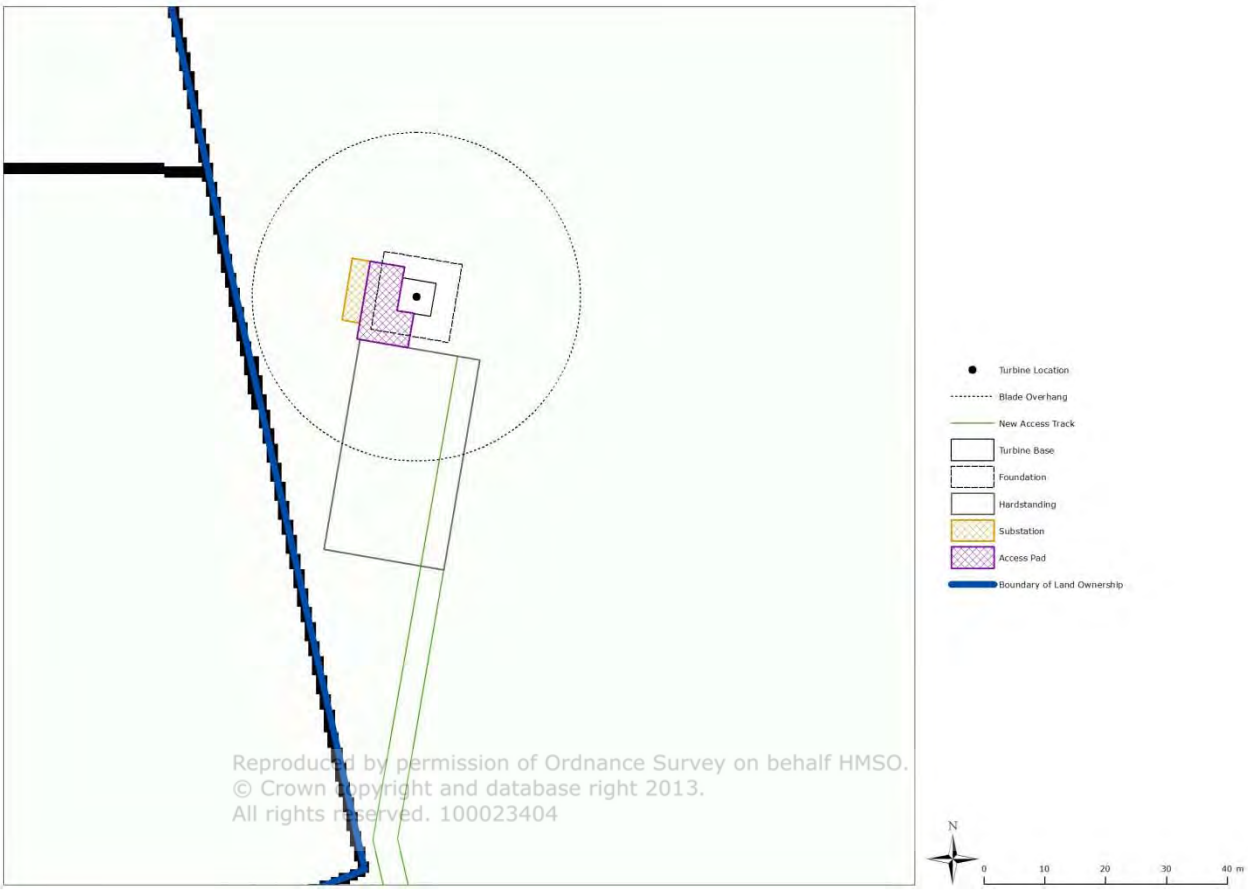

Figure 5: Overview of construction area

An area of hardstanding at a size of 20m x 35m (area of approximately 700m^2) will be required for the safe operation of the main mobile crane and the tailing crane. This area will be filled with crushed stone and/or aggregate of a maximum depth of approximately 750mm.

2.7. Access Road

The new access track will be constructed to resemble existing farm tracks, where possible, to minimise the visual impact of the development. The turbine delivery route will use the existing farm track which links Hillhead and Ascurry farmsteads with each other and with the public highway, as shown in Figure 2 and Drawing HOA002. Direct access to the turbine location will be provided via approximately 1.1km of access track. Approximately 620m of this will be an existing farm track which will require some minor upgrades (see Figure 2). As outlined above this current farm track provides access to and between the Hillhead and Ascurry farmsteads. The remaining 470m will be a new access track which will provide direct access to the turbine location. This track will also provide the farmer with permanent access to the field in which the turbine will be located.

The access track will have a constant useable width of 4m and a load bearing capacity capable of handling the abnormal load vehicles required for delivering the turbine components and installation equipment.

The new dedicated access track will be constructed, where possible, along existing field borders to ensure there will be no unnecessary loss of habitat associated with this additional construction requirement and minimal loss of useable farming land. An example of the access road specification is provided in Figure 6 below.

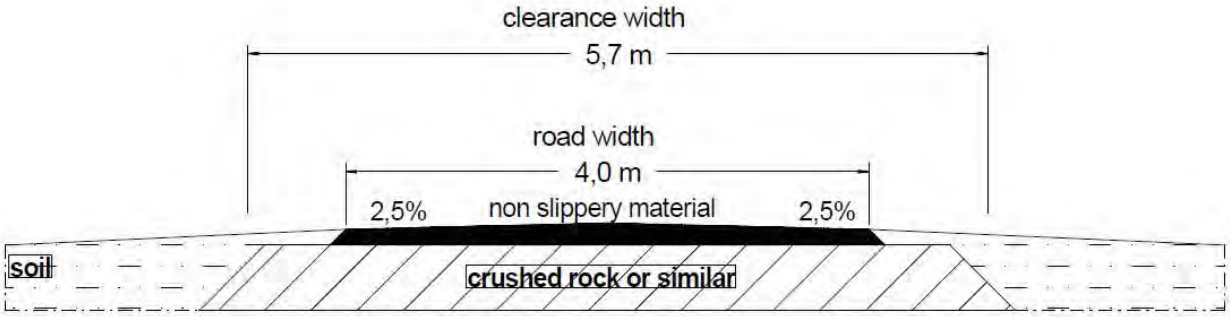

Figure 6: Access track cross-section

2.8. Turbine Foundations

The turbine foundation will most likely consist of a square reinforced concrete base footing and a pedestal. This is illustrated in Figure 7 below, although the exact layout of the foundation may be subject to minor change. The majority of the foundation will be below ground level with only the pedestal being visible post-construction. The standard raft foundation will comprise of a reinforced concrete plinth with approximate dimensions of 13m x 13m. The total depth of the foundation is expected to be approximately 2.5m, however in some cases, following ground investigations, there may be a requirement for a deeper foundation.

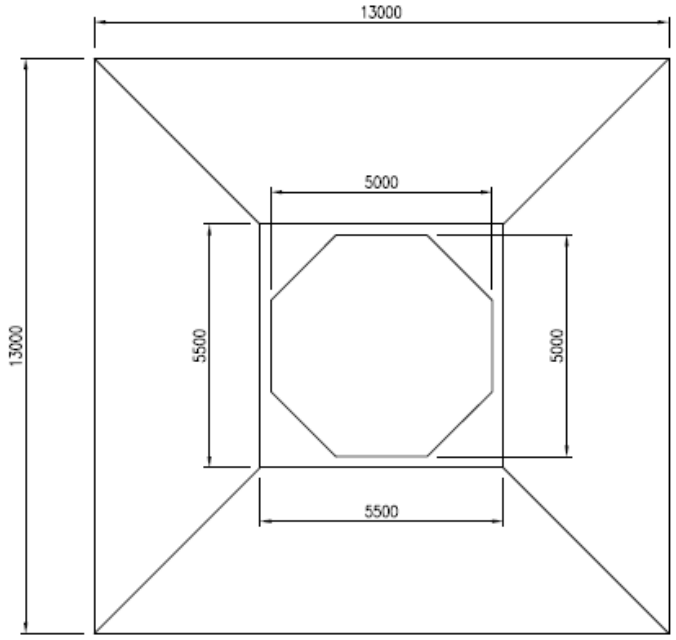

Figure 7: Plan drawing of standard turbine foundation

2.9. Ancillary Works

2.9.1. Grid Connection

It is proposed that the electricity generated by the turbine will be fed directly into the National Grid via 11kV cabling, for subsequent sale as part of a long term power purchase contract. The electricity exported to the National Grid will offset electricity used on site. Scottish and Southern Energy are currently undertaking an assessment of preferred grid connection options for the development, however it is currently proposed to connect to the National Grid at a point approximately 550m to the south of the proposed turbine location, adjacent to the Hillhead farmstead. It is currently envisaged that 11kV cabling will run underground from the proposed turbine to the point of grid connection.

2.9.2. Substation Kiosk

There is a requirement for the transformer, switchgear, communications and further protection equipment to be located in a glass reinforced plastic (GRP) kiosk close to the turbine. As the nature of the final grid connection infrastructure is still being agreed, this building may also be required to have space for the Distribution Network Operator's (DNO's) electrical equipment. The maximum dimensions of the substation kiosk are outlined in Table 3 below.

Length	10.3m
Breadth	3.0m
Height	3.15m

Table 3: Likely substation kiosk dimensions

The substation kiosk can be painted to the most unobtrusive colour that conforms to the surroundings. Typical colours are grey, green or brown. A suitable structure will be confirmed with the DNO (Scottish and Southern Energy) prior to construction.

2.10. Construction Programme

The construction work will be carried out in three phases. During the first phase a soil study will be conducted to determine the foundation design. During the second phase, the civil works will be carried out. This includes the laying of electrical cable and construction of the construction compound. The foundations will also be completed and left to cure for a period of at least 28 days. During the third phase, the turbine will be delivered, erected and commissioned prior to the necessary reinstatement works being completed. The phased construction process is shown in more detail in Table 4 below.

Construction	Works carried out	Approximate duration
Phase 1	Soil investigation survey Turbine foundation design	2 days on site (36 days for survey results and foundation design)
Phase 2	Construct access track Cable trenching and laying Prepare turbine base Prepare transformer kiosk base Install turbine insert & re bars Concrete pour to base Lay turbine external earth mat Install transformer HV jointing at TX and Gen sw/gear	28 days on site (28 days for concrete curing)
Phase 3	Cranes on site Delivery of turbine components Lay out and fit blades to cone Delivery of tower sections Erect Turbine tower/nacelle/blades Internal tower wiring External LV wiring and connecting Site reinstatement Commission turbine and handover	12 days

Table 4: Phased construction program

2.11. Decommissioning

On reaching the end of its operational life (25 years), and if no agreed turbine replacement is consented, the proposed turbine will be decommissioned, dismantled and removed, leaving no visible trace of the development. The site will be completely restored to arable land and there will be no lasting implications on the land usage/character. The turbine components will be dismantled and removed from site. The foundation will be broken down and removed to a licensed off-site facility. A decommissioning programme will be agreed with Angus Council prior to the commencement of decommissioning works.

3. Planning & Environmental Policy

This chapter provides an introduction and overview of the global, European, national and local planning policy documentation which is relevant to a wind energy development of this scale.

Scientific evidence is clear that most of the observed global rises in temperature since the mid-20th century is linked to the emissions of anthropogenic greenhouse gases. This is expected to continue if present emissions levels are maintained or expand without suitable controls. Climate change policy and renewable energy policy are vital tools in controlling and minimising the future impacts of man-made climate change.

EU and individual Government policies have placed the development of renewable energy, including wind energy, as a primary target in their strategic energy policies. These targets have then been translated into planning policy.

In Scotland, national planning policy is principally provided in the National Planning Framework for Scotland 2 (NPF2) and in Scottish Planning Policy (SPP). These documents are produced by the Scottish Government to provide overarching planning policy and are currently subject to review. Regional and local planning policy is formulated by local planning authorities in the form of Structure and Local Plans (which are being phased out) and Strategic and Local Development Plans.

The following is a review of the policies and legislation, at international, European and national level, which relate to the proposed development at Hillhead of Ascurry.

3.1. Global Context

The burning of fossil fuels results in the release of greenhouse gases such as carbon dioxide (CO_2). These gases contribute to the process of climate change. The following policies provide a summary of global policy relating to the current effects of climate change and the policies which aim to avoid and reduce it.

3.1.1. Intergovernmental Panel on Climate Change

The Intergovernmental Panel on Climate Change (IPCC) is the leading body for the assessment of climate change, established by the United Nations Environment Programme and the World Meteorological Organisation to provide the world with a clear scientific view on the current state of climate change and its potential environmental and socio-economic consequences. The IPCC is a scientific body. It reviews and assesses the most recent scientific, technical and socio-economic information produced worldwide, relevant to the understanding of climate change.

The main activity of the IPCC is to provide regular Assessment Reports of the state of knowledge on climate change. The Fourth Assessment Report was released in 2007. The IPCC is now beginning the process towards preparing the Fifth Assessment Report which is due to be finalised in 2014. Some of the findings of the Fourth Assessment Report included the following:

1. Unmitigated climate change would, in the long term, be likely to exceed the capacity of natural, managed and human systems to adapt;

2. A wide range of mitigation options are currently available or projected to be available by 2030 in all sectors;

3. Some planning adaptation of human activities is occurring now but more extensive adaptation is required to reduce vulnerability to climate change;

4. Many impacts can be reduced, delayed or avoided by mitigation. Delayed emissions reductions significantly constrain the opportunities to achieve lower stabilisation levels and increase the risk of more severe climate change impacts; and

5. Decisions about macro-economic and other policies that seem unrelated to climate change can significantly affect emissions.

In the past sixteen years a number of international conferences have been held in relation to the issue of climate change, in particular Kyoto (1997) and subsequent UN conferences.

Kyoto Protocol

Following the World Summit Conference held in Kyoto, Japan, in 1997, nations which signed the Protocol agreed to take actions to control, reduce or limit their emissions of the six main greenhouse gases (carbon dioxide, methane, nitrous oxide, hydrofluorocarbons, perfluorocarbons and sulphur hexafluoride).

The Kyoto Protocol (1997) to the United Nations Framework Convention on Climate Change, 1992 (UNFCCC) imposes legally binding targets to be achieved in the period 2008 – 2012:

- 5% overall reduction in the emission of greenhouse gases in developed countries;
- 8% reduction below 1990 levels within the EU;
- The United Kingdom's contribution is a limit of 12.5% above 1990 levels by 2008-2012. This implies an 8% reduction in CO_2 emissions over this time period; and
- Countries not fulfilling their obligations will be forced to purchase carbon credits on an open market from compliant countries.

3.2. European Context

3.2.1. EU Directive on the Promotion of the Use of Energy from Renewable Sources

An EU Directive (2009/28/EC) on the Use of Energy from Renewable Sources came into force on 23 April 2009 – 'The Renewables Directive'. It establishes the rules for achieving 20% of EU energy consumption from renewable sources by 2020[5]. Other measures introduced at the same time aim to ensure a 20% cut in greenhouse gas emissions by 2020, and a 20% reduction in energy consumption through energy efficiency and demand reduction – the EU's 20:20:20 Plan.

The Renewables Directive recognises the need to promote renewable energy sources and technologies which will have a positive impact on:

- Security of energy supply;
- Regional and local development opportunities;
- Rural development;
- Export prospects;

[5] Directive 2009/28/EC of the European Parliament and of the Council of 23 April 2009 on the promotion of the use of energy from renewable sources and amending and subsequently repealing Directive 2001/77/EC and 2003/30EC.

- Social cohesion; and
- Employment opportunities.

Under an EU 'burden sharing' arrangement, the UK's overall national target for the share of energy from renewable sources in gross final consumption of energy in 2020 is 15% (increased from 1.3% in 2005)[6]. The promotion of electricity produced from renewable energy sources is therefore an extremely important component in the UK achieving its mandatory target.

On 6th June 2012 the European Commission presented a Communication on its renewable energy policy, outlining options for the period beyond 2020. It confirms the market integration of renewables and the need for their growth in the decades after 2020. The Communication also calls for a more coordinated European approach in the establishment and reform of support schemes and an increased use of renewable energy trading among Member States.

It recognises that renewable energy development increases our security of supply and improves European competitiveness creating new industries, jobs, and economic growth and export opportunities, whilst also reducing our greenhouse gas emissions. It states that "*strong renewables growth to 2030 could generate over 3 million jobs, including in small and medium sized enterprises*[7]".

The associated Staff Working Document, also published on 6th June 2012, states that wind energy will provide at least 12% of European electricity by 2012, therefore significantly contributing to the 20:20:20 goal outlined above. Beyond 2020, the integration of 50% wind power into an electricity system is seen as technically possible.

3.3. National Context

The UK Government has set a target to cut the UK's carbon dioxide emissions by 60% by 2050. The UK Government's Energy White Paper, published in May 2007, concludes that if the UK is to achieve a reduction in carbon emissions of that order, then by 2050 renewables will need to contribute at least 30 – 40% of our electricity generation and possibly more.

The Scottish Government's Draft Electricity Generation Policy Statement, published in March 2012, takes full account of the amended target of delivering the equivalent of at least 100% of gross electricity consumption from renewables by 2020. It advises that "*wind power, alongside other forms of onshore and offshore renewables, provides an electricity supply which is largely emissions-free and, because of its decentralised nature, contributes significantly to greater security of supply*".

With regard to the scale of the overall challenge, one of the key findings of the Scottish Government commissioned modelling study is that "*achieving the 100% target will require Scottish installed generation capacity to almost double over the 10 year period to 2020 – with wind (offshore and onshore) accounting for around 13GW of capacity*".

As noted in the 2020 Routemap for Renewable Energy in Scotland, the benefits are not only in terms of energy generation, security of supply and reduced carbon emissions, but also in terms of economic recovery. During the period to 2020, renewables in Scotland could provide "*up to 40,000 jobs and £30bn investment to the Scottish economy*".

[6] Directive of the European Parliament and of the Council on the Promotion of the Use of Energy from Renewable Sources, 2008/0016 (COD), Council of the European Union, Brussels, December 2008; http://www.ewea.org/fileadmin/ewea_documents/documents/00_POLICY_document/RES-directive_consolidated.pdf.

[7] "Renewable energy: a major player in the European energy market", June 2012.

With specific regard to onshore wind, the Routemap notes that "*it is a mature and relatively low cost renewable technology with a large supply chain already established*". Furthermore, "*onshore wind turbines can make a very large contribution to the progress to Scotland's renewable electricity target…"*.

In addition to the 100% renewable electricity generation target, the Routemap also outlines a new objective of 500MW of community and locally-owned renewable energy schemes by 2020. This target seeks to allow communities and rural businesses to take advantage of the revenue streams that can accrue from onshore wind within the Feed in Tariff, thereby generating local revenue and sustaining local economies.

As explained elsewhere within this Document, the proposals at Hillhead of Ascurry fully comply with these community objectives.

3.4. National Planning Policy

3.4.1. National Planning Framework for Scotland 2 (NPF2) 2009

Published in June 2009, National Planning Framework for Scotland 2 (NPF2) guides Scotland's future development and establishes strategic priorities to support the Scottish Government's central purpose of sustainable economic growth.

The spatial strategy to 2030 therefore seeks to *"promote development which helps to reduce Scotland's carbon footprint and facilitates adaptation to climate change"*, and *"realise the potential of Scotland's renewable energy resources and facilitate the generation of power and heat from all clean, low carbon sources"*.

With regard to renewable energy in general, the Scottish Government is *"committed to establishing Scotland as a leading location for the development of renewable energy technology and an energy exporter over the long term"*. The aim of national planning policy is therefore to develop the country's renewable energy potential whilst safeguarding the environment and communities.

With specific regard to onshore wind, the Scottish Government is *"assisting planning authorities with the preparation of supplementary planning guidance on the location of wind farms",* and *"participating in a UK-wide project to identify technical solutions to potential conflicts between wind farm developments and radar systems"*.

NPF2 will eventually be replaced by NPF3. In this respect, the Scottish Government has recently published the NPF3 Main Issues Report (MIR). The consultation window on the MIR closed at the end of July 2013.

To help make Scotland a 'low carbon place', the MIR recommends that NPF3 builds on NPF2 by: *"supporting the further deployment of onshore wind farms, whilst addressing concerns raised about the impacts of some wind energy development"*; *"reflecting the objective of greater community and local ownership of renewable energy"*; and *"identifying further necessary enhancements to the electricity transmission and distribution grid"*.

The MIR reiterates the Scottish Government's ambitious target of generating the equivalent of at least 100% of gross electricity consumption from renewable sources by 2020, with an interim target of 50% by 2015. To put this into context, Scotland met the equivalent of 39% of its gross electricity demand from renewable sources in 2012. If the 100% target is to be met, around 14 – 16 GW of capacity needs to be deployed over the next seven years, with onshore wind playing a significant role.

The Scottish Government supports onshore wind energy development in appropriate locations. Within this context, accompanying the continuing priority to ensure green forms of electricity is to ensure that wind farms are appropriately sited and well designed. The proposed

adjustments to national planning policy (in which greater protection is to be given to nationally important designations such as National Parks and 'wild land') are outlined in draft Scottish Planning Policy (SPP) and summarised in Chapter 3.4.2 below.

3.4.2. Scottish Planning Policy (SPP) 2010

Scottish Planning Policy (SPP) outlines the Scottish Government's policy on land use planning and reaffirms its commitment to increasing sustainable economic growth.

The need to tackle climate change, and in particular reduce emissions of the greenhouse gases that contribute to it, is a principal challenge of sustainable economic growth. Within this context, *"the need to help mitigate the causes of climate change and the need to adapt to its short and long term impacts should be taken into account in all decisions throughout the planning system"*.

The commitment to increase the amount of electricity generated from renewable sources is a vital part of the response to climate change. In this respect, *"renewable energy generation will contribute to more secure and diverse energy supplies and support sustainable economic growth"*.

Planning authorities should therefore *"support the development of a diverse range of renewable energy technologies, guide development to appropriate locations and provide clarity on the issues that will be taken into account when specific proposals are assessed"*. Development plans and supplementary guidance should support all scales of renewable energy generation development, while ensuring that issues in relation to landscape, natural heritage, residential amenity and any cumulative impacts are properly considered.

With specific regard to onshore wind energy, 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"*. Development plans should establish criteria for the assessment of wind farm proposals, including extensions. *"The criteria will vary depending on the scale for development and its relationship to the characteristics of the surrounding area, but are likely to include:*

6. *Landscape and visual impact;*
7. *Effects on the natural heritage and historic environment;*
8. *Contribution of the development to renewable energy generation targets;*
9. *Effect on the local and national economy and tourism and recreation interests;*
10. *Benefits and disbenefits for communities;*
11. *Aviation and telecommunications;*
12. *Noise and shadow flicker; and*
13. *Cumulative impact".*

The design and location of any wind farm should reflect the scale and character of the landscape. Specifically, *"the location of turbines should be considered carefully to ensure that the landscape and visual impact is minimised"*.

When considering cumulative impact, planning authorities should take account of existing wind farms, those which have permission, and valid applications for wind farms which have not been determined. *"The weight that planning authorities attach to undetermined applications should reflect their position in the application process."* Cumulative impact will largely relate to the *"scale and proximity of further development"* and the criteria for its assessment should be set out in the development plan or supplementary guidance.

SPP is currently in the process of being updated. In this respect, the consultation window for the SPP Consultation Draft ended at the end of July 2013.

Fundamentally, the Consultation Draft states that the planning system should help to address climate change by supporting the expansion of renewable energy generating capacity and heat networks. Development plans should therefore *"support all scales of development associated with the generation of electricity and heat from renewable sources with a view to realising the renewable energy potential of the areas they cover"*.

The Consultation Draft provides revised guidance to Local Planning Authorities in the preparation of spatial frameworks to inform the location of wind energy developments, regardless of their scale. In this respect, proposals for wind farms in National Parks and National Scenic Areas *"will not be acceptable"*.

Within 'areas of significant protection', wind farms will only be appropriate where it can be demonstrated that any significant effects on the qualities for which an area is identified can be satisfactorily overcome. For the first time, it is proposed to include areas of 'wild land' as defined by SNH under this tier. It is also intended to increase the suggested separation distance between wind farms and cities, towns and villages from 2km to 2.5km. This is to reduce visual impact but *"decisions on individual developments should take into account specific local circumstances and geography"*.

More generally, in determining applications for wind turbine development, account should be taken of:

14. Community benefits, where they are 'material considerations';
15. Landscape and visual effects, including wild land character;
16. Natural heritage effects, including birds;
17. Impacts on carbon rich soils;
18. Historic environment effects;
19. Impacts on tourism and recreation;
20. Impacts on communities, including residential amenity;
21. Noise and shadow flicker effects;
22. Impacts on aviation and defence interests, including radar and seismological recording;
23. Impacts on telecommunications and broadcasting installations;
24. Impacts on road traffic;
25. Contribution towards renewable energy generation targets; and
26. Cumulative impacts.

The Consultation Draft states that *"proposals for onshore wind turbine development should continue to be determined while spatial frameworks and local policies are being updated"*, and *"moratoria on onshore wind development are not appropriate"*.

3.4.3. Specific Advice Sheet – Onshore Wind Turbines (Updated October 2012)

Last updated in October 2012, this Sheet replaces PAN 45 and provides advice in relation to the determination of onshore wind turbines. The key areas for consideration are summarised in Table 5 below.

Subject	Comments
Impact on Landscape	The ability of the landscape to absorb development often depends on features of landscape character such as landform and vegetation. Different layouts of turbines may be more or less suited to particular landscape types and the physical form and/or colour of turbines may also be relevant. In considering wind farm visibility, it is important to note that visibility and distance do not follow a linear relationship. Factors including the backcloth/skyline against which turbines are seen, turbine colour and typical weather conditions require careful consideration. *"As more areas of search are taken up and as more sites are proposed within or near sensitive landscapes, landscape protection and designing appropriate mitigation through conditions and/or legal agreements, will become a more routine consideration alongside maximising the potential of wind energy"*.
Impact on Wildlife & Habitat, Ecosystems & Biodiversity	*"Wind turbine developments have the capacity to have both positive and negative effects on the wildlife, habitats, ecosystems and biodiversity of an area"*. With regard to the former, renewable energy generation counteracts climate change while wind farm developments offer opportunities to introduce environmental enhancement through land management, land restoration and habitat creation. Conversely, there is also potential for negative environmental effects, including: loss of or damage to valuable habitat; risk of collision, displacement or disturbance to bird and bat species; and impacts on designated sites and protected species, even from a distance. Notwithstanding, *"there is scope for mitigation in the location of wind turbines, construction techniques, design measures and management"*.
Impact on Communities	As a general rule, turbines should be sited ten rotor diameters from the nearest properties so as to avoid shadow flicker. With regard to noise, the Sheet refers the reader to other documents that provide a framework for the measurement of wind farm noise, including acceptable indicative noise levels. One of the cited reports concludes that *"there is no evidence of health effects arising from infrasound or low frequency noise generated by wind turbines"*.
Separation Distances	SPP currently refers to a guideline separation of up to 2km (current proposals are to increase this to 2.5km) between wind farm areas of search and the edge of settlements, to reduce visual impact. However, *"this 2km separation distance is a guide not a rule and decisions on individual developments should take into account specific local circumstances and geography"*. Furthermore, there is no recommended distance between established and proposed groups of turbines.
Aviation Matters	It is essential that the safety of UK aerodromes, aircraft and airspace is not adversely affected by new wind energy infrastructure. Developers and planning authorities are therefore required to consult with the relevant aviation and communication authorities.

Subject	Comments
Military Aviation & Other Defence Matters	It is important that new wind energy infrastructure does not significantly impede or compromise the safe and effective use of any defence assets. Developers and planning authorities are therefore required to engage with the Ministry of Defence in relation to wind farm proposals.
Impact on the Historic Environment	The Sheet notes that Scottish Ministers policies for the protection of the historic environment are outlined in SPP, SHEP and PAN 2/2011. Historic Scotland's guidance on setting explains how the impact of change can be assessed and mitigated. *"Wind farm developments have the potential for direct and/or indirect impacts by virtue of the location of turbines and ancillary development, or changes to groundwater levels or surface water patterns, which may affect archaeological deposits. Developments can be designed to avoid or minimise such impacts"*.
Impact on Road Traffic	In siting turbines close to main roads, pre-application discussions with Transport Scotland are recommended. This is particularly important for the movement of large components (abnormal load routing) during construction, periodic maintenance and decommissioning. Driver distraction may also be a consideration during the operational phase.
Cumulative Impact	In assessing cumulative landscape and visual impacts, the scale and pattern of the turbines as well as access tracks, power lines and ancillary development will be relevant considerations. Consistent with advice published by Scottish Natural Heritage, *"it will also be necessary to consider the significance of the landscape and the views, proximity and inter-visibility and the sensitivity of visual receptors"*. The issue of cumulative impact on Ministry of Defence operations and facilities also needs to be considered. In this respect, it cannot be assumed that the MoD can continue to meets its current operational requirements in cases where there is a further proliferation of turbines.
Good Practice During Construction	Developers are encouraged to appoint Ecological Clerks of Works to ensure that agreed methodologies are followed after planning approval.
Decommissioning	Planning authorities are instructed to *"ensure via conditions and/or legal agreement that site restoration takes place either on the expiry of the consent or in the event of the project ceasing to operate for a specified period"*.

Table 5: Summary of Specific Advice Sheet

3.5. Regional and Local Planning Policy

Planning legislation clearly states that development proposals are to be determined in accordance with the 'development plan' unless 'material considerations' indicate otherwise. With regard to this site, the current 'development plan' comprises the approved TAYplan Strategic Development Plan 2012-2032 and the Angus Local Plan 2009.

3.5.1. TAYplan Strategic Development Plan 2012-2032

The TAYplan Strategic Development Plan has replaced the Dundee and Angus Structure Plan (2009). The plan provides a broad-brush direction for the next 20 years about where new development and infrastructure should take place. The current Strategic Development Plan was approved in June 2012 and the Plan is constantly reviewed. The four Local Authorities in the TAYplan area (including Angus) have their own Local Development Plan which identifies the detail of what development should take place for the next ten years and they must reflect the TAYplan strategy.

The plan recognises *"opportunities to grow the renewable energy 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"*.

TAYplan is underpinned by three principles:

27. Supporting sustainable economic development and improving regional image and distinctiveness;

28. Enhancing the quality of place through better development outcomes; and

29. Ensuring effective resource management and promoting an accessible, connected and networked region.

The main strategic policy relating to wind energy is Policy 6: Energy & Waste/Resource Management Infrastructure. The key elements of this policy, insofar as they relate to small to medium scale wind energy proposals, are summarised in Table 6 below:

Policy 6: Energy & 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)." *"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 (inter alia):* • *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;* • *Cumulative impacts of the scale and massing of multiple developments, including existing infrastructure; and* • *Consistency with the National Planning Framework and its Action Programme."*

Table 6: TAYplan Policy 6

Other relevant policies include:

30. Policy 2: Shaping Better Quality Places;

31. Policy 3: Managing TAYplan's Assets; and

32. Policy 8: Delivering the Strategic Development Plan.

3.5.2. Angus Local Plan (2009)

This document sets out the detailed guidance for new development in Angus from 2009. It conforms to the Dundee and Angus Structure Plan (now superseded by TAYplan), which sets out the broader guidance for new development in both Angus and Dundee up to the end of 2015.

The development strategy of the Local Plan sets the background within which the various policies and proposals of the plan provide for the sustainable development of Angus. Relevant points within this strategy are:

33. *"Provide opportunities for diversification of the rural economy;*

34. *Maintain and protect the diversity and quality of the rural area and encourage local development which supports the population and services of local communities;*

35. *Support the protection and enhancement of the countryside; and*

36. *Maintain the quality of valued landscapes; the natural, built and historic environment, and biodiversity".*

With regard to planning policy that is relevant to this development, Local Plan Policy **ER34** relates to renewable energy developments and is provided below:

"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;*

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."*

Policy **ER35** deals directly with 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; and*

g) *A realistic means of achieving the removal of any apparatus when redundant and the restoration of the site are proposed."*

Table 7 below provides the other policies in the local plan document that are particularly relevant to this development.

Policy S1: Development boundaries
"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."
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
"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."
Policy ER1: Natura 2000 and Ramsar Sites
"Development likely to have a significant effect on a designated, candidate or proposed Natura 2000 site (Special Protection Areas and Special Areas of Conservation), or Ramsar site and not connected with or necessary to the conservation management of the site must undergo an appropriate assessment as required by Regulation 48 of the Conservation (Natural Habitats etc.) Regulations 1994. Development will only be permitted exceptionally and where the assessment indicates that: *a) it will not adversely affect the integrity of the site; or* *b) there are no alternative solutions; and* *c) there are imperative reasons of overriding public interest, including those of a social or economic nature.* *Where proposals affect a priority habitat and/or priority species as defined by the Habitats Directive (92/43/EEC), the only overriding public interest must relate to human health, public safety or beneficial consequences of primary importance to the environment. Other allowable exceptions are subject to the views of the European Commission."*
Policy ER4: Wider natural heritage and biodiversity
"The Council will not normally grant planning permission for development that would have a significant adverse impact on species or habitats protected under British or European Law, identified as a priority in UK or Local Biodiversity Action Plans or on other valuable habitats or species. *Development proposals that affect such species or habitats will be required to include evidence that an assessment of nature conservation interest has been taken into account. Where development is permitted, the retention and enhancement of natural heritage and biodiversity will be secured through appropriate planning conditions or the use of Section 75 Agreements as necessary."*

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:

d) Sites selected should be capable of absorbing the proposed development to ensure that it fits into the landscape;

e) Where required, landscape mitigation measures should be in character with, or enhance, the existing landscape setting;

f) New buildings/structures should respect the pattern, scale, siting, form, design, colour and density of existing development; and

g) 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: Gardens 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 ER29: Agricultural Land
"Proposals for development that would result in the permanent loss of prime quality agricultural land and/or have a detrimental effect on the viability of farming units will only normally be permitted where the land is allocated by this Local Plan or considered essential for implementation of the Local Plan strategy."

Table 7: Relevant policies of the Angus Local Plan relating to the development

These individual policies are discussed further in this document.

3.5.3. Angus Council Implementation Guide for Renewable Energy Proposals (June 2012)

The Angus Local Plan Review establishes the Development Plan policies to be taken into account when assessing proposals for renewable energy projects: Policies ER34: Renewable Energy Development; and ER35: Wind Energy Development. In support of the development plan position the Implementation Guide provides:

- More detailed information and clarification of the main factors that will be taken into account in considering and determining renewable energy proposals in Angus;
- An application checklist;
- Specific guidance for landscape and visual assessment issues in relation to wind turbines; and
- Specific guidance for guidance on noise assessment in relation to wind turbines.

The proposed development lies within the Dipslope Farmland landscape type (LT) and the guidance which relates to a suitable turbine blade tip for this LT states that it is *"considered to have scope for turbines circa 80m in height".*

The landscape advice and wider guidance has been taken into account while assessing the various technical and environmental considerations of the development, particularly with regards to the landscape and visual impact assessment.

3.5.4. Angus Windfarms Landscape Capacity and Cumulative Impacts Study (2008)

Angus Council appointed a landscape architect in 2008 to assess the potential for cumulative landscape and visual impacts of proposed wind developments within Angus. As part of this study, the landscape was assessed on its ability to accept change without significant or unacceptable effect on its character. The landscape in which the Hillhead of Ascurry turbine will be located is described as Dipslope Farmland. The landscape capacity for this area is described as follows:

“Analysis of the landscape character, landscape features and elements suggests that, given its medium to large scale, gentle landform, working agricultural nature and moderately strong rectilinear field pattern it is of medium landscape character sensitivity. Due to the number of settlements and widely distributed population and number of key transport routes, together with a generally open aspect, it is of medium to high visual sensitivity. Overall landscape sensitivity is medium.

There are no statutory landscape designations and much of it is a working landscape. There are nevertheless a number of GDLs, estates and Country Parks. There are also long sections of the National Cycle Route and many local footpaths. 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 wind farms 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.”

This study will be discussed further within the Landscape and Visual Impact Assessment chapter of this document.

4. Work to Date

This chapter provides a summary of the works completed to date relating to wind energy development.

4.1. Requirement for Environmental Assessment

Under the Town and Country planning act (Scotland) 1997, planned developments above a certain scale or activity require consent from the Local Planning Authority (LPA). For more significant developments this may require the inclusion of supporting Environmental documentation to address the full extent, and potential mitigation, of those environmental impacts considered by the LPA to be relevant to the project.

Major planned developments are normally required to complete a full Environmental Impact Assessment (EIA), a systematic process of quantifying those environmental concerns related to the proposed project. The most relevant and up to date document outlining the requirement for an EIA is the Environmental Impact Assessment (Scotland) Regulations 1999.

An EIA must be carried out if the particular development is likely to give rise to significant environmental effects. A written request for a screening opinion was made to Angus Council on 2nd August 2013 outlining details of the proposal (location, scale, location map). The response stated that the proposed development was not considered to require an EIA[8].

The conversations with Angus Council regarding this application, coupled with previous responses, meant that the following topics should be addressed as part of the planning application:

- Relevant planning policy;
- Site selection and description of project;
- Landscape and visual assessment;
- Cumulative visual assessment;
- Noise assessment;
- Ecological assessment;
- Pollution prevention measures;
- Transportation and access;
- Cultural Heritage; and
- Electromagnetic interference/air traffic safety.

4.2. Initial Development & Screening Work

A number of different site layouts were considered during the development process. Various constraints to the development were identified and examined in detail. Location of water courses, houses, telecommunication links, ecologically sensitive areas, noise sensitive areas, archaeological sites and visually sensitive areas were noted. Using Geographical Information Systems (GIS) software, separation distances were applied to these constraints. Different sizes

[8]Response from Ruari Kelly, 12/08/2013

of turbine were examined, relating both to height, generating capacity and noise impact. An initial constraints map was produced for the site and is shown in Figure 8 below. Buffers have been included for the land ownership boundary (blue, buffered by 1.1 x blade length to avoid oversail onto third party land), residential (green, buffered to 500m for non-financially involved properties), overhead lines (purple, buffered to 1.5 x tip height) and roads (orange, buffered to 1.1 x tip height).

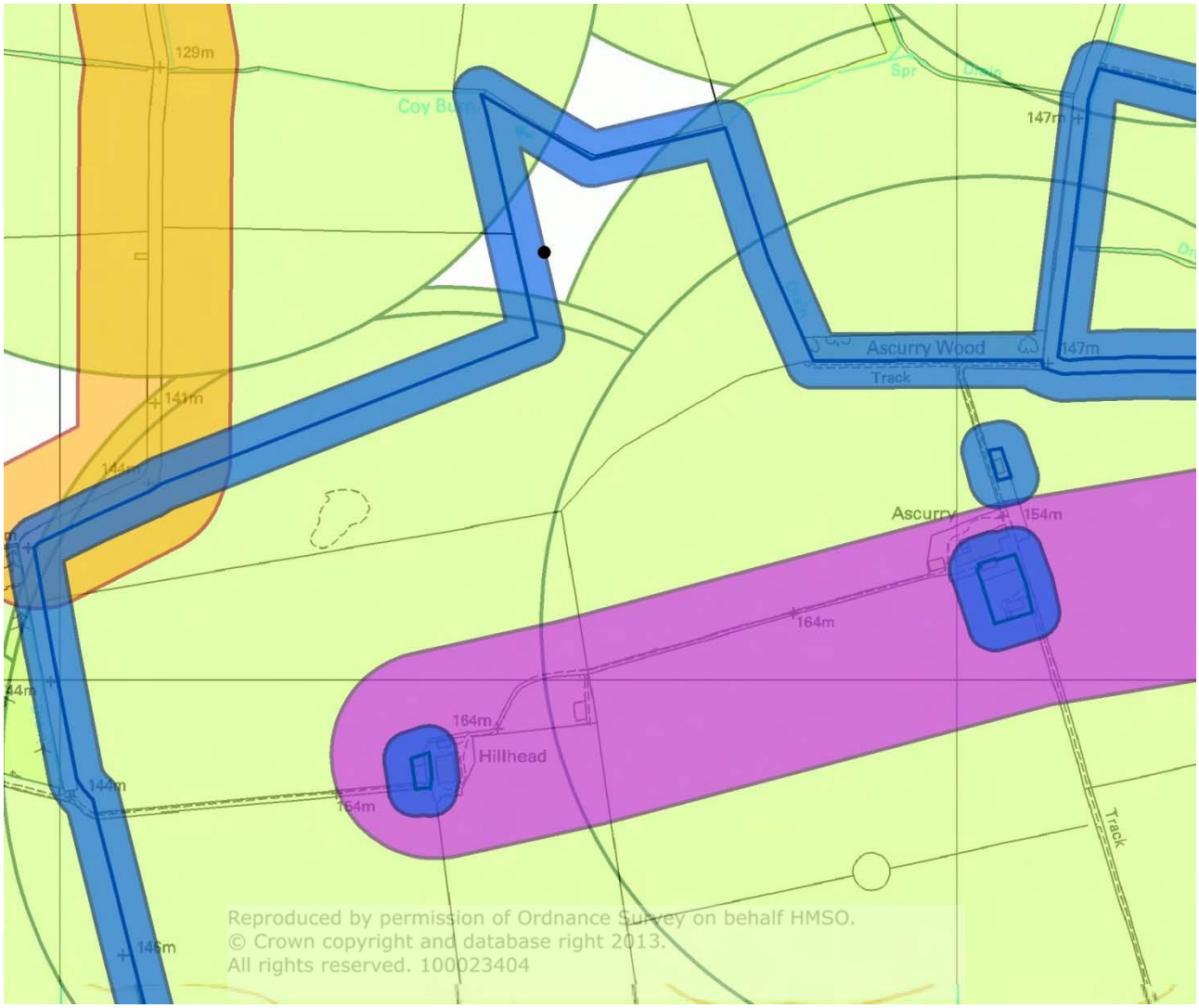

Figure 8: Initial constraints map

Following further assessment of other development constraints (e.g. noise, shadow flicker, visual impacts etc), it was considered that the proposed EWT Directwind wind turbine of 77m tip height would be a suitable turbine model for the Hillhead of Ascurry site. All residential dwellings are over 540m away from the proposed development.

As can be seen in Figure 8 above, there is a small area within the wider land ownership boundary which appears to be suitable for development. However, proximity to an ecological feature and a telecommunications link further to the north of the proposed turbine location further constrain the site; these features are not included in the constraints map above. As such, it is considered that there is very little scope to micro-site the turbine.

4.2.1. Other Consultation

As part of the screening process other stakeholders were contacted in addition to Angus Council. An overview of the responses received are provided in Table 8 below.

Consultee	Comments	Further work required
Telecommunication link operators, including Ofcom, Atkins and Joint Radio Company (JRC).	No telecommunications will be affected by the proposal.	No further assessment necessary.

Table 8: Other pre-application consultee responses received

The above points and general requirements discussed in the screening stage have informed the environmental assessment and ultimately the final design of the development. Pre-planning consultation has been carried out where possible however, due to the level of pre-application queries received, some statutory consultees state they are unable to provide a response (e.g. MOD, NATS) and in these situations Locogen's experience has been utilised to assess the potential for impact.

5. Landscape & Visual

5.1. Introduction

Locogen commissioned a chartered landscape architect (Douglas Harman CMLI) to undertake a Landscape and Visual Impact Assessment (LVIA) of the proposed development. Based on a 25km study area, it identifies the baseline against which the effects of the proposed development are assessed and concentrates on predicting the likely effects during the operational phase of the proposed turbine. The scheme design, including any mitigation measures incorporated to minimise adverse effects, is informed by the findings of the baseline study.

Effects on features identified as important to the landscape quality and effects on the landscape character of the site and its setting are assessed. Although interrelated, effects on views of the site and its setting and visual amenity are assessed separately.

Landscape effects are on the fabric, character and quality of the landscape and are concerned with:

- Landscape elements (e.g. hedgerows, trees and woodlands);
- Landscape character – regional and local distinctiveness; and
- Special interests (e.g. designations, conservation sites, cultural associations).

Visual effects on people are concerned with the changes in available views through intrusion or obstruction and whether important opportunities to enjoy views may be improved or reduced.

The objectives of the assessment are to:

- Describe and evaluate the landscape and visual amenity of the site and surrounding area which is likely to be affected by the proposed development;
- Identify and assess the significance of any effects on landscape or visual amenity, associated with the design, operation and reinstatement of the proposed development;
- Identify mitigation measures which will be implemented in order to avoid, reduce or remedy adverse effects; and
- Describe any enhancements of the landscape or visual amenity incorporated into the proposals.

The findings of the LVIA are presented in the following sections:

5.1.1. Baseline Assessment

- Planning Policy Context: a summary of the regional and local landscape related planning policies relevant to the proposed development;
- Baseline Description: a description of the landscape and visual resource of the study area conducted through desk study and site survey; and
- Design Optimisation and Mitigation Strategy: a summary of the design process in response to landscape and visual issues.

5.1.2. Impact Assessment

- Viewpoint Assessment: a detailed assessment of landscape and visual effects at a selection of representative viewpoints;

- Landscape Effects: an assessment of the potential residual effects upon the landscape resource, landscape character areas and designated landscapes;
- Visual Effects: an assessment of potential residual effects on people of the changes in available views through intrusion or obstruction and whether important opportunities to enjoy views may be improved or reduced;
- Cumulative Landscape and Visual Effects: assessment of the potential residual effects arising from the proposed development in conjunction with built/consented wind farms within the study area and those at planning application stage; and
- Summary and Conclusions.

5.1.3. Appended Methodology

A description of the methods and associated guidance used to inform the assessment process is provided in Appendix A, at the end of this Supporting Environmental Document.

5.1.4. Summary of proposed development

The proposed development will consist of the following elements (a detailed description of the proposed development can be found in Chapter 2 of this Supporting Environmental Document):

- Wind turbine – the proposed turbine is 50m to hub height, has a blade diameter of 54m and is 77m to blade tip;
- Foundation – a foundation with expected dimensions of 13m x 13m. Once constructed this structure will be backfilled so that only the tower base and pedestal will be visible;
- Transformer kiosk – it is proposed that a turbine transformer is either located within the base of the tower (preferred option) or alternatively in a small kiosk located next to the base of the tower with the necessary switchgear and protection equipment;
- Sub-station building – a substation building will be located near the base of the turbine. The approximate dimensions of the building will be 10.3m x 3m and 3.15m in height. This can be painted the most unobtrusive colour that conforms to its surroundings. Typical colours are grey, green or brown. A suitable structure will be confirmed with Scottish and Southern Energy prior to construction;
- Access road – the construction of a dedicated access road to the proposed wind turbine totalling approximately 470m in length, with an additional 620m of existing farm track which will require some minor upgrades (see Figure 2);
- Construction compound – the construction of a temporary hardstanding area for the assembly of the crane and rotor. This would measure an approximate area of 35m x 20m with an adjacent area for lay down of turbine components; and
- Underground cable – an 11kV cable connecting the turbine to a suitable grid connection point will be undergrounded where possible to minimise visual impacts. The point of connection is yet to be finalised.

5.2. Planning Policy context

The development plan relevant to this application is the TAYplan Strategic Development Plan (2012) and the Angus Local Plan Review (2009). The adopted policies of the Planning Authority relevant to landscape are listed in Sections 5.2.1 and 5.2.2, and Section 5.2.3 summarises the '*Implementation Guide for Renewable Energy Proposals*' (2012) which explains and clarifies the existing Angus Local Plan Review policy base.

5.2.1. TAYplan Strategic Development Plan (2012)

The Tayplan Strategic Development Plan has replaced the Dundee and Angus Structure Plan (2009). The plan provides a broad-brush direction for the next 20 years about where new development and infrastructure should take place. The current Strategic Development Plan was approved in June 2012 and the Plan is constantly reviewed. The four Local Authorities in the TAYplan area (including Angus) have their own Local Development Plan which identifies the detail of what development should take place for the next ten years and they must reflect the TAYplan strategy.

The plan recognises *'opportunities to grow the renewable energy 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'*.

The TAYplan Plan does not provide the locations for energy infrastructure; this role is for Local Development Plans. It is the role of this Plan to ensure consistency between Local Development Plans in fulfilling Scottish Planning Policy requirements to define areas of search for renewable energy infrastructure. As part of this, the following policy is relevant to this application:

Policy 6: Energy and Waste/Resource Management Infrastructure

"A - Local Development Plans should identify areas that are suitable for different forms of renewable heat and electricity infrastructure…."

"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."*

5.2.2. Angus Local Plan Review (2009)

In delivering strategic policy, the following policies within the Angus Local Plan are key considerations in assessing the acceptability of the proposed development in landscape terms:

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 ER20: *Historic Gardens 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 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:

(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."

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."

5.2.3. The '*Implementation Guide for Renewable Energy Proposals'* (2012)

The '*Implementation Guide for Renewable Energy Proposals'* (2012) explains and clarifies the existing Angus Local Plan Review policy base that will be used by Angus Council in determining renewable energy planning applications. It has been prepared to support the Angus Local Plan Review (2009) Policies ER34: *Renewable Energy Developments* and ER35: *Wind Energy Development*. This incorporates the findings of the '*Landscape Capacity and Cumulative Impacts Study'* (2008), a strategic level study providing a context for the consideration of the cumulative effects of existing and potential future windfarm developments.

The guide develops a classification of landscape types and identifies 'Levels of Acceptable Landscape Character Change'. Outwith development boundaries, it is considered that there is scope for turbines to be accommodated in some landscapes. The guide heights are extrapolated from sources including the Tayside Landscape Character Assessment, the Landscape Capacity and Cumulative Impacts Study, Reporters findings from planning appeals, responses from statutory consultees and reflect the particular scale and landscape of Angus.

For the *Dipslope Farmland* Landscape Character Type (LCT) in which the site of the proposed development is located, this states:

- Existing Windfarm Character: "*Landscape with Views of Windfarms";*
- Acceptable Future Windfarm Character: "*Landscape with Occasional Windfarms";* and
- Guidance: *"Considered to have scope for turbines circa 80 m in height"*

The guidance also states:

"The relative height and style of turbine (e.g. tower construction, number of blades, blade length) should increasingly reflect those already consented to promoted a harmonious development pattern."

The application of this guidance to the design of the proposed development is discussed in Section 5.4.

5.2.4. Summary of policy context

In summary, development plan policy is generally supportive of wind energy development. This is subject to specific developments avoiding unacceptable landscape and visual impacts and with limitations on the cumulative impact of more than one development within Angus or in neighbouring local authority areas. The *Tayside Landscape Character Assessment* (SNH 1999) is the basis for describing landscape character and the *'Implementation Guide for Renewable Energy Proposals'* (2012) provides guidance for the assessment of the development proposals. This states that the *Dipslope Farmland* LCT in which the proposed development is located, is *'considered to have scope for turbines circa 80m in height'.*

At a strategic level therefore, the proposed development appears to be broadly acceptable in landscape policy terms notwithstanding any significant adverse effects identified in this Landscape & Visual Impact Assessment and the associated application of the relevant policy criteria.

Further guidance on the capacity of the Angus landscape to accommodate a range of wind energy developments is set out in the *'Landscape Capacity and Cumulative Impacts Study'* (2008). A summary of this in relation to the proposed development is set out in Section 5.3.4 of this report.

5.3. Baseline description

The baseline description establishes the existing landscape and visual resource against which the effects of the proposed development are predicted. It describes the site and its setting and examines the existing landscape designations and landscapes character types within the study area and their associated sensitivity to wind energy development. Visual receptors including settlements, road and rail users, users of recreational routes and their associated sensitivity are also identified along with an overview of the landscape and visual receptors to be assessed at the representative viewpoints.

5.3.1. The site and surrounding landscape

The site of the proposed development is located on Hillhead of Ascurry Farm, situated within in an extensive area of gently sloping fertile farmland in Angus (see Drawing HAO001). The village of Letham is located approximately 2.0km to the north of the proposed turbine location, Friockheim approximately 6km to the north-east, Forfar approximately 8km to the north-west and Arbroath approximately 10km to the south-east.

The proposed turbine location is within an open, gently sloping arable field at approximately 145m AOD, approximately 550m to the north of the Hillhead farmstead. The site consists of predominantly medium-large sized arable fields bounded by a mixture of post and wire fencing, stone walls, scrubby vegetation and occasional lines of trees. There are several small blocks of broad-leaved woodland located in the south-eastern and north-eastern part of the site and Coy Burn runs in a west to east direction to the north of the proposed turbine location. A larger block of coniferous woodland (Cotton of Gask) is located along the western boundary, just to the north of Kinneries farmstead.

Within the immediate surroundings, the landscape is predominantly open in character with a pattern of occasional shelterbelts set within a relatively large scale agricultural landscape with a dispersed pattern of farmsteads and occasional scattered dwellings connected by a network of narrow local roads and farm tracks. To the north, extensive policy woodlands around Idvies House provide a visual barrier to the village of Letham, located further north where the land drops away towards the Lunan Water. To the south-east of the site, a quarry set within a

coniferous wooded framework is located to the east of a cluster of dwellings at Mosston. The wider landscape is relatively well settled with a network of busy main roads including the A932 located approximately 4km to the north of the site at its closets point and the A933, 6km to the east. There is a gradual transition to the southern slopes of the Sidlaw Hills located to the south-west and the Montreathmont Hills located to the north, back by distant views of the Highland foothills.

From the site, views tend to medium range but with longer range glimpses of the Grampians to north and the Sidlaws towards the south-west. From nearby roads, the site is generally clearly visible although with increasing distance, views tend to be curtailed by low rising ground and the screening effect of shelter belts and policy woodlands surrounding designed landscapes that are scattered throughout the area. There are also open views of the site from the eastern edge of Sidlaw Hills and a number of hills located to the north of the site.

5.3.2. Landscape designations

There are no National Parks or National Scenic Areas located within the study area. Other landscape designations within the study area (see Drawing HOA006) include Gardens and Designed Landscapes (GDLs), Special Landscape Areas (SLAs) and Country Parks. These are described in Table 9 below.

Gardens and Designed Landscapes

There are seventeen Gardens and Designed Landscapes (GDLs) within the study area, six of which are within 15km from the proposed development. Due to their national importance, GDLs are assessed as having a *high* sensitivity to change.

Local Landscape Designations

A part of Tay Coast Special Landscape Area (in Fife) is located to the south study area and is located approximately 18km from the proposed development at its closest point. Due to its regional importance, the designation is considered as having a *medium-high* sensitivity to change.

Country Parks

There are also five Country Parks within the study area, three of which are within 15km from the proposed development. As a local recreational designation, Country Parks are considered to be of *medium* sensitivity to change.

Summary of landscape designations within the study area

For all landscape designations within 15km from the proposed turbine location, a description and associated sensitivity are set out in Table 9. Outside of 15km, all other designations have been listed. A number of other features of cultural importance occur within the study area. These individual features are assessed in more detail in Chapter 8.

Landscape Designation	Description	Distance to turbine (km)	Sensitivity
All designations within 15 km			
House of Pitmuies GDL	An attractive small landscape boasting beautiful gardens and an interesting group of listed buildings. The A932 forms the northern boundary of the site, beyond which lie the policies of Guthrie Castle. The surrounding landscape is agricultural. From the A932, the landform slopes steeply away into a hollow then gradually descends down towards the Vinny Water. Views into the woodland garden in the north of the site can be gained from this bridge and the A932. Outward views are limited by the low-lying nature of the surrounding landscape.	4.1	High
Guthrie Castle GDL	The walled garden at Guthrie Castle dates from 1614 and the extended designed landscape from the 18th and 19th centuries. Together with the castle, they form a very artistic composition. Guthrie Hill rises gently to 14 m to the north of the Castle, and the best views from the Castle are to the west and south. Fine panoramic views can be obtained from the Castle battlements. The view of the Castle from the A932 to the south is blocked by the raised railway embankment built in 1836, but views of the parks and woodlands are obtained from the minor road to the north of the policies.	4.2	High
The Guynd GDL	An attractive 19th century parkland and woodland landscape providing the setting for a classical mansion house and other interesting architectural features. The surrounding landscape is agricultural with some forestry to the south-west on the Panmure Estate. The low- lying nature of the landscape restricts views from the site but sight of the North Sea can be gained from the top of the house. The Elliot Water and two of its tributaries flow through the policies of The Guynd in valleys which provide variation to the otherwise flat natural landscape. The surrounding woodlands and policy wall along the B9127 are of some significance in the local scenery. They serve to restrict views to the designed landscape within.	5.0	High

Landscape Designation	Description	Distance to turbine (km)	Sensitivity
Crombie Country Park	Crombie Country Park is 102 hectares in area, which includes Crombie Loch as well as broadleaf and conifer woodlands. There are 7km of trails and a range of facilities including an adventure play park, Ranger Centre, picnic facilities, and bird hide & nature trail.	5.3	Medium
Monikie Country Park	Monikie Country Park, with its three reservoirs, woodland and parkland, is a popular countryside attraction with a good network of trails. The scenic surroundings offer a range of opportunities to enjoy the outdoors and situated within a woodland setting is an adventure play park and there also a café. Water sports are available during the summer months. The park is also important for environmental education.	8.3	Medium
Forfar Loch Country Park	Forfar Loch Country Park situated on the west side of Forfar. With woodland, grassland and wetland habitats, the park is a haven for wildlife and visitors. Forfar Loch is circled by a 2.5 mile long trail which is part of the Forfar Path Network and the loch is important for a host of recreational activities.	9.2	Medium
Kinnaird Castle GDL	An attractive designed landscape on a grand scale, the layout seen today dates back to a late 18th century. The walled park lies in the valley of the River South Esk which broadens out south of Brechin into a broad plain before flowing into the Montrose Basin. The hills rise up gently to the north and south of the estate and fine views are afforded from the park. The designed landscape extends northwards to the River South Esk and is enclosed on its remaining boundaries by a park wall 7 miles long and 7' high that limit views out of the parkland.	13.0	High

Landscape Designation	Description	Distance to turbine (km)	Sensitivity
Brechin Castle GDL	Brechin Castle is situated on the southern edge of the town of Brechin. The Castle is set on a rocky outcrop high above the River South Esk on its north side. The river sweeps through the policies to the south of the Castle. The setting originally provided a defensible site from which extensive views can be obtained across the agricultural land to the west and south. First laid out in the early 17th century, the parkland, woodland, formal and informal gardens represent a very fine work of art and a designed landscape of great historical, horticultural and architectural value.	13.0	High
Glamis Castle GDL	Located within the broad vale of Strathmore, Glamis Castle designed landscape dates from the late 17th century and is outstanding in almost every value category. The Castle is set in the low plain of the Dean Water and the land slopes gently north from the Sidlaw Hills in the south to the Castle and the Dean Water. There are magnificent views to the surrounding area from the parks and particularly from the roof of the Castle, the Grampian Mountains forming a magnificent backdrop to the north. The policy woodlands are particularly significant to the designed setting of the Castle. Views into the parks from the surrounding roads are limited by the woods and the high policy walls which form a significant scenic feature in themselves. The Castle is visible from the A928 to the west, and the farmed parks to the east are visible from the A94.	13.9	High
Designations within 15-25 km			
Cortachy Castle GDL		17.2	High
Dunninald GDL		17.5	High
House of Dun GDL		18.2	High
Tay Coast Special Landscape Area		18.3	Med-high
Craig House GDL		18.6	High
Baxter Park GDL		18.9	High
Clatto Country Park		20.3	Medium
Camperdown House GDL		21.0	High

Landscape Designation	Description	Distance to turbine (km)	Sensitivity
Ascreavie GDL		21.8	High
Camperdown and Templeton Woods Country Park		22.0	Medium
Balgay Park GDL		22.1	High
Drumkilbo GDL		23.1	High
Edzell Castle GDL		23.1	High
Airlie Castle GDL		23.9	High

Table 9: Landscape Designations

5.3.3. Landscape character: the site and study area

The landscape character of the study area has been mapped and described using the following landscape character assessments (see Drawing HOA008):

- *Tayside Landscape Character Assessment* (1999); and
- *The Fife Landscape Character Assessment* (1999).

The proposed development is located within the *Dipslope Farmland* landscape character type (LCT), an extensive area of farmland sloping gently towards the Angus coast. The landscape rises up to 180m in the north-west, dropping away to approximately 50m along the coastal strip. The LCT covers a wide area and accommodates significant variation of character ranging from relatively small-scale enclosed farmland to large open fields and small areas of heather moorland.

The landscape is one of the most fertile and productive agricultural areas in Scotland with intensive agriculture, based on cereals, 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, indicating the relatively exposed and windy characteristics of the area. Semi-natural woodland is limited to steeper valley sides, for example along the Lunan Water.

Despite the intensive pattern of agriculture, the area has a range of archaeological and historic sites. These include Bronze Age burial sites such as that at Dickmountlaw just to the north of Arbroath, Roman sites such as the camp at Kirkbuddo near Whigstreet, and medieval castles including Braikie Castle and Gardyne castle near Friockheim and Colliston Castle to the east. Designed landscapes are also an important component of the landscape. A dense scatter of more recent farmsteads is supplemented by a number of isolated houses, reflecting the proximity to Dundee and Arbroath.

There are a further five LCTs within 15km from the proposed development and nine LCTs within 15-25km. Table 10 identifies the key characteristics and features of each LCT and its associated sensitivity to wind energy for those within 15km of the proposed development and lists those LCTs within 15 to 25km.

LCT	Landscape character & features	Sensitivity
LCTs within 15km		
Dipslope Farmland	• Extensive area of land, generally sloping from the north-west to the south-east • Dominated by productive agricultural land • Low woodland cover, expect on large estates and along river corridors • Variety of historic sites • Dispersed settlement pattern, including some suburban development • Limited visual impact of Dundee and Arbroath	Medium
Low Moorland Hills	• Eastern outliers of the Sidlaws • Combination of low, rounded hills and craggy, ridged upland • Moorland character evident in areas of heather and gorse • Some areas of extensive woodland • Rich historic heritage • Scattered modern settlement	Medium to high
Igneous Hills	• The Sidlaw hills, comprising hard volcanic rocks • Short burns and rivers flowing from short steep glens • A few large glens through the hills • Often distinctive scrap and dip slopes • Generally open landscape of almost conical summits dominated by grass moorland • Some extensive areas of forestry • Many modern influences	Medium
Broad Valley Lowland	• Broad Straths formed by glacial erosion • Undersized, misfit rivers • Complex local topography caused by glacial deposition • Distinctive red soils and red building stone • Influence of large estates, particularly in terms of woodland and policies • Dominance of arable and root crops • Tree loss weakening landscape character	Medium
Lowland Loch Basin	• Broad basins formed where sandstones have been eroded away leaving harder enclosing rocks • Extensive mudflats • Rich natural heritage, particularly migratory and wading birds • Historic associations • Dominance of water, sky and distant shores	Medium-high
Coast (Sand & Cliffs)	• 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 • Limited settlement • More resistant sandstones and intrusive rocks • Cliffs, arches, inlets, bays and rocky reefs • Defensive coast with castles • Fishing settlements • Windswept and exposed • Minimal tree cover • Productive farming up to cliff edge	High

LCT	Landscape character & features	Sensitivity
LCTs within 15-25km		
Highland Foothills		Medium to High
Highland Glens		Medium to High
Highland Summits and Plateau		Medium
Agricultural Heartlands		Medium
Lowland Glacial Melt Water Valley		Medium-high
Coastal Terraces		High
Upland Foothills		Medium-High
Coastal Flats		High
Coastal Braes		High

Table 10: Landscape Character Types

5.3.4. Landscape Capacity

Guidance on the capacity of the Angus landscape to accommodate a range of wind energy developments is set out in the '*Landscape Capacity and Cumulative Impacts Study'* (2008). For the *Dipslope Farmland* LCT in which the proposed development is located, the study states:

"Analysis of the landscape character, landscape features and elements suggests that, given its medium to large scale, gentle landform, working agricultural nature and moderately strong rectilinear field pattern it is of medium landscape character sensitivity. Due to the number of settlements and widely distributed population and number of key transport routes, together with a generally open aspect, it is of medium to high visual sensitivity. Overall landscape sensitivity is medium.

There are no statutory landscape designations and much of it is a working landscape. There are nevertheless a number of HGDLs, estates and country parks. There are also long sections of the National Cycle Route and many local footpaths. 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.

Summary of Landscape Capacity

The capacity study concludes that the *Dipslope Farmland* LCT has a *medium overall sensitivity* and a *medium capacity* for windfarm development. This is reinforced by the *Implementation Guide for Renewable Energy Proposals* (2012) which states that the LCT is:

"Considered to have scope for turbines circa 80 m in height."

Therefore at a strategic level, the LCT is broadly appropriate for some development at the proposed scale subject to the detailed findings of this LVIA.

5.3.5. Settlements

Table 11 identifies the clusters of dwellings and villages within 5km of the proposed development and the larger villages and towns within 5-15km that will form the basis of the residential assessment of visual effects. It should be noted that a detailed assessment of views from individual dwellings is beyond the scope of the assessment.

Receptor	Approx. distance (km)	Sensitivity
Clusters and Villages within 5km		
West Mains of Gardyne	1.2	High
Bowriefauld	2.0	High
Letham	2.0	High
Mosston	2.2	High
Greystone	3.0	High
Craichie	3.3	High
Redford	3.4	High
Dunnichen	3.4	High
Cotton of Gardyne	4.2	High
Mains of Balgavies	4.7	High
Villages & Towns within 5-15km		
Forfar	8.2	High
Monikie	8.4	High
Kingsmuir	5.9	High
Guthrie	5.1	High
Friockheim	6.2	High
Leysmill	6.9	High
Lunanhead	8.0	High
Arbirlot	8.7	High
Chapelton	9.0	High
Aberlemno/Crosston	9.3	High
Muirdrum	9.6	High
Arbroath	10.2	High
Carnoustie	11.5	High
Monifieth	13.7	High
Brechin	14.5	High

Table 11: Residential Receptors

5.3.6. Roads

Main roads within 15km that will potentially experience theoretical visibility of the turbine include the A932 located 4km to the north of the site at its closest point, the A933 located 6km to the east and the A90 located 9km to the west at its closest point. There is an extensive network of secondary and local roads within the study area, many of which fall within the ZTV,

particularly within 5km from the proposed turbine location. All of these routes are judged to have a *medium* sensitivity to change.

5.3.7. Viewpoints

The following twelve viewpoints (see Drawing HOA038) have been selected as locations that represent typical views experienced from a variety of receptors, within different landscape character types and at a variety of distances. The visualisations from these viewpoints have been used to undertake a detailed assessment of landscape and visual effects of the proposed development:

VP Location	Distance (km)	Landscape		Visual	
		LCT	Sensitivity	Receptor	Sensitivity
1. Local Road Near Gask	0.5	Dipslope Farmland	Medium	Residents	High
				Local road users	Medium
2. Hillhead	0.8	Dipslope Farmland	Medium	Residents	High
3. Ascurry Mill	1.1	Dipslope Farmland	Medium	Residents	High
				Local road users	Medium
4. Hillkirk/ Dunbarrow Hill	1.9	Dipslope Farmland	Medium	Residents	High
5. Dunnichen	3.4	Dipslope Farmland	Medium	Residents	High
				Local road users	Medium
6. Junction at Girdle Stone	3.4	Dipslope Farmland	Medium	Local road users	Medium
7. A932 at Guthrie Castle	4.3	Dipslope Farmland	Medium	Main road users	Medium
8. B961 near Helenston	4.3	Dipslope Farmland	Medium	Minor road users	Medium
9. Bankhead	5.3	Low Moorland Hills	Medium to high	Residents	High
				Local road users	Medium
10. Turin Hill	7.3	Low Moorland Hills	Medium to high	Walkers	High
11. Balshanner	7.8	Low Moorland Hills	Medium to high	Residents	High
				Local Road users	Medium
12. Local road near Mainsbank	9.8	Dipslope Farmland	Medium	Local road users	Medium

Table 12: Viewpoints

5.3.8. Operational, consented and proposed developments

The following 175 schemes listed in Table 13 have been identified as the baseline scenario to investigate the cumulative landscape and visual effects of the proposed development. The locations of these schemes are identified in Drawing HOA017.

Name	No. of Turbines	Tip height (m)	Status	Distance from turbine (km)
Newton Of Idvies Farm	1	47.5	Approved	1.4
Lochlair Farmhouse	1	47	Approved	3.2
North Mains Of Cononsyth	1	66.7	Installed	3.5
Newmill Of Balgavies	1	66.5	Appeal	3.7
Greenhillock 2	1	67	Pending	4.2
Greenhillock 1	1	45.9	Approved	4.2
Parkconon Farm	1	45	Approved	4.4
Drowndubbs Farm	2	46.5	Pending	5.2
Golf Course Cunninghill	1	77	Pending	6.3
Cuthlie	1	77	Pending	6.4
Pickerton	1	77	Approved	6.4
Dubton Farm	1	77	Pending	6.7
West Mains Of Turin	1	49	Pending	7.2
Craignathro	1	35	Approved	7.2
Stotfaulds Farm	1	77	Pending	7.5
Wester Meathie Farm	2	46.6	Approved	7.6
Pitkennedy Farm	1	74	Pending	8.3
Carsegownie	1	34.2	Pending	8.4
Upper Balmachie Farm	1	77	Pending	9.7
New Downie Farm	1	54	Pending	10.5
North Tarbax	1	45.9	Approved	10.9
Dodd Hill Wind Farm	5	126.5	Pending	10.9
Balnacake Farm	1	67	Pending	11.5
Govals Wind Farm	6	87	Pending	11.9
Frawney Wind Farm	5	80	Pending	12.1
Kalulu House	2	44.8	Pending	13.5
West Cottage	1	77	Pending	14.0
Broom Farm	1	49.5	Pending	14.2
Ethie Barns Farm	1	45	Pending	15.4
Dunswood	1	77	Approved	15.6
Tealing	1	86.5	Approved	15.9
Former Tealing Airfield	1	86.5	Pending	16.1
Michelin Tyres	2	120	Installed	16.1
East Pitforthie Farm	1	47	Approved	17.1
White Top	1	86.5	Pending	17.1
East Memus	1	86.5	Approved	17.2
Arrat Farm	2	46	Approved	17.2
Balkemback Farm	2	46.5	Approved	17.3
Balhall Lodge 1	1	47.5	Approved	17.4
Arkhill	8	79.6	Installed	17.9
Afflochie Farm	2	46.9	Approved	17.9
Balhall Lodge 2	1	49	Pending	18.0
Balrownie Farm	2	46.5	Approved	18.3
Gallow Hill	1	46.5	Pending	18.8
Whitefield Of Dun Farm	1	67	Approved	18.9

Name	No. of Turbines	Tip height (m)	Status	Distance from turbine (km)
Reedie Farm	2	46.9	Approved	19.3
Auchenreoch Farm	1	45.9	Approved	19.7
Glen Trusta	2	46.9	Approved	19.9
Henderston Quarry	1	66	Approved	20.1
Hill Of Stracathro	1	79.6	Approved	20.3
Scotson	1	79	Installed	20.4
Newbigging Farm	1	24.8	Approved	20.6
North Leoch	1	45.6	Approved	20.8
Nathro Hill	17	135	Pending	21.2
Davidston Farm	1	62	Pending	22.9
Wilton Farm	2	74	Pending	23.6
West Mains Farmhouse	1	61	Approved	23.8
West Adamston Farm	1	47.5	Installed	24.3
Lundie Castle Farm	1	48.5	Pending	24.7
Steelstrath Farm	1	84	Pending	24.9
Stone of Morphie Cottage	1	77	Pending	24.9
Grangehall	2	37	Approved	26.1
Moss Side of Esslie	1	45.5	Approved	26.2
Gossesslie Farm	1	47.5	Approved	26.3
Pitbeadlie Farm	1	76	Pending	26.7
South Balmakelly	1	45.5	Approved	26.8
House On The Hill	2	45.4	Approved	26.9
Dykelands	2	40.2	Approved	27.8
Wester Kilmany Farm	1	86.5	Pending	28.3
Hospital Shields Farm	2	46.5	Approved	28.4
Brigton Farm	1	81	Approved	28.4
Criggie Farmhouse	2	45.5	Approved	28.5
Loyal Farm	1	47	Approved	28.6
Windy Corner	1	63.5	Approved	29.1
Mains of Woodstone	1	80	Pending	29.5
Lundie Castle Farm	1	48.5	Pending	24.7
Steelstrath Farm	1	84	Pending	24.9
Stone of Morphie Cottage	1	77	Pending	24.9
Grangehall	2	37	Approved	26.1
Moss Side of Esslie	1	45.5	Approved	26.2
Gossesslie Farm	1	47.5	Approved	26.3
Pitbeadlie Farm	1	76	Pending	26.7
South Balmakelly	1	45.5	Approved	26.8
House On The Hill	2	45.4	Approved	26.9
Dykelands	2	40.2	Approved	27.8
Wester Kilmany Farm	1	86.5	Pending	28.3
Hospital Shields Farm	2	46.5	Approved	28.4
Brigton Farm	1	81	Approved	28.4
Criggie Farmhouse	2	45.5	Approved	28.5
Loyal Farm	1	47	Approved	28.6
Windy Corner	1	63.5	Approved	29.1
Mains of Woodstone	1	80	Pending	29.5
South Bradieston	1	66	Pending	30.2
Chapelfield Farm	1	43.5	Approved	30.4
Lochmalony Farm	1	67	Pending	30.5
Smiddyhill	1	40.5	Approved	31.1

Name	No. of Turbines	Tip height (m)	Status	Distance from turbine (km)
Bamff Wind Farm	7	111	Pending	31.5
Wester Derry Farm	1	45	Approved	32.0
Jackston Farm	1	46.5	Approved	32.0
Mains of Bridgeton	1	77	Approved	32.1
Inchcape Windfarm	213	215	Pending	32.4
Glenbran Farm	1	56.3	Pending	32.5
Tullo	7	122	Installed	32.7
Redford Farm	1	53.88	Approved	32.8
Paul Matthew Hill	1	99.5	Pending	33.0
Lordscairnie Farm	1	45.7	Approved	33.1
The Sheils	3	100	Approved	33.3
Outfield Farm Abernyte	1	40	Approved	33.4
West Cairnbeg	1	77	Pending	33.6
Newington Farm	1	41.5	Approved	33.8
Tullo Farm Extension	7	100	Approved	33.9
Pitbladdo Farm	1	51	Approved	34.4
Easter Pitscottie Farm	1	48.7	Pending	35.5
Drumderg	16	107	Installed	36.2
Lumbennie Hill Pitcairlie	1	84	Approved	36.8
North Callange Farm	1	47	Pending	36.8
Craig Garbil 2	1	79	Pending	37.2
Craig Garbil	2	45.5	Approved	37.2
Nether Benholm	2	45.5	Approved	37.2
Peattie	1	67	Pending	37.6
Muirhead Farm	1	35.83	Approved	37.7
Westhall Cupar Fife	1	45.5	Installed	37.8
Fordoun Sawmill	1	77	Approved	37.8
Netheraird of Glasclune	1	67	Pending	37.9
Dendoldrum	2	45.7	Approved	38.0
Airdrie Farm	1	74	Approved	38.1
Muirton Of Drumlochy	1	20	Approved	38.2
North Baldutho Farm	2	25	Approved	38.4
North Cassingray Farm	1	34.2	Approved	38.4
Higham Farm	2	34	Approved	38.5
The Corb Bridge	1	84	Pending	38.6
Shandry Farm	2	45.5	Approved	38.7
Denside	3	92.5	Pending	39.0
Herscha Hill Extension	2	79	Pending	39.2
Kirkmay Farm	1	45	Approved	39.4
Herscha Hill Cluster	3	79.6	Pending	39.5
South Cassingray Farm	1	50	Pending	39.6
South Baldutho Farm	1	47.5	Approved	39.7
Hill Of Lethendy Farm	1	66.6	Approved	39.9
Wester Essendy Farm	2	32.1	Approved	40.1
Wester Kinloch Farm	1	27	Installed	40.3
Wairds of Alpity	1	79	Approved	40.3
Cornceres Farm	1	53.7	Pending	40.9
Scotshall Farm	1	35.5	Pending	41.0
East Gormack Farm	1	66.7	Approved	41.3
Chapleton Farm	1	49	Pending	41.3
St John's Hill	9	80	Approved	41.3

Name	No. of Turbines	Tip height (m)	Status	Distance from turbine (km)
Droop Hill	2	100	Approved	41.3
Lower Melville Wood	1	85	Pending	41.8
Easter Logie	1	47	Pending	42.0
Mid Hill Extension	25	125	Approved	42.1
Crossgates Cottages	1	49	Pending	42.6
Jacksbank	3	100	Approved	43.2
Ferniebrae	1	67	Approved	45.5
East Town Farm	1	79	Approved	45.5
Stewart Tower Farm	1	45	Approved	46.0
Clochnahill	4	81	Approved	46.0
Annamuick	1	75	Pending	46.3
Hillhead of Auquhirie	3	92.5	Approved	46.6
Demperston Farmhouse	1	54	Pending	47.1
Carriston Farm	1	56.7	Pending	47.2
Upper Wyndings	1	47.5	Approved	47.7
Langside Farmhouse	1	39	Approved	47.8
Shampher Cottage	1	40	Approved	48.2
Newton Of Kingsdale	1	33.6	Installed	48.5
Ardlair	2	27	Approved	48.8
Tewel Farm	1	67	Approved	48.8
EFFC	1	81	Pending	49.0
Methil Docks	1	81	Installed	49.3
Methil Offshore	1	179	Approved	50.9
Balgonie	1	86.5	Pending	51.6
Sluie Hill	1	35	Approved	51.7
Earlseat Farm	8	120.5	Approved	52.3
Lacesston Farm	1	48	Installed	52.5
Easter Fordel	1	27	Approved	52.5
Lochelbank	12	86.5	Installed	52.8
Meikle Carewe	12	70	Installed	54.0
Cuthill Towers Farm	1	40	Approved	54.7
Logie	1	45.5	Approved	54.8
Kempstone Hill	3	52.5	Pending	55.2
Noble Foods Thornton	1	110	Approved	55.7
Skeddoway Farm 1	1	110	Approved	55.8
Skeddoway Farm 2	1	126	Pending	55.8
East Blair Farm	2	45.5	Pending	55.8
Temple Hill	1	84	Pending	56.4
Bogenraith	1	23	Pending	56.6
Griffin	68	130.5	Approved	56.7
Westfield	5	110	Installed	57.5
Drumside	1	46	Pending	58.6
Netherhall Steadings	1	27	Approved	59.4
Boghead	1	79	Pending	59.5
Bankhead	3	27	Approved	60.0

Table 13: Recorded wind Farm Developments within 60km

5.3.9. Design optimisation and mitigation strategy

In the context of other technical and environmental constraints, objectives to minimise the landscape and visual effects have been considered in developing the location and design of the proposed development. Within this, the following landscape design aims have been adopted during the iterative process of site selection and scheme design to minimise any likely adverse effects:

- ***Design Aim 1***: Selection of a development pattern and scale that repeats the emerging pattern of scattered single turbine wind energy developments throughout the lowland landscape in Angus;

- ***Design Aim 2:*** Selection of a location and scale which reflects the medium-large scale of the surrounding landscape with a good degree of separation from surrounding roads and settlements; and

- ***Design Aims 3***: Selection of a location which prevents the coalescence of emerging separated clusters of wind energy developments visible in the surrouning landscape.

5.4. Impact Assessment

5.4.1. Construction and decommissioning phases

In addition to the operational phase, there is also a requirement to assess the landscape and visual effects of the construction and decommissioning phases of the proposed development.

Visual Effects

Any visual effects associated with the construction and decommissioning phases will primarily consist of short term effects on a very low number of nearby residents, road users and walkers with open views of the site resulting from the presence of install cranes and other plant machinery. For a very limited number of residents and walkers within approximately 1.5km of the proposed turbine location who would experience direct open views of the site during the construction and decommissioning phases, a *medium* magnitude of change is predicted resulting in ***mod-major*** (significant) visual effects. These effects would only be experienced in a relatively short duration given the short term nature of these phases.

Landscape Effects

The extent of the proposed development is shown on Drawing HOA002. The construction and decommissioning phase are likely to result in the permanent loss of approximately 2,670m^2 agricultural land as a result of the construction of the access track, turbine foundations and substation building. The new access track would be 470m in total. In addition, 620m of existing farm track will require some minor upgrades (see Figure 2). The surrounding land will remain in agricultural use and no other landscape elements are predicted to experience direct effects as a result of the construction and decommissioning phases.

Taking all these factors into account, it is predicted these works would result in a *low* magnitude of change with a direct ***mod-minor*** (not significant) landscape effect in the short-medium term. Indirect effects on surrounding landscape character are predicted to be ***moderate*** (not significant) largely as a result of the crane and plant machinery detracting from the prevailing rural character and contrasting with the scale of surrounding trees and shelter belts.

5.4.2. Operational phase

Overall, the additional structures associated with the proposed development (see Section 5.1.4) are judged to have a worst case *low* magnitude of change with a ***mod-minor*** (not significant) additional impact on the landscape and visual amenity of the surrounding area. The remainder of this assessment will therefore focus on the likely landscape and visual effect of the proposed wind turbine during the operational phase, having taken account of the mitigation measures described in Section 5.3.9. This is presented through separate assessments of landscape effects, visual effects and cumulative effects and informed through a detailed viewpoint assessment.

5.4.3. Overall pattern of theoretical visibility

The 3 point Zone of Theoretical Visibility (ZTV) is illustrated in Drawings HOA009-013. These demonstrate that within 5km of the proposed turbine location, approximately 50% of the landscape is within theoretical views of the turbine. This includes nearly all of the surrounding agricultural landscape within approximately 2km and a swath of land extending east to west out to 5km. To the north, the villages of Letham and Dunnichen, the south facing slopes of Dunnichen Hill, a 2km section of the A932 and a swath of land around Guthrie Castle are all within theoretical views. To the south and beyond 2km from the proposed turbine location, theoretical visibility is more scattered and limited to small areas of agricultural land, parts of local roads and a small number of dwellings and farmsteads.

Beyond 5km, the large majority of the study area is outside of theoretical visibility. There is however a relatively large area of land concentrated to the east and north-east of the site extending from the north of Arbroath to Brechin and Montrose where theoretical views are predicted although a proportion of this would only be of the turbine blades. The settlements of Brechin, Montrose and Arbroath are all outside of any theoretical views. To the south of the site, theoretical visibility is limited to scattered areas around Crombie Country Park and to the west, an area to the south of Forfar and further south, a section along the A90 and a small part of the east facing slopes of the Sidlaw Hills. To the north of the site, there is a pattern of small scattered areas of theoretical visibility along the south facing slopes and summits of the Grampian foothills.

As the ZTV takes no account of the screening effects of woodland, development and other landcover, it is likely that the patterns of broadleaved woodlands, shelter belts and wooded estates scattered throughout the landscape would significantly limit actual visibility of the turbine in practice, particularly with increasing distance from the site.

5.5. Viewpoint Assessment

Table 14 provides a summary of the landscape and visual assessment undertaken from the twelve representative viewpoint locations. At each viewpoint, a detailed assessment was undertaken to identify any landscape and visual effects, also used to inform the general assessment of landscape and visual effects (see Sections 5.6 and 5.7).

The accompanying photomontages (Drawings HOA039-072) have been prepared by combining a wireframe of the view with the photograph of the existing view and rendering the image using a model of the proposed wind turbine, also generated electronically. The images should be viewed at a distance as recommended on each montage to most closely replicate the view that will be obtained from the viewpoint.

It should be noted that every effort has been made to provide clear views of the turbine although due to intervening vegetation and buildings; clear views were not always available. Where this is the case, these viewpoints have been retained to demonstrate the limited effect of the proposed development in practice.

VP Location	Distance	LANDSCAPE					VISUAL				
		LCT	Sensitivity	Magnitude of Change	Effect	Significant	Receptor	Sensitivity	Magnitude of Change	Effect	Significant
1. Local Road Near Gask	0.5	Dipslope Farmland	Medium	<u>*High*</u>: The turbine would be prominent on the nearby skyline and the movement of blades would detract from the smooth profile of the open topography and the relative sense of tranquility experienced within the local area. It would contrast with the scale of Ascurry Wood located directly behind the turbine and other small woodland blocks on the skyline to the left and right of view. However, these are the only features of a human scale in view thus limiting the opportunity for adverse comparisons in scale. The turbine would also relate relatively well to the large scale of the surrounding landform and land use pattern. Although the turbine would be an uncharacteristic addition within the local landscape, landscape pattern is not particularly strong at this point and is largely unaffected.	**Mod-major**	✓	Residents	High	<u>*Medium-high:*</u> Residents of one nearby dwelling would experience oblique views of the nearby turbine on the local skyline from some upstairs rooms at the back of the dwelling although views from downstairs rooms and the curtilage are likely to be screened by tall garden hedgerows. Where views are experienced, the turbine would create a new visual focus across open fields, contrasting with the scale of surrounding landscape elements. At this distance, the turbine would occupy a large proportion of view, appearing as the most noticeable element in a short to medium range view. The turbine would also be back lit during the morning and would generally be more noticeable as a result. Views from other nearby dwellings are likely to be screened by tall garden hedgerows.	**Mod-major to major**	✓
							Local road users	Medium	<u>*Medium:*</u> The visual changes experienced by a very small number of local road users are very similar to those experienced by residents (see above) although any changes would be experienced along a very short section of the road and from some sections, screened by intervening farm buildings and roadside trees.	Moderate	x

VP Location	Distance	LANDSCAPE					VISUAL				
		LCT	Sensitivity	Magnitude of Change	Effect	Significant	Receptor	Sensitivity	Magnitude of Change	Effect	Significant
2. Hillhead	0.8	Dipslope Farmland	Medium	<u>*Medium-high*</u>*:* The turbine would be relatively prominent on the local skyline but part of the tower would be screened by intervening landform. Although the movement of blades would detract from the smooth profile of the open topography, the turbine would relate relatively well to the prevailing large scale of the landform and land use pattern evident at this location. The turbine would contrast with the scale of woodlands to the left of view but overall, there are few elements of a human scale in view, limiting the opportunity for adverse comparisons in scale. The turbine would be an uncharacteristic change to the local landscape, and the turbine would detract from the strong sense of tranquility and rural character experienced in the locality. Landscape pattern is not evident from this location and is therefore unaffected.	**Moderate to mod-major**	✓	Residents	High	<u>*Medium*</u>*:* Residents of one nearby dwelling would experience only oblique views of the turbine relatively prominent on the nearby skyline from two small rear facing rooms and parts of the curtilage. The primary views from this dwelling are in the opposite direction of the turbine, and no changes would be experienced for views in this direction. The turbine would create a new visual focus that would detract from views of the Montreathmont Hills to the north and the distant Grampians further. At this distance, the turbine would occupy a moderate proportion of the vertical view although only a small part of the more extensive horizontal view. It would however appear as the most noticeable element in a relatively long range view within a composition free of other vertical elements. The turbine would be front lit throughout the day, thus reducing its visibility against a backdrop of the sky in typical weather conditions.	**Mod-major (one dwelling only)**	✓

VP Location	Distance	LANDSCAPE					VISUAL				
		LCT	Sensitivity	Magnitude of Change	Effect	Significant	Receptor	Sensitivity	Magnitude of Change	Effect	Significant
3. Ascurry Mill	1.1	Dipslope Farmland	Medium	*Medium-high:* The turbine would be relatively prominent on the local skyline and viewed above the intervening woodland of Ascurry Wood although approximately half of the turbine tower would be screened by this. The turbine would contrast with the scale of Ascurry Wood, the cluster of buildings at Ascurry Farm to the left of view and the pattern of scattered trees dotted across the nearby skyline. Although the turbine would be an uncharacteristic change to the local landscape, there is an existing composition of other vertical elements consisting of telegraph and small transmission poles in the foreground. The movement of blades however would detract from the tranquil experience and rural character of the local landscape although would relate well to the reactively large scale of the landscape.			Residents	High	*Medium:* Residents of two nearby dwellings would experience oblique views of the turbine relatively prominent on the nearby skyline from some rooms and parts of the curtilage. The turbine would create a new visual focus within the important part of the view across open arable fields although it should be noted that the primary views from these dwellings would be unaffected by the proposed development as these views are in the opposite direction. At this distance, the turbine would occupy a moderate proportion of the vertical view although only a small part of the more extensive horizontal view. It would however appear as the most noticeable element in a relatively short range view.	**Mod-major**	✓
							Local road users	Medium	*Medium:* The visual changes experienced by a small number of local road users are very similar to those experienced by residents (see above) as any changes would be experienced in oblique views from along a short section of open road.	Moderate	x

VP Location	Distance	LANDSCAPE					VISUAL				
		LCT	Sensitivity	Magnitude of Change	Effect	Significant	Receptor	Sensitivity	Magnitude of Change	Effect	Significant
4. Hillkirk/Dunbarrow Hill	1.9	Dipslope Farmland	Medium	*Medium:* The turbine blades would be relatively prominent on the local skyline and viewed above Newton of Idvies Farm buildings, located on an intervening ridgeline. Nearly all of the turbine tower would be screened by intervening rising ground although the turbine blades would appear larger in scale than surrounding farm buildings and woodland clumps. Considering the nearby consented turbine of Newton of Idvies, the proposed development would not be an uncharacteristic change in the local landscape and the movement of blades would only detract from the rural character of the local area and contrast with the pattern of skyline woodland blocks and intervening fields to a limited extent.	Moderate	x	Residents	High	*Medium:* Residents of one nearby dwelling would experience open and direct views of the turbine and a second dwelling open oblique views. The turbine would occupy a moderate proportion of the vertical view although appearing less noticeable than Newton of Idvies. The turbine would be back lit and would generally be more noticeable as a result. The turbine would create an additional visual focus to the consented turbine of Newton of Idvies within the important part of the view although with no change to the focus of view. A degree of visual complexity would also arise whereby the turbine blades would appear above an intervening ridgeline.	**Mod-major (one dwelling only)**	✓

VP Location	Distance	LANDSCAPE					VISUAL				
		LCT	Sensitivity	Magnitude of Change	Effect	Significant	Receptor	Sensitivity	Magnitude of Change	Effect	Significant
5. Dunnichen	3.4	Dipslope Farmland	Medium	*Low-medium:* The turbine would be relatively prominent on a low rising skyline punctuated by occasional woodland blocks. Although the turbine would contrast with the vertical scale of these woodlands, it would however relate well to the extensive horizontal scale of the skyline and the vertical scale of the low rising ground. Although the consented turbine of Newton of Idvies that would be visible to the left of the view sets a precedent for wind energy development, the skyline is otherwise free of vertical elements. Taking into account the changes introduced by Newton of Idvies, the turbine would only change the prevailing rural character and compromise the containment provided by the rising ground to a limited degree.	Moderate to mod-minor	x	Residents	High	*Low*: Residents of one nearby dwelling would experience open but oblique views from front facing rooms and the curtilage of the turbine relatively prominent on the skyline. The turbine would be back lit throughout the day and would be clearly noticeable within an important part of the view to the south although the primary views from the dwelling to the south-west would be unaffected. The turbine would only occupy a very small proportion of the extensive skyline that forms a 180^0 medium range view.	Moderate	x
							Local road users	Medium	*Low*: A relatively small number of local road users would experience oblique views of the turbine along a short section of road before the road heads south and views become direct.	Mod-minor	x

6. Junction at Girdle Stone	3.4	Dipslope Farmland	Medium	*Low-medium:* The turbine would be relatively prominent on a low rising, partly wooded skyline. Although the turbine would contrast with the vertical scale of the nearby woodland blocks, it would however relate well to the relatively extensive horizontal scale of the skyline and the vertical scale of the low rising ground. The consented turbine of Newton of Idvies would be screened at this point and as the skyline is otherwise free of vertical elements, it would be an uncharacteristic change, affecting the prevailing rural character and compromising the containment provided by the rising ground to a degree.	None	x	Local road users	Medium	*Low*: A relatively small number of road users would experience open but oblique views of the turbine relatively prominent on the skyline along a moderate proportion of the local road. The turbine would be back lit throughout the day and would be clearly noticeable within an important part of the view across open fields. The turbine would only occupy a very small proportion of the extensive skyline that forms a 180^0 medium range view, although forming a noticeable focal point on the skyline.	None	x
7. A932 at Guthrie Castle	4.3	Dipslope Farmland	Medium	*Negligible*: During summer months, the turbine would be screened from view by dense intervening woodlands. During winter months, the movement of blades amongst the branches of the intervening woodland would be hardly discernible on the surrounding intimate, wooded character.	Minor	x	Main road users	Medium	*None:* During summer months, the turbine would be screened from view by dense intervening woodlands and during winter, it is very unlikely that road users would experience the turbine blades amongst the woodland when travelling at speed in oblique views.	None	x
8. B961 near Helenston	4.3	Dipslope Farmland	Medium	*None:* The turbine would be screened from view by a large intervening agricultural building and no changes on the surrounding nearby landscape are predicted.	None	x	Minor road users	Medium	*None:* The turbine would be screened from view by a large intervening agricultural building and no changes on the views of road users are predicted.	None	x

9. Bankhead	5.3	Low Moorland Hills	Medium to high	<u>*Low-medium*</u>: The turbine would be relatively prominent on a low rising, partly wooded skyline and viewed above nearby intervening woodlands. Although the turbine would affect the vertical scale of these woodlands, it would relate relatively well to the horizontal scale of the skyline and the vertical scale of the low rising ground. Although the consented turbine of Newton of Idvies that would be visible to the left of view sets a precedent for wind energy development, the skyline is otherwise free of vertical elements. Taking into account the changes introduced by Newton of Idvies, the turbine would only change the prevailing rural character and compromise the containment provided by the rising ground to a limited degree.	Moderate	x	Residents	High	<u>*Low:*</u> Residents of one nearby dwelling would experience open and direct views from two side facing rooms and parts of the curtilage of the turbine relatively prominent on the skyline. The turbine would be back lit during the morning and would be clearly noticeable within a relatively long range view although the primary views from the dwelling to the south would be unaffected. The turbine would only occupy a small proportion of the framed view. Views from two other nearby dwellings would be heavily filtered by garden vegetation.	Moderate	x
							Local road users	Medium	<u>*Low-negligible*</u>*:* The visual changes experienced by a small number of local road users are very similar to those experienced by residents (see above) although within oblique views and in very short duration.	Mod-minor to minor	x
10. Turin Hill	7.3	Low Moorland Hills	Medium to high	<u>*Low-negligible*</u>*:* the turbine would be an evident change, predominantly back clothed against rising ground with the tips just breaking the open skyline. At this distance, the turbine would relate well to the large scale of the landscape and viewed within a panoramic view of other occasional scattered turbines. Considering these factors, the effect of the proposed development on the remote experience and surrounding upland character would be very limited at this distance.	Mod-minor	x	Walkers	High	<u>*Low-negligible*</u>*:* A relatively low number of walkers would experience open views of the turbine evident within a panoramic view of the extensive lowland landscape to the south and the Grampians to the north. The proposed development would not be uncharacteristic and it would not be the most prominent turbine in view. There would be little change to focus of the view and at this distance, the turbine would only occupy a very small proportion of the view. As the turbine would be mostly back clothed, it would be less noticeable than if it were on the skyline. The important views of the Grampians to the north would also be unaffected.	Moderate to mod-minor	x

11. Balshanner	7.8	Low Moorland Hills	Medium to high	*Low-negligible*: the turbine would be an evident change on the open skyline that forms a backdrop to the LCT. At this distance, it would relate well to the relatively extensive horizontal scale of the skyline and the vertical scale of the rising ground. In the foreground, the rural character of the agricultural landscape is already compromised by the consented Craignathro turbine and a relatively prominent line of pylons that cross the view. These factors significantly limit any changes resulting from the proposed development on the surrounding landscape.	Mod-minor	x	Residents	High	*Low-negligible*: Residents of one nearby dwelling would experience open but oblique views from front facing rooms and parts of the curtilage of the turbine evident on the skyline. The turbine would be back lit during the morning and would be quite noticeable within a relatively long range view. The primary and important views of the Sidlaw Hills to the south would be unaffected. The turbine would only occupy a very small proportion of the 180^0 view.	Moderate to mod-minor	x
						Local road users	Medium	*Low-negligible:* The visual changes experienced by a small number of road users along a short section of local road are very similar to those experienced by residents (see above).	Mod-minor to minor	x
12. Local road near Mainsbank	9.8	Dipslope Farmland	Medium	*Negligible*: Part of the turbine would be evident on the distant skyline. It would relate well to the extensive horizontal scale of the skyline and the vertical scale of the rising ground. It would be viewed within a context of other scattered developments and the effect of the proposed development on the agricultural character of the LCT at this location would be very limited.	Minor	x	Minor road users	Medium	Negligible: Minor road users would experience oblique views of the turbine evident on the distant skyline. The proposed development would not be uncharacteristic and it would not be the most prominent turbine in view. There would be no change to focus of the view and at this distance, it would only occupy a very small proportion of the skyline.	Minor	x

Table 14: Viewpoint Assessment

5.6. Landscape effects

5.6.1. Residual landscape effects

Table 15 below sets out a summary of the predicted effects on all landscape designations and LCTs within 15km from the proposed development. The findings have been informed by the detailed viewpoint assessment (see Table 14) and through further field survey assessment. For those designations and LCTs from 15-25km from the turbine, a summary of likely effects are presented in Section 5.6.2. Where any significant effects are identified, a more detailed assessment is presented in Section 5.6.3.

Receptor	Sensitivity	Magnitude of Change	Effect	Significance
Landscape designations				
Within 0km to 15km				
House of Pitmuies GDL	High	*None:* Located 4.1km to north-east of the turbine location at its closest, only a small area confined to the north of the designation is within theoretical views of the turbine blades. All of this is within dense policy woodlands and taking into account the screening effect of woodland along the southern boundary of the garden, no views of the turbine are predicted in practice.	None	Not significant
Guthrie Castle GDL	High	*Low:* Guthrie Castle is located approximately 4.2km to the north-east of the turbine at its closest point and nearly all of the designation is within theoretical views. In practice, views from across the grounds would be screened by dense policy woodlands within the garden, trees along the A932 and the policy woodlands of the House of Pitmuies GDL further south. However, from the Castle, there are views to the west and south and fine panoramic views can be obtained from the Castle battlements. From these limited locations, views of the turbine blades above intervening woodlands are likely to be experienced although at this distance, is very unlikely to be detrimental to the setting of the GDL.	Moderate	Not significant
The Guynd GDL	High	*None*: The GDL is outside of the ZTV and no changes are predicted.	None	Not significant
Crombie Country Park	Medium	*None*: Only a very small part of the Country Park is within theoretical views of the turbine blades, restricted to a dense area of coniferous woodland. No views of the turbine are therefore predicted.	None	Not significant
Monikie Country Park	Medium	*None*: The Country Park is outside of the ZTV and no changes are predicted.	None	Not significant
Forfar Loch Country Park	Medium	*None*: The Country Park is outside of the ZTV and no changes are predicted.	None	Not significant

Receptor	Sensitivity	Magnitude of Change	Effect	Significance
Kinnaird Castle GDL	High	*Negligible:* Kinnaird Castle is located 13km to the north-east of the proposed turbine at its closest point and approximately half of the designation is within theoretical views. Considering the high stone walls and dense woodlands along the south-western boundary of the GDL and the screening effect of large coniferous woodlands of Montreathmont Plantation in the intervening landscape, no views in practice are likely to be experienced from the GDL.	None	Not significant
Brechin Castle GDL	High	*None*: The GDL is outside of the ZTV and no changes are predicted.	None	Not significant
Glamis Castle GDL	High	*None*: Located 13.9km to the west of the proposed turbine at its closest point, only a very small part of Glamis Castle is within theoretical views of the turbine blades, confined to an area of dense policy woodland. In practice, no views of the turbine would be experienced given the screening effect of the policy woodlands in the GDL and those in the intervening landscape.	None	Not significant
Landscape Character Types				
Within 0km to 15km				
Dipslope Farmland	Medium	*Medium:* The proposed turbine would be located within the *Dipslope Farmland* LCT and as illustrated by the ZTV (see Drawing HOA016) approximately one quarter of the LCT is within theoretical visibility. This includes nearly all of the surrounding agricultural landscape within approximately 2km and a swath of land extending east to west out to 5km. The village of Letham and a 2km section along the A932 are within theoretical views and beyond 2km to the south, theoretical visibility is limited to small areas of agricultural land, parts of local roads and a small number of dwellings and farmsteads. Beyond 5km, there are relatively extensive areas of theoretical views to the east and north-east of the site extending towards the coast. To the south, there are scattered areas of theoretical visibility around Crombie Country Park. Taking into account the pattern of broadleaved woodlands, shelter belts and wooded estates scattered throughout the landscape, these would significantly limit actual visibility of the turbine in practice, particularly with increasing distance from	Moderate	Not significant

Receptor	Sensitivity	Magnitude of Change	Effect	Significance
		the site. Overall therefore, only a relatively small proportion of this extensive LCT is likely to experience actual views of the turbine. The landscape assessment from viewpoint 1 predicts a *high* magnitude of change and *medium-high* from viewpoint 2. Both viewpoints (each within 1.1km from the turbine location) are predicted to experience a significant landscape effect largely as a result of the turbine occupying a prominent position on the nearby skyline that would contrast with the scale of the surrounding pattern of woodland blocks, resulting in an uncharacteristic change in the local landscape. At viewpoint 3 (1.9 km), the magnitude reduces to *medium*, *low-medium* at viewpoints 4 and 5, and *negligible* at viewpoints 6 and 11. No viewpoints beyond 1.1km are predicted to result in a significant landscape effect. Considering the limited extent of change across the entire LCT, particularly as a result of the screening effects of intervening woodlands and the decreasing magnitude of change with distance, the magnitude is predicted to be *low-medium* overall.		
Low Moorland Hills	Medium to high	<u>*Low:*</u> The *Low Moorland Hills* LCT is located in relatively close proximity to the north of the proposed turbine location and large areas are within theoretical visibility. Due to the screening effect of the characteristic patterns of coniferous woodlands, particularly the extensive Montreathmont Plantation to the north-east, actual visibility would be significantly reduced in practice. The landscape assessment at viewpoint 5 (5.3km) predicts a *low-medium* magnitude of change, reducing to low-negligible at viewpoints 9 and 10. Although the turbine would be noticeable from some locations on the skyline that forms a backdrop to the LCT, in general, the turbine would relate well to the relatively extensive horizontal scale of the skyline and the vertical scale of the rising ground experienced across the LCT. Taking all these factors into account, the magnitude of change across the LCT is predicted to be *low* overall.	Moderate to mod-minor	Not significant

Receptor	Sensitivity	Magnitude of Change	Effect	Significance
Igneous Hills	Medium	*Low-negligible:* The *Igneous Hills* LCT is located beyond km to the south-west of the site at its closet point with theoretical views concentrated to an area along the A90. For those areas closest to the site, the magnitude of change is predicted to be similar to viewpoint 6 (*low-medium* at 5.3km) although this would reduce with distance. Overall, considering the small proportion of the LCT likely to be affected, the magnitude of change is predicted to be *low-negligible*.	Mod-minor to minor	Not significant
Broad Valley Lowland	Medium	*Negligible:* There are relatively small scattered areas of theoretical views across parts of the *Broad Valley Lowland*, the majority of which are beyond 15 from the proposed turbine location. Taking into account the screening effect of the characteristic patterns of intervening broad-leaved woodland blocks scattered across the LCT, any views in practice are likely to be limited to occasional glimpses on the distant skyline and within the context of other wind energy developments	Minor	Not significant
Lowland Loch Basin	Medium-high	*Negligible:* Over half of the *Lowland Loch Basin* LCT is within views although the majority of this is beyond 15km from the proposed turbine location. Although some open views of the turbine on the distant skyline are likely to be experienced amongst intervening woodlands, at this distance the changes to the open character of the loch and associated low-lying basin would be very limited.	Mod-minor to minor	Not significant
Coast (Sand & Cliffs)	High	*Negligible-none:* Only very small parts of the *Coast* LCT are within theoretical visibility, all of which are beyond 15km from the proposed turbine location. Where any open views of the turbine are experienced, these would be occasional glimpses on the distant skyline. As such, changes to the character from the top of the exposed cliffs would be hardly discernible.	Mod-minor to none	Not significant

Table 15: Residual effects on landscape receptors

5.6.2. Residual landscape effects from 15-25km

As the purpose of the assessment process is to focus on likely *significant* effects, a detailed assessment of landscape designations and LCTs from 15km to 25km from the turbine location has not been undertaken. However, the following landscape designations and LCTs are all outside of theoretical views and no effects would therefore be experienced:

- Cortachy Castle GDL
- Dunninald GDL
- Tay Coast SLA
- Craig House GDL
- Baxter Park GDL
- Clatto Country Park
- Camperdown House GDL
- Ascreavie GDL
- Camperdown Country Park
- Balgay Park GDL
- Drumkilbo GDL
- Edzell Castle GDL
- Airlie Castle GDL
- Lowland Glacial Melt Water Valley LCT
- Coastal Terraces LCT
- Upland Foothills LCT
- Coastal Flats LCT
- Coastal Braes LCT

Parts of The House of Dun GDL and the Highland Foothills, Highland Glens, Highland Summits and Plateau and Agricultural Heartlands LCTs are all within limited theoretical visibility. However, as indicated by the findings of the viewpoint assessment, the magnitude of change is not predicted to be greater than *negligible* at this distance and where any views of the turbine would be experienced, effects would not be greater than ***mod-minor*** (not significant) in the very worst case scenario.

5.6.3. Summary of significant landscape effects

As demonstrated by the viewpoint assessment, **localised significant** effects are predicted on small parts of the *Dipslope Farmland* LCT within approximately 1.1km from the proposed turbine location (see viewpoints 1-3) whereby the turbine would be viewed in close proximity, prominent on the nearby skyline and contrasting with the scale of surrounding woodlands. As the turbine would be uncharacteristic to the locality, it would contrast with the prevailing rural character and experience of relative tranquillity.

However, **no significant** landscape effects are predicted on the overall integrity of the *Dipslope Farmland* LCTs or on any landscape designations or other LCTs within the study area. This demonstrates in landscape terms, that the *Dipslope Farmland* LCT has the capacity to effectively accommodate the proposed development without a detrimental effect on its character. This reinforces the findings of the *Angus Windfarms - Landscape Capacity and Cumulative Impacts Study* (2008) which concludes the landscape has a *medium* capacity for development at the proposed scale.

5.7. Visual effects

5.7.1. Residential dwellings and settlements

Table 16 provides an assessment of the effects on views of residents from clusters and villages within 5km from the turbine location and those larger settlements from 5-15km. As previously noted, a detailed assessment of views from individual dwellings is beyond the scope of this assessment. Given the negligible magnitude of change predicted from the viewpoint assessment for those locations beyond approximately 10km, the effect on towns and cities from 15-25km has not been assessed in detail as significant effects are not predicted at this distance. It should be noted that the study was undertaken on the basis of visits to locations to which access was obtainable without access to private property. Aerial photographs were also used to supplement site visits.

It should be emphasised that this assessment does not constitute a Residential Amenity Survey which assesses in detail how a dwelling is used and how a development would affect a range of environmental factors that relate to the benefit provided by the quality of a space. **It is also important to note that where a significant visual effect is predicted, this does not translate to a significant effect on residential amenity**. Furthermore, taking into account the nature of the proposed development (i.e. a single turbine) and the degree of separation to nearby dwellings, **significant effects on residential amenity are very unlikely to be experienced in any case**.

For a scheme of this nature, significant visual effects are very likely to be experienced on some residents with open views of a nearby turbine **but this does not necessarily translate in effects as being unacceptable.** In considering the overall acceptability of the scheme, it is important to consider that where any significant effects have been identified, these often relate to views from a limited number of rooms that may have direct and open views of the turbine. **In many instances, the primary views from dwellings would not have any views towards the proposed development** and as such, views from these rooms would be unaffected.

Receptor	Distance (km)	Sensitivity	Magnitude of Change	Effect	Significance
Clusters and Villages within 5km					
West Mains of Gardyne	1.2	High	*None:* The settlement is outside of the ZTV and no changes are predicted.	None	Not significant
Bowriefauld	2.0	High	*Medium*: Residents approximately 6 dwellings to the north-west of the village are likely to have some direct views from front facing rooms of the turbine relatively prominent on the open skyline although from the large majority of dwellings, nearby built development, garden vegetation and skyline woodland would tend screen the turbine from view although very oblique glimpses above intervening buildings and woodland might be possible from some dwellings.	**Localised mod-major** None-low for majority	**Significant for some dwellings** Not significant for majority
Letham	2.0	High	*Low:* The entire village is within theoretical views although from the large majority of dwellings, nearby built development would screen any views in practice. For those dwellings in closer proximity to the site, dense woodlands to the north of Idvies House would also help to screen the turbine from view. However, a small proportion of dwellings to the north of the village may experience some views from some upstairs rooms of the turbine blades above skyline woodlands to the south of the village.	Localised moderate None for majority	Not significant
Mosston	2.2	High	*None:* The settlement is outside of the ZTV and no changes are predicted.	None	Not significant
Greystone	3.0	High	*None:* The settlement is outside of the ZTV and no changes are predicted.	None	Not significant
Craichie	3.3	High	*Low-negligible*: Nearly all of the settlement is within theoretical visibility and from the majority of dwellings, nearby farm buildings and built development would screen the turbine from view. Residents of several dwellings along the eastern edge may experience very oblique views of the turbine blades on the skyline.	Localised moderate to mod-minor None for majority	Not significant

Receptor	Distance (km)	Sensitivity	Magnitude of Change	Effect	Significance
Redford	3.4	High	*None:* The settlement is outside of the ZTV and no changes are predicted.	None	Not significant
Dunnichen	3.4	High	*Low:* The entire village is within theoretical views although from the large majority of dwellings, nearby built development and dense tree cover would screen any views in practice. Several dwellings along the southern fringe may experience oblique views above intervening garden vegetation and amongst nearby trees from some rooms and the curtilage of the turbine relatively prominent on the skyline.	Localised moderate None for majority	Not significant
Cotton of Gardyne	4.2	High	*Negligible*: Residents of several dwellings may have some views of the turbine blades above nearby intervening riparian woodland but limited to occasional glimpses amongst dense garden vegetation and nearby trees.	Localised mod-minor None for majority	Not significant
Mains of Balgavies	4.7	High	*Negligible*: Residents of several dwellings may have some direct views of the turbine blades above intervening skyline woodlands but limited to occasional glimpses amongst dense garden vegetation and nearby trees.	Localised mod-minor None for majority	Not significant
Villages and Towns within 15km					
Forfar	8.2	High	*None:* The town is outside of the ZTV and no changes are predicted.	None	Not significant
Monikie	8.4	High	*None:* The village is outside of the ZTV and no changes are predicted.	None	Not significant
Kingsmuir	5.9	High	*None:* The village is outside of the ZTV and no changes are predicted.	None	Not significant
Guthrie	5.1	High	*None*: Although the entire village is within theoretical visibility, in practice views would be screened by nearby dense policy woodlands associated with Guthrie Castle and House of Pitmuies GDLs.	None	Not significant

Receptor	Distance (km)	Sensitivity	Magnitude of Change	Effect	Significance
Friockheim	6.2	High	*None:* The entire village is within theoretical views although views in practice are very likely to be screened by nearby woodlands.	None	Not significant
Leysmill	6.9	High	*None:* The settlement is outside of the ZTV and no changes are predicted.	None	Not significant
Lunanhead	8.0	High	*None:* The village is outside of the ZTV and no changes are predicted.	None	Not significant
Arbirlot	8.7	High	*None:* The settlement is outside of the ZTV and no changes are predicted.	None	Not significant
Chapelton	9.0	High	*None:* Although the village is within theoretical views, nearby woodland blocks to the west of the village are very likely to screen any views in practice.	None	Not significant
Aberlemno/ Crosston	9.3	High	*None:* The village is outside of the ZTV and no changes are predicted.	None	Not significant
Muirdrum	9.6	High	*None:* The village is outside of the ZTV and no changes are predicted.	None	Not significant
Arbroath	10.2	High	*None:* The town is outside of the ZTV and no changes are predicted.	None	Not significant
Carnoustie	11.5	High	*None:* The town is outside of the ZTV and no changes are predicted.	None	Not significant
Monifieth	13.7	High	*None:* The town is outside of the ZTV and no changes are predicted.	None	Not significant
Brechin	14.5	high	*None*: Nearly the entire town is outside of the ZTV and any theoretical views along the northern edge are likely to be screened by intervening skyline woodlands.	None	Not significant

Table 16: Summary of residual effects on residential settlements

5.7.2. Summary of effects on Individual dwellings within 2km

Approximately six of dwellings in the village of Bowriefauld are predicted to experience ***mod-major*** (significant) visual effects, representing only a small proportion of the total number of dwellings in the settlement (approximately 35 dwellings). These effects are restricted to those dwellings that would have direct and open views towards the turbine relatively prominent and back lit on the nearby skyline, forming visual focus in short range views. **However, it should be emphasised that effects are not judged to be oppressive or overbearing on residential amenity and significant effects would only be experienced from front facing rooms and some parts of the curtilage.**

No further residents of the other settlements assessed are predicted to experience significant visual effects as views tend to be partly or fully screened by built development or the pattern of dense woodlands scattered throughout the surrounding landscape. Furthermore, of the 15 settlements from 5-15km from the turbine location, none are predicted to have views of the proposed development.

5.7.3. Roads and recreational routes

A932

The A932 is located approximately 4km to the north of the turbine location at its closest point. Two sections, approximately 3km in total, are within theoretical visibility. As indicated by the findings of the assessment at viewpoint 6, any views in practice are likely to be limited to oblique glimpses of the turbine experienced amongst intervening woodlands. Considering the very short duration of any possible views, the magnitude of change is predicted to be *negligible*, resulting in a ***minor*** (not significant) effect.

A933

The A933 is located approximately 6km to the east of the site at its closest point and approximately 10km in total is within theoretical views, over half of which is of the turbine blades. To the north of Friockheim, extensive road plantation woodland would screen the turbine from view. Further south, occasional direct views of the turbine blades amongst intervening woodlands are likely to be experienced in short duration. The magnitude of change is judged to be *low* resulting in a ***mod-minor*** (not significant) effect.

A90

The ZTV indicates that two sections of the A90, approximately 5km in total and located beyond 9km from the turbine location would have theoretical views of the turbine. In practice, it is very likely that roadside trees and nearby intervening conifer plantations would screen any oblique views of the turbine. As such, the magnitude of change is predicted to be ***none*** with no effect.

Local & Minor roads within 5km

There is a network of quiet local roads within 5km of the turbine location. When travelling along several kilometres of these routes, particularly to the north of the site, road users would have some open views of the turbine although primarily in oblique views. As demonstrated by the findings of the visual assessment at viewpoints in close proximity to the turbine, effects on road users are not judged to be significant given the relatively short duration of predominantly oblique views and distance from the turbine. Taking these factors into account, effects on all road users within 5km are likely to be **not significant**.

5.8. Cumulative effects

This section assesses the potential landscape and visual effects arising from the proposal in conjunction with other wind developments that have been consented, are operational or are at application stage. The proposed site forms the focus of the study area and includes all those schemes within a 60 km radius (see Table 13 and Drawing HOA017). The cumulative assessment identifies the ways in which the proposal may have additional effects, when considered together with the cumulative situation resulting from other planned, consented or operational wind energy developments.

5.8.1. Individual Cumulative Inter-Visibility

There are nineteen planned, approved or installed schemes within 10km which have the greatest potential to present significant cumulative effects with the proposed development. These are provided in Table 17 below.

Name	No. of Turbines	Tip height (m)	Status	Distance from turbine (km)
Newton Of Idvies Farm	1	47.5	Approved	1.4
Lochlair Farmhouse	1	47	Approved	3.2
North Mains Of Cononsyth	1	66.7	Installed	3.5
Newmill Of Balgavies	1	66.5	Appeal	3.7
Greenhillock 2	1	67	Pending	4.2
Greenhillock 1	1	45.9	Approved	4.2
Parkconon Farm	1	45	Approved	4.4
Drowndubbs Farm	2	46.5	Pending	5.2
Golf Course Cunninghill	1	77	Pending	6.3
Cuthlie	1	77	Pending	6.4
Pickerton	1	77	Approved	6.4
Dubton Farm	1	77	Pending	6.7
West Mains Of Turin	1	49	Pending	7.2
Craignathro	1	35	Approved	7.2
Stotfaulds Farm	1	77	Pending	7.5
Wester Meathie Farm	2	46.6	Approved	7.6
Pitkennedy Farm	1	74	Pending	8.3
Carsegownie	1	34.2	Pending	8.4
Upper Balmachie Farm	1	77	Pending	9.7

Table 17: Planned, approved or installed schemes within 10km

Drawings HOA019-037 demonstrate the areas of individual combined theoretical cumulative visibility of the proposed development with these nineteen schemes. Of these, the cumulative visibility with Upper Balmachie, Carsegownie, Wester Meathie, and Downiebrae is limited to relatively small areas mostly beyond 15km from the turbine location and significant effects are therefore less likely to be experienced with these developments. On the other hand, Newton of Idvies has the greatest extent of combined theoretical visibility and Newmill of Balgavies,

Lochlair Farmhouse and Greenhillock have relatively extensive areas of combined theoretical views within approximately 5km from the proposed turbine location. As such, significant effects are more likely to be experienced with these developments. However, given the screening effect of woodland blocks and the wooded estates scattered across the across the landscape, actual cumulative intervisibility would be limited in practice.

The twelve representative viewpoints have been assessed to demonstrate the actual cumulative intervisibility and the associated cumulative effects of the proposed development with all other developments in the study area. As noted previously, these viewpoints are considered to be representative of a range of receptor types and distances. Table 18 outlines the cumulative effect on each representative viewpoint.

VP Location	Distance	Predicted view containing Turbines – without proposed development	Predicted view including proposed development	VISUAL				
				Receptor	Sensitivity	Magnitude of Change	Effect	Significant
1. Local Road Near Gask	0.5	In the combined view, no other developments would be visible. To the west, successive views of developments of varying scales on the distant skyline would potentially be experienced including Nathro Hill, Govals, Arkhill, Dodd Hill, Greenhillock, and Lochlair. North Tarbrax and Fawney Hill would be back clothed against distant hills.	The proposed development would be viewed in close proximity on the nearby skyline. Although it would bring development much closer and to new part of the view, the experience of other distant developments in successive views would be hardly discernible from the nearby dwelling and section of local road due to the screening effect of farm buildings and road side trees that would significantly limit any cumulative views.	Residents	High	Negligible	Mod-minor	x
				Local road users	Medium	Negligible	Minor	x
2. Hillhead	0.8	In the combined view, Nathro Hill would be noticeable on the skyline with the single turbines of West Mains of Turin and Newmill of Balgavies back clothed against rising ground. The blade tips of Balnacake and Newton of Idvies might just be evident above intervening landform. In successive views to the south-west, up to ten developments of varying patterns and scales are likely to be noticeable above the skyline.	The proposed development would be viewed in close proximity on the nearby skyline. Although it would bring development much closer, it would not introduce development to a new part of the view. The introduction of the proposed turbine would maintain a good degree of separation from other developments in view and would repeat the pattern of other occasional single turbines characteristic across the lowland landscape.	Residents	High	Low-medium	Moderate to mod-major	x

3. Ascurry Mill	1.1	In the combined view, no other developments would be visible. To the east, glimpsed views of the tips of North Mains Of Cononsyth are evident amongst nearby trees and above intervening farm buildings from some locations.	The proposed development would be viewed in close proximity on the nearby skyline. Although it would bring development closer and to new part of the view, as views of Mains Of Cononsyth in succession are party screened, this would limit the experience of cumulative views from local road users and nearby dwellings to isolated glimpses.	Residents	High	Low	Moderate	x
				Local road users	Medium	Low-negligible	Mod-minor to minor	x
4. Hillkirk/Dunbarrow Hill	1.9	In the combined view, Newton of Idvies is located in close proximity with a backdrop of more distant developments of varying scales and patterns including Govals, Arkhill, Dodd Hill, Greenhillock, North Tarbrax and Fawney Hill and Ingliston. A number of developments would be evident on the skyline to the west including Nathro Hill with Newmill Of Balgavies backclothed in relatively close proximity.	The proposed development would be viewed in relatively close proximity although it would not bring development closer or to a new part of the view. The proposed turbine would be partly screened by an intervening ridge and viewed in close association with Newton of Idvies, resulting in a notable contrast in its relationship to the landscape and turbine design of Newton of Idvies, resulting in an element of visual complexity on nearby residents.	Residents	High	Medium	**Mod-major**	✓
5. Dunnichen	3.4	Newton of Idvies and Lochlair would be noticeable on the skyline in the combined view with Stotfaulds, Drowndubbs, Greenhillock and Dodd Hill evident within successive longer range views to the west. Developments to the east would be screened by nearby trees and built development.	The proposed development would be relatively prominent on the skyline, appearing as the most noticeable turbine in view. It would not bring development appreciable closer or bring development to a new part of the view. It would reflect the pattern of occasional single turbine development on the skyline with a degree of separation from Newton of Idvies and Lochlair.	Residents	High	Low-medium	Moderate to mod-major	x
				Local road users	Medium	Low	Mod-minor	x

6. Junction at Girdle Stone	3.4	Lochlair would be evident on the skyline in the combined view although intervening woodlands would screen views of North Mains Of Cononsyth and Newton of Idvies. In the successive view to the north, Newmill Of Balgavies would be very prominent in close proximity within a backdrop of other more distant skyline development including the Nathro Hill and West Mains of Turin.	The proposed development would be relatively prominent on the nearby skyline. Although it would reflect the pattern of occasional single turbine development on the skyline with a degree of separation from Newton of Idvies and Lochlair, it would appear as the most noticeable turbine in the southern part of the view. If Newmill Of Balgavies is consented, this would be viewed in close proximity and would dominate the experience of the surrounding landscape and limit the degree of cumulative change from the proposed development.	Local road users	Medium	Medium	Moderate	x
7. A932 at Guthrie Castle	4.3	N/A – the proposed development would be screened from view during summer months and road users are very unlikely to experienced cumulative views during winter months.	N/A – the proposed development would be screened from view during summer months and road users are very unlikely to experienced cumulative views during winter months.	Main Road users	Medium	None	None	x
8. B961 near Helenston	4.3	N/A – the proposed development would be screened from view by intervening farm buildings and no cumulative views would therefore be experienced.	N/A – the proposed development would be screened from view by intervening farm buildings and no cumulative views would therefore be experienced.	Minor road users	Medium	None	None	x

9. Bankhead	5.3	Newton of Idvies and Mains Of Cononsyth would be noticeable on the skyline in the combined view with Lochlair screened by a nearby woodland belt. Nathro Hill, Glen Trusta and Afflochie would be noticeable on the skyline in successive views to the north and Newton of Idvies and Newmill Of Balgavies noticeable on the skyline further to the east.	The proposed development would be relatively noticeable on the skyline. It would reflect the pattern of occasional single turbine development on the skyline with a degree of separation from Newton of Idvies and Newmill Of Balgavies. Although it would appear as the most noticeable turbine in the view, it would not bring development to a new part of the view.	Residents	High	Low	Moderate	x
				Local road users	Medium	Low-negligible	Mod-minor to minor	x
10. Turin Hill	7.3	In the combined view, up to twelve single turbine developments would be evident and scattered across the lowland landscape. In successive views to the north, a large number of schemes of varying patterns and scales would be visible, most notably Nathro Hill that would be very noticeable across the skyline.	The proposed development would be evident within a lowland context. It would not be the most noticeable turbine in view or bring development closer or to a new part of the view. It would reflect the pattern of single turbines scattered across the lowlands and with a degree of separation from surrounding developments.	Walkers	High	Negligible	Mod –minor	x
11. Balshanner	7.8	In the combined view, Craignathro would be viewed in close proximity with Newton of Idvies, Newmill Of Balgavies, Lochlair and Greenhillock evident across a backdrop of occasional skyline development and within a wider context of larger scale developments noticeable on the skyline to the south-west.	The proposed development would be evident on the skyline as part of a pattern of occasional single turbines viewed as backdrop to the nearby Craignathro turbine. It would not be the most noticeable turbine in view or bring development closer or to a new part of the view. It would reflect the pattern of single turbines scattered across the skyline and with a degree of separation from surrounding developments.	Residents	High	Negligible	Mod – minor	x
				Local road users	Medium	Negligible	Minor	

12. Local road near Mainsbank	9.8	In the combined view, up to thirteen developments of varying scales would be evident across the distant skyline with a large number of developments evident in the wider view.	The proposed development would be hardly discernible amongst a distant skyline of scattered developments of varying patterns and scales.	Minor road users	Medium	Negligible	Minor	x

Table 18: Summary of cumulative effects

5.8.2. Summary of significant cumulative effects

Mod-major (significant) cumulative effects are predicted at viewpoint 3 where the proposed development would introduce a notable contrast in its relationship to the surrounding landscape and the design of the nearby Newton of Idvies turbine. This would result in an element of visual complexity on nearby residents of up to two dwellings. **No other significant cumulative effects are predicted.**

5.9. Conclusion

5.9.1. Summary of Effects

- The Landscape and Visual Impact Assessment has demonstrated that the proposed development would not result in any significant direct effects on the physical landscape features of the site or indirect effects on its surroundings during the construction and operational phases;
- Short term significant visual effects during the construction and decommissioning phases are predicted on a very limited number of residents within approximately 1.5km of the proposed turbine location;
- Of the twelve viewpoints, significant landscape effects are only predicted at viewpoints 1-3 (all within 1.1km from the turbine location) and significant visual effects on a very limited number of residents at viewpoints 1-4 (all within 1.9km);
- No significant effects are predicted on the overall integrity of any landscape character types within the study area;
- No significant effects are predicted on any landscape designations within the study area;
- Significant visual effects are predicted on the residents of approximately 6 dwellings in the village of Bowriefauld that would have some direct and open views of the proposed turbine on the skyline, although for the large majority of the village (in total approximately 35 dwellings), no significant visual effects are predicted;
- No significant visual effects are predicted on any road users within the study area; and
- Significant cumulative effects are only predicted on residents of up to two dwellings near to viewpoint 4.

5.9.2. Statement of Significance

Local, Regional and National planning policy are supportive of wind energy developments subject to developments avoiding unacceptable landscape and visual effects. This assessment on the landscape and visual resource has identified that the proposed development would have some localised significant effects which considering the nature of the development, is generally to be expected on the immediate area surrounding the turbine location.

For the *Dipslope Farmland* LCT in which the site is located, the *Angus Windfarms - Landscape Capacity and Cumulative Impacts Study* (2008) study states:

"Analysis of the landscape character, landscape features and elements suggests that, given its medium to large scale, gentle landform, working agricultural nature and moderately strong rectilinear field pattern it is of medium landscape character sensitivity. Due to the number of settlements and widely distributed population and number of key transport routes, together with a generally open aspect, it is of medium to high visual sensitivity. Overall landscape sensitivity is medium.

There are no statutory landscape designations and much of it is a working landscape. There are nevertheless a number of HGDLs, estates and country parks. There are also long sections of the National Cycle Route and many local footpaths. 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."

Furthermore, the '*Implementation Guide for Renewable Energy Proposals*' states that the Dipslope Farmland is:

"Considered to have scope for turbines circa 80 m in height".

Overall, **these factors indicate the landscape has the strategic capacity to effectively accommodate the proposed development without an unacceptable and detrimental change to its inherent character or visual amenity. This is reinforced by the findings of this assessment which demonstrate that any significant landscape effects are limited to a small area of agricultural land within approximately 1.1km from the turbine location.**

Furthermore, significant visual effects are limited to a very small number of residents within approximately 2.0km from the turbine location. In considering the overall acceptability of the scheme, it is important to consider that **where any significant visual effects on residents have been identified, these often relate to views from a limited number of rooms that may have direct and open views of the turbine. In many instances, the primary orientation of dwellings would be in the opposite direction to the proposed development and as such, views from these rooms would be unaffected.**

Although significant visual effects are predicted, it is important to emphasise that **significant effects on residential amenity are very unlikely to be experienced given the limited extent of the proposed development and the distance to nearby dwellings.**

Overall, the proposed development has a good degree of separation from surrounding roads and settlements that limits the extent of significant visual effects. The screening effect of woodlands scattered throughout the landscape also contributes to limiting the extent of change. This is demonstrated by the visual assessment which concludes of the 15 settlements from 5-15km from the turbine location, none are predicted to have views of the proposed development.

In conclusion, the findings of this assessment, in context of the policy framework, indicate that the proposed development would be acceptable in landscape and visual terms, notwithstanding the predicted significant but very limited extent of effects that would occur in close proximity to the site.

6. Soils & Hydrology

This chapter addresses soils, hydrology and hydrogeology in the existing environment, identifies the potential impacts of the proposed development and outlines measures to mitigate concerns as required.

The activities involved with the construction, operation and decommissioning of the wind turbine could have an impact on the hydrological elements within the surrounding area. All hydrological and hydrogeological impacts are examined including impacts on any watercourses, lochs, groundwater, other water features and sensitive receptors. Where necessary, mitigation measures have been outlined to prevent erosion, pollution, sedimentation or discolouration of receptors.

Such issues are thought to be minor at this site. Nevertheless, the risk of any negative effects have been evaluated and appropriately mitigated where necessary.

6.1. Methodology

The methodology used to assess the impact of the proposed development is described as follows:

- All geological and hydrological information available is gathered and potential receptors that may be at risk from the proposed development are identified;
- Each activity of the development such as construction, operation and decommissioning is assessed for the potential to create a pollution risk; and
- Proposed mitigation measures and preventative actions are detailed, as appropriate.

6.2. Baseline Assessment

Relevant legislation and guidance is highlighted in Table 19 below.

Legislation / Guidelines	Source of information
Legislation	- Town & Country Planning (Environmental Impact Assessment) (Scotland) Regulations 2011 - Flood Risk Management (Scotland) Act 2009 - Water Environment (Controlled Activities) Regulations 2005 (CAR) - Water Framework Directive (2000/60/EC)(WFD) and Water Environment and Water Services (Scotland) Act 2003 (WEWSA) - Water Resources Act 1991 - Control of Pollution Act 1974 (as amended) (COPA)
SEPA Policies	- No. 19: Groundwater Protection Policy for Scotland, Dec 2003 - No. 26: Policy on the Culverting of Watercourses - No. 54: Land Protection Policy
Scottish Planning Policies	- SPP (2010) – Flooding & Drainage
Planning Advice Notes (PANs)	- PAN 51: Planning, Environmental Protection and Regulation - PAN 58: Environmental Impact Assessment - PAN 61: Planning and Sustainable Urban Drainage Systems - PAN 79: Water and Drainage

Legislation / Guidelines	Source of information
SEPA Pollution Prevention Guidelines (PPGs)	- PPG1: General guide to the prevention of water pollution - PPG4: The disposal of sewage where no mains drainage is available - PPG5: Works in, near or liable to affect watercourses - PPG6: Working at construction and demolition sites - PPG8: Safe storage and disposal of used oil - PPG21: Pollution incident response planning
Other Guidelines	- CIRIA: Environmental Good Practice on Site - CIRIA: Control of water pollution from construction sites, C532, 2001 - CIRIA: Control of water pollution from linear construction projects - Department of Environment (DoE) – PPG14 – Development on Unstable Land (1990)

Table 19: Relevant policy and guidelines for hydrology assessment

6.2.1. Site Context

This chapter details the existing geological, hydrological and hydrogeological conditions at the site and its surroundings. This includes information on nearby watercourses, groundwater and any potential risks of flooding.

Soils

The site is located within the Midland Valley of Scotland. The geology of the area is part of the Montrose Volcanic Formation[9] and is described as follows:

"Andesite, basaltic andesite, other andesitic rocks, volcaniclastic conglomerate and sandstone."

Surface Water

From the 1:10,000 OS map in Figure 9 below, it is seen that the nearest surface water feature is the field drain, which runs along the west and northern boundary of the field in which the turbine is located. Along the northern boundary of the field this feature is called Coy Burn, and flows in an east-west direction. This is 116m from the proposed turbine location at its nearest point. The site of the proposed turbine will drain in a general south-north north west direction towards Coy Burn, which in turn flows into Vinny Water.

[9] As defined by British Geological Society, http://www.bgs.ac.uk/discoveringGeology/geologyOfBritain/viewer.html, accessed 1/2013.

Figure 9: Hillhead of Ascurry turbine location

Groundwater & Hydrogeology

Groundwater is present under most landforms, although some geological formations are more permeable than others. Any groundwater within the area may be used as a source of water and is also essential for irrigation within highly productive agricultural areas. The hydrogeology at the site has been examined to determine whether any groundwater at the site is at risk of contamination.

The site of the proposed development is underlain by the Lunan/Pow bedrock and localised sand and gravel aquifers (I.D 150266) which covers an area of 170.05km^2. The quality of the groundwater has been classified as poor with high confidence and the quantity of groundwater has been classified as poor with medium confidence in 2008[10].

The Lunan/Pow bedrock and localised sand and gravel aquifers is classified as a Drinking Water Protection Zone. The Scottish Government has identified these areas as those which are used for the abstraction of water for human consumption, which provides more than 10m^3/day as an average, or serve more than 50 persons.

Any reduction in the quality of the groundwater resource is of potential concern and should be avoided.

[10] As defined by SEPA, http://gis.sepa.org.uk/rbmp/, accessed 27/08/2013.

Flooding in the Vicinity of the Site

The areas shaded in blue in Figure 10 below are those areas identified by SEPA as being at risk to flooding from rivers[11]. The nearest river to the proposed development which is at risk to flooding is Vinny Water to which the proposed development site is likely to drain. Any significant increase in run-off would have the potential to increase the risk of flooding already presented by Vinny Water, and should therefore be avoided.

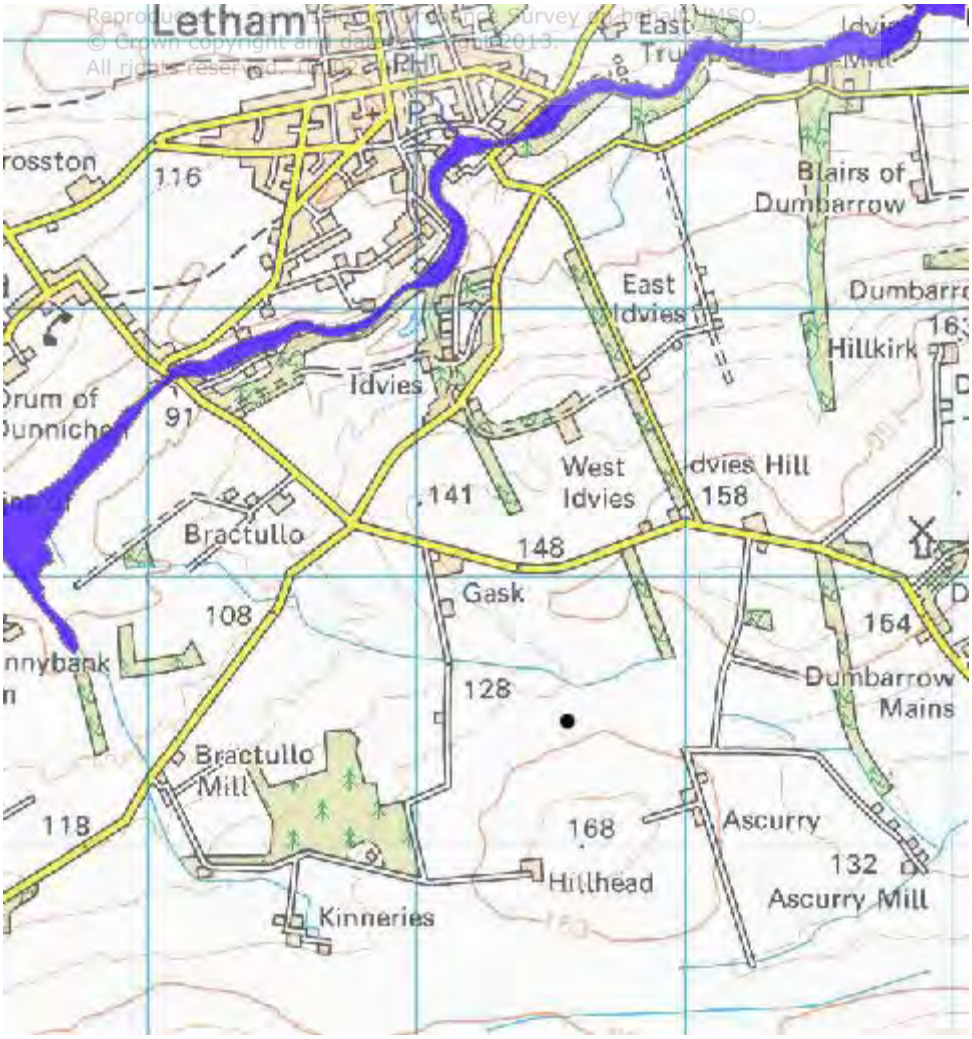

Figure 10: Flooding Risk in Vicinity of Proposed Wind Turbine Development

The total area of new permanent hardstanding associated with the proposed development is approximately 0.27 hectares (ha). The increase in run-off associated with this is considered negligible and will not have an impact on flooding in the receiving catchment.

[11] As defined by SEPA, http://www.sepa.org.uk/flooding/flood_extent_maps/view_the_map.aspx, accessed 27/08/2013.

6.3. Impact Assessment

6.3.1. Soils

The permanent proposed works require the construction of a turbine foundation on an area of 169m^2, hardstanding of 700m^2 and approximately 470m of new access road on an area of arable farmland.

The removal of subsoil and bedrock to form the turbine base, access road and crane pad, in addition to the interference with existing site drainage is a direct permanent effect that, without mitigation, could alter the existing hydrogeological balance of the site.

The existing environment is a modified one due to existing agricultural activities and existing drainage characteristics, but generally consists of surface water runoff which is largely non-intercepted. The potential additional impacts of the development on the soils, hydrology and hydrogeology of the site are listed below:

- The excavation and removal of the subsoils and bedrock will be necessary at the proposed turbine location and for new areas of road formation. This could have a direct permanent impact on these soils and rock in the form of increased erosion and sediment release, which could in turn have additional impacts on water quality (due to sedimentation of water courses);
- The dewatering of excavations with inappropriate disposal of excess water can potentially lead to erosion or undercutting of slopes or saturation and weakening of materials;
- Soil compaction can occur due to movement of construction and maintenance traffic. This could lead to an increase in runoff and subsequently to an increase in flooding and erosion; and
- Removal of soils can result in the exposure of the underlying rock to sources of contamination. Chemical pollution could occur as a result of spillage or leakage of chemicals, runoff from vehicle washing facilities, unset concrete, storage of fuels or refuelling activities, etc. Chemical pollutants could enter groundwater supplies and have implications for damage to ecology and local water supplies.

6.3.2. Surface water

During each phase of the wind turbine development (construction, operation and decommissioning), a number of activities will take place on site, some of which will have the potential to affect the hydrological regime or water quality at the site or its vicinity.

Potential Construction Impacts

The main potential impact of the development on water quality is an increase in sediment during the construction phase. There is also the potential for oil spillages from tanks and machinery on site. A list of risks to surrounding water bodies that require appropriate mitigation measures is provided below:

- Chemical pollution – potential pollutants include spillage or leakage of chemicals, runoff from vehicle wash down facilities, unset concrete, fuel or oil, during use or storage on site. Such pollutants can damage the ecology and quality of affected soils, watercourses and groundwater, affecting biodiversity, fish stocks and water supplies;
- Erosion and sediment release – high levels of sediment can damage fish populations, flood storage capacity and water sources. Spoil heaps from excavations for the turbine base will be stored temporarily; if left exposed, this could lead to an increase in silt-laden run-off draining off site;

- Soil compaction – movement of construction traffic can lead to compaction of the soil, reducing soil permeability and rainfall infiltration;
- Increase in runoff – areas of hard standing will cause local increases in runoff volume. This could influence rates of soil erosion, and alter the way local streams respond to storm rainfall;
- Cable trenches could act as a conduit for surface water flows;
- Incorrect site management of excavations for the access track which could lead to loss of solids and nutrients to surface waters; and
- The construction of new infrastructure (site tracks) has the potential to obstruct existing overland flow.

The construction phase is most likely to give rise to environmental impacts as many of the associated activities have a direct influence on the amount of water, and the amount of suspended solids in the water, arising on the site. Impacts on water quality in the network of streams draining the development could affect receptors sited at some considerable distance from the proposed development. Chemical contamination of ground and surface waters is a risk throughout all phases of construction activity and requires appropriate control and management.

Potential Operational Impacts

When operational, the development will have a negligible effect on surface water quality as there will be no further disturbance of soils post construction.

Due to the insignificant increase in potential run-off from the site, commitment to best practice construction activities and the minimal requirement for new infrastructure, there will be negligible release of sediment to the watercourses from site operations.

During the operational phase, small quantities of oil will be used in cooling the turbine transformer. Whilst there is potential for oil spills they are in no way likely to be significant, given the low volumes of oil present and the presence of the transformer in an internal structure.

Potential Decommissioning Impacts

Potential impacts during the decommissioning stage, albeit at a lesser scale, will be similar to those relating to the construction phase.

6.3.3. Groundwater

In order to protect the bedrock from entry of contaminants, mitigation measures will be put in place to deal with concrete displacement within the bedrock.

Pending site investigations, it is expected that the turbine foundation will be dug at a maximum depth of approximately 2.5m and there is a low risk that groundwater will be present at this level. This will be investigated during the pre-construction ground investigation works and will determine whether sensitive disposal of groundwater at the foundation is necessary.

6.4. Mitigation Measures

Mitigation measures for this wind development will focus on preventing the disturbance and pollution of soil, watercourses and groundwater. With regards to surface water contamination, new drainage pathways may be introduced and carry contaminated run-off. Mitigation measures to prevent these scenarios are outlined within this chapter.

6.4.1. Soils

- The designers will carry out a design risk assessment to evaluate risk levels for the construction, operation and maintenance of the works. Identified risks will be minimised by the application of the principles of avoidance, prevention and protection. Information on residual risks will be recorded and relayed to appropriate parties;
- A method statement for each element of the works will be prepared prior to any element of the work being carried out;
- Details of the relevant assumptions, relating to methods and sequencing of work will be provided to the contractor;
- No amendments to the designed works will be carried out without the prior approval of a suitably qualified and experienced engineer;
- Prior to construction, a site-specific environmental management plan for construction will be prepared in consultation with the relevant statutory bodies;
- Excavation works associated with the construction phase of the development will be monitored by suitably qualified and experienced engineering personnel; and
- The programming of the works will be such that earthworks/excavations are not scheduled to be carried out during severe weather conditions. Where such weather is forecast, suitable measures will be taken to secure the works.

6.4.2. Surface Water

- During construction any oil, fuel or other chemicals will be stored in a suitable temporary storage area. Oil spill cleanup materials will also be stored on site throughout the construction period;
- It is anticipated that concrete will be delivered ready made to the site. Provisions will be made to ensure that deliveries are supervised by qualified personnel and site staff should be aware of what to do in the event of spillage. Mitigation measures will be outlined within construction method statements with regards to concrete delivery and will be carried out in accordance with SEPA guidance (particularly PPG6 and PPG13);
- Washing out of the delivery vehicles will be carried out to ensure that washings do not pollute surface water at the site, and it is proposed to undertake the washing out of concrete trucks offsite at the source location;
- Any stored diesel or fuel oils will be bunded to 110% of capacity. The turbine transformer enclosure will be self-contained or bunded to preclude the release of contaminants to the environment;
- Regular visual inspections of the surrounding burns will be undertaken during the construction phase to examine the turbidity and clarity of the water;
- Underground cables will be laid in small trenches that are parallel to access tracks as far as possible. Trenches will be dug during dry weather periods and the cables will be laid quickly and backfilled to minimise water entering the trenches. Suitable drainage measures will be detailed within the construction method statement and will accord with best practice in the SUDS manual C697;
- Where possible construction will take place from existing tracks, building the new site roads ahead of machinery, such that excavators will avoid operating on bare soils; and
- No work will take place on site during severe weather conditions.

6.4.3. Groundwater & Hydrology

As with any construction project there is a risk of a pollution spill that may enter the water table and contaminate groundwater. It is considered that this risk can be satisfactorily mitigated through use of best practice construction methods. This will require compliance with all of the guidance contained in the relevant Pollution Prevention Guidance (PPG) notes listed in Table 19.

An assessment of groundwater levels at the turbine location will be carried out prior to construction. A borehole will be made to assess whether groundwater is present. This will be carried out as part of a pre-construction soil investigation survey. In the unlikely event that groundwater is present at this depth it will be necessary to temporarily lower the ground water level to avoid any contamination from materials used for the turbine foundations.

6.5. Conclusion

Detailed mitigation measures have been provided with regard to the design, construction and maintenance of the proposed development. Provided that these mitigation measures are adhered to, the impacts on soils, surface water and groundwater are considered to be negligible.

7. Socioeconomic

7.1. Methodology

This chapter will outline the socioeconomic profile of the area as well as describing the tourism and recreational activity within the area. An assessment will then be made on the effect of the proposed wind development on the local economy and tourism sector through consideration of the key business and tourist sites in the region and any relevant previous studies regarding the social/economic impact of wind turbines.

7.2. Baseline Assessment

7.2.1. Site Characteristics

The site lies in a predominantly agricultural setting, within the boundary of The Letham & District Community Council, within the Ward of Arbroath West & Letham. Tourism and recreation is locally important but is considered to be of a lesser importance to other employment sectors in the immediate area. There are a number of tourist attractions that are important in terms of their cultural heritage value in the local area.

7.2.2. Population

An overview of the demographics of the surrounding area is provided in Table 20 below.

Area	Total resident population (all ages)
Immediate Output Area[12]	151
Dundee	154,674
Angus	108,400
Scotland	5,062,011

Table 20: Population of area surrounding Hillhead of Ascurry (2001 Census data)

7.2.3. Economic Activity

Employment data was provided from the 2001 Census for the immediate area and for Dundee, with the Scotland wide average provided as a comparison. This information is provided in Table 21 below.

[12] Output area related to the wider postcode area of DD8 2ND, www.scrol.gov.uk

	Immediate Output Area	Dundee	Scotland
All persons aged 16-74 in employment	71	58,073	2,163,035
% employed in each sector			
- % A. Agriculture and hunting and forestry	9.86	0.55	2.2
- % B. Fishing	0	0.03	0.31
- % C. Mining and quarrying	1.41	0.6	1.29
- % D. Manufacturing	11.27	16.24	13.65
- % E. Electricity and gas and water supply	0	0.95	1.02
- % F. Construction	8.45	7.12	7.76
- % G. Wholesale & retail trade and repairs	14.08	14.71	13.3
- % H. Hotels and restaurants	4.23	4.63	4.95
- % I. Transport and storage and communication	1.41	6.26	6.89
- % J. Financial intermediaries	2.82	2.86	4.74
- % K. Real estate and renting and business activities	7.04	9.77	11.42
- % L. Public administration and defence and social security	9.86	6.08	7.23
- % M. Education	9.86	9.1	7.42
- % N. Health and social work	18.31	15.84	12.63
- % O.P.Q. Other	1.41	5.25	5.18

Table 21: Summary of employment for immediate area and wider zones

Almost 10% of the population within the immediate area are employed in 'agriculture, hunting and forestry'; this is considerably higher than both the Dundee and Scotland averages. No data was found relating to employment within the Community Council ward but one of the key employment types is again expected to be agriculture given the rural nature of the majority of the area.

7.2.4. Tourist Activity

An assessment of existing tourist attractions in the locality was undertaken. The assessment focused on those attractions where the scenic value of the surrounding landscape is important to the draw and/or enjoyment of the attraction. The extent of the assessment was limited to a 10km radius from the turbine as visual impacts are considered to be of greatest significance within this zone. Table 22 below lists the identified attractions.

Tourist Site	Description	Distance to proposed turbine (closest point)
Angus Core Paths Network	Walking Route	1.8km
House of Pitmuies	HGDL, Scheduled Monuments and A-Listed Buildings	4.1km
Guthrie Castle	GDL	4.2km
Crombie Country Park	Country Park	5.3km
National Cycle Route 1	Cycle Route	7.9km
Monikie Country Park	Country Park	8.3km
Forfar Loch Country Park	Country Park	9.3km

Table 22: Tourist activity within the area

Further discussion regarding the impact on tourism on these attractions is provided in the following chapter.

7.3. Impact Assessment

The direct and indirect impacts of the proposed development on the local area can be separated into the following areas:

1. Economic benefits for the landowner;
2. Economic and social benefits for the local community;
3. Economic benefits from construction and operation;
4. Potential adverse impacts on the wider community; and
5. Potential impact on wider tourism and recreation assets.

The potential impact of the development on each of the above areas is discussed further below.

7.3.1. Economic Benefit for the Landowner

Agricultural incomes can vary significantly year on year due to variations in weather conditions, crop quality and yield, market prices, exchange rates, and operational costs for fertiliser, fuel etc. The forthcoming reforms (2014 onwards) to direct payments under the Common Agricultural Policy (CAP) are also a concern.

The combined effect of these uncertainties has prompted the landowner to explore alternative sources of income to help support his business in the long-term. In this respect, the proposed turbine will provide a guaranteed additional source of income over the 25 year expected operational period. The proposed development also has a minimal footprint therefore current farming operations will be largely unaffected.

In addition to the considered suitability of the land for wind energy, the non-agricultural nature of the project also reduces the level of financial risk through diversification outwith the farming sector. In this respect, the renewable energy market is quite stable when compared to other sectors such as agriculture, especially after the introduction of the Feed in Tariff (FiT).

The development of a wind turbine at Hillhead of Ascurry would lead to an additional sustainable source of income for the family farming business, A. M. McEwan. In addition to providing an additional source of income, the electricity generated by the proposed

development will offset a key expense to the farm business. Current expenditure on electricity across the farming business is approximately £120,000 per annum.

7.3.2. Economic and social benefits for the local community

Farmers are considered to be particularly good at recycling extra income back to the farm and wider local economy. Results from the Scottish Income-Output Tables[13] demonstrate that agriculture in general displays a high multiplier effect on the wider economy. Within this assessment agriculture is seen to be within the top 10% of industries for generating additional income in other industries, and within the top 25% for generating additional employment in other industries. Previous studies have also demonstrated that agricultural activity is particularly effective in supporting local economic activity and employment.

The local ownership of this project by a farmer is therefore considered to maximise the real economic benefit available to Angus from renewable energy development. This is the main reason that the Scottish Government have set a target for 500MW of locally owned renewable energy projects by 2020.

As outlined above, A. M. McEwan currently employs 10 full time staff and a 12 part-time/seasonal staff. Diversifying the farming activities will bring an additional sustainable income stream into the farming business, helping to safeguard these jobs and create new jobs as the business continues to expand through investing the project income into the wider farming business.

7.3.3. Economic Benefits from Construction and Operation

The capital cost of the proposed wind turbine development at Hillhead of Ascurry has been estimated at approximately £1.5m. In 2006 Scottish Enterprise published a report discussing the economic impact of wind farm construction. Based on this report, it is estimated that 29%, or at least £435,000, of the capital cost of the installation and operation of the development would be spent locally in Scotland. This would involve:

- Services (consultancy, planning advice);
- Construction (roads, access, fences etc.);
- Cabling (throughout site and to grid access point); and
- Operation and maintenance.

The use of suitably experienced local contractors and sub-contractors will be encouraged for construction, operation and maintenance works associated with the development, as long as they meet the financial and technical requirements for the build.

The increased likelihood to be able to utilise local companies is an additional benefit of smaller commercial wind energy proposals. In this respect, the significant scale of works associated with larger commercial wind farms often dictates that national or multinational companies are used.

A 2010 SAC study into the benefits of locally owned wind energy developments demonstrated what the above factors may mean in terms of local job creation. It was concluded that through

[13] http://www.scotland.gov.uk/Topics/Statistics/Browse/Economy/Input-Output/IOAllFiles2007

development and construction a total of over 5 jobs would be created for a 1 year period, while during operation 2.5 long-term jobs would be created.

7.3.4. Potential Adverse Impacts on the Wider Community

There are a number of potential impacts on the wider community from the proposed development and these include:

- Landscape and visual amenity;
- Noise;
- Shadow flicker; and
- Telecommunications and television reception.

These potential impacts are considered and quantified (where possible) individually in their respective chapters of this Document.

7.3.5. Potential Impact on Wider Tourism and Recreational Assets

From the baseline assessment a number of attractions have been highlighted as having particular importance for tourist activity within the area. The potential impact at each of these attractions is discussed in Table 23 below.

Attraction	Distance from turbine	Potential impact
Angus Core Paths Network	1.4km	Parts of the Core Paths Network within 5km of the site are predicted to experience some theoretical visibility. In practice, users of the Network would experience mostly oblique views of the turbine, where the turbine is visible above the skyline and forms a small element within a wide, open upland agricultural and moorland landscape. Where there are potential views, they are short in duration, oblique and intermittent. Taking into account the distance to the site, the impact of the turbines on the Network is not deemed to be significant.
House of Pitmuies	4.1km	There are a number of A-Listed buildings at House of Pitmuies. As outlined in Drawing HOA014, from these there is no theoretical visibility of the turbine. There is only a small area in the north west of the wider GDL boundary which will have theoretical visibility of the turbine blades. At this distance it is not expected that this will lead to significant visual impacts.
Guthrie Castle	4.2km	As demonstrated by Drawing HOA014, almost all of the GDL has theoretical visibility of the nacelle and blades. Viewpoint 7 (Drawings HOA039 to 072) highlights that there will be minimal impact experienced from the A932 near Guthrie Castle, and also that there is significant screening from vegetation. This is also confirmed in Chapter 5 of this Supporting Environmental Document. As such it is considered that the proposed development will not significantly impact upon the GDL.
Crombie Country Park	5.3km	Apart from a very small area of Crombie Country Park which will experience theoretical visibility of turbine blades only, none of the Country Park will experience theoretical views of the proposed development. Those limited views of the turbine blades from within the Country Park are also considered likely to be screened by surrounding vegetation, further reducing the level of visibility to the proposed development. As such, no significant visual impact on the Country Park is considered likely.

Monikie Country Park	8.3km	There is no visibility of the proposed turbine from within the Country Park.
Forfar Loch Country Park	9.3km	There is no visibility of the proposed turbine from within the Country Park.
National Cycle Route 1	9.5km	The closest part of the National Cycle Route which will have theoretical visibility of the proposed development is approximately 12.5km to the east, and will only have theoretical visibility of the blades and nacelle. Views of the turbine, if experience, will also be limited to oblique and distant views. As such it is considered unlikely that at this distance there will be any significant visual impact on the National Cycle Route.

Table 23: Discussion on tourist attractions within the area

In summary, the proposed development is not expected to have a significant adverse impact on tourism and recreation attractions in the surrounding area.

A national study commissioned by the Scottish Government[14] examined the likely economic impact of wind energy development. It should be noted that this report focuses on larger scale commercial wind developments but many points are relevant to smaller wind projects such as the one proposed at Hillhead of Ascurry. The latest Tourism Attitudes Survey states that 'scenery' and 'natural environment' are the main attractions for tourists visiting Scotland. If wind farms were to deter significant numbers of tourists, they could potentially threaten the tourism industry and also the economic sustainability of the local community.

The study assessed the economic impact of four case studies within Scotland where wind farms were likely to be visible. It was carried out in four key stages:

1. Identifying the change in likelihood of tourists returning to Scotland;
2. Identifying the proportion of tourists in each area where this applies;
3. Identifying the proportion of accommodation exposed (drop in 'room with view' sales); and
4. Estimating likely proportion of change in expenditure in the affected accommodation.

From the study, it was concluded that *"overall there does not appear to be any robust evidence to suggest a serious negative economic impact of wind farms on tourism"*. A change in tourism expenditure is predicted if a substantial amount of wind developments is installed in Scotland, however this loss of revenue is expected to be *"offset or reinforced"* by other positive economic or environmental impacts from wind farms. The study also concluded that tourism activity is likely to be displaced to other areas around Scotland rather than reduced entirely.

A survey of tourists was conducted within the four areas used in the case study; it involved information from tourists that were likely to have seen a wind farm during their visit. The survey confirmed that a minority of around 20% - 39% preferred a landscape that contained no wind farms; overseas visitors were found to be more positive than domestic tourists. The vast majority of the tourists surveyed (93% - 99%) that had seen a wind farm during their visit said that it would not affect their decision to return the area or Scotland as a whole.

[14] Scottish Government (2008) Economic Impacts of Wind Farms on Scottish Tourism

A more recent document[15], prepared by ClimateXChange on behalf of the Scottish Government, found no evidence to suggest that wind energy development within the four case study areas adversely affected tourism.

7.4. Conclusions

The baseline assessment indicates that the immediate area has a relatively low rural population. It is acknowledged that the turbine could potentially result in adverse impacts on residential amenity. Further studies in relation to visual, noise and shadow flicker impacts have therefore been undertaken to determine whether the development falls within acceptable limits.

The project has been assessed as having an overall positive socio-economic impact on the local area. The turbine represents a strong example of diversification for the farmer and is a significant additional source of revenue. This income stream will not only support the ongoing farming business but will also have direct and indirect benefits on other local businesses and the wider community.

With regard to domestic properties there is no robust evidence to suggest that the wind development will have a substantial negative impact on property values within the area and all effort has been made to maximise the distance from houses and therefore negate any adverse impacts on these properties from impacts such as noise and shadow flicker.

Individual assessment of landscape and visual impacts on tourism sites have shown generally low impacts and these impacts are considered to be insufficient to cause a detrimental effect on the attraction of these sites.

[15] ClimateXChange (2012) The Impact of Wind Farms on Scottish Tourism

8. Cultural Heritage

This chapter assesses the impact of the proposed Hillhead of Ascurry wind turbine on those known cultural heritage or archaeological features within the area. This assessment focuses on the impacts upon Listed Buildings and noted archaeological features within the immediate area of the turbine. This includes important Scheduled Ancient Monuments and Gardens and Designed Landscapes (GDLs) within the wider area.

8.1. Methodology

The construction of a single wind turbine at the location proposed will have no direct impact on known archaeological sites or features.

The potential impact of the proposal on the setting of *inter alia* Gardens & Designed Landscapes within a 25km radius of Hillhead of Ascurry has been assessed as part of Chapter 5.

This assessment therefore focuses on how the development might impact on the setting of any sensitive cultural heritage sites and has been carried out in accordance with Historic Scotland's 'Managing Change in the Historic Environment – Setting' dated October 2010. In the case of this development, potential impacts mainly relate to the landscape context, the surrounding landscape character, and the impact on the aesthetic qualities of the site. Where relevant, discussion will be provided on whether the development will impact upon the historical understanding of the site.

Initially a desk-based study was completed using Historic Scotland's available GIS databases. All A Listed buildings and Scheduled Monuments within a 5km radius were identified (see Drawing HOA007). For completeness, a search of B and C Listed buildings within 1km of the proposed turbine location was undertaken; two additional sites were identified as a result.

The assessment focuses mainly on the visual impact on these sites; the matrix used to assess the overall impact is detailed in Table 24 below.

Magnitude	**Sensitivity**			
		High	**Medium**	**Low**
	High	Major	Major/Moderate	Moderate
	Medium	Major/Moderate	Moderate	Moderate/Minor
	Low	Moderate	Moderate/Minor	Minor
	Negligible	Moderate/Minor	Minor	Minor/None

Table 24: Overall impact assessment matrix

The guide in Table 25 and Table 26 below is used to determine the magnitude and sensitivity of the potential impact on cultural heritage receptors.

Magnitude	Description	Definition
High	Dominant	Receptor(s) are within 500m of the development
Medium	Conspicuous	Receptor(s) are between 500m - 2km of the development
Low	Apparent	Receptor(s) are within 2km - 5km of the development
Negligible	Inconspicuous	Receptor(s) are > 5km of the development

Table 25: Magnitude of impact

Sensitivity	Definition
High	• Category A and B Listed buildings • Gardens & Designed Landscapes • Scheduled Ancient Monuments • Non-statutory sites of high significance (of international or national importance)
Medium	• Category C listed buildings • Archaeological sites on the Sites & Monuments Record (of regional or local importance) • Conservation Areas • Country Parks
Low	• Archaeological sites of lesser importance • Non – Inventory Gardens and Designed Landscapes

Table 26: Cultural Heritage Sensitivity

8.2. Baseline Assessment

8.2.1. Relevant Legislation, Policy and Guidance

The following legislation, policy and guidance is relevant to this assessment:

- Historic Environment (Amendment) (Scotland) Act 2011;
- Planning (Listed Buildings and Conservation Areas) (Scotland) Act 1997;
- Ancient Monuments and Archaeological Areas Act 1979;
- Town and Country Planning (Scotland) Act 1997 as amended by Planning etc. (Scotland) Act 2006;
- Scottish Historic Environment Policy;
- PAN 2/2011 Planning and Archaeology;
- Scottish Planning Policy 2010;
- Local Plan Policy ENV19: Archaeological Sites and Ancient Monuments; and
- Local Plan Policy ENV18: Listed Buildings.

8.2.2. Site Context

An assessment was carried out for any sensitive sites within 5km of the Hillhead of Ascurry turbine. Details of these sites are shown in Table 27 below. These sites are shown relative to the turbine in Drawing HOA007 within the appendices.

Site	Description	Distance to Hillhead of Ascurry turbine (km)
Hillhead of Ascurry Farmhouse	C-Listed Building	0.6
Idvieshill	C-Listed Building	0.8
Dunbarrow Hill, fort	Scheduled Ancient Monument	2.2
Gardyne Castle	A-Listed Building	4.5
Pitmuies – Home Farm	A-Listed Building (various)	4.6

Site	Description	Distance to Hillhead of Ascurry turbine (km)
Pitmuies House	A-Listed Building	4.6
Pitmuies, cross slab	Scheduled Ancient Monument	4.7
East Mains of Pitmuies, ring ditch	Scheduled Ancient Monument	4.8
Pitmuies Cottages, ring ditches	Scheduled Ancient Monument	5.0
Kirkbuddo Wood, Roman camp	Scheduled Ancient Monument	5.0

Table 27: Cultural heritage sites within 5km of Hillhead of Ascurry

8.3. Impact Assessment

This impact assessment discusses the potential direct and indirect impacts that may occur at the cultural heritage receptors outlined within the baseline section. Outwith any direct disturbance on known cultural heritage sites the main impact will be visual. In relation to rural settings any development seen in principal views to or from a designated site can be considered as affecting its setting.

8.3.1. Assessed Impacts

With regard to the potential for direct impacts, it is noted that no known archaeological sites or features lie within the extent of construction works for the turbines, crane pad/laydown areas or access road. Any potential impacts (during construction and operation) are therefore expected to be visual. This chapter discusses the potential impact on the sites described within the baseline assessment.

Table 28 below provides details of cultural heritage sites identified within 5km, along with the demonstrated extent of the theoretical turbine visibility, sensitivity, magnitude and potential impact according to the methodology described in Chapter 8.1.

Further discussion is then provided on those sites where there is a theoretical major or major/moderate impact.

Name	Theoretical visibility	Sensitivity	Magnitude	Overall Potential Impact
Hillhead of Ascurry Farmhouse	Nacelle and blades	Medium	Medium	Moderate
Idvieshill	Full	Medium	Medium	Moderate
Dunbarrow Hill, fort	Nacelle and blades	High	Low	Moderate
Gardyne Castle	Blades only	High	Low	Moderate
Pitmuies – Home Farm (various)	None	High	Low	Moderate
Pitmuies House	None	High	Low	Moderate
Pitmuies, cross slab	Blades only	High	Low	Moderate
East Mains of Pitmuies, ring ditch	None	High	Low	Moderate
Pitmuies Cottages, ring ditches	None	High	Low	Moderate
Kirkbuddo Wood, Roman camp	Nacelle and blades	High	Low	Moderate

Table 28: Assessed impact on cultural heritage sites

There are no sites for which there is a theoretical major or major/moderate impact. As such, it is considered that the proposed turbine at Hillhead of Ascurry will not have a significant level of impact on the setting of nearby heritage assets.

8.4. Mitigation Measures

No groundwork or construction will be undertaken within, or adjacent to recorded sites of cultural heritage. Therefore there have been no mitigation measures proposed at this stage.

8.5. Conclusions

This assessment has examined the expected impact of the proposed Hillhead of Ascurry turbine on cultural heritage sites.

With regard to the potential for direct impacts, it is notable that no known archaeological sites are within the proposed construction area for the turbines, crane pad/set down areas or access road. The primary consideration was whether the turbine would have a significant impact on the setting of the sites through significant visual impact as stated in the relevant National and Local policy.

From an initial desk based assessment of the surrounding area, 8 high sensitivity and 2 medium sensitivity cultural heritage assets were found within 5km of the Hillhead of Ascurry development site. In assessing the setting of these sites it was considered that any adverse impacts would not be significant. For those high sensitivity assets, this is due to the distance (>2km) from the proposed turbine location, which reduces the potential for views of the turbine being considered 'dominant' or 'conspicuous'.

As such, it is considered that the proposed development at Hillhead of Ascurry will not have a significant impact on nearby heritage assets.

9. Ecology

The ecological impact of the Hillhead of Ascurry developments has been assessed by Ecologist EnviroCentre Ltd. The ecology report is attached within the appendices of this Supporting Environmental Document. The potential ecological impact of the development is summarised as follows:

"No further survey of the site is necessary.

A bird survey is not necessarily required if construction work can be either timed to avoid the bird breeding season or a pre-construction check of any vegetation to be removed is undertaken immediately prior to works.

Natural England has developed guidance that provides information on how best to site turbines to avoid impacts to bat species. This guidance states that:

"A bat survey should normally be recommended for applications for turbines that will be located within 50m of the following features:

- *Buildings or other features or structures that provide potential as bat roosts, including bridges, mines etc;*
- *Woodland;*
- *Hedgerows;*
- *Rivers or lakes; and*
- *Within or adjacent to a site designated for bats (SSSI or SAC)."*

Therefore, 50m should be the minimum distance between the tip of the turbine blade to the nearest feature which may be used by bats. This distance should not be measured from the base of the turbine but instead should take into account the height of the feature. In order to accurately measure this stand-off distance from the blade tip Natural England have produced the following equation:

$$b = \sqrt{(50 + bl)^2 - (hh - fh)^2}$$, *where:*

b = the minimum distance;

bl = blade length (27m);

hh = hub height (50m); and

fh = feature height (4m).

At Ascurry the minimum distance equates to 61.75m.

As the proposed turbine is located approximately 115m from the nearest linear feature, it is unlikely to affect any feature that may be used by roosting, foraging or commuting bats.

No further survey for bats is required."

10. Shadow Flicker

Under certain combinations of geographical position, time of day and time of year, the sun may pass behind a turbine rotor and cast a shadow over neighbouring properties. When the blades rotate a shadow forms for short periods and this effect is known as 'shadow flicker'. Shadow flicker is considered an issue when the blade shadow passes over a narrow opening, such as a neighbouring property's window. The main cause for concern is the potential annoyance to homeowners. This is an issue that can be completely mitigated, if required, through understanding the periods of concern and controlling the turbine appropriately during these periods.

This chapter considers the potential shadow flicker impact on local properties from the operation of the proposed Hillhead of Ascurry wind turbine.

10.1. Methodology

The effect of shadow flicker can be assessed using specialist software. This software models the shadow flicker from the following 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 proposed turbines that would cast the shadow.

Within this assessment, the sensitivity of any identified receptors is assumed to be high due to the direct impact on local residential amenity.

10.2. Baseline Assessment

10.2.1. Relevant Legislation, Policy and Guidance

The Scottish Government's web based Specific Advice Sheet – Onshore Wind Turbines (most recently updated in October 2012) states:

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

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

10.2.2. Site Context

There are no properties within 10 rotor diameters of the turbine location. The nearest residential property, north of Ascurry, is at the approximate grid reference of E354036 N746253 and is shown in Figure 11 below (marked as H7). This dwelling is measured as being 544m from the proposed turbine location.

Figure 11: Properties assessed for shadow flicker impacts

10.3. Impact Assessment

A map assessment was undertaken to demonstrate the extent of shadow flicker at the site assuming the worst case assumptions. This map is shown in Figure 12 for the proposed development. The contours mark the number of hours of potential impact to an individual window at 2m above ground level. Each contour represents 50 hours of shadow flicker events per annum.

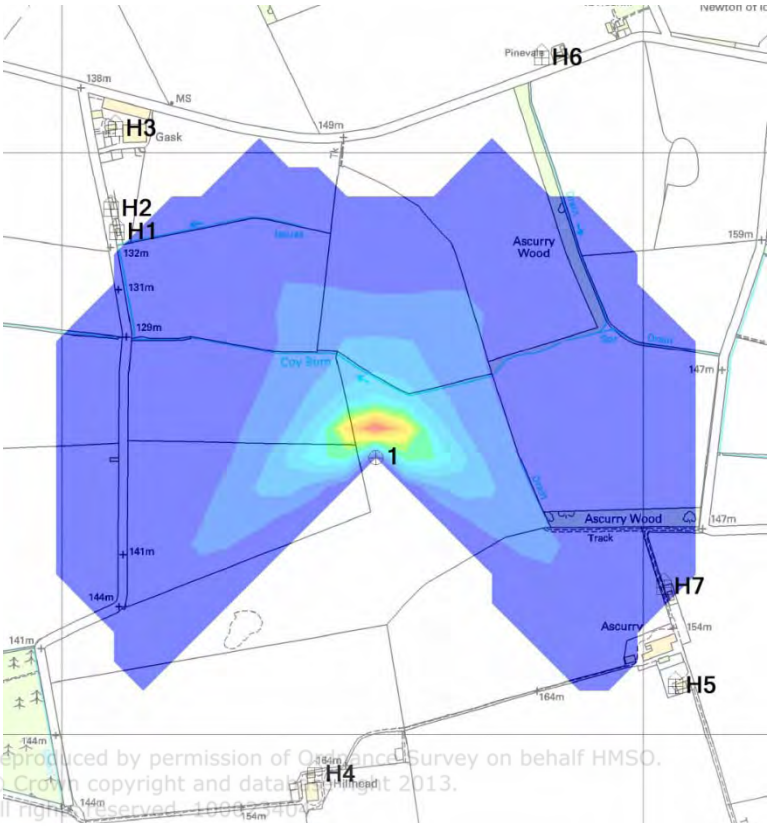

Figure 12: Theoretical shadow flicker zone surrounding the Hillhead of Ascurry turbine

The calculated flicker events are detailed in Table 29 below.

House	Days per year	Max hours per day	Mean hours per day	Total hours per year
H1	0	0	0	0
H2	0	0	0	0
H3	0	0	0	0
H4	0	0	0	0
H5	0	0	0	0
H6	0	0	0	0
H7	0	0	0	0

Table 29: Summary of theoretical shadow flicker impacts

The results in Figure 12 above would suggest that H7 should experience a small amount of shadow flicker, however this is not recorded in Table 29. Figure 12 links edges from the pixelated model to create a better visualisation of the shadow flicker impact from the turbine.

The pixelated version of the model around H7 is outlined in Figure 13 below, alongside the model included above. This confirms that there will be no shadow flicker at H7, as outlined in Table 29.

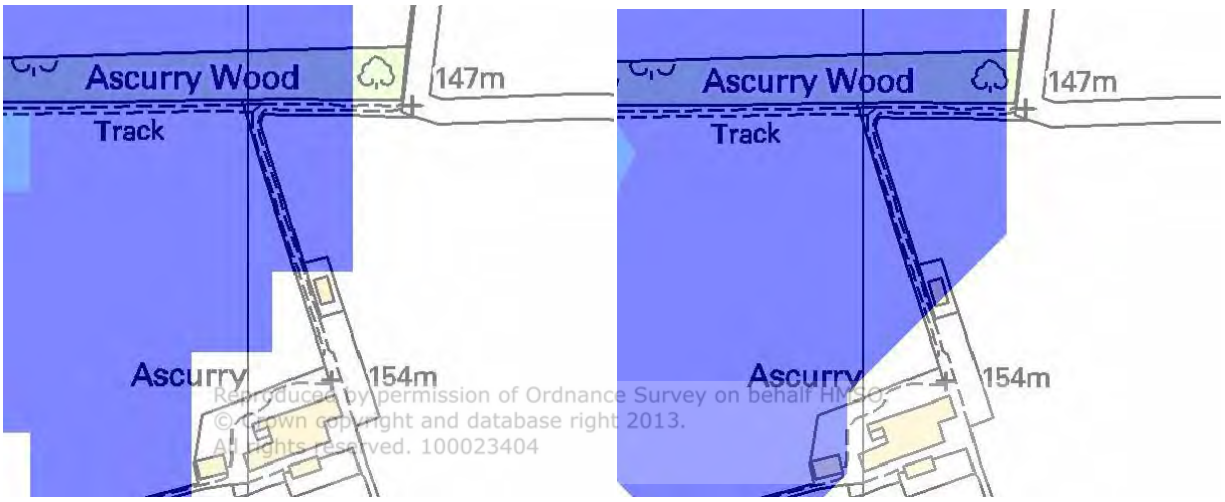

Figure 13: Pixelated theoretical shadow flicker zone surrounding H7

10.4. Conclusion

The following conclusions have been made regarding shadow flicker considerations and the proposed wind development:

- A shadow flicker assessment was completed using Windfarm Software to quantify the areas of potential impact. The model was run using conservative, worst – case assumptions;
- No shadow flicker impacts are expected at nearby properties; and
- Screening from trees has not been considered during this assessment. This means that, if there were potential flicker effects, these will be greatly reduced.

The above assessment considered worse case conditions for the effects of shadow flicker. Therefore shadow flicker should not be considered to be a sustained concern in terms of local residential amenity.

11. Noise

This chapter assesses whether a wind turbine at Hillhead of Ascurry is likely to cause a noise disturbance to the nearest residential dwellings. The chapter will initially provide an overview of relevant policy, wind turbine noise and site context before assessing the extent of wind turbine derived noise on the nearest residents.

11.1. Methodology

A desk based assessment has been carried out in accordance with the relevant guidelines (discussed further in Chapter 11.2.2). Following recent discussion with Angus Council, particular attention has been made to the Institute of Acoustics 'Good Practice Guide to the Application of ETSU-R-97 for the Assessment and Rating of Wind Turbine Noise' (2013). Within the guidance it is outlined that the following parameters should be set when calculating noise predictions:

- A ground factor of G=0.5;
- The use of warranted manufacturer data or, if warranted data is not available, the use of measured data. In the scenario where measured data is used, an uncertainty factor provided by the manufacturer, multiplied by a margin of 1.645, should be used to ensure that suitable uncertainties have been incorporated. This is highlighted within the IEC 61400-11 standard;
- The adoption of a receiver height of 4.0m is recommended (regardless of time of day), as it has the effect of reducing the potential over-sensitivity of the calculation to the receiver region ground factor compared to lower receiver heights; and
- Atmospheric conditions of 10^{o}C and 70% humidity are recommended to represent a reasonably low level of air absorption.

In line with the above guidance, predicted noise levels have been calculated based on measured sound power information provided by the manufacturer and have been compared with the noise limits set out within ETSU-97.

The measured and warranted sound power data from the manufacturer and extracts from the ReSoft Windfarm software used to complete the assessment can be viewed in Appendix C.

The extent of turbine noise has been quantified using International Standard ISO 9613 "Acoustics – Attenuation of Sound during Propagation Outdoors" and from this work it has been considered that further detailed noise survey work is not required for the proposed turbine location and model.

11.2. Baseline Assessment

11.2.1. Turbine Noise

Wind turbines generate noise as they rotate. Wind turbine derived noise will occur above the "cut-in" wind speed and below the "cut-out" wind speed. Below the cut-in wind speed there is insufficient strength in the wind to generate efficiently and above the cut-out wind speed the turbine is automatically shut down to prevent any malfunctions from occurring. The cut-in wind speed for the proposed turbine is 3 meters per second (m/s) and the cut out wind speed is normally around 25m/s (measured at hub height). Above wind speeds of 8 – 12m/s, background noise begins to exceed turbine noise as shown in Figure 14. Therefore, it is within the range 3 to 12m/s that turbine noise is typically most audible.

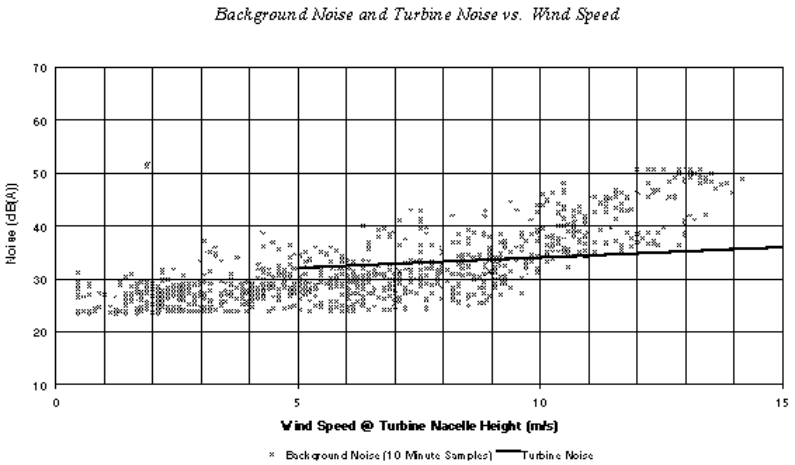

Figure 14: Background Noise and Wind Turbine Noise vs. Wind Speed[16]

During the operational phase there are two potential sources of noise from a wind turbine; aerodynamic noise from the movement of the blades through the air, and mechanical noise from the operation of turbine engine components (e.g. gearbox and generator) in the nacelle.

Modern wind turbines have been designed to be considerably quieter than earlier turbine models and significant progress has been made in recent years in achieving lower noise signatures. Well designed modern wind turbines are generally quiet in operation and compared to the noise of road traffic and construction activities in other locations, the noise from wind turbines is very low.

Aerodynamic noise can be minimised through careful attention to blade design, whilst mechanical noise can be minimised through innovative design and noise insulation materials within the nacelle.

The locational and turbine specific noise details for this project are provided in Table 30 below and the noise data has been provided from EWT documentation for their Directwind 54 turbine which is proposed for this site.

Turbine	EWT Directwind 54
Easting	353539
Northing	746476
Height ASL	144m
Measured sound power level at 95% operation (10m/s) including uncertainty factor of 1.15dB (0.7dB uncertainty factor provided by the manufacturer x 1.645, as outlined in Section 11.1).	100.65dBA

Table 30: Turbine details and sound power level used in this assessment

[16] Graph taken from The Assessment & Rating of Noise from Wind Farms, The Working Group on Wind Turbine Noise, September 1996.

11.2.2. Relevant Legislation, Policy and Guidance

The following policy and guidance documents were utilised in the completion of this chapter:

- Scottish Planning Policy;
- Institute of Acoustics 'Good Practice Guide to the Application of ETSU-R-97 for the Assessment and Rating of Wind Turbine Noise';
- PAN 1/2011 Planning and Noise and accompanying Technical Advice Note;
- Specific Advice Sheet – Onshore Wind Turbines (which replaces PAN 45 Renewable Energy Technologies);
- BS 5228 Parts 1 & 2 – Code of Practice for Noise and Vibration Control on Construction and Open Sites; and
- ETSU-R-97 The Assessment and Rating of Noise from Wind Farms.

The Scottish Government's online guidance (last updated in October 2012) states:

"The Report 'The Assessment and Rating of Noise from Wind Turbines' (Final Report, Sept 1996, DTI), (ETSU-R-97), describes a framework for the measurement of wind farm noise, which should be followed by applicants and consultees, and used by planning authorities to assess and rate noise from wind energy developments, until such time as an update is available. This gives indicative noise levels thought to offer a reasonable degree of protection to wind farm neighbours, without placing unreasonable burdens on wind farm developers, and suggests appropriate noise conditions".

ETSU (1997) suggests that current practice on controlling wind farm noise should be by the application of noise limits at the nearest noise-sensitive properties. These noise limits should be applied to external locations and should apply only to those areas frequently used for relaxation or activities for which a quiet environment is highly desirable. The report suggests that noise limits should be set at a $LA90_{10min}$ of no more than 5 dB(A) above background, subject to a minimum of 35-40 dB(A) for daytime and 43 dB(A) for night-time. These limits are applicable up to a wind speed of 12 m/s measured at 10 m height on the site. However, the report also states both day and night-time lower fixed limits can be increased to 45 dB(A) to increase the permissible margin above background where the occupier of the property has some financial interest in the wind farm.

11.2.3. Site Context

The 7 residential locations closest to the proposed turbine are numbered in Figure 15 below with details provided in Table 31. The distances measured are from the proposed turbine to the nearest part of the property curtilage and therefore include outdoor amenity areas.

Figure 15: Residential areas surrounding the proposed turbine

House	Easting	Northing	Distance to turbine
H1	353095	746862	588m
H2	353084	746903	623m
H3	353092	747040	719m
H4	353436	745929	556m
H5	354054	746083	647m
H6	353852	747162	743m
H7	354036	746253	544m

Table 31: Details of the dwellings in proximity to the proposed turbine

With regards to the existing sources of background noise in the area, the site was considered to be a relatively quiet rural area although there will be anthropogenic noise from farm vehicles and other vehicles on the public roads.

11.3. Impact Assessment

Noise related issues need to be considered for the construction, operational and decommissioning phases of the project.

11.3.1. Construction and decommissioning phases

During these phases there will be a number of short term noise impacts of varying intensity and these include:

- The transportation of abnormal loads (equipment and materials) to site will require the use of Heavy Goods Vehicles (HGV's). The majority of the transport route is likely to be via motorways and other busy regional roads so there is unlikely to be significant additional noise impacts for sensitive receptors along the majority of this route; and
- The construction/excavation of the foundations and ancillary structures (including the excavation of earth to lay foundations and underground cabling) is likely to have short-term noise impacts higher than background levels. In accordance with best practice, this type of construction work will take place during daylight hours to ensure minimal disturbance to nearby residential dwellings.

Given the single turbine nature of the development there will only be a short term noise impact from construction traffic and turbine components coming to and from site along local roads. These stages are therefore considered to have a negligible overall noise impact.

11.3.2. Operational phase

Although noise levels arising from wind turbines are fairly low relative to other anthropogenic sources, as the turbines are generally situated in rural environments there are often few other sources of noise. When wind speeds are high this is not a problem since any turbine noise is masked by wind induced noise effects, particularly that of the trees being blown. At lower wind speeds, however, or in particularly sheltered locations, the wind induced background noise may not be sufficient to mask the noise from the turbine. However, under these conditions, the generated noise levels may be so low as to generate very little impact.

As discussed, a desk-based noise impact was undertaken based on ISO 9613:

- ISO 9613 – 1: Attenuation of Sound During Propagation Outdoors, part 1: Calculation of the Absorption of Sound by the Atmosphere; and
- ISO 9613 – 2: Attenuation of Sound During Propagation Outdoors, Part 2: General Method of Calculation.

The propagation model described in Part 2 of the ISO 9613 standard provides for the prediction of sound pressure levels based on either short-term, down-wind (i.e., worst case) conditions, or long term, downwind overall averages. ISO 9613 is considered a conservative model as it assumes all receivers are downwind from the noise sources. In reality, when wind is blowing in the opposite direction (i.e. from receivers to sources), the source attributable noise levels are lower.

Turbine sound power levels

In this assessment, noise predictions for this site have been based on measured sound pressure levels. Table 32 below gives the calculated octave band sound power levels for the proposed turbine for wind speeds at 10m/s. An uncertainty factor of 1.15dB has been added to each sound power level to provide a more conservative assessment, as per the Institute of Acoustics 'A Good Practice Guide to the Application of ETSU-R-97 for the Assessment and Rating of Wind Turbine Noise'.

Octave Band Frequency (Hz)	Sound Power Level (dB(A))
63	82.75
125	88.95
250	94.25
500	95.55
1000	94.15
2000	91.65
4000	84.75
8000	72.95

Table 32: Octave band spectrum at 10m/s

11.3.3. Other Factors

Directivity Factor

The directivity correction describes the extent to which a point source radiates sound. For a wholly omnidirectional source (like a turbine nacelle), the directivity correction is 0.

Atmospheric Absorption

The atmospheric absorption depends on the relative humidity of the air, ambient temperature and ambient pressure. For this model, an ambient temperature of 10°C with a relative humidity of 70% was used in line with the Institute of Acoustics recommended atmospheric factors. This generated the octave band absorption coefficients used in the model, as shown in Table 33 below.

Frequency (Hz)	63	125	250	500	1,000	2,000	4,000	8,000
Absorption Coefficient (dB/km)	0.12	0.4	1.04	1.93	3.66	9.66	32.8	117.00

Table 33: Octave Band Absorption Coefficients

Ground Factor

The ground region parameter (i.e. how acoustically hard or soft the ground is) was set at 0.5 for the model. The ground region can be set between 0 (hard ground such as water or concrete) to 1.0 (grassland or farm land). In accordance with the Institute of Acoustics guidance, a ground factor of 0.5 was used in the model as the guaranteed turbine sound power level has been utilised.

Barrier Attenuation

There are no screening obstacles (i.e. barriers) included in this model.

11.4. Results

The ETSU Guidelines state that the L_{A90} noise descriptor should be adopted for both background and wind farm noise levels and that, for the wind farm noise, this is likely to be between 1.5 and 2.5 dB less than the L_{Aeq} levels over the same period. Use of the L_{A90} descriptor for wind farm noise allows reliable measurements to be made without corruption from relatively loud, transitory noise events from other sources.

Noise predictions were carried out for a wind speed of 10m/s at 10m height. The receiver was set at a 4m height above ground level. The results are plotted in the form of noise contours shown in Figure 16 below. It should be noted that this represents downwind propagation in all

directions simultaneously, which clearly cannot happen in practice. The predicted turbine noise L_{Aeq} has been adjusted by subtracting 2dB to give the equivalent L_{A90} as suggested in ETSU-R-97. The L_{A90} figures with the uncertainty factor of 1.15dB outlined are included in Appendix C. These have been inserted manually into the ReSoft Windfarm software, to prepare the model in Figure 16 below.

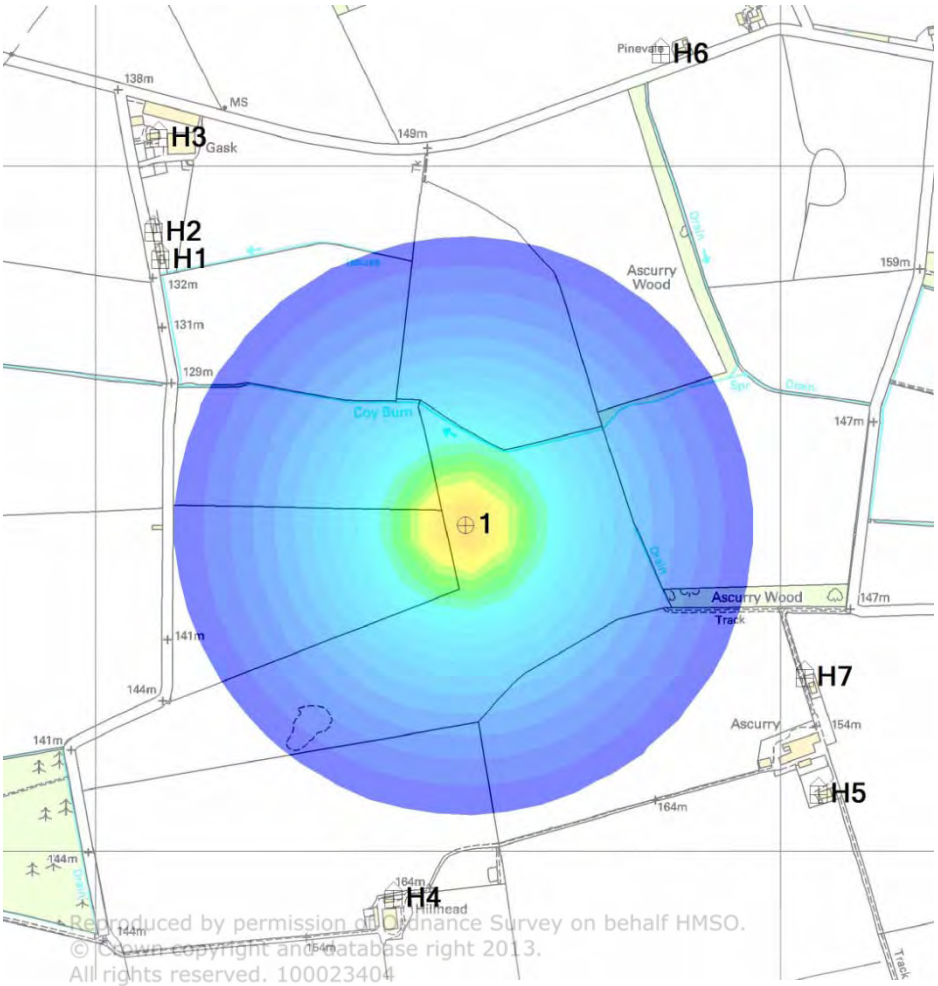

Figure 16: Hillhead of Ascurry Noise Model (using ReSoft Windfarm and L_{A90} data)

As is shown by the above noise assessment, the maximum expected noise levels at the nearest residential areas will be under 35db(A). Based on the ETSU guidance this is considered to be within acceptable levels and background noise measurements are not considered necessary. It should also be noted that:

- Wind turbine noise is modelled at its rated power output and consequently the rated sound power level;
- The model assumes a direct line of sight and does not consider terrain; and
- The noise model assumes that the wind direction is always blowing from the wind turbine to each house simultaneously. Noise levels can be expected to be 2 dB less during cross winds (i.e. where the wind blows across a path between the turbine and the house).

The results of the noise assessment for each house shown in the baseline assessment are shown in Table 34 below.

House no	Predicted Noise (dB)
H1	31.72
H2	31.13
H3	29.68
H4	32.28
H5	30.75
H6	29.35
H7	32.49

Table 34: Calculated noise levels at surrounding properties (from edge of property)

11.5. Mitigation

Construction

Several safeguards exist to minimise the effects of construction noise including:

- The various EC Directives and UK Statutory Instruments that limit noise emissions of a variety of construction plant;
- Guidance set out in BS 5228: 2008: Part 1 which covers noise control on construction sites; and
- The powers that exist for local authorities under the Control of Pollution Act 1974 to control environmental noise on construction sites.

As part of the construction contract, the contractor would be required to implement all committed mitigation measures including those set out in this Document. With a view to ensuring compliance with the agreed noise limits, the adoption of Best Practicable Means, as defined in the Control of Pollution Act 1974, is usually the most effective means of controlling noise from construction sites.

Other additional generic measures to be adopted for the control of noise are as follows:

- All site staff would receive appropriate environmental training at the beginning of the contract and throughout the construction;
- Silenced or sound reduced compressors would be used where necessary;
- Silencers or mufflers would be fitted to pneumatic tools where required;
- Deliveries would be programmed to arrive during daytime hours only and care would be taken to minimise noise when unloading vehicles;
- Delivery vehicles would be prohibited from waiting within the site construction compound with their engines running;
- Plant items would be properly maintained and operated according to manufacturers' recommendations, in such a manner as to avoid causing excessive noise; and
- Appropriate noise limits and working hours would be specified in the contract documents. It is assumed that construction activities would be undertaken during daytime periods only, between the hours of 07:00 to 19:00 hours Monday to Friday and 07:00 to 13:00 hours on Saturday.

Operation

The noise assessment demonstrates that the highest predicated noise level at the nearest residential dwellings to the proposed turbines is under 35 dB(A), which meets ETSU guidelines. On this basis, no mitigation is deemed necessary in relation to the operational phase of development.

11.6. Conclusions

The following conclusions have been made regarding noise considerations and the proposed wind development:

- The area is rural in nature and is expected to have relatively low background noise;
- The nearest property (house and or boundary) to the turbine is measured as being 544m from the turbine position;
- The proposed turbine (EWT Directwind 54) is a modern turbine design with a low noise signature compared with other turbines of a similar size;
- Noise modelling was completed for the proposed development using ReSoft Windfarm software and the guaranteed noise levels for the proposed wind turbine at normal operation. This model is based on ISO 9613;
- The noise at the nearest residential dwellings (applicant and non-applicant owned) to the proposed turbine site is shown not to exceed 35 dB(A) (L_{A90}) at a wind speed of 10m/s and at a received height of 4m, in accordance with ETSU and the guidance from the Institute of Acoustics; and
- ETSU guidance states that in the above scenario the wind turbine development is not considered to require detailed background noise modelling as the turbine noise would be below what is expected to be seen as background noise in a low noise environment.

Overall, noise impacts are predicted to be low and assessed levels are well within ETSU guideline limits.

12. Telecommunications

This chapter examines the proposed development of a wind turbine at the Hillhead of Ascurry site with regards to the potential to interfere with telecommunications and television reception.

12.1. Methodology

To assess the potential impact on telecommunications, Locogen initially provided details of this development to the Office of Communications (Ofcom). Ofcom are the agency tasked with assessing the potential impacts of wind energy proposals on the civilian radio network (consists primarily of mobile phone operators and communication systems for public sector and utility companies). Ofcom responded with a list of those telecom links that are within a 500m radius of the proposed development. Information on the proposed development was also passed on to Atkins and the Joint Radio Company (JRC) who manage the scanning microwave and telemetry links of utility companies.

Ascertaining the potential impact on local television transmission signals previously involved the completion of the BBC wind farm assessment tool. This online assessment tool is no longer available and this is at least partially due to the move to a fully digital television reception network which is considered to significantly reduce the potential for impacts upon reception.

12.2. Baseline Assessment

The potential impacts are likely to be during the operational phase of the project. Various stakeholder bodies were contacted regarding the proposed development, the outcomes of the consultation and further assessment are provided below.

12.2.1. Telecommunications

Ofcom, Atkins and JRC were asked to give details of telemetry and microwave links within a 500m radius of the development. The outcome of this stakeholder contact has been summarised in Table 35 below.

Company	Responded	Links	Further issues
Ofcom	Yes	0	-
Atkins	Yes	0	-
JRC	Yes	0	-

Table 35: Overview of responses from telecommunication companies

12.2.2. Television Reception

With regard to domestic television reception the primary area of concern is that the presence and movement of the turbine causes shadow and/or reflection zones in the surrounding area. A worst case scenario is that television reception systems within these zones may be partially or totally impaired through the reception being blocked or mirrored by the presence of the turbine.

12.3. Impact Assessment

12.3.1. Telecommunications

Consultation with Ofcom and others found one telecommunication link within 500m of the proposed turbine location. This link is managed by the Joint Radio Company (JRC). Further

consultation with JRC has confirmed that the proposed development will not impact upon this link. No interference risks to other nearby telecommunication links are expected.

12.3.2. Television Reception

Prior examples of instances where wind developments have impacted on television reception have involved analogue systems. Therefore a key factor to take into consideration is the UK's completed switch to an all digital broadcasting network. The following information was provided as to how this switch would be likely to significantly reduce the extent of any impact:

> *"Although analogue and digital terrestrial TV signals use different modulation systems, with different characteristics, digital signals will still be broadcast from the same transmitter sites, and in the same frequency ranges, as currently used for analogue TV. The propagation characteristics of both systems are also the same, and physical obstructions such as wind farms will therefore continue to have an effect on domestic reception in the all-digital environment. However, digital signals contain a number of error correction and recovery mechanisms, which mean that an apparently perfect picture can be decoded even in quite adverse reception conditions. The corollary of this robustness is that the failure of digital signals is abrupt: when reception conditions become too poor for the error correction systems to recover from, reception is completely lost. This is in contrast to analogue systems, where visible picture impairments become gradually worse as reception conditions deteriorate".* [17]

Therefore the recent move to digital will mean that the number of potential sites impacted upon will be reduced further due to fewer issues with partial picture distortion.

Overall, television reception issues are not perceived to be a significant concern due to the small scale of development, the limited number of dwellings in the immediate area, the move to digital reception, and the ability to rectify issues for those individual households that are affected.

12.4. Conclusions

On the basis of the above desk-based assessment, no specific mitigation measures are required in relation to telecommunications links.

Following the digital switch-over, loss of local television reception is unlikely to occur. Any impacts that do occur (expected to be minimal, if at all) can be appropriately mitigated at the expense of the developer.

[17] Peter Mandry, Senior Associate technical advisor for Ofcom

13. Aviation

Wind turbines can encroach on airspace and interfere with flight safety (both civilian and military), ground-based radar systems and aircraft navigation systems.

13.1. Methodology

Locogen have assessed the potential impact on aviation and radar through desk based assessment. This includes both Line of Sight assessment and Radar Diffraction Modelling.

13.2. Baseline Assessment

13.2.1. Relevant Legislation, Policy and Guidance

Guidance for assessing the potential impact on aviation considerations is provided in:

- Scottish Government 2002 – PAN 45: Renewable Energy Technologies and as superseded by online planning advice for 'Onshore Wind Turbines' (last updated October 2012);
- BWEA aviation guidance – www.bwea.com/aviation; and
- BERR 2002 (formerly DTI) – Wind Energy & Aviation Interests.

13.3. Impact Assessment

The vast majority of aviation impacts will be during the operational phase of the project. Due to the complexity in assessing aviation interests it is primarily left to the relevant statutory bodies to make their own views regarding the proposed development.

Locogen have completed a desk based assessment of the perceived effects of a wind turbine operation on specific aviation operations.

13.3.1. Civil Aviation

Figure 17 below illustrates that the site lies outwith the radar coverage area for both Edinburgh and Aberdeen airports and is well outwith the 15km safeguarding radius areas for both sites. Furthermore there is not considered to be a safeguarding impact on Dundee Airport, given that the turbine is located over 15km from the aerodrome reference point and that Dundee Airport has no site based radar operations.

It is concluded that objections will not be raised in relation to any of the above noted locations.

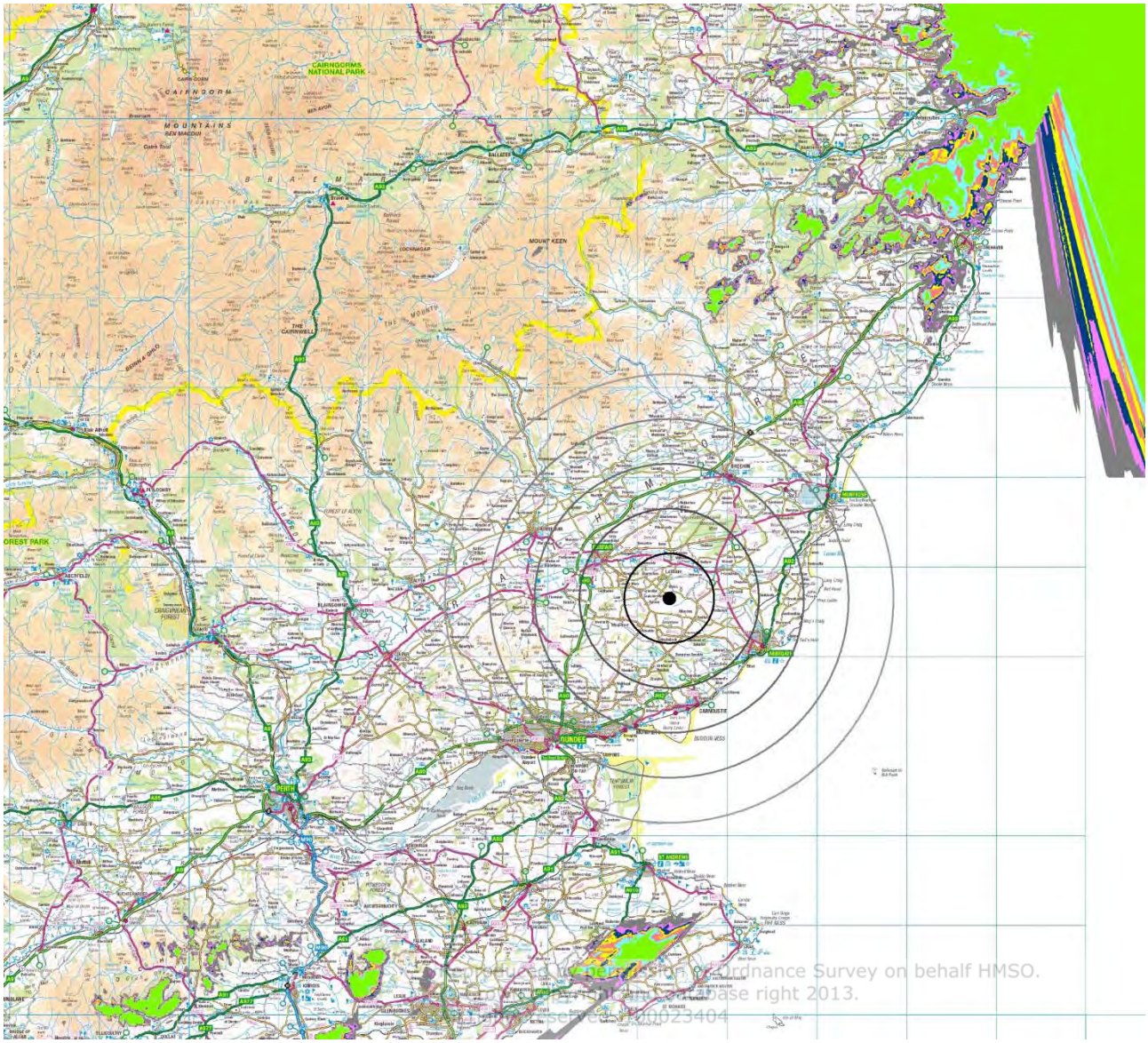

Figure 17: Edinburgh Airport (South) and Aberdeen Airport (North) radar visibility [Radii around turbine in 5km increments]

13.3.2. Military Aviation

The Ministry of Defence (MoD) can no longer resource the provision of pre-application consultation advice. As such, no consultation has been initiated with the MoD. The site lies within a low priority military low flying zone and therefore should not raise concerns in relations to low flying military aircraft.

Based on desk-based GIS modelling, Line of Sight assessment and Radar Diffraction Modelling it is also considered that the Hillhead of Ascurry site will not be visible to MoD radar at RAF Leuchars, which is located approximately 26km south south east of the proposed turbine location. It is therefore considered unlikely that the MoD will raise concerns over the radar visibility of the Hillhead of Ascurry wind turbine. The assessments outlined above can be provided to Angus Council and/or the MoD, if required.

13.3.3. NATS En-Route Ltd (NERL)

NATS En-Route Ltd (NERL) manages the UK's en-route air traffic outside of the individual air traffic control zones around airports. They therefore have a number of radar stations that provide radar coverage across the UK. As a first assessment tool this body provides radar visibility maps of the UK that allow wind developers to initially assess potential issues with regard to en-route navigational facilities. The zones where there would be radar visibility at 60m and 80m AGL are shown coloured red and green respectively in Figure 18 below. The proposed turbine is located outwith those areas having en-route radar visibility.

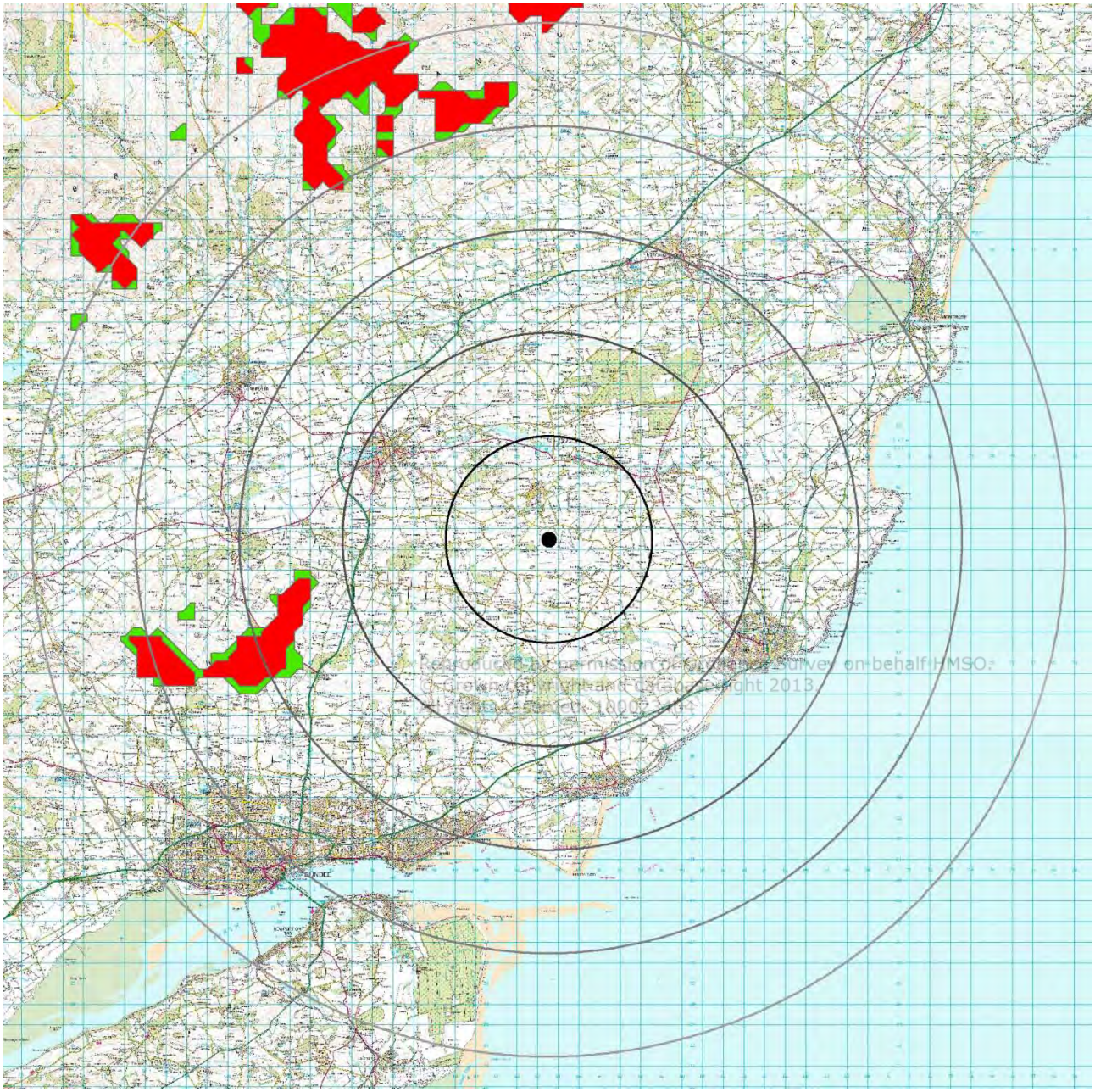

Figure 18: NERL radar visibility at 60m and 80m above ground level

13.3.4. Meteorological Radar Stations

There are no meteorological radar stations within 30km of the proposed turbine site.

13.4. Conclusions

The majority of aviation impacts will be assessed by statutory consultees once a planning application has been submitted. From an initial desk based assessment it is not expected that there will be an issue raised on the grounds of both civil and military aviation.

14. Public Safety

14.1. Baseline Assessment

Information is provided below on the national guidance relating to the operational safety of wind turbines. This is provided by PAN45 (2002) as superseded by the Scottish Government's online renewables planning advice for 'Onshore Wind Turbines'[18].

Equipment Safety: Companies supplying products and services to the wind energy industry operate to a series of international, European and British standards. The build-up of ice on turbine blades is unlikely to present problems on the majority of sites. When icing occurs the turbines' own vibration sensors are likely to detect the imbalance and inhibit the operation of the machines. Site operators also tend to have rigorous and computer aided maintenance regimes and control rooms can detect icing of blades. Danger to human or animal life from falling parts or ice is rare. Similarly, lightning protection measures are incorporated into wind turbines to ensure that lightning is conducted harmlessly past the sensitive parts of the nacelle and down into the earth.

Road Traffic Impacts: In siting wind turbines close to major roads, pre-application discussions are advisable with Transport Scotland's Trunk Roads Network Management (TRNM). This is particularly important for the movement of large components (abnormal load routing) during the construction period, periodic maintenance and for decommissioning. Although wind turbines erected in accordance with best engineering practice should be stable structures, it may be advisable to achieve a set back from roads and railways of at least the height of the turbine proposed, to assure safety. Driver distraction may, in some circumstances, be a consideration.

General Safety Standards: Companies supplying products and services to the wind energy industry operate to a series of international, European and British standards. A set of product standards for wind energy equipment has been developed by the International Electro-technical Commission - IEC 16400. There are a number of British Standards that correspond to it, for example, BS EN 61400-1: 1995 'Wind Turbine Generator Systems - Safety Requirements'.

Blade Loss: A possible but rare source of danger to human or animal life from a wind turbine would be the loss of a piece of the blade or, in most exceptional circumstances, of the whole blade. 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.

Lightning Strike: The possibility of attracting lightning strikes applies to all tall structures and wind turbines are no different. Appropriate lightning protection measures are incorporated in wind turbines to ensure that lightning is conducted harmlessly past the sensitive parts of the nacelle and down into the earth.

[18] http://www.scotland.gov.uk/Topics/Built-Environment/planning/National-Planning-Policy/themes/renewables/Onshore

14.2. Impact Assessment

General safety standards: The proposed EWT Directwind 54 turbine model meets the required international, European and British standards, including BS EN 61400-1: 1995.

Blade loss: As stated above, the turbine has been designed to meet the required safety standards and this includes suitable consideration of the risk of blade loss.

Ice throw: Modern turbine designs are able to accommodate blade heating systems for sites where there is a high likelihood of blade icing occurring. Direction will be sought from the manufacturer on the requirement for this technology and if blade heating is not utilised the turbine could be programmed to shut-down during periods of potential icing and not start up until climatic conditions where such that icing and ice throw were no longer considered to be an issue.

Lightning strike: As stated above, the turbine has been designed to meet the required safety standards and this includes appropriate lightning protection measures.

Proximity to roads, paths and railways: The nearest public road is the minor road to the east of the site, which provides access to the Hillhead farmstead. This road is approximately 450m away from the proposed turbine location at its nearest point. Given that this is ~6 times the height of the turbine, the turbine would sit well beyond the set-back distance recommended in the relevant guidance. Driver distraction is unlikely to be a concern given the distance to the turbines from public roads. To minimise distraction any signage on the turbine will be in line with Council guidelines.

Proximity to overhead transmission lines: An exclusion distance of 1.5 x tip height has been utilised to ensure safe operating distances between wind turbines and overhead power lines.

Proximity to pipelines: An exclusion distance of 1.5 x tip height from underground pipelines has been utilised to ensure safe operating distances between these and the proposed wind turbine.

Distance from buildings: The proposed siting means that the turbine is well in excess of fall-over distance with regard to off-site buildings.

14.3. Conclusions

On the basis of the above assessment, no issues in relation to public safety are anticipated.

The mitigation measures outlined within this Chapter would ensure safe operation of the turbines once installed and full turbine shutdown (if required) during operational periods when this is deemed necessary.

15. Summary & Mitigation

15.1. Residual Environmental Effects

The proposed development has the potential to have both positive and negative impacts on the receiving environment.

15.1.1. Potential Positive Effects

The potential positive effects on the environment include:

- Creation of an indigenous, local, secure, and sustainable energy resource;
- Direct economic and social benefits to the farming business;
- Direct and indirect economic and social benefits to the local community;
- Provision of a valuable new land use, which will not affect existing farming operations; and
- A direct neutral and indirect positive effect on climate.

15.1.2. Potential Negative Effects

The potential negative effects on the environment include:

- Visual impact of the proposed turbines on the surrounding landscape and heritage assets;
- Visual impact of the proposed turbines on surrounding residential dwellings; and
- Increase in local traffic during the construction stage.

15.2. Conclusions on Development and Impacts in Context

The following conclusions can be made from the completed environmental chapters:

- An assessment of landscape and visual impact concluded that the majority of receptors assessed would experience a low to moderate impact from the proposed turbine. Indeed, the extent of significant effects are very limited and given that the proposal includes a single turbine up to 77m in height within a landscape that has the capacity to absorb turbine developments of this nature, it is concluded that this proposal is acceptable in terms of the EIA regulations and local, regional and national policy. Some locally significant impacts have been noted but the single turbine nature of the project and generally low level of cumulative impact is considered to reduce the overall impact. It is therefore considered that the proposed development is acceptable in terms of landscape and visual impact;
- The turbine will provide the farmer with a crucial form of diversification and a sustainable long term income from the operation of the wind turbine. The overall impact on the local area and economy is considered to be positive through direct and indirect means;
- The proposed turbine is considered to be an acceptable distance from known archaeological sites and monuments;
- With the successful application of mitigating measures and best practice construction techniques, the wind turbine construction phase is not anticipated to have any significant, long term negative impacts on the habitats or locally occurring wildlife;

- Modelled noise and shadow flicker levels are predicted to comply with national and international guidelines and will not pose as nuisances to nearby dwellings;
- Concerns regarding telecommunications and civil aviation are not expected; and
- Construction traffic is a short term impact and its management will be coordinated with Angus Council.

In summary, based on the positive impacts of the development, and the low level of negative impacts which will be mitigated where required, it is considered Hillhead of Ascurry is a suitable location for a wind turbine development at the scale proposed.

15.3. Development Plan & Supplementary Planning Guidance Compliance

This document, together with the accompanying drawings and specifications, has been prepared to assist Angus Council in considering the proposed development of a single wind turbine development at Hillhead of Ascurry. It is considered that the proposed development is in accordance with planning policy at all levels in that there would be no demonstrable significant adverse impacts on the surrounding environment.

A summary of the relevant Development Plan and Local Plan policies is given in Table 36 below.

Policy	Policy Area	Comment
TAYPlan Strategic Development Plan Policy 6	Energy	The proposed development can be appropriately serviced in terms of access, grid connection and sustainable drainage. The proposed turbine have been sited so as to avoid any impacts on the oil and gas pipelines in the vicinity. After mitigation, there would be no significant adverse impacts, either individually or cumulatively, in relation to cultural heritage, nature conservation and protected species, residential amenity including noise and shadow flicker, tourism and recreation attractions, surface and ground water, and aviation and telecoms considerations. With regard to landscape and visual matters, taking into consideration the relevant Landscape Character Assessment, care has been taken to minimise potential impacts through sensitive siting and turbine selection.
Local Plan Policy S1	Development boundaries	This Supporting Environmental Document has demonstrated that the Hillhead of Ascurry development will be within a scale and nature appropriate to the location. This has been shown through numerous assessments such as the LVIA, noise, ecological and shadow flicker.
Local Plan Policy S5	Safeguard Areas	No element of the proposed development will be within consultation zones of local hazards.
Local Plan Policy S6	Development Principles	The Supporting Environmental Document demonstrates the potential impact on the relevant principles set out in Schedule 1 of the Local Plan.

Policy	Policy Area	Comment
Local Plan Policy ER4	Wider Natural Heritage and Biodiversity	The Ecology assessment has demonstrated that the proposed development should not impact upon any species or habitats protected under British or European law.
Local Plan Policy ER5	Conservation of Landscape Character	The Landscape and Visual Impact Assessment has demonstrated in detail the impact of the Hillhead of Ascurry turbine on the local and wider landscape. It is considered that the landscape will be capable of absorbing the wind turbine.
Local Plan Policy ER11	Noise Pollution	It has been demonstrated that the maximum expected noise output from the turbine will not have an adverse impact on local residents. The maximum noise level will be within the accepted noise limits detailed within national planning policy and planning guidance.
Local Plan Policy ER16	Development Affecting the Setting of a Listed Building	There would be no direct impact on known archaeological remains as a result of the development. An assessment of the proposed turbines on the setting of cultural heritage sites, including Scheduled Monuments and A Listed buildings, in the locality has been undertaken. The assessment concludes that, at worst, the effect of the development on the setting of identified cultural heritage assets is moderate and therefore not significant.
Local Plan Policy ER19	Archaeological Sites of Local Importance	
Local Plan Policy ER20	Historic Gardens and Designed Landscapes	As demonstrated within the Cultural Heritage and LVIA assessments, the Hillhead of Ascurry turbine will not damage the characteristics or integrity of these sites. Chapter 5 of this report quantifies anticipated impacts on a variety of landscape designations, including designed landscapes, within 25 km of the site. In this respect, the effect of the development on the setting of such sites is not predicted to be significant.

Policy	Policy Area	Comment
Local Plan Policy ER34	Renewable Energy Development	It is considered that this application should be supported by Angus Council as the proposal demonstrates the following: a) The siting of the wind turbine has been chosen in order to minimise the impact on the local amenity; b) There is not considered to be unacceptable effects on the landscape character and sensitive viewpoints; c) There will be no unacceptable detrimental effects on any national heritage, scientific or historic sites; d) There will be no unacceptable effects of transmission lines as any new cabling will be buried underground; and e) The disruption to the local road network will be for a small period and minimal road upgrades are expected. This will be achieved without compromising road safety or causing unacceptable change to the environment.
Local Plan Policy ER35	Wind Energy Development	It is considered that this application should be supported by Angus Council as the proposal demonstrates the following: a) The selected location demonstrates the optimum location for wind development for the applicant while having minimal impact on the surrounding environment; b) It has been shown that the wind turbine will have no interference with birds; c) It has been demonstrated that there will be no unacceptable detrimental effects on residential amenity, existing land use and road safety with regards to shadow flicker and noise; d) There will be no interference with authorised aircraft activity; e) There will be no interference with telecommunication links within the area; f) The cumulative impact of the development with other wind developments in the area will be of an acceptable level; and g) The site will be reinstated to its original condition after decommissioning of the turbine.

Table 36: Summary of Development Plan and SPG compliance

Appendix A – Landscape & Visual Assessment Methodology

Landscape and Visual Impact Assessment Methodology

Although this application is not subject to an Environmental Impact Assessment (EIA), the approach taken for the assessing the landscape and visual effects follows the methods undertaken for a typical EIA wind energy development. This is based on the approach as set out in the *Guidelines for Landscape and Visual Impact Assessment* (Landscape Institute and Institute of Environmental Assessment, 2013). Other relevant best practice and policy guidance includes:

- Visual Assessment of Wind Farms Best Practice, University of Newcastle Scottish Natural Heritage Commissioned Report, (2002);
- Guidelines on the Environmental Impacts of Wind Farms and Small Scale Hydroelectric Schemes, Scottish Natural Heritage (2001);
- Visual Analysis of Wind Farms Good Practice Guidance, Scottish Natural Heritage (Draft 2005);
- Visual Representation of Windfarms: Good Practice Guidance, Scottish Natural Heritage (2007);
- Siting and Designing Windfarms in the landscape, Scottish Natural Heritage (2009); and
- Guidance, Cumulative Effect of Windfarms, Scottish Natural Heritage, (2012).

Evaluation of the Existing Environment – the Baseline

The baseline review for the landscape and visual resource has three elements:

1. Description – a systematic review and digest of existing information and policy relating to the existing landscape and visual resource;
2. Classification – analysis of the data to subdivide the landscape resource into discrete areas of similar and identifiable character and identify the visual receptors; and
3. Evaluation – Use of professional judgement to apply a sensitivity value to a landscape or visual resource with reference to specified criteria.

The baseline review is undertaken through desk-based data review followed by a site survey to verify the findings, and then analysis of the data. This process is described in detail in the following paragraphs.

Desk Based Data Review

Existing mapping, legislation, policy documents and other written, graphic and digital data relating to the proposal and broader study area was reviewed. This included the following documents:

- Scottish Planning Policy (2010);
- Typical Planning Considerations in Determining Planning Applications for Onshore Wind Turbines (web based renewables advice), Scottish Executive (October 2012);
- TAYplan (2012);
- Angus Local Plan (2009);
- Implementation Guide for Renewable Energy Proposals (2012);
- Angus Windfarms - Landscape Capacity and Cumulative Impacts Study (2008);
- The Tayside Landscape Assessment (1999);
- The Fife Landscape Assessment (1999);
- The Inventory of Historic Gardens and Designed Landscapes in Scotland;
- Ordnance Survey maps; and

- Digital sources of mapping and aerial photography.

The desk study also establishes the main users of the area, key viewpoints and key features, thus defining the visual baseline which requires to be verified on site. The potential visual receptors are identified and classified according to their associated use (settlements, footpaths, roads etc.). The aim of the baseline review of visual resources is to ensure that an appropriate range of viewpoints is included in the visual assessment. The potential extent of visibility of the proposed development as identified in the preliminary Zone of Theoretical Visibility (ZTV) provides the basis upon which the potential visual receptors are initially identified.

The desk study informs subsequent site work, which allows the confirmation of the Landscape Character Types (LCT) and Landscape Character Areas where applicable.

Site Survey

Field survey work is carried out to verify and, if required, refine the landscape character types identified within the study area, and to gain a full appreciation of the relationship between the proposed development, and the landscape.

The baseline visual resource is verified during the survey work and at this time, the validity of the list of representative viewpoints used in the LVIA. Since the ZTV is based on a 1:50,000 digital terrain model, it does not capture local landform. There are times when a viewpoint selected from analysis of the ZTV does not actually have any views to the proposed development. In some instances, this can be remedied by slight adjustments of the grid references, although the location must remain relevant to the particular receptor(s) for which the viewpoint was selected. It is also important to ensure that the viewpoints remain a representative selection of views. Wireframes supported the fieldwork, and observations are recorded with photographs.

Data Analysis

Analysis and reporting of the baseline resource took place after the completion of the desk and field surveys. The baseline landscape and visual review provides a description, classification, and evaluation of the landscape and visual resource of the study area.

The baseline review provides a robust description of the landscape and visual resource from which to assess the landscape and visual effects of the proposed development and to advise, in landscape and visual terms, on the development's acceptability in principle and upon its siting, layout and design. This involves identification of all the landscape and visual receptors and analysis of the sensitivity of each of these receptors to the proposed development.

Identification of Landscape and Visual Effects

The impact assessment aims to identify all the potential landscape, visual and cumulative effects of the development taking account of any proposed mitigation measures. This is carried out by:

- Assessing the magnitude of change brought about by the proposed development on each of the receptors identified in the baseline review;
- The effect is then predicted by combining the sensitivity of the receptor (as identified in the baseline review) with the magnitude of change; and
- Lastly, the significance of the predicted effect is assessed in a logical and well-reasoned fashion.

The assessment aims to describe the changes in the character and the landscape resources that are expected to result from the proposed development. It covers both landscape effects

(changes in the fabric, character and key defining characteristics of the landscape); and the visual effects (changes in available views of the landscape and the significance of those changes on people).

The table below identifies potential landscape and visual effects. Potential effects are those that could result from the construction and operation of a wind turbine, according to the project, site and receptor characteristics and their interactions. The inclusion of a potential effect in the table below (for example) does not imply that this will occur, or be significant. The assessment is based upon an assessment of the potential effects, in order to identify predicted effects.

Activity	**Element**	**Potential Effects**	**Potential Sensitive Receptors**
Construction	Construction plant, temporary construction compound, vehicle movements, new access tracks.	Temporary impacts on landscape fabric Temporary impacts on visual amenity	Landscapes character types Designated landscapes Gardens and designed landscapes Visual receptors
Operation	Presence of tracks, turbines, permanent site compound and substation	Long term but reversible impacts on landscape fabric Long term but reversible impacts on visual amenity Cumulative impacts with other wind farms	Landscapes character types Designated landscapes Historic gardens and designed landscapes Visual receptors including: residents, visitors, tourists, road users, walkers, cyclists
Decommissioning	Construction plant, temporary compound, vehicle movements	Temporary impacts on landscape fabric Temporary impacts on visual amenity	Landscapes character types Designated landscapes Historic gardens and designed landscapes Visual receptors including: residents, visitors, tourists, road users, walkers, cyclists

Potential Landscape & Visual Impacts

Extent of the study area and viewpoint selection

Maps of Zone of theoretical visibility (ZTVs) were prepared using digital terrain models. These represent the 'worst case' area of theoretical visibility where the proposed development may theoretically be seen. The ZTVs are based entirely on topographic factors and do not account for any screening effects provided by vegetation, buildings or minor variations in landform or the orientation of view. Therefore, the extent of any ZTVs tends to be greater than actual visibility and does not take account of climatic factors such as light conditions.

Drawing HOA009 illustrates the ZTV for the proposed development and is then used as a basis for the further assessment and evaluation of the magnitude of visual impacts. This approach is described below.

Through the initial stages of the desk study, fourteen viewpoints were chosen to represent views experienced from a variety of receptors, within different landscape character types and

at a variety distances from the proposed development where the view may be apparent. The viewpoints agreed for the scheme are listed in the Supporting Environmental Document.

A study area centred on a 25 km radius from the proposed development has been used for the study of landscape, visual and cumulative effects. Given the relative scale of the development and the character of the landscape, significant effects are very unlikely to be experienced at distances over 15 km.

Landscape Sensitivity and Magnitude of Change

The sensitivity of the landscape resource is variable according to the existing landscape, its relationship to the proposed development, the nature of the development being assessed and the type of change being considered. The determination of the landscape's sensitivity to changes associated with the proposal is defined as High, Medium, Low or Negligible. This is based on the professional interpretation of the key landscape characteristics, the scale of the landscape and the nature of views, and the perceived landscape value as reflected by landscape designations (see table below).

Criteria	High	Medium	Low
Landscape designations and landscape value	Landscape designated for its national landscape value High landscape value, with very strong sense of place	Landscape designated for regional or local landscape value Medium landscape value	No designations present Low landscape value (i.e. industrial landscapes), with elements that detract from sense of place
Scale of Landscape	Small scale landscape	Medium scale landscape	Large scale landscape
Views	Enclosed, medium and short distance views	Open, medium distance views	Panoramic, open and long distance views
Cultural heritage interests that contribute to landscape character	Contains features or sites of national importance	Contains sites of regional importance	Few or no features of interest

Sensitivity of Landscape Receptors

As every proposed development and its interaction with the landscape are unique, there will be situations where predefined criteria will not accurately reflect the potential residual effects. In such cases, professional judgement takes precedence and is explained in the text. The criteria used for understanding the magnitude of landscape change are summarised below.

Level of Magnitude	Definition of Magnitude
High	Total loss or major alteration to key elements, features or characteristics of the baseline landscape so that the post development character and composition of the baseline landscape resource will be fundamentally changed.
Medium	Partial loss or alteration to one or more key elements, features or characteristics of the baseline landscape so that the post development character and composition of the baseline landscape resource will be partially, but noticeably changed.

Low	Minor loss of or to one or more key elements, features or characteristics of the baseline landscape so that the post development character and composition of the baseline landscape resource will be noticeably changed but the underlying character of the baseline landscape will be similar to the pre-development character.
Negligible	Very minor loss or alteration to one or more key elements, features or characteristics of the baseline landscape. Change to the landscape character will be barely distinguishable. No discernible effect upon the view

Definition of Landscape Magnitude of Change

Visual Receptor Sensitivity and Magnitude of Change

The sensitivity of visual receptors depends upon:

- The location of the viewpoint;
- The context of the view;
- The activity of the receptor, such as relaxing at home, taking part in leisure, recreational and sporting activities, travelling or working;
- Whether receptors are likely to be stationary or moving and how long they will be exposed to the change at any one time;
- The extent of the area or route from which the changes would be visible; and
- The frequency of the view (whether receptors will be exposed to the change daily, frequently, occasionally or rarely) and the duration of the view.

Visual receptor sensitivity is defined as High, Medium or Low and these definitions are described in the table below.

High	**Medium**	**Low**
Residents with views from the dwelling or curtilage		
Users of recognised national trails, whose attention or interest is likely to be focused on the landscape or on particular views	Other recreational routes, such as local footpath networks, used for dog walking, for example	People engaged in active outdoor sports or recreation and less likely to focus on the view
Road and rail users where appreciation of the landscape is an important part of the experience, such as scenic routes	Road and rail users likely to be travelling for other purposes than just the view, such as commuter routes	
Visitors to heritage assets or to other attractions, such as recognized beauty spots, where views of the surroundings are an important part of the experience	People at their place of work, where views are an important part of the setting and contribute to the quality of working life	People at their place of work whose attention is likely to be focused on their work or activity, not on their surroundings

Definition of Receptor Visual Sensitivity

In practice, a location may have different levels of sensitivity, according to the different receptors at that location. The specific combinations of factors that have influenced the judgement of sensitivity are described in the viewpoint baseline text.

The magnitude of visual change arising from the Development is described as High, Medium, Low or Negligible based on the overall extent of visibility (see the table below). For individual viewpoints it will depend upon the combination of a range of factors:

- The distance of the viewpoint from the development;
- The duration of effect;
- Extent of the development visible from the viewpoint (number and parts of turbine visible);
- The angle of view in relation to main receptor activity;
- The proportion of the field of view occupied by the development;
- The background to the development; and
- The extent of other built development visible, particularly vertical, elements.

Level of Magnitude	Description of change	Definition of Magnitude
High	Dominant	Highly noticeable change, affecting most key characteristics and dominating the experience of the landscape. The introduction of incongruous development A high proportion of the view is affected.
Medium	Conspicuous	Noticeable, partial change to a proportion of the landscape, affecting some key characteristics and the experience of the landscape. The introduction of some uncharacteristic elements. Some of the view is affected.
Low	Apparent	Minor change, affecting some characteristics and the experience of the landscape to an extent. The introduction of elements that are not uncharacteristic. Little of the view is affected.
Negligible	Inconspicuous	Little perceptible change. No discernible effect upon the view.

Definition of Visual Magnitude of Change

Other factors may also influence the visual effect. These relate to both human perception and to the physical environment itself. Factors which tend to reduce the apparent magnitude include the following:

- Sky-lining of front-lit turbines (where turbines are seen against the sky and the sun is behind the viewer, thus turbines reflect light and blend more easily into the brightness of the sky);
- Landform backdrop to back-lit turbines (where turbines are back-clothed by landform and the viewer sees them silhouetted with the light behind them. In this scenario the turbines are more likely to blend into the landscape);
- An absence of visual clues;
- Turbines do not form the focal point of the view;
- A complex and varied scene; and
- High relative elevation of view.

Factors which tend to increase the apparent magnitude include the following:

- Back-grounding of turbines (where turbines are seen against a backcloth of land);
- Visual clues;
- Turbines form the focal point of the view;

- A simple scene; and
- Low relative elevation of view.

Significance of Effects on Landscape and Visual Receptors

The significance of any identified landscape or visual effect has been assessed as Major, Moderate, Minor or Negligible effect. These categories have been determined by consideration of viewpoint or landscape sensitivity and predicted magnitude of change as described above, with the table below used as a guide to correlating sensitivity and magnitude to determine significance of effects. It should be noted that this is a guide only, and there will be times when the combination of sensitivity and magnitude yield a slightly different result from that predicted by the table. Where this discrepancy leads to prediction of significant effect, it is explained in the text.

	Magnitude of Change			
Sensitivity	**High**	**Medium**	**Low**	**Negligible**
High	Major	Major/moderate	Moderate	Moderate/minor
Medium	Major /moderate	Moderate	Moderate/minor	Minor
Low	Moderate	Moderate/minor	Minor	Minor/none
Negligible	Moderate/minor	Minor	Minor/none	None

Assessment of significance of landscape and visual effects

Where overall effects are predicted to be Moderate-Major or greater (dark grey), these are considered to be equivalent to significant effects, as referred to in the *Town and Country Planning (Environmental Impact Assessment) (Scotland) Regulations* 1999. Overall effects of major/moderate (mid grey) may be significant if experienced over an extensive proportion of a receptor, area or route. Changes of moderate or less are not likely to result in significant effects.

Sequential visual effects

Sequential visual effects typically occur when moving along a linear route, as the observer moves from one point to another and gains views of other wind developments or a different view of the same development. They were driven in both directions, noting where intervening vegetation, buildings or embankments would limit views and recording the elapsed time and distance from the turbines. This was then compared with the ZTV and conclusions drawn about the likely visibility of the turbines. Assessment of the significance of the sequential effect takes into account the direction of travel, the proportion of the journey affected and the relative distance from the turbines.

Cumulative Methodology

Although a Guide to Assessing the Cumulative Effects of Wind Energy Development has been produced (DTI Final Consultation Draft December 1999), there are as yet no formalised guidelines in Great Britain defining an approved methodology for the assessment of cumulative effects on landscape and visual amenity that have been approved and endorsed by the Landscape Institute. The approach used is therefore based on draft guidance notes on cumulative landscape and visual impact assessment of wind farm developments produced by SNH (2005) and the Guidelines for Landscape and Visual Impact Assessment, LI-IEMA 2002.

Scope of Cumulative Assessment

The Cumulative Landscape and Visual Impact Assessment (CLVIA) takes account of all sites which have potentially significant overlapping study areas, and that are in 'the public domain' i.e.:

- Any constructed wind farm;
- Any consented wind farm proposal; and
- Any wind farm proposal that has been lodged as a planning application to the relevant local planning authority or the Scottish Executive.

For the assessment of cumulative effects, the relevant wind farms are listed in Table 5.5.

Types of Cumulative Effect

Cumulative effects are those that occur, or may occur, as a result of more than one wind farm project being constructed. Potential cumulative landscape and visual effects arise from the combined effects of additional wind farm developments. Combined effects relate to the following:

- Extending visibility of wind turbines over parts of the study area from where there are currently existing wind farms visible, which give rise to extended combined visibility of wind turbines at particular locations in the landscape, which may be simultaneous or successive in nature;
- Extending visibility of wind turbines over parts of the study area from where there are currently no wind turbines visible, which may give rise to an extended sequential visibility of wind turbines across the landscape; and
- Both simultaneous and sequential visibility of wind turbines.

In relation to simultaneous visibility, cumulative effects occur where more than one wind farm is visible in the same direction from a particular place. Where wind farms are visible in more than one direction from that place, this is defined as successive visibility. In relation to the sequential visibility, cumulative effects occur where the observer has to move to another viewpoint to see the second wind farm, so they appear in sequence, depending on speed of travel and distance between the viewpoints.

The assessment of potential cumulative landscape and visual effects is carried out in the same generic way as that of non-cumulative effects. Professional judgements are made in relation to the magnitude of change caused by the wind farm to the existing landscape and visual baseline.

Magnitude of Cumulative Change

Cumulative landscape and visual effects may result from additional changes to the baseline landscape or visual amenity caused by the proposed development in conjunction with other wind farm developments. The emphasis of the assessment is on the changes the proposal would bring to the existing landscape, which incorporates wind farm developments as part of its baseline landscape character and visual amenity.

The assessment therefore identifies the cumulative magnitude of change relative to existing visual impacts of wind farms rather than the combined impact of all the wind farms visible. The magnitude of cumulative change arising from the proposed development is assessed as high, medium, low or negligible, based on interpretation of the following largely quantifiable parameters, to take account of cumulative change:

- The number of existing and proposed developments and wind turbines visible;

- The distance to existing and proposed developments;
- The direction and distribution of existing and proposed developments; and
- The landscape setting, context and degree of visual coalescence of existing and developments.

The principle of magnitude of cumulative change makes it possible for the development to have a major effect on a particular receptor while having only a minor cumulative effect. For example, if the magnitude of change of Wind Farm 1 on Receptor 1 is high (for example, if it is 1 km from the receptor) the effect of Wind Farm 1 on Receptor 1 is likely to be major. In terms of a cumulative effect on this receptor, Wind Farm 2 may be visible, but if it is located, for example, 25km from the receptor, the magnitude of cumulative change is likely to be low (Wind Farm 2 will be of limited visibility at 25km) and the cumulative effect is therefore minor.

A significant cumulative effect is likely to only occur if both Wind Farm 1 and Wind Farm 2 are both fully visible, at close distances from the receptor, possibly in the same direction of view and forming a large developed proportion of the skyline. On the basis of professional interpretation of the above parameters, the magnitude of cumulative change arising at both landscape and visual receptors from each of the existing wind farms and the proposed development, both individually and in combination with each other, has been evaluated for the proposed development.

Significance of Cumulative Effects

SNH guidance on cumulative assessment describes the need for understanding whether the Development crosses the threshold of acceptability for the total number of wind farms in an area. As no existing methodology exists for identifying when a landscape has reached its capacity in terms of wind farms, it is necessary to revert back to SNH and Local Authority Guidance which seeks to identify the landscape objectives and policies for the area.

The level of any identified cumulative landscape or visual effect has been assessed as major, major/moderate, moderate, moderate/minor, minor, minor/none or none, in relation to the sensitivity of the receptor and the predicted magnitude of change as outlined above. As in the case of non-cumulative effects, the matrix shown above is used to bring together receptor sensitivity and magnitude of change.

Appendix B – Ecology & Ornithology Report

Ascurry Single Turbine
Extended Phase 1 Habitat Survey

October 2013

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Summary

- A phase 1 habitat survey and protected species survey was undertaken at Ascurry to inform plans to install a single wind turbine.

- The survey area does not support any sites designated for nature conservation value at a local or national level. Several Sites of Special Scientific Interest (SSSI's) were recorded within 10km of the site however these are not connected by structure or function to the site.

- The survey included a search for suitable habitat for and evidence of protected species (i.e. otters, water voles, badgers, red squirrels, bats and birds).

- Although suitable habitat for a range of protected species was identified within the site, no direct field evidence was recorded.

- No European Protected Species licences are likely to be required.

- General mitigation measures are provided.

Ascurry Single Turbine
Phase 1 Habitat Survey

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1. INTRODUCTION

1.1 Remit

EnviroCentre was commissioned by Loco$_2$gen to undertake an Extended Phase 1 Habitat Survey at a site to the south east of Letham in Angus. The survey was requested to inform a planning application to erect a single wind turbine.

The survey aimed to identify all broad habitat types within the site boundary and an appropriate buffer zone, whilst identifying those habitats, which may support populations of protected species (e.g. bats and badgers) and may consequently require further investigation. Consideration is also given to potential ornithological issues associated with the proposed development.

This report sets out the methods by which the survey was undertaken, an account of baseline results, interpretation of the results and a consideration of mitigation, compensation and any requirement for additional, species specific survey work.

1.2 Site Description

The 'site' refers to the proposed turbine location plus a buffer zone of a 500m radius. The site is located at National Grid Reference NO 353539, 746476 approximately 2.5 km to the south east of Letham in Angus.

The site is dominated by arable fields separated by a mixture of post and wire fencing, walls, tall ruderal vegetation and tree lines.

The site is surrounded by further arable and pasture land.

A site location plan is located in Appendix A of this report and photographs are provided in Appendix B.

1.3 Proposed Development

The proposed development will see the erection of a single EWT 500kW turbine at the site. The turbine will be capable of generating 500kW of energy and will have a hub height of 50m and a rotor diameter of 54m.

1.4 Protected Species/ Legislation

European and National legislation along with Planning Policy and guidance relevant to the site is listed below. Cognisance has been taken of this legislation in the preparation of this report:

- The Wildlife and Countryside Act 1981 (as amended);
- The Conservation (Natural Habitats, &c.) Regulations 1994 (as amended);
- Protection of Badgers Act 1992 (as amended); and
- Local and UK Biodiversity Action Plans.

2. METHODS

All survey work was undertaken and verified by experienced and competent ecologists. The survey followed standard methods endorsed by Scottish Natural Heritage (SNH) and the Chartered Institute of Ecology and Environmental Management (CIEEM)[1]. This section provides summary details of the methods adopted.

2.1 Desk Study

Prior to the Phase 1 survey a desk study was undertaken. This included a search of the NBN Gateway[2] and Scottish Natural Heritage's SiteLink website[3], and the Woodland Trust[4] to identify records of the following within a 10km radius of the site:

- Statutory designated sites (Special Protection Areas (SPAs), Special Areas of Conservation (SACs), and Sites of Special Scientific Interest (SSSI);
- Non-statutory designated sites (e.g. Ancient Woodland Inventory, Local Wildlife Sites and Local Nature Reserves);
- Legally protected or notable species/populations (e.g. the presence of bat roosts or badgers);
- UK Biodiversity Action Plan[5] and Tayside Local Biodiversity Action Plan[6] priority habitats and species.

2.2 Phase 1 Habitat Survey

The baseline ecological data for the site was obtained by undertaking an Extended Phase 1 Habitat Survey following guidelines set out by the Joint Nature Conservation Committee (JNCC)[7]. This is a nationally adopted method for baseline ecological survey. Scientific plant names are used in the text and nomenclature follows that of the standard British flora[8].

The site was surveyed on 30th August 2013 when conditions were bright and clear with an air temperature of 19°C.

The survey aimed to identify and map broad habitat types in the proposed development site and its environs and to identify those habitats suitable for, or direct signs of, sensitive or protected faunal species.

A habitat map has been provided in Appendix C of this report while target notes are presented in Appendix D.

2.3 Protected Species Survey

Based on the outcomes of the desk study (see section 3.1) and the habitats found within the site, searches for direct evidence and suitable habitat for the following species were made:

- Otter *(Lutra lutra)*;
- Water vole *(Arvicola terrestris);*
- Badger (*Meles meles*);

[1] IEEM – Guidance on Survey Methodology, Winchester (2006)
[2] NBN Gateway website, available at: www.searchnbn.net
[3] Scottish Natural Heritage Site Link website available at: www.snhi.gov.uk
[4] Woodland Trust www.woodlandtrust.org.uk
[5] UK Biodiversity Action Plan from http://www.ukbap.org.uk
[6] Tayside Biodiversity Action Plan: Available at http://www.angus.gov.uk/biodiversity/actionplan.htm
[7] JNCC – Handbook for Phase 1 Habitat Survey (1991)
[8] Stace, C.A. 1995 New Flora of the British Isles. Cambridge University Press.

- Red squirrel (*Sciurus vulgaris*)
- Bats (various species); and
- Birds (various species).

2.3.1 Otter Survey

The otter survey extended along both banks of any streams within the site, where access allowed. The survey followed best practice guidelines[9] and a search was made for suitable habitat along with field signs, including:

- Spraints (otter faeces/droppings used as territorial signposts. Often located in prominent positions and can be placed on deliberate piles of soil or sand);
- Footprints;
- Feeding remains (can often be a useful indication of otter presence);
- Paths/Slides (otter can often leave a distinctive path from and into the watercourse);
- Holts: holts (underground shelter) are generally found:
    - Within trees roots at the edge of the bank of a river;
    - Within hollowed out trees;
    - In naturally formed holes in the river banks that can be easily extended;
    - Or preferably in ready-made holes created by other large mammals or humans such as badgers sett, rabbit burrows or outlet pipes; and
- Couches/lay-ups (couches or lay-ups are places for lying up above ground are usually located near a watercourse, between rocks or boulders, under dense vegetation).

Where evidence of otter activity was identified, a grid reference was taken at the location and photographs were taken for further interpretation.

2.3.2 Water Vole Survey

The otter survey extended along both banks of any streams on site, where access allowed, and followed standard guidelines[10]. Water voles tend to confine their activity to within 3 m of the bank edge along a watercourse where field signs are to be found. Field evidence includes:

- Faeces: 8-12 mm long, 4-5 mm wide; cylindrical and blunt ended pellets; colour variable with food type. Most droppings left in latrines near the nest, at range boundaries and at water entry points;
- Latrine sites: Concentrations of faeces, often with fresh droppings on top of old ones;
- Runways: Often 5-9 cm broad and multi-branched; usually within 2 m of water's edge and often forming tunnels through vegetation; leading to water's edge or burrows;
- Burrows: 4-8 cm diameter, wider than high; eroded entrances then contract down to typical size; entrances located at water's edge; however some entrances be up to 3m from the water; no spoil heaps;
- Nests: size and shape of a rugby ball, often in base of rushes, sedges or reeds;
- Feeding stations: located along runways, or at platforms along water's edge; usually a pile of cut/chewed vegetation in sections approximately 10 cm long; vegetation ends show marks of two large incisors. Piles of chopped grass, sedge or rush stems, rush pith and leaves;
- Lawns: Short, grazed vegetation around land entrances, often used during nursing periods;

[9] Chanin, P (2003). Natural Life Series, Monitoring the European Otter. Natural England.
[10] Strachan, R. (1998). Water Vole Conservation Handbook. Wildlife Conservation Research Unit, Oxford.

- Footprints: Difficult to tell from rat; adult hind foot 26-34 mm (heel to claw); stride 120mm (smaller than rat); occur at water's edge and lead into vegetation; and
- Sound: Characteristic 'plop' when a vole enters the water.

Emphasis was placed on locating latrine sites. Latrine sites are the most useful sign for recording purposes. They indicate whether there is definite presence of water voles at a site and are used for determining the approximate number of animals within the colony.

Given the aggressive predation on water vole by American mink (*Mustela vison*), all signs of this species were also searched for. Field signs included spraints, footprints and prey remains.

2.3.3 Badger

2.3.3.1 Habitat Suitability

The survey area was searched in its entirety to identify any potential habitat suitable for foraging and commuting badgers.

Badgers require suitable ground conditions for sett creation (e.g. soil that is free draining and can easily be excavated). Continuous well connected linear vegetation, such as tree lines and hedgerows, provide good foraging, sheltering and commuting habitats for badgers and native berry producing trees and shrub species offer a seasonal food resource for badgers.

2.3.3.2 Sett Survey

A badger sett is any structure or place which displays signs indicating current use by badger/located within an active badger territory. Setts comprise of a series of underground tunnels and chambers which form the home of a badger social group (clan). Although normally recorded in sloped, sandy soil in woodland habitats, it should be noted that badgers will excavate setts in a wide range of environs including urban settings.

Setts can be located anywhere within the territory of the clan and more than one sett can often be in use. Within one territory badgers may maintain a main sett with several annexe or satellite setts. Setts are identified by a number of characteristic features. These features include:

- A network of broad, concave entrances;
- Well-worn paths between entrances and foraging areas;
- Piles of excavated soil beside entrances (spoil heaps); and
- Piles of bedding materials beside entrances.

Diagnostic footprints and hair found around a sett can often confirm the presence of badgers and provide evidence of recent use. Fresh soil on spoil heaps can indicate recent use.

2.3.3.3 Field Signs

Badger field signs not only provide evidence of the species, but also give an indication of badger movements and how they utilise their territory. Badger field signs are described in Neal & Cheeseman[11] , Bang & Dahlstrøm[12] , and in SNH (2001)[13] and include:

[11] Neal, E. & Cheeseman, C. (1996). Badgers. Poyser Natural History, London.
[12] Bang P. and Dahlstrom P. 1980. Collins guide to animal tracks and signs. London, Collins.

- Badger guard hair;
- Footprints;
- Snuffling (badgers use their snout to turn over vegetation or soft soil to forage for bulbs and invertebrates);
- Scratching posts (marks on tree trunks/ fallen trees where badgers have left claw marks);
- Breach points (gaps in fences or crossing points over roads);
- Dung pit (single faeces deposit placed in a small excavation); and
- Latrines (collection of faecal deposits often used by badger clans to mark home range boundaries).

2.3.4 Red Squirrel

The walkover survey followed best practice guidance[14] which involves the initial identification of suitable habitat (primarily coniferous woodland) within the survey area. In addition, the survey focused on searching for two distinct signs of squirrel activity. Note that neither of these methods accurately distinguishes between red or grey squirrels.

The signs of squirrel activity searched for are dreys and the remains of pine cones which have been stripped of their edible parts. The following methods are adopted:

- Drey count – dreys are the nests made by both species of squirrels in trees. Dreys are easily distinguishable from bird nests as they are normally 50 cm in diameter and 30 cm deep. They are normally located close to the main stem of the tree at a height of 3 m or more.
- Feeding transects – Where cone producing trees (conifers) are evident, a 50m x 1m transect is laid out through the woodland and evidence of squirrel feeding is searched for. Although the two species of squirrel cannot be distinguished from feeding remains, the manner in which squirrels break open seeds and nuts, which are then left on the forest floor, is diagnostic from other groups of animals.

2.3.5 Bat Roost Potential Survey (BRP)

The BRP is designed to identify those structures and features present within a site which may provide suitable habitat for roosting bats and may therefore require further survey work. Bats utilise a variety of roosts throughout the year, depending on their seasonal needs (e.g. breeding or hibernating etc.) and on the prevalent climatic conditions.

The BRP survey was conducted in accordance with the assessment criteria set out by the Bat Conservation Trust[15] and comprised ground based visual inspections of trees and an internal and external investigation of any buildings on site where access allowed.

In general, it is accepted that mature, broad-leaved trees are preferred by bats, particularly Oak (*Quercus* spp.) and Beech (*Fagus sylvatica*). It is also known that for trees to be used by bats, they must be part of a wider habitat network that allows protected foraging, commuting and dispersal. The criteria used to assess the suitability of buildings and trees for bat roosts can be found in Table 1.

[13] SNH (2001). Scotland's Wildlife: Badgers and Development (http://www.snh.org.uk/publications/online/wildlife/badgersanddevelopment/default.asp).
[14] Gurnell J, *et al* (2001). Forestry Commission Practice Note 11. Forestry Commission, Edinburgh.
[15] Bat Conservation Trust (2007). Bat Surveys – Good Practice Guidelines. Bat Conservation Trust, London.

Table 1: Bat Roosting Features and Field Signs

Features of buildings used as bat roosts	Features of trees used as roosts	Signs indicating possible use by bats
Gaps/cracks in wood barge boards, soffits and fascia boards	Cavities/ Loose bark	Tiny scratches around entry point
Gaps in end tiles, ridge tiles and eaves	Woodpecker holes	Staining around entry point
Gaps in lead flashing and roofing felt	Cracks/splits in major limbs	Bat droppings in/around/below entrance
Cavities in masonry	Behind thick ivy growth	Audible squeaking at dusk or during warm weather
Broken or hanging tiles	Within dense epicormic growth	Flies around entry point
Ventilation ducts, damaged drainage, overflow pipes	Existing bird and bat boxes	Smoothing of surfaces around cavity

Trees are more likely to be used for roosting by bats if they are part of a wider habitat network that allows protected foraging, commuting and dispersal.

According to their roosting suitability, trees are categorised as follows:

- Known roost
- Category 1*: Trees with multiple, highly suitable features capable of supporting larger roosts;
- Category 1: Trees with definite bat potential, supporting fewer features than category 1* trees or with potential for use by single bats;
- Category 2: Trees with no obvious potential, although the tree is of a size and age that elevated surveys may result in cracks or crevices being found; or the tree supports some features which may have limited potential to support bats; and
- Category 3: Trees with no potential to support bats.

2.3.6 Birds

A desk study was undertaken to identify the potential sensitivity of avian species to the proposed wind turbine development.

The desk study was supported by a search for suitable nesting features during the Phase 1 Habitat Survey.

2.4 Constraints

The protected species surveyed for are transient in nature and this survey provides a snapshot of the activity on site.

3. SURVEY RESULTS

3.1 Desk Study

The results of the desk study are provided in the table below.

Table 2: Desk Study Results

Source	**Information Provided**			
SiteLink	**Site name**	**Designation**[16]	**Distance and orientation**	**Features**
	Rescobie and Balgavies Lochs	SSSI	4.5km N	Vascular plant assemblage Transition open fen Basin fen
	Dilty Moss	SSSI	5.5km SE	Raised bog
Local Plan	No non-statutory designations are applicable to the site.			
Sketchmap	**Woodland name**		**Distance and orientation**	**Category (Antiquity Woodland Categories**[17]**)**
	Ascurry Wood		0.23km SE	Long-established (of Plantation origin)
	Ascurry Wood/ Cotton of Gask Wood		0.72km SW	Long-established (of Plantation origin)
	No name		1km N	Long-established (of Plantation origin)
	Idves Strip		1.5km NW	Long-established (of Plantation origin)
NBN Gateway	**Species occurring within 5km of the site**		**Distance and orientation**	**Source/date**
	Brown Hare (*Lepus europaeus*)		Two records 3km N and E	People's Trust for Endangered Species (29/05/2012) Biological Records Centre (20/05/2008)
	Otter (*Lutra lutra*)		Five records, closest 1.5km NW	JNCC (02/12/2004)
	Pine Marten (*Martes martes*)		One record 4.5km W	Biological Records Centre (20/05/2008)
	Eurasian Badger (*Meles meles*)		Three records, closest 3.5km NE	Biological Records Centre (20/05/2008)

[16] Site of Special Scientific Interest (SSSI), Special Area of Conservation (SAC), Special Protection Area (SPA), Ramsar wetland designation (RAMSAR).
[17] Definition of antiquity categories, available from: http://www.snh.org.uk/publications/on-line/advisorynotes/95/95.html

	Daubentons bat (*Myotis daubentonii*)	Two records closest 1.5km N	BCT (29/05/2012)
	Common pipistrelle bat (*Pipistrellus pipistrellus*.)	One record, 4km SW	BCT (29/05/2012)
	Soprano pipistrelle bat (*Pipistrellus pygmaeus)*	One record 5km E	SNH (12/04/2007)
	Brown long-eared bat (*Plecotus auritus*)	Two records, closest 1km N	BCT (29/05/2012) SNH (12/04/2007)
	Red squirrel (*Sciurus vulgaris*)	Twelve records, closest 1km NW	SWT (19/04/2013)
JNCC	JNCC Article 17 reporting maps (2008) show that the distribution and range of the following species include that of the site area: Common pipistrelle (*Pipistrellus pipistrellus*), Brown long-eared (*Plecotus auritus*) Daubentons (*Myotis daubentonii*), Natterers (*Myotis nattereri*) and Soprano (*Pipistrellus pygmaeus*)		
LBAP (Tayside) and UKBAP	The following bat species are listed in UKBAP and LBAP and potentially relevant to the site: **Species:** • Badger (LBAP); • Pine marten(UKBAP); • Daubentons bat(UKBAP); • Soprano pipistrelle (UKBAP);and • Red squirrel(UKBAP) Please note that other bat species are included as UKBAP priority species but are not included here as they are not considered to be relevant to the region.		

The JNCC collation of taxon designations includes those species are that included within the following items:

- Bern Convention (Appendices 1, 2 and 3);
- Biodiversity Action Plan (BAP) UK priority species list;
- Global IUCN Red List;
- Habitats Directive (Annex 2 (priority species), Annex 2 (non-priority species), Annexes 4 and 5);
- Nationally Rare/Scarce (not based on IUCN criteria);
- National Red Lists (including red listings based on IUCN guidelines);
- Species of principal importance in Scotland (NERC section 41 & 42 lists, Scottish Biodiversity List);
- The Conservation (Natural Habitats, &c.) Regulations 1994 (Schedules 2, 3 & 4) and
- Wildlife and Countryside Act 1981 (Schedules 1, 5 & 8).

The table below lists notable plant species included within the JNCC collation of taxon designations recorded for the 10 km grid square in which the site is located (NO54 between 1993-2013)

Vernacular name	Scientific name
Annual Knawel	*Scleranthus annuus*
Black-bindweed	*Fallopia convolvulus*
Bluebell	*Hyacinthoides non-scripta*
Bogbean	*Menyanthes trifoliata*
Box	*Buxus sempervirens*
Charlock	*Sinapis arvensis*
Chicory	*Cichorium intybus*
Coralroot Orchid	*Corallorhiza trifida*
Corn Mint	*Mentha arvensis*
Eyebright	*Euphrasia arctica subsp. borealis*
Field Madder	*Sherardia arvensis*
Harebell	*Campanula rotundifolia*
Heath Cudweed	*Gnaphalium sylvaticum*
Heather	*Calluna vulgaris*
Hoary Plantain	*Plantago media*
Lesser Butterfly-orchid	*Platanthera bifolia*
Monk's-rhubarb	*Rumex alpinus*
Primrose	*Primula vulgaris*
Scandinavian Small-reed	*Calamagrostis purpurea*
Sun Spurge	*Euphorbia helioscopia*
Wall Germander	*Teucrium chamaedrys*
Welsh Poppy	*Meconopsis cambrica*
Wild Pansy	*Viola tricolor*
Wood Crane's-bill	*Geranium sylvaticum*

3.2 Phase 1 Habitat Survey

This section describes the habitats identified within the site. When considering this section, reference should be made to the supporting maps, target notes and photographs provided in the appendices of this report.

A total of twelve habitat types were identified within the site boundaries.

- A1.1.1 semi-natural broad-leaved woodland;
- A2.2 scattered scrub;
- A3.1 broad-leaved scattered trees;
- B1.2 semi-improved grassland;
- B3 improved grassland;
- C3.1 tall ruderal vegetation;
- J1.1 arable;
- J2.5 wall;
- J2.6 dry ditch;
- J3.4 fence.
- J3.6 buildings; and
- J4 bare ground.

Semi-natural broad-leaved woodland
Woodland is defined as vegetation dominated by trees more than 5m high when mature, forming a distinct although sometimes open canopy. Semi natural woodland comprises all stands which do not obviously originate from planting. This habitat is located in the south east of the site and north east of the site and comprises a mixture of beech (*Fagus sylvatica)*, willow (*Salix* sp.) and sycamore (*Acer pseudoplatanus)* with an understory of bramble (*Rubus fruticosa*), gorse *(Ulex europaeus*), common nettle *(Urtica dioica)* and broom (*Genista scoparia).*

Scattered scrub
Scrub is seral or climax vegetation dominated by locally native shrubs, usually less than 5m tall. This habitat is present along the dry ditch to the north of the turbine location. The species composition is primarily gorse *(Ulex europaeus*) and hawthorn *(Crataegus monogyna).*

Broad-leaved scattered trees
Scattered trees are located along the field boundaries in the west of the site. The species include ash (*Fraxinus excelsior)* and rowan (*Sorbus aucuparia).* These trees may provide suitable nesting habitat for birds and commuting corridors for bats.

Semi-improved grassland
Semi-improved grassland is a transition category made up of grassland which have been modified by artificial fertilisers, slurry and intensive grazing and consequently have a range of species which are less diverse and natural than unimproved grassland. This habitat is located in the field to the east of the proposed turbine location and in the north of the site. The species composition includes cocks foot (*Dactylis glomerata*), fescues (*Festuca* sp.), common bent (*Agrostis capillaris*), perennial ryegrass (*Lolium perenne*), daisy (*Bellis perennis*), white clover (*Trifolium repens*), creeping buttercup (*Ranunculus repens)* and common thistle *(Cirsium vulgare).*

Improved grassland
This habitat is similar to that above but has undergone more intensive grazing reducing its overall species diversity. This habitat is present in the north east of the site.

Tall ruderal
Areas of tall ruderal vegetation were present along the field boundaries throughout the site and adjacent to the dry ditch to the north and north east of the proposed turbine location. The species present within this habitat included rosebay willowherb *(Chamerion angustifolium)*, common nettle *(Urtica dioica)*, broadleaf dock *(Rumex obtusifolius)*, and ragwort *(Jacobaea vulgaris)*. The longer vegetation may provide suitable cover and shelter for commuting mammals.

Arable
This habitat is the dominant habitat throughout the site. It is found in the field of the turbine location as well as the surrounding fields. It is considered to offer low ecological value, although the tree lines and tall ruderal vegetation along some of the field boundaries may provide suitable commuting corridors for small mammals.

Wall
A stone wall is present around the field boundaries in the west of the site.

Dry ditch
A dry ditch was present to the north and north east of the turbine location, no standing water was recorded and the ditch was noted to be overgrown with tall ruderal vegetation.

Fence
A post and wire fencing is present around the fields in the south and east of the site.

Building
A derelict outbuilding is present in west of the site and is described in detail below.

Bare ground
This habitat includes bare soil and other substrates (including tarmac). This habitat is present in the form of an unnamed road running north south in the east of the site.. It is considered to be of low ecological value.

3.2.1 Faunal Species

During the site walk-over, an assessment was made of the potential presence of nationally or internationally protected species and species of local importance as highlighted during the desk study. The following sections present the results of the survey.

3.2.1.1 Otter Survey

No otter field signs were identified during the survey.

No suitable habitat for otters was identified within the site as the ditch was recorded to be dry.

3.2.1.2 Water Vole Survey

No water vole field signs were identified during the survey.

No suitable habitat for water voles was identified within the site as the ditch was recorded to be dry.

3.2.1.3 Badger Survey

Habitat Survey
The survey identified generally flat lying improved and semi-improved grassland fields in the east and north of the site separated by post and wire fencing, tall ruderal vegetation and stone walls. In most places soils appeared to be free draining, providing both a suitable substrate for sett excavation and foraging. In general, the survey area presented some of the features required by sheltering and commuting badgers, particularly the tall ruderal vegetation and tree lines.

Sett Survey
Despite suitable habitat for badgers being identified, there was no evidence of badger setts at the site.

Field Signs Survey
Although generic mammal field signs were identified at the site, such as mammal paths, there was no evidence of badger field signs.

3.2.1.4 Red Squirrel Survey

As demonstrated in the Phase 1 habitat survey, there was no suitable habitat for this species within the survey area.

3.2.1.5 Bat Roost Potential Survey

There is a derelict outbuilding present in the west of the site. It was identified to be comprised of stone and wooden slatted walls with a corrugated metal roof. Although gaps were present under the corrugated sheets, these were considered to be too large and exposed for sheltering bats. The buildings were therefore considered to have limited bat roost potential.

While the woodland in the north east and south east and the scattered trees along the field boundary in the north west of the site did not present any of the features listed in table 1, the trees are of a size and age that elevated surveys may result in cracks or crevices being found. These trees were considered to be Category 2. The remainder of trees on site were recoded as immature and multi-stemmed with no potential to support roosting bats. These were considered to be Category 3 trees.

The survey area supports a limited number of linear vegetation features which could support foraging and commuting bats. The mitigation section below provides recommendations for how to avoid affecting foraging and commuting bats.

3.2.1.6 Birds

No evidence of nesting birds was found during the survey. While the scattered scrub and trees around the site may provide suitable nesting habitat for birds the proposed turbine location, located on arable land, is unlikely to affect breeding birds.

4. FURTHER SURVEY

4.1 Further Survey

No further survey of the site is necessary.

A bird survey is not necessarily required if construction work can be either timed to avoid the bird breeding season or a pre-construction check of any vegetation to be removed is undertaken immediately prior to works.

Natural England has developed guidance[18] that provides information on how best to site turbines to avoid impacts to bat species. This guidance states that:

"*A bat survey should normally be recommended for applications for turbines that will be located within 50 m of the following features:*

- *buildings or other features or structures that provide potential as bat roosts, including bridges, mines etc;*
- *woodland;*
- *hedgerows;*
- *rivers or lakes; and*
- *within or adjacent to a site designated for bats (SSSI or SAC)."*

Therefore, 50m should be the minimum distance between the tip of the turbine blade to the nearest feature which may be used by bats. This distance should not be measured from the base of the turbine but instead should take into account the height of the feature. In order to accurately measure this stand-off distance from the blade tip Natural England have produced the following equation[19]:

$$b = \sqrt{(50 + bl)^2 - (hh - fh)^2}$$

b = the minimum distance
bl = blade length (27m)
hh = hub height (50m)
fh = feature height (4m)

At Ascurry the minimum distance equates to **61.75m**.

As the proposed turbine is located approximately **115m** from the nearest linear feature, it is unlikely to affect any feature that may be used by roosting, foraging or commuting bats.

No further survey for bats is required.

[18] Natural England (2009). Natural England Technical Information Note TIN059 – Bats and Single Large Wind Turbines: Joint Agencies Interim Guidance
[19] Natural England (2012). Natural England Technical Information Note TIN051 – Bats and Onshore Wind Turbines (second edition)

4.2 Protected Species Licensing

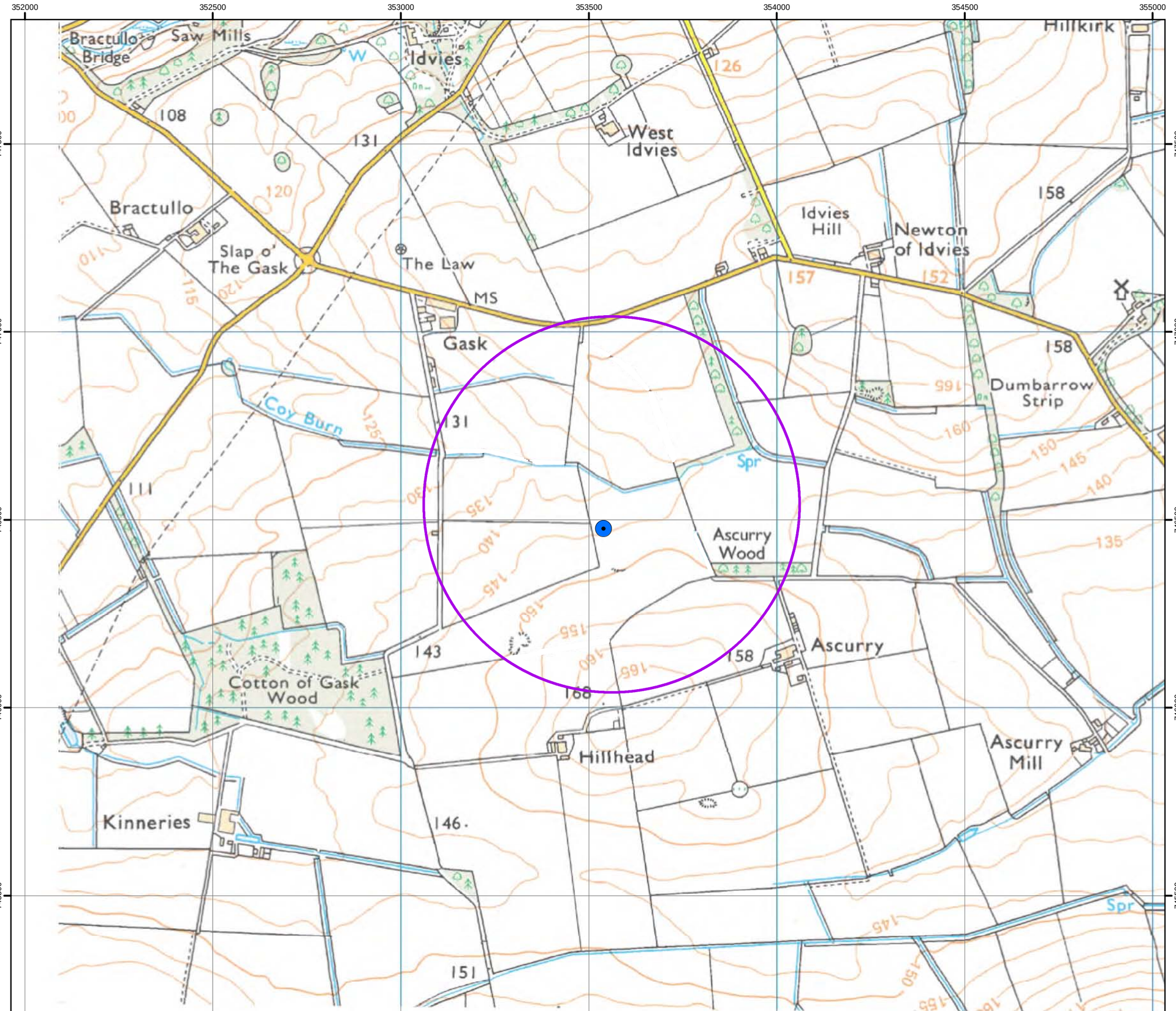
It is unlikely that a protected species licence will be required for this development. Should a protected species, or evidence of a protected species, be discovered on site the licensing requirement will require to be reviewed.

4.2.1 General Good Practice Mitigation During Construction

1. Any vegetation removal should be undertaken outside the bird nesting season, which runs from March to August. If vegetation removal is planned during the nesting season, a suitably qualified ecologist should inspect the area for the presence of nests up to a maximum of one day prior to removal. If an active nest is discovered the vegetation cannot be removed and must be left until the young have fledged. In this scenario alternative approaches to the works should be proposed.
2. Any trenches or pits should be covered when unattended or a shallow angled plank inserted to allow animals to escape, should they become trapped inside them. The ends of any pipeline should be capped when unattended, or at the end of each working day to prevent animal access.
3. In the event that a protected species is discovered on site all work in that area must stop immediately and an ecologist contacted. Details of the local police Wildlife Crime Officer, SNH Area Officer and Scottish Society for the Prevention of Cruelty to Animals (SSPCA) relevant Officer could be held in site emergency procedure documents.

Appendix A: Site Location Plan

AC53



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Legend

- Turbine Location Updated Oct 2013
- Survey Area

Do not scale this map

Client: Locogen

Project: Hillhead of Ascurry Single Turbine

Title: Site Location Plan

Status: FINAL

Drawing No.	Revision
164621-003	A

Scale		Date
1:10,000	A3	14 Oct 2013

Drawn	Checked	Approved
JI	MN	KH

ENVIRO Centre
Craighall Business Park, Eagle Street, Glasgow, G4 9XA
Tel: 0141 341 5040
Fax: 0141 341 5045

Appendix B: Site Photographs

Photograph 1: A view of the arable field in which the turbine is proposed.

Photograph 2: A view of the semi-natural woodland in the south east of the site.

Photograph 3: A view of the semi-improved grassland in the east of the site.

Photograph 4: A view of the semi-natural woodland in the north east of the site.

Photograph 5: A view of overgrown dry ditch in the north east of the site.

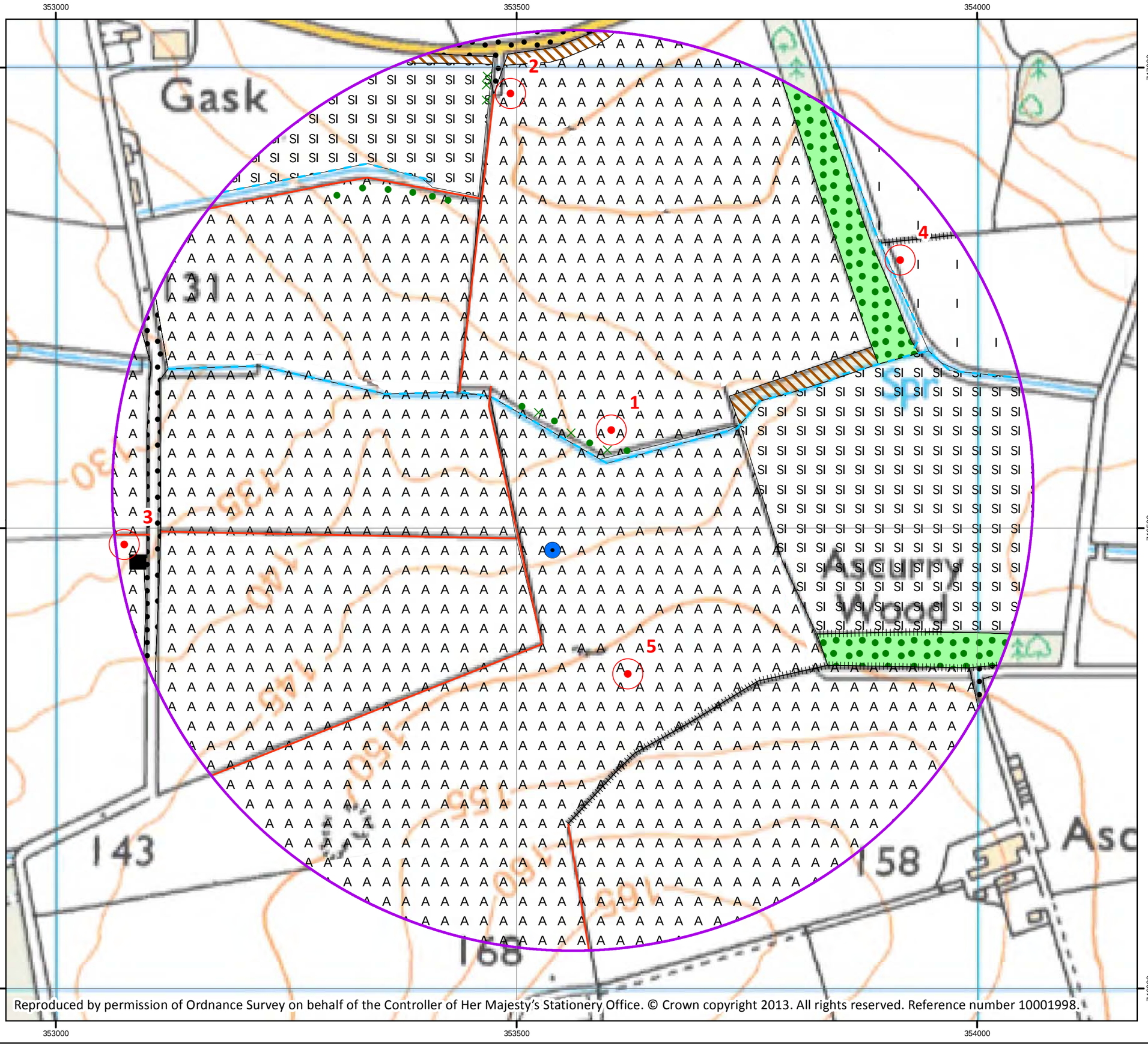
Photograph 6: A view of the disused building in the west of the site.

Photograph 7: A view of one of the stone wall boundaries in the west of the site.

Photograph 8: A view of the tree line along a field boundary in the north west of the site.

Appendix C: Phase 1 Habitat Map

AC53



Legend

- Turbine Location Updated Oct 2013
- Survey Area
- Target Note

JNCC Code

- A1.3.1 Broadleaf semi-natural woodland
- A2.2 Scattered Scrub
- A3.1 Scattered Broadleaved Trees
- B4 Improved Grassland
- B6 Poor Semi-Improved Grassland
- C3.1 Tall ruderal
- J1.1 Cultivated/disturbed land
- J2.4 Post & Wire Fence
- J2.5 Wall
- J2.6 Dry Ditch
- J3.6 Building
- J4 bare Ground

Do not scale this map

Client: Locogen

Project: Hillhead of Ascurry Single Turbine

Title: Phase 1 Habitat Survey

Status: FINAL

Drawing No.	Revision
164621-002	A

Scale		Date
1:4,000	A3	14 Oct 2013

Drawn	Checked	Approved
JI	MN	KH

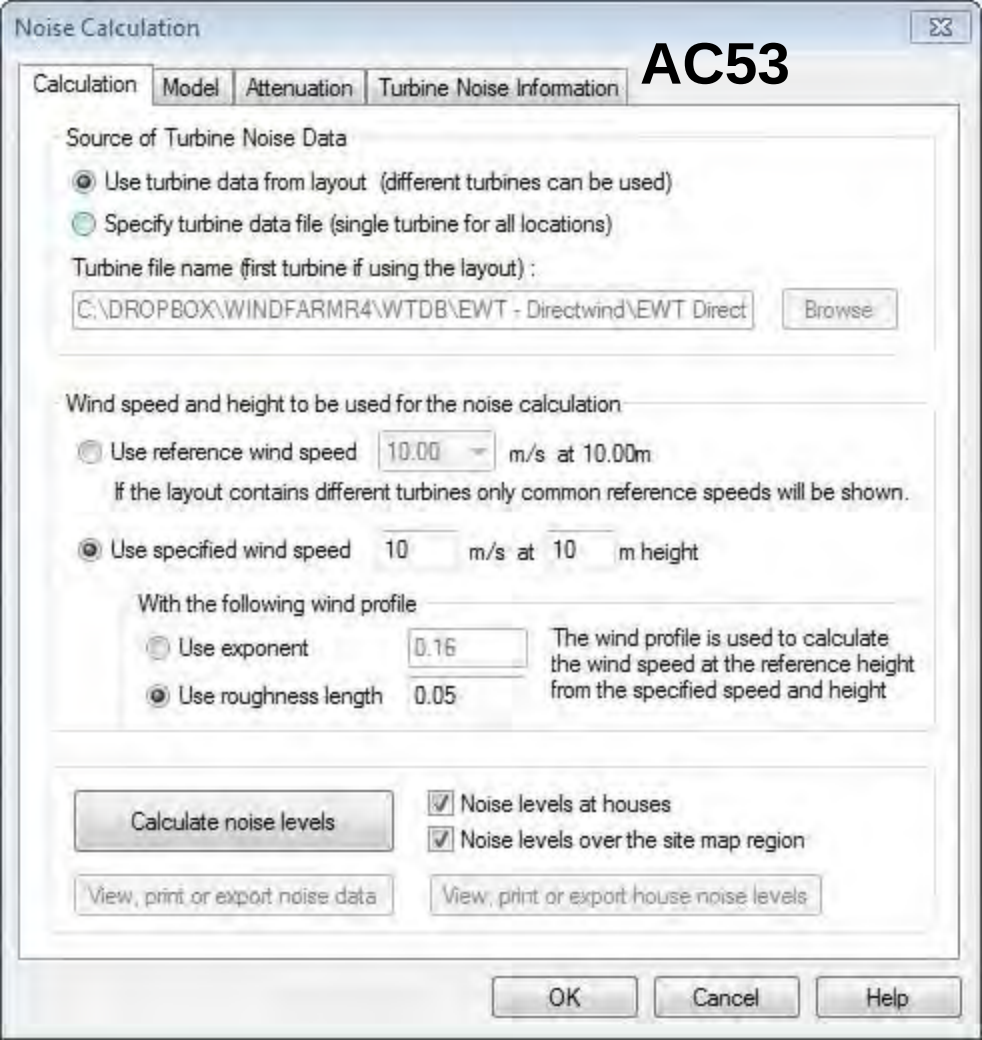
ENVIRO Centre
Craighall Business Park, Eagle Street, Glasgow, G4 9XA
Tel: 0141 341 5040
Fax: 0141 341 5045

Appendix D: Target Notes

Date of Survey: 30th August 2013
Recorder Name: Karen Hassard
Weather Conditions: Bright and clear with an air temperature of 19°C.

Target Note	Details
1.	**Feature:** Scattered scrub **Description:** This habitat is present to the north of the proposed turbine location. Although it is not continuous it may provide a suitable commuting and foraging route for gap tolerant bat species such as pipistrelles.
2.	**Feature:** Rubble pile **Description:** A large pile of building rubble was recorded adjacent to the road in the north of the site.
3.	**Feature:** Derelict building **Description:** There is a derelict outbuilding present in the west of the site. It was identified to be comprised of stone and wooden slatted walls with a corrugated metal roof. Although gaps were present under the corrugated sheets, these were considered to be too large and exposed for sheltering bats. The buildings were therefore considered to have limited bat roost potential.
4.	**Feature:** Dry ditch **Description:** A dry ditch was present to the north east of the turbine location, no standing water was recorded and the ditch was noted to be overgrown with tall ruderal vegetation. It was therefore not considered suitable habitat for otters or water voles.
5.	**Feature:** Arable land **Description:** This habitat is the dominant habitat throughout the site. It is found in the field of the turbine location as well as the surrounding fields. The main crop grown was identified to be a variety of wheat.

Appendix C – Manufacturer's Noise Data and ReSoft Windfarm Report Exports


Noise Calculation
AC53
Calculation
Model
Attenuation
Turbine Noise Information
Source of Turbine Noise Data
Use turbine data from layout (different turbines can be used)
Specify turbine data file (single turbine for all locations)
Turbine file name (first turbine if using the layout) :
C:\DROPBOX\WINDFARMR4\WTDB\EWT - Directwind\EWT Direct
Browse
Wind speed and height to be used for the noise calculation
Use reference wind speed
10.00
m/s at 10.00m
If the layout contains different turbines only common reference speeds will be shown.
Use specified wind speed
10
m/s at
10
m height
With the following wind profile
Use exponent
0.16
Use roughness length
0.05
The wind profile is used to calculate the wind speed at the reference height from the specified speed and height
Calculate noise levels
Noise levels at houses
Noise levels over the site map region
View, print or export noise data
View, print or export house noise levels
OK
Cancel
Help

Noise Calculation

AC53

Calculation | Model | Attenuation | Turbine Noise Information

Noise Model

- Danish noise standard
- (•) ISO 9613

Noise spreading model

ISO 9613 suggests the 500Hz attenuation coefficient is used for broadband spreading. This suggests and it is recommended that 0.002 is used for the Danish model.

Only the alternate ISO 9613 ground model can be used with broadband spreading.

If the ISO 9613 model is used with broadband spreading and no ground attenuation the result will be 3dB lower than the Danish model because hard ground is not included as a default in the ISO 9613 model.

- Use broadband sound power level and attenuation : 0.005 dB(A) / m
- (•) Use speading by octaves (attenuation is specified on the attenuation page)
- [✓] Use line of sight distance (includes turbine hub height)

Additional Factors

- [ ] Add a base level noise of 0 dB(A)
- [ ] Use a distance limit of 5000 metres (noise ignored beyond this distance)

OK | Cancel | Help

Noise Calculation

AC53

Calculation | Model | Attenuation | Turbine Noise Information

Atmospheric Octave Attenuation

- ○ Use default attenuation for Danish model
- ○ Specify attenuation manually
- ◉ Use ISO 9613 attenuation (specify humidity and temperature)

Humidity (%) : 70% Temperature (deg C) : 10

Attenuation Coefficents (dB/m)

Hz	63	125	250	500	1000	2000	4000	8000
	0.00012	0.00041	0.00104	0.00193	0.00366	0.00966	0.0328	0.117

☐ Keep attenuation as default

Reset attenuation to original defaults

Ground Attenuation

- ○ No ground attenuation (Danish = hard ground, 3dB more than with ISO 9613)
- ◉ ISO 9613
- ○ Alternative ISO 9613

Porosity Factor (0=hard, 1=soft)

Source porosity factor : 0.5 Middle : 0.5 Receiver : 0.5

Receiver height (m) : 4 ☐ Use receiver height and porosity from layout

OK | Cancel | Help

Noise Calculation

Calculation | Model | Attenuation | Turbine Noise Information

AC53

This turbine data is just for information. Use the Turbine Studio to change any values.

Turbine File : C:\DROPBOX\WINDFARMR4\WTDB\EWT - Directwind\EWT

Turbine broadband sound power level :	99.5	dB(A)
Reference measurement windspeed :	10	m/s at height : 10 m
Reference measurement roughness :	0.05	m
Variation of noise with wind speed :	0.8	dB(A) / m/s
Tonal penalty :	0	dB(A)

Octave data - dB(A)

Hz	63	125	250	500	1000	2000	4000	8000
	80.75	86.95	92.25	93.55	92.15	89.65	82.75	70.95

OK | Cancel | Help

Project name : ASCURRY
Layout name : HILLHEAD 77M FINAL LOCATION FG1.WFL

Noise data file name : NASCURRY.WFN
Created : 09:37:31 20-Aug-2013
Revised : 16:09:08 17-Oct-2013
Revision : 62
Title :
Author :
Comment :

Turbine noise data : From the layout
Turbine file (first) : ..\WTDB\EWT - Directwind\EWT Directwind - Measured 500kW ocata

NOISE MODEL
Noise standard : ISO 9613
Noise spreading model : Octaves
Use line-of-sight distance: Yes

ATMOSPHERIC ATTENUATION
Source of attenuation : ISO 9613
Humidity : 70 %
Temperature : 10 deg C
Attenuation coefficients
63 Hz : 0.00012
125 Hz : 0.00041
250 Hz : 0.00104
500 Hz : 0.00193
1000 Hz : 0.00366
2000 Hz : 0.00966
4000 Hz : 0.03280
8000 Hz : 0.11700

GROUND ATTENUATION
Formulation : ISO 9613
Source porosity : 0.50
Middle porosity : 0.50
Receiver porosity : 0.50
Receiver height : 4.00

WIND SPEED
Turbine reference : No
Wind speed : 10.00
Wind speed height : 10.0
Wind profile Z0 : 0.0500

ADDITIONAL FACTORS
Base noise level : None
Distance limit : None

House ID	Easting	Northing	Altitude	Noise (db)
1	353095	746862	0	31.72
2	353084	746903	0	31.13
3	353092	747040	0	29.68
4	353436	745929	0	32.28
5	354054	746083	0	30.75
6	353825	747162	0	29.35
7	354036	746253	0	32.49

	Emergya Wind Technologies BV
	DW54

Category:	Specification	Page 1 / 11
Doc code:	S-1005030	

Created by:	RH	Creation Date:	09-05-12
Checked by:	LE	Checked Date:	09-05-12
Approved by:	TY	Approved Date:	09-05-12

Title:

Specification

Sound power level DW54 - 500kW

Revision	Date	Author	Approved	Description of changes
01	17-08-12	RH	TY	corrected format
-	-	-	-	-
-	-	-	-	-
-	-	-	-	-
-	-	-	-	-
-	-	-	-	-

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Contents

1 Introduction

Following information with regard to the sound power level measurements, are distillated from measurement data of a *DIRECT**WIND*** 54 500kW turbine, located at the Elbaweg in Venhuizen, the Netherlands.

The measurements were performed by a third party according to the International Standard IEC 64100-11 December 2002: "Wind turbine generator systems – Part 11: Acoustic noise measurement techniques ".

2 Measurements

The measurements have been performed by measuring the sound pressure levels in the third octave bands of 25 Hz to 10,000 Hz at the reference point downwind of the operating turbine. The background noise level was measured during standstill of the turbine.

Measurements were carried out on the ground on a hard board according to the IEC standard. This method doubles the pressure on the microphone which raises the sound pressure level with +6 dB(A) compared to free field measurements.

The measured sound pressure levels can be found in Appendix 2 measured sound pressure levels.

3 Results

The sound power levels are calculated from the measured sound pressure levels according to IEC-61400-11. The wind velocities have been corrected for a reference roughness Z_0 of 0.05m by applying a factor of 1.1 on the measured wind velocity, and the sound power levels have been calculated for a reference height of 10m.

Sound power level Lwa in dB(A)		**middle frequency of the octave bands [hz]**								
Wind speed at a height of 10m		**31.5**	**63**	**125**	**250**	**500**	**1k**	**2k**	**4k**	**8k**
Wind 5 m/s	95.0 dB(A)	67.3	76.3	82.5	89.0	90.3	87.9	85.3	80.6	71.0
Wind 6 m/s	96.6 dB(A)	68.2	78.0	84.1	90.7	92.0	89.5	86.7	81.4	72.4
Wind 7 m/s	97.7 dB(A)	69.5	79.3	85.5	91.8	93.0	90.7	88.0	82.2	72.9
Wind 8 m/s	98.8 dB(A)	70.9	80.7	86.9	92.6	94.1	92.0	89.2	83.0	72.8
Wind 9 m/s	99.7 dB(A)	72.4	82.1	88.3	93.5	94.7	92.9	90.3	83.5	72.0
Wind 10 m/s	99.5 dB(A)	72.2	81.6	87.8	93.1	94.4	93.0	90.5	83.6	71.8

Table 3.1 gives the calculated sound power levels at the different wind speeds, and the calculated octave band power levels. Figure 3.1 gives the calculated 3rd octave band sound power levels, the values for these can be found in Appendix 1 Third octave band sound power levels.

Sound power level Lwa in dB(A)		**middle frequency of the octave bands [hz]**								
Wind speed at a height of 10m		**31.5**	**63**	**125**	**250**	**500**	**1k**	**2k**	**4k**	**8k**
Wind 5 m/s	95.0 dB(A)	67.3	76.3	82.5	89.0	90.3	87.9	85.3	80.6	71.0
Wind 6 m/s	96.6 dB(A)	68.2	78.0	84.1	90.7	92.0	89.5	86.7	81.4	72.4
Wind 7 m/s	97.7 dB(A)	69.5	79.3	85.5	91.8	93.0	90.7	88.0	82.2	72.9
Wind 8 m/s	98.8 dB(A)	70.9	80.7	86.9	92.6	94.1	92.0	89.2	83.0	72.8
Wind 9 m/s	99.7 dB(A)	72.4	82.1	88.3	93.5	94.7	92.9	90.3	83.5	72.0
Wind 10 m/s	99.5 dB(A)	72.2	81.6	87.8	93.1	94.4	93.0	90.5	83.6	71.8

Table 3.1 Sound power levels and the octave band data

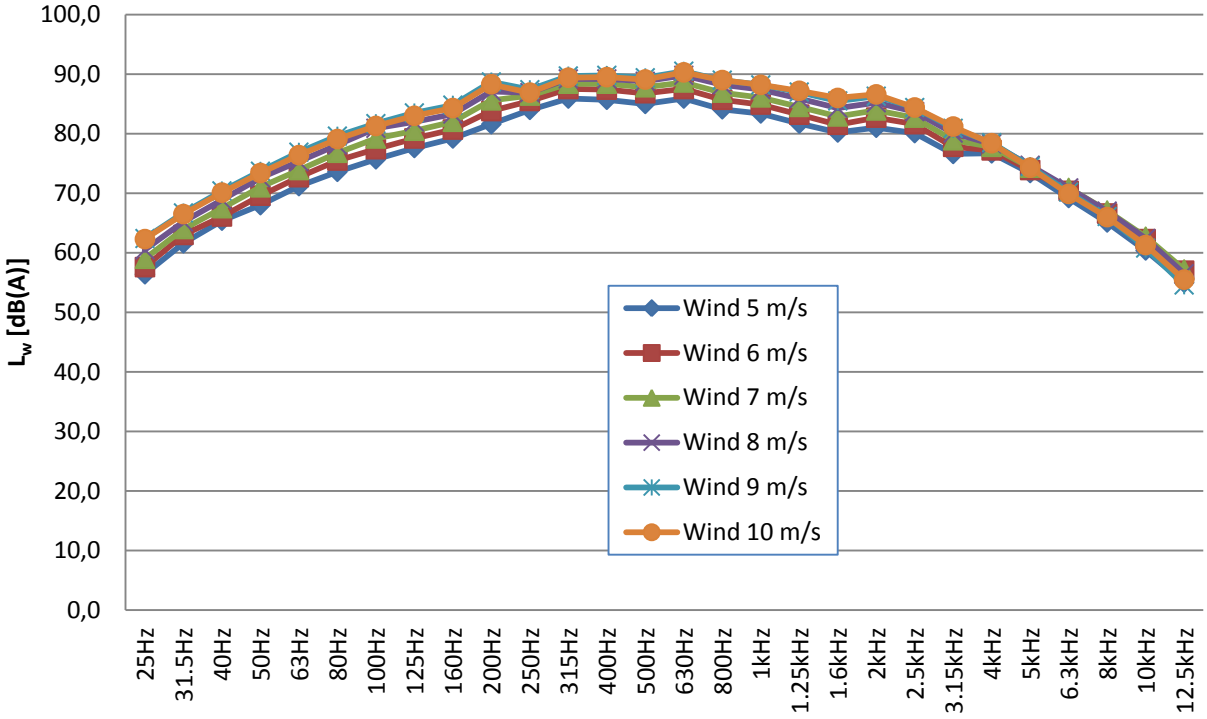


Figure 3.1 The 3rd octave band Sound Power Level spectra

3.1 Corrected sound power level graphical

Figure 3.2 and table 3.2 below provides all the calculated sound power levels at the different wind speeds at reference conditions (h = 10 m and z_0 = 0.05 m) and after correction for the background noise. The figure also gives the 4th order regression on this curve:

$$L_W = 0.0033V_{wind}^4 - 0.1327V_{wind}^3 + 1.7261V_{wind}^2 - 7.8733V_{wind} + 106.02\ dB(A)$$

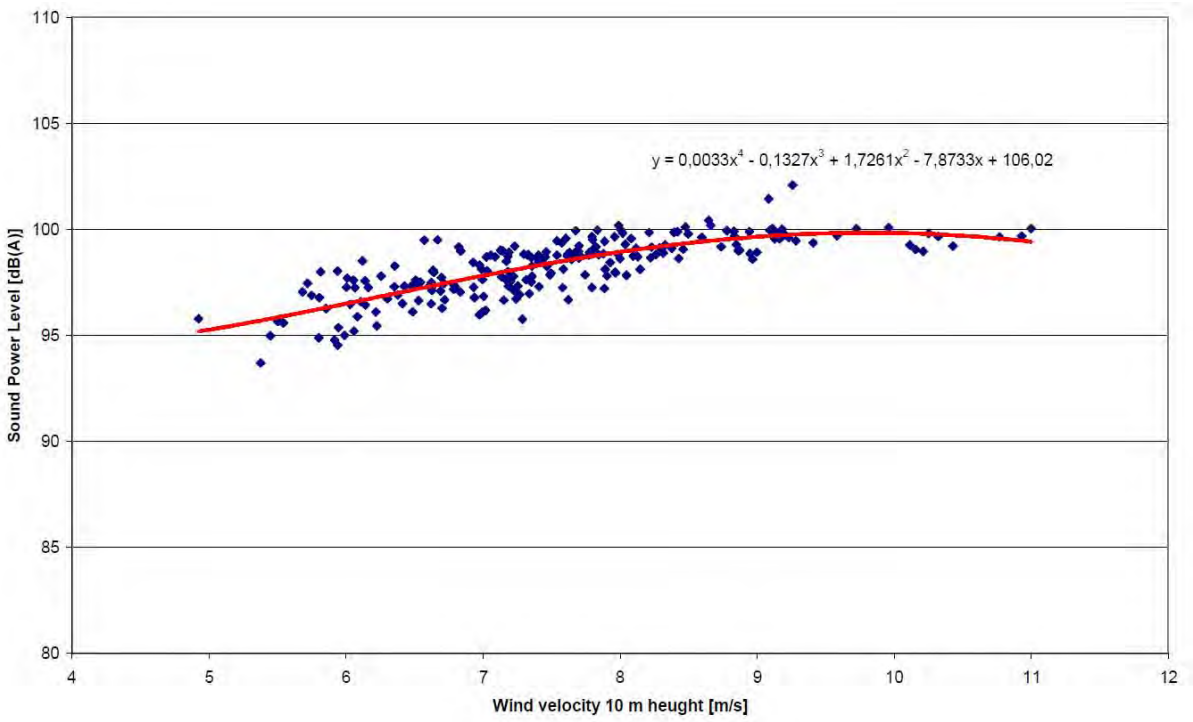


Figure 3.2 the calculated sound power level at different wind speeds

Sound power level with 4th Order regression in dB(A) **Wind speed at a height of 10m**	
Wind 5 m/s	95.3 dB(A)
Wind 6 m/s	96.5 dB(A)
Wind 7 m/s	97.8 dB(A)
Wind 8 m/s	98.9 dB(A)
Wind 9 m/s	99.6 dB(A)
Wind 10 m/s	99.8 dB(A)

Table 3.2 Sound Power Levels with 4th Order regression

3.2 Tonal Audibility

The audibility of the tones in the sound was analysed at the reference position and is given in Table 3.3 Tonal Audibility. The most important frequencies are 2.2 and 4.4 kHz. In Table 3.3 also the tonal penalty according to ETSU-R-97 (The assessment and rating of noise from wind farms – September 2006) is given. For the tone level of 3.3, the ETSU penalty of 2.5 dB can be found in Figure 3.3. No penalties are incurred for audibility levels below 2.0 dB.

According to ETSU-R-97, the tonal penalty should be added at the receiver for the specific wind speed at which the tonal audibility is present.

Wind @ 10 m ([m/s]	5	6	7	8	9
ΔL_A [dB(A)]	3.3	0.9	1.5	0.7	-0.7
ETSU Penalty [dB]	2.5	-	-	-	-

Table 3.3 Tonal Audibility

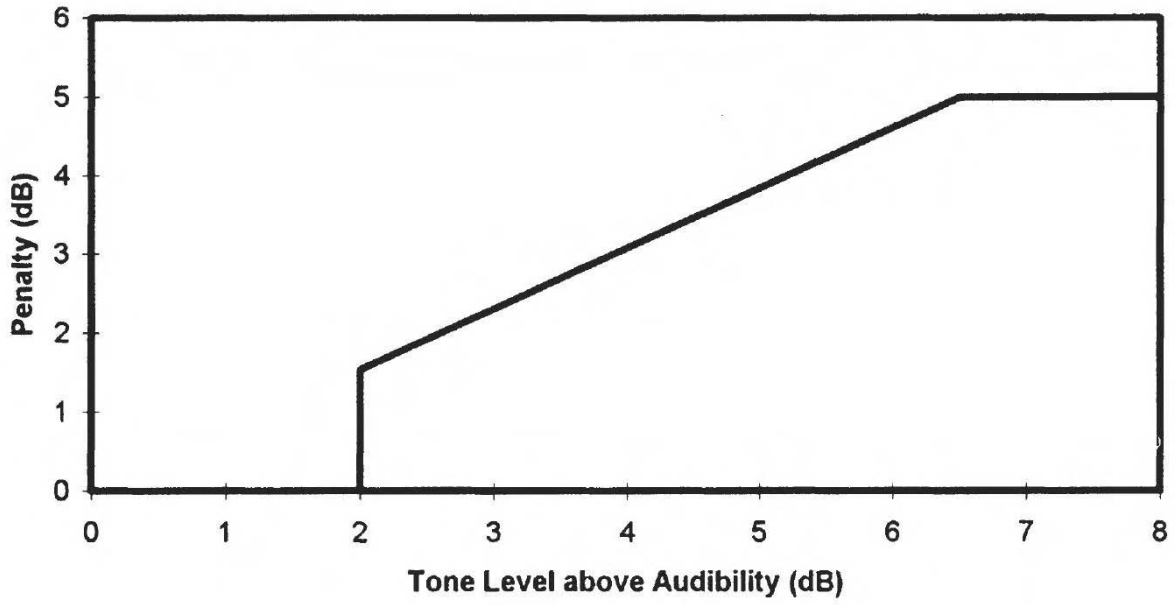


Figure 3.3 Tonal penalty according to ETSU-R-97

3.3 Uncertainty

The following Table 3.4 gives the number of measurements and the uncertainty in dB(A) for each different wind speed.

Wind Class	Number of measurements	Uncertainty [dB(A)]
Wind 5 m/s	4	1.7
Wind 6 m/s	37	1.4
Wind 7 m/s	77	1.2
Wind 8 m/s	68	0.9
Wind 9 m/s	26	0.9
Wind 10 m/s	9	0.7

Table 3.4 Number of measurements and uncertainty

Appendix 1 Third octave band sound power levels

V10[m/s]	25Hz	31.5Hz	40Hz	50Hz	63Hz	80Hz	100Hz	125Hz	160Hz
Wind 5 m/s	56,4	61,6	65,4	68,0	71,2	73,6	75,7	77,6	79,2
Wind 6 m/s	57,6	63,0	66,1	69,6	72,7	75,5	77,4	79,2	80,7
Wind 7 m/s	59,0	64,0	67,5	71,0	73,9	76,8	79,2	80,5	82,0
Wind 8 m/s	60,5	65,2	68,9	72,6	75,3	78,1	80,9	82,0	83,3
Wind 9 m/s	62,4	66,7	70,4	73,7	76,9	79,6	81,7	83,5	84,8
Wind 10 m/s	62,3	66,5	70,1	73,4	76,4	79,1	81,3	83,0	84,3

V10[m/s]	200Hz	250Hz	315Hz	400Hz	500Hz	630Hz	800Hz	1kHz	1.25kHz
Wind 5 m/s	81,6	84,0	85,9	85,7	85,0	85,9	84,1	83,4	81,7
Wind 6 m/s	83,8	85,5	87,5	87,4	86,8	87,5	85,7	84,9	83,2
Wind 7 m/s	85,6	86,4	88,4	88,4	87,8	88,6	86,9	86,1	84,5
Wind 8 m/s	87,1	86,9	89,2	89,2	88,8	89,8	88,2	87,4	85,9
Wind 9 m/s	88,7	87,4	89,7	89,8	89,4	90,5	89,0	88,2	87,0
Wind 10 m/s	88,3	86,9	89,4	89,5	89,1	90,3	89,0	88,2	87,2

V10[m/s]	1.6kHz	2kHz	2.5kHz	3.15kHz	4kHz	5kHz	6.3kHz	8kHz	10kHz	12.5kHz
Wind 5 m/s	80,2	81,0	80,1	76,6	76,7	73,4	69,2	65,1	60,4	55,0
Wind 6 m/s	81,5	82,7	81,6	77,8	77,2	73,9	70,4	66,6	62,3	57,0
Wind 7 m/s	82,9	83,9	82,7	78,9	77,8	74,3	70,9	67,1	62,7	57,2
Wind 8 m/s	84,3	85,2	83,7	80,1	78,3	74,7	70,9	67,0	62,4	56,5
Wind 9 m/s	85,5	86,3	84,4	80,9	78,5	74,5	70,2	66,1	60,8	54,6
Wind 10 m/s	86,0	86,6	84,4	81,2	78,4	74,3	69,9	66,0	61,3	55,5

Appendix 2 measured sound pressure levels

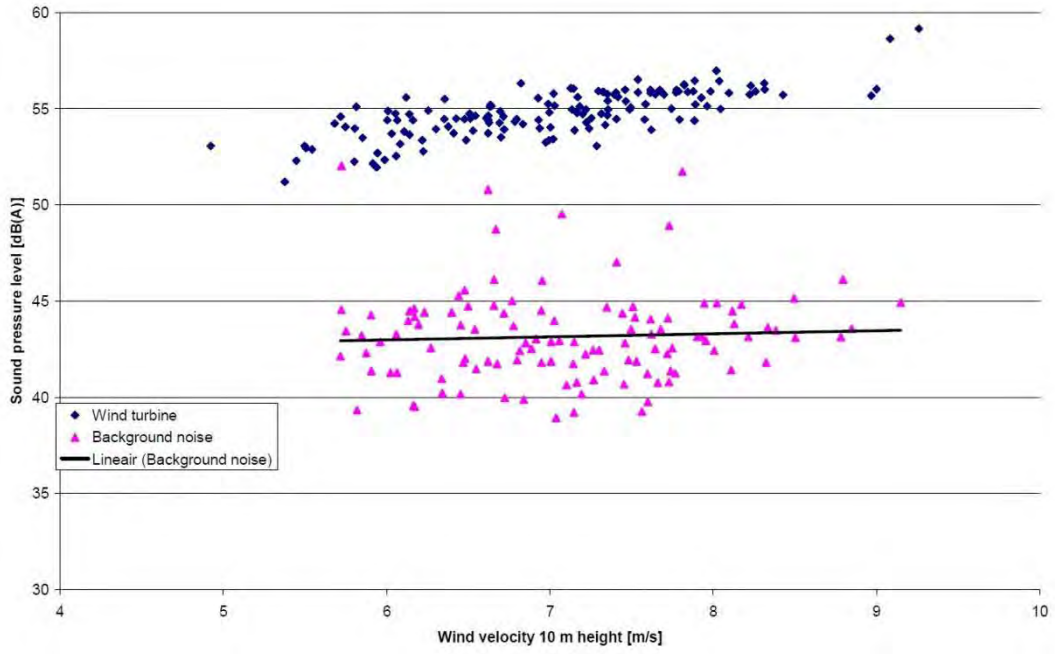


Figure 0.1 Measured sound pressure levels 11 November 2011

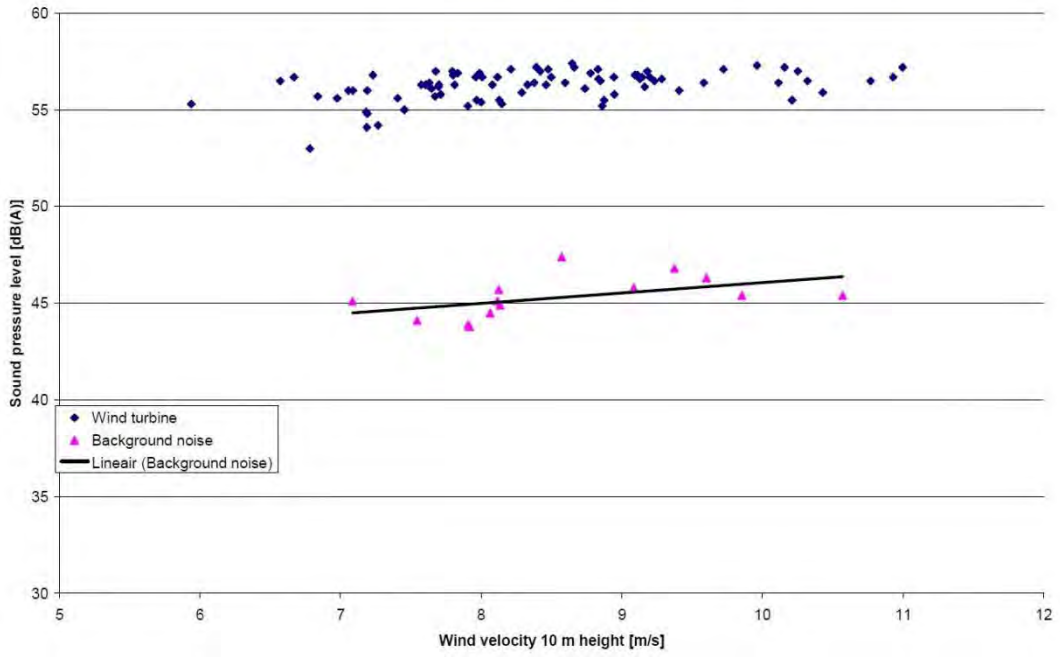


Figure 0.2 Measured sound pressure levels 15 February 2012

EWT	Emergya Wind Technologies BV
	Engineering

Category:	Specification	Page 1 / 2
Doc code:	S-1005020	

Created by:	TY	Creation Date:	07-12-11
Checked by:	MS	Checked Date:	07-12-11
Approved by:	TY	Approved Date:	07-12-11

Title:

Specification

Sound power warranty levels DW52/54 500kW

Revision	Date	Author	Approved	Description of changes
02	14-03-12	AB	TY	Modifications based on new IEC measurements
01	09-12-11	AB	TY	correction
-	-	-	-	-
-	-	-	-	-
-	-	-	-	-
-	-	-	-	-

Emergya Wind Technologies BV
Building 'Le Soleil' - Computerweg 1 - 3821 AA Amersfoort - The Netherlands
T +31 (0)33 454 0520 - F +31 (0)33 456 3092 - www.ewtinternational.com

Sound power levels

The warranted sound power levels are presented with reference to IEC 61400-11:2002.

V_{wind} at 10m height	**DW52**	**DW54**
5 m/s	96,5 dB(A)	97.0 dB(A)
6 m/s	97.5 dB(A)	98.0 dB(A)
7 m/s	98.5 dB(A)	99.0 dB(A)
8 m/s	99.5 dB(A)	100.0 dB(A)
9 m/s	100.3 dB(A)	100.5 dB(A)
10 m/s	100.5 dB(A)	100.5 dB(A)

Sound power level Lw in dB(A)

The warranted sound power levels are based on actual measurements executed by an independent noise measurement institute according to the preferred methods set out in IEC-61400-11.

Uncertainty levels are included in the warranted sound power levels.

At 5m/s a maximum tonal noise penalty of 2,5dB shall be considered according to ETSU-R-97 guidelines.

The measured third octave sound power levels are available upon request.

The values given in the table are valid for normal operational mode (rotation speed 0-24 RPM)

The calculation of the standardized wind speed at 10m height according to IEC 61400-11 is based on a terrain roughness length Z_0=0,05m.

In case validation measurements have to be performed, they should be executed according to the preferred methods set out in IEC-61400-11 by an independent measurement institute which is accredited to ISO/IEC 17025 to conduct measurements of wind turbine noise emissions.

EWT reserves the right to make modifications or adjust settings in order to comply with the warranted sound power levels.

AC54

A.M. McEWAN

WEST MAINS OF COLLISTON
BY ARBROATH
DD11 3RT

TELEPHONE: 01241 890226 FAX: 01241 890496
EMAIL: ammcewan@btconnect.com

Mr Ruari Kelly
Development Standards
Angus Council
County Buildings
Market Street
Forfar
DD8 3LG

24 March 2014

Planning application 13/01029/FULL
Erection Of Wind Turbine Of 50 Metres To Hub Height And 77 Metres To Blade Tip Field 500M North West Of Ascurry Farm Ascurry Letham

Dear Mr Kelly

As the applicant of the above planning application I would like this letter to be added to the supporting documentation from my agent Locogen Limited.

I am a partner in the farming business A M McEwan which is now in its third generation of farming 2,300 acres in Angus. We employ ten full time and twelve part time staff. We always use local companies where possible and feel that we make a large contribution to the Angus economy.

We have applied for a wind turbine on this carefully chosen location for several reasons. One reason is that we sell potatoes to customers who supply the major supermarkets. More and more top down pressure is being put on us from customers to demonstrate a reduction in our carbon emissions. This comes from the pressure put on our retail customers by Government to respond to the climate change agenda. Without a commitment from us to adhere to this the business might be unable to sell to this market in the future. This would obviously have a drastic effect on our business and as a consequence the Angus economy. A letter in support from Albert Bartlett and Sons Ltd illustrates this point.

The wind turbine will also increase the revenue of the business and support the continued viability of the farming business and safeguard employment.

The model of wind turbine chosen is one of the quietest and most efficient 500kW machines available today. It will generate approximately the same amount of electricity as six turbines rated at 100kW that are almost 50m high. It would seem to me that if Angus Council wishes to limit the amount of turbines in the landscape then by allowing single efficient turbines such as this type instead of six or seven smaller capacity turbines, that are almost as high, would achieve this. It would also contribute better towards the Government's targets for renewable energy.

I feel that the location of the turbine has been well chosen to minimise the impact on the landscape and local residents.

When the application was submitted in October 2013 the new landscape and visual assessment was not published and as such I submitted this application along with the application fee based on the planning policies in place at this time. I now find that this application is now being considered against a new set of policies and criteria not available at the time of submission.

That said, as the turbine sits in the Redford Farmland sub-area as detailed in the new SLCA document I feel that the location fits perfectly with this new criteria as well as the landscape assessment and I refer to the letter from my agent on 20 December 2013 which sets out how the new location complies with the new criteria. I have attached a copy of that letter for easy reference. I think it is also worth pointing out that the nearest village of Letham has little or no views of the turbine as it is screened by the topography of the rising land to the south and the dense trees and vegetation of Idvies House policies between the turbine and the village.

When you are actually standing on the proposed turbine location due to the topography of the ground, farm buildings, the natural screening of Ascurry Wood and nearby hedgerows, it is only just possible to partially see one of the nearest eight houses that are documented in the supporting documentation submitted my agent Locogen. This is because the turbine would sit down in a natural bowl. It is also the case that the turbine will not be directly in front of any of these houses.

It should be noted that the turbine is also a good distance from the nearest unclassified road and again is well screened from by the topography, trees and farm buildings.

I note that at the date of this letter there have been no objections from any statutory or Angus Council consultees. These are summarised below.

Consultee	Reason for consultation	Reply	Outcome
AC Environmental Health	Noise	Yes	No objection
NERL safeguarding	Aircraft safety	Yes	No objection
Spectrum Licensing	Radio communications	Yes	No objection
Civil Aviation Authority	Aircraft safety	Yes	No objection
Dundee Airport	Aircraft safety	Yes	No objection
Atkins	Radio communications	Yes	No objection
AC Roads Department	Road safety	Yes	No objection
Scottish Water	Water supply	Yes	No objection
JRC	Radio communications	No	No concerns agreed with Locogen
RSPB	Wildlife	No	No comments
Community Council		No	No comments
MOD	Radar	No	No comments
AC Natural and Build		No	No comments

I also note that there have been 15 letters of support and 28 letters of objection (several of which are multiple objections from the same household and 17 from locations distant from the turbine location including several letters from individuals that object to all wind turbine applications regardless of the location).

I think it is important to note the level of objections and support from the nearest eight houses. These are summarised below:

Number per Locogen	House name (if known)	Distance from turbine	Number of objection letters submitted	Number of support letters submitted
H1	No2 Gask Cottage	588m	1	None
H2	Gask Bungalow	623m	1	None
H3	Gask Farm House	719m	None	None
H4	Hillhead Farm House	556m	None	None
H5	Ascurry Farm Bungalow	647m	None	1
H6	Bungalow on unclassified road	743m	None	None
H7	Lewiston Cottage	544m	5	None
H8	Ascurry Farmhouse	594m	None	None

Therefore out of the nearest eight houses, five houses have either supported the application or have not objected with only three households raising objections. I feel that the objections from these three households have been adequately answered either by the statutory consultees or additional information supplied by my agent.

I also wish to point out that none of these eight houses are owned or controlled by me, my business or any relatives.

I also think it is significant that in the appeal decision for the wind farm at the Govals Farm, Kincaldrum, Forfar Angus, the Scottish reporter stated:

"of course, merely being able to see a wind farm or any other major development should not normally be sufficient on its own to refuse them. There is no automatic right to a view or have your prospect unchanged"

He went on further to say "*wind farms are now part of the Scottish countryside"*

I feel that along with the supporting documentation from my agent and the points in this letter demonstrate that the proposed turbine can be adequately accommodated in the landscape without any detrimental effects on the amenity of the nearest households.

This is a major investment for an Angus based business and we will use our policy of using local business' where possible in the construction of the turbine civil infrastructure such as the road, the base and associated landscaping. This will be a considerable amount for local companies resulting in the benefits being felt in the Angus economy as well as ensuring the continued prosperity for our farming business with the revenue raised from the project also staying in the local economy.

Yours sincerely

[redacted]

Graham McEwan
Partner

Locogen Ltd
44 Constitution Street
Edinburgh, EH6 6RS

20/12/2013

Mr Ruari Kelly
Development Standards
Angus Council
County Buildings
Market Street
Forfar
DD8 3LG

13/01029/FULL – Strategic Landscape Capacity Assessment for Wind Energy in Angus (2013)

Dear Mr Kelly,

With regard to the above application, I am pleased to see that the recently published Strategic Landscape Capacity Assessment for Wind Energy in Angus has concluded that the proposed wind turbine at Hillhead of Ascurry lies within the Redford Farmland sub-area, classified as having medium capacity for 50m – <80m turbines. I also note that the proposed location is within an area classified as having the highest underlying capacity for development, as outlined in the attached drawing.

Such areas are judged to have the capacity to accommodate larger sizes of turbine and/or greater numbers and concentrations relative to other areas of landscape in Angus. This is based on a combination of one or more factors including suitable landscape character, lower visual sensitivity or lower value.

Located within the Redford Farmland sub-area, the assessment describes the landscape and landscape capacity as:

"This sub-area is the largest scale, highest and most open within the Dipslope Farmland and this is partly reflected in the scale of farms and field sizes. There are areas with minimal settlement and roads although it borders the populated coastal area in the south. This has the highest capacity for wind energy in the Dipslope Farmland and can accommodate medium/large turbines, subject to local constraints."

"The largest size turbines (medium/large) would be most suitable in the largest scale areas located in the centre and north of the sub-area."

I appreciate the proposed turbine is located within an area where cumulative impact is considered to limit some development, however the location is close to the edge of this area, and is located a significant distance from the cluster of wind turbines which are considered to result in this classification. Indeed, the detailed Landscape and Visual Assessment included within our Supporting Environmental Document concluded that minimal cumulative effects are predicted as a result of the proposed development.

I also note that the following is included within the assessment, with regard to the outlined separation distances between turbines:

"In all cases the distances are an approximate range intended for guidance. Separation distances between specific proposals should therefore be considered in more detail on a case by case basis."

Reviewing the recent Strategic Landscape Capacity Assessment alongside the other conclusions within our Supporting Environmental Document, I am confident that a development of the size proposed at Hillhead of Ascurry will be of an acceptable scale given both the landscape capacity and other local considerations.

I hope the above proves useful. Please let me know if you need anything additional from me at this stage.

Yours sincerely,

[redacted]

Andy Lowe
Senior Wind Developer

Locogen Ltd.

Locogen Ltd
44 Constitution Street
Edinburgh, EH6 6RS

24/03/2014

Mr Ruari Kelly
Development Standards
Angus Council
County Buildings
Market Street
Forfar
DD8 3LG

13/01029/FULL – Shadow Flicker

Dear Mr Kelly,

With regard to the above application, I note that there have been responses to your department raising concerns over shadow flicker at Lewiston Cottage.

Shadow flicker only occurs inside buildings where the flicker appears through a narrow window opening. Only properties within 130 degrees either side of north of the turbine can be affected at UK latitudes, and shadow flicker can occur only within ten rotor diameters of a turbine position.

As outlined in Section 10 of the Supporting Environmental Document which was submitted with this application, a detailed shadow flicker assessment has been completed using ReSoft Windfarm Software to quantify the areas of potential impact. The model was run using conservative, worst case assumptions. **The assessment concluded that no shadow flicker impacts will be experienced at nearby properties**. I also note that screening from trees at Ascurry Wood has not been considered during this assessment, which further reduces the impact of shadow flicker.

As noted above, shadow flicker occurs through narrow window openings within a certain distance and orientation from a wind turbine, as opposed to in open outside space. Nevertheless, to alleviate any perceived impact, the applicant is happy to completely mitigate even the casting of a shadow over any part of the curtilage of Lewiston Cottage by simply programming the turbine to switch off during the identified times when a shadow may be cast. This is a straight forward procedure and the applicant would accept a planning condition to this effect.

Yours sincerely,

Andy Lowe
Senior Wind Developer
Locogen Ltd.

AC56

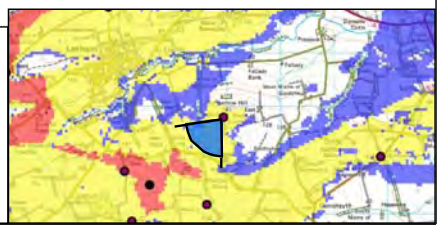
Photomontage showing proposed development

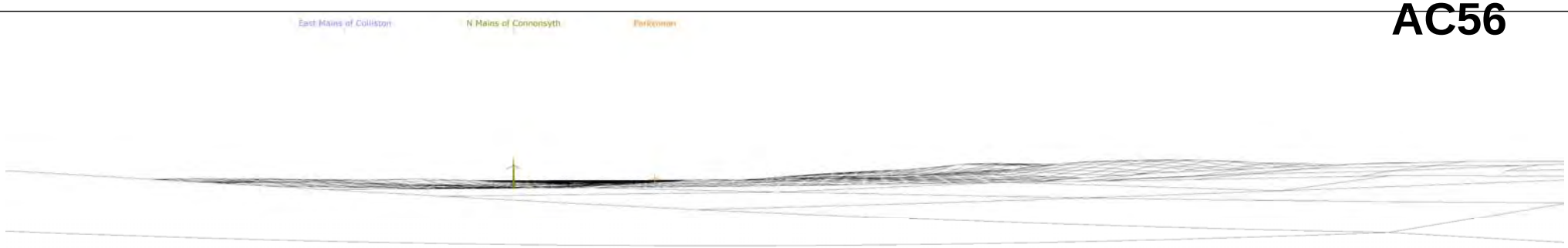
Locogen Ltd, 44 Constitution St, Edinburgh, EH6 6RS
Tel:+44(0)131 624 8968;
Email: info@locogen.com
Company Number: SC370060

Project:	Hillhead of Ascurry
Drawing no:	HOA049
Drawing by:	Franco Giovanetti
Approved by:	Andy Lowe
OS Licence N°:	100050069

Viewpoint No:	VP04
Viewpoint Location:	E354935 N747798
Field of View:	45°
View direction:	221.5°
Dist to turbine:	1.9 km
Title:	Hillkirk/Dunbarrow Hill

Camera:	Nikon D60
Effective Focal Length:	50mm
Viewing Distance:	48.3 cm
Elevation:	1.8m
Date taken:	29-Aug
Time taken:	14:30:00





Computer generated wireframe showing cumulative development

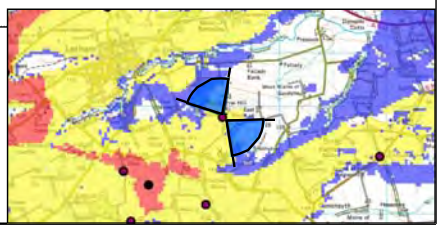
Computer generated wireframe showing cumulative development

Locogen Ltd, 44 Constitution St, Edinburgh, EH6 6RS
Tel:+44(0)131 624 8968;
Email: info@locogen.com
Company Number: SC370060

Project:	Hillhead of Ascurry
Drawing no:	HOA050
Drawing by:	Franco Giovanetti
Approved by:	Andy Lowe
OS Licence N°:	100050069

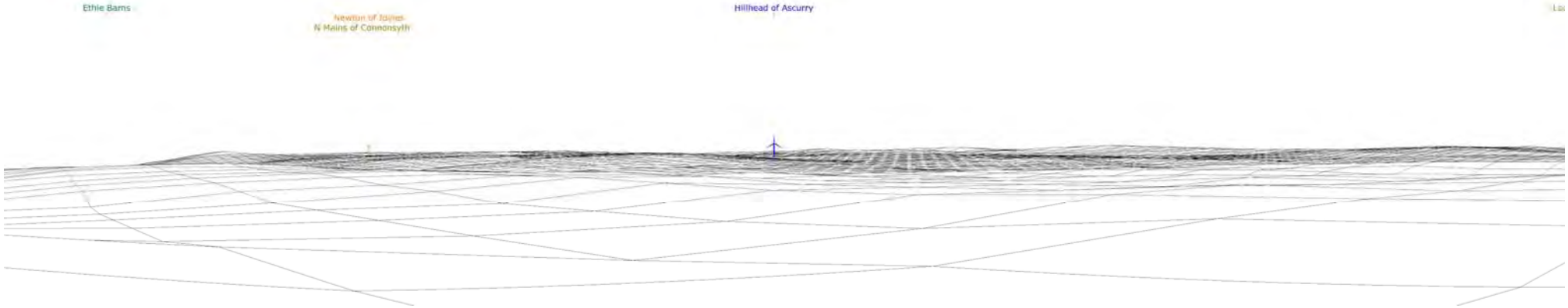
Viewpoint No:	VP04
Viewpoint Location:	E354935 N747798
Field of View:	80°
View direction:	130.6° (top), 330° (bottom)
Dist to turbine:	1.9 km
Title:	Hillkirk/Dunbarrow Hill

Camera:	Nikon D60
Effective Focal Length:	50mm
Viewing Distance:	23.8 cm
Elevation:	1.8m
Date taken:	29-Aug
Time taken:	14:30:00



AC56

Existing view from Dunnichen



Computer generated wireframe showing proposed turbine in blue

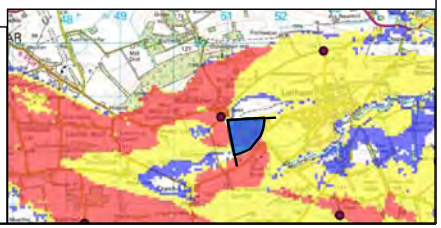
Photomontage showing proposed development

Locogen Ltd, 44 Constitution St, Edinburgh, EH6 6RS
Tel:+44(0)131 624 8968;
Email: info@locogen.com
Company Number: SC370060

Project:	Hillhead of Ascurry
Drawing no:	HOA051
Drawing by:	Franco Giovanetti
Approved by:	Andy Lowe
OS Licence N°:	100050069

Viewpoint No:	VP05
Viewpoint Location:	E350883 N748620
Field of View:	80°
View direction:	128.7°
Dist to turbine:	3.4 km
Title:	Dunnichen

Camera:	Nikon D60
Effective Focal Length:	50mm
Viewing Distance:	23.8 cm
Elevation:	1.8m
Date taken:	29-Aug
Time taken:	15:40:00



AC56

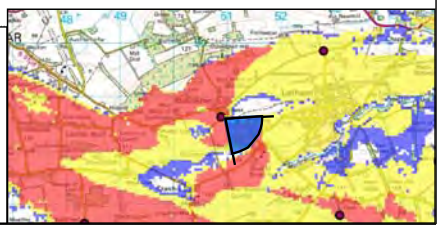
Photomontage showing proposed development

Locogen Ltd, 44 Constitution St, Edinburgh, EH6 6RS
Tel:+44(0)131 624 8968;
Email: info@locogen.com
Company Number: SC370060

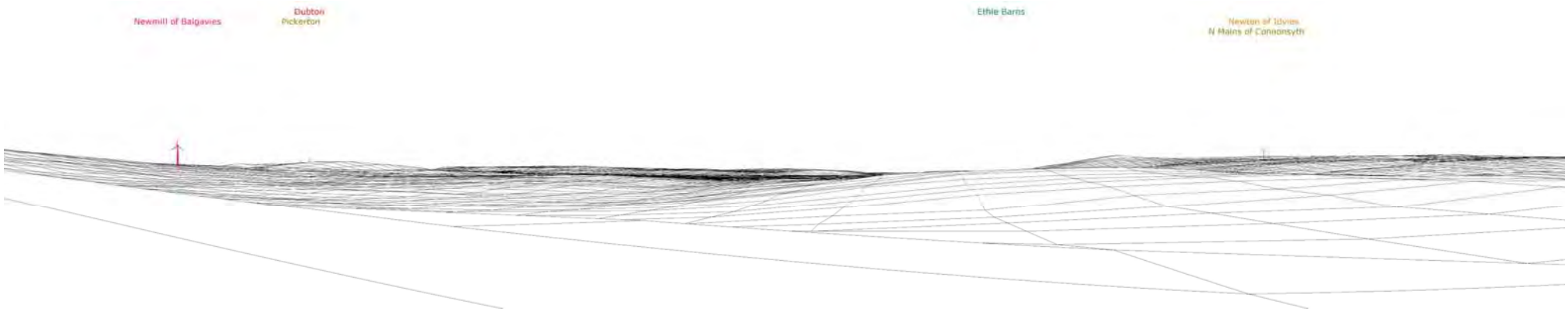
Project:	Hillhead of Ascurry
Drawing no:	HOA052
Drawing by:	Franco Giovanetti
Approved by:	Andy Lowe
OS Licence N°:	100050069

Viewpoint No:	VP05
Viewpoint Location:	E350883 N748620
Field of View:	45°
View direction:	128.7°
Dist to turbine:	3.4 km
Title:	Dunnichen

Camera:	Nikon D60
Effective Focal Length:	50mm
Viewing Distance:	48.3 cm
Elevation:	1.8m
Date taken:	29-Aug
Time taken:	15:40:00



Computer generated wireframe showing cumulative development



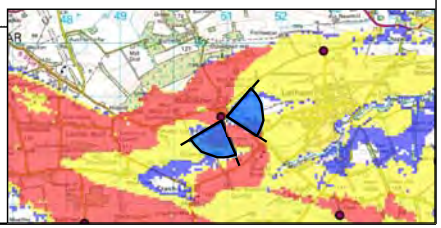
Computer generated wireframe showing cumulative development

Locogen Ltd, 44 Constitution St, Edinburgh, EH6 6RS
Tel:+44(0)131 624 8968;
Email: info@locogen.com
Company Number: SC370060

Project:	Hillhead of Ascurry
Drawing no:	HOA053
Drawing by:	Franco Giovanetti
Approved by:	Andy Lowe
OS Licence N°:	100050069

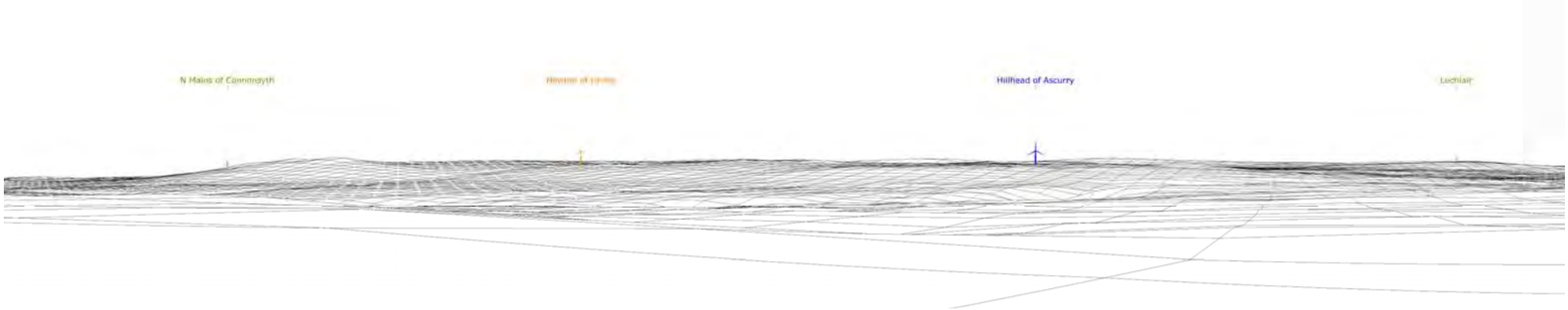
Viewpoint No:	VP05
Viewpoint Location:	E350883 N748620
Field of View:	80°
View direction:	199.4 (top), 82.9 (bottom)°
Dist to turbine:	3.4 km
Title:	Dunnichen

Camera:	Nikon D60
Effective Focal Length:	50mm
Viewing Distance:	23.8 cm
Elevation:	1.8m
Date taken:	29-Aug
Time taken:	15:40:00



AC56

Existing view from Girdle Lane



Computer generated wireframe showing proposed turbine in blue

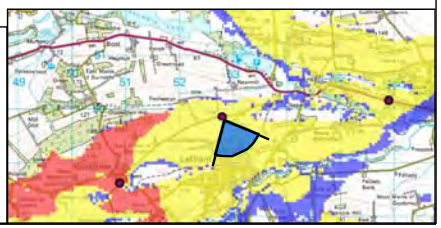
Photomontage showing proposed development screened by vegetation

Locogen Ltd, 44 Constitution St, Edinburgh, EH6 6RS
Tel:+44(0)131 624 8968;
Email: info@locogen.com
Company Number: SC370060

Project:	Hillhead of Ascurry
Drawing no:	HOA054
Drawing by:	Franco Giovanetti
Approved by:	Andy Lowe
OS Licence N°:	100050069

Viewpoint No:	VP06
Viewpoint Location:	E352792 N749851
Field of View:	80°
View direction:	154.7°
Dist to turbine:	3.4 km
Title:	Junction at Girdle Stone

Camera:	Nikon D60
Effective Focal Length:	50mm
Viewing Distance:	23.8 cm
Elevation:	1.8m
Date taken:	29-Aug
Time taken:	15:30:00



AC56

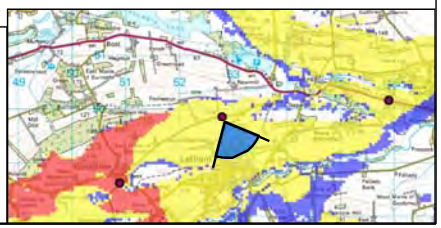
Photomontage showing proposed development

Locogen Ltd, 44 Constitution St, Edinburgh, EH6 6RS
Tel:+44(0)131 624 8968;
Email: info@locogen.com
Company Number: SC370060

Project:	Hillhead of Ascurry
Drawing no:	HOA055
Drawing by:	Franco Giovanetti
Approved by:	Andy Lowe
OS Licence N°:	100050069

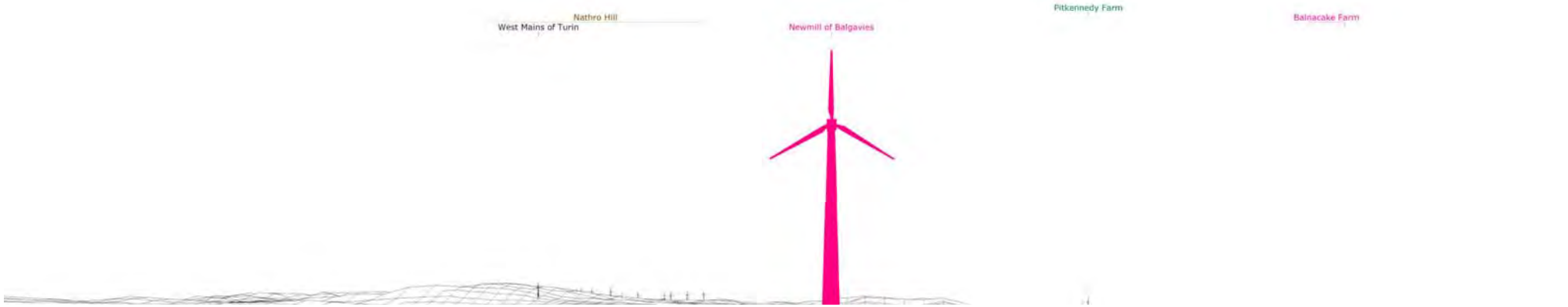
Viewpoint No:	VP06
Viewpoint Location:	E352792 N749851
Field of View:	45°
View direction:	157.7°
Dist to turbine:	3.4 km
Title:	Junction at Girdle Stone

Camera:	Nikon D60
Effective Focal Length:	50mm
Viewing Distance:	48.3 cm
Elevation:	1.8m
Date taken:	29-Aug
Time taken:	15:30:00



AC56

Computer generated wireframe showing cumulative development



Computer generated wireframe showing cumulative development

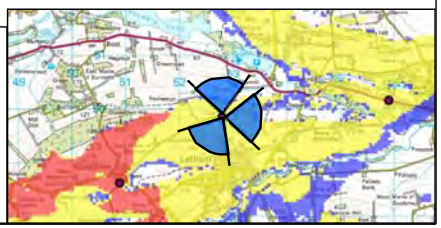
Computer generated wireframe showing cumulative development

Locogen Ltd, 44 Constitution St, Edinburgh, EH6 6RS
Tel:+44(0)131 624 8968;
Email: info@locogen.com
Company Number: SC370060

Project:	Hillhead of Ascurry
Drawing no:	HOA056
Drawing by:	Franco Giovanetti
Approved by:	Andy Lowe
OS Licence N°:	100050069

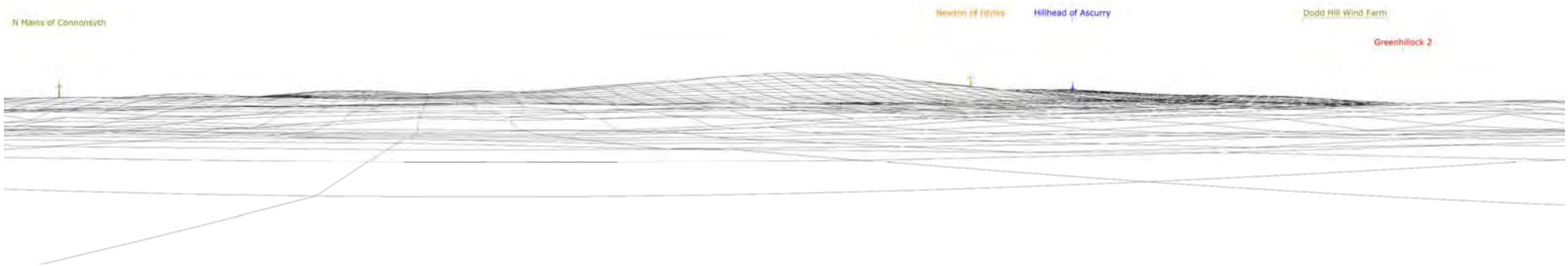
Viewpoint No:	VP06
Viewpoint Location:	E352792 N749851
Field of View:	80°
View direction: 93.5 (bottom)°	213.5 (top), 354.7 (middle),
Dist to turbine:	3.4 km
Title:	Junction at Girdle Stone

Camera:	Nikon D60
Effective Focal Length:	50mm
Viewing Distance:	23.8 cm
Elevation:	1.8m
Date taken:	29-Aug
Time taken:	15:30:00



AC56

Existing view from A932 at Guthrie Castle



Computer generated wireframe showing proposed turbine in blue

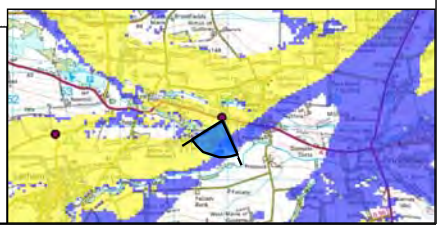
Photomontage showing proposed development

Locogen Ltd, 44 Constitution St, Edinburgh, EH6 6RS
Tel:+44(0)131 624 8968;
Email: info@locogen.com
Company Number: SC370060

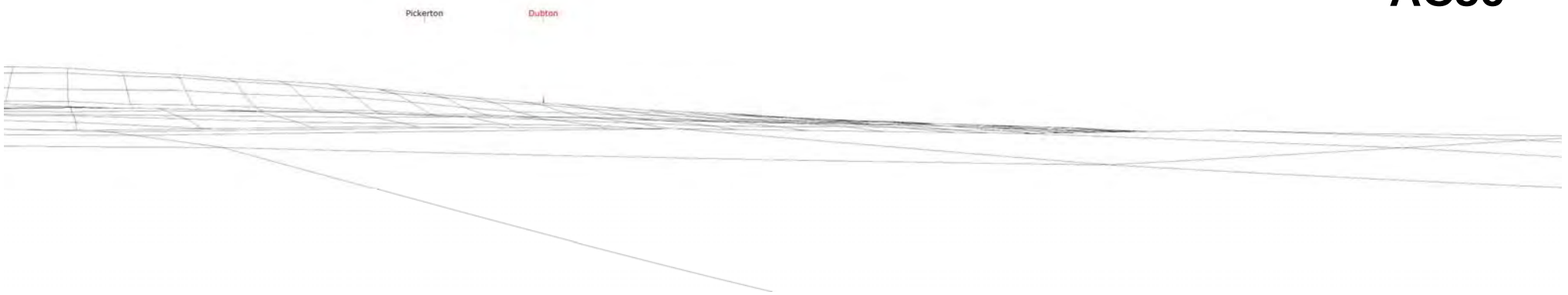
Project:	Hillhead of Ascurry
Drawing no:	HOA057
Drawing by:	Franco Giovanetti
Approved by:	Andy Lowe
OS Licence N°:	100050069

Viewpoint No:	VP07
Viewpoint Location:	E355894 N750159
Field of View:	80°
View direction:	198.2°
Dist to turbine:	4.3 km
Title:	A932 at Guthrie Castle

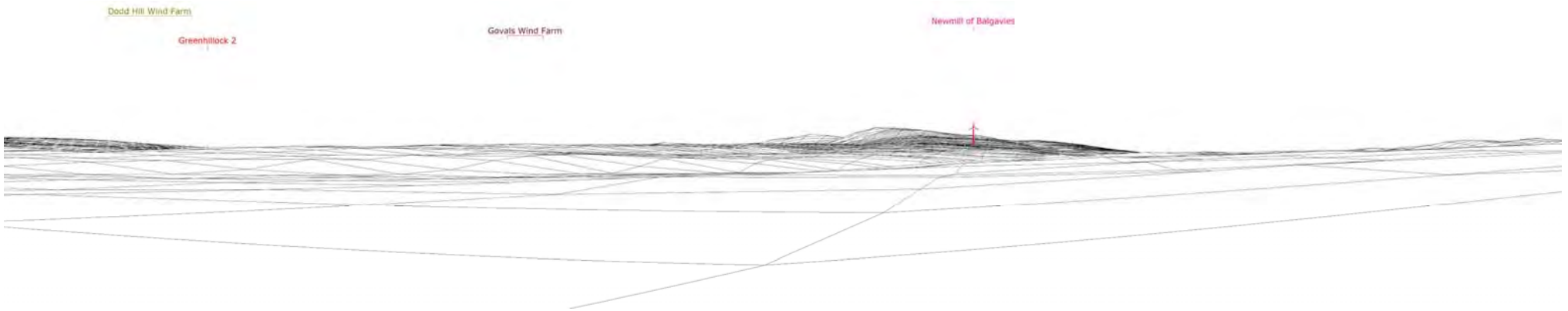
Camera:	Nikon D60
Effective Focal Length:	50mm
Viewing Distance:	23.8 cm
Elevation:	1.8m
Date taken:	29-Aug
Time taken:	13:23:00



AC56



Computer generated wireframe showing cumulative development



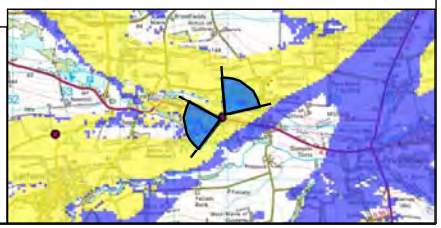
Computer generated wireframe showing cumulative development

Locogen Ltd, 44 Constitution St, Edinburgh, EH6 6RS
Tel:+44(0)131 624 8968;
Email: info@locogen.com
Company Number: SC370060

Project:	Hillhead of Ascurry
Drawing no:	HOA058
Drawing by:	Franco Giovanetti
Approved by:	Andy Lowe
OS Licence N°:	100050069

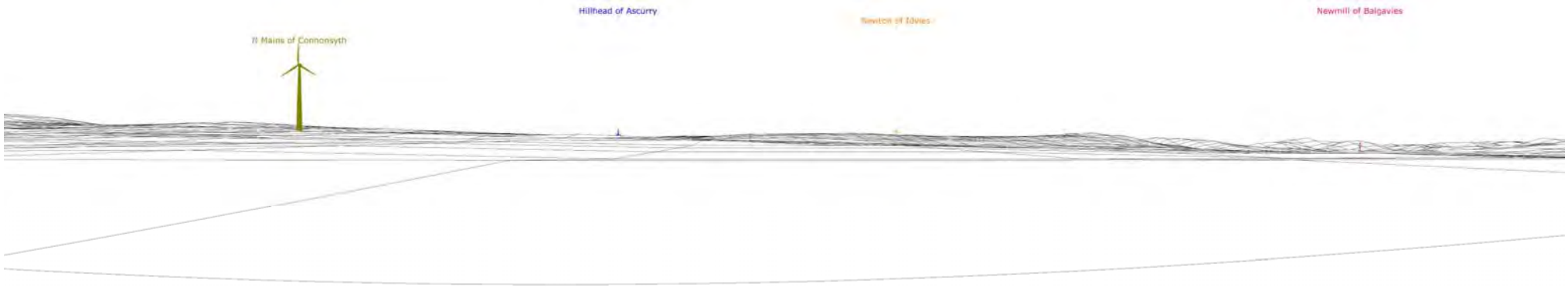
Viewpoint No:	VP07
Viewpoint Location:	E355894 N750159
Field of View:	80°
View direction:	37.1 (top), 259.4 (bottom)°
Dist to turbine:	4.3 km
Title:	A932 at Guthrie Castle

Camera:	Nikon D60
Effective Focal Length:	50mm
Viewing Distance:	23.8 cm
Elevation:	1.8m
Date taken:	29-Aug
Time taken:	13:23:00



AC56

Existing view from B961 near Helenston



Computer generated wireframe showing proposed turbine in blue

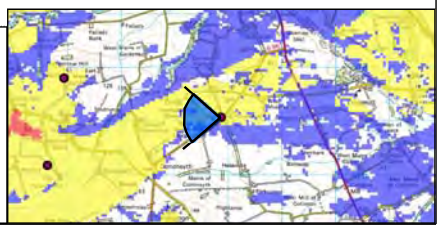
Photomontage showing proposed development

Locogen Ltd, 44 Constitution St, Edinburgh, EH6 6RS
Tel:+44(0)131 624 8968;
Email: info@locogen.com
Company Number: SC370060

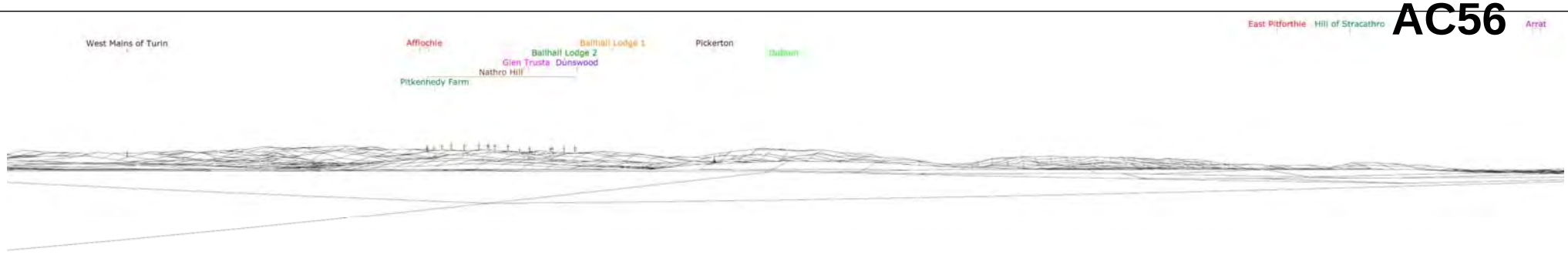
Project:	Hillhead of Ascurry
Drawing no:	HOA059
Drawing by:	Franco Giovanetti
Approved by:	Andy Lowe
OS Licence N°:	100050069

Viewpoint No:	VP08
Viewpoint Location:	E357867 N747065
Field of View:	80°
View direction:	271.5°
Dist to turbine:	4.3 km
Title:	B961 near Helenston

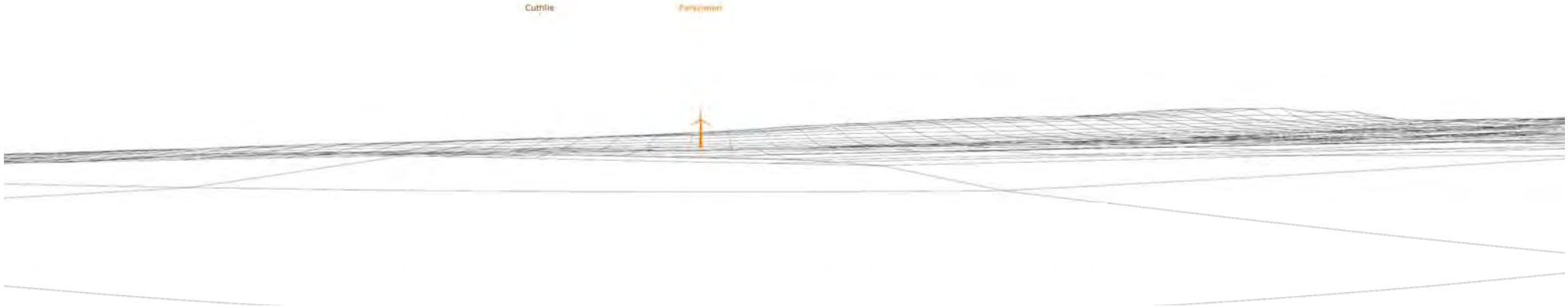
Camera:	Nikon D60
Effective Focal Length:	50mm
Viewing Distance:	23.8 cm
Elevation:	1.8m
Date taken:	29-Aug
Time taken:	13:44:00



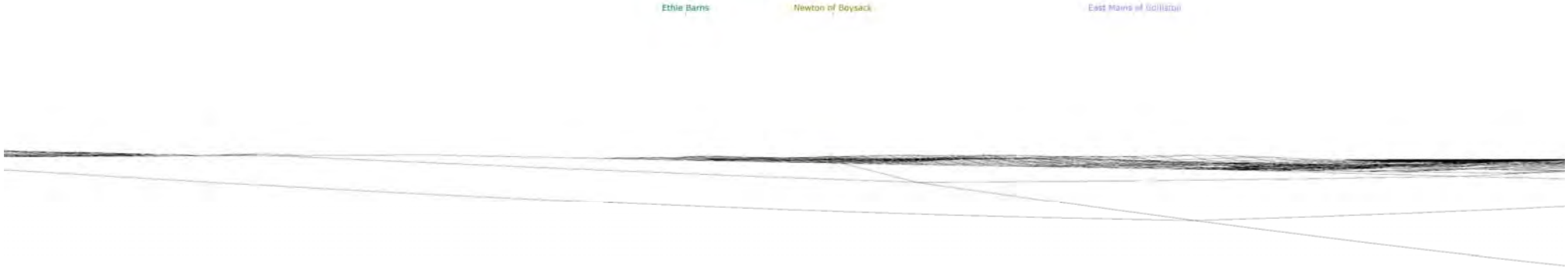
AC56



Computer generated wireframe showing cumulative development



Computer generated wireframe showing cumulative development



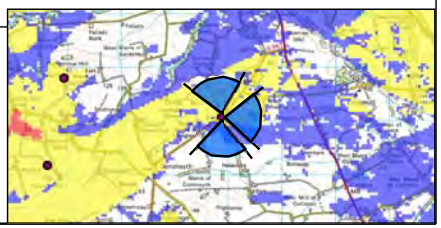
Computer generated wireframe showing cumulative development

Locogen Ltd, 44 Constitution St, Edinburgh, EH6 6RS
Tel:+44(0)131 624 8968;
Email: info@locogen.com
Company Number: SC370060

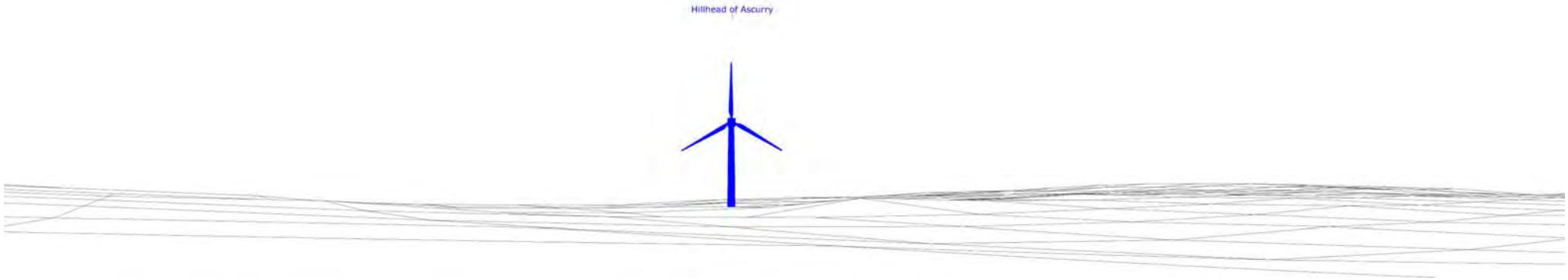
Project:	Hillhead of Ascurry
Drawing no:	HOA060
Drawing by:	Franco Giovanetti
Approved by:	Andy Lowe
OS Licence N°:	100050069

Viewpoint No:	VP08
Viewpoint Location:	E357867 N747065
Field of View:	80°
View direction:	349.4° (top), 183.5° (middle), 93.5° (bottom)
Dist to turbine:	4.3 km
Title:	B961 near Helenston

Camera:	Nikon D60
Effective Focal Length:	50mm
Viewing Distance:	23.8 cm
Elevation:	1.8m
Date taken:	29-Aug
Time taken:	13:44:00



Existing view from local road near Gask



Computer generated wireframe showing proposed turbine in blue

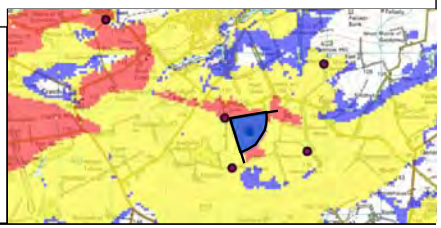
Photomontage showing proposed development

Locogen Ltd, 44 Constitution St, Edinburgh, EH6 6RS
Tel:+44(0)131 624 8968;
Email: info@locogen.com
Company Number: SC370060

Project:	Hillhead of Ascurry
Drawing no:	HOA039
Drawing by:	Franco Giovanetti
Approved by:	Andy Lowe
OS Licence N°:	100050069

Viewpoint No:	VP01
Viewpoint Location:	E353092 N746791
Field of View:	80°
View direction:	122.65°
Dist to turbine:	0.5 km
Title:	Local Road Near Gask

Camera:	Nikon D60
Effective Focal Length:	50mm
Viewing Distance:	23.8 cm
Elevation:	1.8m
Date taken:	29-Aug
Time taken:	14:39:00



AC56

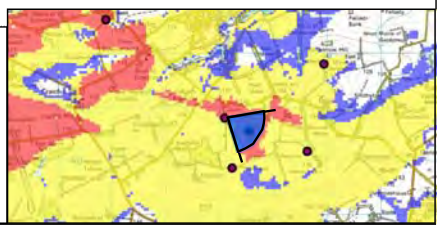
Photomontage showing proposed development

Locogen Ltd, 44 Constitution St, Edinburgh, EH6 6RS
Tel:+44(0)131 624 8968;
Email: info@locogen.com
Company Number: SC370060

Project:	Hillhead of Ascurry
Drawing no:	HOA040
Drawing by:	Franco Giovanetti
Approved by:	Andy Lowe
OS Licence N°:	100050069

Viewpoint No:	VP01
Viewpoint Location:	E353092 N746791
Field of View:	45°
View direction:	122.65°
Dist to turbine:	0.5 km
Title:	Local Road Near Gask

Camera:	Nikon D60
Effective Focal Length:	50mm
Viewing Distance:	48.3 cm
Elevation:	1.8m
Date taken:	29-Aug
Time taken:	14:39:00



AC56

Computer generated wireframe showing cumulative development

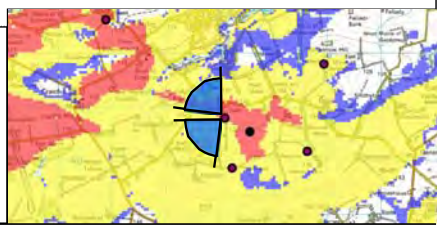
Computer generated wireframe showing cumulative development

Locogen Ltd, 44 Constitution St, Edinburgh, EH6 6RS
Tel:+44(0)131 624 8968;
Email: info@locogen.com
Company Number: SC370060

Project:	Hillhead of Ascurry
Drawing no:	HOA041
Drawing by:	Franco Giovanetti
Approved by:	Andy Lowe
OS Licence N°:	100050069

Viewpoint No:	VP01
Viewpoint Location:	E353092 N746791
Field of View:	80°
View direction:	229.4° (top), 319.4° (bottom)
Dist to turbine:	0.5 km
Title:	Local Road Near Gask

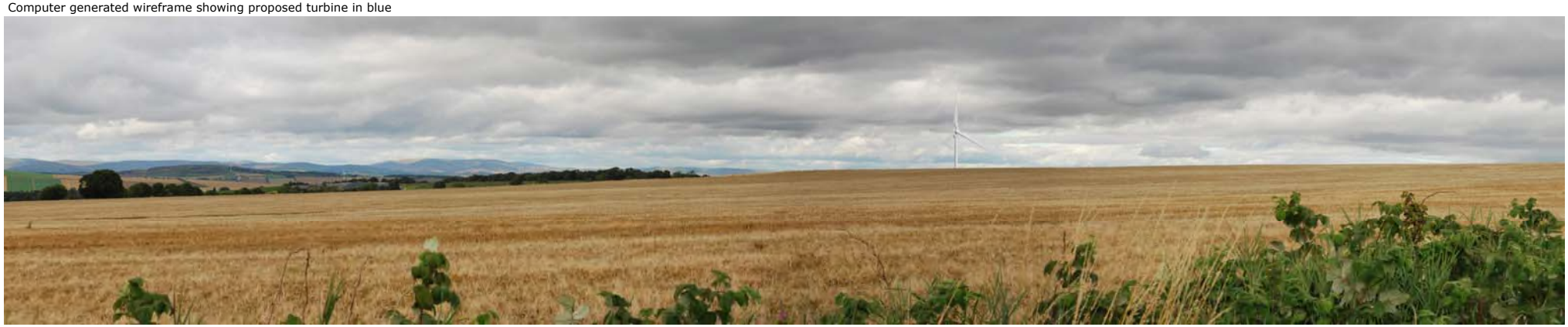
Camera:	Nikon D60
Effective Focal Length:	50mm
Viewing Distance:	23.8 cm
Elevation:	1.8m
Date taken:	29-Aug
Time taken:	14:39:00



AC56

Existing view from Hillhead

Computer generated wireframe showing proposed turbine in blue



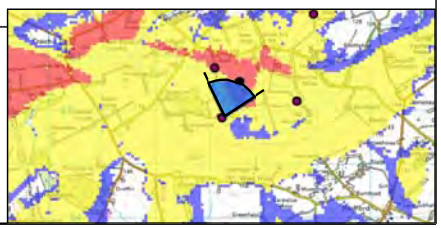
Photomontage showing proposed development

Locogen Ltd, 44 Constitution St, Edinburgh, EH6 6RS
Tel:+44(0)131 624 8968;
Email: info@locogen.com
Company Number: SC370060

Project:	Hillhead of Ascurry
Drawing no:	HOA042
Drawing by:	Franco Giovanetti
Approved by:	Andy Lowe
OS Licence N°:	100050069

Viewpoint No:	VP02
Viewpoint Location:	E353230 N745864
Field of View:	80°
View direction:	16.5°
Dist to turbine:	0.8 km
Title:	Hillhead

Camera:	Nikon D60
Effective Focal Length:	50mm
Viewing Distance:	23.8 cm
Elevation:	1.8m
Date taken:	29-Aug
Time taken:	14:59:00



AC56

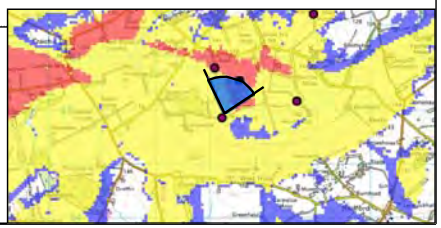
Photomontage showing proposed development

Locogen Ltd, 44 Constitution St, Edinburgh, EH6 6RS
Tel:+44(0)131 624 8968;
Email: info@locogen.com
Company Number: SC370060

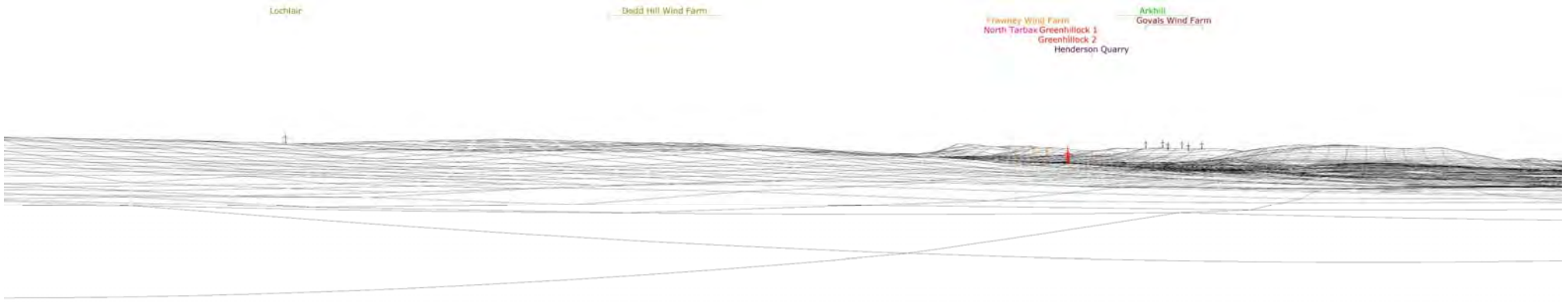
Project:	Hillhead of Ascurry
Drawing no:	HOA043
Drawing by:	Franco Giovanetti
Approved by:	Andy Lowe
OS Licence N°:	100050069

Viewpoint No:	VP02
Viewpoint Location:	E353230 N745864
Field of View:	45°
View direction:	16.5°
Dist to turbine:	0.8 km
Title:	Hillhead

Camera:	Nikon D60
Effective Focal Length:	50mm
Viewing Distance:	48.3 cm
Elevation:	1.8m
Date taken:	29-Aug
Time taken:	14:59:00



AC56



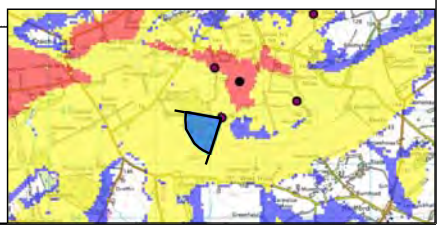
Computer generated wireframe showing cumulative development

Locogen Ltd, 44 Constitution St, Edinburgh, EH6 6RS
Tel:+44(0)131 624 8968;
Email: info@locogen.com
Company Number: SC370060

Project:	Hillhead of Ascurry
Drawing no:	HOA044
Drawing by:	Franco Giovanetti
Approved by:	Andy Lowe
OS Licence N°:	100050069

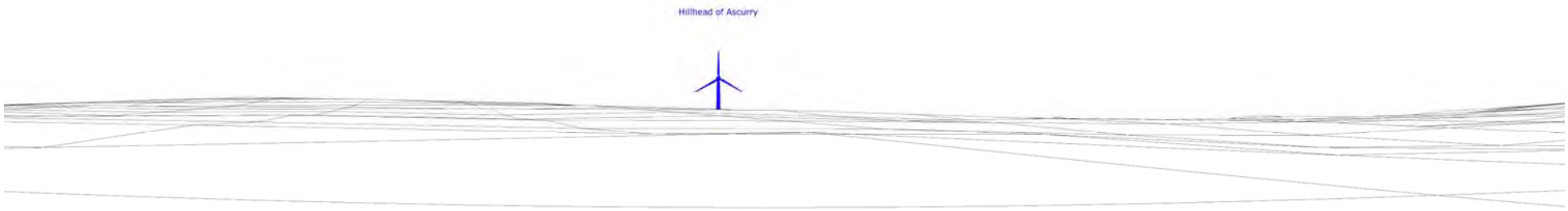
Viewpoint No:	VP02
Viewpoint Location:	E353230 N745864
Field of View:	80°
View direction:	240°
Dist to turbine:	0.8 km
Title:	Hillhead

Camera:	Nikon D60
Effective Focal Length:	50mm
Viewing Distance:	23.8 cm
Elevation:	1.8m
Date taken:	29-Aug
Time taken:	14:59:00



AC56

Existing view from Mill of Ascurry



Computer generated wireframe showing proposed turbine in blue

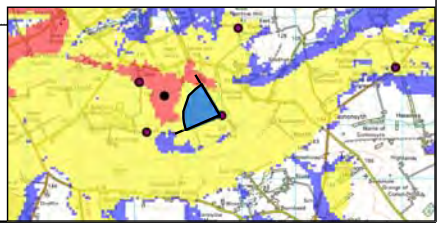
Photomontage showing proposed development

Locogen Ltd, 44 Constitution St, Edinburgh, EH6 6RS
Tel:+44(0)131 624 8968;
Email: info@locogen.com
Company Number: SC370060

Project:	Hillhead of Ascurry
Drawing no:	HOA045
Drawing by:	Franco Giovanetti
Approved by:	Andy Lowe
OS Licence N°:	100050069

Viewpoint No:	VP03
Viewpoint Location:	E354624 N746174
Field of View:	80°
View direction:	289°
Dist to turbine:	1.1 km
Title:	Ascurry Mill

Camera:	Nikon D60
Effective Focal Length:	50mm
Viewing Distance:	23.8 cm
Elevation:	1.8m
Date taken:	29-Aug
Time taken:	13:58:00



AC56

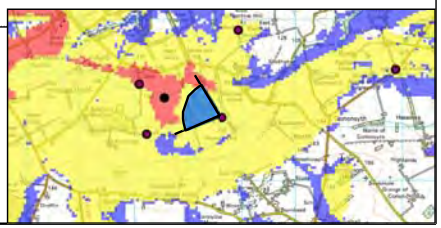
Photomontage showing proposed development

Locogen Ltd, 44 Constitution St, Edinburgh, EH6 6RS
Tel:+44(0)131 624 8968;
Email: info@locogen.com
Company Number: SC370060

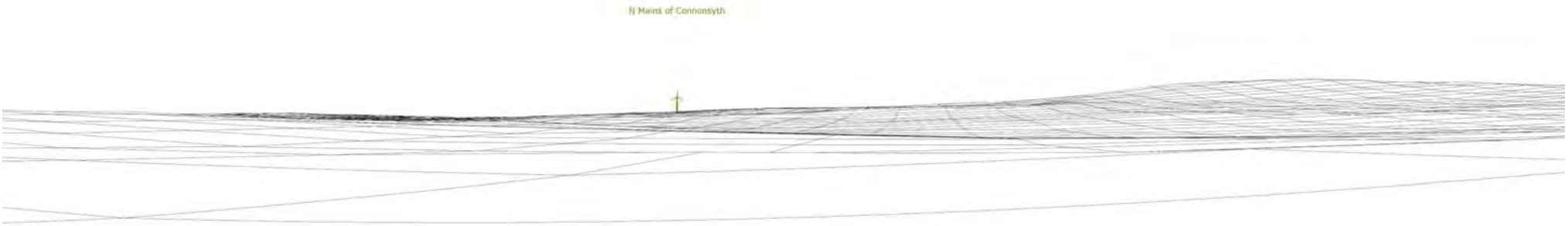
Project:	Hillhead of Ascurry
Drawing no:	HOA046
Drawing by:	Franco Giovanetti
Approved by:	Andy Lowe
OS Licence N°:	100050069

Viewpoint No:	VP03
Viewpoint Location:	E354624 N746174
Field of View:	45°
View direction:	289°
Dist to turbine:	1.1 km
Title:	Ascurry Mill

Camera:	Nikon D60
Effective Focal Length:	50mm
Viewing Distance:	48.3 cm
Elevation:	1.8m
Date taken:	29-Aug
Time taken:	13:58:00



AC56



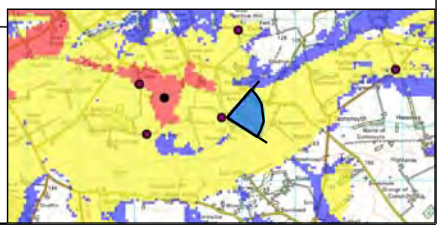
Computer generated wireframe showing cumulative development

Locogen Ltd, 44 Constitution St, Edinburgh, EH6 6RS
Tel:+44(0)131 624 8968;
Email: info@locogen.com
Company Number: SC370060

Project:	Hillhead of Ascurry
Drawing no:	HOA047
Drawing by:	Franco Giovanetti
Approved by:	Andy Lowe
OS Licence N°:	100050069

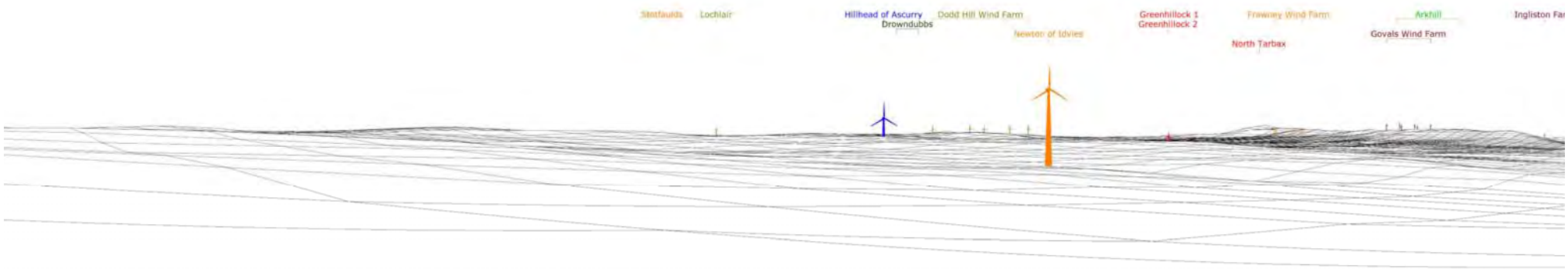
Viewpoint No:	VP03
Viewpoint Location:	E354624 N746174
Field of View:	80°
View direction:	82.9°
Dist to turbine:	1.1 km
Title:	Ascurry Mill

Camera:	Nikon D60
Effective Focal Length:	50mm
Viewing Distance:	23.8 cm
Elevation:	1.8m
Date taken:	29-Aug
Time taken:	13:58:00



AC56

Existing view from Hillkirk



Computer generated wireframe showing proposed turbine in blue

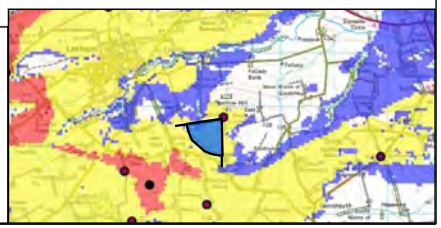
Photomontage showing proposed development

Locogen Ltd, 44 Constitution St, Edinburgh, EH6 6RS
Tel:+44(0)131 624 8968;
Email: info@locogen.com
Company Number: SC370060

Project:	Hillhead of Ascurry
Drawing no:	HOA048
Drawing by:	Franco Giovanetti
Approved by:	Andy Lowe
OS Licence N°:	100050069

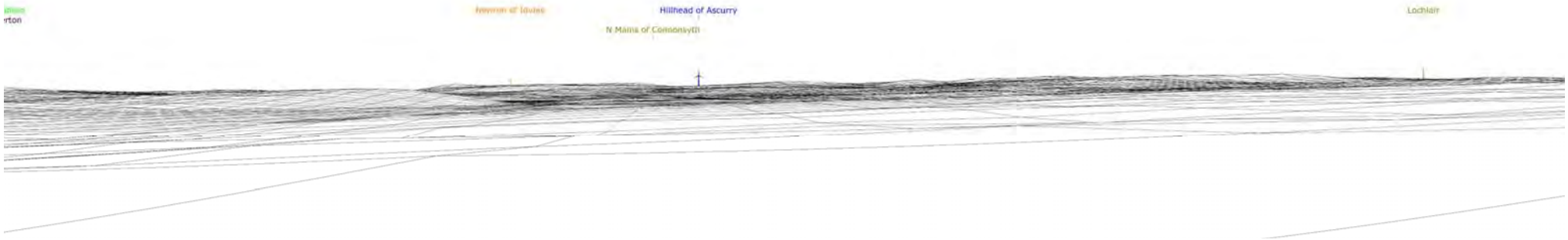
Viewpoint No:	VP04
Viewpoint Location:	E354935 N747798
Field of View:	80°
View direction:	221.5°
Dist to turbine:	1.9 km
Title:	Hillkirk/Dunbarrow Hill

Camera:	Nikon D60
Effective Focal Length:	50mm
Viewing Distance:	23.8 cm
Elevation:	1.8m
Date taken:	29-Aug
Time taken:	14:30:00



AC56

Existing view from Bankhead



Computer generated wireframe showing proposed turbine in blue

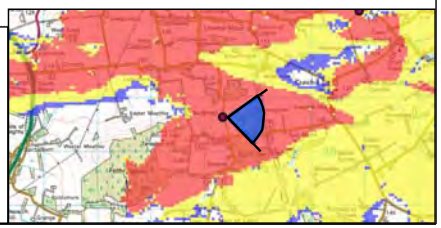
Photomontage showing proposed development screened by vegetation

Locogen Ltd, 44 Constitution St, Edinburgh, EH6 6RS
Tel:+44(0)131 624 8968;
Email: info@locogen.com
Company Number: SC370060

Project:	Hillhead of Ascurry
Drawing no:	HOA061
Drawing by:	Franco Giovanetti
Approved by:	Andy Lowe
OS Licence N°:	100050069

Viewpoint No:	VP09
Viewpoint Location:	E348337 N746639
Field of View:	80°
View direction:	96.2°
Dist to turbine:	5.2 km
Title:	Bankhead

Camera:	Nikon D60
Effective Focal Length:	50mm
Viewing Distance:	23.8 cm
Elevation:	1.8m
Date taken:	29-Aug
Time taken:	16:20:00



AC56

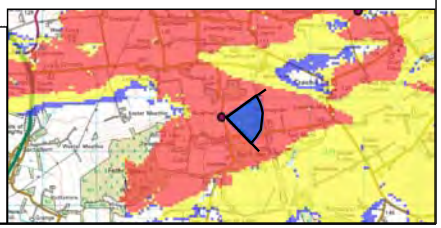
Photomontage showing proposed development screened by vegetation

Locogen Ltd, 44 Constitution St, Edinburgh, EH6 6RS
Tel:+44(0)131 624 8968;
Email: info@locogen.com
Company Number: SC370060

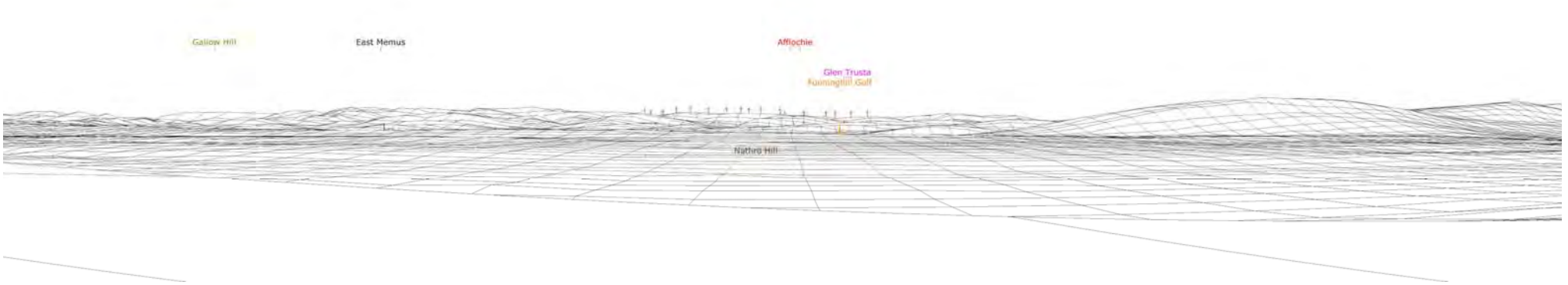
Project:	Hillhead of Ascurry
Drawing no:	HOA062
Drawing by:	Franco Giovanetti
Approved by:	Andy Lowe
OS Licence N°:	100050069

Viewpoint No:	VP09
Viewpoint Location:	E348337 N746639
Field of View:	45°
View direction:	96.2°
Dist to turbine:	5.2 km
Title:	Bankhead

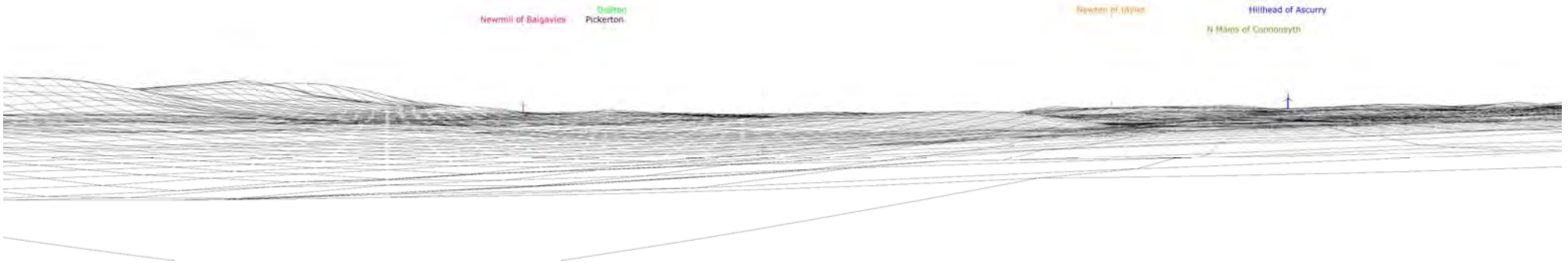
Camera:	Nikon D60
Effective Focal Length:	50mm
Viewing Distance:	48.3 cm
Elevation:	1.8m
Date taken:	29-Aug
Time taken:	16:20:00



AC56



Computer generated wireframe showing cumulative development



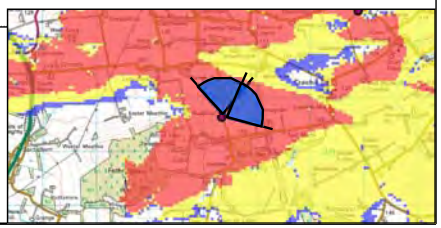
Computer generated wireframe showing cumulative development

Locogen Ltd, 44 Constitution St, Edinburgh, EH6 6RS
Tel:+44(0)131 624 8968;
Email: info@locogen.com
Company Number: SC370060

Project:	Hillhead of Ascurry
Drawing no:	HOA063
Drawing by:	Franco Giovanetti
Approved by:	Andy Lowe
OS Licence N°:	100050069

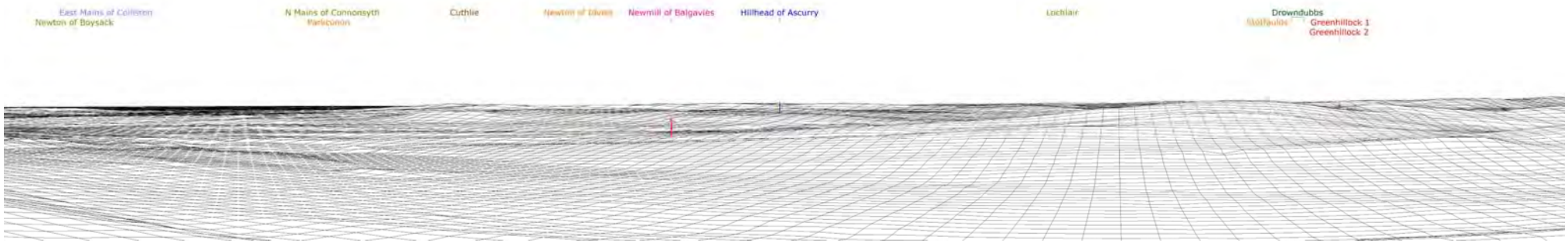
Viewpoint No:	VP09
Viewpoint Location:	E348337 N746639
Field of View:	80°
View direction:	0° (top), 65.3° (bottom)
Dist to turbine:	5.2 km
Title:	Bankhead

Camera:	Nikon D60
Effective Focal Length:	50mm
Viewing Distance:	23.8 cm
Elevation:	2.8m
Date taken:	29-Aug
Time taken:	16:20:00



AC56

Existing view from Turin Hill



Computer generated wireframe showing proposed turbine in blue

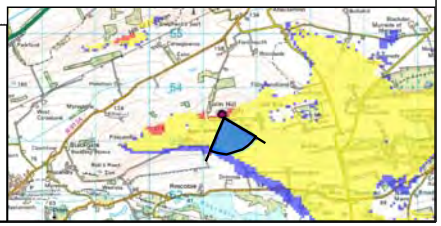
Photomontage showing proposed development

Locogen Ltd, 44 Constitution St, Edinburgh, EH6 6RS
Tel:+44(0)131 624 8968;
Email: info@locogen.com
Company Number: SC370060

Project:	Hillhead of Ascurry
Drawing no:	HOA064
Drawing by:	Franco Giovanetti
Approved by:	Andy Lowe
OS Licence N°:	100050069

Viewpoint No:	VP10
Viewpoint Location:	E351355 N753495
Field of View:	80°
View direction:	163°
Dist to turbine:	7.3 km
Title:	Turin Hill

Camera:	Nikon D60
Effective Focal Length:	50mm
Viewing Distance:	23.8 cm
Elevation:	1.8m
Date taken:	29-Aug
Time taken:	12:30:00



AC56

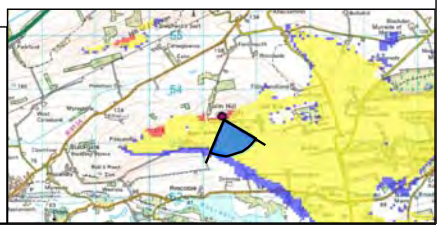
Photomontage showing proposed development

Locogen Ltd, 44 Constitution St, Edinburgh, EH6 6RS
Tel:+44(0)131 624 8968;
Email: info@locogen.com
Company Number: SC370060

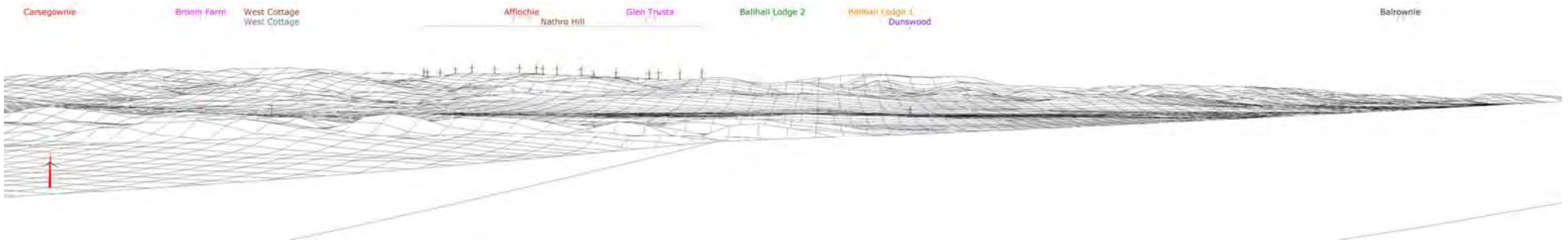
Project:	Hillhead of Ascurry
Drawing no:	HOA065
Drawing by:	Franco Giovanetti
Approved by:	Andy Lowe
OS Licence N°:	100050069

Viewpoint No:	VP10
Viewpoint Location:	E351355 N753495
Field of View:	45°
View direction:	163°
Dist to turbine:	7.3 km
Title:	Turin Hill

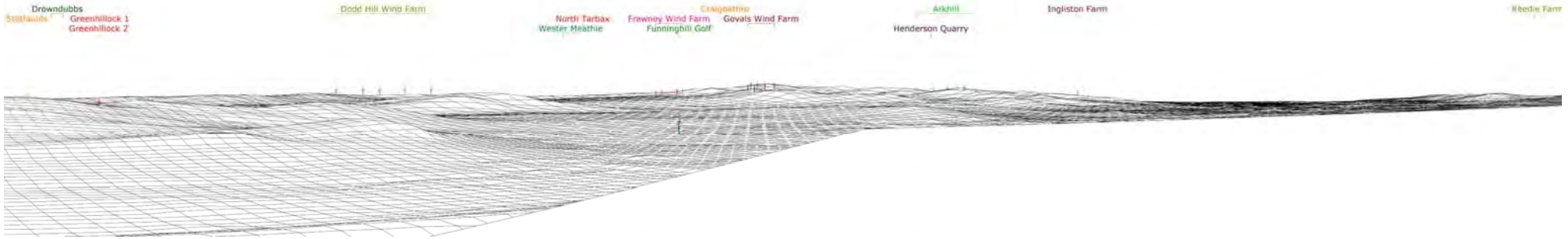
Camera:	Nikon D60
Effective Focal Length:	50mm
Viewing Distance:	48.3 cm
Elevation:	1.8m
Date taken:	29-Aug
Time taken:	12:30:00



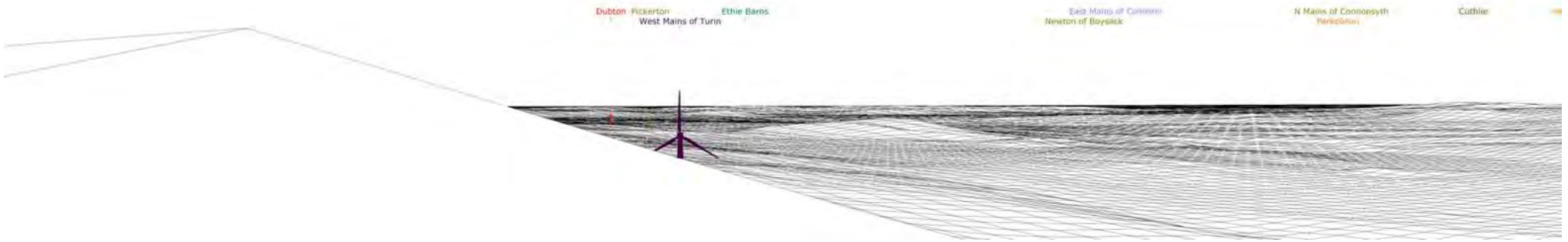
AC56



Computer generated wireframe showing cumulative development



Computer generated wireframe showing cumulative development



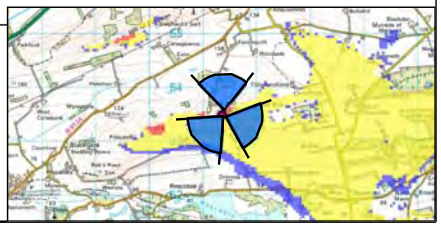
Computer generated wireframe showing cumulative development

Locogen Ltd, 44 Constitution St, Edinburgh, EH6 6RS
Tel:+44(0)131 624 8968;
Email: info@locogen.com
Company Number: SC370060

Project:	Hillhead of Ascurry
Drawing no:	HOA066
Drawing by:	Franco Giovanetti
Approved by:	Andy Lowe
OS Licence N°:	100050069

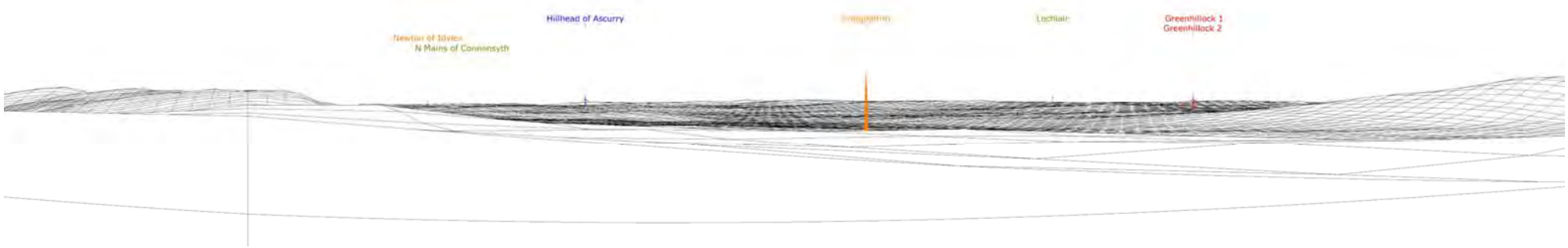
Viewpoint No:	VP10
Viewpoint Location:	E351355 N753495
Field of View:	80°
View direction:	358.2° (top), 226.5° (middle), 111.2° (bottom)
Dist to turbine:	7.3 km
Title:	Turin Hill

Camera:	Nikon D60
Effective Focal Length:	50mm
Viewing Distance:	23.8 cm
Elevation:	1.8m
Date taken:	29-Aug
Time taken:	12:30:00



AC56

Existing view from Balmashanner



Computer generated wireframe showing proposed turbine in blue

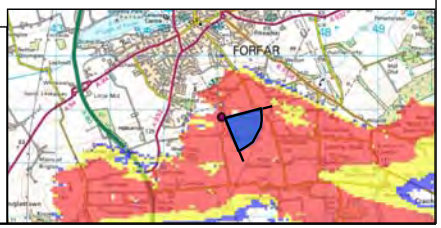
Photomontage showing proposed development

Locogen Ltd, 44 Constitution St, Edinburgh, EH6 6RS
Tel:+44(0)131 624 8968;
Email: info@locogen.com
Company Number: SC370060

Project:	Hillhead of Ascurry
Drawing no:	HOA067
Drawing by:	Franco Giovanetti
Approved by:	Andy Lowe
OS Licence N°:	100050069

Viewpoint No:	VP11
Viewpoint Location:	E346082 N748853
Field of View:	80°
View direction:	117.5°
Dist to turbine:	7.8 km
Title:	Balshanner

Camera:	Nikon D60
Effective Focal Length:	50mm
Viewing Distance:	23.8 cm
Elevation:	1.8m
Date taken:	29-Aug
Time taken:	16:09:00



AC56

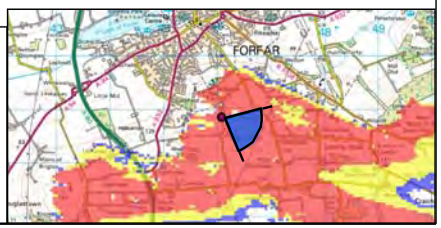
Photomontage showing proposed development

Locogen Ltd, 44 Constitution St, Edinburgh, EH6 6RS
Tel:+44(0)131 624 8968;
Email: info@locogen.com
Company Number: SC370060

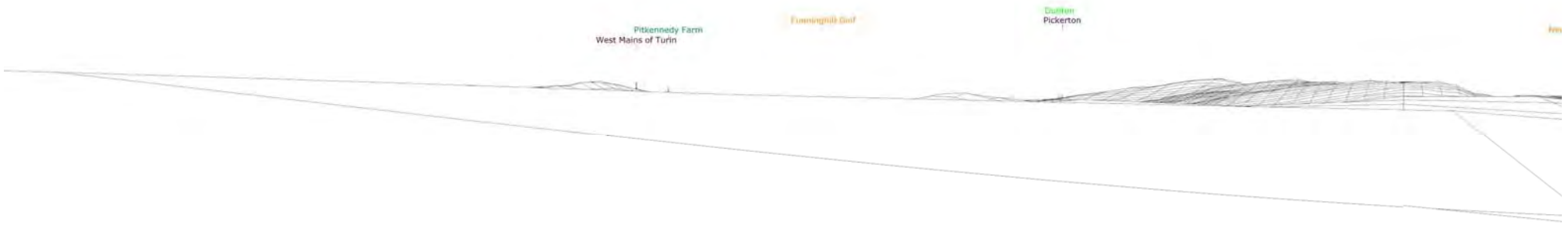
Project:	Hillhead of Ascurry
Drawing no:	HOA068
Drawing by:	Franco Giovanetti
Approved by:	Andy Lowe
OS Licence N°:	100050069

Viewpoint No:	VP11
Viewpoint Location:	E346082 N748853
Field of View:	45°
View direction:	117.5°
Dist to turbine:	7.8 km
Title:	Balshanner

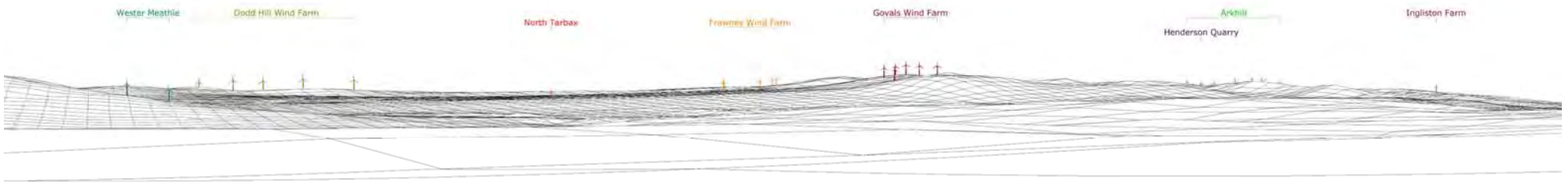
Camera:	Nikon D60
Effective Focal Length:	50mm
Viewing Distance:	48.3 cm
Elevation:	1.8m
Date taken:	29-Aug
Time taken:	16:09:00



AC56



Computer generated wireframe showing cumulative development



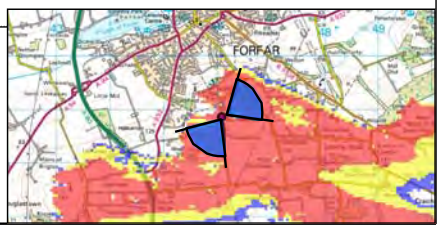
Computer generated wireframe showing cumulative development

Locogen Ltd, 44 Constitution St, Edinburgh, EH6 6RS
Tel:+44(0)131 624 8968;
Email: info@locogen.com
Company Number: SC370060

Project:	Hillhead of Ascurry
Drawing no:	HOA069
Drawing by:	Franco Giovanetti
Approved by:	Andy Lowe
OS Licence N°:	100050069

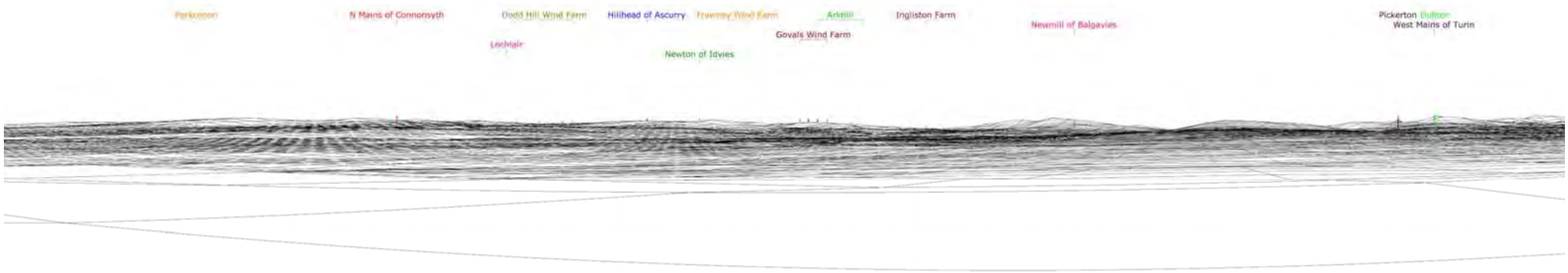
Viewpoint No:	VP11
Viewpoint Location:	E346082 N748853
Field of View:	80°
View direction:	58.2° (top), 215.3° (bottom)
Dist to turbine:	7.8 km
Title:	Balshanner

Camera:	Nikon D60
Effective Focal Length:	50mm
Viewing Distance:	23.8 cm
Elevation:	1.8m
Date taken:	29-Aug
Time taken:	16:09:00



AC56

Existing view from local road near Mainsbank



Computer generated wireframe showing proposed turbine in blue

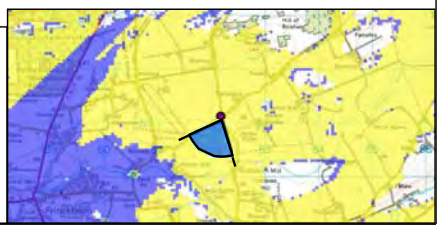
Photomontage showing proposed development

Locogen Ltd, 44 Constitution St, Edinburgh, EH6 6RS
Tel:+44(0)131 624 8968;
Email: info@locogen.com
Company Number: SC370060

Project:	Hillhead of Ascurry
Drawing no:	HOA070
Drawing by:	Franco Giovanetti
Approved by:	Andy Lowe
OS Licence N°:	100050069

Viewpoint No:	VP12
Viewpoint Location:	E362172 N751122
Field of View:	80°
View direction:	205°
Dist to turbine:	9.8 km
Title:	Local road near Mainsbank

Camera:	Nikon D60
Effective Focal Length:	50mm
Viewing Distance:	23.8 cm
Elevation:	1.8m
Date taken:	29-Aug
Time taken:	10:36:00



AC56

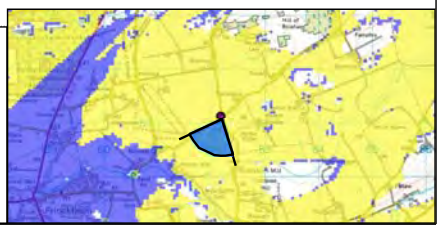
Photomontage showing proposed development

Locogen Ltd, 44 Constitution St, Edinburgh, EH6 6RS
Tel:+44(0)131 624 8968;
Email: info@locogen.com
Company Number: SC370060

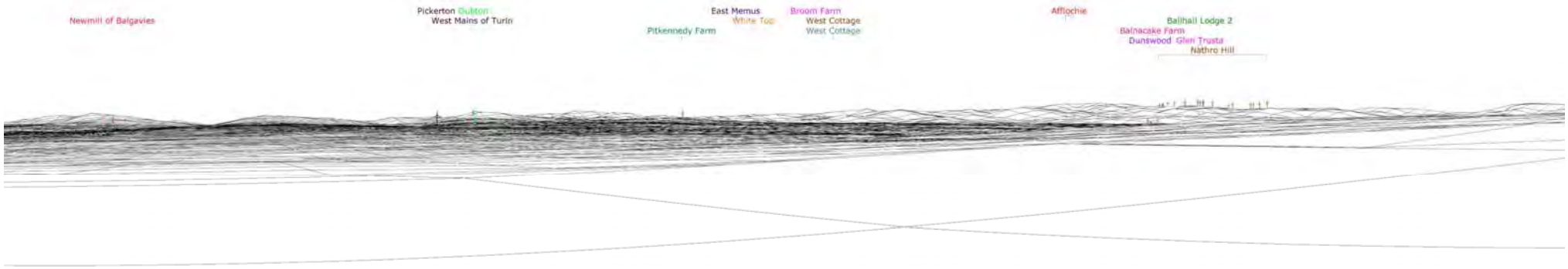
Project:	Hillhead of Ascurry
Drawing no:	HOA071
Drawing by:	Franco Giovanetti
Approved by:	Andy Lowe
OS Licence N°:	100050069

Viewpoint No:	VP12
Viewpoint Location:	E362172 N751122
Field of View:	45°
View direction:	205°
Dist to turbine:	9.8 km
Title:	Local road near Mainsbank

Camera:	Nikon D60
Effective Focal Length:	50mm
Viewing Distance:	48.3 cm
Elevation:	1.8m
Date taken:	29-Aug
Time taken:	10:36:00



AC56



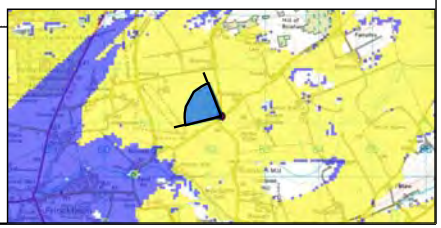
Computer generated wireframe showing cumulative development

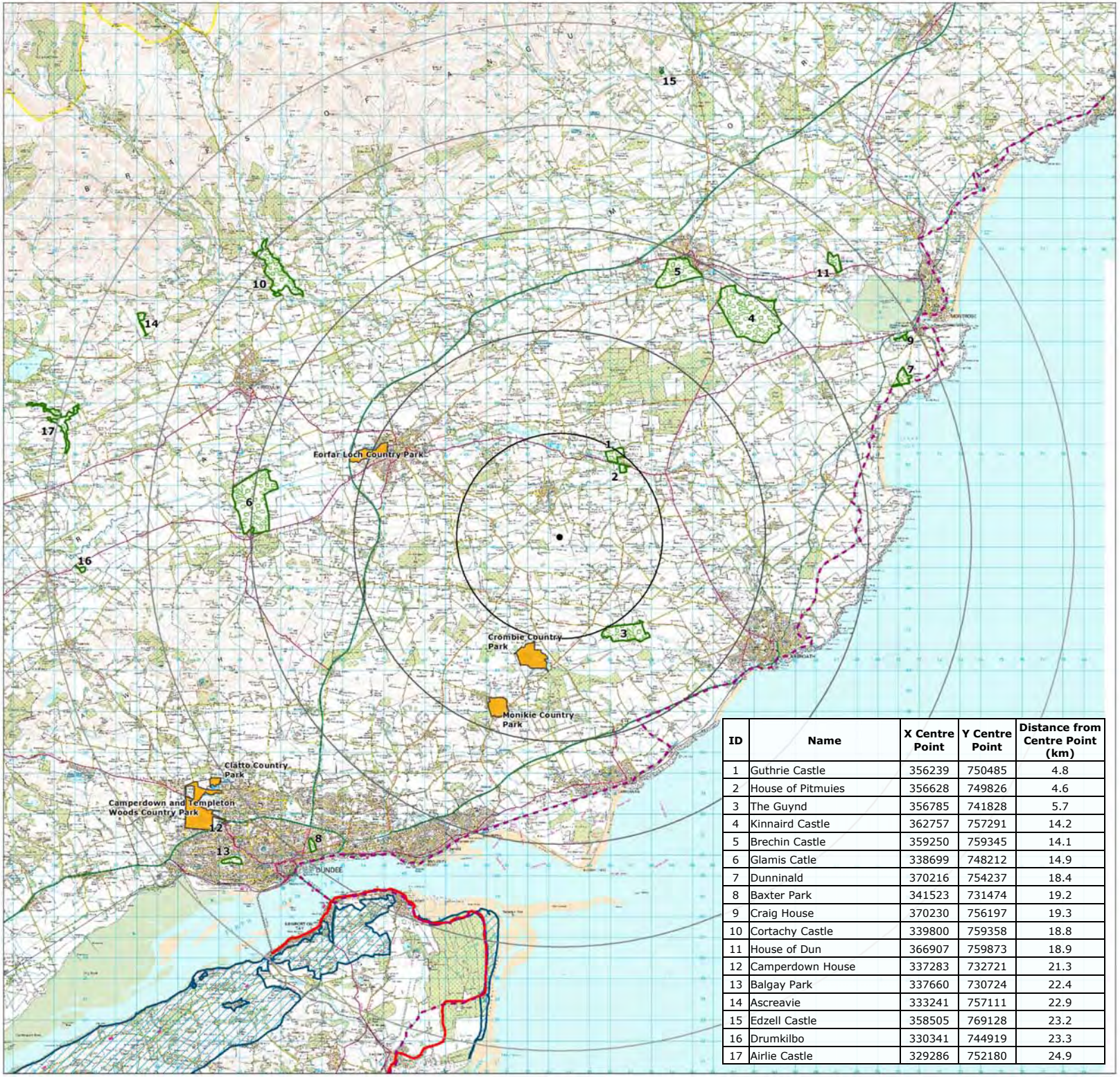
Locogen Ltd, 44 Constitution St, Edinburgh, EH6 6RS
Tel:+44(0)131 624 8968;
Email: info@locogen.com
Company Number: SC370060

Project:	Hillhead of Ascurry
Drawing no:	HOA072
Drawing by:	Franco Giovanetti
Approved by:	Andy Lowe
OS Licence N°:	100050069

Viewpoint No:	VP12
Viewpoint Location:	E362172 N751122
Field of View:	80°
View direction:	298.2°
Dist to turbine:	9.8 km
Title:	Local road near Mainsbank

Camera:	Nikon D60
Effective Focal Length:	50mm
Viewing Distance:	23.8 cm
Elevation:	1.8m
Date taken:	29-Aug
Time taken:	10:36:00





ID	Name	X Centre Point	Y Centre Point	Distance from Centre Point (km)
1	Guthrie Castle	356239	750485	4.8
2	House of Pitmuies	356628	749826	4.6
3	The Guynd	356785	741828	5.7
4	Kinnaird Castle	362757	757291	14.2
5	Brechin Castle	359250	759345	14.1
6	Glamis Catle	338699	748212	14.9
7	Dunninald	370216	754237	18.4
8	Baxter Park	341523	731474	19.2
9	Craig House	370230	756197	19.3
10	Cortachy Castle	339800	759358	18.8
11	House of Dun	366907	759873	18.9
12	Camperdown House	337283	732721	21.3
13	Balgay Park	337660	730724	22.4
14	Ascreavie	333241	757111	22.9
15	Edzell Castle	358505	769128	23.2
16	Drumkilbo	330341	744919	23.3
17	Airlie Castle	329286	752180	24.9

AC57

Locogen Ltd, 44 Constitution St, Edinburgh, EH6 6RS
Tel: +44 (0) 131 555 4745; Email: info@locogen.com
Company Number: SC370060; VAT Number: 983 3836 77

Project Description

Number of Turbine(s):	1
Turbine Model:	EWT Directwind 54
Hub Height:	50m
Blade diameter:	54m
Total height to blade tip:	77m
Turbine location:	353539 746476

Notes

This map shows the designated landscape areas within 25km of the proposed site: country parks, gardens and designed landscapes, popular walking and cycling routes and local designated areas.

Radii: 5, 10, 15, 20 and 25km

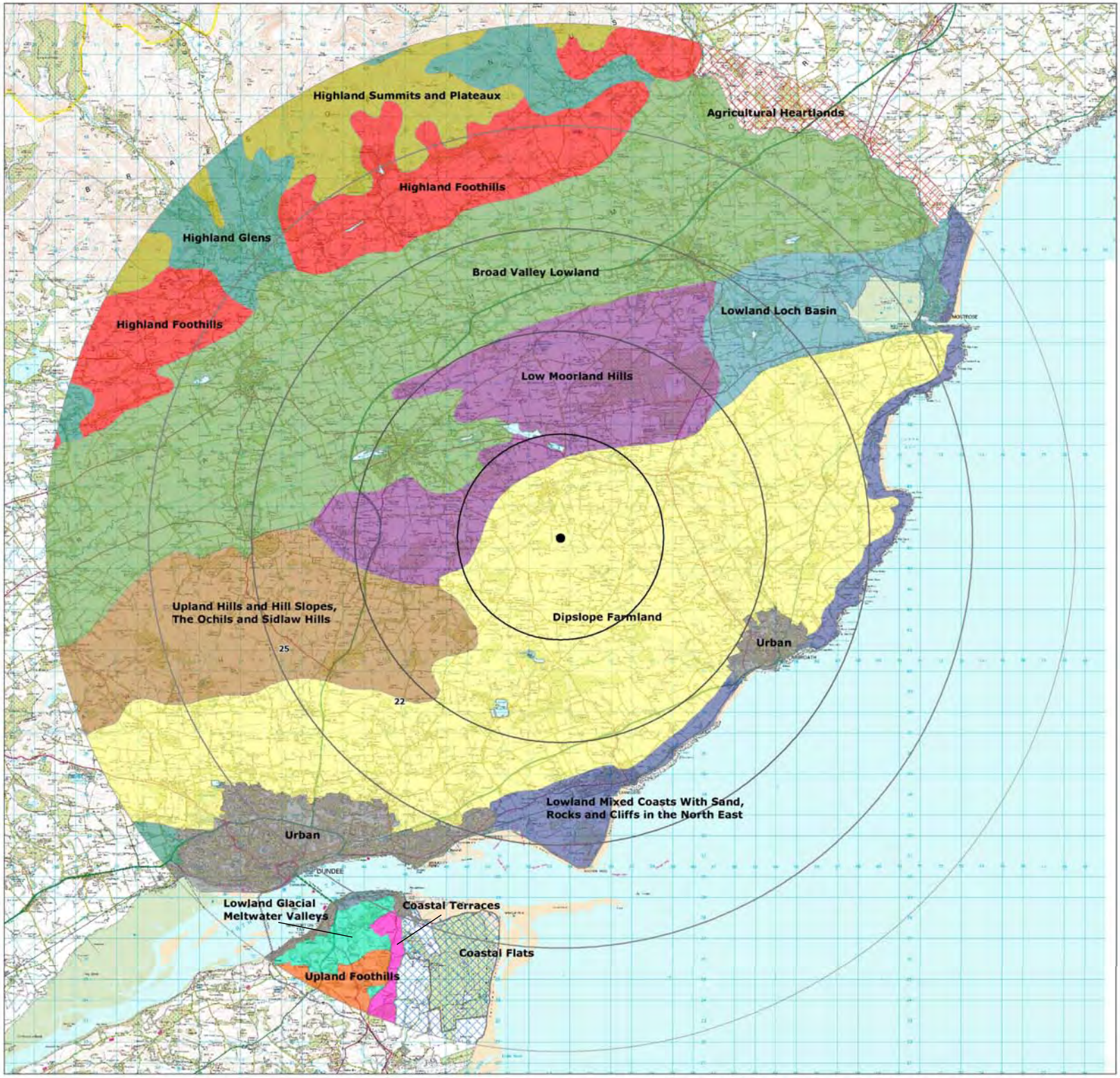
Legend

- Turbine Location
- Historic Gardens and Designed Landscapes
- Country Parks
- National Cycle Route 1
- Fife Coastal Path
- Fife Council Special Landscape Areas

PROJECT:	**Hillhead of Ascurry**
DRAWING TITLE:	Designated Landscape Areas
DRAWING NO:	HOA006
DOCUMENT SIZE:	A3
SCALE:	1:180,000
DATE:	05/10/2013
DRAWING BY:	Franco Giovanetti
APPROVED BY:	Andy Lowe

N

0 5 10 15 km



AC57

Locogen Ltd, 44 Constitution St, Edinburgh, EH6 6RS
Tel: +44 (0) 131 555 4745; Email: info@locogen.com
Company Number: SC370060; VAT Number: 983 3836 77

Project Description

Number of Turbine(s):	1
Turbine Model:	EWT Directwind 54
Hub Height:	50m
Blade diameter:	54m
Total height to blade tip:	77m
Turbine location:	353539 746476

Notes

This map shows the various Landscape Character Areas within 25km of the proposed wind turbine site.

Radii: 5, 10, 15, 20 and 25km

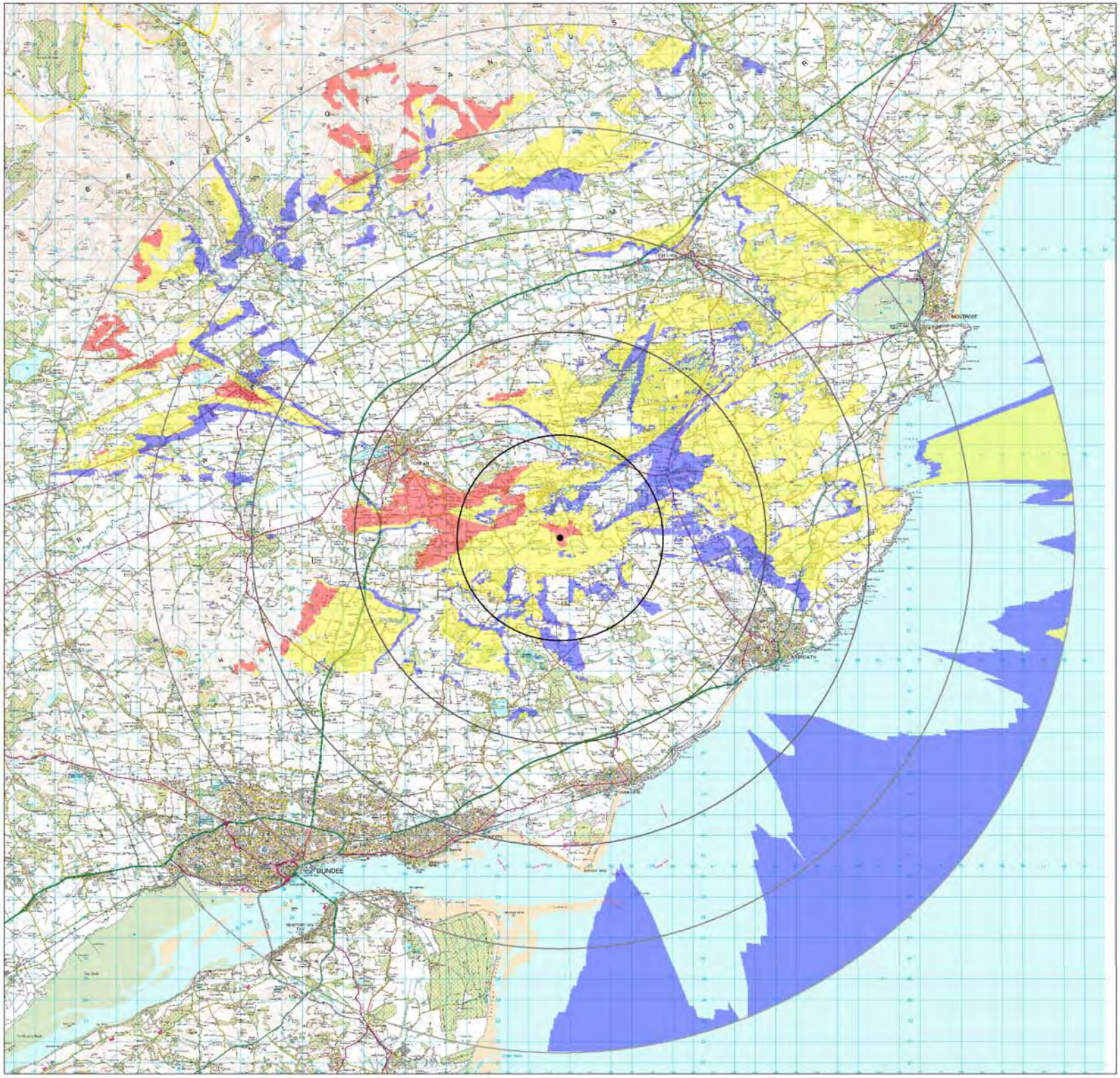
Legend

● Turbine Location

PROJECT:	**Hillhead of Ascurry**
DRAWING TITLE:	Landscape Character Type
DRAWING NO:	HOA008
DOCUMENT SIZE:	A3
SCALE:	1:180,000
DATE:	05/10/2013
DRAWING BY:	Franco Giovanetti
APPROVED BY:	Andy Lowe

N

0 5 10 15 km



AC57

Locogen Ltd, 44 Constitution St, Edinburgh, EH6 6RS
Tel: +44 (0) 131 555 4745; Email: info@locogen.com
Company Number: SC370060; VAT Number: 983 3836 77

Project Description

Number of Turbine(s):	1
Turbine Model:	EWT Directwind 54
Hub Height:	50m
Blade diameter:	54m
Total height to blade tip:	77m
Turbine location:	353539 746476

Notes

This map shows the Zone of Theoretical Visibility of the proposed wind turbine within 25km.

Radii: 5, 10, 15, 20 and 25km

Legend

● Turbine Location

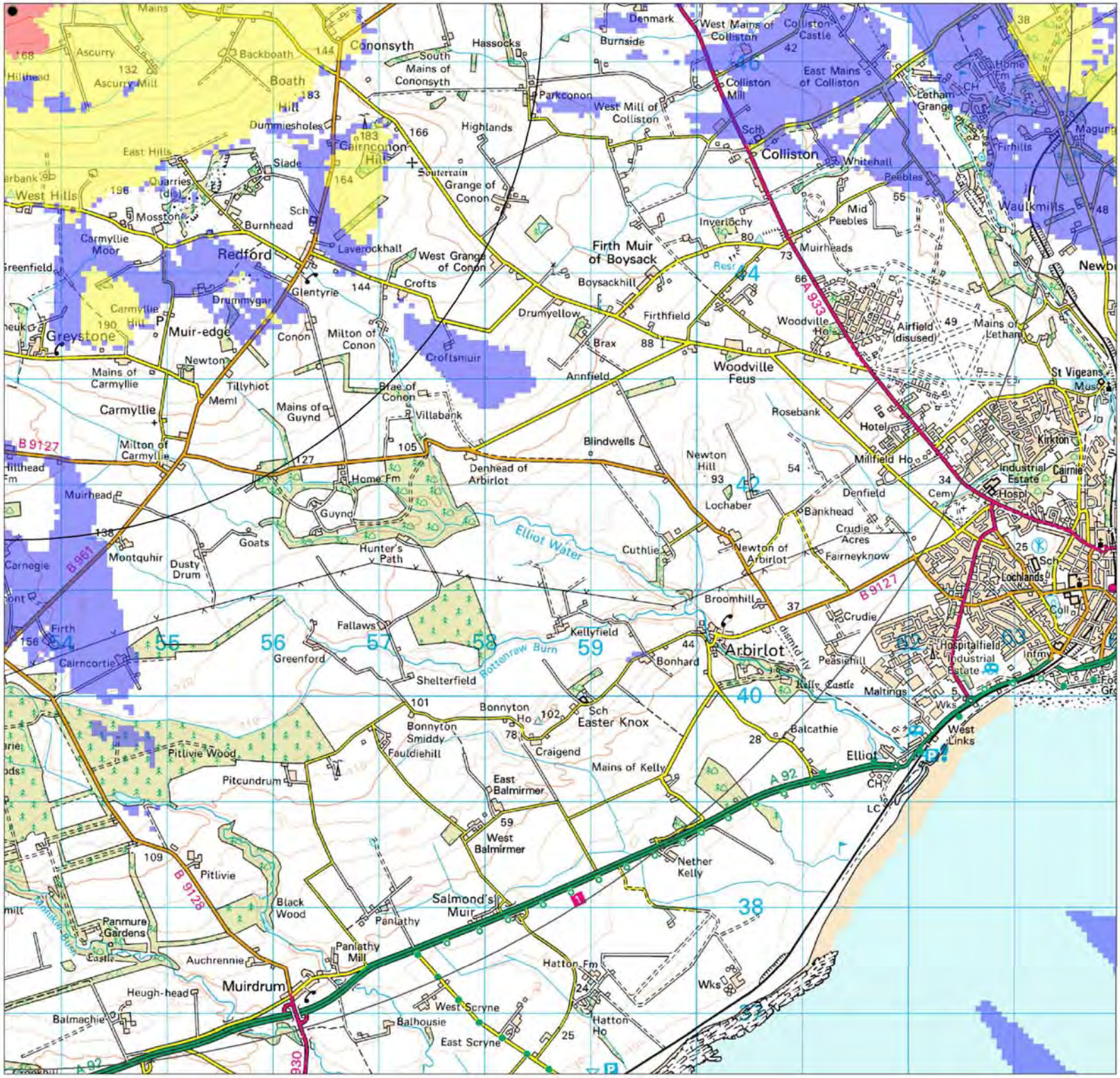
This theoretical visibility map is based on a receptor viewing height of 1.8m AGL. The levels of theoretical visibility are based on the following colouring scheme:

Blue:	Only the blades are theoretically visible from these areas
Yellow:	At least the nacelle and blades are theoretically visible in these areas
Red:	The blades, nacelle and tower down to a point at least 1m AGL are theoretically visible in these areas

PROJECT:	**Hillhead of Ascurry**
DRAWING TITLE:	ZTV
DRAWING NO:	HOA009
DOCUMENT SIZE:	A3
SCALE:	1:180,000
DATE:	05/10/2013
DRAWING BY:	Franco Giovanetti
APPROVED BY:	Andy Lowe

N

0 5 10 15 km



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Locogen Ltd, 44 Constitution St, Edinburgh, EH6 6RS
Tel: +44 (0) 131 555 4745; Email: info@locogen.com
Company Number: SC370060; VAT Number: 983 3836 77

Project Description

Number of Turbine(s):	1
Turbine Model:	EWT Directwind 54
Hub Height:	50m
Blade diameter:	54m
Total height to blade tip:	77m
Turbine location:	353539 746476

Notes

This map shows the proposed turbine Zone of Theoretical Visibility within 10km of the proposed site in a south east direction.

Radii: 5 and 10km

Legend

● Turbine Location

This theoretical visibility map is based on a receptor viewing height of 1.8m AGL. The levels of theoretical visibility are based on the following colouring scheme:

Blue: Only the blades are theoretically visible from these areas

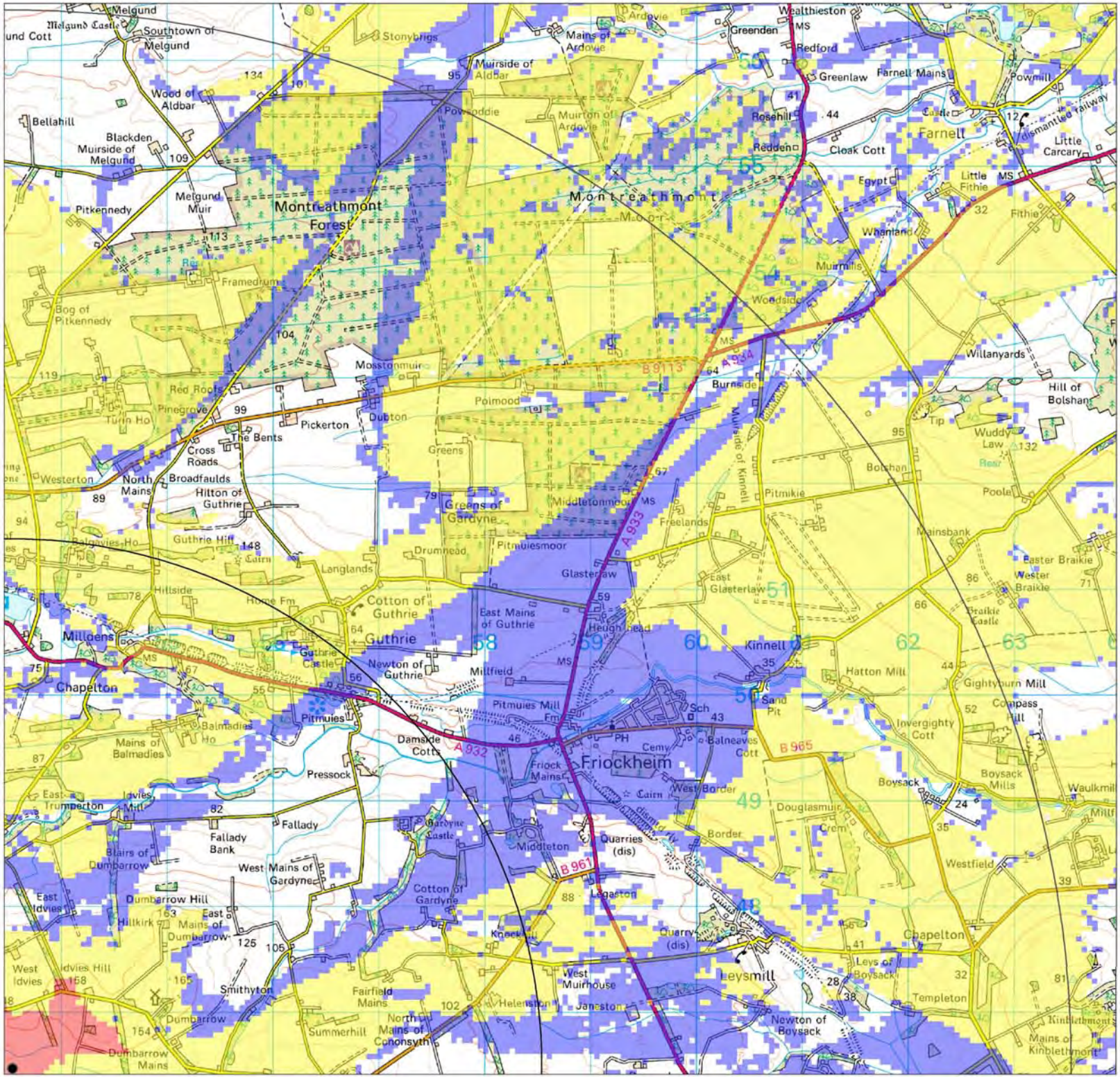
Yellow: At least the nacelle and blades are theoretically visible in these areas

Red: The blades, nacelle and tower down to a point at least 1m AGL are theoretically visible in these areas

PROJECT:	**Hillhead of Ascurry**
DRAWING TITLE:	ZTV 10km South East
DRAWING NO:	HOA010
DOCUMENT SIZE:	A3
SCALE:	1:35,000
DATE:	05/10/2013
DRAWING BY:	Franco Giovanetti
APPROVED BY:	Andy Lowe

N

0 1 2 3 km



AC57

Locogen Ltd, 44 Constitution St, Edinburgh, EH6 6RS
Tel: +44 (0) 131 555 4745; Email: info@locogen.com
Company Number: SC370060; VAT Number: 983 3836 77

Project Description

Number of Turbine(s):	1
Turbine Model:	EWT Directwind 54
Hub Height:	50m
Blade diameter:	54m
Total height to blade tip:	77m
Turbine location:	353539 746476

Notes

This map shows the proposed turbine Zone of Theoretical Visibility within 10km of the proposed site in a north east direction.

Radii: 5 and 10km

Legend

● Turbine Location

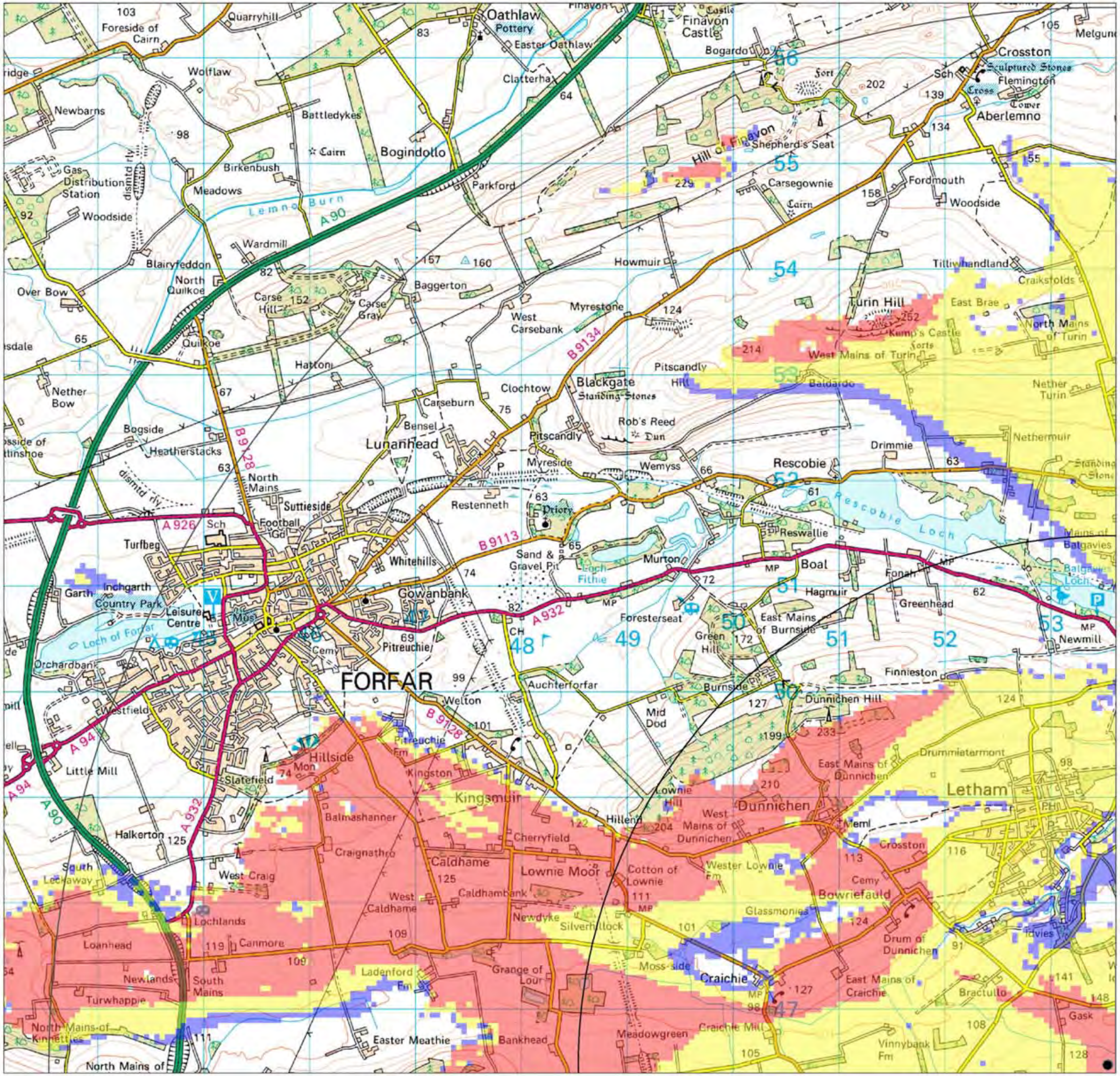
This theoretical visibility map is based on a receptor viewing height of 1.8m AGL. The levels of theoretical visibility are based on the following colouring scheme:

Blue:	Only the blades are theoretically visible from these areas
Yellow:	At least the nacelle and blades are theoretically visible in these areas
Red:	The blades, nacelle and tower down to a point at least 1m AGL are theoretically visible in these areas

PROJECT:	**Hillhead of Ascurry**
DRAWING TITLE:	ZTV 10km North East
DRAWING NO:	HOA011
DOCUMENT SIZE:	A3
SCALE:	1:35,000
DATE:	05/10/2013
DRAWING BY:	Franco Giovanetti
APPROVED BY:	Andy Lowe

N

0 1 2 3 km



AC57

Locogen

Locogen Ltd, 44 Constitution St, Edinburgh, EH6 6RS
Tel: +44 (0) 131 555 4745; Email: info@locogen.com
Company Number: SC370060; VAT Number: 983 3836 77

Project Description

Number of Turbine(s):	1
Turbine Model:	EWT Directwind 54
Hub Height:	50m
Blade diameter:	54m
Total height to blade tip:	77m
Turbine location:	353539 746476

Notes

This map shows the proposed turbine Zone of Theoretical Visibility within 10km of the proposed site in a north west direction.

Radii: 5 and 10km

Legend

● Turbine Location

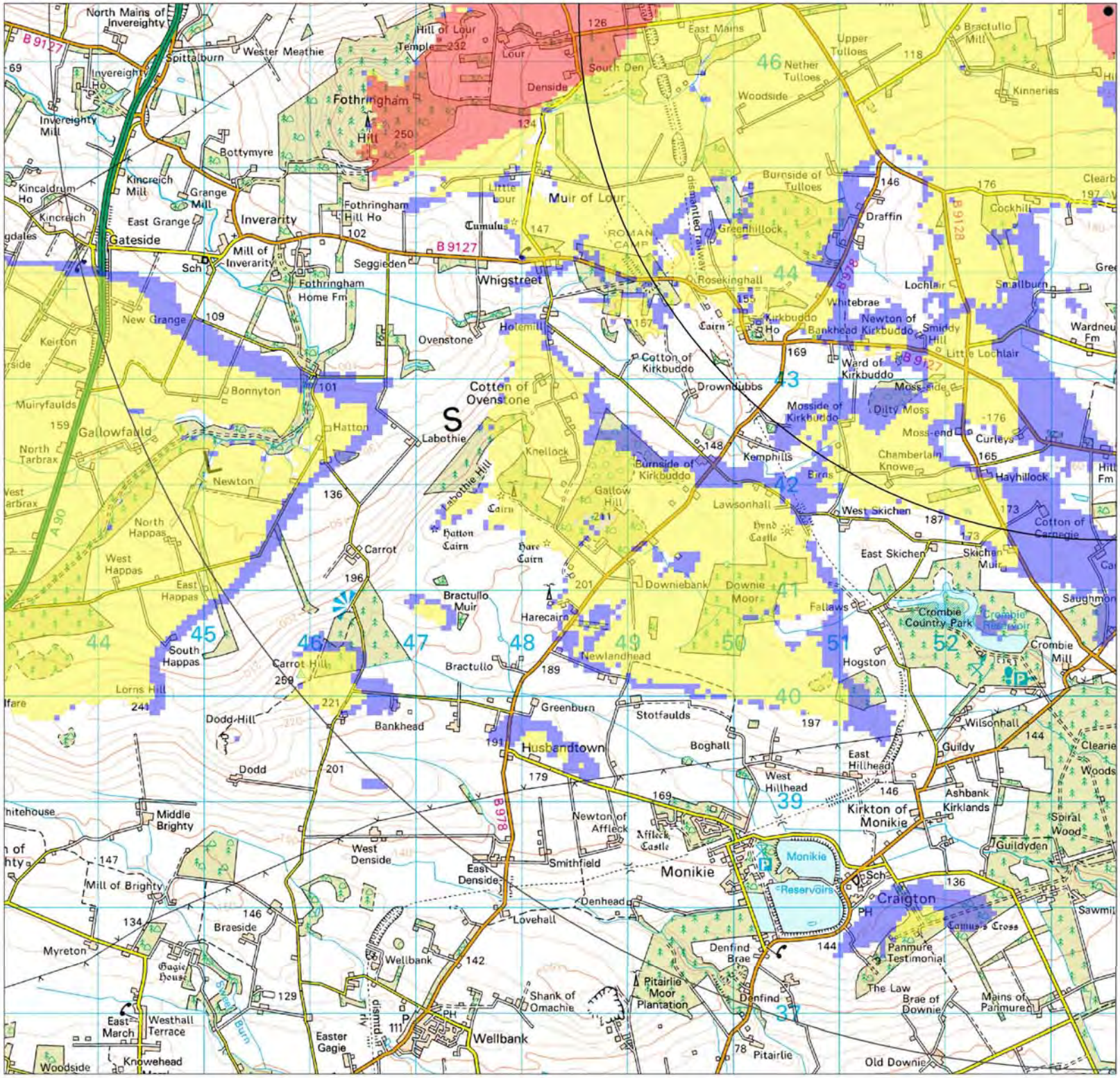
This theoretical visibility map is based on a receptor viewing height of 1.8m AGL. The levels of theoretical visibility are based on the following colouring scheme:

Blue:	Only the blades are theoretically visible from these areas
Yellow:	At least the nacelle and blades are theoretically visible in these areas
Red:	The blades, nacelle and tower down to a point at least 1m AGL are theoretically visible in these areas

PROJECT:	**Hillhead of Ascurry**
DRAWING TITLE:	ZTV 10km North West
DRAWING NO:	HOA012
DOCUMENT SIZE:	A3
SCALE:	1:35,000
DATE:	05/10/2013
DRAWING BY:	Franco Giovanetti
APPROVED BY:	Andy Lowe

N

0 1 2 3 km



AC57 Locogen

Locogen Ltd, 44 Constitution St, Edinburgh, EH6 6RS
Tel: +44 (0) 131 555 4745; Email: info@locogen.com
Company Number: SC370060; VAT Number: 983 3836 77

Project Description

Number of Turbine(s):	1
Turbine Model:	EWT Directwind 54
Hub Height:	50m
Blade diameter:	54m
Total height to blade tip:	77m
Turbine location:	353539 746476

Notes

This map shows the proposed turbine Zone of Theoretical Visibility within 10km of the proposed site in a south west direction.

Radii: 5 and 10km

Legend

● Turbine Location

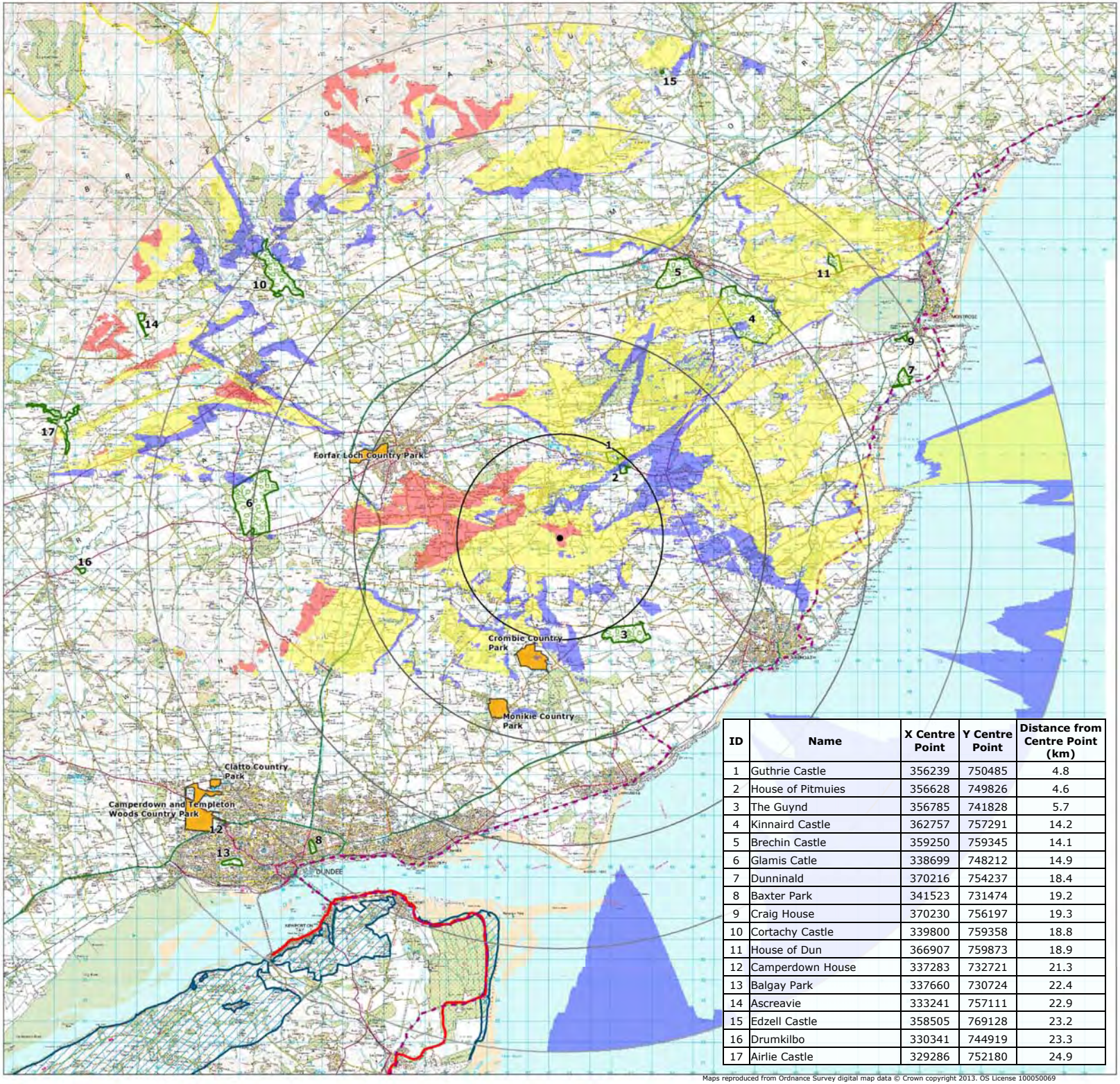
This theoretical visibility map is based on a receptor viewing height of 1.8m AGL. The levels of theoretical visibility are based on the following colouring scheme:

Blue:	Only the blades are theoretically visible from these areas
Yellow:	At least the nacelle and blades are theoretically visible in these areas
Red:	The blades, nacelle and tower down to a point at least 1m AGL are theoretically visible in these areas

PROJECT:	**Hillhead of Ascurry**
DRAWING TITLE:	ZTV 10km South West
DRAWING NO:	HOA013
DOCUMENT SIZE:	A3
SCALE:	1:35,000
DATE:	05/10/2013
DRAWING BY:	Franco Giovanetti
APPROVED BY:	Andy Lowe

N

0 1 2 3 km



ID	Name	X Centre Point	Y Centre Point	Distance from Centre Point (km)
1	Guthrie Castle	356239	750485	4.8
2	House of Pitmuies	356628	749826	4.6
3	The Guynd	356785	741828	5.7
4	Kinnaird Castle	362757	757291	14.2
5	Brechin Castle	359250	759345	14.1
6	Glamis Catle	338699	748212	14.9
7	Dunninald	370216	754237	18.4
8	Baxter Park	341523	731474	19.2
9	Craig House	370230	756197	19.3
10	Cortachy Castle	339800	759358	18.8
11	House of Dun	366907	759873	18.9
12	Camperdown House	337283	732721	21.3
13	Balgay Park	337660	730724	22.4
14	Ascreavie	333241	757111	22.9
15	Edzell Castle	358505	769128	23.2
16	Drumkilbo	330341	744919	23.3
17	Airlie Castle	329286	752180	24.9

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Tel: +44 (0) 131 555 4745; Email: info@locogen.com
Company Number: SC370060; VAT Number: 983 3836 77

Project Description

Number of Turbine(s):	1
Turbine Model:	EWT Directwind 54
Hub Height:	50m
Blade diameter:	54m
Total height to blade tip:	77m
Turbine location:	353539 746476

Notes

This map shows the designated landscape areas within 25km of the proposed site: country parks, gardens and designed landscapes, popular walking and cycling routes and local designated areas.

Radii: 5, 10, 15, 20 and 25km

Legend

- Turbine Location
- Historic Gardens and Designed Landscapes
- Country Parks
- National Cycle Route 1
- Fife Coastal Path
- Fife Council Special Landscape Areas

This theoretical visibility map is based on a receptor viewing height of 1.8m AGL. The levels of theoretical visibility are based on the following colouring scheme:

Blue: Only the blades are theoretically visible from these areas

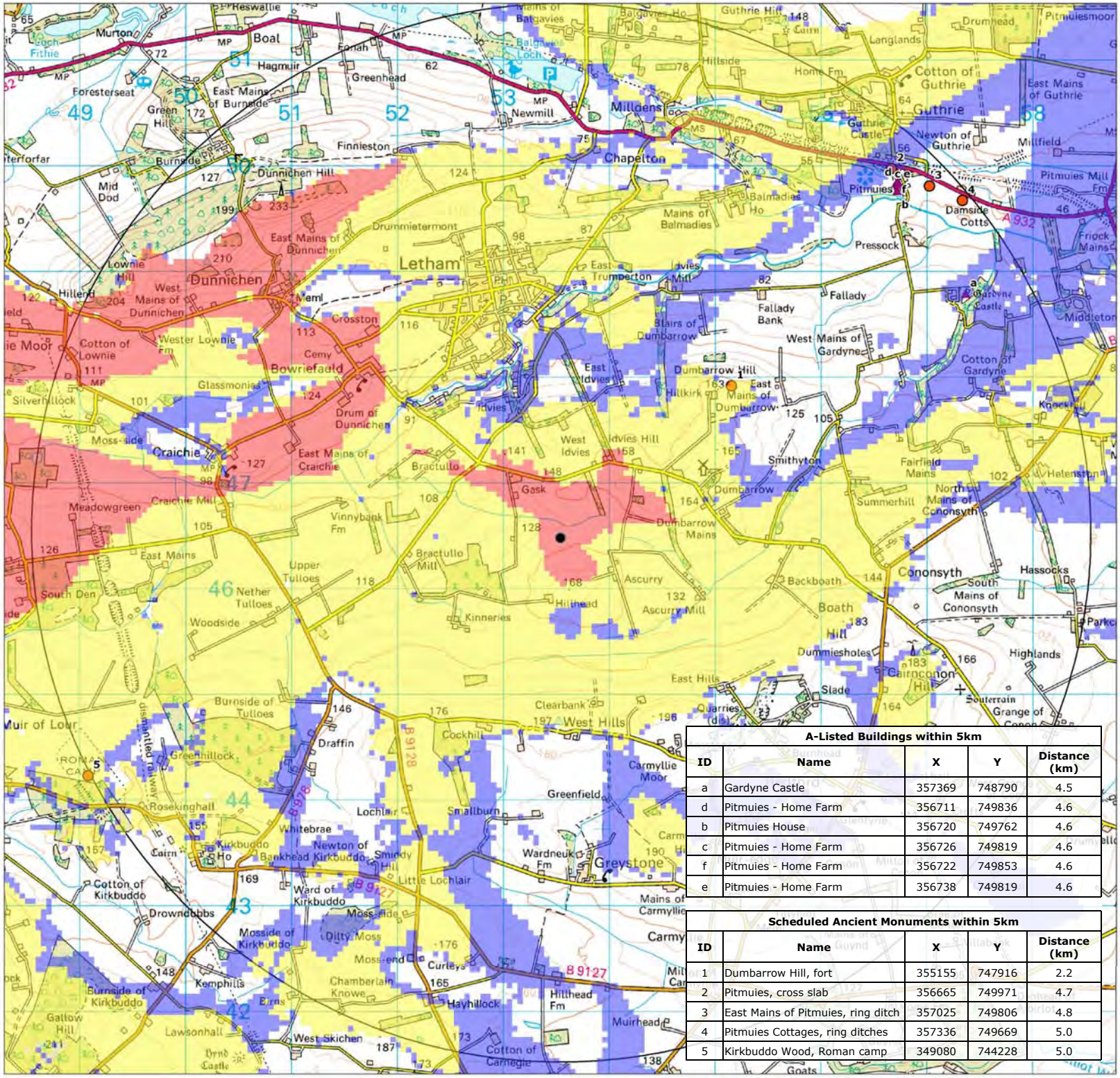
Yellow: At least the nacelle and blades are theoretically visible in these areas

Red: The blades, nacelle and tower down to a point at least 1m AGL are theoretically visible in these areas

PROJECT:	**Hillhead of Ascurry**
DRAWING TITLE:	Designated Landscapes and ZTV
DRAWING NO:	HOA014
DOCUMENT SIZE:	A3
SCALE:	1:180,000
DATE:	05/10/2013
DRAWING BY:	Franco Giovanetti
APPROVED BY:	Andy Lowe

N

0 5 10 15 km



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A-Listed Buildings within 5km

ID	Name	X	Y	Distance (km)
a	Gardyne Castle	357369	748790	4.5
d	Pitmuies - Home Farm	356711	749836	4.6
b	Pitmuies House	356720	749762	4.6
c	Pitmuies - Home Farm	356726	749819	4.6
f	Pitmuies - Home Farm	356722	749853	4.6
e	Pitmuies - Home Farm	356738	749819	4.6

Scheduled Ancient Monuments within 5km

ID	Name	X	Y	Distance (km)
1	Dumbarrow Hill, fort	355155	747916	2.2
2	Pitmuies, cross slab	356665	749971	4.7
3	East Mains of Pitmuies, ring ditch	357025	749806	4.8
4	Pitmuies Cottages, ring ditches	357336	749669	5.0
5	Kirkbuddo Wood, Roman camp	349080	744228	5.0

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Project Description

Number of Turbine(s):	1
Turbine Model:	EWT Directwind 54
Hub Height:	50m
Blade diameter:	54m
Total height to blade tip:	77m
Turbine location:	353539 746476

Notes

This map shows the Scheduled Monuments and A-Listed Buildings within 5km of the proposed wind turbine site.

Radius: 5km

Legend

- Turbine Location
- A-Listed Buildings
- Scheduled Monuments

This theoretical visibility map is based on a receptor viewing height of 1.8m AGL. The levels of theoretical visibility are based on the following colouring scheme:

Blue: Only the blades are theoretically visible from these areas

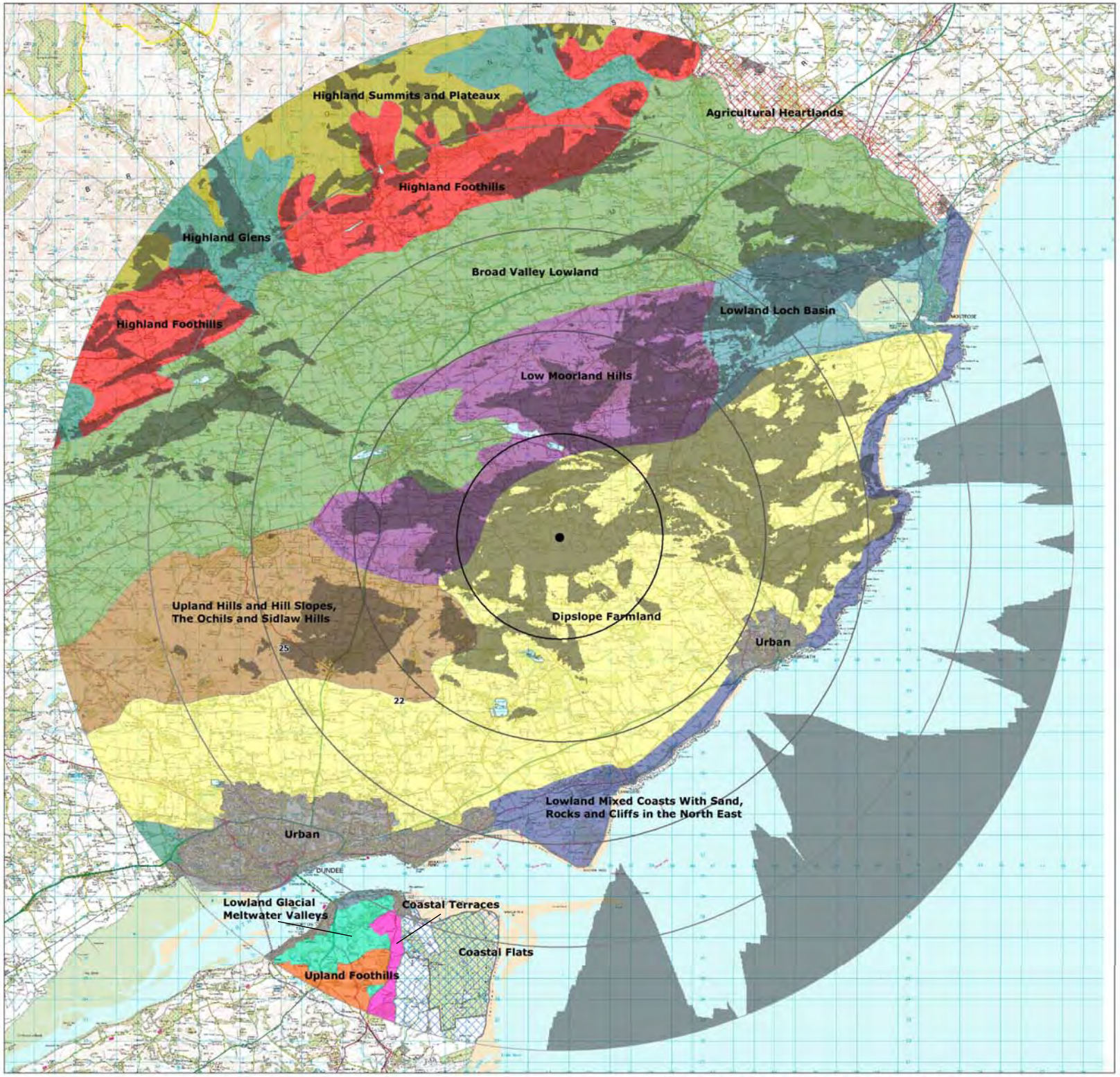
Yellow: At least the nacelle and blades are theoretically visible in these areas

Red: The blades, nacelle and tower down to a point at least 1m AGL are theoretically visible in these areas

PROJECT:	Hillhead of Ascurry
DRAWING TITLE:	Cultural Heritage and ZTV
DRAWING NO:	HOA015
DOCUMENT SIZE:	A3
SCALE:	1:35,000
DATE:	05/10/2013
DRAWING BY:	Franco Giovanetti
APPROVED BY:	Andy Lowe

N

0 1 2 3 km



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Company Number: SC370060; VAT Number: 983 3836 77

Project Description

Number of Turbine(s):	1
Turbine Model:	EWT Directwind 54
Hub Height:	50m
Blade diameter:	54m
Total height to blade tip:	77m
Turbine location:	353539 746476

Notes

This map shows the proposed wind turbine ZTV and Landscape Characters within 25km of the proposed wind turbine site.

Radii: 5, 10, 15, 20 and 25km

Legend

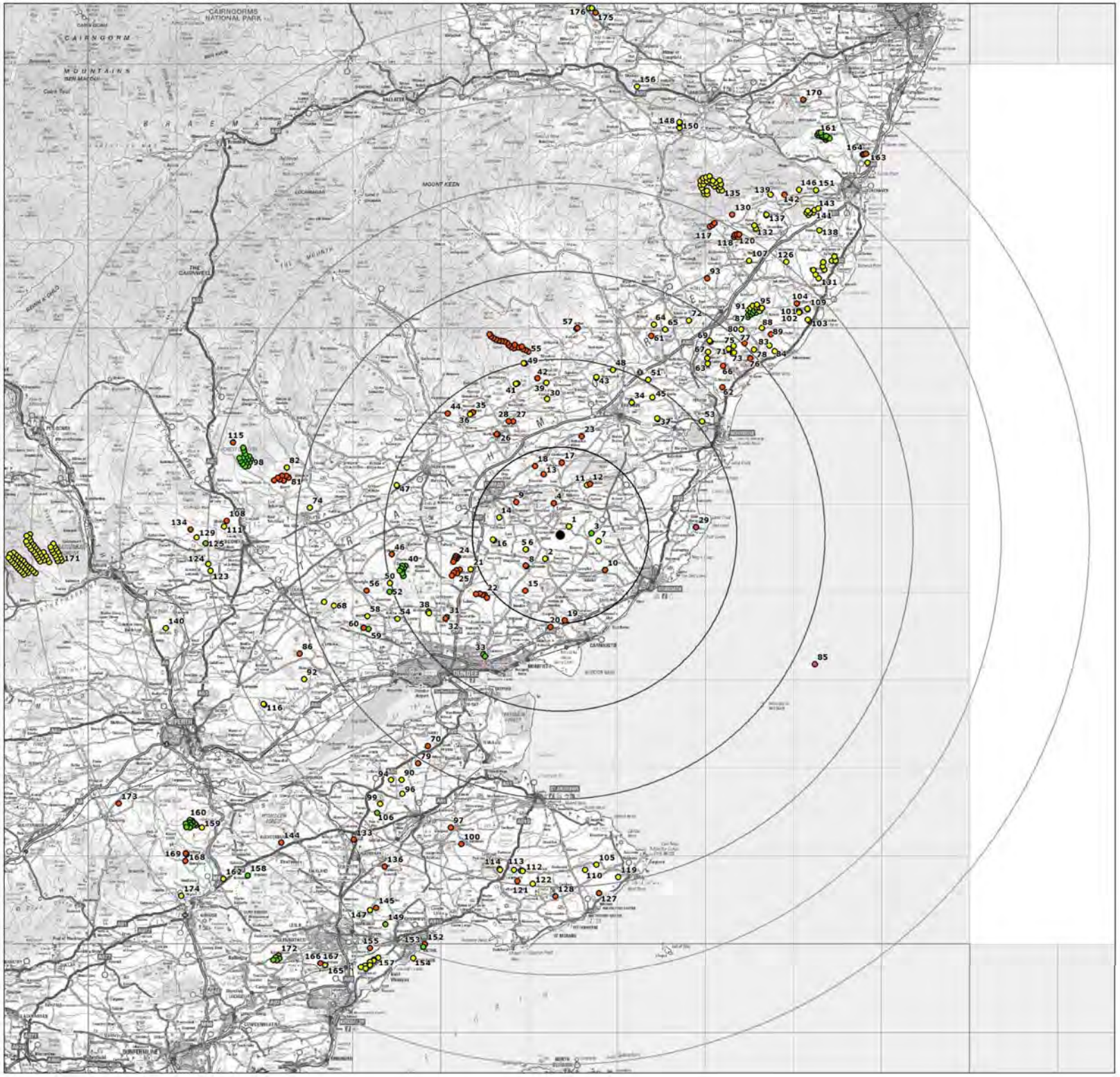
● Turbine Location

This theoretical visibility map is based on a receptor viewing height of 1.8m AGL.

PROJECT:	**Hillhead of Ascurry**
DRAWING TITLE:	Landscape Character Type and ZTV
DRAWING NO:	HOA016
DOCUMENT SIZE:	A3
SCALE:	1:180,000
DATE:	05/10/2013
DRAWING BY:	Franco Giovanetti
APPROVED BY:	Andy Lowe

N

0 5 10 15 km



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Company Number: SC370060; VAT Number: 983 3836 77

Project Description

Number of Turbine(s):	1
Turbine Model:	EWT Directwind 54
Hub Height:	50m
Blade diameter:	54m
Total height to blade tip:	77m
Turbine location:	353539 746476

Notes

This map shows the cumulative base plan around the proposed turbine location.

Radii: 10, 20, 30, 40, 50 and 60km

Legend

- Turbine Location

60km Cumulative Status

- Installed
- Approved
- Pending

PROJECT:	**Hillhead of Ascurry**
DRAWING TITLE:	Cumulative Base Plan
DRAWING NO:	HOA017
DOCUMENT SIZE:	A3
SCALE:	1:420,000
DATE:	05/10/2013
DRAWING BY:	Franco Giovanetti
APPROVED BY:	Andy Lowe

N

0 10 20 30 km

Label	Location	Turbines	Tip (m)	Status	Distance (km)
1	Newton Of Idvies Farm	1	47.5	Approved	1.4
2	Lochlair Farmhouse	1	47	Approved	3.2
3	North Mains Of Cononsyth	1	66.7	Installed	3.5
4	Newmill Of Balgavies	1	66.5	Pending	3.7
5	Greenhillock 2	1	67	Pending	4.2
6	Greenhillock 1	1	45.9	Approved	4.2
7	Parkconon Farm	1	45	Approved	4.4
8	Drowndubbs Farm	2	46.5	Pending	5.2
9	Golf Course Cunninghill	1	77	Pending	6.3
10	Cuthlie	1	77	Pending	6.4
11	Pickerton	1	77	Approved	6.4
12	Dubton Farm	1	77	Pending	6.7
13	West Mains Of Turin	1	49	Pending	7.2
14	Craignathro	1	35	Approved	7.2
15	Stotfaulds Farm	1	77	Pending	7.5
16	Wester Meathie Farm	2	46.6	Approved	7.6
17	Pitkennedy Farm	1	74	Pending	8.3
18	Carsegownie	1	34.2	Pending	8.4
19	Upper Balmachie Farm	1	77	Pending	9.7
20	New Downie Farm	1	54	Pending	10.5
21	North Tarbax	1	45.9	Approved	10.9
22	Dodd Hill Wind Farm	5	126.5	Pending	10.9
23	Balnacake Farm	1	67	Pending	11.5
24	Govals Wind Farm	6	87	Pending	11.9
25	Frawney Wind Farm	5	80	Pending	12.1
26	Kalulu House	2	44.8	Pending	13.5
27	West Cottage	1	77	Pending	14.0
28	Broom Farm	1	49.5	Pending	14.2
29	Ethie Barns Farm	1	45	Pending	15.4
30	Dunswood	1	77	Approved	15.6
31	Tealing	1	86.5	Approved	15.9
32	Former Tealing Airfield	1	86.5	Pending	16.1
33	Michelin Tyres	2	120	Installed	16.1
34	East Pitforthie Farm	1	47	Approved	17.1
35	White Top	1	86.5	Pending	17.1
36	East Memus	1	86.5	Approved	17.2
37	Arrat Farm	2	46	Approved	17.2
38	Balkemback Farm	2	46.5	Approved	17.3

Label	Location	Turbines	Tip (m)	Status	Distance (km)
39	Balhall Lodge 1	1	47.5	Approved	17.4
40	Arkhill	8	79.6	Installed	17.9
41	Afflochie Farm	2	46.9	Approved	17.9
42	Balhall Lodge 2	1	49	Pending	18.0
43	Balrownie Farm	2	46.5	Approved	18.3
44	Gallow Hill	1	46.5	Pending	18.8
45	Whitefield Of Dun Farm	1	67	Approved	18.9
46	Ingliston Farm	1	77	Planning	19.3
47	Reedie Farm	2	46.9	Approved	19.3
48	Auchenreoch Farm	1	45.9	Approved	19.7
49	Glen Trusta	2	46.9	Approved	19.9
50	Henderston Quarry	1	66	Approved	20.1
51	Hill Of Stracathro	1	79.6	Approved	20.3
52	Scotson	1	79	Installed	20.4
53	Newbigging Farm	1	24.8	Approved	20.6
54	North Leoch	1	45.6	Approved	20.8
55	Nathro Hill	17	135	Pending	21.2
56	Davidston Farm	1	62	Pending	22.9
57	Wilton Farm	2	74	Pending	23.6
58	West Mains Farmhouse	1	61	Approved	23.8
59	West Adamston Farm	1	47.5	Installed	24.3
60	Lundie Castle Farm	1	48.5	Pending	24.7
61	Steelstrath Farm	1	84	Pending	24.9
62	Stone of Morphie Cottage	1	77	Pending	24.9
63	Grangehall	2	37	Approved	26.1
64	Moss Side of Esslie	1	45.5	Approved	26.2
65	Gossesslie Farm	1	47.5	Approved	26.3
66	Pitbeadlie Farm	1	76	Pending	26.7
67	South Balmakelly	1	45.5	Approved	26.8
68	House On The Hill	2	45.4	Approved	26.9
69	Dykelands	2	40.2	Approved	27.8
70	Wester Kilmany Farm	1	86.5	Pending	28.3
71	Hospital Shields Farm	2	46.5	Approved	28.4
72	Brigton Farm	1	81	Approved	28.4
73	Criggie Farmhouse	2	45.5	Approved	28.5
74	Loyal Farm	1	47	Approved	28.6
75	Windy Corner	1	63.5	Approved	29.1
76	Mains of Woodstone	1	80	Pending	29.5

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Company Number: SC370060; VAT Number: 983 3836 77

Project Description

Number of Turbine(s):	1
Turbine Model:	EWT Directwind 54
Hub Height:	50m
Blade diameter:	54m
Total height to blade tip:	77m
Turbine location:	353539 746476

Notes

Details of cumulative developments shown in the Cumulative Base Plan drawing HOA017 within 30km of Hillhead of Ascurry

PROJECT:	**Hillhead of Ascurry**
DRAWING TITLE:	Cumulative Base Plan List 1
DRAWING NO:	HOA018a
DOCUMENT SIZE:	A3
SCALE:	n/a
DATE:	05/10/2013
DRAWING BY:	Franco Giovanetti
APPROVED BY:	Andy Lowe

Label	Location	Turbines	Tip (m)	Status	Distance (km)
77	South Bradieston	1	66	Pending	30.2
78	Chapelfield Farm	1	43.5	Approved	30.4
79	Lochmalony Farm	1	67	Pending	30.5
80	Smiddyhill	1	40.5	Approved	31.1
81	Bamff Wind Farm	7	111	Pending	31.5
82	Wester Derry Farm	1	45	Approved	32.0
83	Jackston Farm	1	46.5	Approved	32.0
84	Mains of Bridgeton	1	77	Approved	32.1
85	Inchcape Windfarm	213	215	Pending	32.4
86	Glenbran Farm	1	56.3	Pending	32.5
87	Tullo	7	122	Installed	32.7
88	Redford Farm	1	53.88	Approved	32.8
89	Paul Matthew Hill	1	99.5	Pending	33.0
90	Lordscairnie Farm	1	45.7	Approved	33.1
91	The Sheils	3	100	Approved	33.3
92	Outfield Farm Abernyte	1	40	Approved	33.4
93	West Cairnbeg	1	77	Pending	33.6
94	Newington Farm	1	41.5	Approved	33.8
95	Tullo Farm Extension	7	100	Approved	33.9
96	Pitbladdo Farm	1	51	Approved	34.4
97	Easter Pitscottie Farm	1	48.7	Pending	35.5
98	Drumderg	16	107	Installed	36.2
99	Lumbennie Hill Pitcairlie	1	84	Approved	36.8
100	North Callange Farm	1	47	Pending	36.8
101	Craig Garbil 2	1	79	Pending	37.2
102	Craig Garbil	2	45.5	Approved	37.2
103	Nether Benholm	2	45.5	Approved	37.2
104	Peattie	1	67	Pending	37.6
105	Muirhead Farm	1	35.83	Approved	37.7
106	Westhall Cupar Fife	1	45.5	Installed	37.8
107	Fordoun Sawmill	1	77	Approved	37.8
108	Netheraird of Glasclune	1	67	Pending	37.9
109	Dendoldrum	2	45.7	Approved	38.0
110	Airdrie Farm	1	74	Approved	38.1
111	Muirton Of Drumlochy	1	20	Approved	38.2
112	North Baldutho Farm	2	25	Approved	38.4
113	North Cassingray Farm	1	34.2	Approved	38.4
114	Higham Farm	2	34	Approved	38.5
115	The Corb Bridge	1	84	Pending	38.6
116	Shandry Farm	2	45.5	Approved	38.7
117	Denside	3	92.5	Pending	39.0
118	Herscha Hill Extension	2	79	Pending	39.2
119	Kirkmay Farm	1	45	Approved	39.4
120	Herscha Hill Cluster	3	79.6	Pending	39.5
121	South Cassingray Farm	1	50	Pending	39.6
122	South Baldutho Farm	1	47.5	Approved	39.7
123	Hill Of Lethendy Farm	1	66.6	Approved	39.9
124	Wester Essendy Farm	2	32.1	Approved	40.1
125	Wester Kinloch Farm	1	27	Installed	40.3
126	Wairds of Alpity	1	79	Approved	40.3

Label	Location	Turbines	Tip (m)	Status	Distance (km)
127	Cornceres Farm	1	53.7	Pending	40.9
128	Scotshall Farm	1	35.5	Pending	41.0
129	East Gormack Farm	1	66.7	Approved	41.3
130	Chapleton Farm	1	49	Pending	41.3
131	St John's Hill	9	80	Approved	41.3
132	Droop Hill	2	100	Approved	41.3
133	Lower Melville Wood	1	85	Pending	41.8
134	Easter Logie	1	47	Pending	42.0
135	Mid Hill Extension	25	125	Approved	42.1
136	Crossgates Cottages	1	49	Pending	42.6
137	Jacksbank	3	100	Approved	43.2
138	Ferniebrae	1	67	Approved	45.5
139	East Town Farm	1	79	Approved	45.5
140	Stewart Tower Farm	1	45	Approved	46.0
141	Clochnahill	4	81	Approved	46.0
142	Annamuick	1	75	Pending	46.3
143	Hillhead of Auquhirie	3	92.5	Approved	46.6
144	Demperston Farmhouse	1	54	Pending	47.1
145	Carriston Farm	1	56.7	Pending	47.2
146	Upper Wyndings	1	47.5	Approved	47.7
147	Langside Farmhouse	1	39	Approved	47.8
148	Shampher Cottage	1	40	Approved	48.2
149	Newton Of Kingsdale	1	33.6	Installed	48.5
150	Ardlair	2	27	Approved	48.8
151	Tewel Farm	1	67	Approved	48.8
152	EFFC	1	81	Pending	49.0
153	Methil Docks	1	81	Installed	49.3
154	Methil Offshore	1	179	Approved	50.9
155	Balgonie	1	86.5	Pending	51.6
156	Sluie Hill	1	35	Approved	51.7
157	Earlseat Farm	8	120.5	Approved	52.3
158	Lacesston Farm	1	48	Installed	52.5
159	Easter Fordel	1	27	Approved	52.5
160	Lochelbank	12	86.5	Installed	52.8
161	Meikle Carewe	12	70	Installed	54.0
162	Cuthill Towers Farm	1	40	Approved	54.7
163	Logie	1	45.5	Approved	54.8
164	Kempstone Hill	3	52.5	Pending	55.2
165	Noble Foods Thornton	1	110	Approved	55.7
166	Skeddoway Farm 1	1	110	Approved	55.8
167	Skeddoway Farm 2	1	126	Pending	55.8
168	East Blair Farm	2	45.5	Pending	55.8
169	Temple Hill	1	84	Pending	56.4
170	Bogenraith	1	23	Pending	56.6
171	Griffin	68	130.5	Approved	56.7
172	Westfield	5	110	Installed	57.5
173	Drumside	1	46	Pending	58.6
174	Netherhall Steadings	1	27	Approved	59.4
175	Boghead	1	79	Pending	59.5
176	Bankhead	3	27	Approved	60.0

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Company Number: SC370060; VAT Number: 983 3836 77

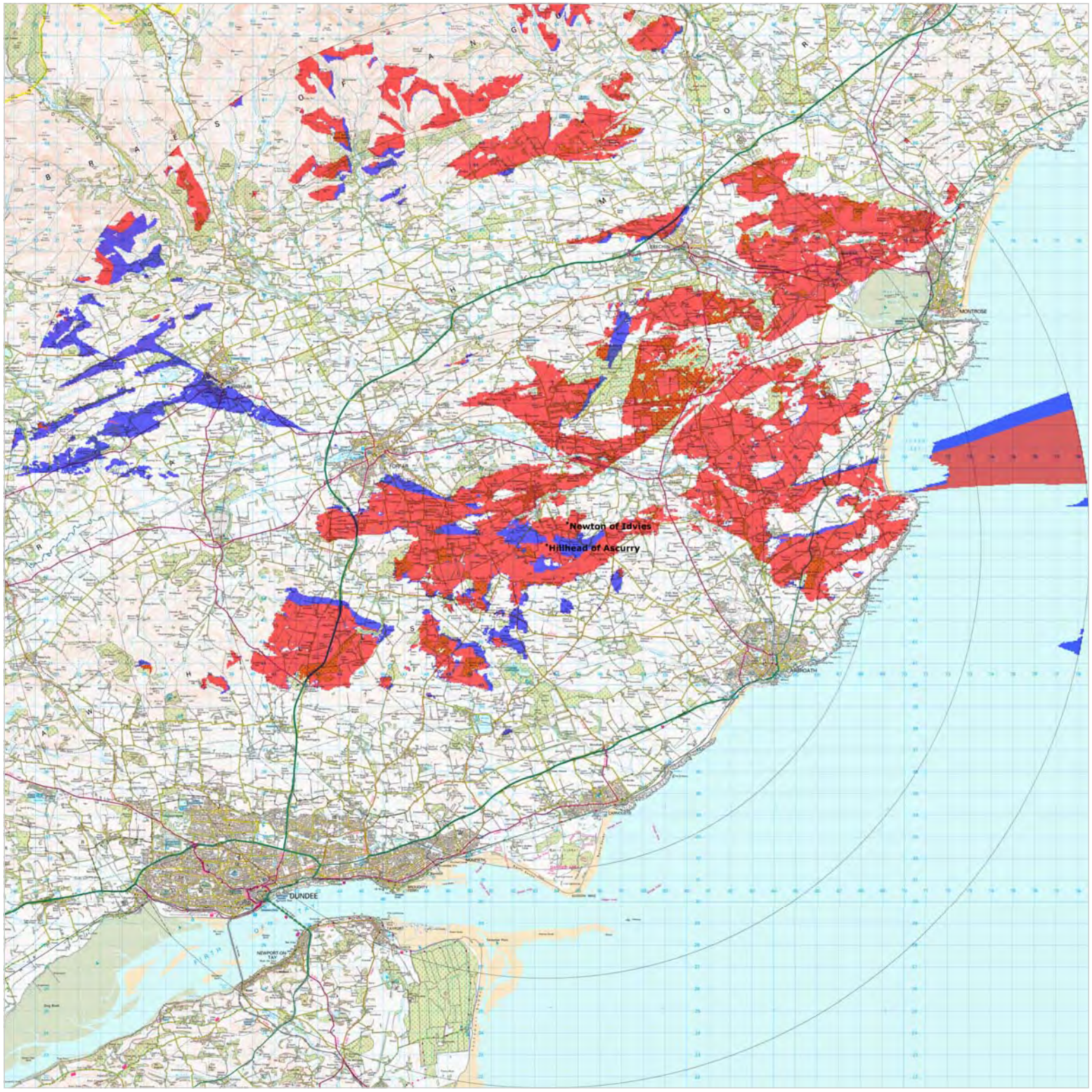
Project Description

Number of Turbine(s):	1
Turbine Model:	EWT Directwind 54
Hub Height:	50m
Blade diameter:	54m
Total height to blade tip:	77m
Turbine location:	353539 746476

Notes

Details of cumulative developments shown in the Cumulative Base Plan drawing HOA018 between 30km and 60km from Hillhead of As-curry

PROJECT:	**Hillhead of Ascurry**
DRAWING TITLE:	Cumulative Base Plan List 2
DRAWING NO:	HOA018b
DOCUMENT SIZE:	A3
SCALE:	n/a
DATE:	05/10/2013
DRAWING BY:	Franco Giovanetti
APPROVED BY:	Andy Lowe



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Company Number: SC370060; VAT Number: 983 3836 77

Project Description

Number of Turbine(s):	1
Turbine Model:	EWT Directwind 54
Hub Height:	50m
Blade diameter:	54m
Total height to blade tip:	77m
Turbine location:	353539 746476

Notes

This map shows the cumulative zone of visibility of the proposed Hillhead of Ascurry turbine and the approved Newton of Idvies development.

Radii: 5, 10, 15, 20 and 25km

Legend

This theoretical visibility map is based on a receptor viewing height of 1.8m AGL. The levels of theoretical visibility are based on the following colouring scheme:

Blue: Only Hillhead of Ascurry turbine visible

Red: At least the nacelle of the Hillhead of Ascurry turbine and the Newton of Idvies turbine will be visible

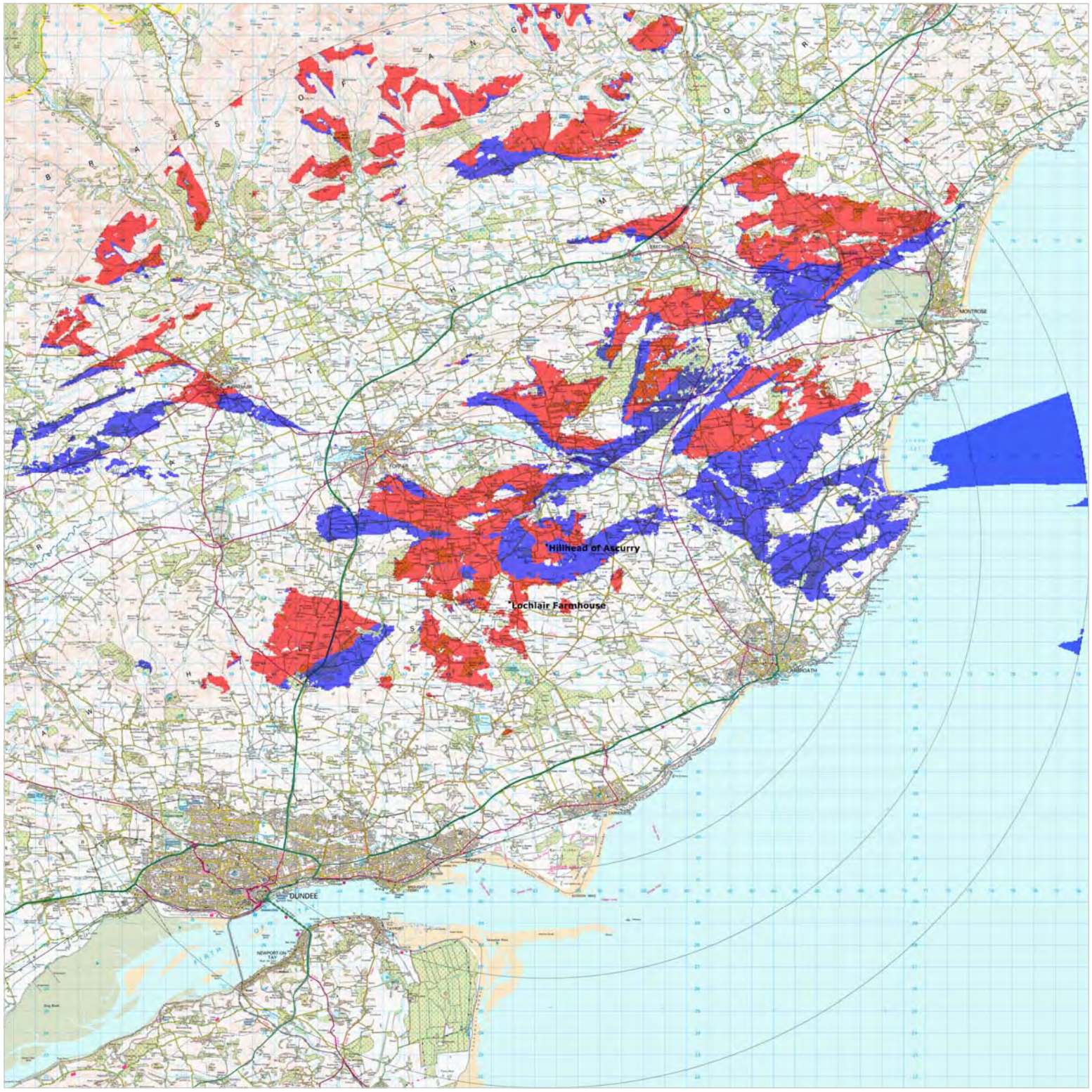
Newton of Idvies details

No of turbines:	1
Distance from Hillhead of Ascurry:	1.4km
Height to blade tip:	47.5m
Status:	Approved

PROJECT:	**Hillhead of Ascurry**
DRAWING TITLE:	Cumulative ZTV—Newton of Idvies Farm
DRAWING NO:	HOA019
DOCUMENT SIZE:	A3
SCALE:	1:170,000
DATE:	07/10/2013
DRAWING BY:	Franco Giovanetti
APPROVED BY:	Andy Lowe

N

0 5 10 15km



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Project Description

Number of Turbines:	1
Turbine Model:	EWT Directwind 54
Hub Height:	50m
Blade diameter:	54m
Total height to blade tip:	77m
Turbine location:	353539 746476

Notes

This map shows the cumulative zone of visibility of the proposed Hillhead of Ascurry turbine and the approved Lochlair Farmhouse development.

Radii: 5, 10, 15, 20 and 25km

Legend

This theoretical visibility map is based on a receptor viewing height of 1.8m AGL. The levels of theoretical visibility are based on the following colouring scheme:

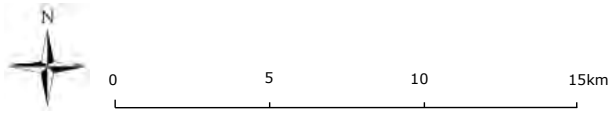
Blue: Only Hillhead of Ascurry turbine visible

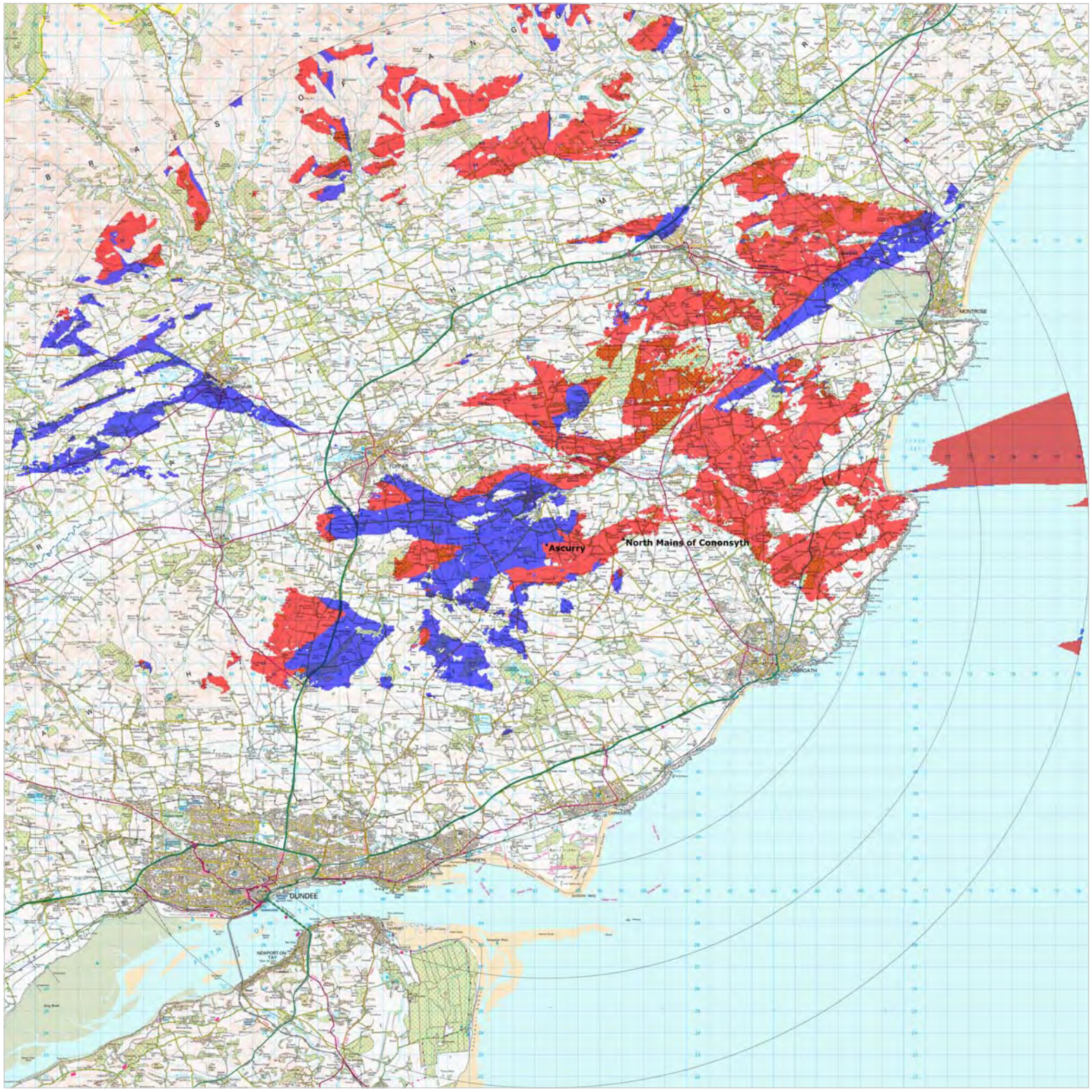
Red: At least the nacelle of the Hillhead of Ascurry turbine and the Lochlair Farmhouse turbine will be visible

Lochlair Farmhouse details

No of turbines:	1
Distance from Hillhead of Ascurry:	3.2km
Height to blade tip:	47.0m
Status:	Approved

PROJECT:	**Hillhead of Ascurry**
DRAWING TITLE:	Cumulative ZTV—Lochlair Farmhouse
DRAWING NO:	HOA020
DOCUMENT SIZE:	A3
SCALE:	1:170,000
DATE:	07/10/2013
DRAWING BY:	Franco Giovanetti
APPROVED BY:	Andy Lowe





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Tel: +44 (0) 131 555 4745; Email: info@locogen.com
Company Number: SC370060; VAT Number: 983 3836 77

Project Description

Number of Turbines:	1
Turbine Model:	EWT Directwind 54
Hub Height:	50m
Blade diameter:	54m
Total height to blade tip:	77m
Turbine location:	353539 746476

Notes

This map shows the cumulative zone of visibility of the proposed Hillhead of Ascurry turbine and the operational North Mains of Cononsyth development.

Radii: 5, 10, 15, 20 and 25km

Legend

This theoretical visibility map is based on a receptor viewing height of 1.8m AGL. The levels of theoretical visibility are based on the following colouring scheme:

Blue: Only Hillhead of Ascurry turbine visible

Red: At least the nacelle of the Hillhead of Ascurry turbine and the North Mains of Cononsyth turbine will be visible

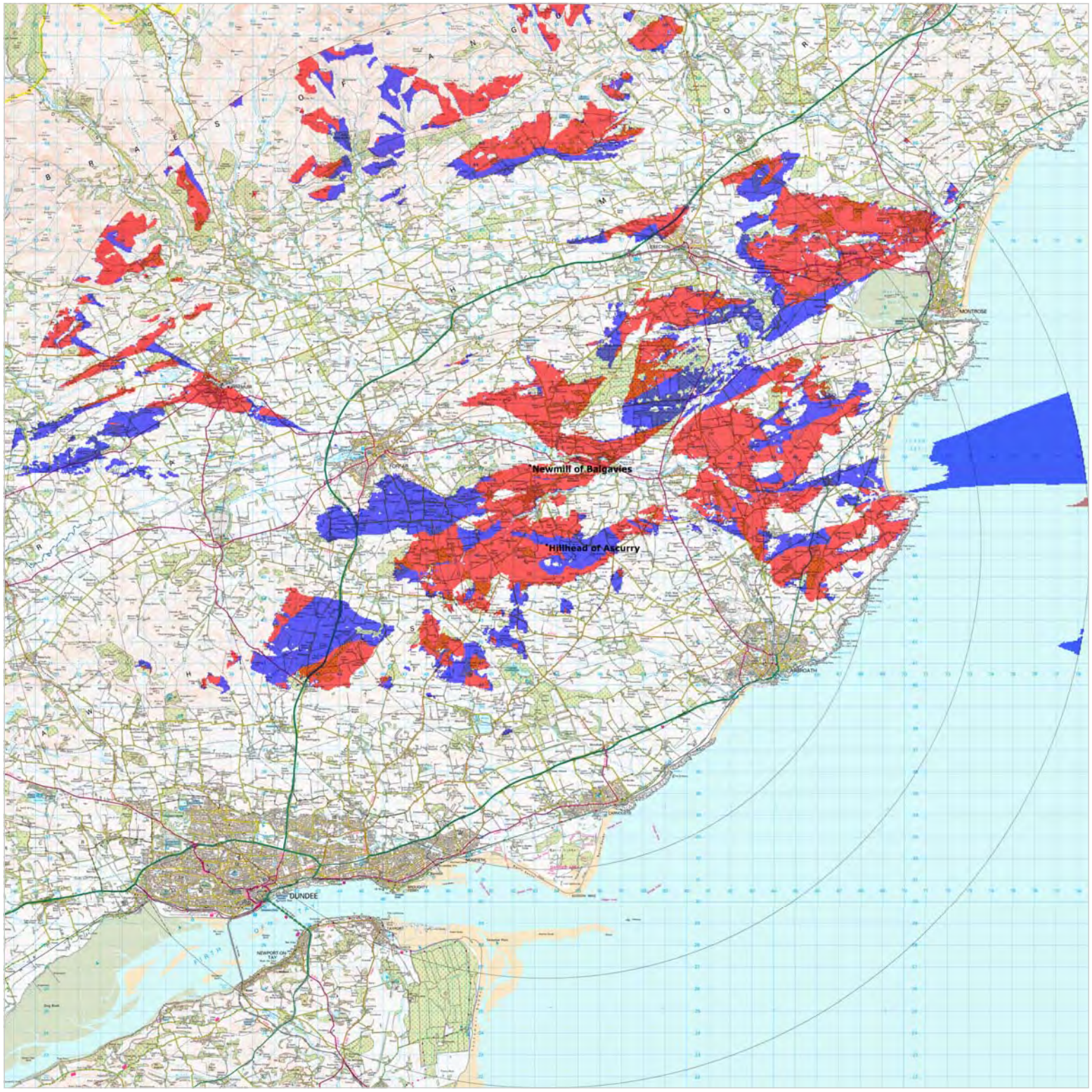
North Mains of Cononsyth details

No of turbines:	1
Distance from Hillhead of Ascurry:	3.5km
Height to blade tip:	66.7m
Status:	Operational

PROJECT:	**Hillhead of Ascurry**
DRAWING TITLE:	Cumulative ZTV—N. Mains of Cononsyth
DRAWING NO:	HOA021
DOCUMENT SIZE:	A3
SCALE:	1:170,000
DATE:	07/10/2013
DRAWING BY:	Franco Giovanetti
APPROVED BY:	Andy Lowe

N

0 5 10 15km



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Company Number: SC370060; VAT Number: 983 3836 77

Project Description

Number of Turbines:	1
Turbine Model:	EWT Directwind 54
Hub Height:	50m
Blade diameter:	54m
Total height to blade tip:	77m
Turbine location:	353539 746476

Notes

This map shows the cumulative zone of visibility of the proposed Hillhead of Ascurry turbine and the proposed Newmill of Balgavies development.

Radii: 5, 10, 15, 20 and 25km

Legend

This theoretical visibility map is based on a receptor viewing height of 1.8m AGL. The levels of theoretical visibility are based on the following colouring scheme:

Blue: Only Hillhead of Ascurry turbine visible

Red: At least the nacelle of the Hillhead of Ascurry turbine and the Newmill of Balgavies turbine will be visible

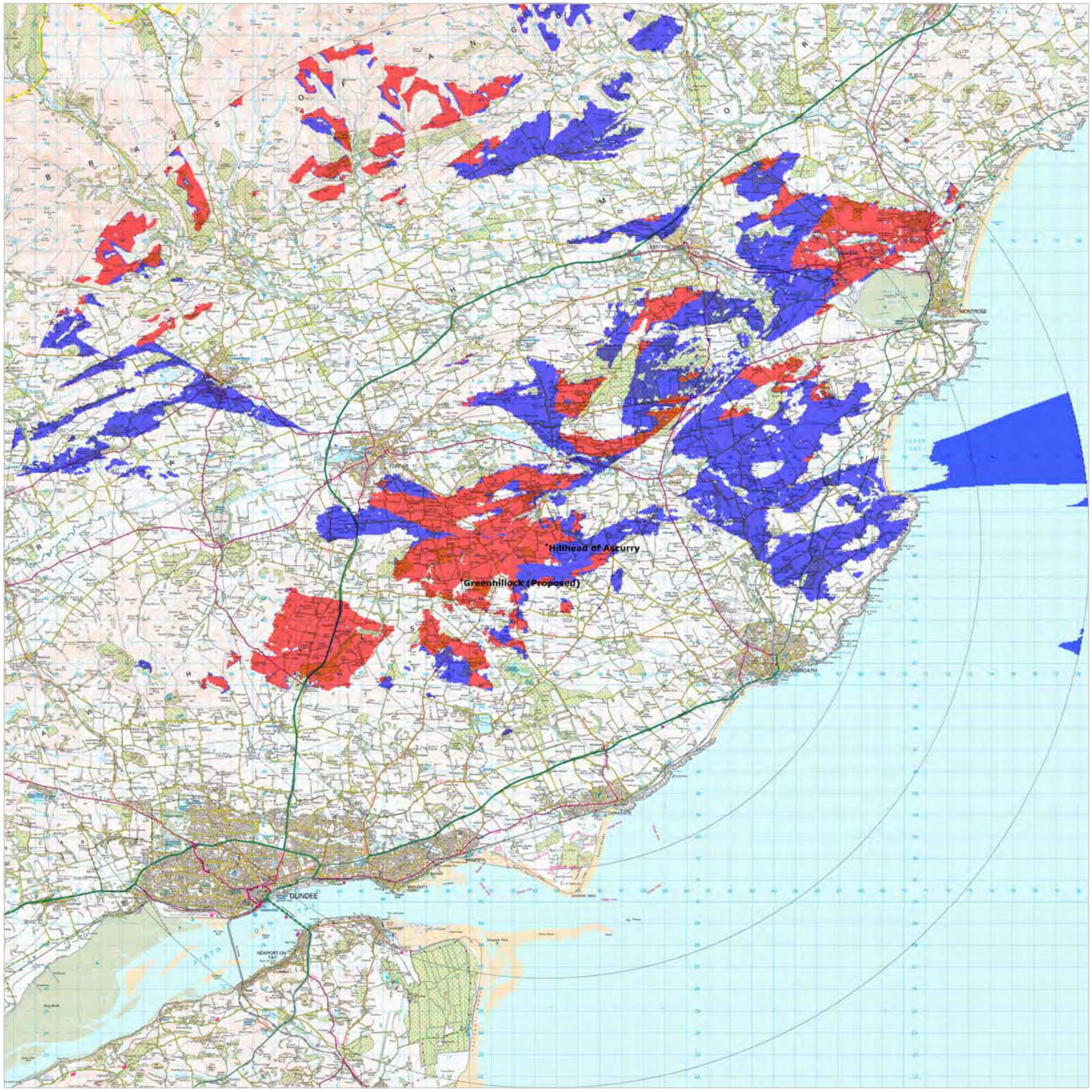
Newmill of Balgavies details

No of turbines:	1
Distance from Hillhead of Ascurry:	3.7km
Height to blade tip:	66.5m
Status:	Proposed

PROJECT:	**Hillhead of Ascurry**
DRAWING TITLE:	Cumulative ZTV—Newmill of Balgavies
DRAWING NO:	HOA022
DOCUMENT SIZE:	A3
SCALE:	1:170,000
DATE:	07/10/2013
DRAWING BY:	Franco Giovanetti
APPROVED BY:	Andy Lowe

N

0 5 10 15km



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Tel: +44 (0) 131 555 4745; Email: info@locogen.com
Company Number: SC370060; VAT Number: 983 3836 77

Project Description

Number of Turbines:	1
Turbine Model:	EWT Directwind 54
Hub Height:	50m
Blade diameter:	54m
Total height to blade tip:	77m
Turbine location:	353539 746476

Notes

This map shows the cumulative zone of visibility of the proposed Hillhead of Ascurry turbine and the proposed Greenhillock development.

Radii: 5, 10, 15, 20 and 25km

Legend

This theoretical visibility map is based on a receptor viewing height of 1.8m AGL. The levels of theoretical visibility are based on the following colouring scheme:

Blue: Only Hillhead of Ascurry turbine visible

Red: At least the nacelle of the Hillhead of Ascurry turbine and the proposed Greenhillock development will be visible

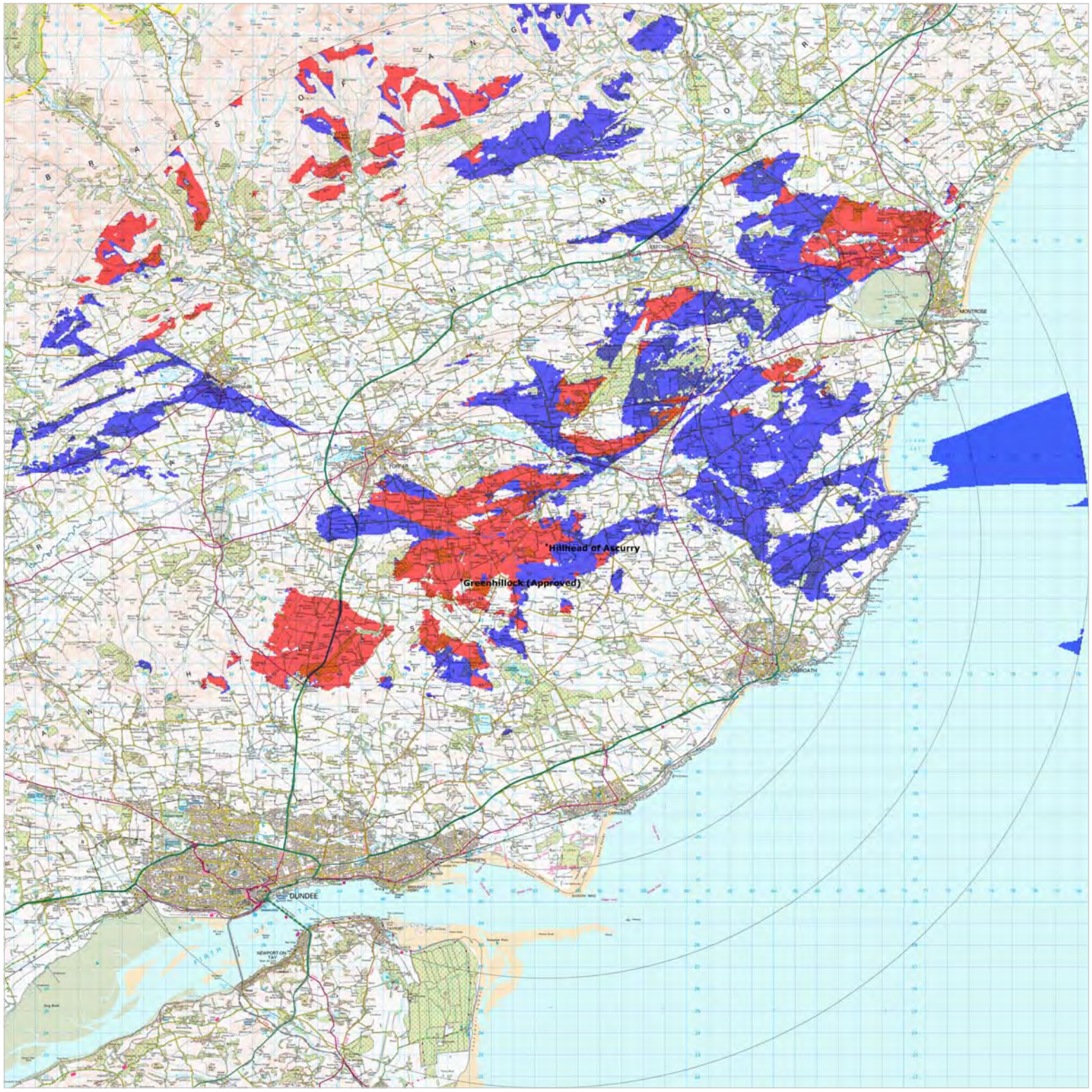
Greenhillock (proposed) details

No of turbines:	1
Distance from Hillhead of Ascurry:	4.2km
Height to blade tip:	67.5m
Status:	Proposed

PROJECT:	**Hillhead of Ascurry**
DRAWING TITLE:	Cumulative ZTV— Greenhillock-Proposed
DRAWING NO:	HOA023
DOCUMENT SIZE:	A3
SCALE:	1:170,000
DATE:	07/10/2013
DRAWING BY:	Franco Giovanetti
APPROVED BY:	Andy Lowe

N

0 5 10 15km



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Tel: +44 (0) 131 555 4745; Email: info@locogen.com
Company Number: SC370060; VAT Number: 983 3836 77

Project Description

Number of Turbines:	1
Turbine Model:	EWT Directwind 54
Hub Height:	50m
Blade diameter:	54m
Total height to blade tip:	77m
Turbine location:	353539 746476

Notes

This map shows the cumulative zone of visibility of the proposed Hillhead of Ascurry turbine and the approved Greenhillock development.

Radii: 5, 10, 15, 20 and 25km

Legend

This theoretical visibility map is based on a receptor viewing height of 1.8m AGL. The levels of theoretical visibility are based on the following colouring scheme:

Blue: Only Hillhead of Ascurry turbine visible

Red: At least the nacelle of the Hillhead of Ascurry turbine and the approved Greenhillock development will be visible

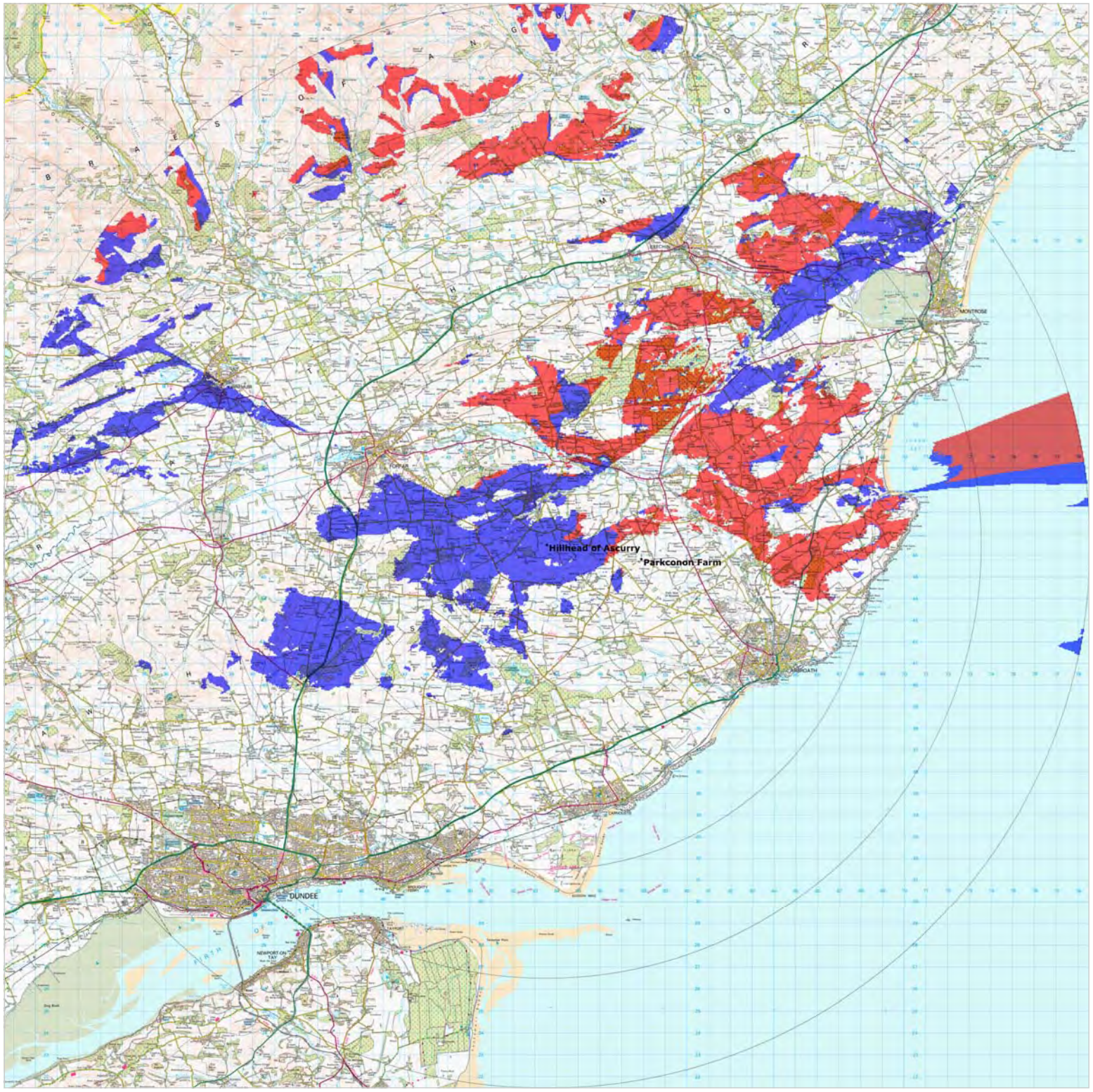
Greenhillock (approved) details

No of turbines:	1
Distance from Hillhead of Ascurry:	4.2km
Height to blade tip:	45.9m
Status:	Approved

PROJECT:	**Hillhead of Ascurry**
DRAWING TITLE:	Cumulative ZTV— Greenhillock-Approved
DRAWING NO:	HOA024
DOCUMENT SIZE:	A3
SCALE:	1:170,000
DATE:	07/10/2013
DRAWING BY:	Franco Giovanetti
APPROVED BY:	Andy Lowe

N

0 5 10 15km



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Company Number: SC370060; VAT Number: 983 3836 77

Project Description

Number of Turbines:	1
Turbine Model:	EWT Directwind 54
Hub Height:	50m
Blade diameter:	54m
Total height to blade tip:	77m
Turbine location:	353539 746476

Notes

This map shows the cumulative zone of visibility of the proposed Hillhead of Ascurry turbine and the approved Parkconon Farm development.

Radii: 5, 10, 15, 20 and 25km

Legend

This theoretical visibility map is based on a receptor viewing height of 1.8m AGL. The levels of theoretical visibility are based on the following colouring scheme:

Blue: Only Hillhead of Ascurry turbine visible

Red: At least the nacelle of the Hillhead of Ascurry turbine and the Parkconon turbine will be visible

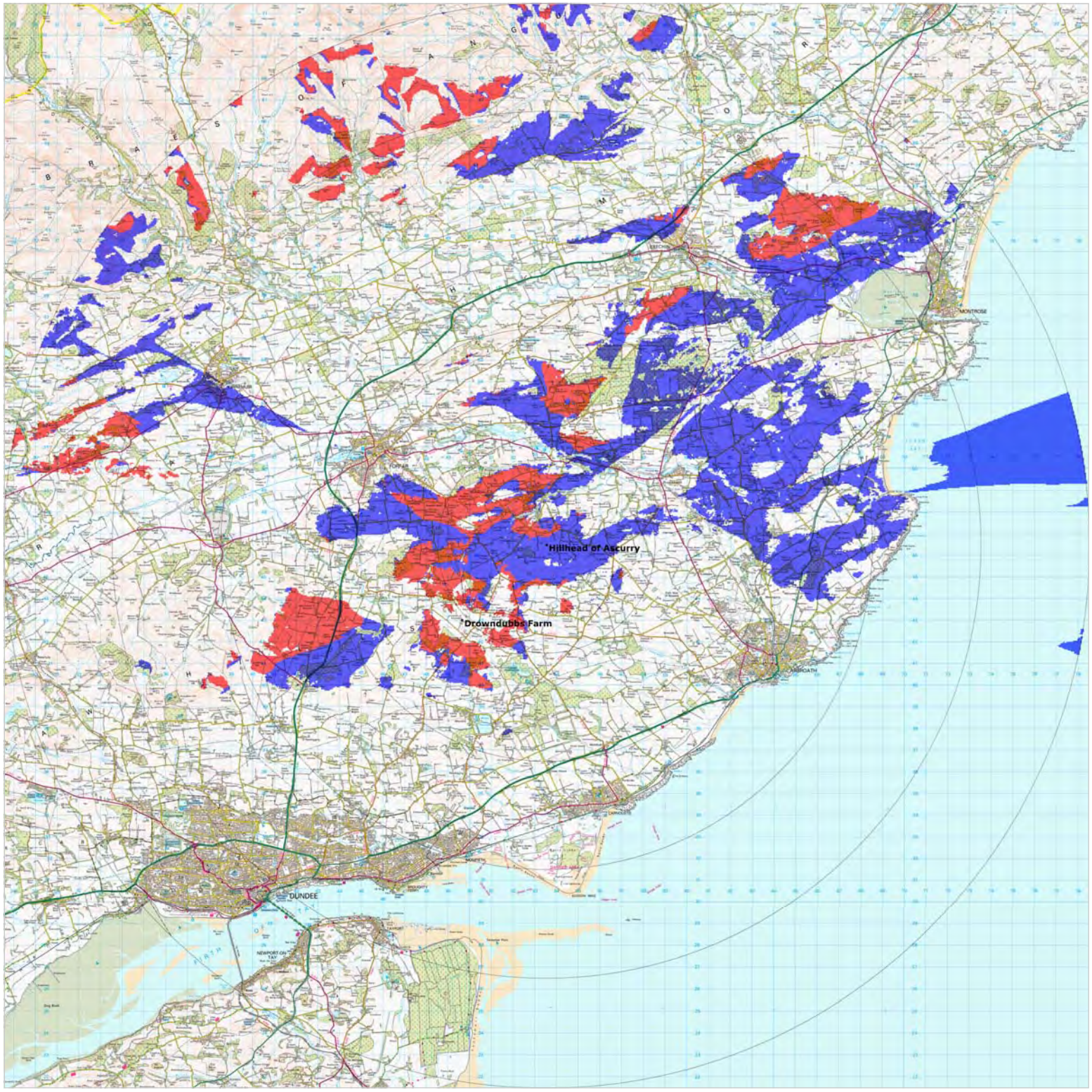
Parkconon details

No of turbines:	1
Distance from Hillhead of Ascurry:	4.4km
Height to blade tip:	45m
Status:	Approved

PROJECT:	**Hillhead of Ascurry**
DRAWING TITLE:	Cumulative ZTV—Parkconon Farm
DRAWING NO:	HOA025
DOCUMENT SIZE:	A3
SCALE:	1:170,000
DATE:	07/10/2013
DRAWING BY:	Franco Giovanetti
APPROVED BY:	Andy Lowe

N

0 5 10 15km



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Project Description

Number of Turbines:	1
Turbine Model:	EWT Directwind 54
Hub Height:	50m
Blade diameter:	54m
Total height to blade tip:	77m
Turbine location:	353539 746476

Notes

This map shows the cumulative zone of visibility of the proposed Hillhead of Ascurry turbine and the proposed Drowndubbs development.

Radii: 5, 10, 15, 20 and 25km

Legend

This theoretical visibility map is based on a receptor viewing height of 1.8m AGL. The levels of theoretical visibility are based on the following colouring scheme:

Blue: Only Hillhead of Ascurry turbine visible

Red: At least the nacelle of the Hillhead of Ascurry turbine and the Drowndubbs turbines will be visible

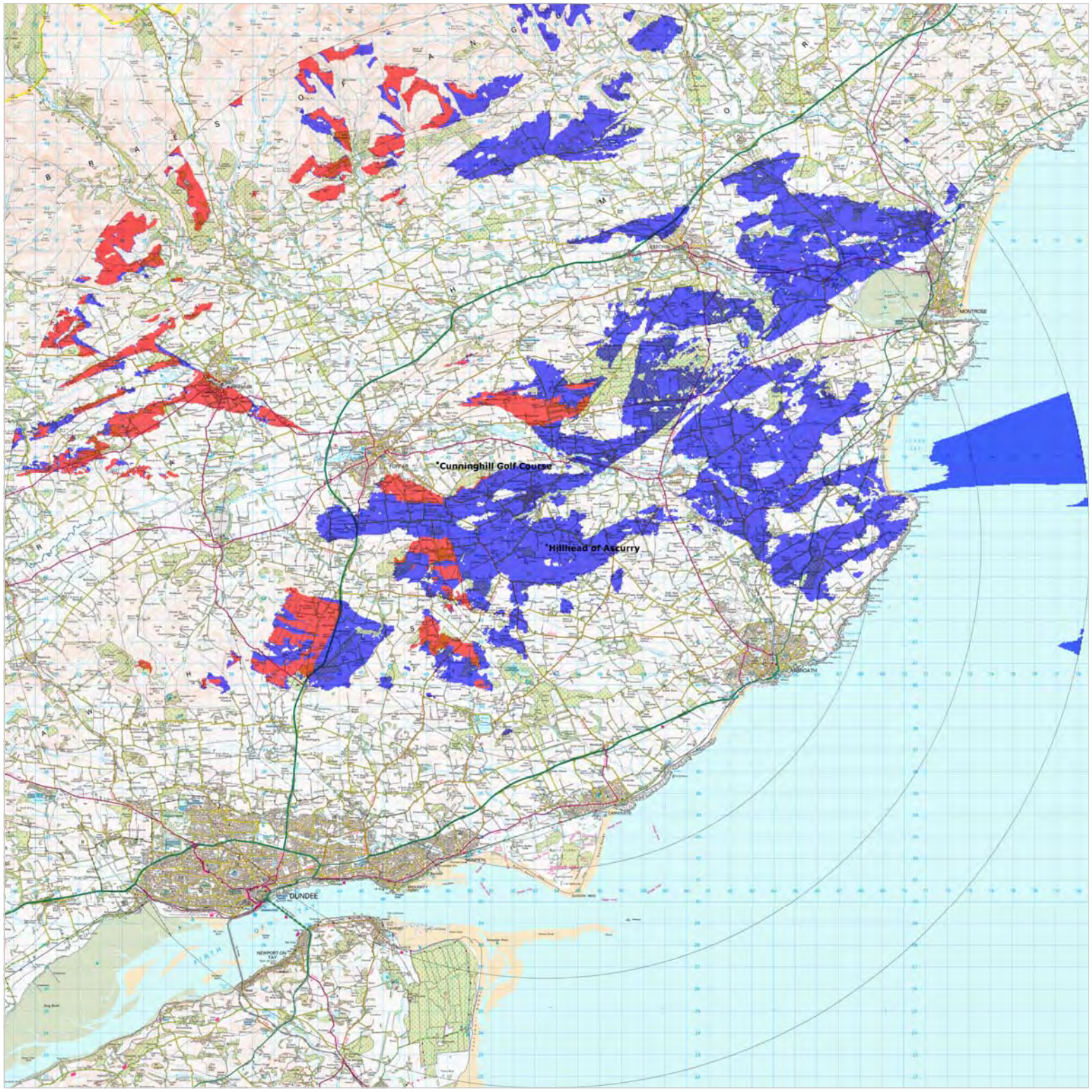
Drowndubbs details

No of turbines:	2
Distance from Hillhead of Ascurry:	5.2km
Height to blade tip:	46.5m
Status:	Proposed

PROJECT:	**Hillhead of Ascurry**
DRAWING TITLE:	Cumulative ZTV—Drowndubbs
DRAWING NO:	HOA026
DOCUMENT SIZE:	A3
SCALE:	1:170,000
DATE:	07/10/2013
DRAWING BY:	Franco Giovanetti
APPROVED BY:	Andy Lowe

N

0 5 10 15km



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Company Number: SC370060; VAT Number: 983 3836 77

Project Description

Number of Turbines:	1
Turbine Model:	EWT Directwind 54
Hub Height:	50m
Blade diameter:	54m
Total height to blade tip:	77m
Turbine location:	353539 746476

Notes

This map shows the cumulative zone of visibility of the proposed Hillhead of Ascurry turbine and the proposed Cunninghill Golf Course development.

Radii: 5, 10, 15, 20 and 25km

Legend

This theoretical visibility map is based on a receptor viewing height of 1.8m AGL. The levels of theoretical visibility are based on the following colouring scheme:

Blue: Only Hillhead of Ascurry turbine visible

Red: At least the nacelle of the Hillhead of Ascurry turbine and the Cunninghill Golf Course turbine will be visible

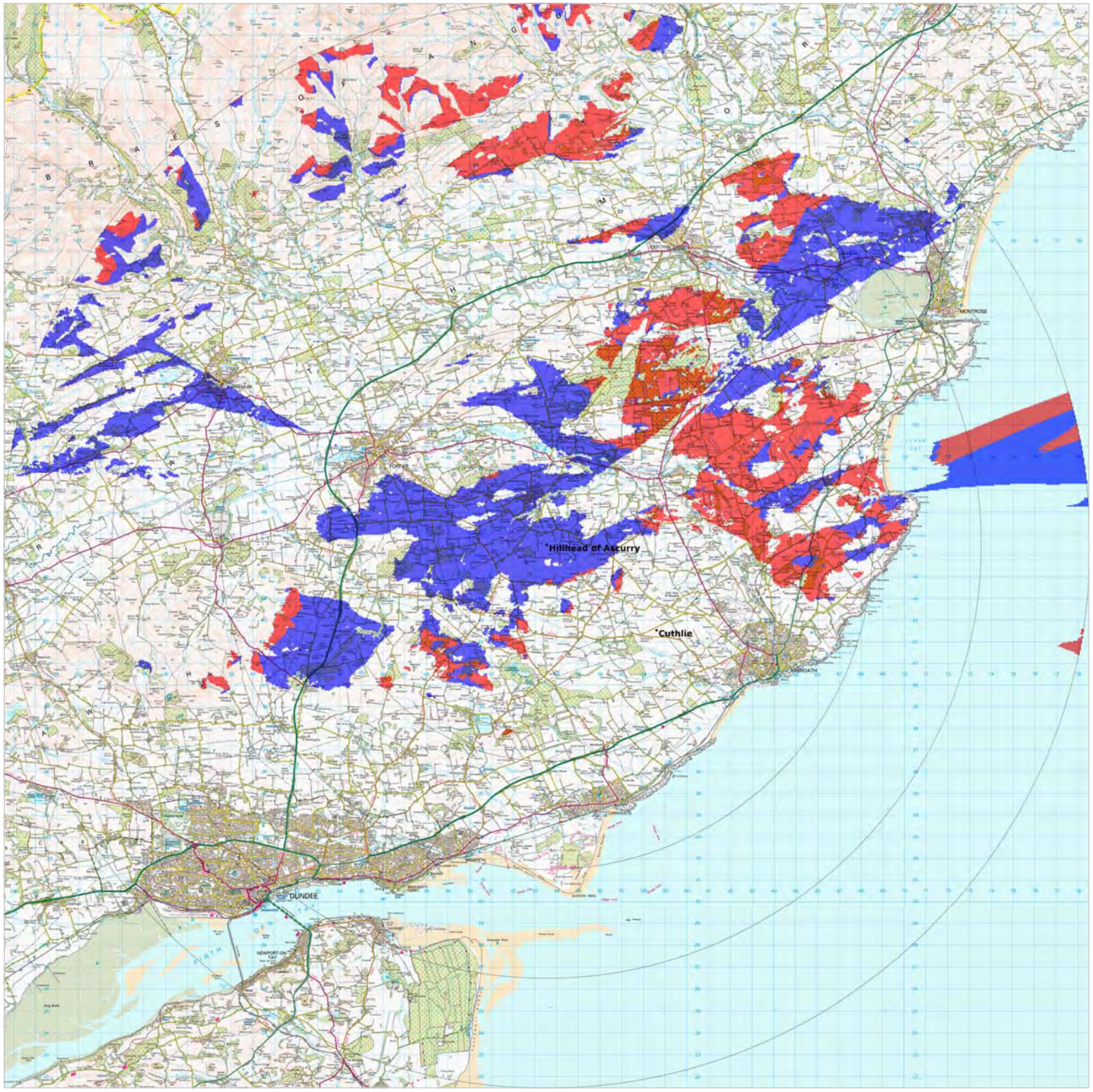
Cunninghill Golf Course details

No of turbines:	1
Distance from Hillhead of Ascurry:	6.3km
Height to blade tip:	77.0m
Status:	Proposed

PROJECT:	**Hillhead of Ascurry**
DRAWING TITLE:	Cumulative ZTV— Cunninghill Golf Course
DRAWING NO:	HOA027
DOCUMENT SIZE:	A3
SCALE:	1:170,000
DATE:	07/10/2013
DRAWING BY:	Franco Giovanetti
APPROVED BY:	Andy Lowe

N

0 5 10 15km



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Company Number: SC370060; VAT Number: 983 3836 77

Project Description

Number of Turbines:	1
Turbine Model:	EWT Directwind 54
Hub Height:	50m
Blade diameter:	54m
Total height to blade tip:	77m
Turbine location:	353539 746476

Notes

This map shows the cumulative zone of visibility of the proposed Hillhead of Ascurry turbine and the proposed Cuthlie development.

Radii: 5, 10, 15, 20 and 25km

Legend

This theoretical visibility map is based on a receptor viewing height of 1.8m AGL. The levels of theoretical visibility are based on the following colouring scheme:

Blue: Only Hillhead of Ascurry turbine visible

Red: At least the nacelle of the Hillhead of Ascurry turbine and the Cuthlie turbine will be visible

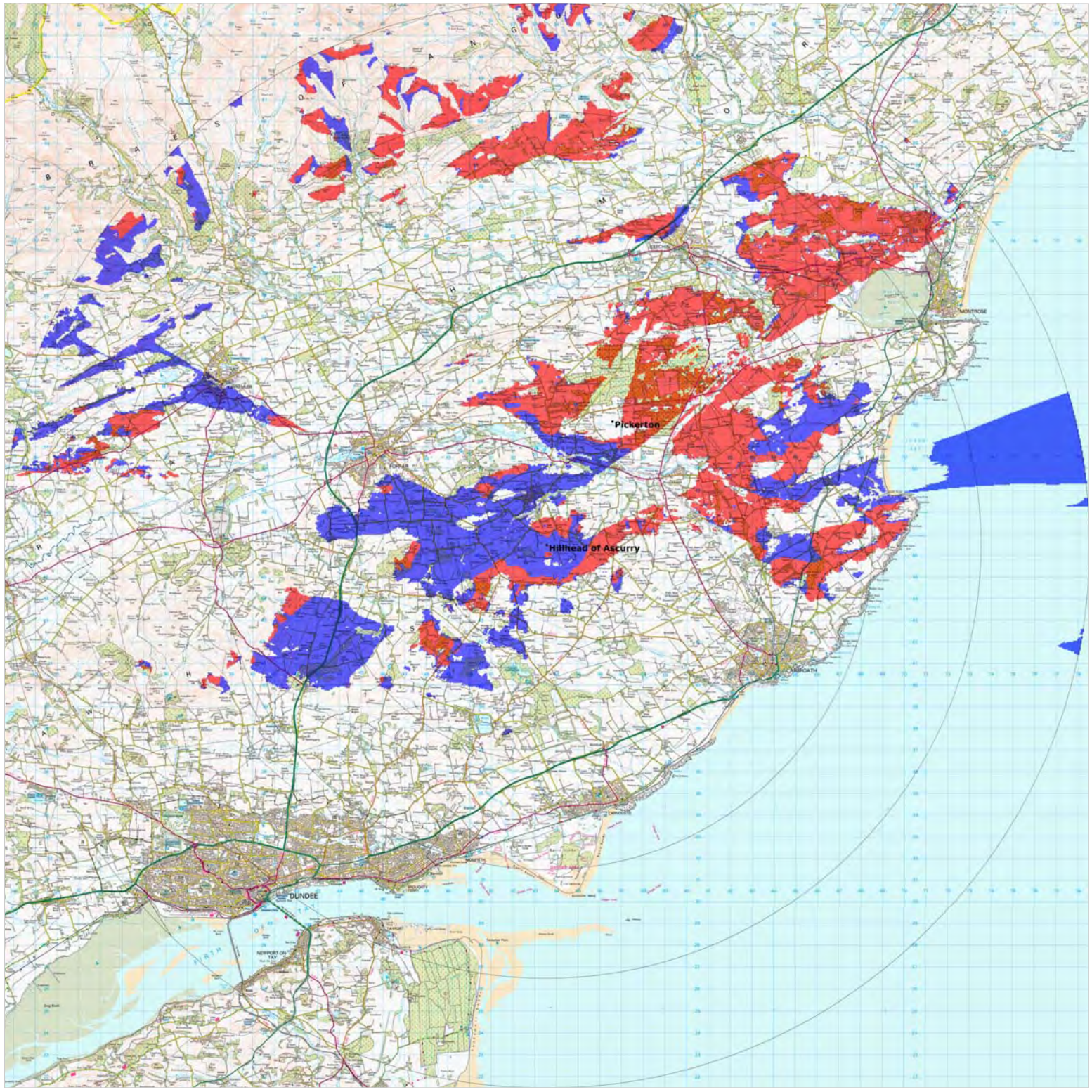
Cuthlie details

No of turbines:	1
Distance from Hillhead of Ascurry:	6.4km
Height to blade tip:	77.0m
Status:	Proposed

PROJECT:	**Hillhead of Ascurry**
DRAWING TITLE:	Cumulative ZTV—Cuthlie
DRAWING NO:	HOA028
DOCUMENT SIZE:	A3
SCALE:	1:170,000
DATE:	07/10/2013
DRAWING BY:	Franco Giovanetti
APPROVED BY:	Andy Lowe

N

0 5 10 15km



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Company Number: SC370060; VAT Number: 983 3836 77

Project Description

Number of Turbines:	1
Turbine Model:	EWT Directwind 54
Hub Height:	50m
Blade diameter:	54m
Total height to blade tip:	77m
Turbine location:	353539 746476

Notes

This map shows the cumulative zone of visibility of the proposed Hillhead of Ascurry turbine and the approved Pickerton development.

Radii: 5, 10, 15, 20 and 25km

Legend

This theoretical visibility map is based on a receptor viewing height of 1.8m AGL. The levels of theoretical visibility are based on the following colouring scheme:

Blue: Only Hillhead of Ascurry turbine visible

Red: At least the nacelle of the Hillhead of Ascurry turbine and the Pickerton turbine will be visible

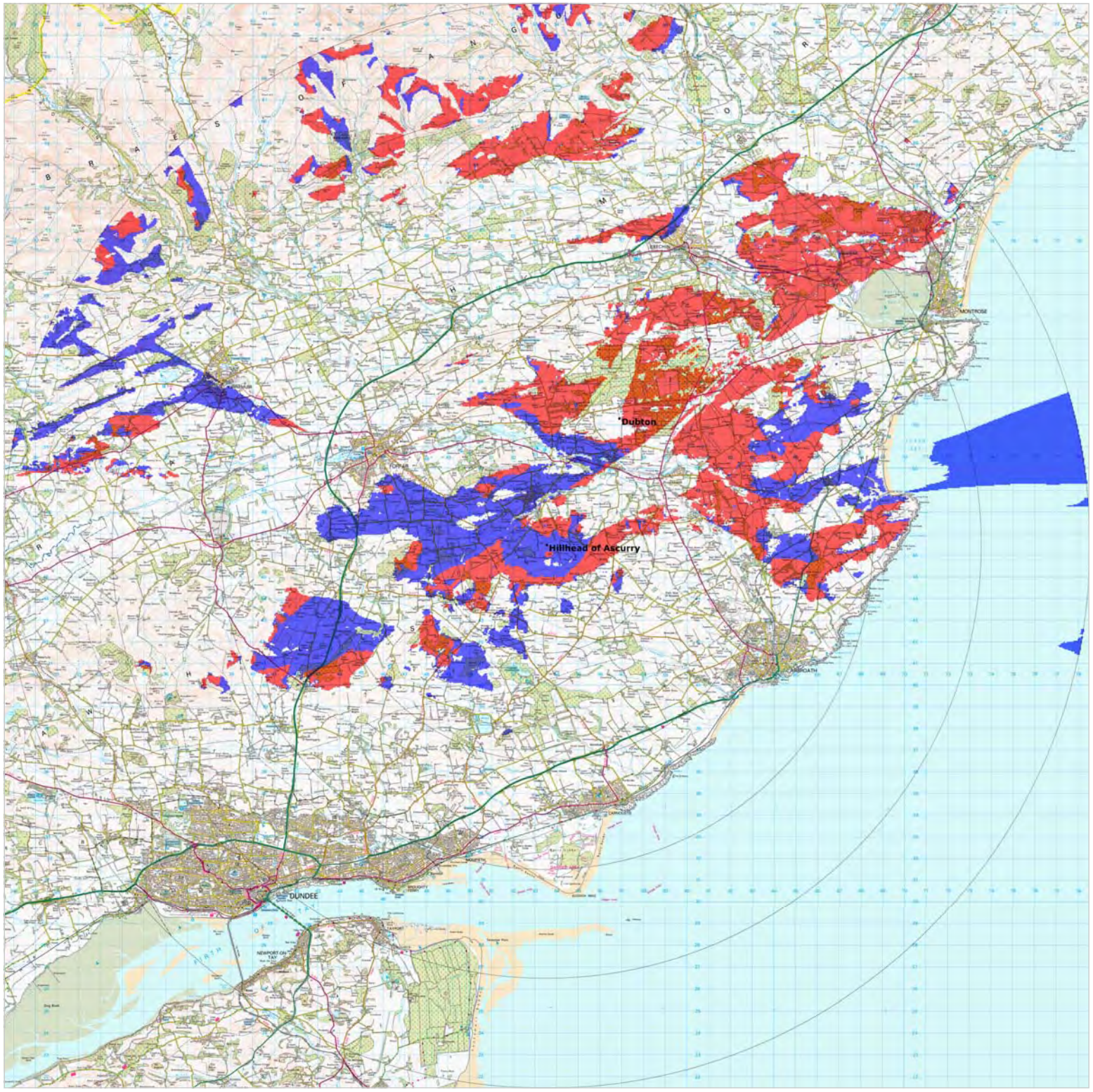
Pickerton details

No of turbines:	1
Distance from Hillhead of Ascurry:	6.4km
Height to blade tip:	77m
Status:	Approved

PROJECT:	**Hillhead of Ascurry**
DRAWING TITLE:	Cumulative ZTV—Pickerton
DRAWING NO:	HOA029
DOCUMENT SIZE:	A3
SCALE:	1:170,000
DATE:	07/10/2013
DRAWING BY:	Franco Giovanetti
APPROVED BY:	Andy Lowe

N

0 5 10 15km



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Project Description

Number of Turbines:	1
Turbine Model:	EWT Directwind 54
Hub Height:	50m
Blade diameter:	54m
Total height to blade tip:	77m
Turbine location:	353539 746476

Notes

This map shows the cumulative zone of visibility of the proposed Hillhead of Ascurry turbine and the proposed Dubton development.

Radii: 5, 10, 15, 20 and 25km

Legend

This theoretical visibility map is based on a receptor viewing height of 1.8m AGL. The levels of theoretical visibility are based on the following colouring scheme:

Blue: Only Hillhead of Ascurry turbine visible

Red: At least the nacelle of the Hillhead of Ascurry turbine and the Dubton turbine will be visible

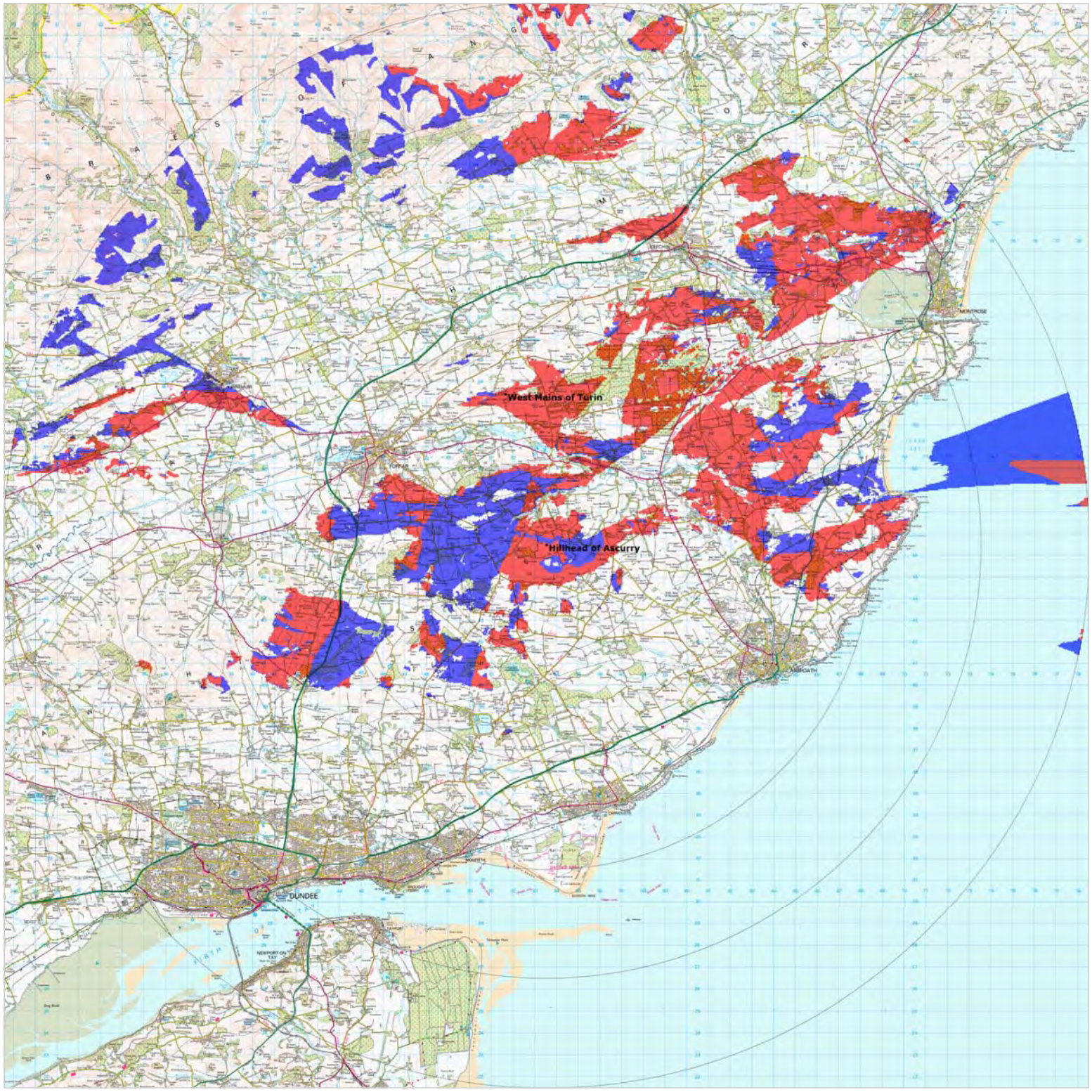
Dubton details

No of turbines:	1
Distance from Hillhead of Ascurry:	6.7km
Height to blade tip:	77m
Status:	Proposed

PROJECT:	**Hillhead of Ascurry**
DRAWING TITLE:	Cumulative ZTV—Dubton
DRAWING NO:	HOA030
DOCUMENT SIZE:	A3
SCALE:	1:170,000
DATE:	07/10/2013
DRAWING BY:	Franco Giovanetti
APPROVED BY:	Andy Lowe

N

0 5 10 15km



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Company Number: SC370060; VAT Number: 983 3836 77

Project Description

Number of Turbines:	1
Turbine Model:	EWT Directwind 54
Hub Height:	50m
Blade diameter:	54m
Total height to blade tip:	77m
Turbine location:	353539 746476

Notes

This map shows the cumulative zone of visibility of the proposed Hillhead of Ascurry turbine and the proposed West Mains of Turin development.

Radii: 5, 10, 15, 20 and 25km

Legend

This theoretical visibility map is based on a receptor viewing height of 1.8m AGL. The levels of theoretical visibility are based on the following colouring scheme:

Blue: Only Hillhead of Ascurry turbine visible

Red: At least the nacelle of the Hillhead of Ascurry turbine and the West Mains of Turin turbine will be visible

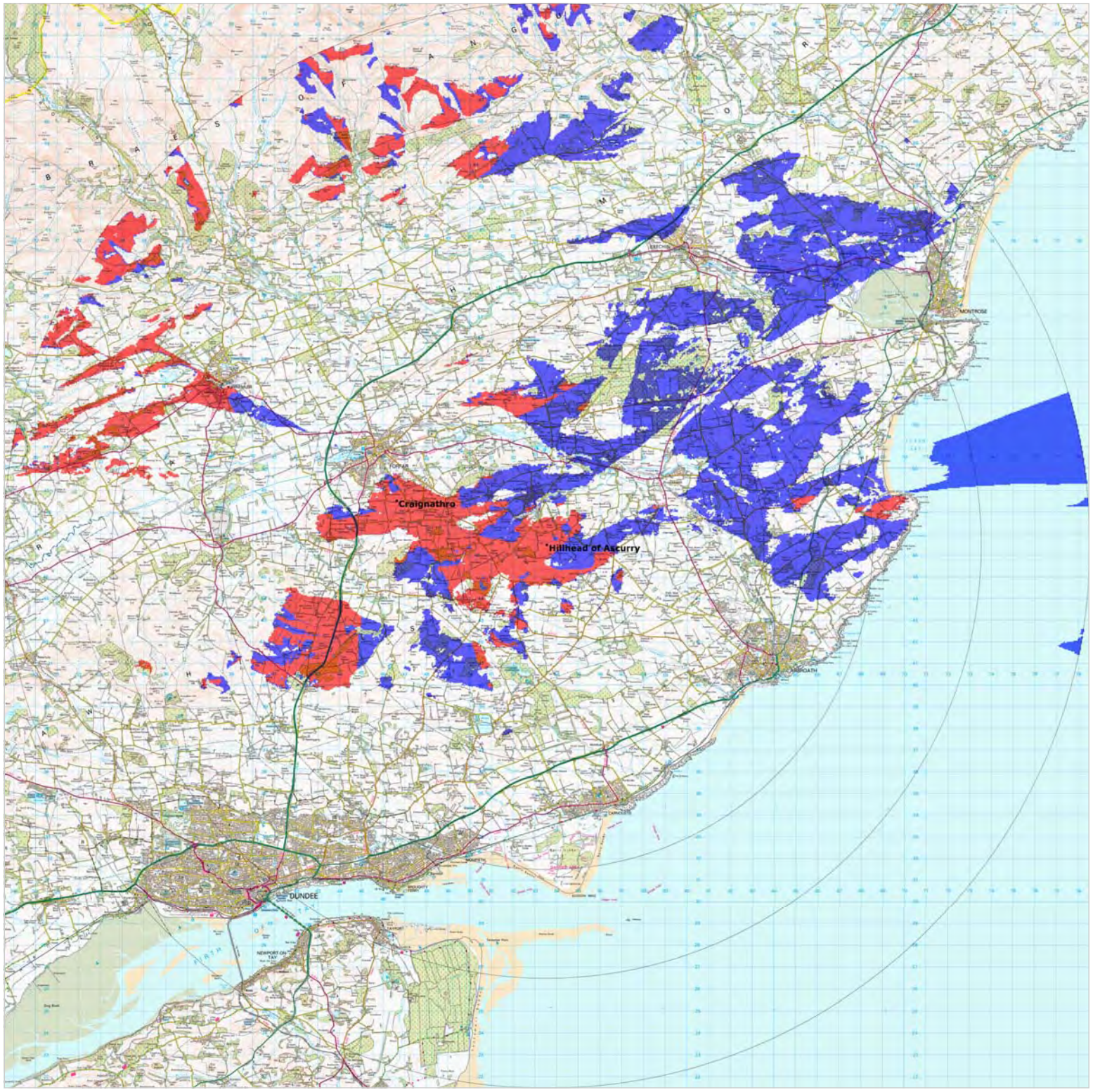
West Mains of Turin details

No of turbines:	1
Distance from Hillhead of Ascurry:	7.2km
Height to blade tip:	49m
Status:	Proposed

PROJECT:	**Hillhead of Ascurry**
DRAWING TITLE:	Cumulative ZTV—West Mains of Turin
DRAWING NO:	HOA031
DOCUMENT SIZE:	A3
SCALE:	1:170,000
DATE:	07/10/2013
DRAWING BY:	Franco Giovanetti
APPROVED BY:	Andy Lowe

N

0 5 10 15km



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Company Number: SC370060; VAT Number: 983 3836 77

Project Description

Number of Turbines:	1
Turbine Model:	EWT Directwind 54
Hub Height:	50m
Blade diameter:	54m
Total height to blade tip:	77m
Turbine location:	353539 746476

Notes

This map shows the cumulative zone of visibility of the proposed Hillhead of Ascurry turbine and the approved Craignathro development.

Radii: 5, 10, 15, 20 and 25km

Legend

This theoretical visibility map is based on a receptor viewing height of 1.8m AGL. The levels of theoretical visibility are based on the following colouring scheme:

Blue: Only Hillhead of Ascurry turbine visible

Red: At least the nacelle of the Hillhead of Ascurry turbine and the Craignathro turbine will be visible

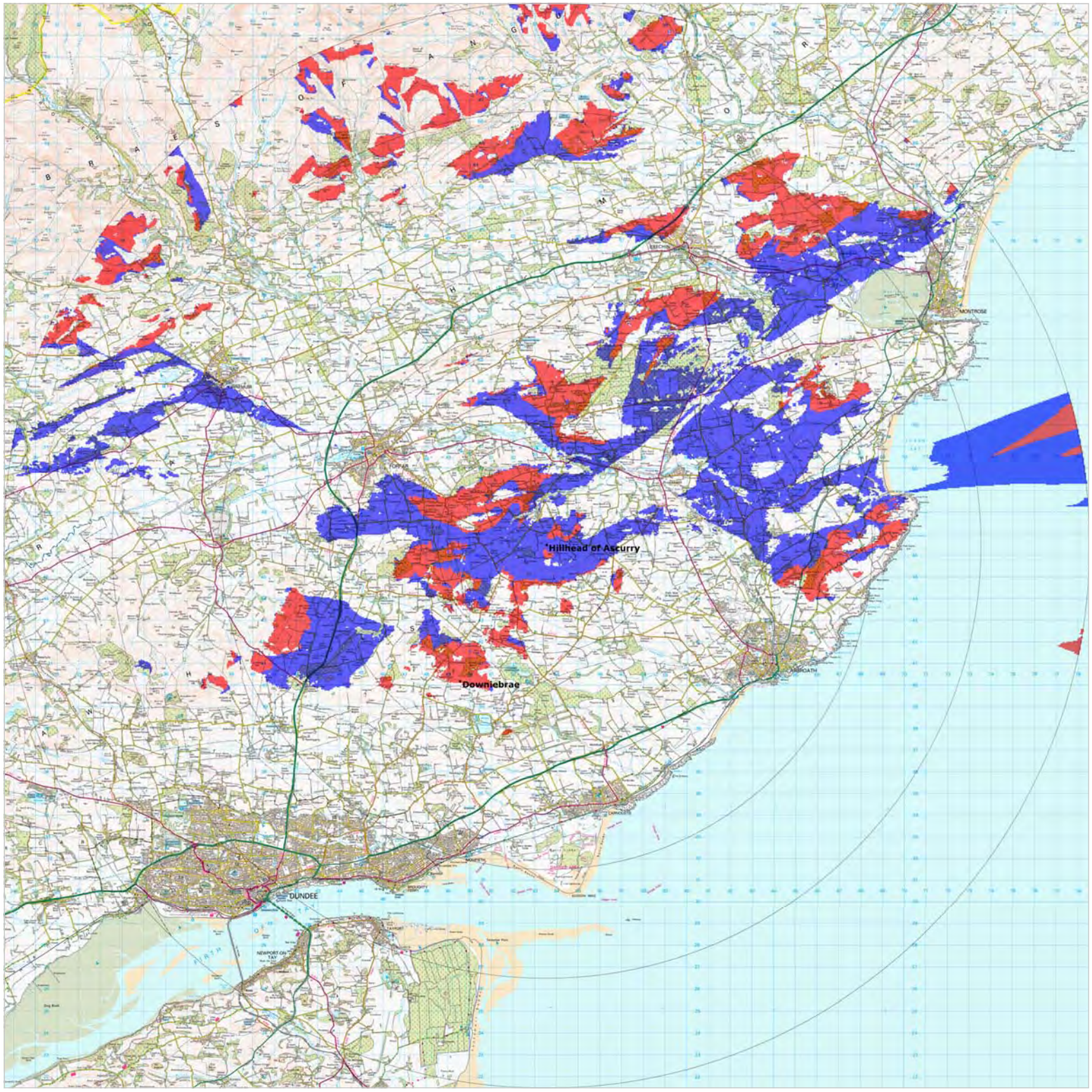
Craignathro details

No of turbines:	1
Distance from Hillhead of Ascurry:	7.2km
Height to blade tip:	35.0m
Status:	Approved

PROJECT:	**Hillhead of Ascurry**
DRAWING TITLE:	Cumulative ZTV—Craignathro
DRAWING NO:	HOA032
DOCUMENT SIZE:	A3
SCALE:	1:170,000
DATE:	07/10/2013
DRAWING BY:	Franco Giovanetti
APPROVED BY:	Andy Lowe

N

0 5 10 15km



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Company Number: SC370060; VAT Number: 983 3836 77

Project Description

Number of Turbines:	1
Turbine Model:	EWT Directwind 54
Hub Height:	50m
Blade diameter:	54m
Total height to blade tip:	77m
Turbine location:	353539 746476

Notes

This map shows the cumulative zone of visibility of the proposed Hillhead of Ascurry turbine and the proposed Downiebrae development.

Radii: 5, 10, 15, 20 and 25km

Legend

This theoretical visibility map is based on a receptor viewing height of 1.8m AGL. The levels of theoretical visibility are based on the following colouring scheme:

Blue: Only Hillhead of Ascurry turbine visible

Red: At least the nacelle of the Hillhead of Ascurry turbine and the Downiebrae turbine will be visible

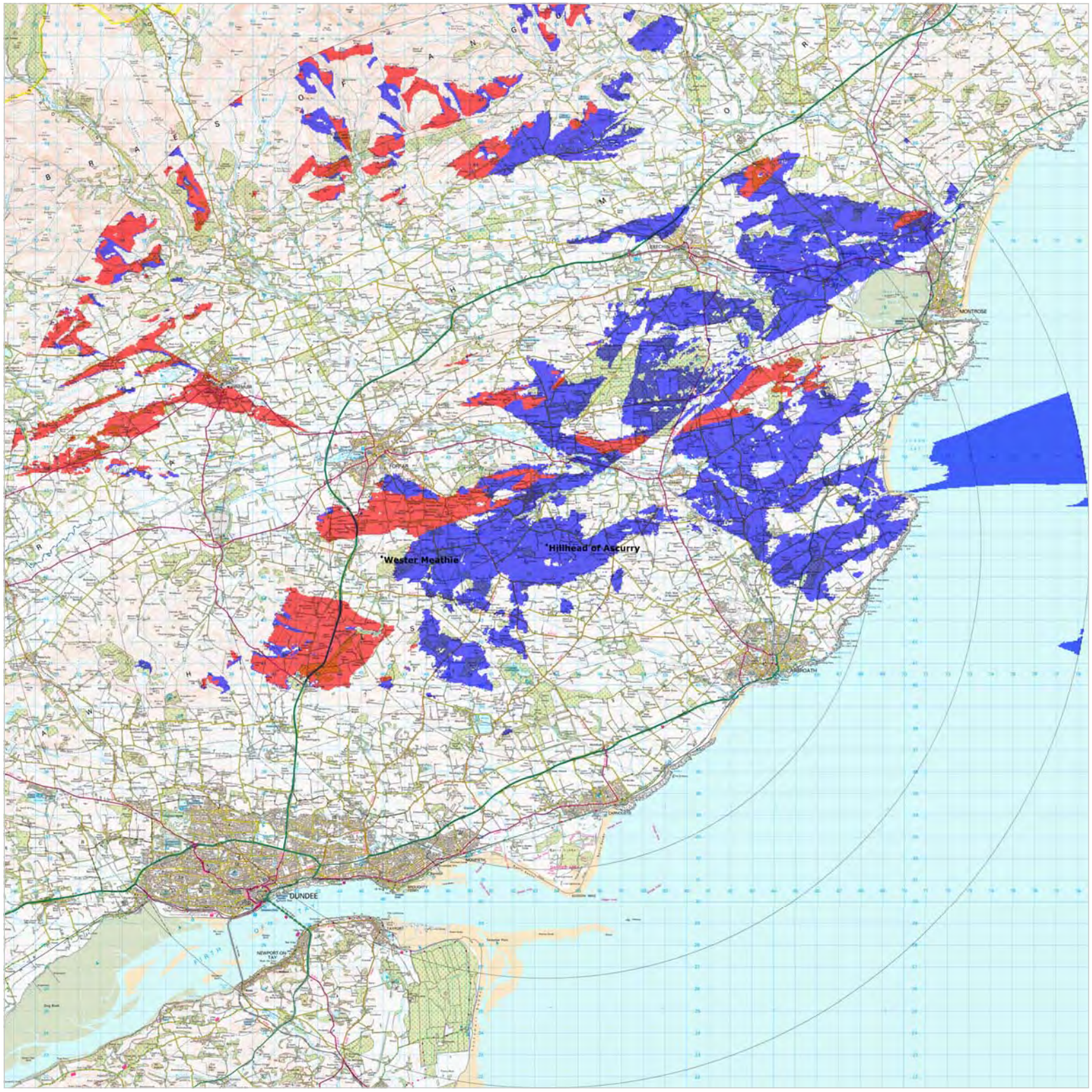
Downiebrae details

No of turbines:	1
Distance from Hillhead of Ascurry:	7.5km
Height to blade tip:	77.0m
Status:	Proposed

PROJECT:	**Hillhead of Ascurry**
DRAWING TITLE:	Cumulative ZTV—Downiebrae
DRAWING NO:	HOA033
DOCUMENT SIZE:	A3
SCALE:	1:170,000
DATE:	07/10/2013
DRAWING BY:	Franco Giovanetti
APPROVED BY:	Andy Lowe

N

0 5 10 15km



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Company Number: SC370060; VAT Number: 983 3836 77

Project Description

Number of Turbines:	1
Turbine Model:	EWT Directwind 54
Hub Height:	50m
Blade diameter:	54m
Total height to blade tip:	77m
Turbine location:	353539 746476

Notes

This map shows the cumulative zone of visibility of the proposed Hillhead of Ascurry turbine and the approved Wester Meathie development.

Legend

This theoretical visibility map is based on a receptor viewing height of 1.8m AGL. The levels of theoretical visibility are based on the following colouring scheme:

Blue: Only Hillhead of Ascurry turbine visible

Red: At least the nacelle of the Hillhead of Ascurry turbine and the Wester Meathie turbines will be visible

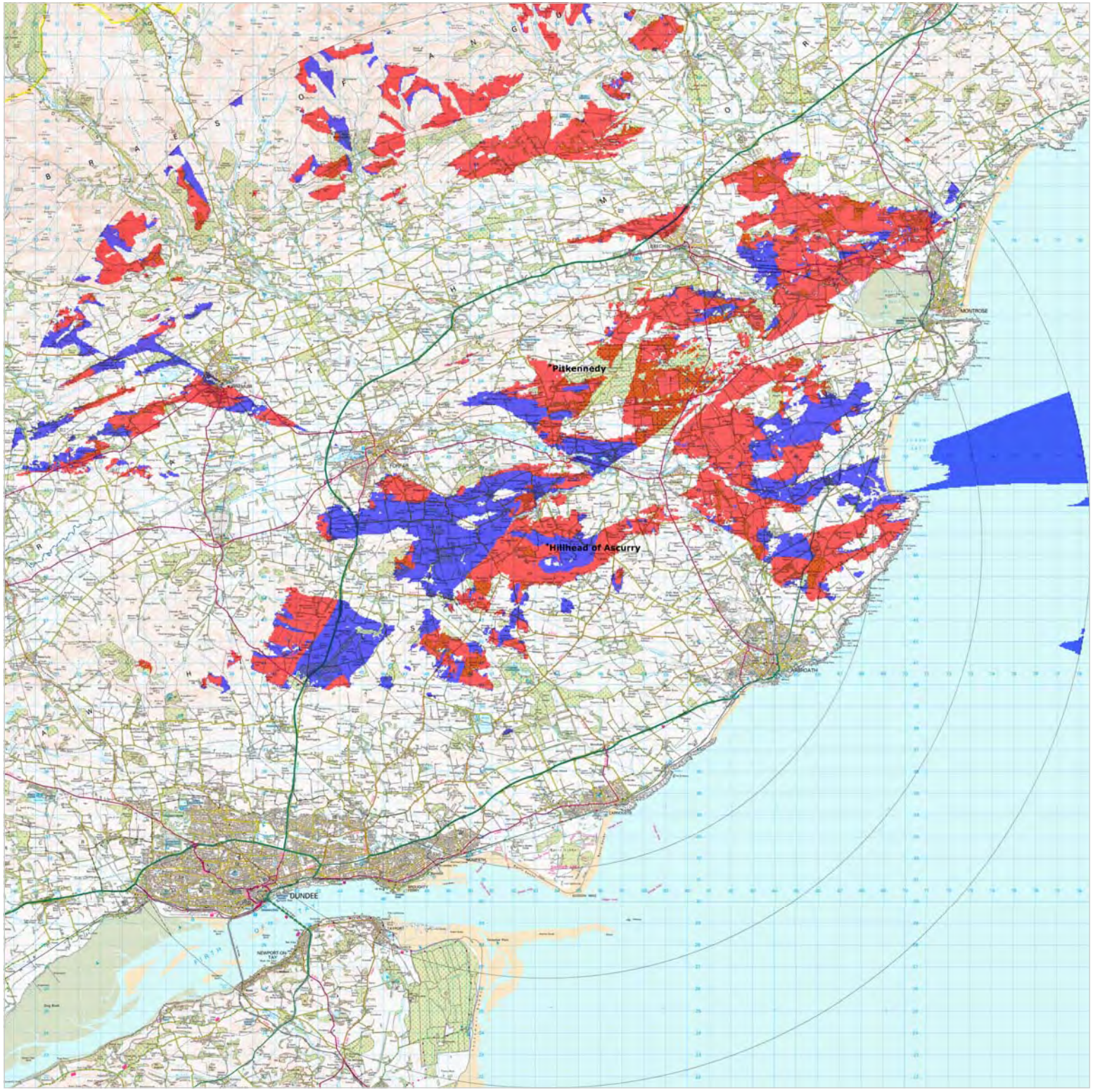
Wester Meathie details

No of turbines:	2
Distance from Hillhead of Ascurry:	7.6km
Height to blade tip:	46.6m
Status:	Approved

PROJECT:	**Hillhead of Ascurry**
DRAWING TITLE:	Cumulative ZTV—Wester Meathie
DRAWING NO:	HOA034
DOCUMENT SIZE:	A3
SCALE:	1:170,000
DATE:	07/10/2013
DRAWING BY:	Franco Giovanetti
APPROVED BY:	Andy Lowe

N

0 5 10 15km



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Tel: +44 (0) 131 555 4745; Email: info@locogen.com
Company Number: SC370060; VAT Number: 983 3836 77

Project Description

Number of Turbines:	1
Turbine Model:	EWT Directwind 54
Hub Height:	50m
Blade diameter:	54m
Total height to blade tip:	77m
Turbine location:	353539 746476

Notes

This map shows the cumulative zone of visibility of the proposed Hillhead of Ascurry turbine and the proposed Pitkennedy development.

Radii: 5, 10, 15, 20 and 25km

Legend

This theoretical visibility map is based on a receptor viewing height of 1.8m AGL. The levels of theoretical visibility are based on the following colouring scheme:

Blue: Only Hillhead of Ascurry turbine visible

Red: At least the nacelle of the Hillhead of Ascurry turbine and the Pitkennedy turbine will be visible

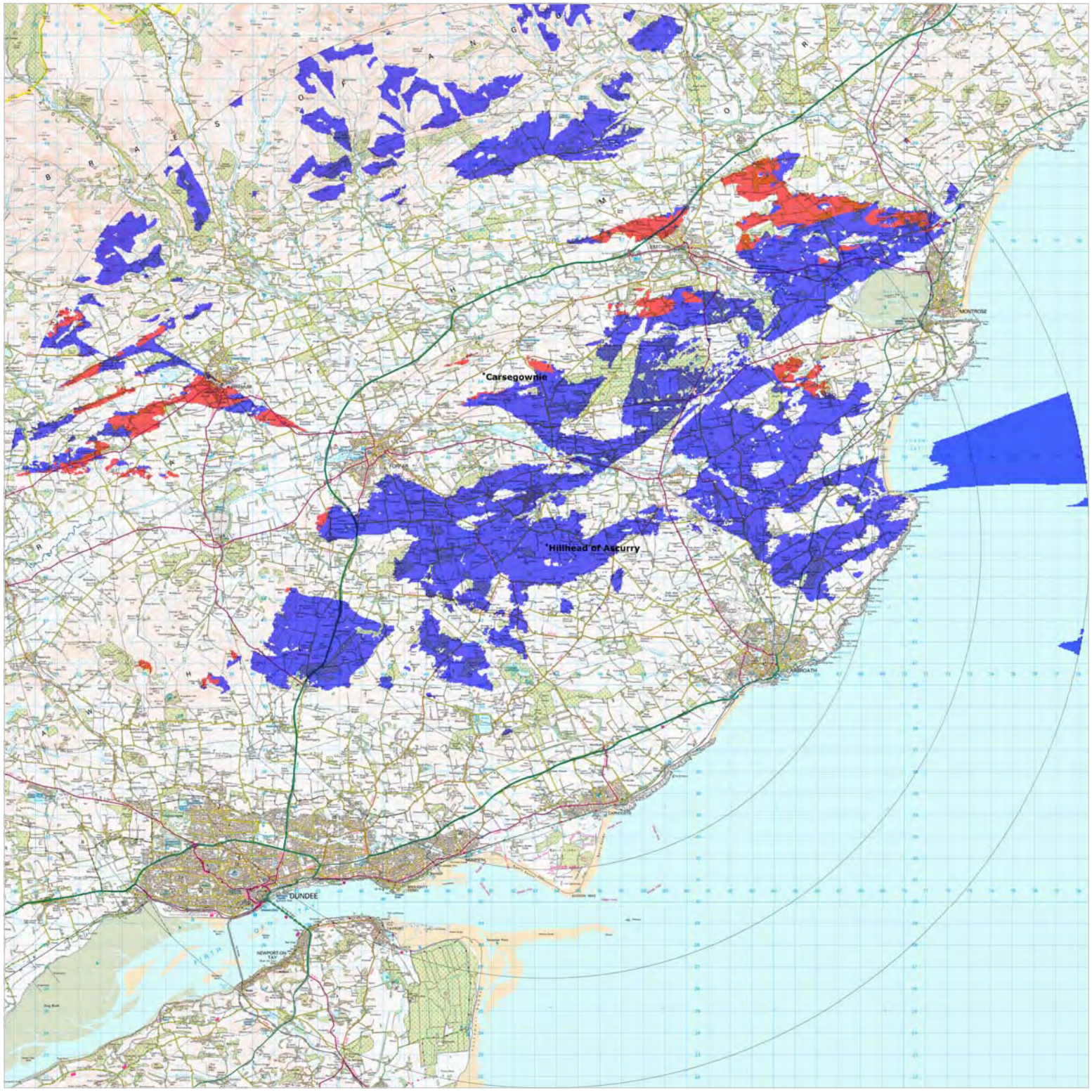
Pitkennedy details

No of turbines:	1
Distance from Hillhead of Ascurry:	83km
Height to blade tip:	74m
Status:	Proposed

PROJECT:	**Hillhead of Ascurry**
DRAWING TITLE:	Cumulative ZTV—Pitkennedy
DRAWING NO:	HOA035
DOCUMENT SIZE:	A3
SCALE:	1:170,000
DATE:	07/10/2013
DRAWING BY:	Franco Giovanetti
APPROVED BY:	Andy Lowe

N

0 5 10 15km



AC57

Locogen Ltd, 44 Constitution St, Edinburgh, EH6 6RS
Tel: +44 (0) 131 555 4745; Email: info@locogen.com
Company Number: SC370060; VAT Number: 983 3836 77

Project Description

Number of Turbines:	1
Turbine Model:	EWT Directwind 54
Hub Height:	50m
Blade diameter:	54m
Total height to blade tip:	77m
Turbine location:	353539 746476

Notes

This map shows the cumulative zone of visibility of the proposed Hillhead of Ascurry turbine and the proposed Carsegownie development.

Radii: 5, 10, 15, 20 and 25km

Legend

This theoretical visibility map is based on a receptor viewing height of 1.8m AGL. The levels of theoretical visibility are based on the following colouring scheme:

Blue: Only Hillhead of Ascurry turbine visible

Red: At least the nacelle of the Hillhead of Ascurry turbine and the Carsegownie turbine will be visible

Carsegownie details

No of turbines:	1
Distance from Hillhead of Ascurry:	8.4km
Height to blade tip:	34.2m
Status:	Proposed

PROJECT:	**Hillhead of Ascurry**
DRAWING TITLE:	Cumulative ZTV—Carsegownie
DRAWING NO:	HOA036
DOCUMENT SIZE:	A3
SCALE:	1:170,000
DATE:	07/10/2013
DRAWING BY:	Franco Giovanetti
APPROVED BY:	Andy Lowe

N

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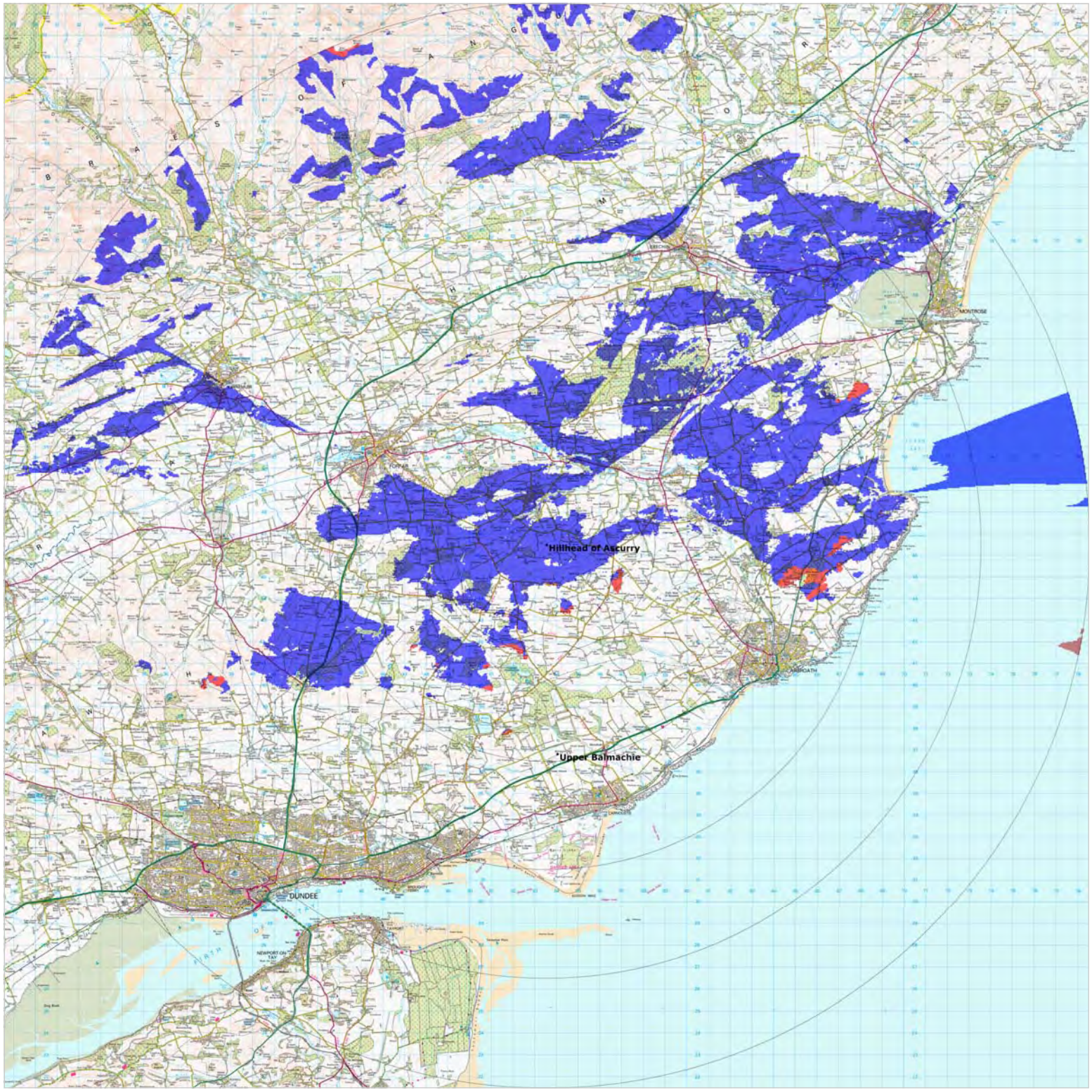

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AC57

Locogen Ltd, 44 Constitution St, Edinburgh, EH6 6RS
Tel: +44 (0) 131 555 4745; Email: info@locogen.com
Company Number: SC370060; VAT Number: 983 3836 77

Project Description

Number of Turbines:	1
Turbine Model:	EWT Directwind 54
Hub Height:	50m
Blade diameter:	54m
Total height to blade tip:	77m
Turbine location:	353539 746476

Notes

This map shows the cumulative zone of visibility of the proposed Hillhead of Ascurry turbine and the proposed Upper Balmachie development.

Legend

This theoretical visibility map is based on a receptor viewing height of 1.8m AGL. The levels of theoretical visibility are based on the following colouring scheme:

Blue: Only Hillhead of Ascurry turbine visible

Red: At least the nacelle of the Hillhead of Ascurry turbine and the Upper Balmachie turbine will be visible

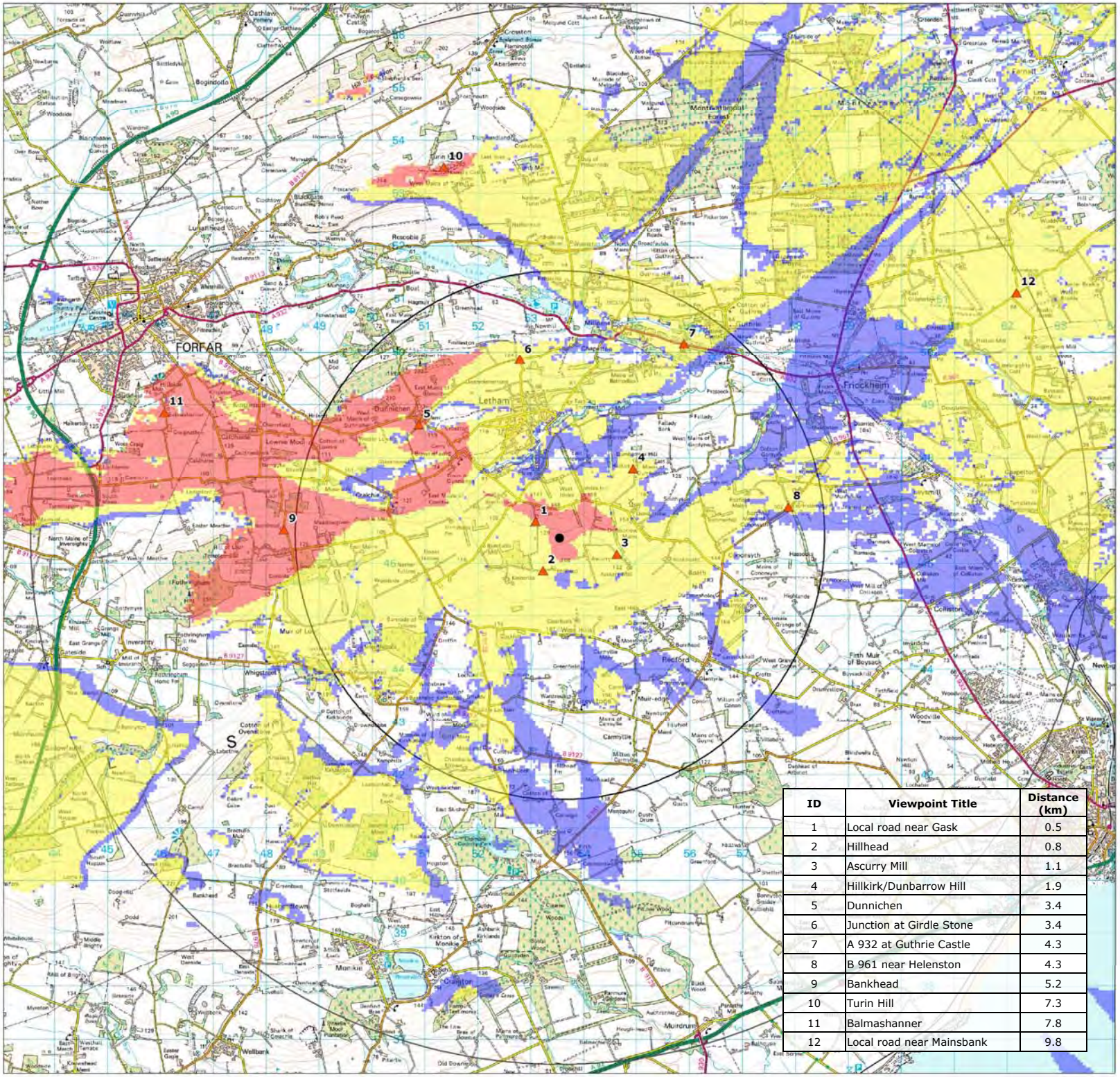
Upper Balmachie details

No of turbines:	1
Distance from Hillhead of Ascurry:	9.7km
Height to blade tip:	77.0m
Status:	Proposed

PROJECT:	**Hillhead of Ascurry**
DRAWING TITLE:	Cumulative ZTV—Upper Balmachie
DRAWING NO:	HOA037
DOCUMENT SIZE:	A3
SCALE:	1:170,000
DATE:	07/10/2013
DRAWING BY:	Franco Giovanetti
APPROVED BY:	Andy Lowe

N

0 5 10 15km



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ID	Viewpoint Title	Distance (km)
1	Local road near Gask	0.5
2	Hillhead	0.8
3	Ascurry Mill	1.1
4	Hillkirk/Dunbarrow Hill	1.9
5	Dunnichen	3.4
6	Junction at Girdle Stone	3.4
7	A 932 at Guthrie Castle	4.3
8	B 961 near Helenston	4.3
9	Bankhead	5.2
10	Turin Hill	7.3
11	Balmashanner	7.8
12	Local road near Mainsbank	9.8

AC57

Locogen Ltd, 44 Constitution St, Edinburgh, EH6 6RS
Tel: +44 (0) 131 555 4745; Email: info@locogen.com
Company Number: SC370060; VAT Number: 983 3836 77

Project Description

Number of Turbine(s):	1
Turbine Model:	EWT Directwind 54
Hub Height:	50m
Blade diameter:	54m
Total height to blade tip:	77m
Turbine location:	353539 746476

Notes

This map illustrates the selected viewpoints for the LVIA study and the turbine ZTV.

Radii: 5, 10 and 15km

Legend

- Turbine Location
- Viewpoints

This theoretical visibility map is based on a receptor viewing height of 1.8m AGL. The levels of theoretical visibility are based on the following colouring scheme:

Blue:	Only the blades are theoretically visible from these areas
Yellow:	At least the nacelle and blades are theoretically visible in these areas
Red:	The blades, nacelle and tower down to a point at least 1m AGL are theoretically visible in these areas

PROJECT:	**Hillhead of Ascurry**
DRAWING TITLE:	Viewpoints and ZTV
DRAWING NO:	HOA038
DOCUMENT SIZE:	A3
SCALE:	1:70,000
DATE:	05/10/2013
DRAWING BY:	Franco Giovanetti
APPROVED BY:	Andy Lowe

N

0 1 2 3 km

APPENDIX 2

DEVELOPMENT MANAGEMENT REVIEW COMMITTEE

APPLICATION FOR REVIEW

FIELD 500M NORTH WEST OF ASCURRY FARM, LETHAM

APPLICATION NO 13/01029/FULL

APPLICANT'S SUBMISSION

ITEM 1. Notice of Review Form

ITEM 2. Appeal Statement

ITEM 3. Supporting Environmental Document

ITEM 4. Planning Drawings HOA001-038

ITEM 5. Photomontages HOA039-072

ITEM 6. Additional Noise Information submitted to Angus Council

ITEM 7. Additional Shadow Flicker Information submitted to Angus Council

ITEM 8. Additional Landscape Character Assessment Information submitted to Angus Council

ITEM 9. Covering Letter requesting Non-Determination Appeal

ITEM 10. Letter from Applicant submitted to Angus Council

County Buildings Market Street Forfar DD8 3LG

Tel: 01307 461460

Fax: 01307 461 895

Email: plnprocessing@angus.gov.uk

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

Thank you for completing this application form:

ONLINE REFERENCE 000085948-001

The online ref number 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:	Locogen
Ref. Number:	
First Name: *	Andy
Last Name: *	Lowe
Telephone Number: *	01315554745
Extension Number:	
Mobile Number:	
Fax Number:	
Email Address: *	andy.lowe@locogen.com

You must enter a Building Name or Number, or both:*

Building Name:	Locogen
Building Number:	
Address 1 (Street): *	44 Constitution Street
Address 2:	
Town/City: *	Edinburgh
Country: *	UK
Postcode: *	EH6 6RS

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

☐ Individual ☑ Organisation/Corporate entity

Applicant Details

Please enter Applicant details

Title:		You must enter a Building Name or Number, or both:*	
Other Title:		Building Name:	West Mains of Colliston Farm
First Name:		Building Number:	
Last Name:		Address 1 (Street): *	Colliston
Company/Organisation: *	A. M. McEwan	Address 2:	
Telephone Number:		Town/City: *	Arbroath
Extension Number:		Country: *	UK
Mobile Number:		Postcode: *	DD11 3RT
Fax Number:			
Email Address:			

Site Address Details

Planning Authority: Angus Council

Full postal address of the site (including postcode where available):

Address 1:		Address 5:	
Address 2:		Town/City/Settlement:	
Address 3:		Post Code:	
Address 4:			

Please identify/describe the location of the site or sites.

Field approximately 550m to the north of Hillhead of Ascurry Farmstead

Northing	746476	Easting	353539

Description of the Proposal

Please provide a description of the 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)

Proposed erection of one wind turbine (measuring 50m to hub and 77m to blade tip) and associated sub-station and transformer kiosk, hardstanding areas and access road.

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 of 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.

Please see attached file "13_01029_FULL_Hillhead of Ascurry Farm_Non Determination Appeal"

Have you raised any matters which were not before the appointed officer at the time the determination on your application was made? * ☐ Yes ☑ No

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)

1. Supporting Environmental Document
2. Planning drawings HOA001-038
3. Photomontages HOA039-072
4. Additional noise information submitted to Angus Council
5. Additional shadow flicker information submitted to Angus Council
6. Additional Landscape Character Assessment information submitted to Angus Council
7. Covering letter requesting non-determination Appeal
8. Letter from Applicant submitted to Angus Council

Application Details

Please provide details of the application and decision.

What is the application reference number? * 13_01029_FULL

What date was the application submitted to the planning authority? * 05/11/13

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

Please indicate what procedure (or combination of procedures) you think is most appropriate for the handling of your review. You may select more than one option if you wish the review to be conducted by a combination of procedures.

Please select a further procedure *

Inspection of the land subject of the appeal. (Further details below are not required)

Please explain in detail in your own words why this further procedure is required and the matters set out in your statement of appeal it will deal with? * (Max 500 characters)

The site has been carefully selected to be a suitable distance from houses and to be located in a natural bowl in the landscape. There is also considered to be minimal impact on local residents. It is considered that a site visit is required for this to be understood.

Please select a further procedure *

Holding one or more hearing sessions on specific matters

Please explain in detail in your own words why this further procedure is required and the matters set out in your statement of appeal it will deal with? * (Max 500 characters)

The Applicant and/or Applicant's Agent would like the opportunity to present the benefits of the proposal to the Local Review Body, and to give them the opportunity to ask any questions.

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

If there are reasons why you think the Local Review Body would be unable to undertake an unaccompanied site inspection, please explain here. (Max 500 characters)

The site forms part of a working farm therefore members of the Local Review Body require to be accompanied on site.

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:	Andy Lowe
Declaration Date:	25/03/2014
Submission Date:	25/03/2014

ITEM 2

Locogen Ltd
44 Constitution Street
Edinburgh
EH6 6RS

24/03/2014

Corporate Services
Angus Council
Angus House
Orchardbank
Forfar
DD8 1AN

Request for Development Management Review
Non Determination of Planning Application Reference: 13/01029/FULL
Land at Hillhead of Ascurry Farm

Dear Sir/Madam,

The above application was validated by Angus Council on 4th November 2013. Its target determination date was 4th January 2014. We are now 11 weeks beyond that date and, although there are no objections from statutory consultees, it is considered that there is likely to be further delay for the Development Standards Department to complete their assessment of the application.

We have provided a comprehensive and professional planning submission, including all the required information. Post-submission we have made three additional submissions to provide more clarity on the application, covering noise, shadow flicker and landscape character. The applicant has also recently written directly to the Council outlining his further comments on the application.

In summary, the proposed single wind turbine is of vital importance to A. M. McEwan's farming business. Mr McEwan is a local farmer and employs 10 local people on a full time basis and 12 further part time and seasonal staff.

The main objectives of the proposal are as follows:

- To improve attractiveness of food produce to suppliers through improved sustainability credentials;
- To support existing employment and create new job opportunities;
- To provide renewable energy to meet demand;
- To reduce the overall carbon footprint of the farming business through offsetting energy usage, which currently costs in the region of £120,000 per annum;
- To increase direct business revenue and thus support the continued viability of the existing farming business;
- To promote the use of green energy generation in the area and contribute towards achieving stated renewable energy generation and carbon reduction targets; and
- To spread the farmer's risk into a non-agricultural sector.

The development of wind energy at the site by the applicant will also maximise the local benefits from renewable development as the revenue from the project will stay in the local economy. It is also Mr McEwan's desire to use local contractors, where possible, for

different aspects of the wind turbine installation. Again, this will keep investment in the local area.

The proposed turbine will be situated at the edge of an arable field. The site has been carefully chosen to maintain statutory separation distances from nearby sensitive receptors, and as outlined in the detailed Landscape and Visual Impact Assessment included within Chapter 5 of the Supporting Environmental Document, there will be no significant long term impacts on the overall integrity of the landscape character or any landscape designations.

Given that this application is a 'local development' and has not been determined within the target determination period, it is the applicant's desire to seek a review by the Council's Development Management Review Committee. As required, we submit the following documents:

- Notice of Review;
- Supporting Environmental Document and associated graphics; and
- Additional information submitted in support of the application.

Please acknowledge safe receipt of this letter and enclosures.

Please do not hesitate to contact me directly should you wish to discuss.

Yours faithfully,

Andy Lowe
Senior Wind Developer

Locogen Ltd.

Supporting Environmental Document

for

Hillhead of Ascurry Wind Turbine

Prepared by:	Andy Lowe
Telephone:	0131 555 4745
Email:	Andy.Lowe@locogen.com
Issued to:	Angus Council – Planning
Contact address:	County Buildings, Market St, Forfar, Angus, DD8 3LG.
Telephone:	01307 461 460
Email:	planning@angus.gov.uk
Date of issue:	29/10/2013

Version	Date	Purpose of amendment
0430RRev1	29/10/2013	Final planning submission to LPA

Table of Contents

Abbreviations

AGL	Above Ground Level
AOD	Above Ordnance Datum
ALS	Area of Landscape Significance
ASL	Above Sea Level
ATC	Air Traffic Control
BAA	British Airports Authority
CAA	Civil Aviation Authority
CO_2	Carbon dioxide
EIA	Environmental Impact Assessment
GHG	Greenhouse Gas
GRP	Glassfibre Reinforced Plastic
GDL	Gardens and Designed Landscapes
HGV	Heavy Goods Vehicle
HBT	Height to Blade Tip
IPCC	Inter-governmental Panel on Climate Change
kW	Kilowatt (a unit of power)
kWh	Kilowatt-hour (a unit of energy generation)
LCA	Landscape Character Assessment
LCT	Landscape Character Type
LPA	Local Planning Authority
LVIA	Landscape and Visual impact Assessment
MOD	Ministry of Defence
MW	Megawatt
NATS	National Air Traffic Services
NSA	National Scenic Areas
Ofcom	Office of Communications
RSPB	Royal Society for the Protection of Birds
SINC	Site of Importance for Nature Conservation
SNH	Scottish Natural Heritage
SPA	Special Protection Area
SSSI	Site of Special Scientific Interest
ZTV	Zone of Theoretical visibility

1. Introduction

This Supporting Environmental Document describes and quantifies the potential environmental and social impacts associated with the construction, operation and decommissioning of a medium scale wind turbine at Hillhead of Ascurry, near Letham. It also provides further information on the proposed development, its compliance with planning policy and the reasons for development. It is to be read alongside the formal planning application submitted to Angus Council.

The remainder of this chapter provides background information on the Hillhead of Ascurry site and the drivers that led to the proposed development being put forward.

1.1. Turbine site

The proposed turbine will be situated at the edge of an arable field, approximately 2km south of Letham, 3km north of Greystone and 3.2km north west of Redford. The area that comprises the Hillhead of Ascurry site is illustrated in Figure 1 below with the boundary of the agricultural land owned by the applicant shown in blue. The proposed turbine location is highlighted by the black circle.

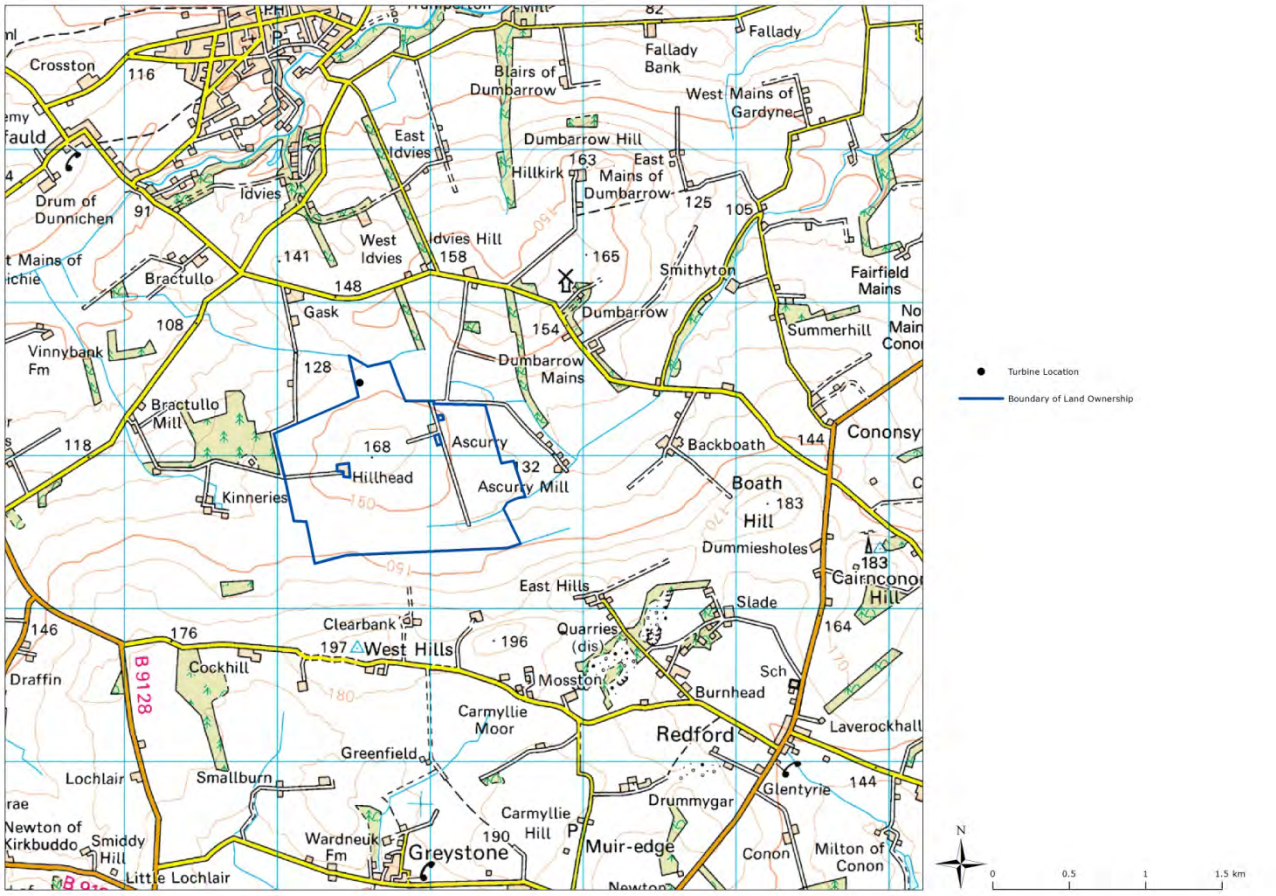

Figure 1: Map showing the land comprising the Hillhead of Ascurry site

1.2. Project Benefits

There are three core drivers for the applicant to develop wind energy on the farm:

1. Diversification of farming business;
2. Improve environmental performance; and
3. Combating climate change.

These drivers are discussed further in the chapters below.

1.2.1. Diversification

The development of a wind turbine at Hillhead of Ascurry would lead to an additional sustainable source of income for the family farming business, A. M. McEwan. Concerns have been raised over the poor weather conditions experienced in recent years and the significant impact this has had on the farming business. This has prompted the applicant to explore alternative areas of income to help support his farming business. A. M. McEwan currently employs 10 full time staff and 12 part-time and seasonal staff.

The proposed wind turbine will provide a source of additional income over the 25 years of expected operation. Agriculture incomes can differ significantly year to year due to variations in weather conditions, crop quality and yield, market prices, exchange rates and operational costs for fertiliser, fuel etc. The operation of the wind turbine will provide an income stream that is separate from these variables and the project therefore demonstrates best practice diversification. The development will also have a minimal footprint and allow for the continuation of the current farming operation on the vast majority of the land.

The main objectives of the proposed income diversification are as follows:

- To increase direct business revenue and thus support the continued viability of the existing farming business;
- To improve attractiveness of food produce to suppliers through improved sustainability credentials;
- To support existing employment;
- To create new employment;
- To provide renewable energy to meet demand;
- To reduce the overall carbon footprint of the farm through offsetting energy usage;
- To promote the use of renewable energy generation in the area and contribute towards achieving national and regional renewable energy targets; and
- To spread the farmer's risk into a non-agricultural sector.

The development of wind energy at the site by the applicant will also maximise the local benefits from renewable development as the revenue from the project will stay in the local economy. The additional benefits of locally developed and owned renewable energy projects are described in further detail in the socioeconomic chapter of this document but is considered to lead to a greater opportunity for retained benefits and local job creation.

1.2.2. Improve Environmental Performance

Hillhead of Ascurry is an arable farm comprising approximately 380 acres of farm land. Hillhead of Ascurry is one of 11 farms owned by A. M. McEwan, with the wider farming business totalling approximately 2,200 acres across Angus.

Arable cropping across the farming estate includes malting barley, feed wheat, oilseed rape, ware potatoes, seed potatoes and a small area of permanent grazing. In addition 250 – 300 cattle per annum are finished for the beef trade on the permanent grazing and in a cattle store at one of A. M. McEwan's farms.

The farming business comprises a number of farm buildings, including 4 cold stores capable of storing 5,300 tonnes of potatoes, 2 ambient stores capable of storing 6,200 tonnes of produce, a grain drier, a potato grader and a hammer mill.

All of A. M. McEwan's ware potatoes are sold to Albert Bartlett & Sons (Airdrie) Ltd. These in turn end up in most of the major supermarkets throughout the UK. These businesses demand high quality and the best way to maintain quality over a long period of time is through cold storage. Whilst potatoes are being stored on the farm this requires an ambient temperature of 2 – 3 degrees.

The seed potatoes grown across the farming business are sold to Grampian Growers Ltd, the cattle to McIntosh Donald, and the oilseed rape, malting barley and feed wheat to WN Lindsay, DM Carnegie and East Coast Viners Grain LLP. All of these are local businesses.

Given the above operations the farming business has a significant carbon footprint from normal operations and this is primarily linked to the energy consumption required to run the business.

Electricity usage across the farming business is also high, costing in the region of £120,000 per annum. This is therefore a significant cost to the business and a source of associated carbon emissions, and this will only increase as the farm business continues to grow and energy prices increase.

In addition it is estimated that the A. M. McEwan business annually consumes ~350,000 litres of red diesel and this is considered to directly lead to 934 tonnes of CO_2[1] emitted per annum.

As a high energy user, a supplier to local and national food companies, and a supplier of British produce, the farm is seeking to improve its sustainability credentials and reduce its carbon footprint. The requirement to demonstrate a tangible commitment to sustainability is increasing, with markets demanding higher environmental standards from their supply chain, and buyers requesting support from suppliers to help meet their environmental commitments. In a competitive market the ability to demonstrate that the farm business is working hard to support buyers' environmental strategies is becoming increasingly important to maintain business. Energy prices are also increasing and to ensure farming remains viable, both environmentally and financially, a sustainable energy supply is essential.

Given the strong expected wind resource at the proposed location the operation of 1 No. 500kW wind turbine is expected to generate in the region of 1,650MWh per annum[2]. This would directly offset the emission of approximately 866 tonnes of CO_2 for every year of operation[3]. This would be a significant step towards reducing the carbon footprint of the

[1] Using current figures from DECC and the Carbon Trust each litre of diesel used emits 2.6676 kg of CO_2.
[2] This figure is based on a turbine capacity factor of 38%.
[3] Using current figures from DECC and the Carbon Trust each kWh of electricity generated offsets 0.5246kg of CO_2.

farming business and meeting A. M. McEwan's desire to achieve environmentally friendly farming practices.

1.2.3. Combating Climate Change

In addition to the above local drivers the development will also be a positive towards combating climate change. It is now generally accepted that there is an important requirement to reduce the emission of harmful Greenhouse Gases (GHG's) – specifically carbon dioxide (CO_2) – in order to mitigate the worst impacts of human-induced global climate change. To this end there are global and national targets in place that address this requirement for a move to a low carbon way of life.

The UK has signed up to targets to reduce total CO_2 emissions. Over and above the terms laid out in the UK, Scotland has set further ambitious targets. Around 20% of the UK's CO_2 emissions are caused by the production of electricity from conventional burning of fossil fuels (coal, oil and gas). Therefore the increased development of renewable energy technologies – such as wind energy – is a key part of the strategy to meet the UK's legal requirements. To this end a number of national and regional targets have been set out for the increased provision of electricity from renewable sources and these are summarised for Scotland and the UK in Table 1 below.

	Scotland	**UK**
CO_2 emissions reduction targets by 2020[4]	42%	34%
Proportion of electricity demand to be met by renewable technologies by 2020	100%	15%
Estimated renewable electricity generation required to meet target	45TWh	>100TWh
Expected proportion of the above to be met by onshore wind	50%	40%
Equivalent GW capacity required from onshore wind to meet this target	~9.5GW	~15-19GW
Actual onshore installed capacity as of October 2012	3.4GW	5.0GW

Table 1: Overview of energy related CO_2 emission reduction targets

From the above table it can be seen that Scotland and the UK are a considerable way from achieving the scale of on-shore wind development considered necessary to meet their wider renewable targets. This proposed development is therefore a positive step towards meeting the Scottish and UK goals regarding a low carbon economy.

This locally owned development will also contribute to the target of 500MW community and locally-owned renewable energy schemes by 2020, as laid out in the 2011 document, the '2020 Routemap for Renewable Energy in Scotland'. This target was put forward with the aim of generating local revenue and sustaining local economies and it is considered that the applicant is well placed to support these aims through his farming business.

1.3. Remainder of the Document

This Environmental Supporting Document is divided into separate chapters. The environmental assessment chapters describe the subject being addressed, summarise relevant background and guidance documentation, state the relevance to the Hillhead of Ascurry project and discuss the methodologies used in the assessment. The results of each impact assessment are

[4] From 1990 levels

then presented and, where appropriate, mitigation measures are suggested. A brief overview of the contents of each chapter is provided below:

2. **The Wind Turbine Proposal –** A description of the proposed development, including turbine description, site layout, access, grid connection, delivery routes etc.

3. **Planning & Environmental Policy** – An introduction and overview of the national, regional and local planning legislation relevant to the project.

4. **Work to Date** – An outline of the development works completed prior to this planning submission.

5. **Landscape & Visual –** This chapter uses ZTVs, photomontages and wireframe analysis to demonstrate and assess the landscape and visual impacts associated with the proposed development.

6. **Soils & Hydrology –** Provides a description of the hydrological and the hydrogeological features surrounding the site and the expected impact of the development.

7. **Socioeconomic –** Provides a description of the activity of the local economy and tourism and the expected impacts of the development on these areas.

8. **Cultural Heritage –** Provides an assessment of the effects of the wind development on the setting of cultural sites in the area such as Listed Buildings and Scheduled Ancient Monuments.

9. **Ecology –** Provides a description of the flora and fauna within the surrounding region of the turbine and the expected impact of development.

10. **Shadow Flicker –** Industry software has been used to identify dwellings which may be subject to the effect of shadow flicker. The exact times and durations are calculated and, should any shadow flicker impact be expected, mitigation measures are suggested.

11. **Noise –** A noise assessment was carried out to assess the effect of background noise on the nearby residential areas.

12. **Telecommunications –** Relevant industry bodies have been contacted to assess any potential impact on communication signals and infrastructure.

13. **Aviation –** Considers any potential impacts on civil and military aviation operations in the area.

14. **Public Safety –** Based on national planning guidelines, this chapter outlines the public safety issues associated with the proposed development. The proximity of the turbine locations to pipeline consultation zones is also discussed in this chapter.

15. **Summary & Mitigation –** Summarises the main conclusions of the Supporting Environmental Document and provides justification as necessary for the proposal.

2. The Wind Turbine Proposal

This chapter provides an overview of the proposed location of the medium scale turbine at the site, given the existing constraints and the available space within the surrounding area. A single medium scale turbine was deemed suitable for this site to ensure maximum utilisation of the available wind resource, whilst ensuring a minimal impact on the local environment.

2.1. Site Selection

The primary criteria to consider for the feasible installation of a medium scale wind turbine are as follows:

- **Distance from residential buildings** – It is important to maximise the distance between the turbine and nearby residential dwellings to mitigate potential issues such as noise, shadow flicker and a loss of visual amenity. Satisfactory residential exclusion zones were applied to mitigate these key issues from those properties not in the ownership of the applicant;
- **Avoidance of key environmental areas** – In choosing the most suitable location, efforts were made to avoid environmentally sensitive areas. Ecological studies undertaken at the site identified it as being a low sensitivity site in terms of the habitats and species noted within or adjacent to the development area;
- **Available wind resource** – The best available wind resource for the turbine was sought through maximising the height of the location without significantly impacting upon visual concerns. The wind resource for the area was assessed through desk based models and the suitable areas (to maximise generation) were considered to be on the higher areas of land within the centre of the land ownership area;
- **Access to site** – Efforts were made to minimise the need for additional civil works. The preferred access utilises as much of the existing road network as possible and this in turn will minimise the footprint and associated environmental impact of the development. Direct access to the turbine location will be provided via approximately 1.1km of access track. Approximately 620m of this will be an existing farm track which will require some minor upgrades (see Figure 2). This current farm track provides access to and between the Hillhead and Ascurry farmsteads. The remaining 470m will be a new access track which will provide direct access to the turbine location. This track will also provide the farmer with permanent access to the field in which the turbine will be located;
- **Avoidance of culturally sensitive areas** – The disturbance of archaeological or historical sites, including stone walls and ruins of interest was avoided through the sympathetic selection of the site; and
- **Clearance from public roads** – The required clearance distance for a turbine from public roads is dependent on the Local Planning Authority (LPA) but a conservative distance of 84.7 m (equal to fall-over distance plus 10%) was used as a minimum to ensure public health and safety.

When examining the above criteria, the key concerns were to maximise the distance from residential properties, minimise visual impact whilst still ensuring sufficient wind resource and avoid areas of higher ecological sensitivity.

The next section discusses the development components in further detail.

2.2. Site Layout

The proposed position of the turbine is in an arable field. The proposed installation will include the following components:

- **Wind turbine** – The candidate turbine is discussed in further detail in Chapter 2.3 below;
- **Foundation** – For the chosen turbine the foundation will be a square structure with expected dimensions of 13m x 13m. Once constructed this structure will be backfilled so that only the tower base pedestal will be visible;
- **Electrical substation kiosk** – It is proposed that the required turbine transformer be located in a GRP building located next to the base of the tower along with the necessary switchgear and protection equipment. In addition this building would have space for the Distribution Network Operator's (DNO's) electrical equipment. This building will have maximum dimensions of 10.3m x 3m, and will have a maximum elevation of 3.15m;
- **Access road** – Direct access to the turbine location will be provided via approximately 1.1km of access track. Approximately 620m of this will be an existing farm track which will require some minor upgrades (see Figure 2). This current farm track provides access to and between the Hillhead and Ascurry farmsteads. The remaining 470m will be a new access track which will provide direct access to the turbine location. This track will also provide the farmer with improved access to the field in which the turbine will be located;
- **Construction compound** – There will be a requirement for the construction of a hardstanding area for the assembly of the crane and rotor. This would measure an estimated 20m x 35m with an adjacent temporary compacted area for lay down of turbine components during construction; and
- **Underground cable** – The 11kV cable connecting the turbine to the proposed grid connection point will be buried, where possible, to minimise visual impacts.

The proposed layout of the construction components is illustrated in Figure 2 and Figure 5 below, with further information provided in Drawings HOA002 and HOA003 which are attached to this Supporting Environmental Document.

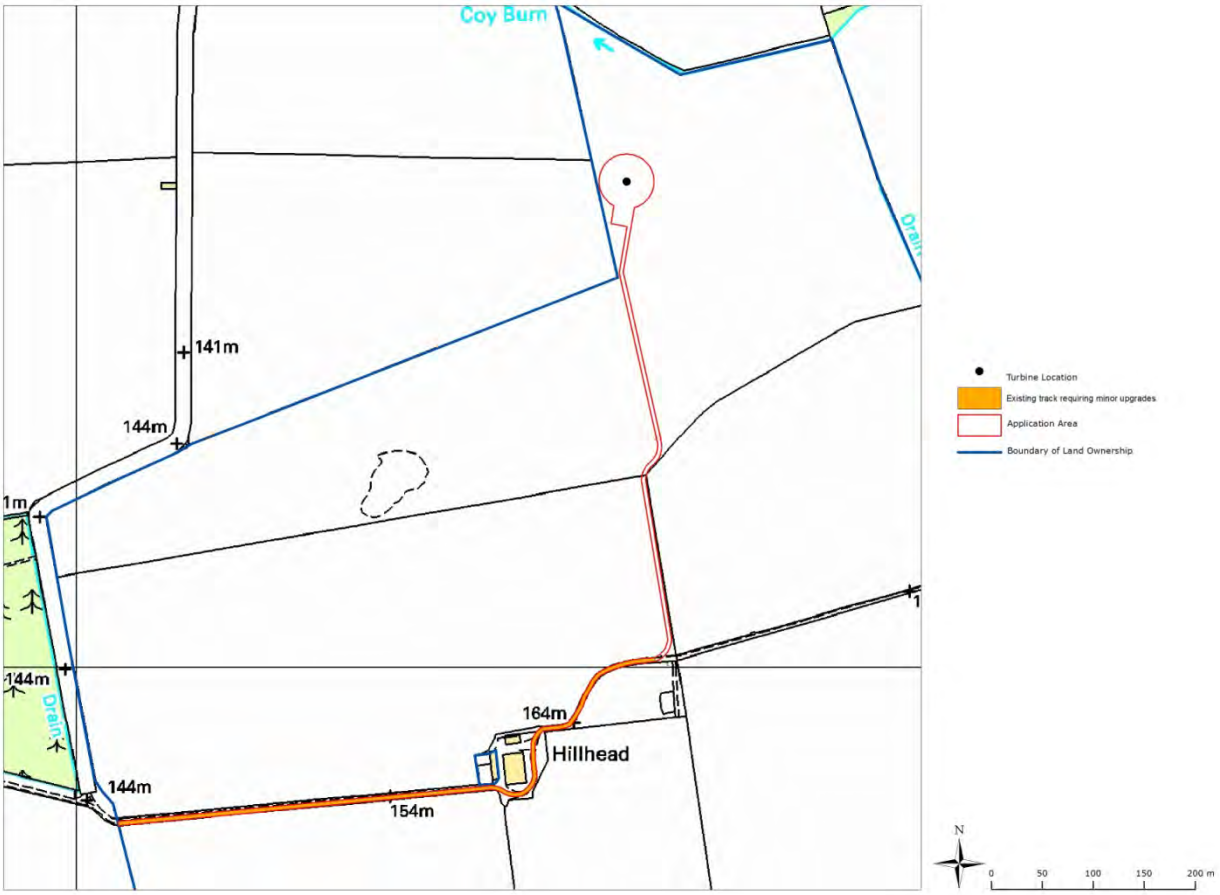

Figure 2: Proposed layout of application site

From the above information it can be seen that all works for this application will take place on the applicant's land. The requirement for ancillary structures will be minimal with limited additional permanent structures required alongside the turbine. The only visible aspects of the development once construction is complete will be the retained access road, crane pad, turbine and substation kiosk. The next chapters discuss the various components of the development in further detail.

2.3. Turbine Specification

The proposed choice of turbine for development is a medium scale turbine with a capacity of up to 500kW. At this time the preferred choice of turbine is the EWT Directwind 54 model. The final choice of turbine may differ but would not increase in size from what is proposed or vary significantly in design (e.g. all considered turbine options would be 3 bladed upwind designs as used in commercial wind farms).

The outline technical specifications for the Directwind 54 are provided in Figure 3 below alongside a photograph of an operational EWT turbine.

	Directwind 54
Rated Capacity	500kW
Status	New
IEC Wind Class	IIIa
Proposed Hub Height	50m
Rotor diameter	54m
Distance from ground to blade tip	77m
IEC Maximum Rotational Speed	12 – 28rpm
Rated wind speed	10m/s
Operational turbine life	25 years

Figure 3: Technical specifications and photograph of the proposed turbine option

2.4. Transport to Site

It is intended that the wind turbine components will be delivered to site from a suitable port on the east coast from where they will be loaded onto road vehicles. The access road requirement for a turbine of the scale proposed is provided in Table 2 below. The longest single load will be the blades themselves which are each approximately 26m in total length, while the tower will be delivered in two sections of approximately 23m.

Consideration	Requirement
Useful width of carriageway	4m
Clearance width	5.7m
Clearance height	4.6m
Radius of curve, external	20m
Maximum longitudinal slope	8°
Maximum lateral slope	0 - 2°
Maximum axle load	16.5t

Table 2: Minimum access considerations for the proposed scale of wind turbine

At this time it is proposed that the turbine components are transported to site from Dundee Port. The delivery vehicles will utilise the A92 to Muirdrum and then the B9128 which would lead to Forfar. Approximately 2km south south east of Craichie the delivery vehicles will turn right and from here will utilise the minor road network to access the site. Direct access to the turbine location will be provided via approximately 1.1km of access track. Approximately 620m of this will be an existing farm track which will require some minor upgrades (see Figure 2). This current farm track provides access to and between the Hillhead and Ascurry farmsteads. The remaining 470m will be a new access track which will provide direct access to the turbine location. This track will also provide the farmer with permanent access to the field in which the turbine will be located. The proposed access route from Dundee Port is shown in Figure 4 below.

Figure 4: Proposed transport route (shown pink).

From an initial assessment of the route, the junctions can generally be considered to be suitable to allow for the safe movement of the turbine delivery vehicles. This assumes that front and rear axle steered vehicles would be used to allow for increased manoeuvrability. If consented a full transport assessment can be provided to Angus Council's Roads Department for discussion and approval.

2.5. Construction Traffic

The turbine components will be delivered in approximately 8 individual loads. Extendable trailers will be employed to transport the larger turbine components. All vehicles carrying abnormally long loads will have rear wheel steering to facilitate delivery down minor roads. The axle loading of the heaviest delivery vehicle is 16.5 tonnes. Two cranes are required for the offloading and construction of the turbine, the main crane is expected to be a 250 – 500 tonne mobile crane. The tailing crane is likely to be a 90 tonne, rear wheel steering crane. Additional construction traffic would be necessary for the construction of the hardstanding area. There will also be small vehicle access for site workers/individual contractors throughout the construction program.

2.6. Construction Compound

The construction hardstanding area will comprise an area of suitably firm footing for the cranes to operate. There will also be levelled lay down and assembly area to allow for the set down of components, rotor blade assembly and for general installation works. The proposed construction area is shown in Figure 5 below (this is also provided in Drawing HOA003).

Figure 5: Overview of construction area

An area of hardstanding at a size of 20m x 35m (area of approximately 700m^2) will be required for the safe operation of the main mobile crane and the tailing crane. This area will be filled with crushed stone and/or aggregate of a maximum depth of approximately 750mm.

2.7. Access Road

The new access track will be constructed to resemble existing farm tracks, where possible, to minimise the visual impact of the development. The turbine delivery route will use the existing farm track which links Hillhead and Ascurry farmsteads with each other and with the public highway, as shown in Figure 2 and Drawing HOA002. Direct access to the turbine location will be provided via approximately 1.1km of access track. Approximately 620m of this will be an existing farm track which will require some minor upgrades (see Figure 2). As outlined above this current farm track provides access to and between the Hillhead and Ascurry farmsteads. The remaining 470m will be a new access track which will provide direct access to the turbine location. This track will also provide the farmer with permanent access to the field in which the turbine will be located.

The access track will have a constant useable width of 4m and a load bearing capacity capable of handling the abnormal load vehicles required for delivering the turbine components and installation equipment.

The new dedicated access track will be constructed, where possible, along existing field borders to ensure there will be no unnecessary loss of habitat associated with this additional construction requirement and minimal loss of useable farming land. An example of the access road specification is provided in Figure 6 below.

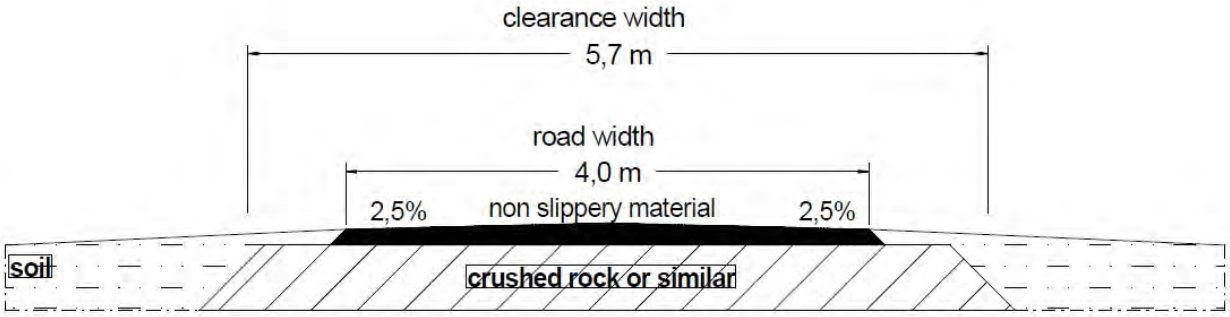

Figure 6: Access track cross-section

2.8. Turbine Foundations

The turbine foundation will most likely consist of a square reinforced concrete base footing and a pedestal. This is illustrated in Figure 7 below, although the exact layout of the foundation may be subject to minor change. The majority of the foundation will be below ground level with only the pedestal being visible post-construction. The standard raft foundation will comprise of a reinforced concrete plinth with approximate dimensions of 13m x 13m. The total depth of the foundation is expected to be approximately 2.5m, however in some cases, following ground investigations, there may be a requirement for a deeper foundation.

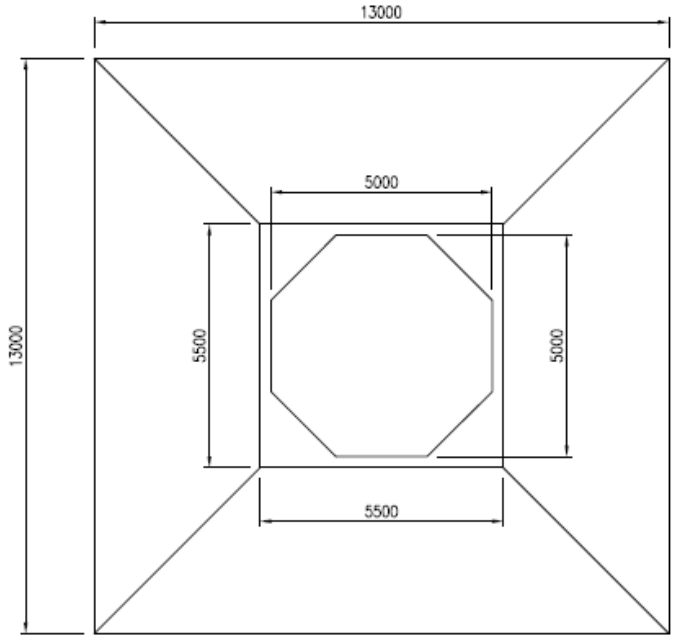

Figure 7: Plan drawing of standard turbine foundation

2.9. Ancillary Works

2.9.1. Grid Connection

It is proposed that the electricity generated by the turbine will be fed directly into the National Grid via 11kV cabling, for subsequent sale as part of a long term power purchase contract. The electricity exported to the National Grid will offset electricity used on site. Scottish and Southern Energy are currently undertaking an assessment of preferred grid connection options for the development, however it is currently proposed to connect to the National Grid at a point approximately 550m to the south of the proposed turbine location, adjacent to the Hillhead farmstead. It is currently envisaged that 11kV cabling will run underground from the proposed turbine to the point of grid connection.

2.9.2. Substation Kiosk

There is a requirement for the transformer, switchgear, communications and further protection equipment to be located in a glass reinforced plastic (GRP) kiosk close to the turbine. As the nature of the final grid connection infrastructure is still being agreed, this building may also be required to have space for the Distribution Network Operator's (DNO's) electrical equipment. The maximum dimensions of the substation kiosk are outlined in Table 3 below.

Length	10.3m
Breadth	3.0m
Height	3.15m

Table 3: Likely substation kiosk dimensions

The substation kiosk can be painted to the most unobtrusive colour that conforms to the surroundings. Typical colours are grey, green or brown. A suitable structure will be confirmed with the DNO (Scottish and Southern Energy) prior to construction.

2.10. Construction Programme

The construction work will be carried out in three phases. During the first phase a soil study will be conducted to determine the foundation design. During the second phase, the civil works will be carried out. This includes the laying of electrical cable and construction of the construction compound. The foundations will also be completed and left to cure for a period of at least 28 days. During the third phase, the turbine will be delivered, erected and commissioned prior to the necessary reinstatement works being completed. The phased construction process is shown in more detail in Table 4 below.

Construction	Works carried out	Approximate duration
Phase 1	Soil investigation survey Turbine foundation design	2 days on site (36 days for survey results and foundation design)
Phase 2	Construct access track Cable trenching and laying Prepare turbine base Prepare transformer kiosk base Install turbine insert & re bars Concrete pour to base Lay turbine external earth mat Install transformer HV jointing at TX and Gen sw/gear	28 days on site (28 days for concrete curing)
Phase 3	Cranes on site Delivery of turbine components Lay out and fit blades to cone Delivery of tower sections Erect Turbine tower/nacelle/blades Internal tower wiring External LV wiring and connecting Site reinstatement Commission turbine and handover	12 days

Table 4: Phased construction program

2.11. Decommissioning

On reaching the end of its operational life (25 years), and if no agreed turbine replacement is consented, the proposed turbine will be decommissioned, dismantled and removed, leaving no visible trace of the development. The site will be completely restored to arable land and there will be no lasting implications on the land usage/character. The turbine components will be dismantled and removed from site. The foundation will be broken down and removed to a licensed off-site facility. A decommissioning programme will be agreed with Angus Council prior to the commencement of decommissioning works.

3. Planning & Environmental Policy

This chapter provides an introduction and overview of the global, European, national and local planning policy documentation which is relevant to a wind energy development of this scale.

Scientific evidence is clear that most of the observed global rises in temperature since the mid-20th century is linked to the emissions of anthropogenic greenhouse gases. This is expected to continue if present emissions levels are maintained or expand without suitable controls. Climate change policy and renewable energy policy are vital tools in controlling and minimising the future impacts of man-made climate change.

EU and individual Government policies have placed the development of renewable energy, including wind energy, as a primary target in their strategic energy policies. These targets have then been translated into planning policy.

In Scotland, national planning policy is principally provided in the National Planning Framework for Scotland 2 (NPF2) and in Scottish Planning Policy (SPP). These documents are produced by the Scottish Government to provide overarching planning policy and are currently subject to review. Regional and local planning policy is formulated by local planning authorities in the form of Structure and Local Plans (which are being phased out) and Strategic and Local Development Plans.

The following is a review of the policies and legislation, at international, European and national level, which relate to the proposed development at Hillhead of Ascurry.

3.1. Global Context

The burning of fossil fuels results in the release of greenhouse gases such as carbon dioxide (CO_2). These gases contribute to the process of climate change. The following policies provide a summary of global policy relating to the current effects of climate change and the policies which aim to avoid and reduce it.

3.1.1. Intergovernmental Panel on Climate Change

The Intergovernmental Panel on Climate Change (IPCC) is the leading body for the assessment of climate change, established by the United Nations Environment Programme and the World Meteorological Organisation to provide the world with a clear scientific view on the current state of climate change and its potential environmental and socio-economic consequences. The IPCC is a scientific body. It reviews and assesses the most recent scientific, technical and socio-economic information produced worldwide, relevant to the understanding of climate change.

The main activity of the IPCC is to provide regular Assessment Reports of the state of knowledge on climate change. The Fourth Assessment Report was released in 2007. The IPCC is now beginning the process towards preparing the Fifth Assessment Report which is due to be finalised in 2014. Some of the findings of the Fourth Assessment Report included the following:

1. Unmitigated climate change would, in the long term, be likely to exceed the capacity of natural, managed and human systems to adapt;
2. A wide range of mitigation options are currently available or projected to be available by 2030 in all sectors;
3. Some planning adaptation of human activities is occurring now but more extensive adaptation is required to reduce vulnerability to climate change;

4. Many impacts can be reduced, delayed or avoided by mitigation. Delayed emissions reductions significantly constrain the opportunities to achieve lower stabilisation levels and increase the risk of more severe climate change impacts; and

5. Decisions about macro-economic and other policies that seem unrelated to climate change can significantly affect emissions.

In the past sixteen years a number of international conferences have been held in relation to the issue of climate change, in particular Kyoto (1997) and subsequent UN conferences.

Kyoto Protocol

Following the World Summit Conference held in Kyoto, Japan, in 1997, nations which signed the Protocol agreed to take actions to control, reduce or limit their emissions of the six main greenhouse gases (carbon dioxide, methane, nitrous oxide, hydrofluorocarbons, perfluorocarbons and sulphur hexafluoride).

The Kyoto Protocol (1997) to the United Nations Framework Convention on Climate Change, 1992 (UNFCCC) imposes legally binding targets to be achieved in the period 2008 – 2012:

- 5% overall reduction in the emission of greenhouse gases in developed countries;
- 8% reduction below 1990 levels within the EU;
- The United Kingdom's contribution is a limit of 12.5% above 1990 levels by 2008-2012. This implies an 8% reduction in CO_2 emissions over this time period; and
- Countries not fulfilling their obligations will be forced to purchase carbon credits on an open market from compliant countries.

3.2. European Context

3.2.1. EU Directive on the Promotion of the Use of Energy from Renewable Sources

An EU Directive (2009/28/EC) on the Use of Energy from Renewable Sources came into force on 23 April 2009 – 'The Renewables Directive'. It establishes the rules for achieving 20% of EU energy consumption from renewable sources by 2020[5]. Other measures introduced at the same time aim to ensure a 20% cut in greenhouse gas emissions by 2020, and a 20% reduction in energy consumption through energy efficiency and demand reduction – the EU's 20:20:20 Plan.

The Renewables Directive recognises the need to promote renewable energy sources and technologies which will have a positive impact on:

- Security of energy supply;
- Regional and local development opportunities;
- Rural development;
- Export prospects;

[5] Directive 2009/28/EC of the European Parliament and of the Council of 23 April 2009 on the promotion of the use of energy from renewable sources and amending and subsequently repealing Directive 2001/77/EC and 2003/30EC.

- Social cohesion; and
- Employment opportunities.

Under an EU 'burden sharing' arrangement, the UK's overall national target for the share of energy from renewable sources in gross final consumption of energy in 2020 is 15% (increased from 1.3% in 2005)[6]. The promotion of electricity produced from renewable energy sources is therefore an extremely important component in the UK achieving its mandatory target.

On 6th June 2012 the European Commission presented a Communication on its renewable energy policy, outlining options for the period beyond 2020. It confirms the market integration of renewables and the need for their growth in the decades after 2020. The Communication also calls for a more coordinated European approach in the establishment and reform of support schemes and an increased use of renewable energy trading among Member States.

It recognises that renewable energy development increases our security of supply and improves European competitiveness creating new industries, jobs, and economic growth and export opportunities, whilst also reducing our greenhouse gas emissions. It states that "*strong renewables growth to 2030 could generate over 3 million jobs, including in small and medium sized enterprises*[7]".

The associated Staff Working Document, also published on 6th June 2012, states that wind energy will provide at least 12% of European electricity by 2012, therefore significantly contributing to the 20:20:20 goal outlined above. Beyond 2020, the integration of 50% wind power into an electricity system is seen as technically possible.

3.3. National Context

The UK Government has set a target to cut the UK's carbon dioxide emissions by 60% by 2050. The UK Government's Energy White Paper, published in May 2007, concludes that if the UK is to achieve a reduction in carbon emissions of that order, then by 2050 renewables will need to contribute at least 30 – 40% of our electricity generation and possibly more.

The Scottish Government's Draft Electricity Generation Policy Statement, published in March 2012, takes full account of the amended target of delivering the equivalent of at least 100% of gross electricity consumption from renewables by 2020. It advises that "*wind power, alongside other forms of onshore and offshore renewables, provides an electricity supply which is largely emissions-free and, because of its decentralised nature, contributes significantly to greater security of supply*".

With regard to the scale of the overall challenge, one of the key findings of the Scottish Government commissioned modelling study is that "*achieving the 100% target will require Scottish installed generation capacity to almost double over the 10 year period to 2020 – with wind (offshore and onshore) accounting for around 13GW of capacity*".

As noted in the 2020 Routemap for Renewable Energy in Scotland, the benefits are not only in terms of energy generation, security of supply and reduced carbon emissions, but also in terms of economic recovery. During the period to 2020, renewables in Scotland could provide "*up to 40,000 jobs and £30bn investment to the Scottish economy*".

[6] Directive of the European Parliament and of the Council on the Promotion of the Use of Energy from Renewable Sources, 2008/0016 (COD), Council of the European Union, Brussels, December 2008; http://www.ewea.org/fileadmin/ewea_documents/documents/00_POLICY_document/RES-directive_consolidated.pdf.

[7] "Renewable energy: a major player in the European energy market", June 2012.

With specific regard to onshore wind, the Routemap notes that "*it is a mature and relatively low cost renewable technology with a large supply chain already established*". Furthermore, "*onshore wind turbines can make a very large contribution to the progress to Scotland's renewable electricity target…*".

In addition to the 100% renewable electricity generation target, the Routemap also outlines a new objective of 500MW of community and locally-owned renewable energy schemes by 2020. This target seeks to allow communities and rural businesses to take advantage of the revenue streams that can accrue from onshore wind within the Feed in Tariff, thereby generating local revenue and sustaining local economies.

As explained elsewhere within this Document, the proposals at Hillhead of Ascurry fully comply with these community objectives.

3.4. National Planning Policy

3.4.1. National Planning Framework for Scotland 2 (NPF2) 2009

Published in June 2009, National Planning Framework for Scotland 2 (NPF2) guides Scotland's future development and establishes strategic priorities to support the Scottish Government's central purpose of sustainable economic growth.

The spatial strategy to 2030 therefore seeks to *"promote development which helps to reduce Scotland's carbon footprint and facilitates adaptation to climate change"*, and *"realise the potential of Scotland's renewable energy resources and facilitate the generation of power and heat from all clean, low carbon sources"*.

With regard to renewable energy in general, the Scottish Government is *"committed to establishing Scotland as a leading location for the development of renewable energy technology and an energy exporter over the long term"*. The aim of national planning policy is therefore to develop the country's renewable energy potential whilst safeguarding the environment and communities.

With specific regard to onshore wind, the Scottish Government is *"assisting planning authorities with the preparation of supplementary planning guidance on the location of wind farms"*, and *"participating in a UK-wide project to identify technical solutions to potential conflicts between wind farm developments and radar systems"*.

NPF2 will eventually be replaced by NPF3. In this respect, the Scottish Government has recently published the NPF3 Main Issues Report (MIR). The consultation window on the MIR closed at the end of July 2013.

To help make Scotland a 'low carbon place', the MIR recommends that NPF3 builds on NPF2 by: *"supporting the further deployment of onshore wind farms, whilst addressing concerns raised about the impacts of some wind energy development"*; *"reflecting the objective of greater community and local ownership of renewable energy"*; and *"identifying further necessary enhancements to the electricity transmission and distribution grid"*.

The MIR reiterates the Scottish Government's ambitious target of generating the equivalent of at least 100% of gross electricity consumption from renewable sources by 2020, with an interim target of 50% by 2015. To put this into context, Scotland met the equivalent of 39% of its gross electricity demand from renewable sources in 2012. If the 100% target is to be met, around 14 – 16 GW of capacity needs to be deployed over the next seven years, with onshore wind playing a significant role.

The Scottish Government supports onshore wind energy development in appropriate locations. Within this context, accompanying the continuing priority to ensure green forms of electricity is to ensure that wind farms are appropriately sited and well designed. The proposed

adjustments to national planning policy (in which greater protection is to be given to nationally important designations such as National Parks and 'wild land') are outlined in draft Scottish Planning Policy (SPP) and summarised in Chapter 3.4.2 below.

3.4.2. Scottish Planning Policy (SPP) 2010

Scottish Planning Policy (SPP) outlines the Scottish Government's policy on land use planning and reaffirms its commitment to increasing sustainable economic growth.

The need to tackle climate change, and in particular reduce emissions of the greenhouse gases that contribute to it, is a principal challenge of sustainable economic growth. Within this context, *"the need to help mitigate the causes of climate change and the need to adapt to its short and long term impacts should be taken into account in all decisions throughout the planning system"*.

The commitment to increase the amount of electricity generated from renewable sources is a vital part of the response to climate change. In this respect, *"renewable energy generation will contribute to more secure and diverse energy supplies and support sustainable economic growth"*.

Planning authorities should therefore *"support the development of a diverse range of renewable energy technologies, guide development to appropriate locations and provide clarity on the issues that will be taken into account when specific proposals are assessed"*. Development plans and supplementary guidance should support all scales of renewable energy generation development, while ensuring that issues in relation to landscape, natural heritage, residential amenity and any cumulative impacts are properly considered.

With specific regard to onshore wind energy, 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"*. Development plans should establish criteria for the assessment of wind farm proposals, including extensions. *"The criteria will vary depending on the scale for development and its relationship to the characteristics of the surrounding area, but are likely to include:*

6. *Landscape and visual impact;*
7. *Effects on the natural heritage and historic environment;*
8. *Contribution of the development to renewable energy generation targets;*
9. *Effect on the local and national economy and tourism and recreation interests;*
10. *Benefits and disbenefits for communities;*
11. *Aviation and telecommunications;*
12. *Noise and shadow flicker; and*
13. *Cumulative impact".*

The design and location of any wind farm should reflect the scale and character of the landscape. Specifically, *"the location of turbines should be considered carefully to ensure that the landscape and visual impact is minimised"*.

When considering cumulative impact, planning authorities should take account of existing wind farms, those which have permission, and valid applications for wind farms which have not been determined. *"The weight that planning authorities attach to undetermined applications should reflect their position in the application process."* Cumulative impact will largely relate to the *"scale and proximity of further development"* and the criteria for its assessment should be set out in the development plan or supplementary guidance.

SPP is currently in the process of being updated. In this respect, the consultation window for the SPP Consultation Draft ended at the end of July 2013.

Fundamentally, the Consultation Draft states that the planning system should help to address climate change by supporting the expansion of renewable energy generating capacity and heat networks. Development plans should therefore *"support all scales of development associated with the generation of electricity and heat from renewable sources with a view to realising the renewable energy potential of the areas they cover"*.

The Consultation Draft provides revised guidance to Local Planning Authorities in the preparation of spatial frameworks to inform the location of wind energy developments, regardless of their scale. In this respect, proposals for wind farms in National Parks and National Scenic Areas *"will not be acceptable"*.

Within 'areas of significant protection', wind farms will only be appropriate where it can be demonstrated that any significant effects on the qualities for which an area is identified can be satisfactorily overcome. For the first time, it is proposed to include areas of 'wild land' as defined by SNH under this tier. It is also intended to increase the suggested separation distance between wind farms and cities, towns and villages from 2km to 2.5km. This is to reduce visual impact but *"decisions on individual developments should take into account specific local circumstances and geography"*.

More generally, in determining applications for wind turbine development, account should be taken of:

14. Community benefits, where they are 'material considerations';
15. Landscape and visual effects, including wild land character;
16. Natural heritage effects, including birds;
17. Impacts on carbon rich soils;
18. Historic environment effects;
19. Impacts on tourism and recreation;
20. Impacts on communities, including residential amenity;
21. Noise and shadow flicker effects;
22. Impacts on aviation and defence interests, including radar and seismological recording;
23. Impacts on telecommunications and broadcasting installations;
24. Impacts on road traffic;
25. Contribution towards renewable energy generation targets; and
26. Cumulative impacts.

The Consultation Draft states that *"proposals for onshore wind turbine development should continue to be determined while spatial frameworks and local policies are being updated"*, and *"moratoria on onshore wind development are not appropriate"*.

3.4.3. Specific Advice Sheet – Onshore Wind Turbines (Updated October 2012)

Last updated in October 2012, this Sheet replaces PAN 45 and provides advice in relation to the determination of onshore wind turbines. The key areas for consideration are summarised in Table 5 below.

Subject	Comments
Impact on Landscape	The ability of the landscape to absorb development often depends on features of landscape character such as landform and vegetation. Different layouts of turbines may be more or less suited to particular landscape types and the physical form and/or colour of turbines may also be relevant. In considering wind farm visibility, it is important to note that visibility and distance do not follow a linear relationship. Factors including the backcloth/skyline against which turbines are seen, turbine colour and typical weather conditions require careful consideration. *"As more areas of search are taken up and as more sites are proposed within or near sensitive landscapes, landscape protection and designing appropriate mitigation through conditions and/or legal agreements, will become a more routine consideration alongside maximising the potential of wind energy"*.
Impact on Wildlife & Habitat, Ecosystems & Biodiversity	*"Wind turbine developments have the capacity to have both positive and negative effects on the wildlife, habitats, ecosystems and biodiversity of an area"*. With regard to the former, renewable energy generation counteracts climate change while wind farm developments offer opportunities to introduce environmental enhancement through land management, land restoration and habitat creation. Conversely, there is also potential for negative environmental effects, including: loss of or damage to valuable habitat; risk of collision, displacement or disturbance to bird and bat species; and impacts on designated sites and protected species, even from a distance. Notwithstanding, *"there is scope for mitigation in the location of wind turbines, construction techniques, design measures and management"*.
Impact on Communities	As a general rule, turbines should be sited ten rotor diameters from the nearest properties so as to avoid shadow flicker. With regard to noise, the Sheet refers the reader to other documents that provide a framework for the measurement of wind farm noise, including acceptable indicative noise levels. One of the cited reports concludes that *"there is no evidence of health effects arising from infrasound or low frequency noise generated by wind turbines"*.
Separation Distances	SPP currently refers to a guideline separation of up to 2km (current proposals are to increase this to 2.5km) between wind farm areas of search and the edge of settlements, to reduce visual impact. However, *"this 2km separation distance is a guide not a rule and decisions on individual developments should take into account specific local circumstances and geography"*. Furthermore, there is no recommended distance between established and proposed groups of turbines.
Aviation Matters	It is essential that the safety of UK aerodromes, aircraft and airspace is not adversely affected by new wind energy infrastructure. Developers and planning authorities are therefore required to consult with the relevant aviation and communication authorities.

Subject	Comments
Military Aviation & Other Defence Matters	It is important that new wind energy infrastructure does not significantly impede or compromise the safe and effective use of any defence assets. Developers and planning authorities are therefore required to engage with the Ministry of Defence in relation to wind farm proposals.
Impact on the Historic Environment	The Sheet notes that Scottish Ministers policies for the protection of the historic environment are outlined in SPP, SHEP and PAN 2/2011. Historic Scotland's guidance on setting explains how the impact of change can be assessed and mitigated. *"Wind farm developments have the potential for direct and/or indirect impacts by virtue of the location of turbines and ancillary development, or changes to groundwater levels or surface water patterns, which may affect archaeological deposits. Developments can be designed to avoid or minimise such impacts"*.
Impact on Road Traffic	In siting turbines close to main roads, pre-application discussions with Transport Scotland are recommended. This is particularly important for the movement of large components (abnormal load routing) during construction, periodic maintenance and decommissioning. Driver distraction may also be a consideration during the operational phase.
Cumulative Impact	In assessing cumulative landscape and visual impacts, the scale and pattern of the turbines as well as access tracks, power lines and ancillary development will be relevant considerations. Consistent with advice published by Scottish Natural Heritage, *"it will also be necessary to consider the significance of the landscape and the views, proximity and inter-visibility and the sensitivity of visual receptors"*. The issue of cumulative impact on Ministry of Defence operations and facilities also needs to be considered. In this respect, it cannot be assumed that the MoD can continue to meets its current operational requirements in cases where there is a further proliferation of turbines.
Good Practice During Construction	Developers are encouraged to appoint Ecological Clerks of Works to ensure that agreed methodologies are followed after planning approval.
Decommissioning	Planning authorities are instructed to *"ensure via conditions and/or legal agreement that site restoration takes place either on the expiry of the consent or in the event of the project ceasing to operate for a specified period"*.

Table 5: Summary of Specific Advice Sheet

3.5. Regional and Local Planning Policy

Planning legislation clearly states that development proposals are to be determined in accordance with the 'development plan' unless 'material considerations' indicate otherwise. With regard to this site, the current 'development plan' comprises the approved TAYplan Strategic Development Plan 2012-2032 and the Angus Local Plan 2009.

3.5.1. TAYplan Strategic Development Plan 2012-2032

The TAYplan Strategic Development Plan has replaced the Dundee and Angus Structure Plan (2009). The plan provides a broad-brush direction for the next 20 years about where new development and infrastructure should take place. The current Strategic Development Plan was approved in June 2012 and the Plan is constantly reviewed. The four Local Authorities in the TAYplan area (including Angus) have their own Local Development Plan which identifies the detail of what development should take place for the next ten years and they must reflect the TAYplan strategy.

The plan recognises *"opportunities to grow the renewable energy 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"*.

TAYplan is underpinned by three principles:

27. Supporting sustainable economic development and improving regional image and distinctiveness;
28. Enhancing the quality of place through better development outcomes; and
29. Ensuring effective resource management and promoting an accessible, connected and networked region.

The main strategic policy relating to wind energy is Policy 6: Energy & Waste/Resource Management Infrastructure. The key elements of this policy, insofar as they relate to small to medium scale wind energy proposals, are summarised in Table 6 below:

Policy 6: Energy & 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)." *"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 (inter alia):* • *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;* • *Cumulative impacts of the scale and massing of multiple developments, including existing infrastructure; and* • *Consistency with the National Planning Framework and its Action Programme."*

Table 6: TAYplan Policy 6

Other relevant policies include:

30. Policy 2: Shaping Better Quality Places;
31. Policy 3: Managing TAYplan's Assets; and
32. Policy 8: Delivering the Strategic Development Plan.

3.5.2. Angus Local Plan (2009)

This document sets out the detailed guidance for new development in Angus from 2009. It conforms to the Dundee and Angus Structure Plan (now superseded by TAYplan), which sets out the broader guidance for new development in both Angus and Dundee up to the end of 2015.

The development strategy of the Local Plan sets the background within which the various policies and proposals of the plan provide for the sustainable development of Angus. Relevant points within this strategy are:

33. *"Provide opportunities for diversification of the rural economy;*
34. *Maintain and protect the diversity and quality of the rural area and encourage local development which supports the population and services of local communities;*
35. *Support the protection and enhancement of the countryside; and*
36. *Maintain the quality of valued landscapes; the natural, built and historic environment, and biodiversity".*

With regard to planning policy that is relevant to this development, Local Plan Policy **ER34** relates to renewable energy developments and is provided below:

"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;*
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."*

Policy **ER35** deals directly with 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; and*

g) *A realistic means of achieving the removal of any apparatus when redundant and the restoration of the site are proposed."*

Table 7 below provides the other policies in the local plan document that are particularly relevant to this development.

Policy S1: Development boundaries
"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."
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
"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."
Policy ER1: Natura 2000 and Ramsar Sites
"Development likely to have a significant effect on a designated, candidate or proposed Natura 2000 site (Special Protection Areas and Special Areas of Conservation), or Ramsar site and not connected with or necessary to the conservation management of the site must undergo an appropriate assessment as required by Regulation 48 of the Conservation (Natural Habitats etc.) Regulations 1994. Development will only be permitted exceptionally and where the assessment indicates that: *a) it will not adversely affect the integrity of the site; or* *b) there are no alternative solutions; and* *c) there are imperative reasons of overriding public interest, including those of a social or economic nature.* *Where proposals affect a priority habitat and/or priority species as defined by the Habitats Directive (92/43/EEC), the only overriding public interest must relate to human health, public safety or beneficial consequences of primary importance to the environment. Other allowable exceptions are subject to the views of the European Commission."*
Policy ER4: Wider natural heritage and biodiversity
"The Council will not normally grant planning permission for development that would have a significant adverse impact on species or habitats protected under British or European Law, identified as a priority in UK or Local Biodiversity Action Plans or on other valuable habitats or species. *Development proposals that affect such species or habitats will be required to include evidence that an assessment of nature conservation interest has been taken into account. Where development is permitted, the retention and enhancement of natural heritage and biodiversity will be secured through appropriate planning conditions or the use of Section 75 Agreements as necessary."*

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: *d) Sites selected should be capable of absorbing the proposed development to ensure that it fits into the landscape;* *e) Where required, landscape mitigation measures should be in character with, or enhance, the existing landscape setting;* *f) New buildings/structures should respect the pattern, scale, siting, form, design, colour and density of existing development; and* *g) 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: Gardens 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 ER29: Agricultural Land
"Proposals for development that would result in the permanent loss of prime quality agricultural land and/or have a detrimental effect on the viability of farming units will only normally be permitted where the land is allocated by this Local Plan or considered essential for implementation of the Local Plan strategy."

Table 7: Relevant policies of the Angus Local Plan relating to the development

These individual policies are discussed further in this document.

3.5.3. Angus Council Implementation Guide for Renewable Energy Proposals (June 2012)

The Angus Local Plan Review establishes the Development Plan policies to be taken into account when assessing proposals for renewable energy projects: Policies ER34: Renewable Energy Development; and ER35: Wind Energy Development. In support of the development plan position the Implementation Guide provides:

- More detailed information and clarification of the main factors that will be taken into account in considering and determining renewable energy proposals in Angus;
- An application checklist;
- Specific guidance for landscape and visual assessment issues in relation to wind turbines; and
- Specific guidance for guidance on noise assessment in relation to wind turbines.

The proposed development lies within the Dipslope Farmland landscape type (LT) and the guidance which relates to a suitable turbine blade tip for this LT states that it is *"considered to have scope for turbines circa 80m in height".*

The landscape advice and wider guidance has been taken into account while assessing the various technical and environmental considerations of the development, particularly with regards to the landscape and visual impact assessment.

3.5.4. Angus Windfarms Landscape Capacity and Cumulative Impacts Study (2008)

Angus Council appointed a landscape architect in 2008 to assess the potential for cumulative landscape and visual impacts of proposed wind developments within Angus. As part of this study, the landscape was assessed on its ability to accept change without significant or unacceptable effect on its character. The landscape in which the Hillhead of Ascurry turbine will be located is described as Dipslope Farmland. The landscape capacity for this area is described as follows:

"Analysis of the landscape character, landscape features and elements suggests that, given its medium to large scale, gentle landform, working agricultural nature and moderately strong rectilinear field pattern it is of medium landscape character sensitivity. Due to the number of settlements and widely distributed population and number of key transport routes, together with a generally open aspect, it is of medium to high visual sensitivity. Overall landscape sensitivity is medium.

There are no statutory landscape designations and much of it is a working landscape. There are nevertheless a number of GDLs, estates and Country Parks. There are also long sections of the National Cycle Route and many local footpaths. 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 wind farms 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."

This study will be discussed further within the Landscape and Visual Impact Assessment chapter of this document.

4. Work to Date

This chapter provides a summary of the works completed to date relating to wind energy development.

4.1. Requirement for Environmental Assessment

Under the Town and Country planning act (Scotland) 1997, planned developments above a certain scale or activity require consent from the Local Planning Authority (LPA). For more significant developments this may require the inclusion of supporting Environmental documentation to address the full extent, and potential mitigation, of those environmental impacts considered by the LPA to be relevant to the project.

Major planned developments are normally required to complete a full Environmental Impact Assessment (EIA), a systematic process of quantifying those environmental concerns related to the proposed project. The most relevant and up to date document outlining the requirement for an EIA is the Environmental Impact Assessment (Scotland) Regulations 1999.

An EIA must be carried out if the particular development is likely to give rise to significant environmental effects. A written request for a screening opinion was made to Angus Council on 2nd August 2013 outlining details of the proposal (location, scale, location map). The response stated that the proposed development was not considered to require an EIA[8].

The conversations with Angus Council regarding this application, coupled with previous responses, meant that the following topics should be addressed as part of the planning application:

- Relevant planning policy;
- Site selection and description of project;
- Landscape and visual assessment;
- Cumulative visual assessment;
- Noise assessment;
- Ecological assessment;
- Pollution prevention measures;
- Transportation and access;
- Cultural Heritage; and
- Electromagnetic interference/air traffic safety.

4.2. Initial Development & Screening Work

A number of different site layouts were considered during the development process. Various constraints to the development were identified and examined in detail. Location of water courses, houses, telecommunication links, ecologically sensitive areas, noise sensitive areas, archaeological sites and visually sensitive areas were noted. Using Geographical Information Systems (GIS) software, separation distances were applied to these constraints. Different sizes

[8]Response from Ruari Kelly, 12/08/2013

of turbine were examined, relating both to height, generating capacity and noise impact. An initial constraints map was produced for the site and is shown in Figure 8 below. Buffers have been included for the land ownership boundary (blue, buffered by 1.1 x blade length to avoid oversail onto third party land), residential (green, buffered to 500m for non-financially involved properties), overhead lines (purple, buffered to 1.5 x tip height) and roads (orange, buffered to 1.1 x tip height).

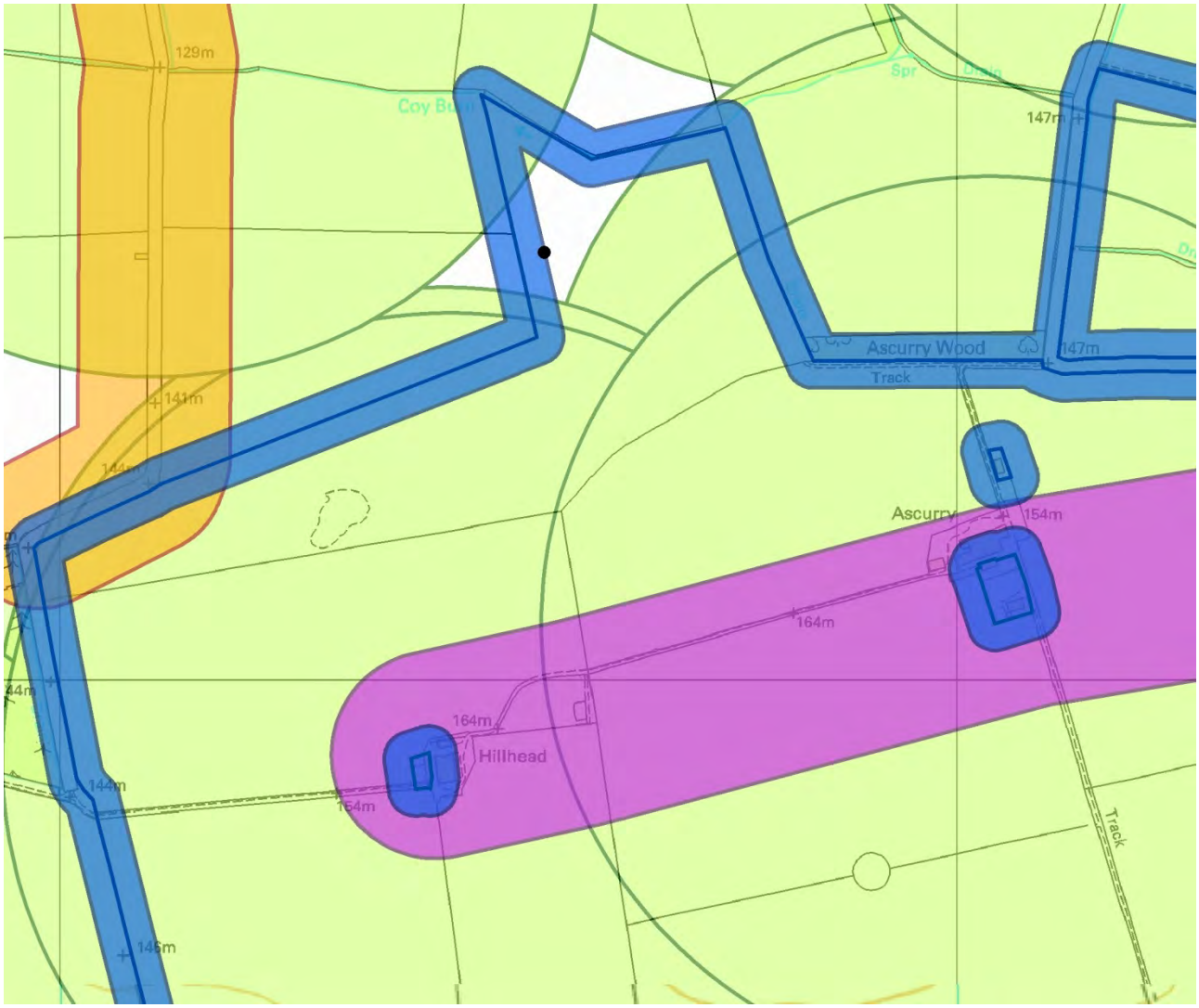

Figure 8: Initial constraints map

Following further assessment of other development constraints (e.g. noise, shadow flicker, visual impacts etc), it was considered that the proposed EWT Directwind wind turbine of 77m tip height would be a suitable turbine model for the Hillhead of Ascurry site. All residential dwellings are over 540m away from the proposed development.

As can be seen in Figure 8 above, there is a small area within the wider land ownership boundary which appears to be suitable for development. However, proximity to an ecological feature and a telecommunications link further to the north of the proposed turbine location further constrain the site; these features are not included in the constraints map above. As such, it is considered that there is very little scope to micro-site the turbine.

4.2.1. Other Consultation

As part of the screening process other stakeholders were contacted in addition to Angus Council. An overview of the responses received are provided in Table 8 below.

Consultee	Comments	Further work required
Telecommunication link operators, including Ofcom, Atkins and Joint Radio Company (JRC).	No telecommunications will be affected by the proposal.	No further assessment necessary.

Table 8: Other pre-application consultee responses received

The above points and general requirements discussed in the screening stage have informed the environmental assessment and ultimately the final design of the development. Pre-planning consultation has been carried out where possible however, due to the level of pre-application queries received, some statutory consultees state they are unable to provide a response (e.g. MOD, NATS) and in these situations Locogen's experience has been utilised to assess the potential for impact.

5. Landscape & Visual

5.1. Introduction

Locogen commissioned a chartered landscape architect (Douglas Harman CMLI) to undertake a Landscape and Visual Impact Assessment (LVIA) of the proposed development. Based on a 25km study area, it identifies the baseline against which the effects of the proposed development are assessed and concentrates on predicting the likely effects during the operational phase of the proposed turbine. The scheme design, including any mitigation measures incorporated to minimise adverse effects, is informed by the findings of the baseline study.

Effects on features identified as important to the landscape quality and effects on the landscape character of the site and its setting are assessed. Although interrelated, effects on views of the site and its setting and visual amenity are assessed separately.

Landscape effects are on the fabric, character and quality of the landscape and are concerned with:

- Landscape elements (e.g. hedgerows, trees and woodlands);
- Landscape character – regional and local distinctiveness; and
- Special interests (e.g. designations, conservation sites, cultural associations).

Visual effects on people are concerned with the changes in available views through intrusion or obstruction and whether important opportunities to enjoy views may be improved or reduced.

The objectives of the assessment are to:

- Describe and evaluate the landscape and visual amenity of the site and surrounding area which is likely to be affected by the proposed development;
- Identify and assess the significance of any effects on landscape or visual amenity, associated with the design, operation and reinstatement of the proposed development;
- Identify mitigation measures which will be implemented in order to avoid, reduce or remedy adverse effects; and
- Describe any enhancements of the landscape or visual amenity incorporated into the proposals.

The findings of the LVIA are presented in the following sections:

5.1.1. Baseline Assessment

- Planning Policy Context: a summary of the regional and local landscape related planning policies relevant to the proposed development;
- Baseline Description: a description of the landscape and visual resource of the study area conducted through desk study and site survey; and
- Design Optimisation and Mitigation Strategy: a summary of the design process in response to landscape and visual issues.

5.1.2. Impact Assessment

- Viewpoint Assessment: a detailed assessment of landscape and visual effects at a selection of representative viewpoints;

- Landscape Effects: an assessment of the potential residual effects upon the landscape resource, landscape character areas and designated landscapes;
- Visual Effects: an assessment of potential residual effects on people of the changes in available views through intrusion or obstruction and whether important opportunities to enjoy views may be improved or reduced;
- Cumulative Landscape and Visual Effects: assessment of the potential residual effects arising from the proposed development in conjunction with built/consented wind farms within the study area and those at planning application stage; and
- Summary and Conclusions.

5.1.3. Appended Methodology

A description of the methods and associated guidance used to inform the assessment process is provided in Appendix A, at the end of this Supporting Environmental Document.

5.1.4. Summary of proposed development

The proposed development will consist of the following elements (a detailed description of the proposed development can be found in Chapter 2 of this Supporting Environmental Document):

- Wind turbine – the proposed turbine is 50m to hub height, has a blade diameter of 54m and is 77m to blade tip;
- Foundation – a foundation with expected dimensions of 13m x 13m. Once constructed this structure will be backfilled so that only the tower base and pedestal will be visible;
- Transformer kiosk – it is proposed that a turbine transformer is either located within the base of the tower (preferred option) or alternatively in a small kiosk located next to the base of the tower with the necessary switchgear and protection equipment;
- Sub-station building – a substation building will be located near the base of the turbine. The approximate dimensions of the building will be 10.3m x 3m and 3.15m in height. This can be painted the most unobtrusive colour that conforms to its surroundings. Typical colours are grey, green or brown. A suitable structure will be confirmed with Scottish and Southern Energy prior to construction;
- Access road – the construction of a dedicated access road to the proposed wind turbine totalling approximately 470m in length, with an additional 620m of existing farm track which will require some minor upgrades (see Figure 2);
- Construction compound – the construction of a temporary hardstanding area for the assembly of the crane and rotor. This would measure an approximate area of 35m x 20m with an adjacent area for lay down of turbine components; and
- Underground cable – an 11kV cable connecting the turbine to a suitable grid connection point will be undergrounded where possible to minimise visual impacts. The point of connection is yet to be finalised.

5.2. Planning Policy context

The development plan relevant to this application is the TAYplan Strategic Development Plan (2012) and the Angus Local Plan Review (2009). The adopted policies of the Planning Authority relevant to landscape are listed in Sections 5.2.1 and 5.2.2, and Section 5.2.3 summarises the '*Implementation Guide for Renewable Energy Proposals*' (2012) which explains and clarifies the existing Angus Local Plan Review policy base.

5.2.1. TAYplan Strategic Development Plan (2012)

The Tayplan Strategic Development Plan has replaced the Dundee and Angus Structure Plan (2009). The plan provides a broad-brush direction for the next 20 years about where new development and infrastructure should take place. The current Strategic Development Plan was approved in June 2012 and the Plan is constantly reviewed. The four Local Authorities in the TAYplan area (including Angus) have their own Local Development Plan which identifies the detail of what development should take place for the next ten years and they must reflect the TAYplan strategy.

The plan recognises *'opportunities to grow the renewable energy 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'*.

The TAYplan Plan does not provide the locations for energy infrastructure; this role is for Local Development Plans. It is the role of this Plan to ensure consistency between Local Development Plans in fulfilling Scottish Planning Policy requirements to define areas of search for renewable energy infrastructure. As part of this, the following policy is relevant to this application:

Policy 6: Energy and Waste/Resource Management Infrastructure

"A - Local Development Plans should identify areas that are suitable for different forms of renewable heat and electricity infrastructure…."

"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."*

5.2.2. Angus Local Plan Review (2009)

In delivering strategic policy, the following policies within the Angus Local Plan are key considerations in assessing the acceptability of the proposed development in landscape terms:

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 ER20: *Historic Gardens 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 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:

(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."

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."

5.2.3. The '*Implementation Guide for Renewable Energy Proposals*' (2012)

The '*Implementation Guide for Renewable Energy Proposals*' (2012) explains and clarifies the existing Angus Local Plan Review policy base that will be used by Angus Council in determining renewable energy planning applications. It has been prepared to support the Angus Local Plan Review (2009) Policies ER34: *Renewable Energy Developments* and ER35: *Wind Energy Development*. This incorporates the findings of the '*Landscape Capacity and Cumulative Impacts Study*' (2008), a strategic level study providing a context for the consideration of the cumulative effects of existing and potential future windfarm developments.

The guide develops a classification of landscape types and identifies 'Levels of Acceptable Landscape Character Change'. Outwith development boundaries, it is considered that there is scope for turbines to be accommodated in some landscapes. The guide heights are extrapolated from sources including the Tayside Landscape Character Assessment, the Landscape Capacity and Cumulative Impacts Study, Reporters findings from planning appeals, responses from statutory consultees and reflect the particular scale and landscape of Angus.

For the *Dipslope Farmland* Landscape Character Type (LCT) in which the site of the proposed development is located, this states:

- Existing Windfarm Character: "*Landscape with Views of Windfarms";*
- Acceptable Future Windfarm Character: "*Landscape with Occasional Windfarms";* and
- Guidance: *"Considered to have scope for turbines circa 80 m in height"*

The guidance also states:

"The relative height and style of turbine (e.g. tower construction, number of blades, blade length) should increasingly reflect those already consented to promoted a harmonious development pattern."

The application of this guidance to the design of the proposed development is discussed in Section 5.4.

5.2.4. Summary of policy context

In summary, development plan policy is generally supportive of wind energy development. This is subject to specific developments avoiding unacceptable landscape and visual impacts and with limitations on the cumulative impact of more than one development within Angus or in neighbouring local authority areas. The *Tayside Landscape Character Assessment* (SNH 1999) is the basis for describing landscape character and the *'Implementation Guide for Renewable Energy Proposals'* (2012) provides guidance for the assessment of the development proposals. This states that the *Dipslope Farmland* LCT in which the proposed development is located, is *'considered to have scope for turbines circa 80m in height'.*

At a strategic level therefore, the proposed development appears to be broadly acceptable in landscape policy terms notwithstanding any significant adverse effects identified in this Landscape & Visual Impact Assessment and the associated application of the relevant policy criteria.

Further guidance on the capacity of the Angus landscape to accommodate a range of wind energy developments is set out in the *'Landscape Capacity and Cumulative Impacts Study'* (2008). A summary of this in relation to the proposed development is set out in Section 5.3.4 of this report.

5.3. Baseline description

The baseline description establishes the existing landscape and visual resource against which the effects of the proposed development are predicted. It describes the site and its setting and examines the existing landscape designations and landscapes character types within the study area and their associated sensitivity to wind energy development. Visual receptors including settlements, road and rail users, users of recreational routes and their associated sensitivity are also identified along with an overview of the landscape and visual receptors to be assessed at the representative viewpoints.

5.3.1. The site and surrounding landscape

The site of the proposed development is located on Hillhead of Ascurry Farm, situated within in an extensive area of gently sloping fertile farmland in Angus (see Drawing HAO001). The village of Letham is located approximately 2.0km to the north of the proposed turbine location, Friockheim approximately 6km to the north-east, Forfar approximately 8km to the north-west and Arbroath approximately 10km to the south-east.

The proposed turbine location is within an open, gently sloping arable field at approximately 145m AOD, approximately 550m to the north of the Hillhead farmstead. The site consists of predominantly medium-large sized arable fields bounded by a mixture of post and wire fencing, stone walls, scrubby vegetation and occasional lines of trees. There are several small blocks of broad-leaved woodland located in the south-eastern and north-eastern part of the site and Coy Burn runs in a west to east direction to the north of the proposed turbine location. A larger block of coniferous woodland (Cotton of Gask) is located along the western boundary, just to the north of Kinneries farmstead.

Within the immediate surroundings, the landscape is predominantly open in character with a pattern of occasional shelterbelts set within a relatively large scale agricultural landscape with a dispersed pattern of farmsteads and occasional scattered dwellings connected by a network of narrow local roads and farm tracks. To the north, extensive policy woodlands around Idvies House provide a visual barrier to the village of Letham, located further north where the land drops away towards the Lunan Water. To the south-east of the site, a quarry set within a

coniferous wooded framework is located to the east of a cluster of dwellings at Mosston. The wider landscape is relatively well settled with a network of busy main roads including the A932 located approximately 4km to the north of the site at its closets point and the A933, 6km to the east. There is a gradual transition to the southern slopes of the Sidlaw Hills located to the south-west and the Montreathmont Hills located to the north, back by distant views of the Highland foothills.

From the site, views tend to medium range but with longer range glimpses of the Grampians to north and the Sidlaws towards the south-west. From nearby roads, the site is generally clearly visible although with increasing distance, views tend to be curtailed by low rising ground and the screening effect of shelter belts and policy woodlands surrounding designed landscapes that are scattered throughout the area. There are also open views of the site from the eastern edge of Sidlaw Hills and a number of hills located to the north of the site.

5.3.2. Landscape designations

There are no National Parks or National Scenic Areas located within the study area. Other landscape designations within the study area (see Drawing HOA006) include Gardens and Designed Landscapes (GDLs), Special Landscape Areas (SLAs) and Country Parks. These are described in Table 9 below.

Gardens and Designed Landscapes

There are seventeen Gardens and Designed Landscapes (GDLs) within the study area, six of which are within 15km from the proposed development. Due to their national importance, GDLs are assessed as having a *high* sensitivity to change.

Local Landscape Designations

A part of Tay Coast Special Landscape Area (in Fife) is located to the south study area and is located approximately 18km from the proposed development at its closest point. Due to its regional importance, the designation is considered as having a *medium-high* sensitivity to change.

Country Parks

There are also five Country Parks within the study area, three of which are within 15km from the proposed development. As a local recreational designation, Country Parks are considered to be of *medium* sensitivity to change.

Summary of landscape designations within the study area

For all landscape designations within 15km from the proposed turbine location, a description and associated sensitivity are set out in Table 9. Outside of 15km, all other designations have been listed. A number of other features of cultural importance occur within the study area. These individual features are assessed in more detail in Chapter 8.

Landscape Designation	Description	Distance to turbine (km)	Sensitivity
All designations within 15 km			
House of Pitmuies GDL	An attractive small landscape boasting beautiful gardens and an interesting group of listed buildings. The A932 forms the northern boundary of the site, beyond which lie the policies of Guthrie Castle. The surrounding landscape is agricultural. From the A932, the landform slopes steeply away into a hollow then gradually descends down towards the Vinny Water. Views into the woodland garden in the north of the site can be gained from this bridge and the A932. Outward views are limited by the low-lying nature of the surrounding landscape.	4.1	High
Guthrie Castle GDL	The walled garden at Guthrie Castle dates from 1614 and the extended designed landscape from the 18th and 19th centuries. Together with the castle, they form a very artistic composition. Guthrie Hill rises gently to 14 m to the north of the Castle, and the best views from the Castle are to the west and south. Fine panoramic views can be obtained from the Castle battlements. The view of the Castle from the A932 to the south is blocked by the raised railway embankment built in 1836, but views of the parks and woodlands are obtained from the minor road to the north of the policies.	4.2	High
The Guynd GDL	An attractive 19th century parkland and woodland landscape providing the setting for a classical mansion house and other interesting architectural features. The surrounding landscape is agricultural with some forestry to the south-west on the Panmure Estate. The low- lying nature of the landscape restricts views from the site but sight of the North Sea can be gained from the top of the house. The Elliot Water and two of its tributaries flow through the policies of The Guynd in valleys which provide variation to the otherwise flat natural landscape. The surrounding woodlands and policy wall along the B9127 are of some significance in the local scenery. They serve to restrict views to the designed landscape within.	5.0	High

Landscape Designation	Description	Distance to turbine (km)	Sensitivity
Crombie Country Park	Crombie Country Park is 102 hectares in area, which includes Crombie Loch as well as broadleaf and conifer woodlands. There are 7km of trails and a range of facilities including an adventure play park, Ranger Centre, picnic facilities, and bird hide & nature trail.	5.3	Medium
Monikie Country Park	Monikie Country Park, with its three reservoirs, woodland and parkland, is a popular countryside attraction with a good network of trails. The scenic surroundings offer a range of opportunities to enjoy the outdoors and situated within a woodland setting is an adventure play park and there also a café. Water sports are available during the summer months. The park is also important for environmental education.	8.3	Medium
Forfar Loch Country Park	Forfar Loch Country Park situated on the west side of Forfar. With woodland, grassland and wetland habitats, the park is a haven for wildlife and visitors. Forfar Loch is circled by a 2.5 mile long trail which is part of the Forfar Path Network and the loch is important for a host of recreational activities.	9.2	Medium
Kinnaird Castle GDL	An attractive designed landscape on a grand scale, the layout seen today dates back to a late 18th century. The walled park lies in the valley of the River South Esk which broadens out south of Brechin into a broad plain before flowing into the Montrose Basin. The hills rise up gently to the north and south of the estate and fine views are afforded from the park. The designed landscape extends northwards to the River South Esk and is enclosed on its remaining boundaries by a park wall 7 miles long and 7' high that limit views out of the parkland.	13.0	High

Landscape Designation	Description	Distance to turbine (km)	Sensitivity
Brechin Castle GDL	Brechin Castle is situated on the southern edge of the town of Brechin. The Castle is set on a rocky outcrop high above the River South Esk on its north side. The river sweeps through the policies to the south of the Castle. The setting originally provided a defensible site from which extensive views can be obtained across the agricultural land to the west and south. First laid out in the early 17th century, the parkland, woodland, formal and informal gardens represent a very fine work of art and a designed landscape of great historical, horticultural and architectural value.	13.0	High
Glamis Castle GDL	Located within the broad vale of Strathmore, Glamis Castle designed landscape dates from the late 17th century and is outstanding in almost every value category. The Castle is set in the low plain of the Dean Water and the land slopes gently north from the Sidlaw Hills in the south to the Castle and the Dean Water. There are magnificent views to the surrounding area from the parks and particularly from the roof of the Castle, the Grampian Mountains forming a magnificent backdrop to the north. The policy woodlands are particularly significant to the designed setting of the Castle. Views into the parks from the surrounding roads are limited by the woods and the high policy walls which form a significant scenic feature in themselves. The Castle is visible from the A928 to the west, and the farmed parks to the east are visible from the A94.	13.9	High
Designations within 15-25 km			
Cortachy Castle GDL		17.2	High
Dunninald GDL		17.5	High
House of Dun GDL		18.2	High
Tay Coast Special Landscape Area		18.3	Med-high
Craig House GDL		18.6	High
Baxter Park GDL		18.9	High
Clatto Country Park		20.3	Medium
Camperdown House GDL		21.0	High

Landscape Designation	Description	Distance to turbine (km)	Sensitivity
Ascreavie GDL		21.8	High
Camperdown and Templeton Woods Country Park		22.0	Medium
Balgay Park GDL		22.1	High
Drumkilbo GDL		23.1	High
Edzell Castle GDL		23.1	High
Airlie Castle GDL		23.9	High

Table 9: Landscape Designations

5.3.3. Landscape character: the site and study area

The landscape character of the study area has been mapped and described using the following landscape character assessments (see Drawing HOA008):

- *Tayside Landscape Character Assessment* (1999); and
- *The Fife Landscape Character Assessment* (1999).

The proposed development is located within the *Dipslope Farmland* landscape character type (LCT), an extensive area of farmland sloping gently towards the Angus coast. The landscape rises up to 180m in the north-west, dropping away to approximately 50m along the coastal strip. The LCT covers a wide area and accommodates significant variation of character ranging from relatively small-scale enclosed farmland to large open fields and small areas of heather moorland.

The landscape is one of the most fertile and productive agricultural areas in Scotland with intensive agriculture, based on cereals, 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, indicating the relatively exposed and windy characteristics of the area. Semi-natural woodland is limited to steeper valley sides, for example along the Lunan Water.

Despite the intensive pattern of agriculture, the area has a range of archaeological and historic sites. These include Bronze Age burial sites such as that at Dickmountlaw just to the north of Arbroath, Roman sites such as the camp at Kirkbuddo near Whigstreet, and medieval castles including Braikie Castle and Gardyne castle near Friockheim and Colliston Castle to the east. Designed landscapes are also an important component of the landscape. A dense scatter of more recent farmsteads is supplemented by a number of isolated houses, reflecting the proximity to Dundee and Arbroath.

There are a further five LCTs within 15km from the proposed development and nine LCTs within 15-25km. Table 10 identifies the key characteristics and features of each LCT and its associated sensitivity to wind energy for those within 15km of the proposed development and lists those LCTs within 15 to 25km.

LCT	Landscape character & features	Sensitivity
LCTs within 15km		
Dipslope Farmland	• Extensive area of land, generally sloping from the north-west to the south-east • Dominated by productive agricultural land • Low woodland cover, expect on large estates and along river corridors • Variety of historic sites • Dispersed settlement pattern, including some suburban development • Limited visual impact of Dundee and Arbroath	Medium
Low Moorland Hills	• Eastern outliers of the Sidlaws • Combination of low, rounded hills and craggy, ridged upland • Moorland character evident in areas of heather and gorse • Some areas of extensive woodland • Rich historic heritage • Scattered modern settlement	Medium to high
Igneous Hills	• The Sidlaw hills, comprising hard volcanic rocks • Short burns and rivers flowing from short steep glens • A few large glens through the hills • Often distinctive scrap and dip slopes • Generally open landscape of almost conical summits dominated by grass moorland • Some extensive areas of forestry • Many modern influences	Medium
Broad Valley Lowland	• Broad Straths formed by glacial erosion • Undersized, misfit rivers • Complex local topography caused by glacial deposition • Distinctive red soils and red building stone • Influence of large estates, particularly in terms of woodland and policies • Dominance of arable and root crops • Tree loss weakening landscape character	Medium
Lowland Loch Basin	• Broad basins formed where sandstones have been eroded away leaving harder enclosing rocks • Extensive mudflats • Rich natural heritage, particularly migratory and wading birds • Historic associations • Dominance of water, sky and distant shores	Medium-high
Coast (Sand & Cliffs)	• 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 • Limited settlement • More resistant sandstones and intrusive rocks • Cliffs, arches, inlets, bays and rocky reefs • Defensive coast with castles • Fishing settlements • Windswept and exposed • Minimal tree cover • Productive farming up to cliff edge	High

LCT	Landscape character & features	Sensitivity
LCTs within 15-25km		
Highland Foothills		Medium to High
Highland Glens		Medium to High
Highland Summits and Plateau		Medium
Agricultural Heartlands		Medium
Lowland Glacial Melt Water Valley		Medium-high
Coastal Terraces		High
Upland Foothills		Medium-High
Coastal Flats		High
Coastal Braes		High

Table 10: Landscape Character Types

5.3.4. Landscape Capacity

Guidance on the capacity of the Angus landscape to accommodate a range of wind energy developments is set out in the '*Landscape Capacity and Cumulative Impacts Study'* (2008). For the *Dipslope Farmland* LCT in which the proposed development is located, the study states:

"Analysis of the landscape character, landscape features and elements suggests that, given its medium to large scale, gentle landform, working agricultural nature and moderately strong rectilinear field pattern it is of medium landscape character sensitivity. Due to the number of settlements and widely distributed population and number of key transport routes, together with a generally open aspect, it is of medium to high visual sensitivity. Overall landscape sensitivity is medium.

There are no statutory landscape designations and much of it is a working landscape. There are nevertheless a number of HGDLs, estates and country parks. There are also long sections of the National Cycle Route and many local footpaths. 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.

Summary of Landscape Capacity

The capacity study concludes that the *Dipslope Farmland* LCT has a *medium overall sensitivity* and a *medium capacity* for windfarm development. This is reinforced by the *Implementation Guide for Renewable Energy Proposals* (2012) which states that the LCT is:

"Considered to have scope for turbines circa 80 m in height."

Therefore at a strategic level, the LCT is broadly appropriate for some development at the proposed scale subject to the detailed findings of this LVIA.

5.3.5. Settlements

Table 11 identifies the clusters of dwellings and villages within 5km of the proposed development and the larger villages and towns within 5-15km that will form the basis of the residential assessment of visual effects. It should be noted that a detailed assessment of views from individual dwellings is beyond the scope of the assessment.

Receptor	Approx. distance (km)	Sensitivity
Clusters and Villages within 5km		
West Mains of Gardyne	1.2	High
Bowriefauld	2.0	High
Letham	2.0	High
Mosston	2.2	High
Greystone	3.0	High
Craichie	3.3	High
Redford	3.4	High
Dunnichen	3.4	High
Cotton of Gardyne	4.2	High
Mains of Balgavies	4.7	High
Villages & Towns within 5-15km		
Forfar	8.2	High
Monikie	8.4	High
Kingsmuir	5.9	High
Guthrie	5.1	High
Friockheim	6.2	High
Leysmill	6.9	High
Lunanhead	8.0	High
Arbirlot	8.7	High
Chapelton	9.0	High
Aberlemno/Crosston	9.3	High
Muirdrum	9.6	High
Arbroath	10.2	High
Carnoustie	11.5	High
Monifieth	13.7	High
Brechin	14.5	High

Table 11: Residential Receptors

5.3.6. Roads

Main roads within 15km that will potentially experience theoretical visibility of the turbine include the A932 located 4km to the north of the site at its closest point, the A933 located 6km to the east and the A90 located 9km to the west at its closest point. There is an extensive network of secondary and local roads within the study area, many of which fall within the ZTV,

particularly within 5km from the proposed turbine location. All of these routes are judged to have a *medium* sensitivity to change.

5.3.7. Viewpoints

The following twelve viewpoints (see Drawing HOA038) have been selected as locations that represent typical views experienced from a variety of receptors, within different landscape character types and at a variety of distances. The visualisations from these viewpoints have been used to undertake a detailed assessment of landscape and visual effects of the proposed development:

VP Location	Distance (km)	Landscape		Visual	
		LCT	Sensitivity	Receptor	Sensitivity
1. Local Road Near Gask	0.5	Dipslope Farmland	Medium	Residents	High
				Local road users	Medium
2. Hillhead	0.8	Dipslope Farmland	Medium	Residents	High
3. Ascurry Mill	1.1	Dipslope Farmland	Medium	Residents	High
				Local road users	Medium
4. Hillkirk/ Dunbarrow Hill	1.9	Dipslope Farmland	Medium	Residents	High
5. Dunnichen	3.4	Dipslope Farmland	Medium	Residents	High
				Local road users	Medium
6. Junction at Girdle Stone	3.4	Dipslope Farmland	Medium	Local road users	Medium
7. A932 at Guthrie Castle	4.3	Dipslope Farmland	Medium	Main road users	Medium
8. B961 near Helenston	4.3	Dipslope Farmland	Medium	Minor road users	Medium
9. Bankhead	5.3	Low Moorland Hills	Medium to high	Residents	High
				Local road users	Medium
10. Turin Hill	7.3	Low Moorland Hills	Medium to high	Walkers	High
11. Balshanner	7.8	Low Moorland Hills	Medium to high	Residents	High
				Local Road users	Medium
12. Local road near Mainsbank	9.8	Dipslope Farmland	Medium	Local road users	Medium

Table 12: Viewpoints

5.3.8. Operational, consented and proposed developments

The following 175 schemes listed in Table 13 have been identified as the baseline scenario to investigate the cumulative landscape and visual effects of the proposed development. The locations of these schemes are identified in Drawing HOA017.

Name	No. of Turbines	Tip height (m)	Status	Distance from turbine (km)
Newton Of Idvies Farm	1	47.5	Approved	1.4
Lochlair Farmhouse	1	47	Approved	3.2
North Mains Of Cononsyth	1	66.7	Installed	3.5
Newmill Of Balgavies	1	66.5	Appeal	3.7
Greenhillock 2	1	67	Pending	4.2
Greenhillock 1	1	45.9	Approved	4.2
Parkconon Farm	1	45	Approved	4.4
Drowndubbs Farm	2	46.5	Pending	5.2
Golf Course Cunninghill	1	77	Pending	6.3
Cuthlie	1	77	Pending	6.4
Pickerton	1	77	Approved	6.4
Dubton Farm	1	77	Pending	6.7
West Mains Of Turin	1	49	Pending	7.2
Craignathro	1	35	Approved	7.2
Stotfaulds Farm	1	77	Pending	7.5
Wester Meathie Farm	2	46.6	Approved	7.6
Pitkennedy Farm	1	74	Pending	8.3
Carsegownie	1	34.2	Pending	8.4
Upper Balmachie Farm	1	77	Pending	9.7
New Downie Farm	1	54	Pending	10.5
North Tarbax	1	45.9	Approved	10.9
Dodd Hill Wind Farm	5	126.5	Pending	10.9
Balnacake Farm	1	67	Pending	11.5
Govals Wind Farm	6	87	Pending	11.9
Frawney Wind Farm	5	80	Pending	12.1
Kalulu House	2	44.8	Pending	13.5
West Cottage	1	77	Pending	14.0
Broom Farm	1	49.5	Pending	14.2
Ethie Barns Farm	1	45	Pending	15.4
Dunswood	1	77	Approved	15.6
Tealing	1	86.5	Approved	15.9
Former Tealing Airfield	1	86.5	Pending	16.1
Michelin Tyres	2	120	Installed	16.1
East Pitforthie Farm	1	47	Approved	17.1
White Top	1	86.5	Pending	17.1
East Memus	1	86.5	Approved	17.2
Arrat Farm	2	46	Approved	17.2
Balkemback Farm	2	46.5	Approved	17.3
Balhall Lodge 1	1	47.5	Approved	17.4
Arkhill	8	79.6	Installed	17.9
Afflochie Farm	2	46.9	Approved	17.9
Balhall Lodge 2	1	49	Pending	18.0
Balrownie Farm	2	46.5	Approved	18.3
Gallow Hill	1	46.5	Pending	18.8
Whitefield Of Dun Farm	1	67	Approved	18.9

Name	No. of Turbines	Tip height (m)	Status	Distance from turbine (km)
Reedie Farm	2	46.9	Approved	19.3
Auchenreoch Farm	1	45.9	Approved	19.7
Glen Trusta	2	46.9	Approved	19.9
Henderston Quarry	1	66	Approved	20.1
Hill Of Stracathro	1	79.6	Approved	20.3
Scotson	1	79	Installed	20.4
Newbigging Farm	1	24.8	Approved	20.6
North Leoch	1	45.6	Approved	20.8
Nathro Hill	17	135	Pending	21.2
Davidston Farm	1	62	Pending	22.9
Wilton Farm	2	74	Pending	23.6
West Mains Farmhouse	1	61	Approved	23.8
West Adamston Farm	1	47.5	Installed	24.3
Lundie Castle Farm	1	48.5	Pending	24.7
Steelstrath Farm	1	84	Pending	24.9
Stone of Morphie Cottage	1	77	Pending	24.9
Grangehall	2	37	Approved	26.1
Moss Side of Esslie	1	45.5	Approved	26.2
Gossesslie Farm	1	47.5	Approved	26.3
Pitbeadlie Farm	1	76	Pending	26.7
South Balmakelly	1	45.5	Approved	26.8
House On The Hill	2	45.4	Approved	26.9
Dykelands	2	40.2	Approved	27.8
Wester Kilmany Farm	1	86.5	Pending	28.3
Hospital Shields Farm	2	46.5	Approved	28.4
Brigton Farm	1	81	Approved	28.4
Criggie Farmhouse	2	45.5	Approved	28.5
Loyal Farm	1	47	Approved	28.6
Windy Corner	1	63.5	Approved	29.1
Mains of Woodstone	1	80	Pending	29.5
Lundie Castle Farm	1	48.5	Pending	24.7
Steelstrath Farm	1	84	Pending	24.9
Stone of Morphie Cottage	1	77	Pending	24.9
Grangehall	2	37	Approved	26.1
Moss Side of Esslie	1	45.5	Approved	26.2
Gossesslie Farm	1	47.5	Approved	26.3
Pitbeadlie Farm	1	76	Pending	26.7
South Balmakelly	1	45.5	Approved	26.8
House On The Hill	2	45.4	Approved	26.9
Dykelands	2	40.2	Approved	27.8
Wester Kilmany Farm	1	86.5	Pending	28.3
Hospital Shields Farm	2	46.5	Approved	28.4
Brigton Farm	1	81	Approved	28.4
Criggie Farmhouse	2	45.5	Approved	28.5
Loyal Farm	1	47	Approved	28.6
Windy Corner	1	63.5	Approved	29.1
Mains of Woodstone	1	80	Pending	29.5
South Bradieston	1	66	Pending	30.2
Chapelfield Farm	1	43.5	Approved	30.4
Lochmalony Farm	1	67	Pending	30.5
Smiddyhill	1	40.5	Approved	31.1

Name	No. of Turbines	Tip height (m)	Status	Distance from turbine (km)
Bamff Wind Farm	7	111	Pending	31.5
Wester Derry Farm	1	45	Approved	32.0
Jackston Farm	1	46.5	Approved	32.0
Mains of Bridgeton	1	77	Approved	32.1
Inchcape Windfarm	213	215	Pending	32.4
Glenbran Farm	1	56.3	Pending	32.5
Tullo	7	122	Installed	32.7
Redford Farm	1	53.88	Approved	32.8
Paul Matthew Hill	1	99.5	Pending	33.0
Lordscairnie Farm	1	45.7	Approved	33.1
The Sheils	3	100	Approved	33.3
Outfield Farm Abernyte	1	40	Approved	33.4
West Cairnbeg	1	77	Pending	33.6
Newington Farm	1	41.5	Approved	33.8
Tullo Farm Extension	7	100	Approved	33.9
Pitbladdo Farm	1	51	Approved	34.4
Easter Pitscottie Farm	1	48.7	Pending	35.5
Drumderg	16	107	Installed	36.2
Lumbennie Hill Pitcairlie	1	84	Approved	36.8
North Callange Farm	1	47	Pending	36.8
Craig Garbil 2	1	79	Pending	37.2
Craig Garbil	2	45.5	Approved	37.2
Nether Benholm	2	45.5	Approved	37.2
Peattie	1	67	Pending	37.6
Muirhead Farm	1	35.83	Approved	37.7
Westhall Cupar Fife	1	45.5	Installed	37.8
Fordoun Sawmill	1	77	Approved	37.8
Netheraird of Glasclune	1	67	Pending	37.9
Dendoldrum	2	45.7	Approved	38.0
Airdrie Farm	1	74	Approved	38.1
Muirton Of Drumlochy	1	20	Approved	38.2
North Baldutho Farm	2	25	Approved	38.4
North Cassingray Farm	1	34.2	Approved	38.4
Higham Farm	2	34	Approved	38.5
The Corb Bridge	1	84	Pending	38.6
Shandry Farm	2	45.5	Approved	38.7
Denside	3	92.5	Pending	39.0
Herscha Hill Extension	2	79	Pending	39.2
Kirkmay Farm	1	45	Approved	39.4
Herscha Hill Cluster	3	79.6	Pending	39.5
South Cassingray Farm	1	50	Pending	39.6
South Baldutho Farm	1	47.5	Approved	39.7
Hill Of Lethendy Farm	1	66.6	Approved	39.9
Wester Essendy Farm	2	32.1	Approved	40.1
Wester Kinloch Farm	1	27	Installed	40.3
Wairds of Alpity	1	79	Approved	40.3
Cornceres Farm	1	53.7	Pending	40.9
Scotshall Farm	1	35.5	Pending	41.0
East Gormack Farm	1	66.7	Approved	41.3
Chapleton Farm	1	49	Pending	41.3
St John's Hill	9	80	Approved	41.3

Name	No. of Turbines	Tip height (m)	Status	Distance from turbine (km)
Droop Hill	2	100	Approved	41.3
Lower Melville Wood	1	85	Pending	41.8
Easter Logie	1	47	Pending	42.0
Mid Hill Extension	25	125	Approved	42.1
Crossgates Cottages	1	49	Pending	42.6
Jacksbank	3	100	Approved	43.2
Ferniebrae	1	67	Approved	45.5
East Town Farm	1	79	Approved	45.5
Stewart Tower Farm	1	45	Approved	46.0
Clochnahill	4	81	Approved	46.0
Annamuick	1	75	Pending	46.3
Hillhead of Auquhirie	3	92.5	Approved	46.6
Demperston Farmhouse	1	54	Pending	47.1
Carriston Farm	1	56.7	Pending	47.2
Upper Wyndings	1	47.5	Approved	47.7
Langside Farmhouse	1	39	Approved	47.8
Shampher Cottage	1	40	Approved	48.2
Newton Of Kingsdale	1	33.6	Installed	48.5
Ardlair	2	27	Approved	48.8
Tewel Farm	1	67	Approved	48.8
EFFC	1	81	Pending	49.0
Methil Docks	1	81	Installed	49.3
Methil Offshore	1	179	Approved	50.9
Balgonie	1	86.5	Pending	51.6
Sluie Hill	1	35	Approved	51.7
Earlseat Farm	8	120.5	Approved	52.3
Lacesston Farm	1	48	Installed	52.5
Easter Fordel	1	27	Approved	52.5
Lochelbank	12	86.5	Installed	52.8
Meikle Carewe	12	70	Installed	54.0
Cuthill Towers Farm	1	40	Approved	54.7
Logie	1	45.5	Approved	54.8
Kempstone Hill	3	52.5	Pending	55.2
Noble Foods Thornton	1	110	Approved	55.7
Skeddoway Farm 1	1	110	Approved	55.8
Skeddoway Farm 2	1	126	Pending	55.8
East Blair Farm	2	45.5	Pending	55.8
Temple Hill	1	84	Pending	56.4
Bogenraith	1	23	Pending	56.6
Griffin	68	130.5	Approved	56.7
Westfield	5	110	Installed	57.5
Drumside	1	46	Pending	58.6
Netherhall Steadings	1	27	Approved	59.4
Boghead	1	79	Pending	59.5
Bankhead	3	27	Approved	60.0

Table 13: Recorded wind Farm Developments within 60km

5.3.9. Design optimisation and mitigation strategy

In the context of other technical and environmental constraints, objectives to minimise the landscape and visual effects have been considered in developing the location and design of the proposed development. Within this, the following landscape design aims have been adopted during the iterative process of site selection and scheme design to minimise any likely adverse effects:

- ***Design Aim 1***: Selection of a development pattern and scale that repeats the emerging pattern of scattered single turbine wind energy developments throughout the lowland landscape in Angus;

- ***Design Aim 2:*** Selection of a location and scale which reflects the medium-large scale of the surrounding landscape with a good degree of separation from surrounding roads and settlements; and

- ***Design Aims 3***: Selection of a location which prevents the coalescence of emerging separated clusters of wind energy developments visible in the surrouning landscape.

5.4. Impact Assessment

5.4.1. Construction and decommissioning phases

In addition to the operational phase, there is also a requirement to assess the landscape and visual effects of the construction and decommissioning phases of the proposed development.

Visual Effects

Any visual effects associated with the construction and decommissioning phases will primarily consist of short term effects on a very low number of nearby residents, road users and walkers with open views of the site resulting from the presence of install cranes and other plant machinery. For a very limited number of residents and walkers within approximately 1.5km of the proposed turbine location who would experience direct open views of the site during the construction and decommissioning phases, a *medium* magnitude of change is predicted resulting in ***mod-major*** (significant) visual effects. These effects would only be experienced in a relatively short duration given the short term nature of these phases.

Landscape Effects

The extent of the proposed development is shown on Drawing HOA002. The construction and decommissioning phase are likely to result in the permanent loss of approximately 2,670m^2 agricultural land as a result of the construction of the access track, turbine foundations and substation building. The new access track would be 470m in total. In addition, 620m of existing farm track will require some minor upgrades (see Figure 2). The surrounding land will remain in agricultural use and no other landscape elements are predicted to experience direct effects as a result of the construction and decommissioning phases.

Taking all these factors into account, it is predicted these works would result in a *low* magnitude of change with a direct ***mod-minor*** (not significant) landscape effect in the short-medium term. Indirect effects on surrounding landscape character are predicted to be ***moderate*** (not significant) largely as a result of the crane and plant machinery detracting from the prevailing rural character and contrasting with the scale of surrounding trees and shelter belts.

5.4.2. Operational phase

Overall, the additional structures associated with the proposed development (see Section 5.1.4) are judged to have a worst case *low* magnitude of change with a ***mod-minor*** (not significant) additional impact on the landscape and visual amenity of the surrounding area. The remainder of this assessment will therefore focus on the likely landscape and visual effect of the proposed wind turbine during the operational phase, having taken account of the mitigation measures described in Section 5.3.9. This is presented through separate assessments of landscape effects, visual effects and cumulative effects and informed through a detailed viewpoint assessment.

5.4.3. Overall pattern of theoretical visibility

The 3 point Zone of Theoretical Visibility (ZTV) is illustrated in Drawings HOA009-013. These demonstrate that within 5km of the proposed turbine location, approximately 50% of the landscape is within theoretical views of the turbine. This includes nearly all of the surrounding agricultural landscape within approximately 2km and a swath of land extending east to west out to 5km. To the north, the villages of Letham and Dunnichen, the south facing slopes of Dunnichen Hill, a 2km section of the A932 and a swath of land around Guthrie Castle are all within theoretical views. To the south and beyond 2km from the proposed turbine location, theoretical visibility is more scattered and limited to small areas of agricultural land, parts of local roads and a small number of dwellings and farmsteads.

Beyond 5km, the large majority of the study area is outside of theoretical visibility. There is however a relatively large area of land concentrated to the east and north-east of the site extending from the north of Arbroath to Brechin and Montrose where theoretical views are predicted although a proportion of this would only be of the turbine blades. The settlements of Brechin, Montrose and Arbroath are all outside of any theoretical views. To the south of the site, theoretical visibility is limited to scattered areas around Crombie Country Park and to the west, an area to the south of Forfar and further south, a section along the A90 and a small part of the east facing slopes of the Sidlaw Hills. To the north of the site, there is a pattern of small scattered areas of theoretical visibility along the south facing slopes and summits of the Grampian foothills.

As the ZTV takes no account of the screening effects of woodland, development and other landcover, it is likely that the patterns of broadleaved woodlands, shelter belts and wooded estates scattered throughout the landscape would significantly limit actual visibility of the turbine in practice, particularly with increasing distance from the site.

5.5. Viewpoint Assessment

Table 14 provides a summary of the landscape and visual assessment undertaken from the twelve representative viewpoint locations. At each viewpoint, a detailed assessment was undertaken to identify any landscape and visual effects, also used to inform the general assessment of landscape and visual effects (see Sections 5.6 and 5.7).

The accompanying photomontages (Drawings HOA039-072) have been prepared by combining a wireframe of the view with the photograph of the existing view and rendering the image using a model of the proposed wind turbine, also generated electronically. The images should be viewed at a distance as recommended on each montage to most closely replicate the view that will be obtained from the viewpoint.

It should be noted that every effort has been made to provide clear views of the turbine although due to intervening vegetation and buildings; clear views were not always available. Where this is the case, these viewpoints have been retained to demonstrate the limited effect of the proposed development in practice.

VP Location	Distance	LANDSCAPE					VISUAL				
		LCT	Sensitivity	Magnitude of Change	Effect	Significant	Receptor	Sensitivity	Magnitude of Change	Effect	Significant
1. Local Road Near Gask	0.5	Dipslope Farmland	Medium	<u>*High*</u>: The turbine would be prominent on the nearby skyline and the movement of blades would detract from the smooth profile of the open topography and the relative sense of tranquility experienced within the local area. It would contrast with the scale of Ascurry Wood located directly behind the turbine and other small woodland blocks on the skyline to the left and right of view. However, these are the only features of a human scale in view thus limiting the opportunity for adverse comparisons in scale. The turbine would also relate relatively well to the large scale of the surrounding landform and land use pattern. Although the turbine would be an uncharacteristic addition within the local landscape, landscape pattern is not particularly strong at this point and is largely unaffected.	**Mod-major**	✓	Residents	High	<u>*Medium-high:*</u> Residents of one nearby dwelling would experience oblique views of the nearby turbine on the local skyline from some upstairs rooms at the back of the dwelling although views from downstairs rooms and the curtilage are likely to be screened by tall garden hedgerows. Where views are experienced, the turbine would create a new visual focus across open fields, contrasting with the scale of surrounding landscape elements. At this distance, the turbine would occupy a large proportion of view, appearing as the most noticeable element in a short to medium range view. The turbine would also be back lit during the morning and would generally be more noticeable as a result. Views from other nearby dwellings are likely to be screened by tall garden hedgerows.	**Mod-major to major**	✓
							Local road users	Medium	<u>*Medium:*</u> The visual changes experienced by a very small number of local road users are very similar to those experienced by residents (see above) although any changes would be experienced along a very short section of the road and from some sections, screened by intervening farm buildings and roadside trees.	Moderate	x

VP Location	Distance	LANDSCAPE					VISUAL				
		LCT	Sensitivity	Magnitude of Change	Effect	Significant	Receptor	Sensitivity	Magnitude of Change	Effect	Significant
2. Hillhead	0.8	Dipslope Farmland	Medium	<u>*Medium-high*</u>*:* The turbine would be relatively prominent on the local skyline but part of the tower would be screened by intervening landform. Although the movement of blades would detract from the smooth profile of the open topography, the turbine would relate relatively well to the prevailing large scale of the landform and land use pattern evident at this location. The turbine would contrast with the scale of woodlands to the left of view but overall, there are few elements of a human scale in view, limiting the opportunity for adverse comparisons in scale. The turbine would be an uncharacteristic change to the local landscape, and the turbine would detract from the strong sense of tranquility and rural character experienced in the locality. Landscape pattern is not evident from this location and is therefore unaffected.	**Moderate to mod-major**	✓	Residents	High	<u>*Medium*</u>*:* Residents of one nearby dwelling would experience only oblique views of the turbine relatively prominent on the nearby skyline from two small rear facing rooms and parts of the curtilage. The primary views from this dwelling are in the opposite direction of the turbine, and no changes would be experienced for views in this direction. The turbine would create a new visual focus that would detract from views of the Montreathmont Hills to the north and the distant Grampians further. At this distance, the turbine would occupy a moderate proportion of the vertical view although only a small part of the more extensive horizontal view. It would however appear as the most noticeable element in a relatively long range view within a composition free of other vertical elements. The turbine would be front lit throughout the day, thus reducing its visibility against a backdrop of the sky in typical weather conditions.	**Mod-major (one dwelling only)**	✓

VP Location	Distance	LANDSCAPE					VISUAL				
		LCT	Sensitivity	Magnitude of Change	Effect	Significant	Receptor	Sensitivity	Magnitude of Change	Effect	Significant
3. Ascurry Mill	1.1	Dipslope Farmland	Medium	*Medium-high:* The turbine would be relatively prominent on the local skyline and viewed above the intervening woodland of Ascurry Wood although approximately half of the turbine tower would be screened by this. The turbine would contrast with the scale of Ascurry Wood, the cluster of buildings at Ascurry Farm to the left of view and the pattern of scattered trees dotted across the nearby skyline. Although the turbine would be an uncharacteristic change to the local landscape, there is an existing composition of other vertical elements consisting of telegraph and small transmission poles in the foreground. The movement of blades however would detract from the tranquil experience and rural character of the local landscape although would relate well to the reactively large scale of the landscape.			Residents	High	*Medium:* Residents of two nearby dwellings would experience oblique views of the turbine relatively prominent on the nearby skyline from some rooms and parts of the curtilage. The turbine would create a new visual focus within the important part of the view across open arable fields although it should be noted that the primary views from these dwellings would be unaffected by the proposed development as these views are in the opposite direction. At this distance, the turbine would occupy a moderate proportion of the vertical view although only a small part of the more extensive horizontal view. It would however appear as the most noticeable element in a relatively short range view.	**Mod-major**	✓
							Local road users	Medium	*Medium:* The visual changes experienced by a small number of local road users are very similar to those experienced by residents (see above) as any changes would be experienced in oblique views from along a short section of open road.	Moderate	x

VP Location	Distance	LANDSCAPE					VISUAL				
		LCT	Sensitivity	Magnitude of Change	Effect	Significant	Receptor	Sensitivity	Magnitude of Change	Effect	Significant
4. Hillkirk/Dunbarrow Hill	1.9	Dipslope Farmland	Medium	*Medium:* The turbine blades would be relatively prominent on the local skyline and viewed above Newton of Idvies Farm buildings, located on an intervening ridgeline. Nearly all of the turbine tower would be screened by intervening rising ground although the turbine blades would appear larger in scale than surrounding farm buildings and woodland clumps. Considering the nearby consented turbine of Newton of Idvies, the proposed development would not be an uncharacteristic change in the local landscape and the movement of blades would only detract from the rural character of the local area and contrast with the pattern of skyline woodland blocks and intervening fields to a limited extent.	Moderate	x	Residents	High	*Medium:* Residents of one nearby dwelling would experience open and direct views of the turbine and a second dwelling open oblique views. The turbine would occupy a moderate proportion of the vertical view although appearing less noticeable than Newton of Idvies. The turbine would be back lit and would generally be more noticeable as a result. The turbine would create an additional visual focus to the consented turbine of Newton of Idvies within the important part of the view although with no change to the focus of view. A degree of visual complexity would also arise whereby the turbine blades would appear above an intervening ridgeline.	**Mod-major (one dwelling only)**	✓

VP Location	Distance	LANDSCAPE					VISUAL				
		LCT	Sensitivity	Magnitude of Change	Effect	Significant	Receptor	Sensitivity	Magnitude of Change	Effect	Significant
5. Dunnichen	3.4	Dipslope Farmland	Medium	<u>*Low-medium*</u>*:* The turbine would be relatively prominent on a low rising skyline punctuated by occasional woodland blocks. Although the turbine would contrast with the vertical scale of these woodlands, it would however relate well to the extensive horizontal scale of the skyline and the vertical scale of the low rising ground. Although the consented turbine of Newton of Idvies that would be visible to the left of the view sets a precedent for wind energy development, the skyline is otherwise free of vertical elements. Taking into account the changes introduced by Newton of Idvies, the turbine would only change the prevailing rural character and compromise the containment provided by the rising ground to a limited degree.	Moderate to mod-minor	x	Residents	High	<u>*Low*</u>: Residents of one nearby dwelling would experience open but oblique views from front facing rooms and the curtilage of the turbine relatively prominent on the skyline. The turbine would be back lit throughout the day and would be clearly noticeable within an important part of the view to the south although the primary views from the dwelling to the south-west would be unaffected. The turbine would only occupy a very small proportion of the extensive skyline that forms a 180^0 medium range view.	Moderate	x
							Local road users	Medium	<u>*Low*</u>: A relatively small number of local road users would experience oblique views of the turbine along a short section of road before the road heads south and views become direct.	Mod-minor	x

6. Junction at Girdle Stone	3.4	Dipslope Farmland	Medium	<u>*Low-medium*</u>*:* The turbine would be relatively prominent on a low rising, partly wooded skyline. Although the turbine would contrast with the vertical scale of the nearby woodland blocks, it would however relate well to the relatively extensive horizontal scale of the skyline and the vertical scale of the low rising ground. The consented turbine of Newton of Idvies would be screened at this point and as the skyline is otherwise free of vertical elements, it would be an uncharacteristic change, affecting the prevailing rural character and compromising the containment provided by the rising ground to a degree.	None	x	Local road users	Medium	<u>*Low*</u>: A relatively small number of road users would experience open but oblique views of the turbine relatively prominent on the skyline along a moderate proportion of the local road. The turbine would be back lit throughout the day and would be clearly noticeable within an important part of the view across open fields. The turbine would only occupy a very small proportion of the extensive skyline that forms a 180^0 medium range view, although forming a noticeable focal point on the skyline.	None	x
7. A932 at Guthrie Castle	4.3	Dipslope Farmland	Medium	<u>*Negligible*</u>: During summer months, the turbine would be screened from view by dense intervening woodlands. During winter months, the movement of blades amongst the branches of the intervening woodland would be hardly discernible on the surrounding intimate, wooded character.	Minor	x	Main road users	Medium	<u>*None*</u>*:* During summer months, the turbine would be screened from view by dense intervening woodlands and during winter, it is very unlikely that road users would experience the turbine blades amongst the woodland when travelling at speed in oblique views.	None	x
8. B961 near Helenston	4.3	Dipslope Farmland	Medium	<u>*None*</u>*:* The turbine would be screened from view by a large intervening agricultural building and no changes on the surrounding nearby landscape are predicted.	None	x	Minor road users	Medium	<u>*None*</u>*:* The turbine would be screened from view by a large intervening agricultural building and no changes on the views of road users are predicted.	None	x

9. Bankhead	5.3	Low Moorland Hills	Medium to high	<u>*Low-medium*</u>: The turbine would be relatively prominent on a low rising, partly wooded skyline and viewed above nearby intervening woodlands. Although the turbine would affect the vertical scale of these woodlands, it would relate relatively well to the horizontal scale of the skyline and the vertical scale of the low rising ground. Although the consented turbine of Newton of Idvies that would be visible to the left of view sets a precedent for wind energy development, the skyline is otherwise free of vertical elements. Taking into account the changes introduced by Newton of Idvies, the turbine would only change the prevailing rural character and compromise the containment provided by the rising ground to a limited degree.	Moderate	x	Residents	High	<u>*Low:*</u> Residents of one nearby dwelling would experience open and direct views from two side facing rooms and parts of the curtilage of the turbine relatively prominent on the skyline. The turbine would be back lit during the morning and would be clearly noticeable within a relatively long range view although the primary views from the dwelling to the south would be unaffected. The turbine would only occupy a small proportion of the framed view. Views from two other nearby dwellings would be heavily filtered by garden vegetation.	Moderate	x
							Local road users	Medium	<u>*Low-negligible*</u>*:* The visual changes experienced by a small number of local road users are very similar to those experienced by residents (see above) although within oblique views and in very short duration.	Mod-minor to minor	x
10. Turin Hill	7.3	Low Moorland Hills	Medium to high	<u>*Low-negligible*</u>*:* the turbine would be an evident change, predominantly back clothed against rising ground with the tips just breaking the open skyline. At this distance, the turbine would relate well to the large scale of the landscape and viewed within a panoramic view of other occasional scattered turbines. Considering these factors, the effect of the proposed development on the remote experience and surrounding upland character would be very limited at this distance.	Mod-minor	x	Walkers	High	<u>*Low-negligible*</u>*:* A relatively low number of walkers would experience open views of the turbine evident within a panoramic view of the extensive lowland landscape to the south and the Grampians to the north. The proposed development would not be uncharacteristic and it would not be the most prominent turbine in view. There would be little change to focus of the view and at this distance, the turbine would only occupy a very small proportion of the view. As the turbine would be mostly back clothed, it would be less noticeable than if it were on the skyline. The important views of the Grampians to the north would also be unaffected.	Moderate to mod-minor	x

11. Balshanner	7.8	Low Moorland Hills	Medium to high	<u>*Low-negligible*</u>: the turbine would be an evident change on the open skyline that forms a backdrop to the LCT. At this distance, it would relate well to the relatively extensive horizontal scale of the skyline and the vertical scale of the rising ground. In the foreground, the rural character of the agricultural landscape is already compromised by the consented Craignathro turbine and a relatively prominent line of pylons that cross the view. These factors significantly limit any changes resulting from the proposed development on the surrounding landscape.	Mod-minor	x	Residents	High	<u>*Low-negligible*</u>: Residents of one nearby dwelling would experience open but oblique views from front facing rooms and parts of the curtilage of the turbine evident on the skyline. The turbine would be back lit during the morning and would be quite noticeable within a relatively long range view. The primary and important views of the Sidlaw Hills to the south would be unaffected. The turbine would only occupy a very small proportion of the 180^0 view.	Moderate to mod-minor	x
						Local road users	Medium	<u>*Low-negligible*</u>*:* The visual changes experienced by a small number of road users along a short section of local road are very similar to those experienced by residents (see above).	Mod-minor to minor	x
12. Local road near Mainsbank	9.8	Dipslope Farmland	Medium	<u>*Negligible*</u>: Part of the turbine would be evident on the distant skyline. It would relate well to the extensive horizontal scale of the skyline and the vertical scale of the rising ground. It would be viewed within a context of other scattered developments and the effect of the proposed development on the agricultural character of the LCT at this location would be very limited.	Minor	x	Minor road users	Medium	<u>Negligible:</u> Minor road users would experience oblique views of the turbine evident on the distant skyline. The proposed development would not be uncharacteristic and it would not be the most prominent turbine in view. There would be no change to focus of the view and at this distance, it would only occupy a very small proportion of the skyline.	Minor	x

Table 14: Viewpoint Assessment

5.6. Landscape effects

5.6.1. Residual landscape effects

Table 15 below sets out a summary of the predicted effects on all landscape designations and LCTs within 15km from the proposed development. The findings have been informed by the detailed viewpoint assessment (see Table 14) and through further field survey assessment. For those designations and LCTs from 15-25km from the turbine, a summary of likely effects are presented in Section 5.6.2. Where any significant effects are identified, a more detailed assessment is presented in Section 5.6.3.

Receptor	Sensitivity	Magnitude of Change	Effect	Significance
Landscape designations				
Within 0km to 15km				
House of Pitmuies GDL	High	*None:* Located 4.1km to north-east of the turbine location at its closest, only a small area confined to the north of the designation is within theoretical views of the turbine blades. All of this is within dense policy woodlands and taking into account the screening effect of woodland along the southern boundary of the garden, no views of the turbine are predicted in practice.	None	Not significant
Guthrie Castle GDL	High	*Low:* Guthrie Castle is located approximately 4.2km to the north-east of the turbine at its closest point and nearly all of the designation is within theoretical views. In practice, views from across the grounds would be screened by dense policy woodlands within the garden, trees along the A932 and the policy woodlands of the House of Pitmuies GDL further south. However, from the Castle, there are views to the west and south and fine panoramic views can be obtained from the Castle battlements. From these limited locations, views of the turbine blades above intervening woodlands are likely to be experienced although at this distance, is very unlikely to be detrimental to the setting of the GDL.	Moderate	Not significant
The Guynd GDL	High	*None*: The GDL is outside of the ZTV and no changes are predicted.	None	Not significant
Crombie Country Park	Medium	*None*: Only a very small part of the Country Park is within theoretical views of the turbine blades, restricted to a dense area of coniferous woodland. No views of the turbine are therefore predicted.	None	Not significant
Monikie Country Park	Medium	*None*: The Country Park is outside of the ZTV and no changes are predicted.	None	Not significant
Forfar Loch Country Park	Medium	*None*: The Country Park is outside of the ZTV and no changes are predicted.	None	Not significant

Receptor	Sensitivity	Magnitude of Change	Effect	Significance
Kinnaird Castle GDL	High	*Negligible:* Kinnaird Castle is located 13km to the north-east of the proposed turbine at its closest point and approximately half of the designation is within theoretical views. Considering the high stone walls and dense woodlands along the south-western boundary of the GDL and the screening effect of large coniferous woodlands of Montreathmont Plantation in the intervening landscape, no views in practice are likely to be experienced from the GDL.	None	Not significant
Brechin Castle GDL	High	*None*: The GDL is outside of the ZTV and no changes are predicted.	None	Not significant
Glamis Castle GDL	High	*None*: Located 13.9km to the west of the proposed turbine at its closest point, only a very small part of Glamis Castle is within theoretical views of the turbine blades, confined to an area of dense policy woodland. In practice, no views of the turbine would be experienced given the screening effect of the policy woodlands in the GDL and those in the intervening landscape.	None	Not significant
Landscape Character Types				
Within 0km to 15km				
Dipslope Farmland	Medium	*Medium:* The proposed turbine would be located within the *Dipslope Farmland* LCT and as illustrated by the ZTV (see Drawing HOA016) approximately one quarter of the LCT is within theoretical visibility. This includes nearly all of the surrounding agricultural landscape within approximately 2km and a swath of land extending east to west out to 5km. The village of Letham and a 2km section along the A932 are within theoretical views and beyond 2km to the south, theoretical visibility is limited to small areas of agricultural land, parts of local roads and a small number of dwellings and farmsteads. Beyond 5km, there are relatively extensive areas of theoretical views to the east and north-east of the site extending towards the coast. To the south, there are scattered areas of theoretical visibility around Crombie Country Park. Taking into account the pattern of broadleaved woodlands, shelter belts and wooded estates scattered throughout the landscape, these would significantly limit actual visibility of the turbine in practice, particularly with increasing distance from	Moderate	Not significant

Receptor	Sensitivity	Magnitude of Change	Effect	Significance
		the site. Overall therefore, only a relatively small proportion of this extensive LCT is likely to experience actual views of the turbine. The landscape assessment from viewpoint 1 predicts a *high* magnitude of change and *medium-high* from viewpoint 2. Both viewpoints (each within 1.1km from the turbine location) are predicted to experience a significant landscape effect largely as a result of the turbine occupying a prominent position on the nearby skyline that would contrast with the scale of the surrounding pattern of woodland blocks, resulting in an uncharacteristic change in the local landscape. At viewpoint 3 (1.9 km), the magnitude reduces to *medium*, *low-medium* at viewpoints 4 and 5, and *negligible* at viewpoints 6 and 11. No viewpoints beyond 1.1km are predicted to result in a significant landscape effect. Considering the limited extent of change across the entire LCT, particularly as a result of the screening effects of intervening woodlands and the decreasing magnitude of change with distance, the magnitude is predicted to be *low-medium* overall.		
Low Moorland Hills	Medium to high	*Low:* The *Low Moorland Hills* LCT is located in relatively close proximity to the north of the proposed turbine location and large areas are within theoretical visibility. Due to the screening effect of the characteristic patterns of coniferous woodlands, particularly the extensive Montreathmont Plantation to the north-east, actual visibility would be significantly reduced in practice. The landscape assessment at viewpoint 5 (5.3km) predicts a *low-medium* magnitude of change, reducing to low-negligible at viewpoints 9 and 10. Although the turbine would be noticeable from some locations on the skyline that forms a backdrop to the LCT, in general, the turbine would relate well to the relatively extensive horizontal scale of the skyline and the vertical scale of the rising ground experienced across the LCT. Taking all these factors into account, the magnitude of change across the LCT is predicted to be *low* overall.	Moderate to mod-minor	Not significant

Receptor	Sensitivity	Magnitude of Change	Effect	Significance
Igneous Hills	Medium	*Low-negligible:* The *Igneous Hills* LCT is located beyond km to the south-west of the site at its closet point with theoretical views concentrated to an area along the A90. For those areas closest to the site, the magnitude of change is predicted to be similar to viewpoint 6 (*low-medium* at 5.3km) although this would reduce with distance. Overall, considering the small proportion of the LCT likely to be affected, the magnitude of change is predicted to be *low-negligible*.	Mod-minor to minor	Not significant
Broad Valley Lowland	Medium	*Negligible:* There are relatively small scattered areas of theoretical views across parts of the *Broad Valley Lowland*, the majority of which are beyond 15 from the proposed turbine location. Taking into account the screening effect of the characteristic patterns of intervening broad-leaved woodland blocks scattered across the LCT, any views in practice are likely to be limited to occasional glimpses on the distant skyline and within the context of other wind energy developments	Minor	Not significant
Lowland Loch Basin	Medium-high	*Negligible:* Over half of the *Lowland Loch Basin* LCT is within views although the majority of this is beyond 15km from the proposed turbine location. Although some open views of the turbine on the distant skyline are likely to be experienced amongst intervening woodlands, at this distance the changes to the open character of the loch and associated low-lying basin would be very limited.	Mod-minor to minor	Not significant
Coast (Sand & Cliffs)	High	*Negligible-none:* Only very small parts of the *Coast* LCT are within theoretical visibility, all of which are beyond 15km from the proposed turbine location. Where any open views of the turbine are experienced, these would be occasional glimpses on the distant skyline. As such, changes to the character from the top of the exposed cliffs would be hardly discernible.	Mod-minor to none	Not significant

Table 15: Residual effects on landscape receptors

5.6.2. Residual landscape effects from 15-25km

As the purpose of the assessment process is to focus on likely *significant* effects, a detailed assessment of landscape designations and LCTs from 15km to 25km from the turbine location has not been undertaken. However, the following landscape designations and LCTs are all outside of theoretical views and no effects would therefore be experienced:

- Cortachy Castle GDL
- Dunninald GDL
- Tay Coast SLA
- Craig House GDL
- Baxter Park GDL
- Clatto Country Park
- Camperdown House GDL
- Ascreavie GDL
- Camperdown Country Park
- Balgay Park GDL
- Drumkilbo GDL
- Edzell Castle GDL
- Airlie Castle GDL
- Lowland Glacial Melt Water Valley LCT
- Coastal Terraces LCT
- Upland Foothills LCT
- Coastal Flats LCT
- Coastal Braes LCT

Parts of The House of Dun GDL and the Highland Foothills, Highland Glens, Highland Summits and Plateau and Agricultural Heartlands LCTs are all within limited theoretical visibility. However, as indicated by the findings of the viewpoint assessment, the magnitude of change is not predicted to be greater than *negligible* at this distance and where any views of the turbine would be experienced, effects would not be greater than ***mod-minor*** (not significant) in the very worst case scenario.

5.6.3. Summary of significant landscape effects

As demonstrated by the viewpoint assessment, **localised significant** effects are predicted on small parts of the *Dipslope Farmland* LCT within approximately 1.1km from the proposed turbine location (see viewpoints 1-3) whereby the turbine would be viewed in close proximity, prominent on the nearby skyline and contrasting with the scale of surrounding woodlands. As the turbine would be uncharacteristic to the locality, it would contrast with the prevailing rural character and experience of relative tranquillity.

However, **no significant** landscape effects are predicted on the overall integrity of the *Dipslope Farmland* LCTs or on any landscape designations or other LCTs within the study area. This demonstrates in landscape terms, that the *Dipslope Farmland* LCT has the capacity to effectively accommodate the proposed development without a detrimental effect on its character. This reinforces the findings of the *Angus Windfarms - Landscape Capacity and Cumulative Impacts Study* (2008) which concludes the landscape has a *medium* capacity for development at the proposed scale.

5.7. Visual effects

5.7.1. Residential dwellings and settlements

Table 16 provides an assessment of the effects on views of residents from clusters and villages within 5km from the turbine location and those larger settlements from 5-15km. As previously noted, a detailed assessment of views from individual dwellings is beyond the scope of this assessment. Given the negligible magnitude of change predicted from the viewpoint assessment for those locations beyond approximately 10km, the effect on towns and cities from 15-25km has not been assessed in detail as significant effects are not predicted at this distance. It should be noted that the study was undertaken on the basis of visits to locations to which access was obtainable without access to private property. Aerial photographs were also used to supplement site visits.

It should be emphasised that this assessment does not constitute a Residential Amenity Survey which assesses in detail how a dwelling is used and how a development would affect a range of environmental factors that relate to the benefit provided by the quality of a space. **It is also important to note that where a significant visual effect is predicted, this does not translate to a significant effect on residential amenity**. Furthermore, taking into account the nature of the proposed development (i.e. a single turbine) and the degree of separation to nearby dwellings, **significant effects on residential amenity are very unlikely to be experienced in any case**.

For a scheme of this nature, significant visual effects are very likely to be experienced on some residents with open views of a nearby turbine **but this does not necessarily translate in effects as being unacceptable.** In considering the overall acceptability of the scheme, it is important to consider that where any significant effects have been identified, these often relate to views from a limited number of rooms that may have direct and open views of the turbine. **In many instances, the primary views from dwellings would not have any views towards the proposed development** and as such, views from these rooms would be unaffected.

Receptor	Distance (km)	Sensitivity	Magnitude of Change	Effect	Significance
Clusters and Villages within 5km					
West Mains of Gardyne	1.2	High	*None:* The settlement is outside of the ZTV and no changes are predicted.	None	Not significant
Bowriefauld	2.0	High	*Medium*: Residents approximately 6 dwellings to the north-west of the village are likely to have some direct views from front facing rooms of the turbine relatively prominent on the open skyline although from the large majority of dwellings, nearby built development, garden vegetation and skyline woodland would tend screen the turbine from view although very oblique glimpses above intervening buildings and woodland might be possible from some dwellings.	**Localised mod-major** None-low for majority	**Significant for some dwellings** Not significant for majority
Letham	2.0	High	*Low:* The entire village is within theoretical views although from the large majority of dwellings, nearby built development would screen any views in practice. For those dwellings in closer proximity to the site, dense woodlands to the north of Idvies House would also help to screen the turbine from view. However, a small proportion of dwellings to the north of the village may experience some views from some upstairs rooms of the turbine blades above skyline woodlands to the south of the village.	Localised moderate None for majority	Not significant
Mosston	2.2	High	*None:* The settlement is outside of the ZTV and no changes are predicted.	None	Not significant
Greystone	3.0	High	*None:* The settlement is outside of the ZTV and no changes are predicted.	None	Not significant
Craichie	3.3	High	*Low-negligible*: Nearly all of the settlement is within theoretical visibility and from the majority of dwellings, nearby farm buildings and built development would screen the turbine from view. Residents of several dwellings along the eastern edge may experience very oblique views of the turbine blades on the skyline.	Localised moderate to mod-minor None for majority	Not significant

Receptor	Distance (km)	Sensitivity	Magnitude of Change	Effect	Significance
Redford	3.4	High	*None:* The settlement is outside of the ZTV and no changes are predicted.	None	Not significant
Dunnichen	3.4	High	*Low:* The entire village is within theoretical views although from the large majority of dwellings, nearby built development and dense tree cover would screen any views in practice. Several dwellings along the southern fringe may experience oblique views above intervening garden vegetation and amongst nearby trees from some rooms and the curtilage of the turbine relatively prominent on the skyline.	Localised moderate None for majority	Not significant
Cotton of Gardyne	4.2	High	*Negligible*: Residents of several dwellings may have some views of the turbine blades above nearby intervening riparian woodland but limited to occasional glimpses amongst dense garden vegetation and nearby trees.	Localised mod-minor None for majority	Not significant
Mains of Balgavies	4.7	High	*Negligible*: Residents of several dwellings may have some direct views of the turbine blades above intervening skyline woodlands but limited to occasional glimpses amongst dense garden vegetation and nearby trees.	Localised mod-minor None for majority	Not significant
Villages and Towns within 15km					
Forfar	8.2	High	*None:* The town is outside of the ZTV and no changes are predicted.	None	Not significant
Monikie	8.4	High	*None:* The village is outside of the ZTV and no changes are predicted.	None	Not significant
Kingsmuir	5.9	High	*None:* The village is outside of the ZTV and no changes are predicted.	None	Not significant
Guthrie	5.1	High	*None*: Although the entire village is within theoretical visibility, in practice views would be screened by nearby dense policy woodlands associated with Guthrie Castle and House of Pitmuies GDLs.	None	Not significant

Receptor	Distance (km)	Sensitivity	Magnitude of Change	Effect	Significance
Friockheim	6.2	High	*None:* The entire village is within theoretical views although views in practice are very likely to be screened by nearby woodlands.	None	Not significant
Leysmill	6.9	High	*None:* The settlement is outside of the ZTV and no changes are predicted.	None	Not significant
Lunanhead	8.0	High	*None:* The village is outside of the ZTV and no changes are predicted.	None	Not significant
Arbirlot	8.7	High	*None:* The settlement is outside of the ZTV and no changes are predicted.	None	Not significant
Chapelton	9.0	High	*None:* Although the village is within theoretical views, nearby woodland blocks to the west of the village are very likely to screen any views in practice.	None	Not significant
Aberlemno/ Crosston	9.3	High	*None:* The village is outside of the ZTV and no changes are predicted.	None	Not significant
Muirdrum	9.6	High	*None:* The village is outside of the ZTV and no changes are predicted.	None	Not significant
Arbroath	10.2	High	*None:* The town is outside of the ZTV and no changes are predicted.	None	Not significant
Carnoustie	11.5	High	*None:* The town is outside of the ZTV and no changes are predicted.	None	Not significant
Monifieth	13.7	High	*None:* The town is outside of the ZTV and no changes are predicted.	None	Not significant
Brechin	14.5	high	*None*: Nearly the entire town is outside of the ZTV and any theoretical views along the northern edge are likely to be screened by intervening skyline woodlands.	None	Not significant

Table 16: Summary of residual effects on residential settlements

5.7.2. Summary of effects on Individual dwellings within 2km

Approximately six of dwellings in the village of Bowriefauld are predicted to experience ***mod-major*** (significant) visual effects, representing only a small proportion of the total number of dwellings in the settlement (approximately 35 dwellings). These effects are restricted to those dwellings that would have direct and open views towards the turbine relatively prominent and back lit on the nearby skyline, forming visual focus in short range views. **However, it should be emphasised that effects are not judged to be oppressive or overbearing on residential amenity and significant effects would only be experienced from front facing rooms and some parts of the curtilage.**

No further residents of the other settlements assessed are predicted to experience significant visual effects as views tend to be partly or fully screened by built development or the pattern of dense woodlands scattered throughout the surrounding landscape. Furthermore, of the 15 settlements from 5-15km from the turbine location, none are predicted to have views of the proposed development.

5.7.3. Roads and recreational routes

A932

The A932 is located approximately 4km to the north of the turbine location at its closest point. Two sections, approximately 3km in total, are within theoretical visibility. As indicated by the findings of the assessment at viewpoint 6, any views in practice are likely to be limited to oblique glimpses of the turbine experienced amongst intervening woodlands. Considering the very short duration of any possible views, the magnitude of change is predicted to be *negligible*, resulting in a ***minor*** (not significant) effect.

A933

The A933 is located approximately 6km to the east of the site at its closest point and approximately 10km in total is within theoretical views, over half of which is of the turbine blades. To the north of Friockheim, extensive road plantation woodland would screen the turbine from view. Further south, occasional direct views of the turbine blades amongst intervening woodlands are likely to be experienced in short duration. The magnitude of change is judged to be *low* resulting in a ***mod-minor*** (not significant) effect.

A90

The ZTV indicates that two sections of the A90, approximately 5km in total and located beyond 9km from the turbine location would have theoretical views of the turbine. In practice, it is very likely that roadside trees and nearby intervening conifer plantations would screen any oblique views of the turbine. As such, the magnitude of change is predicted to be ***none*** with no effect.

Local & Minor roads within 5km

There is a network of quiet local roads within 5km of the turbine location. When travelling along several kilometres of these routes, particularly to the north of the site, road users would have some open views of the turbine although primarily in oblique views. As demonstrated by the findings of the visual assessment at viewpoints in close proximity to the turbine, effects on road users are not judged to be significant given the relatively short duration of predominantly oblique views and distance from the turbine. Taking these factors into account, effects on all road users within 5km are likely to be **not significant**.

5.8. Cumulative effects

This section assesses the potential landscape and visual effects arising from the proposal in conjunction with other wind developments that have been consented, are operational or are at application stage. The proposed site forms the focus of the study area and includes all those schemes within a 60 km radius (see Table 13 and Drawing HOA017). The cumulative assessment identifies the ways in which the proposal may have additional effects, when considered together with the cumulative situation resulting from other planned, consented or operational wind energy developments.

5.8.1. Individual Cumulative Inter-Visibility

There are nineteen planned, approved or installed schemes within 10km which have the greatest potential to present significant cumulative effects with the proposed development. These are provided in Table 17 below.

Name	No. of Turbines	Tip height (m)	Status	Distance from turbine (km)
Newton Of Idvies Farm	1	47.5	Approved	1.4
Lochlair Farmhouse	1	47	Approved	3.2
North Mains Of Cononsyth	1	66.7	Installed	3.5
Newmill Of Balgavies	1	66.5	Appeal	3.7
Greenhillock 2	1	67	Pending	4.2
Greenhillock 1	1	45.9	Approved	4.2
Parkconon Farm	1	45	Approved	4.4
Drowndubbs Farm	2	46.5	Pending	5.2
Golf Course Cunninghill	1	77	Pending	6.3
Cuthlie	1	77	Pending	6.4
Pickerton	1	77	Approved	6.4
Dubton Farm	1	77	Pending	6.7
West Mains Of Turin	1	49	Pending	7.2
Craignathro	1	35	Approved	7.2
Stotfaulds Farm	1	77	Pending	7.5
Wester Meathie Farm	2	46.6	Approved	7.6
Pitkennedy Farm	1	74	Pending	8.3
Carsegownie	1	34.2	Pending	8.4
Upper Balmachie Farm	1	77	Pending	9.7

Table 17: Planned, approved or installed schemes within 10km

Drawings HOA019-037 demonstrate the areas of individual combined theoretical cumulative visibility of the proposed development with these nineteen schemes. Of these, the cumulative visibility with Upper Balmachie, Carsegownie, Wester Meathie, and Downiebrae is limited to relatively small areas mostly beyond 15km from the turbine location and significant effects are therefore less likely to be experienced with these developments. On the other hand, Newton of Idvies has the greatest extent of combined theoretical visibility and Newmill of Balgavies,

Lochlair Farmhouse and Greenhillock have relatively extensive areas of combined theoretical views within approximately 5km from the proposed turbine location. As such, significant effects are more likely to be experienced with these developments. However, given the screening effect of woodland blocks and the wooded estates scattered across the across the landscape, actual cumulative intervisibility would be limited in practice.

The twelve representative viewpoints have been assessed to demonstrate the actual cumulative intervisibility and the associated cumulative effects of the proposed development with all other developments in the study area. As noted previously, these viewpoints are considered to be representative of a range of receptor types and distances. Table 18 outlines the cumulative effect on each representative viewpoint.

VP Location	Distance	Predicted view containing Turbines – without proposed development	Predicted view including proposed development	VISUAL				
				Receptor	Sensitivity	Magnitude of Change	Effect	Significant
1. Local Road Near Gask	0.5	In the combined view, no other developments would be visible. To the west, successive views of developments of varying scales on the distant skyline would potentially be experienced including Nathro Hill, Govals, Arkhill, Dodd Hill, Greenhillock, and Lochlair. North Tarbrax and Fawney Hill would be back clothed against distant hills.	The proposed development would be viewed in close proximity on the nearby skyline. Although it would bring development much closer and to new part of the view, the experience of other distant developments in successive views would be hardly discernible from the nearby dwelling and section of local road due to the screening effect of farm buildings and road side trees that would significantly limit any cumulative views.	Residents	High	Negligible	Mod-minor	x
				Local road users	Medium	Negligible	Minor	x
2. Hillhead	0.8	In the combined view, Nathro Hill would be noticeable on the skyline with the single turbines of West Mains of Turin and Newmill of Balgavies back clothed against rising ground. The blade tips of Balnacake and Newton of Idvies might just be evident above intervening landform. In successive views to the south-west, up to ten developments of varying patterns and scales are likely to be noticeable above the skyline.	The proposed development would be viewed in close proximity on the nearby skyline. Although it would bring development much closer, it would not introduce development to a new part of the view. The introduction of the proposed turbine would maintain a good degree of separation from other developments in view and would repeat the pattern of other occasional single turbines characteristic across the lowland landscape.	Residents	High	Low-medium	Moderate to mod-major	x

3. Ascurry Mill	1.1	In the combined view, no other developments would be visible. To the east, glimpsed views of the tips of North Mains Of Cononsyth are evident amongst nearby trees and above intervening farm buildings from some locations.	The proposed development would be viewed in close proximity on the nearby skyline. Although it would bring development closer and to new part of the view, as views of Mains Of Cononsyth in succession are party screened, this would limit the experience of cumulative views from local road users and nearby dwellings to isolated glimpses.	Residents	High	Low	Moderate	x
				Local road users	Medium	Low-negligible	Mod-minor to minor	x
4. Hillkirk/Dunbarrow Hill	1.9	In the combined view, Newton of Idvies is located in close proximity with a backdrop of more distant developments of varying scales and patterns including Govals, Arkhill, Dodd Hill, Greenhillock, North Tarbrax and Fawney Hill and Ingliston. A number of developments would be evident on the skyline to the west including Nathro Hill with Newmill Of Balgavies backclothed in relatively close proximity.	The proposed development would be viewed in relatively close proximity although it would not bring development closer or to a new part of the view. The proposed turbine would be partly screened by an intervening ridge and viewed in close association with Newton of Idvies, resulting in a notable contrast in its relationship to the landscape and turbine design of Newton of Idvies, resulting in an element of visual complexity on nearby residents.	Residents	High	Medium	**Mod-major**	✓
5. Dunnichen	3.4	Newton of Idvies and Lochlair would be noticeable on the skyline in the combined view with Stotfaulds, Drowndubbs, Greenhillock and Dodd Hill evident within successive longer range views to the west. Developments to the east would be screened by nearby trees and built development.	The proposed development would be relatively prominent on the skyline, appearing as the most noticeable turbine in view. It would not bring development appreciable closer or bring development to a new part of the view. It would reflect the pattern of occasional single turbine development on the skyline with a degree of separation from Newton of Idvies and Lochlair.	Residents	High	Low-medium	Moderate to mod-major	x
				Local road users	Medium	Low	Mod-minor	x

6. Junction at Girdle Stone	3.4	Lochlair would be evident on the skyline in the combined view although intervening woodlands would screen views of North Mains Of Cononsyth and Newton of Idvies. In the successive view to the north, Newmill Of Balgavies would be very prominent in close proximity within a backdrop of other more distant skyline development including the Nathro Hill and West Mains of Turin.	The proposed development would be relatively prominent on the nearby skyline. Although it would reflect the pattern of occasional single turbine development on the skyline with a degree of separation from Newton of Idvies and Lochlair, it would appear as the most noticeable turbine in the southern part of the view. If Newmill Of Balgavies is consented, this would be viewed in close proximity and would dominate the experience of the surrounding landscape and limit the degree of cumulative change from the proposed development.	Local road users	Medium	Medium	Moderate	x
7. A932 at Guthrie Castle	4.3	N/A – the proposed development would be screened from view during summer months and road users are very unlikely to experienced cumulative views during winter months.	N/A – the proposed development would be screened from view during summer months and road users are very unlikely to experienced cumulative views during winter months.	Main Road users	Medium	None	None	x
8. B961 near Helenston	4.3	N/A – the proposed development would be screened from view by intervening farm buildings and no cumulative views would therefore be experienced.	N/A – the proposed development would be screened from view by intervening farm buildings and no cumulative views would therefore be experienced.	Minor road users	Medium	None	None	x

9. Bankhead	5.3	Newton of Idvies and Mains Of Cononsyth would be noticeable on the skyline in the combined view with Lochlair screened by a nearby woodland belt. Nathro Hill, Glen Trusta and Afflochie would be noticeable on the skyline in successive views to the north and Newton of Idvies and Newmill Of Balgavies noticeable on the skyline further to the east.	The proposed development would be relatively noticeable on the skyline. It would reflect the pattern of occasional single turbine development on the skyline with a degree of separation from Newton of Idvies and Newmill Of Balgavies. Although it would appear as the most noticeable turbine in the view, it would not bring development to a new part of the view.	Residents	High	Low	Moderate	x
				Local road users	Medium	Low-negligible	Mod-minor to minor	x
10. Turin Hill	7.3	In the combined view, up to twelve single turbine developments would be evident and scattered across the lowland landscape. In successive views to the north, a large number of schemes of varying patterns and scales would be visible, most notably Nathro Hill that would be very noticeable across the skyline.	The proposed development would be evident within a lowland context. It would not be the most noticeable turbine in view or bring development closer or to a new part of the view. It would reflect the pattern of single turbines scattered across the lowlands and with a degree of separation from surrounding developments.	Walkers	High	Negligible	Mod –minor	x
11. Balshanner	7.8	In the combined view, Craignathro would be viewed in close proximity with Newton of Idvies, Newmill Of Balgavies, Lochlair and Greenhillock evident across a backdrop of occasional skyline development and within a wider context of larger scale developments noticeable on the skyline to the south-west.	The proposed development would be evident on the skyline as part of a pattern of occasional single turbines viewed as backdrop to the nearby Craignathro turbine. It would not be the most noticeable turbine in view or bring development closer or to a new part of the view. It would reflect the pattern of single turbines scattered across the skyline and with a degree of separation from surrounding developments.	Residents	High	Negligible	Mod – minor	x
				Local road users	Medium	Negligible	Minor	

12. Local road near Mainsbank	9.8	In the combined view, up to thirteen developments of varying scales would be evident across the distant skyline with a large number of developments evident in the wider view.	The proposed development would be hardly discernible amongst a distant skyline of scattered developments of varying patterns and scales.	Minor road users	Medium	Negligible	Minor	x

Table 18: Summary of cumulative effects

5.8.2. Summary of significant cumulative effects

Mod-major (significant) cumulative effects are predicted at viewpoint 3 where the proposed development would introduce a notable contrast in its relationship to the surrounding landscape and the design of the nearby Newton of Idvies turbine. This would result in an element of visual complexity on nearby residents of up to two dwellings. **No other significant cumulative effects are predicted.**

5.9. Conclusion

5.9.1. Summary of Effects

- The Landscape and Visual Impact Assessment has demonstrated that the proposed development would not result in any significant direct effects on the physical landscape features of the site or indirect effects on its surroundings during the construction and operational phases;
- Short term significant visual effects during the construction and decommissioning phases are predicted on a very limited number of residents within approximately 1.5km of the proposed turbine location;
- Of the twelve viewpoints, significant landscape effects are only predicted at viewpoints 1-3 (all within 1.1km from the turbine location) and significant visual effects on a very limited number of residents at viewpoints 1-4 (all within 1.9km);
- No significant effects are predicted on the overall integrity of any landscape character types within the study area;
- No significant effects are predicted on any landscape designations within the study area;
- Significant visual effects are predicted on the residents of approximately 6 dwellings in the village of Bowriefauld that would have some direct and open views of the proposed turbine on the skyline, although for the large majority of the village (in total approximately 35 dwellings), no significant visual effects are predicted;
- No significant visual effects are predicted on any road users within the study area; and
- Significant cumulative effects are only predicted on residents of up to two dwellings near to viewpoint 4.

5.9.2. Statement of Significance

Local, Regional and National planning policy are supportive of wind energy developments subject to developments avoiding unacceptable landscape and visual effects. This assessment on the landscape and visual resource has identified that the proposed development would have some localised significant effects which considering the nature of the development, is generally to be expected on the immediate area surrounding the turbine location.

For the *Dipslope Farmland* LCT in which the site is located, the *Angus Windfarms - Landscape Capacity and Cumulative Impacts Study* (2008) study states:

"Analysis of the landscape character, landscape features and elements suggests that, given its medium to large scale, gentle landform, working agricultural nature and moderately strong rectilinear field pattern it is of medium landscape character sensitivity. Due to the number of settlements and widely distributed population and number of key transport routes, together with a generally open aspect, it is of medium to high visual sensitivity. Overall landscape sensitivity is medium.

There are no statutory landscape designations and much of it is a working landscape. There are nevertheless a number of HGDLs, estates and country parks. There are also long sections of the National Cycle Route and many local footpaths. 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."

Furthermore, the '*Implementation Guide for Renewable Energy Proposals*' states that the Dipslope Farmland is:

"Considered to have scope for turbines circa 80 m in height".

Overall, **these factors indicate the landscape has the strategic capacity to effectively accommodate the proposed development without an unacceptable and detrimental change to its inherent character or visual amenity. This is reinforced by the findings of this assessment which demonstrate that any significant landscape effects are limited to a small area of agricultural land within approximately 1.1km from the turbine location.**

Furthermore, significant visual effects are limited to a very small number of residents within approximately 2.0km from the turbine location. In considering the overall acceptability of the scheme, it is important to consider that **where any significant visual effects on residents have been identified, these often relate to views from a limited number of rooms that may have direct and open views of the turbine. In many instances, the primary orientation of dwellings would be in the opposite direction to the proposed development and as such, views from these rooms would be unaffected.**

Although significant visual effects are predicted, it is important to emphasise that **significant effects on residential amenity are very unlikely to be experienced given the limited extent of the proposed development and the distance to nearby dwellings.**

Overall, the proposed development has a good degree of separation from surrounding roads and settlements that limits the extent of significant visual effects. The screening effect of woodlands scattered throughout the landscape also contributes to limiting the extent of change. This is demonstrated by the visual assessment which concludes of the 15 settlements from 5-15km from the turbine location, none are predicted to have views of the proposed development.

In conclusion, the findings of this assessment, in context of the policy framework, indicate that the proposed development would be acceptable in landscape and visual terms, notwithstanding the predicted significant but very limited extent of effects that would occur in close proximity to the site.

6. Soils & Hydrology

This chapter addresses soils, hydrology and hydrogeology in the existing environment, identifies the potential impacts of the proposed development and outlines measures to mitigate concerns as required.

The activities involved with the construction, operation and decommissioning of the wind turbine could have an impact on the hydrological elements within the surrounding area. All hydrological and hydrogeological impacts are examined including impacts on any watercourses, lochs, groundwater, other water features and sensitive receptors. Where necessary, mitigation measures have been outlined to prevent erosion, pollution, sedimentation or discolouration of receptors.

Such issues are thought to be minor at this site. Nevertheless, the risk of any negative effects have been evaluated and appropriately mitigated where necessary.

6.1. Methodology

The methodology used to assess the impact of the proposed development is described as follows:

- All geological and hydrological information available is gathered and potential receptors that may be at risk from the proposed development are identified;
- Each activity of the development such as construction, operation and decommissioning is assessed for the potential to create a pollution risk; and
- Proposed mitigation measures and preventative actions are detailed, as appropriate.

6.2. Baseline Assessment

Relevant legislation and guidance is highlighted in Table 19 below.

Legislation / Guidelines	Source of information
Legislation	- Town & Country Planning (Environmental Impact Assessment) (Scotland) Regulations 2011 - Flood Risk Management (Scotland) Act 2009 - Water Environment (Controlled Activities) Regulations 2005 (CAR) - Water Framework Directive (2000/60/EC)(WFD) and Water Environment and Water Services (Scotland) Act 2003 (WEWSA) - Water Resources Act 1991 - Control of Pollution Act 1974 (as amended) (COPA)
SEPA Policies	- No. 19: Groundwater Protection Policy for Scotland, Dec 2003 - No. 26: Policy on the Culverting of Watercourses - No. 54: Land Protection Policy
Scottish Planning Policies	- SPP (2010) – Flooding & Drainage
Planning Advice Notes (PANs)	- PAN 51: Planning, Environmental Protection and Regulation - PAN 58: Environmental Impact Assessment - PAN 61: Planning and Sustainable Urban Drainage Systems - PAN 79: Water and Drainage

Legislation / Guidelines	Source of information
SEPA Pollution Prevention Guidelines (PPGs)	- PPG1: General guide to the prevention of water pollution - PPG4: The disposal of sewage where no mains drainage is available - PPG5: Works in, near or liable to affect watercourses - PPG6: Working at construction and demolition sites - PPG8: Safe storage and disposal of used oil - PPG21: Pollution incident response planning
Other Guidelines	- CIRIA: Environmental Good Practice on Site - CIRIA: Control of water pollution from construction sites, C532, 2001 - CIRIA: Control of water pollution from linear construction projects - Department of Environment (DoE) – PPG14 – Development on Unstable Land (1990)

Table 19: Relevant policy and guidelines for hydrology assessment

6.2.1. Site Context

This chapter details the existing geological, hydrological and hydrogeological conditions at the site and its surroundings. This includes information on nearby watercourses, groundwater and any potential risks of flooding.

Soils

The site is located within the Midland Valley of Scotland. The geology of the area is part of the Montrose Volcanic Formation[9] and is described as follows:

"Andesite, basaltic andesite, other andesitic rocks, volcaniclastic conglomerate and sandstone."

Surface Water

From the 1:10,000 OS map in Figure 9 below, it is seen that the nearest surface water feature is the field drain, which runs along the west and northern boundary of the field in which the turbine is located. Along the northern boundary of the field this feature is called Coy Burn, and flows in an east-west direction. This is 116m from the proposed turbine location at its nearest point. The site of the proposed turbine will drain in a general south-north north west direction towards Coy Burn, which in turn flows into Vinny Water.

[9] As defined by British Geological Society, http://www.bgs.ac.uk/discoveringGeology/geologyOfBritain/viewer.html, accessed 1/2013.

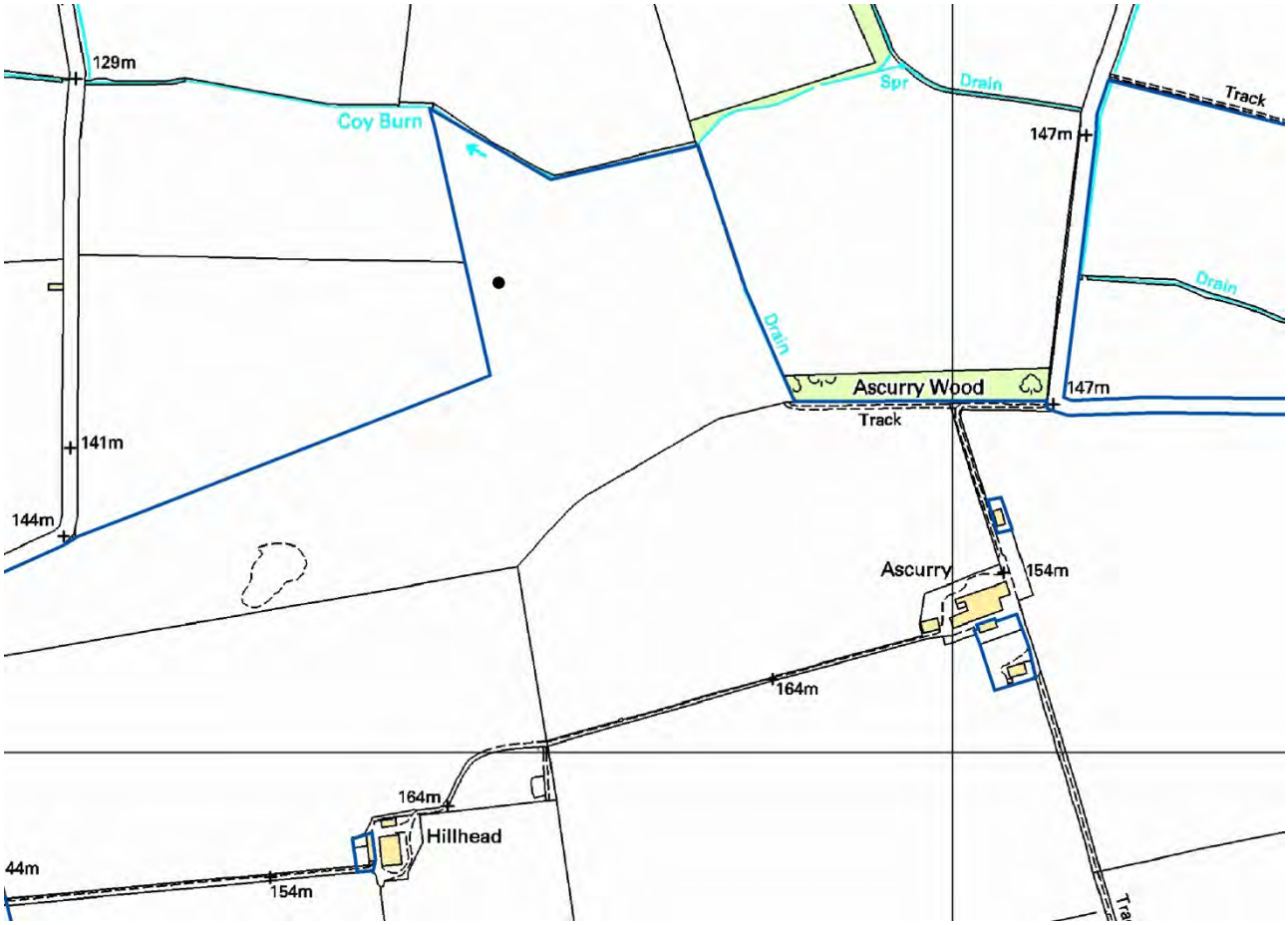

Figure 9: Hillhead of Ascurry turbine location

Groundwater & Hydrogeology

Groundwater is present under most landforms, although some geological formations are more permeable than others. Any groundwater within the area may be used as a source of water and is also essential for irrigation within highly productive agricultural areas. The hydrogeology at the site has been examined to determine whether any groundwater at the site is at risk of contamination.

The site of the proposed development is underlain by the Lunan/Pow bedrock and localised sand and gravel aquifers (I.D 150266) which covers an area of 170.05km^2. The quality of the groundwater has been classified as poor with high confidence and the quantity of groundwater has been classified as poor with medium confidence in 2008[10].

The Lunan/Pow bedrock and localised sand and gravel aquifers is classified as a Drinking Water Protection Zone. The Scottish Government has identified these areas as those which are used for the abstraction of water for human consumption, which provides more than 10m^3/day as an average, or serve more than 50 persons.

Any reduction in the quality of the groundwater resource is of potential concern and should be avoided.

[10] As defined by SEPA, http://gis.sepa.org.uk/rbmp/, accessed 27/08/2013.

Flooding in the Vicinity of the Site

The areas shaded in blue in Figure 10 below are those areas identified by SEPA as being at risk to flooding from rivers[11]. The nearest river to the proposed development which is at risk to flooding is Vinny Water to which the proposed development site is likely to drain. Any significant increase in run-off would have the potential to increase the risk of flooding already presented by Vinny Water, and should therefore be avoided.

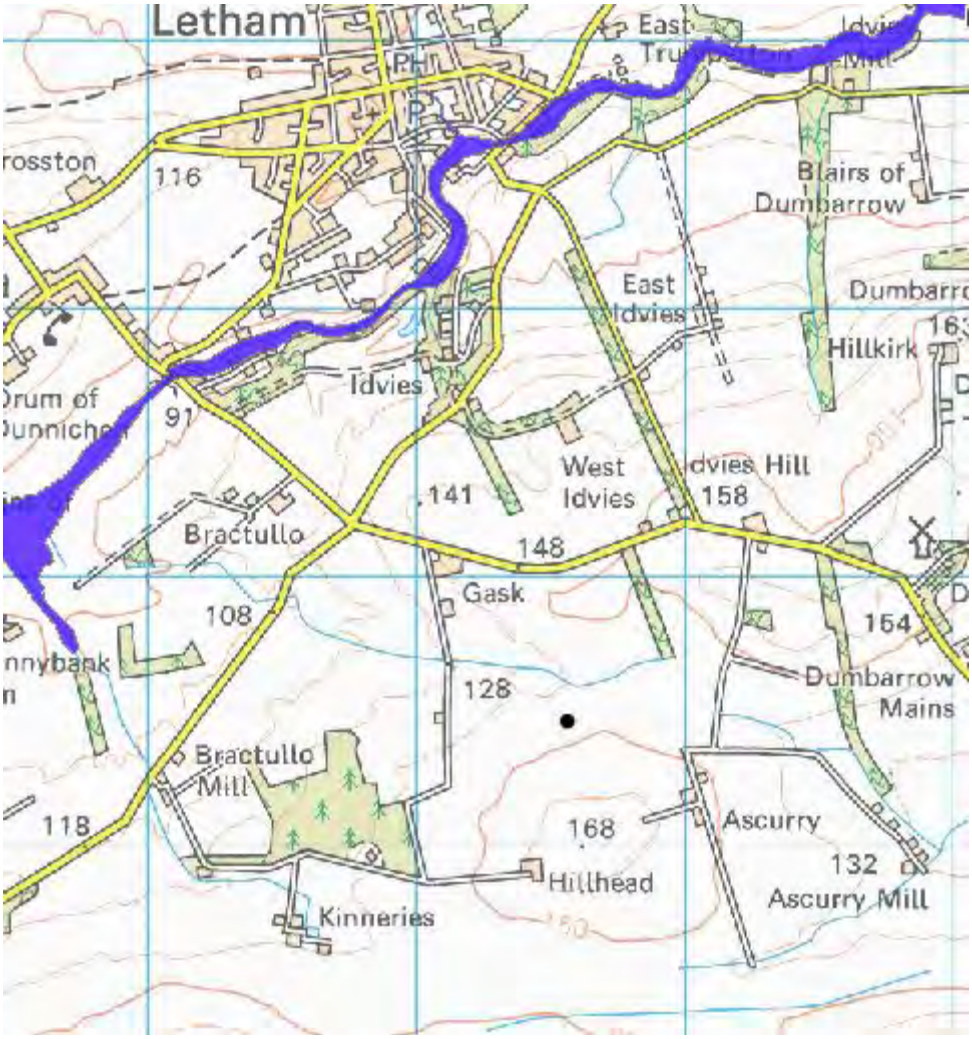

Figure 10: Flooding Risk in Vicinity of Proposed Wind Turbine Development

The total area of new permanent hardstanding associated with the proposed development is approximately 0.27 hectares (ha). The increase in run-off associated with this is considered negligible and will not have an impact on flooding in the receiving catchment.

[11] As defined by SEPA, http://www.sepa.org.uk/flooding/flood_extent_maps/view_the_map.aspx, accessed 27/08/2013.

6.3. Impact Assessment

6.3.1. Soils

The permanent proposed works require the construction of a turbine foundation on an area of 169m^2, hardstanding of 700m^2 and approximately 470m of new access road on an area of arable farmland.

The removal of subsoil and bedrock to form the turbine base, access road and crane pad, in addition to the interference with existing site drainage is a direct permanent effect that, without mitigation, could alter the existing hydrogeological balance of the site.

The existing environment is a modified one due to existing agricultural activities and existing drainage characteristics, but generally consists of surface water runoff which is largely non-intercepted. The potential additional impacts of the development on the soils, hydrology and hydrogeology of the site are listed below:

- The excavation and removal of the subsoils and bedrock will be necessary at the proposed turbine location and for new areas of road formation. This could have a direct permanent impact on these soils and rock in the form of increased erosion and sediment release, which could in turn have additional impacts on water quality (due to sedimentation of water courses);
- The dewatering of excavations with inappropriate disposal of excess water can potentially lead to erosion or undercutting of slopes or saturation and weakening of materials;
- Soil compaction can occur due to movement of construction and maintenance traffic. This could lead to an increase in runoff and subsequently to an increase in flooding and erosion; and
- Removal of soils can result in the exposure of the underlying rock to sources of contamination. Chemical pollution could occur as a result of spillage or leakage of chemicals, runoff from vehicle washing facilities, unset concrete, storage of fuels or refuelling activities, etc. Chemical pollutants could enter groundwater supplies and have implications for damage to ecology and local water supplies.

6.3.2. Surface water

During each phase of the wind turbine development (construction, operation and decommissioning), a number of activities will take place on site, some of which will have the potential to affect the hydrological regime or water quality at the site or its vicinity.

Potential Construction Impacts

The main potential impact of the development on water quality is an increase in sediment during the construction phase. There is also the potential for oil spillages from tanks and machinery on site. A list of risks to surrounding water bodies that require appropriate mitigation measures is provided below:

- Chemical pollution – potential pollutants include spillage or leakage of chemicals, runoff from vehicle wash down facilities, unset concrete, fuel or oil, during use or storage on site. Such pollutants can damage the ecology and quality of affected soils, watercourses and groundwater, affecting biodiversity, fish stocks and water supplies;
- Erosion and sediment release – high levels of sediment can damage fish populations, flood storage capacity and water sources. Spoil heaps from excavations for the turbine base will be stored temporarily; if left exposed, this could lead to an increase in silt-laden run-off draining off site;

- Soil compaction – movement of construction traffic can lead to compaction of the soil, reducing soil permeability and rainfall infiltration;
- Increase in runoff – areas of hard standing will cause local increases in runoff volume. This could influence rates of soil erosion, and alter the way local streams respond to storm rainfall;
- Cable trenches could act as a conduit for surface water flows;
- Incorrect site management of excavations for the access track which could lead to loss of solids and nutrients to surface waters; and
- The construction of new infrastructure (site tracks) has the potential to obstruct existing overland flow.

The construction phase is most likely to give rise to environmental impacts as many of the associated activities have a direct influence on the amount of water, and the amount of suspended solids in the water, arising on the site. Impacts on water quality in the network of streams draining the development could affect receptors sited at some considerable distance from the proposed development. Chemical contamination of ground and surface waters is a risk throughout all phases of construction activity and requires appropriate control and management.

Potential Operational Impacts

When operational, the development will have a negligible effect on surface water quality as there will be no further disturbance of soils post construction.

Due to the insignificant increase in potential run-off from the site, commitment to best practice construction activities and the minimal requirement for new infrastructure, there will be negligible release of sediment to the watercourses from site operations.

During the operational phase, small quantities of oil will be used in cooling the turbine transformer. Whilst there is potential for oil spills they are in no way likely to be significant, given the low volumes of oil present and the presence of the transformer in an internal structure.

Potential Decommissioning Impacts

Potential impacts during the decommissioning stage, albeit at a lesser scale, will be similar to those relating to the construction phase.

6.3.3. Groundwater

In order to protect the bedrock from entry of contaminants, mitigation measures will be put in place to deal with concrete displacement within the bedrock.

Pending site investigations, it is expected that the turbine foundation will be dug at a maximum depth of approximately 2.5m and there is a low risk that groundwater will be present at this level. This will be investigated during the pre-construction ground investigation works and will determine whether sensitive disposal of groundwater at the foundation is necessary.

6.4. Mitigation Measures

Mitigation measures for this wind development will focus on preventing the disturbance and pollution of soil, watercourses and groundwater. With regards to surface water contamination, new drainage pathways may be introduced and carry contaminated run-off. Mitigation measures to prevent these scenarios are outlined within this chapter.

6.4.1. Soils

- The designers will carry out a design risk assessment to evaluate risk levels for the construction, operation and maintenance of the works. Identified risks will be minimised by the application of the principles of avoidance, prevention and protection. Information on residual risks will be recorded and relayed to appropriate parties;
- A method statement for each element of the works will be prepared prior to any element of the work being carried out;
- Details of the relevant assumptions, relating to methods and sequencing of work will be provided to the contractor;
- No amendments to the designed works will be carried out without the prior approval of a suitably qualified and experienced engineer;
- Prior to construction, a site-specific environmental management plan for construction will be prepared in consultation with the relevant statutory bodies;
- Excavation works associated with the construction phase of the development will be monitored by suitably qualified and experienced engineering personnel; and
- The programming of the works will be such that earthworks/excavations are not scheduled to be carried out during severe weather conditions. Where such weather is forecast, suitable measures will be taken to secure the works.

6.4.2. Surface Water

- During construction any oil, fuel or other chemicals will be stored in a suitable temporary storage area. Oil spill cleanup materials will also be stored on site throughout the construction period;
- It is anticipated that concrete will be delivered ready made to the site. Provisions will be made to ensure that deliveries are supervised by qualified personnel and site staff should be aware of what to do in the event of spillage. Mitigation measures will be outlined within construction method statements with regards to concrete delivery and will be carried out in accordance with SEPA guidance (particularly PPG6 and PPG13);
- Washing out of the delivery vehicles will be carried out to ensure that washings do not pollute surface water at the site, and it is proposed to undertake the washing out of concrete trucks offsite at the source location;
- Any stored diesel or fuel oils will be bunded to 110% of capacity. The turbine transformer enclosure will be self-contained or bunded to preclude the release of contaminants to the environment;
- Regular visual inspections of the surrounding burns will be undertaken during the construction phase to examine the turbidity and clarity of the water;
- Underground cables will be laid in small trenches that are parallel to access tracks as far as possible. Trenches will be dug during dry weather periods and the cables will be laid quickly and backfilled to minimise water entering the trenches. Suitable drainage measures will be detailed within the construction method statement and will accord with best practice in the SUDS manual C697;
- Where possible construction will take place from existing tracks, building the new site roads ahead of machinery, such that excavators will avoid operating on bare soils; and
- No work will take place on site during severe weather conditions.

6.4.3. Groundwater & Hydrology

As with any construction project there is a risk of a pollution spill that may enter the water table and contaminate groundwater. It is considered that this risk can be satisfactorily mitigated through use of best practice construction methods. This will require compliance with all of the guidance contained in the relevant Pollution Prevention Guidance (PPG) notes listed in Table 19.

An assessment of groundwater levels at the turbine location will be carried out prior to construction. A borehole will be made to assess whether groundwater is present. This will be carried out as part of a pre-construction soil investigation survey. In the unlikely event that groundwater is present at this depth it will be necessary to temporarily lower the ground water level to avoid any contamination from materials used for the turbine foundations.

6.5. Conclusion

Detailed mitigation measures have been provided with regard to the design, construction and maintenance of the proposed development. Provided that these mitigation measures are adhered to, the impacts on soils, surface water and groundwater are considered to be negligible.

7. Socioeconomic

7.1. Methodology

This chapter will outline the socioeconomic profile of the area as well as describing the tourism and recreational activity within the area. An assessment will then be made on the effect of the proposed wind development on the local economy and tourism sector through consideration of the key business and tourist sites in the region and any relevant previous studies regarding the social/economic impact of wind turbines.

7.2. Baseline Assessment

7.2.1. Site Characteristics

The site lies in a predominantly agricultural setting, within the boundary of The Letham & District Community Council, within the Ward of Arbroath West & Letham. Tourism and recreation is locally important but is considered to be of a lesser importance to other employment sectors in the immediate area. There are a number of tourist attractions that are important in terms of their cultural heritage value in the local area.

7.2.2. Population

An overview of the demographics of the surrounding area is provided in Table 20 below.

Area	Total resident population (all ages)
Immediate Output Area[12]	151
Dundee	154,674
Angus	108,400
Scotland	5,062,011

Table 20: Population of area surrounding Hillhead of Ascurry (2001 Census data)

7.2.3. Economic Activity

Employment data was provided from the 2001 Census for the immediate area and for Dundee, with the Scotland wide average provided as a comparison. This information is provided in Table 21 below.

[12] Output area related to the wider postcode area of DD8 2ND, www.scrol.gov.uk

	Immediate Output Area	Dundee	Scotland
All persons aged 16-74 in employment	71	58,073	2,163,035
% employed in each sector			
- % A. Agriculture and hunting and forestry	9.86	0.55	2.2
- % B. Fishing	0	0.03	0.31
- % C. Mining and quarrying	1.41	0.6	1.29
- % D. Manufacturing	11.27	16.24	13.65
- % E. Electricity and gas and water supply	0	0.95	1.02
- % F. Construction	8.45	7.12	7.76
- % G. Wholesale & retail trade and repairs	14.08	14.71	13.3
- % H. Hotels and restaurants	4.23	4.63	4.95
- % I. Transport and storage and communication	1.41	6.26	6.89
- % J. Financial intermediaries	2.82	2.86	4.74
- % K. Real estate and renting and business activities	7.04	9.77	11.42
- % L. Public administration and defence and social security	9.86	6.08	7.23
- % M. Education	9.86	9.1	7.42
- % N. Health and social work	18.31	15.84	12.63
- % O.P.Q. Other	1.41	5.25	5.18

Table 21: Summary of employment for immediate area and wider zones

Almost 10% of the population within the immediate area are employed in 'agriculture, hunting and forestry'; this is considerably higher than both the Dundee and Scotland averages. No data was found relating to employment within the Community Council ward but one of the key employment types is again expected to be agriculture given the rural nature of the majority of the area.

7.2.4. Tourist Activity

An assessment of existing tourist attractions in the locality was undertaken. The assessment focused on those attractions where the scenic value of the surrounding landscape is important to the draw and/or enjoyment of the attraction. The extent of the assessment was limited to a 10km radius from the turbine as visual impacts are considered to be of greatest significance within this zone. Table 22 below lists the identified attractions.

Tourist Site	Description	Distance to proposed turbine (closest point)
Angus Core Paths Network	Walking Route	1.8km
House of Pitmuies	HGDL, Scheduled Monuments and A-Listed Buildings	4.1km
Guthrie Castle	GDL	4.2km
Crombie Country Park	Country Park	5.3km
National Cycle Route 1	Cycle Route	7.9km
Monikie Country Park	Country Park	8.3km
Forfar Loch Country Park	Country Park	9.3km

Table 22: Tourist activity within the area

Further discussion regarding the impact on tourism on these attractions is provided in the following chapter.

7.3. Impact Assessment

The direct and indirect impacts of the proposed development on the local area can be separated into the following areas:

1. Economic benefits for the landowner;
2. Economic and social benefits for the local community;
3. Economic benefits from construction and operation;
4. Potential adverse impacts on the wider community; and
5. Potential impact on wider tourism and recreation assets.

The potential impact of the development on each of the above areas is discussed further below.

7.3.1. Economic Benefit for the Landowner

Agricultural incomes can vary significantly year on year due to variations in weather conditions, crop quality and yield, market prices, exchange rates, and operational costs for fertiliser, fuel etc. The forthcoming reforms (2014 onwards) to direct payments under the Common Agricultural Policy (CAP) are also a concern.

The combined effect of these uncertainties has prompted the landowner to explore alternative sources of income to help support his business in the long-term. In this respect, the proposed turbine will provide a guaranteed additional source of income over the 25 year expected operational period. The proposed development also has a minimal footprint therefore current farming operations will be largely unaffected.

In addition to the considered suitability of the land for wind energy, the non-agricultural nature of the project also reduces the level of financial risk through diversification outwith the farming sector. In this respect, the renewable energy market is quite stable when compared to other sectors such as agriculture, especially after the introduction of the Feed in Tariff (FiT).

The development of a wind turbine at Hillhead of Ascurry would lead to an additional sustainable source of income for the family farming business, A. M. McEwan. In addition to providing an additional source of income, the electricity generated by the proposed

development will offset a key expense to the farm business. Current expenditure on electricity across the farming business is approximately £120,000 per annum.

7.3.2. Economic and social benefits for the local community

Farmers are considered to be particularly good at recycling extra income back to the farm and wider local economy. Results from the Scottish Income-Output Tables[13] demonstrate that agriculture in general displays a high multiplier effect on the wider economy. Within this assessment agriculture is seen to be within the top 10% of industries for generating additional income in other industries, and within the top 25% for generating additional employment in other industries. Previous studies have also demonstrated that agricultural activity is particularly effective in supporting local economic activity and employment.

The local ownership of this project by a farmer is therefore considered to maximise the real economic benefit available to Angus from renewable energy development. This is the main reason that the Scottish Government have set a target for 500MW of locally owned renewable energy projects by 2020.

As outlined above, A. M. McEwan currently employs 10 full time staff and a 12 part-time/seasonal staff. Diversifying the farming activities will bring an additional sustainable income stream into the farming business, helping to safeguard these jobs and create new jobs as the business continues to expand through investing the project income into the wider farming business.

7.3.3. Economic Benefits from Construction and Operation

The capital cost of the proposed wind turbine development at Hillhead of Ascurry has been estimated at approximately £1.5m. In 2006 Scottish Enterprise published a report discussing the economic impact of wind farm construction. Based on this report, it is estimated that 29%, or at least £435,000, of the capital cost of the installation and operation of the development would be spent locally in Scotland. This would involve:

- Services (consultancy, planning advice);
- Construction (roads, access, fences etc.);
- Cabling (throughout site and to grid access point); and
- Operation and maintenance.

The use of suitably experienced local contractors and sub-contractors will be encouraged for construction, operation and maintenance works associated with the development, as long as they meet the financial and technical requirements for the build.

The increased likelihood to be able to utilise local companies is an additional benefit of smaller commercial wind energy proposals. In this respect, the significant scale of works associated with larger commercial wind farms often dictates that national or multinational companies are used.

A 2010 SAC study into the benefits of locally owned wind energy developments demonstrated what the above factors may mean in terms of local job creation. It was concluded that through

[13] http://www.scotland.gov.uk/Topics/Statistics/Browse/Economy/Input-Output/IOAllFiles2007

development and construction a total of over 5 jobs would be created for a 1 year period, while during operation 2.5 long-term jobs would be created.

7.3.4. Potential Adverse Impacts on the Wider Community

There are a number of potential impacts on the wider community from the proposed development and these include:

- Landscape and visual amenity;
- Noise;
- Shadow flicker; and
- Telecommunications and television reception.

These potential impacts are considered and quantified (where possible) individually in their respective chapters of this Document.

7.3.5. Potential Impact on Wider Tourism and Recreational Assets

From the baseline assessment a number of attractions have been highlighted as having particular importance for tourist activity within the area. The potential impact at each of these attractions is discussed in Table 23 below.

Attraction	Distance from turbine	Potential impact
Angus Core Paths Network	1.4km	Parts of the Core Paths Network within 5km of the site are predicted to experience some theoretical visibility. In practice, users of the Network would experience mostly oblique views of the turbine, where the turbine is visible above the skyline and forms a small element within a wide, open upland agricultural and moorland landscape. Where there are potential views, they are short in duration, oblique and intermittent. Taking into account the distance to the site, the impact of the turbines on the Network is not deemed to be significant.
House of Pitmuies	4.1km	There are a number of A-Listed buildings at House of Pitmuies. As outlined in Drawing HOA014, from these there is no theoretical visibility of the turbine. There is only a small area in the north west of the wider GDL boundary which will have theoretical visibility of the turbine blades. At this distance it is not expected that this will lead to significant visual impacts.
Guthrie Castle	4.2km	As demonstrated by Drawing HOA014, almost all of the GDL has theoretical visibility of the nacelle and blades. Viewpoint 7 (Drawings HOA039 to 072) highlights that there will be minimal impact experienced from the A932 near Guthrie Castle, and also that there is significant screening from vegetation. This is also confirmed in Chapter 5 of this Supporting Environmental Document. As such it is considered that the proposed development will not significantly impact upon the GDL.
Crombie Country Park	5.3km	Apart from a very small area of Crombie Country Park which will experience theoretical visibility of turbine blades only, none of the Country Park will experience theoretical views of the proposed development. Those limited views of the turbine blades from within the Country Park are also considered likely to be screened by surrounding vegetation, further reducing the level of visibility to the proposed development. As such, no significant visual impact on the Country Park is considered likely.

Monikie Country Park	8.3km	There is no visibility of the proposed turbine from within the Country Park.
Forfar Loch Country Park	9.3km	There is no visibility of the proposed turbine from within the Country Park.
National Cycle Route 1	9.5km	The closest part of the National Cycle Route which will have theoretical visibility of the proposed development is approximately 12.5km to the east, and will only have theoretical visibility of the blades and nacelle. Views of the turbine, if experience, will also be limited to oblique and distant views. As such it is considered unlikely that at this distance there will be any significant visual impact on the National Cycle Route.

Table 23: Discussion on tourist attractions within the area

In summary, the proposed development is not expected to have a significant adverse impact on tourism and recreation attractions in the surrounding area.

A national study commissioned by the Scottish Government[14] examined the likely economic impact of wind energy development. It should be noted that this report focuses on larger scale commercial wind developments but many points are relevant to smaller wind projects such as the one proposed at Hillhead of Ascurry. The latest Tourism Attitudes Survey states that 'scenery' and 'natural environment' are the main attractions for tourists visiting Scotland. If wind farms were to deter significant numbers of tourists, they could potentially threaten the tourism industry and also the economic sustainability of the local community.

The study assessed the economic impact of four case studies within Scotland where wind farms were likely to be visible. It was carried out in four key stages:

1. Identifying the change in likelihood of tourists returning to Scotland;
2. Identifying the proportion of tourists in each area where this applies;
3. Identifying the proportion of accommodation exposed (drop in 'room with view' sales); and
4. Estimating likely proportion of change in expenditure in the affected accommodation.

From the study, it was concluded that *"overall there does not appear to be any robust evidence to suggest a serious negative economic impact of wind farms on tourism"*. A change in tourism expenditure is predicted if a substantial amount of wind developments is installed in Scotland, however this loss of revenue is expected to be *"offset or reinforced"* by other positive economic or environmental impacts from wind farms. The study also concluded that tourism activity is likely to be displaced to other areas around Scotland rather than reduced entirely.

A survey of tourists was conducted within the four areas used in the case study; it involved information from tourists that were likely to have seen a wind farm during their visit. The survey confirmed that a minority of around 20% - 39% preferred a landscape that contained no wind farms; overseas visitors were found to be more positive than domestic tourists. The vast majority of the tourists surveyed (93% - 99%) that had seen a wind farm during their visit said that it would not affect their decision to return the area or Scotland as a whole.

[14] Scottish Government (2008) Economic Impacts of Wind Farms on Scottish Tourism

A more recent document[15], prepared by ClimateXChange on behalf of the Scottish Government, found no evidence to suggest that wind energy development within the four case study areas adversely affected tourism.

7.4. Conclusions

The baseline assessment indicates that the immediate area has a relatively low rural population. It is acknowledged that the turbine could potentially result in adverse impacts on residential amenity. Further studies in relation to visual, noise and shadow flicker impacts have therefore been undertaken to determine whether the development falls within acceptable limits.

The project has been assessed as having an overall positive socio-economic impact on the local area. The turbine represents a strong example of diversification for the farmer and is a significant additional source of revenue. This income stream will not only support the ongoing farming business but will also have direct and indirect benefits on other local businesses and the wider community.

With regard to domestic properties there is no robust evidence to suggest that the wind development will have a substantial negative impact on property values within the area and all effort has been made to maximise the distance from houses and therefore negate any adverse impacts on these properties from impacts such as noise and shadow flicker.

Individual assessment of landscape and visual impacts on tourism sites have shown generally low impacts and these impacts are considered to be insufficient to cause a detrimental effect on the attraction of these sites.

[15] ClimateXChange (2012) The Impact of Wind Farms on Scottish Tourism

8. Cultural Heritage

This chapter assesses the impact of the proposed Hillhead of Ascurry wind turbine on those known cultural heritage or archaeological features within the area. This assessment focuses on the impacts upon Listed Buildings and noted archaeological features within the immediate area of the turbine. This includes important Scheduled Ancient Monuments and Gardens and Designed Landscapes (GDLs) within the wider area.

8.1. Methodology

The construction of a single wind turbine at the location proposed will have no direct impact on known archaeological sites or features.

The potential impact of the proposal on the setting of *inter alia* Gardens & Designed Landscapes within a 25km radius of Hillhead of Ascurry has been assessed as part of Chapter 5.

This assessment therefore focuses on how the development might impact on the setting of any sensitive cultural heritage sites and has been carried out in accordance with Historic Scotland's 'Managing Change in the Historic Environment – Setting' dated October 2010. In the case of this development, potential impacts mainly relate to the landscape context, the surrounding landscape character, and the impact on the aesthetic qualities of the site. Where relevant, discussion will be provided on whether the development will impact upon the historical understanding of the site.

Initially a desk-based study was completed using Historic Scotland's available GIS databases. All A Listed buildings and Scheduled Monuments within a 5km radius were identified (see Drawing HOA007). For completeness, a search of B and C Listed buildings within 1km of the proposed turbine location was undertaken; two additional sites were identified as a result.

The assessment focuses mainly on the visual impact on these sites; the matrix used to assess the overall impact is detailed in Table 24 below.

Magnitude	**Sensitivity**			
		High	**Medium**	**Low**
	High	Major	Major/Moderate	Moderate
	Medium	Major/Moderate	Moderate	Moderate/Minor
	Low	Moderate	Moderate/Minor	Minor
	Negligible	Moderate/Minor	Minor	Minor/None

Table 24: Overall impact assessment matrix

The guide in Table 25 and Table 26 below is used to determine the magnitude and sensitivity of the potential impact on cultural heritage receptors.

Magnitude	Description	Definition
High	Dominant	Receptor(s) are within 500m of the development
Medium	Conspicuous	Receptor(s) are between 500m - 2km of the development
Low	Apparent	Receptor(s) are within 2km - 5km of the development
Negligible	Inconspicuous	Receptor(s) are > 5km of the development

Table 25: Magnitude of impact

Sensitivity	Definition
High	• Category A and B Listed buildings • Gardens & Designed Landscapes • Scheduled Ancient Monuments • Non-statutory sites of high significance (of international or national importance)
Medium	• Category C listed buildings • Archaeological sites on the Sites & Monuments Record (of regional or local importance) • Conservation Areas • Country Parks
Low	• Archaeological sites of lesser importance • Non – Inventory Gardens and Designed Landscapes

Table 26: Cultural Heritage Sensitivity

8.2. Baseline Assessment

8.2.1. Relevant Legislation, Policy and Guidance

The following legislation, policy and guidance is relevant to this assessment:

- Historic Environment (Amendment) (Scotland) Act 2011;
- Planning (Listed Buildings and Conservation Areas) (Scotland) Act 1997;
- Ancient Monuments and Archaeological Areas Act 1979;
- Town and Country Planning (Scotland) Act 1997 as amended by Planning etc. (Scotland) Act 2006;
- Scottish Historic Environment Policy;
- PAN 2/2011 Planning and Archaeology;
- Scottish Planning Policy 2010;
- Local Plan Policy ENV19: Archaeological Sites and Ancient Monuments; and
- Local Plan Policy ENV18: Listed Buildings.

8.2.2. Site Context

An assessment was carried out for any sensitive sites within 5km of the Hillhead of Ascurry turbine. Details of these sites are shown in Table 27 below. These sites are shown relative to the turbine in Drawing HOA007 within the appendices.

Site	Description	Distance to Hillhead of Ascurry turbine (km)
Hillhead of Ascurry Farmhouse	C-Listed Building	0.6
Idvieshill	C-Listed Building	0.8
Dunbarrow Hill, fort	Scheduled Ancient Monument	2.2
Gardyne Castle	A-Listed Building	4.5
Pitmuies – Home Farm	A-Listed Building (various)	4.6

Site	Description	Distance to Hillhead of Ascurry turbine (km)
Pitmuies House	A-Listed Building	4.6
Pitmuies, cross slab	Scheduled Ancient Monument	4.7
East Mains of Pitmuies, ring ditch	Scheduled Ancient Monument	4.8
Pitmuies Cottages, ring ditches	Scheduled Ancient Monument	5.0
Kirkbuddo Wood, Roman camp	Scheduled Ancient Monument	5.0

Table 27: Cultural heritage sites within 5km of Hillhead of Ascurry

8.3. Impact Assessment

This impact assessment discusses the potential direct and indirect impacts that may occur at the cultural heritage receptors outlined within the baseline section. Outwith any direct disturbance on known cultural heritage sites the main impact will be visual. In relation to rural settings any development seen in principal views to or from a designated site can be considered as affecting its setting.

8.3.1. Assessed Impacts

With regard to the potential for direct impacts, it is noted that no known archaeological sites or features lie within the extent of construction works for the turbines, crane pad/laydown areas or access road. Any potential impacts (during construction and operation) are therefore expected to be visual. This chapter discusses the potential impact on the sites described within the baseline assessment.

Table 28 below provides details of cultural heritage sites identified within 5km, along with the demonstrated extent of the theoretical turbine visibility, sensitivity, magnitude and potential impact according to the methodology described in Chapter 8.1.

Further discussion is then provided on those sites where there is a theoretical major or major/moderate impact.

Name	Theoretical visibility	Sensitivity	Magnitude	Overall Potential Impact
Hillhead of Ascurry Farmhouse	Nacelle and blades	Medium	Medium	Moderate
Idvieshill	Full	Medium	Medium	Moderate
Dunbarrow Hill, fort	Nacelle and blades	High	Low	Moderate
Gardyne Castle	Blades only	High	Low	Moderate
Pitmuies – Home Farm (various)	None	High	Low	Moderate
Pitmuies House	None	High	Low	Moderate
Pitmuies, cross slab	Blades only	High	Low	Moderate
East Mains of Pitmuies, ring ditch	None	High	Low	Moderate
Pitmuies Cottages, ring ditches	None	High	Low	Moderate
Kirkbuddo Wood, Roman camp	Nacelle and blades	High	Low	Moderate

Table 28: Assessed impact on cultural heritage sites

There are no sites for which there is a theoretical major or major/moderate impact. As such, it is considered that the proposed turbine at Hillhead of Ascurry will not have a significant level of impact on the setting of nearby heritage assets.

8.4. Mitigation Measures

No groundwork or construction will be undertaken within, or adjacent to recorded sites of cultural heritage. Therefore there have been no mitigation measures proposed at this stage.

8.5. Conclusions

This assessment has examined the expected impact of the proposed Hillhead of Ascurry turbine on cultural heritage sites.

With regard to the potential for direct impacts, it is notable that no known archaeological sites are within the proposed construction area for the turbines, crane pad/set down areas or access road. The primary consideration was whether the turbine would have a significant impact on the setting of the sites through significant visual impact as stated in the relevant National and Local policy.

From an initial desk based assessment of the surrounding area, 8 high sensitivity and 2 medium sensitivity cultural heritage assets were found within 5km of the Hillhead of Ascurry development site. In assessing the setting of these sites it was considered that any adverse impacts would not be significant. For those high sensitivity assets, this is due to the distance (>2km) from the proposed turbine location, which reduces the potential for views of the turbine being considered 'dominant' or 'conspicuous'.

As such, it is considered that the proposed development at Hillhead of Ascurry will not have a significant impact on nearby heritage assets.

9. Ecology

The ecological impact of the Hillhead of Ascurry developments has been assessed by Ecologist EnviroCentre Ltd. The ecology report is attached within the appendices of this Supporting Environmental Document. The potential ecological impact of the development is summarised as follows:

"No further survey of the site is necessary.

A bird survey is not necessarily required if construction work can be either timed to avoid the bird breeding season or a pre-construction check of any vegetation to be removed is undertaken immediately prior to works.

Natural England has developed guidance that provides information on how best to site turbines to avoid impacts to bat species. This guidance states that:

"A bat survey should normally be recommended for applications for turbines that will be located within 50m of the following features:

- *Buildings or other features or structures that provide potential as bat roosts, including bridges, mines etc;*
- *Woodland;*
- *Hedgerows;*
- *Rivers or lakes; and*
- *Within or adjacent to a site designated for bats (SSSI or SAC)."*

Therefore, 50m should be the minimum distance between the tip of the turbine blade to the nearest feature which may be used by bats. This distance should not be measured from the base of the turbine but instead should take into account the height of the feature. In order to accurately measure this stand-off distance from the blade tip Natural England have produced the following equation:

$$b = \sqrt{(50 + bl)^2 - (hh - fh)^2}$$, *where:*

b = the minimum distance;

bl = blade length (27m);

hh = hub height (50m); and

fh = feature height (4m).

At Ascurry the minimum distance equates to 61.75m.

As the proposed turbine is located approximately 115m from the nearest linear feature, it is unlikely to affect any feature that may be used by roosting, foraging or commuting bats.

No further survey for bats is required."

10. Shadow Flicker

Under certain combinations of geographical position, time of day and time of year, the sun may pass behind a turbine rotor and cast a shadow over neighbouring properties. When the blades rotate a shadow forms for short periods and this effect is known as 'shadow flicker'. Shadow flicker is considered an issue when the blade shadow passes over a narrow opening, such as a neighbouring property's window. The main cause for concern is the potential annoyance to homeowners. This is an issue that can be completely mitigated, if required, through understanding the periods of concern and controlling the turbine appropriately during these periods.

This chapter considers the potential shadow flicker impact on local properties from the operation of the proposed Hillhead of Ascurry wind turbine.

10.1. Methodology

The effect of shadow flicker can be assessed using specialist software. This software models the shadow flicker from the following 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 proposed turbines that would cast the shadow.

Within this assessment, the sensitivity of any identified receptors is assumed to be high due to the direct impact on local residential amenity.

10.2. Baseline Assessment

10.2.1. Relevant Legislation, Policy and Guidance

The Scottish Government's web based Specific Advice Sheet – Onshore Wind Turbines (most recently updated in October 2012) states:

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

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

10.2.2. Site Context

There are no properties within 10 rotor diameters of the turbine location. The nearest residential property, north of Ascurry, is at the approximate grid reference of E354036 N746253 and is shown in Figure 11 below (marked as H7). This dwelling is measured as being 544m from the proposed turbine location.

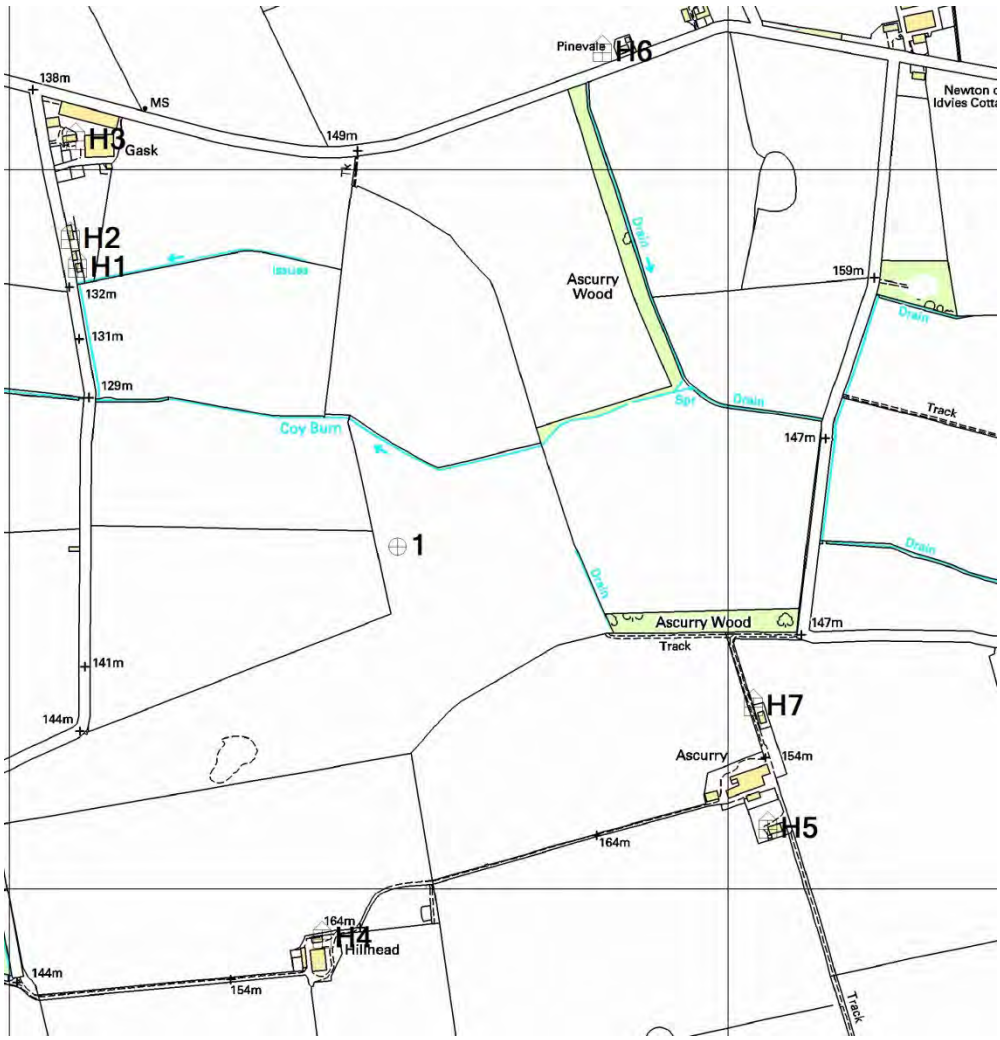

Figure 11: Properties assessed for shadow flicker impacts

10.3. Impact Assessment

A map assessment was undertaken to demonstrate the extent of shadow flicker at the site assuming the worst case assumptions. This map is shown in Figure 12 for the proposed development. The contours mark the number of hours of potential impact to an individual window at 2m above ground level. Each contour represents 50 hours of shadow flicker events per annum.

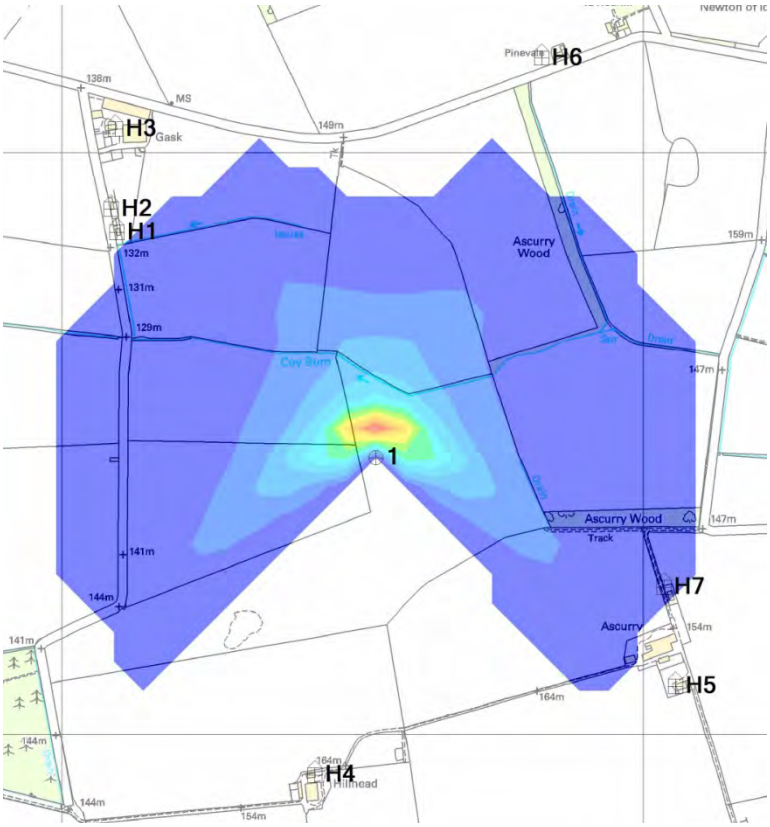

Figure 12: Theoretical shadow flicker zone surrounding the Hillhead of Ascurry turbine

The calculated flicker events are detailed in Table 29 below.

House	Days per year	Max hours per day	Mean hours per day	Total hours per year
H1	0	0	0	0
H2	0	0	0	0
H3	0	0	0	0
H4	0	0	0	0
H5	0	0	0	0
H6	0	0	0	0
H7	0	0	0	0

Table 29: Summary of theoretical shadow flicker impacts

The results in Figure 12 above would suggest that H7 should experience a small amount of shadow flicker, however this is not recorded in Table 29. Figure 12 links edges from the pixelated model to create a better visualisation of the shadow flicker impact from the turbine.

The pixelated version of the model around H7 is outlined in Figure 13 below, alongside the model included above. This confirms that there will be no shadow flicker at H7, as outlined in Table 29.

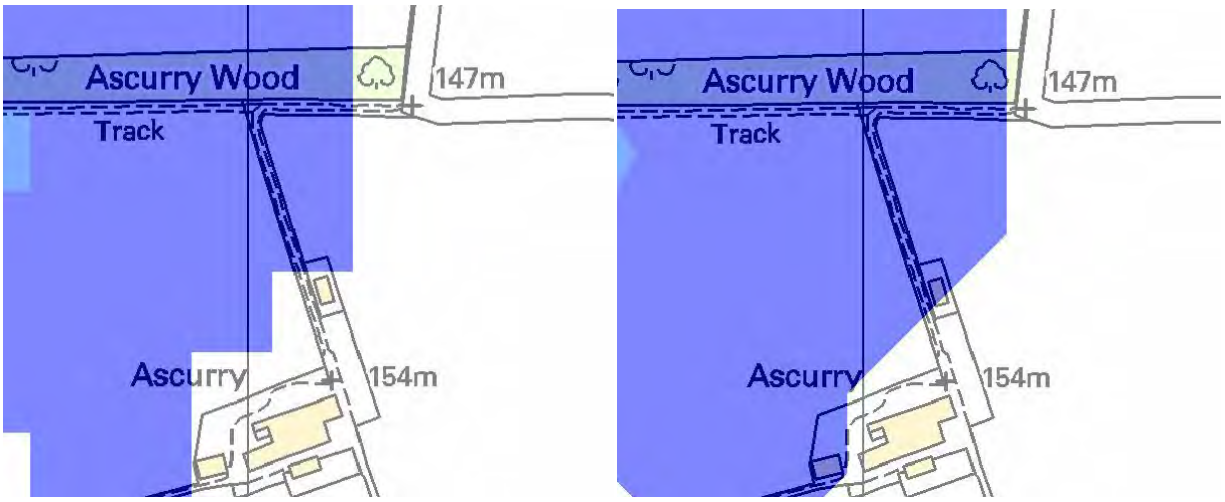

Figure 13: Pixelated theoretical shadow flicker zone surrounding H7

10.4. Conclusion

The following conclusions have been made regarding shadow flicker considerations and the proposed wind development:

- A shadow flicker assessment was completed using Windfarm Software to quantify the areas of potential impact. The model was run using conservative, worst – case assumptions;
- No shadow flicker impacts are expected at nearby properties; and
- Screening from trees has not been considered during this assessment. This means that, if there were potential flicker effects, these will be greatly reduced.

The above assessment considered worse case conditions for the effects of shadow flicker. Therefore shadow flicker should not be considered to be a sustained concern in terms of local residential amenity.

11. Noise

This chapter assesses whether a wind turbine at Hillhead of Ascurry is likely to cause a noise disturbance to the nearest residential dwellings. The chapter will initially provide an overview of relevant policy, wind turbine noise and site context before assessing the extent of wind turbine derived noise on the nearest residents.

11.1. Methodology

A desk based assessment has been carried out in accordance with the relevant guidelines (discussed further in Chapter 11.2.2). Following recent discussion with Angus Council, particular attention has been made to the Institute of Acoustics 'Good Practice Guide to the Application of ETSU-R-97 for the Assessment and Rating of Wind Turbine Noise' (2013). Within the guidance it is outlined that the following parameters should be set when calculating noise predictions:

- A ground factor of G=0.5;
- The use of warranted manufacturer data or, if warranted data is not available, the use of measured data. In the scenario where measured data is used, an uncertainty factor provided by the manufacturer, multiplied by a margin of 1.645, should be used to ensure that suitable uncertainties have been incorporated. This is highlighted within the IEC 61400-11 standard;
- The adoption of a receiver height of 4.0m is recommended (regardless of time of day), as it has the effect of reducing the potential over-sensitivity of the calculation to the receiver region ground factor compared to lower receiver heights; and
- Atmospheric conditions of 10^{o}C and 70% humidity are recommended to represent a reasonably low level of air absorption.

In line with the above guidance, predicted noise levels have been calculated based on measured sound power information provided by the manufacturer and have been compared with the noise limits set out within ETSU-97.

The measured and warranted sound power data from the manufacturer and extracts from the ReSoft Windfarm software used to complete the assessment can be viewed in Appendix C.

The extent of turbine noise has been quantified using International Standard ISO 9613 "Acoustics – Attenuation of Sound during Propagation Outdoors" and from this work it has been considered that further detailed noise survey work is not required for the proposed turbine location and model.

11.2. Baseline Assessment

11.2.1. Turbine Noise

Wind turbines generate noise as they rotate. Wind turbine derived noise will occur above the "cut-in" wind speed and below the "cut-out" wind speed. Below the cut-in wind speed there is insufficient strength in the wind to generate efficiently and above the cut-out wind speed the turbine is automatically shut down to prevent any malfunctions from occurring. The cut-in wind speed for the proposed turbine is 3 meters per second (m/s) and the cut out wind speed is normally around 25m/s (measured at hub height). Above wind speeds of 8 – 12m/s, background noise begins to exceed turbine noise as shown in Figure 14. Therefore, it is within the range 3 to 12m/s that turbine noise is typically most audible.

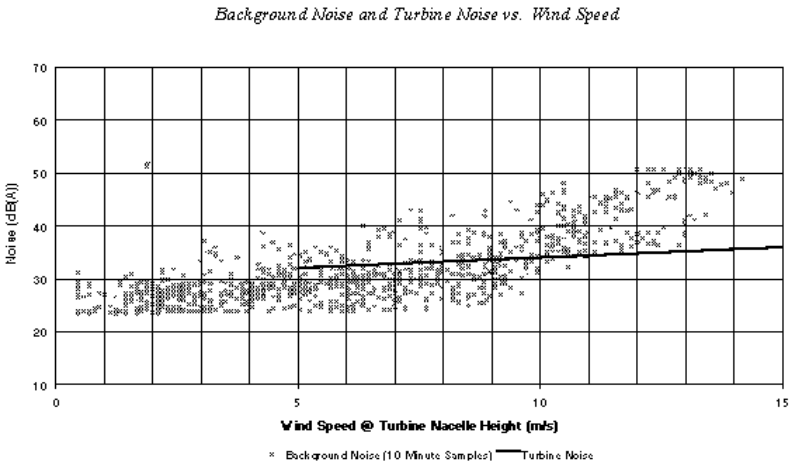

Figure 14: Background Noise and Wind Turbine Noise vs. Wind Speed[16]

During the operational phase there are two potential sources of noise from a wind turbine; aerodynamic noise from the movement of the blades through the air, and mechanical noise from the operation of turbine engine components (e.g. gearbox and generator) in the nacelle.

Modern wind turbines have been designed to be considerably quieter than earlier turbine models and significant progress has been made in recent years in achieving lower noise signatures. Well designed modern wind turbines are generally quiet in operation and compared to the noise of road traffic and construction activities in other locations, the noise from wind turbines is very low.

Aerodynamic noise can be minimised through careful attention to blade design, whilst mechanical noise can be minimised through innovative design and noise insulation materials within the nacelle.

The locational and turbine specific noise details for this project are provided in Table 30 below and the noise data has been provided from EWT documentation for their Directwind 54 turbine which is proposed for this site.

Turbine	EWT Directwind 54
Easting	353539
Northing	746476
Height ASL	144m
Measured sound power level at 95% operation (10m/s) including uncertainty factor of 1.15dB (0.7dB uncertainty factor provided by the manufacturer x 1.645, as outlined in Section 11.1).	100.65dBA

Table 30: Turbine details and sound power level used in this assessment

[16] Graph taken from The Assessment & Rating of Noise from Wind Farms, The Working Group on Wind Turbine Noise, September 1996.

11.2.2. Relevant Legislation, Policy and Guidance

The following policy and guidance documents were utilised in the completion of this chapter:

- Scottish Planning Policy;
- Institute of Acoustics 'Good Practice Guide to the Application of ETSU-R-97 for the Assessment and Rating of Wind Turbine Noise';
- PAN 1/2011 Planning and Noise and accompanying Technical Advice Note;
- Specific Advice Sheet – Onshore Wind Turbines (which replaces PAN 45 Renewable Energy Technologies);
- BS 5228 Parts 1 & 2 – Code of Practice for Noise and Vibration Control on Construction and Open Sites; and
- ETSU-R-97 The Assessment and Rating of Noise from Wind Farms.

The Scottish Government's online guidance (last updated in October 2012) states:

"The Report 'The Assessment and Rating of Noise from Wind Turbines' (Final Report, Sept 1996, DTI), (ETSU-R-97), describes a framework for the measurement of wind farm noise, which should be followed by applicants and consultees, and used by planning authorities to assess and rate noise from wind energy developments, until such time as an update is available. This gives indicative noise levels thought to offer a reasonable degree of protection to wind farm neighbours, without placing unreasonable burdens on wind farm developers, and suggests appropriate noise conditions".

ETSU (1997) suggests that current practice on controlling wind farm noise should be by the application of noise limits at the nearest noise-sensitive properties. These noise limits should be applied to external locations and should apply only to those areas frequently used for relaxation or activities for which a quiet environment is highly desirable. The report suggests that noise limits should be set at a $LA90_{10min}$ of no more than 5 dB(A) above background, subject to a minimum of 35-40 dB(A) for daytime and 43 dB(A) for night-time. These limits are applicable up to a wind speed of 12 m/s measured at 10 m height on the site. However, the report also states both day and night-time lower fixed limits can be increased to 45 dB(A) to increase the permissible margin above background where the occupier of the property has some financial interest in the wind farm.

11.2.3. Site Context

The 7 residential locations closest to the proposed turbine are numbered in Figure 15 below with details provided in Table 31. The distances measured are from the proposed turbine to the nearest part of the property curtilage and therefore include outdoor amenity areas.

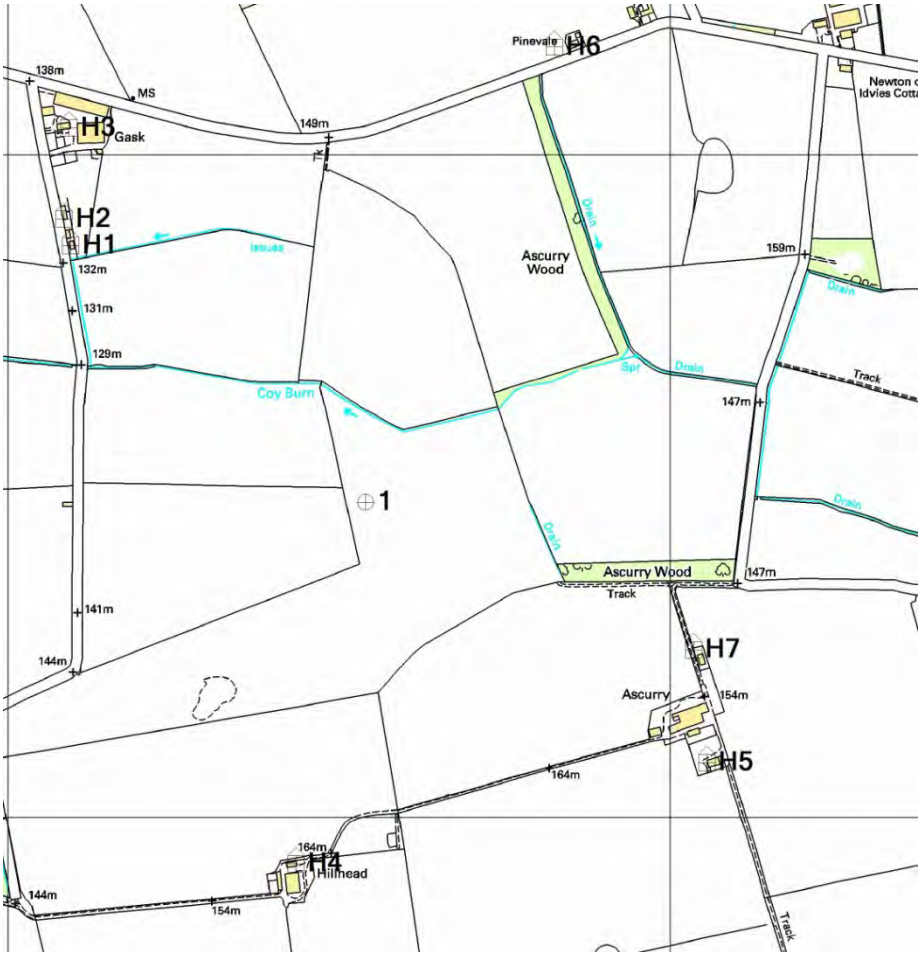

Figure 15: Residential areas surrounding the proposed turbine

House	Easting	Northing	Distance to turbine
H1	353095	746862	588m
H2	353084	746903	623m
H3	353092	747040	719m
H4	353436	745929	556m
H5	354054	746083	647m
H6	353852	747162	743m
H7	354036	746253	544m

Table 31: Details of the dwellings in proximity to the proposed turbine

With regards to the existing sources of background noise in the area, the site was considered to be a relatively quiet rural area although there will be anthropogenic noise from farm vehicles and other vehicles on the public roads.

11.3. Impact Assessment

Noise related issues need to be considered for the construction, operational and decommissioning phases of the project.

11.3.1. Construction and decommissioning phases

During these phases there will be a number of short term noise impacts of varying intensity and these include:

- The transportation of abnormal loads (equipment and materials) to site will require the use of Heavy Goods Vehicles (HGV's). The majority of the transport route is likely to be via motorways and other busy regional roads so there is unlikely to be significant additional noise impacts for sensitive receptors along the majority of this route; and
- The construction/excavation of the foundations and ancillary structures (including the excavation of earth to lay foundations and underground cabling) is likely to have short-term noise impacts higher than background levels. In accordance with best practice, this type of construction work will take place during daylight hours to ensure minimal disturbance to nearby residential dwellings.

Given the single turbine nature of the development there will only be a short term noise impact from construction traffic and turbine components coming to and from site along local roads. These stages are therefore considered to have a negligible overall noise impact.

11.3.2. Operational phase

Although noise levels arising from wind turbines are fairly low relative to other anthropogenic sources, as the turbines are generally situated in rural environments there are often few other sources of noise. When wind speeds are high this is not a problem since any turbine noise is masked by wind induced noise effects, particularly that of the trees being blown. At lower wind speeds, however, or in particularly sheltered locations, the wind induced background noise may not be sufficient to mask the noise from the turbine. However, under these conditions, the generated noise levels may be so low as to generate very little impact.

As discussed, a desk-based noise impact was undertaken based on ISO 9613:

- ISO 9613 – 1: Attenuation of Sound During Propagation Outdoors, part 1: Calculation of the Absorption of Sound by the Atmosphere; and
- ISO 9613 – 2: Attenuation of Sound During Propagation Outdoors, Part 2: General Method of Calculation.

The propagation model described in Part 2 of the ISO 9613 standard provides for the prediction of sound pressure levels based on either short-term, down-wind (i.e., worst case) conditions, or long term, downwind overall averages. ISO 9613 is considered a conservative model as it assumes all receivers are downwind from the noise sources. In reality, when wind is blowing in the opposite direction (i.e. from receivers to sources), the source attributable noise levels are lower.

Turbine sound power levels

In this assessment, noise predictions for this site have been based on measured sound pressure levels. Table 32 below gives the calculated octave band sound power levels for the proposed turbine for wind speeds at 10m/s. An uncertainty factor of 1.15dB has been added to each sound power level to provide a more conservative assessment, as per the Institute of Acoustics 'A Good Practice Guide to the Application of ETSU-R-97 for the Assessment and Rating of Wind Turbine Noise'.

Octave Band Frequency (Hz)	Sound Power Level (dB(A))
63	82.75
125	88.95
250	94.25
500	95.55
1000	94.15
2000	91.65
4000	84.75
8000	72.95

Table 32: Octave band spectrum at 10m/s

11.3.3. Other Factors

Directivity Factor

The directivity correction describes the extent to which a point source radiates sound. For a wholly omnidirectional source (like a turbine nacelle), the directivity correction is 0.

Atmospheric Absorption

The atmospheric absorption depends on the relative humidity of the air, ambient temperature and ambient pressure. For this model, an ambient temperature of 10°C with a relative humidity of 70% was used in line with the Institute of Acoustics recommended atmospheric factors. This generated the octave band absorption coefficients used in the model, as shown in Table 33 below.

Frequency (Hz)	63	125	250	500	1,000	2,000	4,000	8,000
Absorption Coefficient (dB/km)	0.12	0.4	1.04	1.93	3.66	9.66	32.8	117.00

Table 33: Octave Band Absorption Coefficients

Ground Factor

The ground region parameter (i.e. how acoustically hard or soft the ground is) was set at 0.5 for the model. The ground region can be set between 0 (hard ground such as water or concrete) to 1.0 (grassland or farm land). In accordance with the Institute of Acoustics guidance, a ground factor of 0.5 was used in the model as the guaranteed turbine sound power level has been utilised.

Barrier Attenuation

There are no screening obstacles (i.e. barriers) included in this model.

11.4. Results

The ETSU Guidelines state that the L_{A90} noise descriptor should be adopted for both background and wind farm noise levels and that, for the wind farm noise, this is likely to be between 1.5 and 2.5 dB less than the L_{Aeq} levels over the same period. Use of the L_{A90} descriptor for wind farm noise allows reliable measurements to be made without corruption from relatively loud, transitory noise events from other sources.

Noise predictions were carried out for a wind speed of 10m/s at 10m height. The receiver was set at a 4m height above ground level. The results are plotted in the form of noise contours shown in Figure 16 below. It should be noted that this represents downwind propagation in all

directions simultaneously, which clearly cannot happen in practice. The predicted turbine noise L_{Aeq} has been adjusted by subtracting 2dB to give the equivalent L_{A90} as suggested in ETSU-R-97. The L_{A90} figures with the uncertainty factor of 1.15dB outlined are included in Appendix C. These have been inserted manually into the ReSoft Windfarm software, to prepare the model in Figure 16 below.

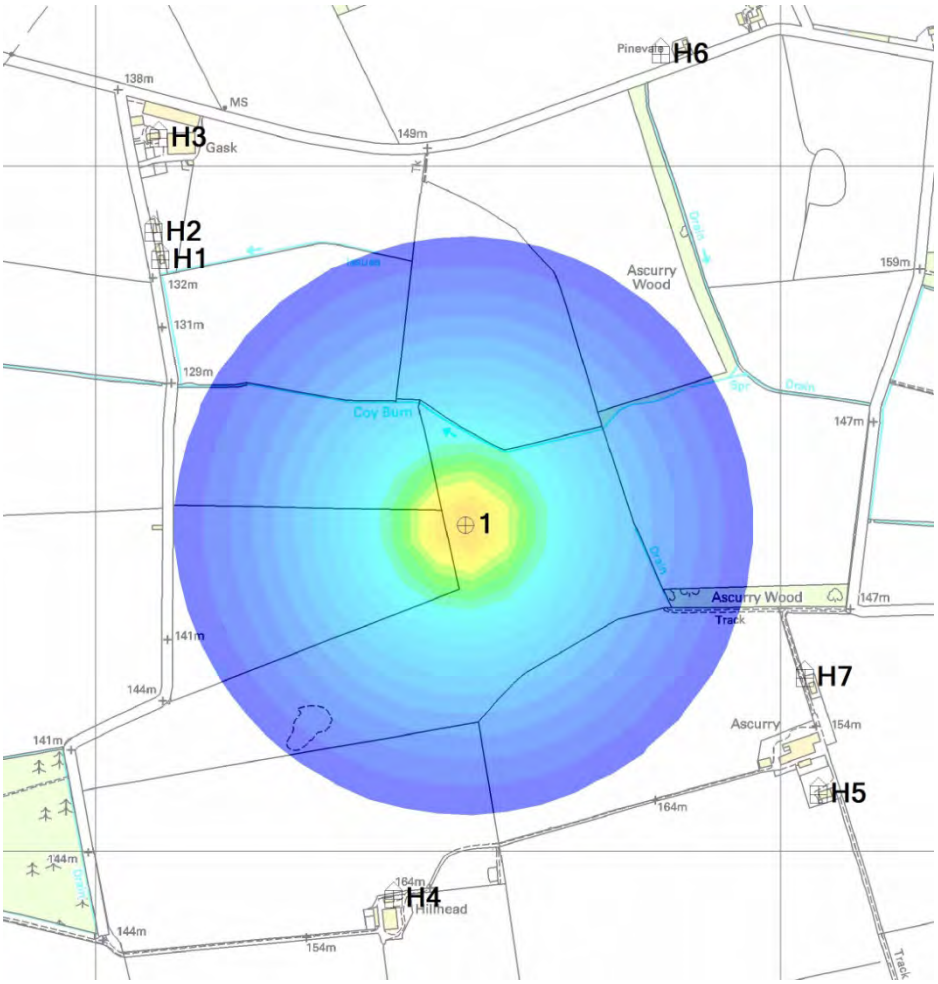

Figure 16: Hillhead of Ascurry Noise Model (using ReSoft Windfarm and L_{A90} data)

As is shown by the above noise assessment, the maximum expected noise levels at the nearest residential areas will be under 35db(A). Based on the ETSU guidance this is considered to be within acceptable levels and background noise measurements are not considered necessary. It should also be noted that:

- Wind turbine noise is modelled at its rated power output and consequently the rated sound power level;
- The model assumes a direct line of sight and does not consider terrain; and
- The noise model assumes that the wind direction is always blowing from the wind turbine to each house simultaneously. Noise levels can be expected to be 2 dB less during cross winds (i.e. where the wind blows across a path between the turbine and the house).

The results of the noise assessment for each house shown in the baseline assessment are shown in Table 34 below.

House no	Predicted Noise (dB)
H1	31.72
H2	31.13
H3	29.68
H4	32.28
H5	30.75
H6	29.35
H7	32.49

Table 34: Calculated noise levels at surrounding properties (from edge of property)

11.5. Mitigation

Construction

Several safeguards exist to minimise the effects of construction noise including:

- The various EC Directives and UK Statutory Instruments that limit noise emissions of a variety of construction plant;
- Guidance set out in BS 5228: 2008: Part 1 which covers noise control on construction sites; and
- The powers that exist for local authorities under the Control of Pollution Act 1974 to control environmental noise on construction sites.

As part of the construction contract, the contractor would be required to implement all committed mitigation measures including those set out in this Document. With a view to ensuring compliance with the agreed noise limits, the adoption of Best Practicable Means, as defined in the Control of Pollution Act 1974, is usually the most effective means of controlling noise from construction sites.

Other additional generic measures to be adopted for the control of noise are as follows:

- All site staff would receive appropriate environmental training at the beginning of the contract and throughout the construction;
- Silenced or sound reduced compressors would be used where necessary;
- Silencers or mufflers would be fitted to pneumatic tools where required;
- Deliveries would be programmed to arrive during daytime hours only and care would be taken to minimise noise when unloading vehicles;
- Delivery vehicles would be prohibited from waiting within the site construction compound with their engines running;
- Plant items would be properly maintained and operated according to manufacturers' recommendations, in such a manner as to avoid causing excessive noise; and
- Appropriate noise limits and working hours would be specified in the contract documents. It is assumed that construction activities would be undertaken during daytime periods only, between the hours of 07:00 to 19:00 hours Monday to Friday and 07:00 to 13:00 hours on Saturday.

Operation

The noise assessment demonstrates that the highest predicated noise level at the nearest residential dwellings to the proposed turbines is under 35 dB(A), which meets ETSU guidelines. On this basis, no mitigation is deemed necessary in relation to the operational phase of development.

11.6. Conclusions

The following conclusions have been made regarding noise considerations and the proposed wind development:

- The area is rural in nature and is expected to have relatively low background noise;
- The nearest property (house and or boundary) to the turbine is measured as being 544m from the turbine position;
- The proposed turbine (EWT Directwind 54) is a modern turbine design with a low noise signature compared with other turbines of a similar size;
- Noise modelling was completed for the proposed development using ReSoft Windfarm software and the guaranteed noise levels for the proposed wind turbine at normal operation. This model is based on ISO 9613;
- The noise at the nearest residential dwellings (applicant and non-applicant owned) to the proposed turbine site is shown not to exceed 35 dB(A) (L_{A90}) at a wind speed of 10m/s and at a received height of 4m, in accordance with ETSU and the guidance from the Institute of Acoustics; and
- ETSU guidance states that in the above scenario the wind turbine development is not considered to require detailed background noise modelling as the turbine noise would be below what is expected to be seen as background noise in a low noise environment.

Overall, noise impacts are predicted to be low and assessed levels are well within ETSU guideline limits.

12. Telecommunications

This chapter examines the proposed development of a wind turbine at the Hillhead of Ascurry site with regards to the potential to interfere with telecommunications and television reception.

12.1. Methodology

To assess the potential impact on telecommunications, Locogen initially provided details of this development to the Office of Communications (Ofcom). Ofcom are the agency tasked with assessing the potential impacts of wind energy proposals on the civilian radio network (consists primarily of mobile phone operators and communication systems for public sector and utility companies). Ofcom responded with a list of those telecom links that are within a 500m radius of the proposed development. Information on the proposed development was also passed on to Atkins and the Joint Radio Company (JRC) who manage the scanning microwave and telemetry links of utility companies.

Ascertaining the potential impact on local television transmission signals previously involved the completion of the BBC wind farm assessment tool. This online assessment tool is no longer available and this is at least partially due to the move to a fully digital television reception network which is considered to significantly reduce the potential for impacts upon reception.

12.2. Baseline Assessment

The potential impacts are likely to be during the operational phase of the project. Various stakeholder bodies were contacted regarding the proposed development, the outcomes of the consultation and further assessment are provided below.

12.2.1. Telecommunications

Ofcom, Atkins and JRC were asked to give details of telemetry and microwave links within a 500m radius of the development. The outcome of this stakeholder contact has been summarised in Table 35 below.

Company	Responded	Links	Further issues
Ofcom	Yes	0	-
Atkins	Yes	0	-
JRC	Yes	0	-

Table 35: Overview of responses from telecommunication companies

12.2.2. Television Reception

With regard to domestic television reception the primary area of concern is that the presence and movement of the turbine causes shadow and/or reflection zones in the surrounding area. A worst case scenario is that television reception systems within these zones may be partially or totally impaired through the reception being blocked or mirrored by the presence of the turbine.

12.3. Impact Assessment

12.3.1. Telecommunications

Consultation with Ofcom and others found one telecommunication link within 500m of the proposed turbine location. This link is managed by the Joint Radio Company (JRC). Further

consultation with JRC has confirmed that the proposed development will not impact upon this link. No interference risks to other nearby telecommunication links are expected.

12.3.2. Television Reception

Prior examples of instances where wind developments have impacted on television reception have involved analogue systems. Therefore a key factor to take into consideration is the UK's completed switch to an all digital broadcasting network. The following information was provided as to how this switch would be likely to significantly reduce the extent of any impact:

> *"Although analogue and digital terrestrial TV signals use different modulation systems, with different characteristics, digital signals will still be broadcast from the same transmitter sites, and in the same frequency ranges, as currently used for analogue TV. The propagation characteristics of both systems are also the same, and physical obstructions such as wind farms will therefore continue to have an effect on domestic reception in the all-digital environment. However, digital signals contain a number of error correction and recovery mechanisms, which mean that an apparently perfect picture can be decoded even in quite adverse reception conditions. The corollary of this robustness is that the failure of digital signals is abrupt: when reception conditions become too poor for the error correction systems to recover from, reception is completely lost. This is in contrast to analogue systems, where visible picture impairments become gradually worse as reception conditions deteriorate".* [17]

Therefore the recent move to digital will mean that the number of potential sites impacted upon will be reduced further due to fewer issues with partial picture distortion.

Overall, television reception issues are not perceived to be a significant concern due to the small scale of development, the limited number of dwellings in the immediate area, the move to digital reception, and the ability to rectify issues for those individual households that are affected.

12.4. Conclusions

On the basis of the above desk-based assessment, no specific mitigation measures are required in relation to telecommunications links.

Following the digital switch-over, loss of local television reception is unlikely to occur. Any impacts that do occur (expected to be minimal, if at all) can be appropriately mitigated at the expense of the developer.

[17] Peter Mandry, Senior Associate technical advisor for Ofcom

13. Aviation

Wind turbines can encroach on airspace and interfere with flight safety (both civilian and military), ground-based radar systems and aircraft navigation systems.

13.1. Methodology

Locogen have assessed the potential impact on aviation and radar through desk based assessment. This includes both Line of Sight assessment and Radar Diffraction Modelling.

13.2. Baseline Assessment

13.2.1. Relevant Legislation, Policy and Guidance

Guidance for assessing the potential impact on aviation considerations is provided in:

- Scottish Government 2002 – PAN 45: Renewable Energy Technologies and as superseded by online planning advice for 'Onshore Wind Turbines' (last updated October 2012);
- BWEA aviation guidance – www.bwea.com/aviation; and
- BERR 2002 (formerly DTI) – Wind Energy & Aviation Interests.

13.3. Impact Assessment

The vast majority of aviation impacts will be during the operational phase of the project. Due to the complexity in assessing aviation interests it is primarily left to the relevant statutory bodies to make their own views regarding the proposed development.

Locogen have completed a desk based assessment of the perceived effects of a wind turbine operation on specific aviation operations.

13.3.1. Civil Aviation

Figure 17 below illustrates that the site lies outwith the radar coverage area for both Edinburgh and Aberdeen airports and is well outwith the 15km safeguarding radius areas for both sites. Furthermore there is not considered to be a safeguarding impact on Dundee Airport, given that the turbine is located over 15km from the aerodrome reference point and that Dundee Airport has no site based radar operations.

It is concluded that objections will not be raised in relation to any of the above noted locations.

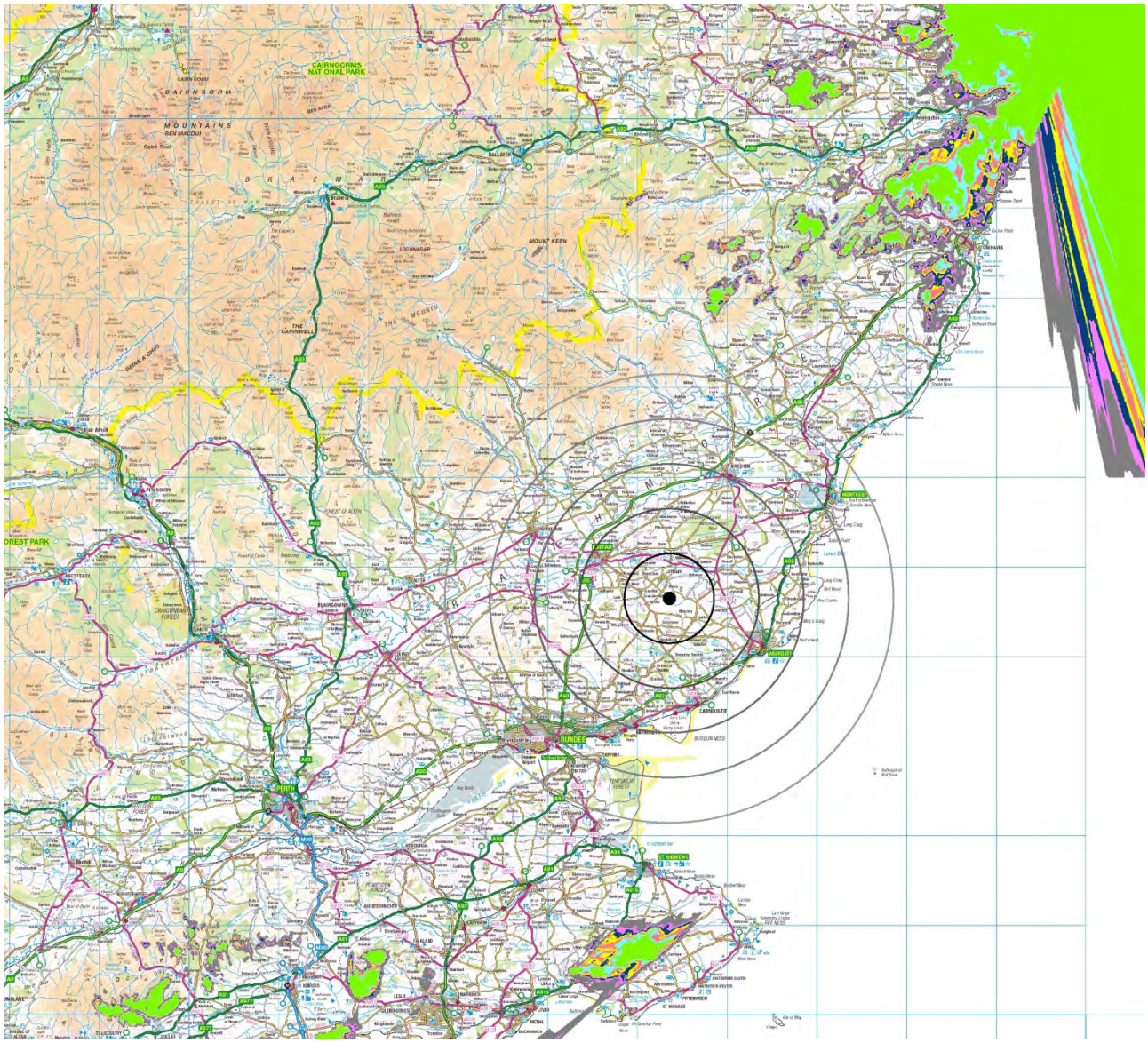

Figure 17: Edinburgh Airport (South) and Aberdeen Airport (North) radar visibility [Radii around turbine in 5km increments]

13.3.2. Military Aviation

The Ministry of Defence (MoD) can no longer resource the provision of pre-application consultation advice. As such, no consultation has been initiated with the MoD. The site lies within a low priority military low flying zone and therefore should not raise concerns in relations to low flying military aircraft.

Based on desk-based GIS modelling, Line of Sight assessment and Radar Diffraction Modelling it is also considered that the Hillhead of Ascurry site will not be visible to MoD radar at RAF Leuchars, which is located approximately 26km south south east of the proposed turbine location. It is therefore considered unlikely that the MoD will raise concerns over the radar visibility of the Hillhead of Ascurry wind turbine. The assessments outlined above can be provided to Angus Council and/or the MoD, if required.

13.3.3. NATS En-Route Ltd (NERL)

NATS En-Route Ltd (NERL) manages the UK's en-route air traffic outside of the individual air traffic control zones around airports. They therefore have a number of radar stations that provide radar coverage across the UK. As a first assessment tool this body provides radar visibility maps of the UK that allow wind developers to initially assess potential issues with regard to en-route navigational facilities. The zones where there would be radar visibility at 60m and 80m AGL are shown coloured red and green respectively in Figure 18 below. The proposed turbine is located outwith those areas having en-route radar visibility.

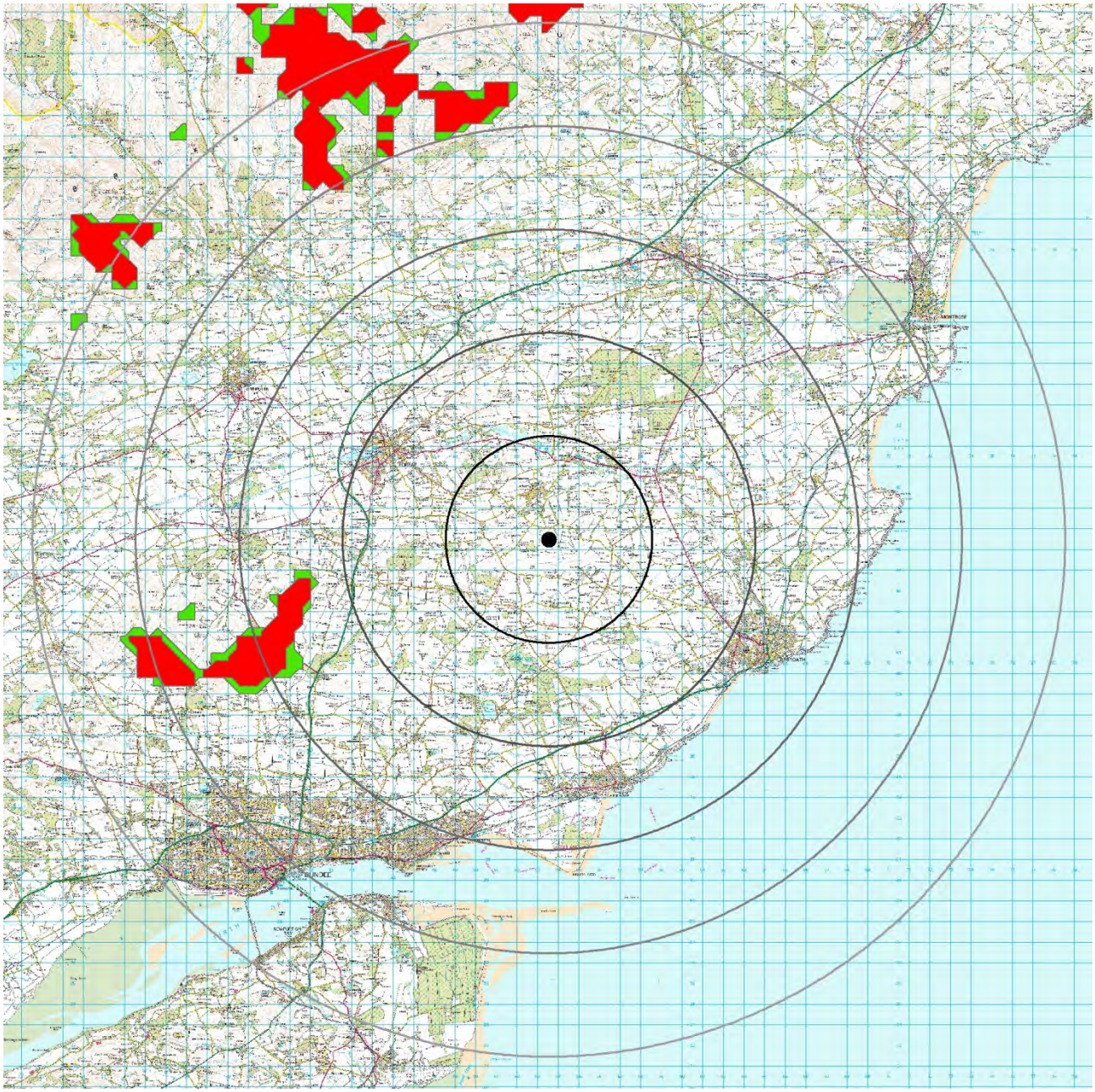

Figure 18: NERL radar visibility at 60m and 80m above ground level

13.3.4. Meteorological Radar Stations

There are no meteorological radar stations within 30km of the proposed turbine site.

13.4. Conclusions

The majority of aviation impacts will be assessed by statutory consultees once a planning application has been submitted. From an initial desk based assessment it is not expected that there will be an issue raised on the grounds of both civil and military aviation.

14. Public Safety

14.1. Baseline Assessment

Information is provided below on the national guidance relating to the operational safety of wind turbines. This is provided by PAN45 (2002) as superseded by the Scottish Government's online renewables planning advice for 'Onshore Wind Turbines'[18].

Equipment Safety: Companies supplying products and services to the wind energy industry operate to a series of international, European and British standards. The build-up of ice on turbine blades is unlikely to present problems on the majority of sites. When icing occurs the turbines' own vibration sensors are likely to detect the imbalance and inhibit the operation of the machines. Site operators also tend to have rigorous and computer aided maintenance regimes and control rooms can detect icing of blades. Danger to human or animal life from falling parts or ice is rare. Similarly, lightning protection measures are incorporated into wind turbines to ensure that lightning is conducted harmlessly past the sensitive parts of the nacelle and down into the earth.

Road Traffic Impacts: In siting wind turbines close to major roads, pre-application discussions are advisable with Transport Scotland's Trunk Roads Network Management (TRNM). This is particularly important for the movement of large components (abnormal load routing) during the construction period, periodic maintenance and for decommissioning. Although wind turbines erected in accordance with best engineering practice should be stable structures, it may be advisable to achieve a set back from roads and railways of at least the height of the turbine proposed, to assure safety. Driver distraction may, in some circumstances, be a consideration.

General Safety Standards: Companies supplying products and services to the wind energy industry operate to a series of international, European and British standards. A set of product standards for wind energy equipment has been developed by the International Electro-technical Commission - IEC 16400. There are a number of British Standards that correspond to it, for example, BS EN 61400-1: 1995 'Wind Turbine Generator Systems - Safety Requirements'.

Blade Loss: A possible but rare source of danger to human or animal life from a wind turbine would be the loss of a piece of the blade or, in most exceptional circumstances, of the whole blade. 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.

Lightning Strike: The possibility of attracting lightning strikes applies to all tall structures and wind turbines are no different. Appropriate lightning protection measures are incorporated in wind turbines to ensure that lightning is conducted harmlessly past the sensitive parts of the nacelle and down into the earth.

[18] http://www.scotland.gov.uk/Topics/Built-Environment/planning/National-Planning-Policy/themes/renewables/Onshore

14.2. Impact Assessment

General safety standards: The proposed EWT Directwind 54 turbine model meets the required international, European and British standards, including BS EN 61400-1: 1995.

Blade loss: As stated above, the turbine has been designed to meet the required safety standards and this includes suitable consideration of the risk of blade loss.

Ice throw: Modern turbine designs are able to accommodate blade heating systems for sites where there is a high likelihood of blade icing occurring. Direction will be sought from the manufacturer on the requirement for this technology and if blade heating is not utilised the turbine could be programmed to shut-down during periods of potential icing and not start up until climatic conditions where such that icing and ice throw were no longer considered to be an issue.

Lightning strike: As stated above, the turbine has been designed to meet the required safety standards and this includes appropriate lightning protection measures.

Proximity to roads, paths and railways: The nearest public road is the minor road to the east of the site, which provides access to the Hillhead farmstead. This road is approximately 450m away from the proposed turbine location at its nearest point. Given that this is ~6 times the height of the turbine, the turbine would sit well beyond the set-back distance recommended in the relevant guidance. Driver distraction is unlikely to be a concern given the distance to the turbines from public roads. To minimise distraction any signage on the turbine will be in line with Council guidelines.

Proximity to overhead transmission lines: An exclusion distance of 1.5 x tip height has been utilised to ensure safe operating distances between wind turbines and overhead power lines.

Proximity to pipelines: An exclusion distance of 1.5 x tip height from underground pipelines has been utilised to ensure safe operating distances between these and the proposed wind turbine.

Distance from buildings: The proposed siting means that the turbine is well in excess of fall-over distance with regard to off-site buildings.

14.3. Conclusions

On the basis of the above assessment, no issues in relation to public safety are anticipated.

The mitigation measures outlined within this Chapter would ensure safe operation of the turbines once installed and full turbine shutdown (if required) during operational periods when this is deemed necessary.

15. Summary & Mitigation

15.1. Residual Environmental Effects

The proposed development has the potential to have both positive and negative impacts on the receiving environment.

15.1.1. Potential Positive Effects

The potential positive effects on the environment include:

- Creation of an indigenous, local, secure, and sustainable energy resource;
- Direct economic and social benefits to the farming business;
- Direct and indirect economic and social benefits to the local community;
- Provision of a valuable new land use, which will not affect existing farming operations; and
- A direct neutral and indirect positive effect on climate.

15.1.2. Potential Negative Effects

The potential negative effects on the environment include:

- Visual impact of the proposed turbines on the surrounding landscape and heritage assets;
- Visual impact of the proposed turbines on surrounding residential dwellings; and
- Increase in local traffic during the construction stage.

15.2. Conclusions on Development and Impacts in Context

The following conclusions can be made from the completed environmental chapters:

- An assessment of landscape and visual impact concluded that the majority of receptors assessed would experience a low to moderate impact from the proposed turbine. Indeed, the extent of significant effects are very limited and given that the proposal includes a single turbine up to 77m in height within a landscape that has the capacity to absorb turbine developments of this nature, it is concluded that this proposal is acceptable in terms of the EIA regulations and local, regional and national policy. Some locally significant impacts have been noted but the single turbine nature of the project and generally low level of cumulative impact is considered to reduce the overall impact. It is therefore considered that the proposed development is acceptable in terms of landscape and visual impact;
- The turbine will provide the farmer with a crucial form of diversification and a sustainable long term income from the operation of the wind turbine. The overall impact on the local area and economy is considered to be positive through direct and indirect means;
- The proposed turbine is considered to be an acceptable distance from known archaeological sites and monuments;
- With the successful application of mitigating measures and best practice construction techniques, the wind turbine construction phase is not anticipated to have any significant, long term negative impacts on the habitats or locally occurring wildlife;

- Modelled noise and shadow flicker levels are predicted to comply with national and international guidelines and will not pose as nuisances to nearby dwellings;
- Concerns regarding telecommunications and civil aviation are not expected; and
- Construction traffic is a short term impact and its management will be coordinated with Angus Council.

In summary, based on the positive impacts of the development, and the low level of negative impacts which will be mitigated where required, it is considered Hillhead of Ascurry is a suitable location for a wind turbine development at the scale proposed.

15.3. Development Plan & Supplementary Planning Guidance Compliance

This document, together with the accompanying drawings and specifications, has been prepared to assist Angus Council in considering the proposed development of a single wind turbine development at Hillhead of Ascurry. It is considered that the proposed development is in accordance with planning policy at all levels in that there would be no demonstrable significant adverse impacts on the surrounding environment.

A summary of the relevant Development Plan and Local Plan policies is given in Table 36 below.

Policy	Policy Area	Comment
TAYPlan Strategic Development Plan Policy 6	Energy	The proposed development can be appropriately serviced in terms of access, grid connection and sustainable drainage. The proposed turbine have been sited so as to avoid any impacts on the oil and gas pipelines in the vicinity. After mitigation, there would be no significant adverse impacts, either individually or cumulatively, in relation to cultural heritage, nature conservation and protected species, residential amenity including noise and shadow flicker, tourism and recreation attractions, surface and ground water, and aviation and telecoms considerations. With regard to landscape and visual matters, taking into consideration the relevant Landscape Character Assessment, care has been taken to minimise potential impacts through sensitive siting and turbine selection.
Local Plan Policy S1	Development boundaries	This Supporting Environmental Document has demonstrated that the Hillhead of Ascurry development will be within a scale and nature appropriate to the location. This has been shown through numerous assessments such as the LVIA, noise, ecological and shadow flicker.
Local Plan Policy S5	Safeguard Areas	No element of the proposed development will be within consultation zones of local hazards.
Local Plan Policy S6	Development Principles	The Supporting Environmental Document demonstrates the potential impact on the relevant principles set out in Schedule 1 of the Local Plan.

Policy	Policy Area	Comment
Local Plan Policy ER4	Wider Natural Heritage and Biodiversity	The Ecology assessment has demonstrated that the proposed development should not impact upon any species or habitats protected under British or European law.
Local Plan Policy ER5	Conservation of Landscape Character	The Landscape and Visual Impact Assessment has demonstrated in detail the impact of the Hillhead of Ascurry turbine on the local and wider landscape. It is considered that the landscape will be capable of absorbing the wind turbine.
Local Plan Policy ER11	Noise Pollution	It has been demonstrated that the maximum expected noise output from the turbine will not have an adverse impact on local residents. The maximum noise level will be within the accepted noise limits detailed within national planning policy and planning guidance.
Local Plan Policy ER16	Development Affecting the Setting of a Listed Building	There would be no direct impact on known archaeological remains as a result of the development. An assessment of the proposed turbines on the setting of cultural heritage sites, including Scheduled Monuments and A Listed buildings, in the locality has been undertaken. The assessment concludes that, at worst, the effect of the development on the setting of identified cultural heritage assets is moderate and therefore not significant.
Local Plan Policy ER19	Archaeological Sites of Local Importance	
Local Plan Policy ER20	Historic Gardens and Designed Landscapes	As demonstrated within the Cultural Heritage and LVIA assessments, the Hillhead of Ascurry turbine will not damage the characteristics or integrity of these sites. Chapter 5 of this report quantifies anticipated impacts on a variety of landscape designations, including designed landscapes, within 25 km of the site. In this respect, the effect of the development on the setting of such sites is not predicted to be significant.

Policy	Policy Area	Comment
Local Plan Policy ER34	Renewable Energy Development	It is considered that this application should be supported by Angus Council as the proposal demonstrates the following: a) The siting of the wind turbine has been chosen in order to minimise the impact on the local amenity; b) There is not considered to be unacceptable effects on the landscape character and sensitive viewpoints; c) There will be no unacceptable detrimental effects on any national heritage, scientific or historic sites; d) There will be no unacceptable effects of transmission lines as any new cabling will be buried underground; and e) The disruption to the local road network will be for a small period and minimal road upgrades are expected. This will be achieved without compromising road safety or causing unacceptable change to the environment.
Local Plan Policy ER35	Wind Energy Development	It is considered that this application should be supported by Angus Council as the proposal demonstrates the following: a) The selected location demonstrates the optimum location for wind development for the applicant while having minimal impact on the surrounding environment; b) It has been shown that the wind turbine will have no interference with birds; c) It has been demonstrated that there will be no unacceptable detrimental effects on residential amenity, existing land use and road safety with regards to shadow flicker and noise; d) There will be no interference with authorised aircraft activity; e) There will be no interference with telecommunication links within the area; f) The cumulative impact of the development with other wind developments in the area will be of an acceptable level; and g) The site will be reinstated to its original condition after decommissioning of the turbine.

Table 36: Summary of Development Plan and SPG compliance

Appendix A – Landscape & Visual Assessment Methodology

Landscape and Visual Impact Assessment Methodology

Although this application is not subject to an Environmental Impact Assessment (EIA), the approach taken for the assessing the landscape and visual effects follows the methods undertaken for a typical EIA wind energy development. This is based on the approach as set out in the *Guidelines for Landscape and Visual Impact Assessment* (Landscape Institute and Institute of Environmental Assessment, 2013). Other relevant best practice and policy guidance includes:

- Visual Assessment of Wind Farms Best Practice, University of Newcastle Scottish Natural Heritage Commissioned Report, (2002);
- Guidelines on the Environmental Impacts of Wind Farms and Small Scale Hydroelectric Schemes, Scottish Natural Heritage (2001);
- Visual Analysis of Wind Farms Good Practice Guidance, Scottish Natural Heritage (Draft 2005);
- Visual Representation of Windfarms: Good Practice Guidance, Scottish Natural Heritage (2007);
- Siting and Designing Windfarms in the landscape, Scottish Natural Heritage (2009); and
- Guidance, Cumulative Effect of Windfarms, Scottish Natural Heritage, (2012).

Evaluation of the Existing Environment – the Baseline

The baseline review for the landscape and visual resource has three elements:

1. Description – a systematic review and digest of existing information and policy relating to the existing landscape and visual resource;
2. Classification – analysis of the data to subdivide the landscape resource into discrete areas of similar and identifiable character and identify the visual receptors; and
3. Evaluation – Use of professional judgement to apply a sensitivity value to a landscape or visual resource with reference to specified criteria.

The baseline review is undertaken through desk-based data review followed by a site survey to verify the findings, and then analysis of the data. This process is described in detail in the following paragraphs.

Desk Based Data Review

Existing mapping, legislation, policy documents and other written, graphic and digital data relating to the proposal and broader study area was reviewed. This included the following documents:

- Scottish Planning Policy (2010);
- Typical Planning Considerations in Determining Planning Applications for Onshore Wind Turbines (web based renewables advice), Scottish Executive (October 2012);
- TAYplan (2012);
- Angus Local Plan (2009);
- Implementation Guide for Renewable Energy Proposals (2012);
- Angus Windfarms - Landscape Capacity and Cumulative Impacts Study (2008);
- The Tayside Landscape Assessment (1999);
- The Fife Landscape Assessment (1999);
- The Inventory of Historic Gardens and Designed Landscapes in Scotland;
- Ordnance Survey maps; and

- Digital sources of mapping and aerial photography.

The desk study also establishes the main users of the area, key viewpoints and key features, thus defining the visual baseline which requires to be verified on site. The potential visual receptors are identified and classified according to their associated use (settlements, footpaths, roads etc.). The aim of the baseline review of visual resources is to ensure that an appropriate range of viewpoints is included in the visual assessment. The potential extent of visibility of the proposed development as identified in the preliminary Zone of Theoretical Visibility (ZTV) provides the basis upon which the potential visual receptors are initially identified.

The desk study informs subsequent site work, which allows the confirmation of the Landscape Character Types (LCT) and Landscape Character Areas where applicable.

Site Survey

Field survey work is carried out to verify and, if required, refine the landscape character types identified within the study area, and to gain a full appreciation of the relationship between the proposed development, and the landscape.

The baseline visual resource is verified during the survey work and at this time, the validity of the list of representative viewpoints used in the LVIA. Since the ZTV is based on a 1:50,000 digital terrain model, it does not capture local landform. There are times when a viewpoint selected from analysis of the ZTV does not actually have any views to the proposed development. In some instances, this can be remedied by slight adjustments of the grid references, although the location must remain relevant to the particular receptor(s) for which the viewpoint was selected. It is also important to ensure that the viewpoints remain a representative selection of views. Wireframes supported the fieldwork, and observations are recorded with photographs.

Data Analysis

Analysis and reporting of the baseline resource took place after the completion of the desk and field surveys. The baseline landscape and visual review provides a description, classification, and evaluation of the landscape and visual resource of the study area.

The baseline review provides a robust description of the landscape and visual resource from which to assess the landscape and visual effects of the proposed development and to advise, in landscape and visual terms, on the development's acceptability in principle and upon its siting, layout and design. This involves identification of all the landscape and visual receptors and analysis of the sensitivity of each of these receptors to the proposed development.

Identification of Landscape and Visual Effects

The impact assessment aims to identify all the potential landscape, visual and cumulative effects of the development taking account of any proposed mitigation measures. This is carried out by:

- Assessing the magnitude of change brought about by the proposed development on each of the receptors identified in the baseline review;
- The effect is then predicted by combining the sensitivity of the receptor (as identified in the baseline review) with the magnitude of change; and
- Lastly, the significance of the predicted effect is assessed in a logical and well-reasoned fashion.

The assessment aims to describe the changes in the character and the landscape resources that are expected to result from the proposed development. It covers both landscape effects

(changes in the fabric, character and key defining characteristics of the landscape); and the visual effects (changes in available views of the landscape and the significance of those changes on people).

The table below identifies potential landscape and visual effects. Potential effects are those that could result from the construction and operation of a wind turbine, according to the project, site and receptor characteristics and their interactions. The inclusion of a potential effect in the table below (for example) does not imply that this will occur, or be significant. The assessment is based upon an assessment of the potential effects, in order to identify predicted effects.

Activity	**Element**	**Potential Effects**	**Potential Sensitive Receptors**
Construction	Construction plant, temporary construction compound, vehicle movements, new access tracks.	Temporary impacts on landscape fabric Temporary impacts on visual amenity	Landscapes character types Designated landscapes Gardens and designed landscapes Visual receptors
Operation	Presence of tracks, turbines, permanent site compound and substation	Long term but reversible impacts on landscape fabric Long term but reversible impacts on visual amenity Cumulative impacts with other wind farms	Landscapes character types Designated landscapes Historic gardens and designed landscapes Visual receptors including: residents, visitors, tourists, road users, walkers, cyclists
Decommissioning	Construction plant, temporary compound, vehicle movements	Temporary impacts on landscape fabric Temporary impacts on visual amenity	Landscapes character types Designated landscapes Historic gardens and designed landscapes Visual receptors including: residents, visitors, tourists, road users, walkers, cyclists

Potential Landscape & Visual Impacts

Extent of the study area and viewpoint selection

Maps of Zone of theoretical visibility (ZTVs) were prepared using digital terrain models. These represent the 'worst case' area of theoretical visibility where the proposed development may theoretically be seen. The ZTVs are based entirely on topographic factors and do not account for any screening effects provided by vegetation, buildings or minor variations in landform or the orientation of view. Therefore, the extent of any ZTVs tends to be greater than actual visibility and does not take account of climatic factors such as light conditions.

Drawing HOA009 illustrates the ZTV for the proposed development and is then used as a basis for the further assessment and evaluation of the magnitude of visual impacts. This approach is described below.

Through the initial stages of the desk study, fourteen viewpoints were chosen to represent views experienced from a variety of receptors, within different landscape character types and

at a variety distances from the proposed development where the view may be apparent. The viewpoints agreed for the scheme are listed in the Supporting Environmental Document.

A study area centred on a 25 km radius from the proposed development has been used for the study of landscape, visual and cumulative effects. Given the relative scale of the development and the character of the landscape, significant effects are very unlikely to be experienced at distances over 15 km.

Landscape Sensitivity and Magnitude of Change

The sensitivity of the landscape resource is variable according to the existing landscape, its relationship to the proposed development, the nature of the development being assessed and the type of change being considered. The determination of the landscape's sensitivity to changes associated with the proposal is defined as High, Medium, Low or Negligible. This is based on the professional interpretation of the key landscape characteristics, the scale of the landscape and the nature of views, and the perceived landscape value as reflected by landscape designations (see table below).

Criteria	High	Medium	Low
Landscape designations and landscape value	Landscape designated for its national landscape value High landscape value, with very strong sense of place	Landscape designated for regional or local landscape value Medium landscape value	No designations present Low landscape value (i.e. industrial landscapes), with elements that detract from sense of place
Scale of Landscape	Small scale landscape	Medium scale landscape	Large scale landscape
Views	Enclosed, medium and short distance views	Open, medium distance views	Panoramic, open and long distance views
Cultural heritage interests that contribute to landscape character	Contains features or sites of national importance	Contains sites of regional importance	Few or no features of interest

Sensitivity of Landscape Receptors

As every proposed development and its interaction with the landscape are unique, there will be situations where predefined criteria will not accurately reflect the potential residual effects. In such cases, professional judgement takes precedence and is explained in the text. The criteria used for understanding the magnitude of landscape change are summarised below.

Level of Magnitude	Definition of Magnitude
High	Total loss or major alteration to key elements, features or characteristics of the baseline landscape so that the post development character and composition of the baseline landscape resource will be fundamentally changed.
Medium	Partial loss or alteration to one or more key elements, features or characteristics of the baseline landscape so that the post development character and composition of the baseline landscape resource will be partially, but noticeably changed.

Low	Minor loss of or to one or more key elements, features or characteristics of the baseline landscape so that the post development character and composition of the baseline landscape resource will be noticeably changed but the underlying character of the baseline landscape will be similar to the pre-development character.
Negligible	Very minor loss or alteration to one or more key elements, features or characteristics of the baseline landscape. Change to the landscape character will be barely distinguishable. No discernible effect upon the view

Definition of Landscape Magnitude of Change

Visual Receptor Sensitivity and Magnitude of Change

The sensitivity of visual receptors depends upon:

- The location of the viewpoint;
- The context of the view;
- The activity of the receptor, such as relaxing at home, taking part in leisure, recreational and sporting activities, travelling or working;
- Whether receptors are likely to be stationary or moving and how long they will be exposed to the change at any one time;
- The extent of the area or route from which the changes would be visible; and
- The frequency of the view (whether receptors will be exposed to the change daily, frequently, occasionally or rarely) and the duration of the view.

Visual receptor sensitivity is defined as High, Medium or Low and these definitions are described in the table below.

High	**Medium**	**Low**
Residents with views from the dwelling or curtilage		
Users of recognised national trails, whose attention or interest is likely to be focused on the landscape or on particular views	Other recreational routes, such as local footpath networks, used for dog walking, for example	People engaged in active outdoor sports or recreation and less likely to focus on the view
Road and rail users where appreciation of the landscape is an important part of the experience, such as scenic routes	Road and rail users likely to be travelling for other purposes than just the view, such as commuter routes	
Visitors to heritage assets or to other attractions, such as recognized beauty spots, where views of the surroundings are an important part of the experience	People at their place of work, where views are an important part of the setting and contribute to the quality of working life	People at their place of work whose attention is likely to be focused on their work or activity, not on their surroundings

Definition of Receptor Visual Sensitivity

In practice, a location may have different levels of sensitivity, according to the different receptors at that location. The specific combinations of factors that have influenced the judgement of sensitivity are described in the viewpoint baseline text.

The magnitude of visual change arising from the Development is described as High, Medium, Low or Negligible based on the overall extent of visibility (see the table below). For individual viewpoints it will depend upon the combination of a range of factors:

- The distance of the viewpoint from the development;
- The duration of effect;
- Extent of the development visible from the viewpoint (number and parts of turbine visible);
- The angle of view in relation to main receptor activity;
- The proportion of the field of view occupied by the development;
- The background to the development; and
- The extent of other built development visible, particularly vertical, elements.

Level of Magnitude	Description of change	Definition of Magnitude
High	Dominant	Highly noticeable change, affecting most key characteristics and dominating the experience of the landscape. The introduction of incongruous development A high proportion of the view is affected.
Medium	Conspicuous	Noticeable, partial change to a proportion of the landscape, affecting some key characteristics and the experience of the landscape. The introduction of some uncharacteristic elements. Some of the view is affected.
Low	Apparent	Minor change, affecting some characteristics and the experience of the landscape to an extent. The introduction of elements that are not uncharacteristic. Little of the view is affected.
Negligible	Inconspicuous	Little perceptible change. No discernible effect upon the view.

Definition of Visual Magnitude of Change

Other factors may also influence the visual effect. These relate to both human perception and to the physical environment itself. Factors which tend to reduce the apparent magnitude include the following:

- Sky-lining of front-lit turbines (where turbines are seen against the sky and the sun is behind the viewer, thus turbines reflect light and blend more easily into the brightness of the sky);
- Landform backdrop to back-lit turbines (where turbines are back-clothed by landform and the viewer sees them silhouetted with the light behind them. In this scenario the turbines are more likely to blend into the landscape);
- An absence of visual clues;
- Turbines do not form the focal point of the view;
- A complex and varied scene; and
- High relative elevation of view.

Factors which tend to increase the apparent magnitude include the following:

- Back-grounding of turbines (where turbines are seen against a backcloth of land);
- Visual clues;
- Turbines form the focal point of the view;

- A simple scene; and
- Low relative elevation of view.

Significance of Effects on Landscape and Visual Receptors

The significance of any identified landscape or visual effect has been assessed as Major, Moderate, Minor or Negligible effect. These categories have been determined by consideration of viewpoint or landscape sensitivity and predicted magnitude of change as described above, with the table below used as a guide to correlating sensitivity and magnitude to determine significance of effects. It should be noted that this is a guide only, and there will be times when the combination of sensitivity and magnitude yield a slightly different result from that predicted by the table. Where this discrepancy leads to prediction of significant effect, it is explained in the text.

	Magnitude of Change			
Sensitivity	**High**	**Medium**	**Low**	**Negligible**
High	Major	Major/moderate	Moderate	Moderate/minor
Medium	Major /moderate	Moderate	Moderate/minor	Minor
Low	Moderate	Moderate/minor	Minor	Minor/none
Negligible	Moderate/minor	Minor	Minor/none	None

Assessment of significance of landscape and visual effects

Where overall effects are predicted to be Moderate-Major or greater (dark grey), these are considered to be equivalent to significant effects, as referred to in the *Town and Country Planning (Environmental Impact Assessment) (Scotland) Regulations* 1999. Overall effects of major/moderate (mid grey) may be significant if experienced over an extensive proportion of a receptor, area or route. Changes of moderate or less are not likely to result in significant effects.

Sequential visual effects

Sequential visual effects typically occur when moving along a linear route, as the observer moves from one point to another and gains views of other wind developments or a different view of the same development. They were driven in both directions, noting where intervening vegetation, buildings or embankments would limit views and recording the elapsed time and distance from the turbines. This was then compared with the ZTV and conclusions drawn about the likely visibility of the turbines. Assessment of the significance of the sequential effect takes into account the direction of travel, the proportion of the journey affected and the relative distance from the turbines.

Cumulative Methodology

Although a Guide to Assessing the Cumulative Effects of Wind Energy Development has been produced (DTI Final Consultation Draft December 1999), there are as yet no formalised guidelines in Great Britain defining an approved methodology for the assessment of cumulative effects on landscape and visual amenity that have been approved and endorsed by the Landscape Institute. The approach used is therefore based on draft guidance notes on cumulative landscape and visual impact assessment of wind farm developments produced by SNH (2005) and the Guidelines for Landscape and Visual Impact Assessment, LI-IEMA 2002.

Scope of Cumulative Assessment

The Cumulative Landscape and Visual Impact Assessment (CLVIA) takes account of all sites which have potentially significant overlapping study areas, and that are in 'the public domain' i.e.:

- Any constructed wind farm;
- Any consented wind farm proposal; and
- Any wind farm proposal that has been lodged as a planning application to the relevant local planning authority or the Scottish Executive.

For the assessment of cumulative effects, the relevant wind farms are listed in Table 5.5.

Types of Cumulative Effect

Cumulative effects are those that occur, or may occur, as a result of more than one wind farm project being constructed. Potential cumulative landscape and visual effects arise from the combined effects of additional wind farm developments. Combined effects relate to the following:

- Extending visibility of wind turbines over parts of the study area from where there are currently existing wind farms visible, which give rise to extended combined visibility of wind turbines at particular locations in the landscape, which may be simultaneous or successive in nature;
- Extending visibility of wind turbines over parts of the study area from where there are currently no wind turbines visible, which may give rise to an extended sequential visibility of wind turbines across the landscape; and
- Both simultaneous and sequential visibility of wind turbines.

In relation to simultaneous visibility, cumulative effects occur where more than one wind farm is visible in the same direction from a particular place. Where wind farms are visible in more than one direction from that place, this is defined as successive visibility. In relation to the sequential visibility, cumulative effects occur where the observer has to move to another viewpoint to see the second wind farm, so they appear in sequence, depending on speed of travel and distance between the viewpoints.

The assessment of potential cumulative landscape and visual effects is carried out in the same generic way as that of non-cumulative effects. Professional judgements are made in relation to the magnitude of change caused by the wind farm to the existing landscape and visual baseline.

Magnitude of Cumulative Change

Cumulative landscape and visual effects may result from additional changes to the baseline landscape or visual amenity caused by the proposed development in conjunction with other wind farm developments. The emphasis of the assessment is on the changes the proposal would bring to the existing landscape, which incorporates wind farm developments as part of its baseline landscape character and visual amenity.

The assessment therefore identifies the cumulative magnitude of change relative to existing visual impacts of wind farms rather than the combined impact of all the wind farms visible. The magnitude of cumulative change arising from the proposed development is assessed as high, medium, low or negligible, based on interpretation of the following largely quantifiable parameters, to take account of cumulative change:

- The number of existing and proposed developments and wind turbines visible;

- The distance to existing and proposed developments;
- The direction and distribution of existing and proposed developments; and
- The landscape setting, context and degree of visual coalescence of existing and developments.

The principle of magnitude of cumulative change makes it possible for the development to have a major effect on a particular receptor while having only a minor cumulative effect. For example, if the magnitude of change of Wind Farm 1 on Receptor 1 is high (for example, if it is 1 km from the receptor) the effect of Wind Farm 1 on Receptor 1 is likely to be major. In terms of a cumulative effect on this receptor, Wind Farm 2 may be visible, but if it is located, for example, 25km from the receptor, the magnitude of cumulative change is likely to be low (Wind Farm 2 will be of limited visibility at 25km) and the cumulative effect is therefore minor.

A significant cumulative effect is likely to only occur if both Wind Farm 1 and Wind Farm 2 are both fully visible, at close distances from the receptor, possibly in the same direction of view and forming a large developed proportion of the skyline. On the basis of professional interpretation of the above parameters, the magnitude of cumulative change arising at both landscape and visual receptors from each of the existing wind farms and the proposed development, both individually and in combination with each other, has been evaluated for the proposed development.

Significance of Cumulative Effects

SNH guidance on cumulative assessment describes the need for understanding whether the Development crosses the threshold of acceptability for the total number of wind farms in an area. As no existing methodology exists for identifying when a landscape has reached its capacity in terms of wind farms, it is necessary to revert back to SNH and Local Authority Guidance which seeks to identify the landscape objectives and policies for the area.

The level of any identified cumulative landscape or visual effect has been assessed as major, major/moderate, moderate, moderate/minor, minor, minor/none or none, in relation to the sensitivity of the receptor and the predicted magnitude of change as outlined above. As in the case of non-cumulative effects, the matrix shown above is used to bring together receptor sensitivity and magnitude of change.

Appendix B – Ecology & Ornithology Report

Ascurry Single Turbine
Extended Phase 1 Habitat Survey

October 2013

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Summary

- A phase 1 habitat survey and protected species survey was undertaken at Ascurry to inform plans to install a single wind turbine.

- The survey area does not support any sites designated for nature conservation value at a local or national level. Several Sites of Special Scientific Interest (SSSI's) were recorded within 10km of the site however these are not connected by structure or function to the site.

- The survey included a search for suitable habitat for and evidence of protected species (i.e. otters, water voles, badgers, red squirrels, bats and birds).

- Although suitable habitat for a range of protected species was identified within the site, no direct field evidence was recorded.

- No European Protected Species licences are likely to be required.

- General mitigation measures are provided.

Ascurry Single Turbine
Phase 1 Habitat Survey

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1. INTRODUCTION

1.1 Remit

EnviroCentre was commissioned by Loco$_2$gen to undertake an Extended Phase 1 Habitat Survey at a site to the south east of Letham in Angus. The survey was requested to inform a planning application to erect a single wind turbine.

The survey aimed to identify all broad habitat types within the site boundary and an appropriate buffer zone, whilst identifying those habitats, which may support populations of protected species (e.g. bats and badgers) and may consequently require further investigation. Consideration is also given to potential ornithological issues associated with the proposed development.

This report sets out the methods by which the survey was undertaken, an account of baseline results, interpretation of the results and a consideration of mitigation, compensation and any requirement for additional, species specific survey work.

1.2 Site Description

The 'site' refers to the proposed turbine location plus a buffer zone of a 500m radius. The site is located at National Grid Reference NO 353539, 746476 approximately 2.5 km to the south east of Letham in Angus.

The site is dominated by arable fields separated by a mixture of post and wire fencing, walls, tall ruderal vegetation and tree lines.

The site is surrounded by further arable and pasture land.

A site location plan is located in Appendix A of this report and photographs are provided in Appendix B.

1.3 Proposed Development

The proposed development will see the erection of a single EWT 500kW turbine at the site. The turbine will be capable of generating 500kW of energy and will have a hub height of 50m and a rotor diameter of 54m.

1.4 Protected Species/ Legislation

European and National legislation along with Planning Policy and guidance relevant to the site is listed below. Cognisance has been taken of this legislation in the preparation of this report:

- The Wildlife and Countryside Act 1981 (as amended);
- The Conservation (Natural Habitats, &c.) Regulations 1994 (as amended);
- Protection of Badgers Act 1992 (as amended); and
- Local and UK Biodiversity Action Plans.

2. METHODS

All survey work was undertaken and verified by experienced and competent ecologists. The survey followed standard methods endorsed by Scottish Natural Heritage (SNH) and the Chartered Institute of Ecology and Environmental Management (CIEEM)[1]. This section provides summary details of the methods adopted.

2.1 Desk Study

Prior to the Phase 1 survey a desk study was undertaken. This included a search of the NBN Gateway[2] and Scottish Natural Heritage's SiteLink website[3], and the Woodland Trust[4] to identify records of the following within a 10km radius of the site:

- Statutory designated sites (Special Protection Areas (SPAs), Special Areas of Conservation (SACs), and Sites of Special Scientific Interest (SSSI);
- Non-statutory designated sites (e.g. Ancient Woodland Inventory, Local Wildlife Sites and Local Nature Reserves);
- Legally protected or notable species/populations (e.g. the presence of bat roosts or badgers);
- UK Biodiversity Action Plan[5] and Tayside Local Biodiversity Action Plan[6] priority habitats and species.

2.2 Phase 1 Habitat Survey

The baseline ecological data for the site was obtained by undertaking an Extended Phase 1 Habitat Survey following guidelines set out by the Joint Nature Conservation Committee (JNCC)[7]. This is a nationally adopted method for baseline ecological survey. Scientific plant names are used in the text and nomenclature follows that of the standard British flora[8].

The site was surveyed on 30th August 2013 when conditions were bright and clear with an air temperature of 19^{o}C.

The survey aimed to identify and map broad habitat types in the proposed development site and its environs and to identify those habitats suitable for, or direct signs of, sensitive or protected faunal species.

A habitat map has been provided in Appendix C of this report while target notes are presented in Appendix D.

2.3 Protected Species Survey

Based on the outcomes of the desk study (see section 3.1) and the habitats found within the site, searches for direct evidence and suitable habitat for the following species were made:

- Otter *(Lutra lutra)*;
- Water vole *(Arvicola terrestris);*
- Badger (*Meles meles*);

[1] IEEM – Guidance on Survey Methodology, Winchester (2006)
[2] NBN Gateway website, available at: www.searchnbn.net
[3] Scottish Natural Heritage Site Link website available at: www.snhi.gov.uk
[4] Woodland Trust www.woodlandtrust.org.uk
[5] UK Biodiversity Action Plan from http://www.ukbap.org.uk
[6] Tayside Biodiversity Action Plan: Available at http://www.angus.gov.uk/biodiversity/actionplan.htm
[7] JNCC – Handbook for Phase 1 Habitat Survey (1991)
[8] Stace, C.A. 1995 New Flora of the British Isles. Cambridge University Press.

- Red squirrel (*Sciurus vulgaris*)
- Bats (various species); and
- Birds (various species).

2.3.1 Otter Survey

The otter survey extended along both banks of any streams within the site, where access allowed. The survey followed best practice guidelines[9] and a search was made for suitable habitat along with field signs, including:

- Spraints (otter faeces/droppings used as territorial signposts. Often located in prominent positions and can be placed on deliberate piles of soil or sand);
- Footprints;
- Feeding remains (can often be a useful indication of otter presence);
- Paths/Slides (otter can often leave a distinctive path from and into the watercourse);
- Holts: holts (underground shelter) are generally found:
    - Within trees roots at the edge of the bank of a river;
    - Within hollowed out trees;
    - In naturally formed holes in the river banks that can be easily extended;
    - Or preferably in ready-made holes created by other large mammals or humans such as badgers sett, rabbit burrows or outlet pipes; and
- Couches/lay-ups (couches or lay-ups are places for lying up above ground are usually located near a watercourse, between rocks or boulders, under dense vegetation).

Where evidence of otter activity was identified, a grid reference was taken at the location and photographs were taken for further interpretation.

2.3.2 Water Vole Survey

The otter survey extended along both banks of any streams on site, where access allowed, and followed standard guidelines[10]. Water voles tend to confine their activity to within 3 m of the bank edge along a watercourse where field signs are to be found. Field evidence includes:

- Faeces: 8-12 mm long, 4-5 mm wide; cylindrical and blunt ended pellets; colour variable with food type. Most droppings left in latrines near the nest, at range boundaries and at water entry points;
- Latrine sites: Concentrations of faeces, often with fresh droppings on top of old ones;
- Runways: Often 5-9 cm broad and multi-branched; usually within 2 m of water's edge and often forming tunnels through vegetation; leading to water's edge or burrows;
- Burrows: 4-8 cm diameter, wider than high; eroded entrances then contract down to typical size; entrances located at water's edge; however some entrances be up to 3m from the water; no spoil heaps;
- Nests: size and shape of a rugby ball, often in base of rushes, sedges or reeds;
- Feeding stations: located along runways, or at platforms along water's edge; usually a pile of cut/chewed vegetation in sections approximately 10 cm long; vegetation ends show marks of two large incisors. Piles of chopped grass, sedge or rush stems, rush pith and leaves;
- Lawns: Short, grazed vegetation around land entrances, often used during nursing periods;

[9] Chanin, P (2003). Natural Life Series, Monitoring the European Otter. Natural England.
[10] Strachan, R. (1998). Water Vole Conservation Handbook. Wildlife Conservation Research Unit, Oxford.

- Footprints: Difficult to tell from rat; adult hind foot 26-34 mm (heel to claw); stride 120mm (smaller than rat); occur at water's edge and lead into vegetation; and
- Sound: Characteristic 'plop' when a vole enters the water.

Emphasis was placed on locating latrine sites. Latrine sites are the most useful sign for recording purposes. They indicate whether there is definite presence of water voles at a site and are used for determining the approximate number of animals within the colony.

Given the aggressive predation on water vole by American mink (*Mustela vison*), all signs of this species were also searched for. Field signs included spraints, footprints and prey remains.

2.3.3 Badger

2.3.3.1 Habitat Suitability

The survey area was searched in its entirety to identify any potential habitat suitable for foraging and commuting badgers.

Badgers require suitable ground conditions for sett creation (e.g. soil that is free draining and can easily be excavated). Continuous well connected linear vegetation, such as tree lines and hedgerows, provide good foraging, sheltering and commuting habitats for badgers and native berry producing trees and shrub species offer a seasonal food resource for badgers.

2.3.3.2 Sett Survey

A badger sett is any structure or place which displays signs indicating current use by badger/located within an active badger territory. Setts comprise of a series of underground tunnels and chambers which form the home of a badger social group (clan). Although normally recorded in sloped, sandy soil in woodland habitats, it should be noted that badgers will excavate setts in a wide range of environs including urban settings.

Setts can be located anywhere within the territory of the clan and more than one sett can often be in use. Within one territory badgers may maintain a main sett with several annexe or satellite setts. Setts are identified by a number of characteristic features. These features include:

- A network of broad, concave entrances;
- Well-worn paths between entrances and foraging areas;
- Piles of excavated soil beside entrances (spoil heaps); and
- Piles of bedding materials beside entrances.

Diagnostic footprints and hair found around a sett can often confirm the presence of badgers and provide evidence of recent use. Fresh soil on spoil heaps can indicate recent use.

2.3.3.3 Field Signs

Badger field signs not only provide evidence of the species, but also give an indication of badger movements and how they utilise their territory. Badger field signs are described in Neal & Cheeseman[11] , Bang & Dahlstrøm[12] , and in SNH (2001)[13] and include:

[11] Neal, E. & Cheeseman, C. (1996). Badgers. Poyser Natural History, London.
[12] Bang P. and Dahlstrom P. 1980. Collins guide to animal tracks and signs. London, Collins.

- Badger guard hair;
- Footprints;
- Snuffling (badgers use their snout to turn over vegetation or soft soil to forage for bulbs and invertebrates);
- Scratching posts (marks on tree trunks/ fallen trees where badgers have left claw marks);
- Breach points (gaps in fences or crossing points over roads);
- Dung pit (single faeces deposit placed in a small excavation); and
- Latrines (collection of faecal deposits often used by badger clans to mark home range boundaries).

2.3.4 Red Squirrel

The walkover survey followed best practice guidance[14] which involves the initial identification of suitable habitat (primarily coniferous woodland) within the survey area. In addition, the survey focused on searching for two distinct signs of squirrel activity. Note that neither of these methods accurately distinguishes between red or grey squirrels.

The signs of squirrel activity searched for are dreys and the remains of pine cones which have been stripped of their edible parts. The following methods are adopted:

- Drey count – dreys are the nests made by both species of squirrels in trees. Dreys are easily distinguishable from bird nests as they are normally 50 cm in diameter and 30 cm deep. They are normally located close to the main stem of the tree at a height of 3 m or more.
- Feeding transects – Where cone producing trees (conifers) are evident, a 50m x 1m transect is laid out through the woodland and evidence of squirrel feeding is searched for. Although the two species of squirrel cannot be distinguished from feeding remains, the manner in which squirrels break open seeds and nuts, which are then left on the forest floor, is diagnostic from other groups of animals.

2.3.5 Bat Roost Potential Survey (BRP)

The BRP is designed to identify those structures and features present within a site which may provide suitable habitat for roosting bats and may therefore require further survey work. Bats utilise a variety of roosts throughout the year, depending on their seasonal needs (e.g. breeding or hibernating etc.) and on the prevalent climatic conditions.

The BRP survey was conducted in accordance with the assessment criteria set out by the Bat Conservation Trust[15] and comprised ground based visual inspections of trees and an internal and external investigation of any buildings on site where access allowed.

In general, it is accepted that mature, broad-leaved trees are preferred by bats, particularly Oak (*Quercus* spp.) and Beech (*Fagus sylvatica*). It is also known that for trees to be used by bats, they must be part of a wider habitat network that allows protected foraging, commuting and dispersal. The criteria used to assess the suitability of buildings and trees for bat roosts can be found in Table 1.

[13] SNH (2001). Scotland's Wildlife: Badgers and Development (http://www.snh.org.uk/publications/online/wildlife/badgersanddevelopment/default.asp).
[14] Gurnell J, *et al* (2001). Forestry Commission Practice Note 11. Forestry Commission, Edinburgh.
[15] Bat Conservation Trust (2007). Bat Surveys – Good Practice Guidelines. Bat Conservation Trust, London.

Table 1: Bat Roosting Features and Field Signs

Features of buildings used as bat roosts	Features of trees used as roosts	Signs indicating possible use by bats
Gaps/cracks in wood barge boards, soffits and fascia boards	Cavities/ Loose bark	Tiny scratches around entry point
Gaps in end tiles, ridge tiles and eaves	Woodpecker holes	Staining around entry point
Gaps in lead flashing and roofing felt	Cracks/splits in major limbs	Bat droppings in/around/below entrance
Cavities in masonry	Behind thick ivy growth	Audible squeaking at dusk or during warm weather
Broken or hanging tiles	Within dense epicormic growth	Flies around entry point
Ventilation ducts, damaged drainage, overflow pipes	Existing bird and bat boxes	Smoothing of surfaces around cavity

Trees are more likely to be used for roosting by bats if they are part of a wider habitat network that allows protected foraging, commuting and dispersal.

According to their roosting suitability, trees are categorised as follows:

- Known roost
- Category 1*: Trees with multiple, highly suitable features capable of supporting larger roosts;
- Category 1: Trees with definite bat potential, supporting fewer features than category 1* trees or with potential for use by single bats;
- Category 2: Trees with no obvious potential, although the tree is of a size and age that elevated surveys may result in cracks or crevices being found; or the tree supports some features which may have limited potential to support bats; and
- Category 3: Trees with no potential to support bats.

2.3.6 Birds

A desk study was undertaken to identify the potential sensitivity of avian species to the proposed wind turbine development.

The desk study was supported by a search for suitable nesting features during the Phase 1 Habitat Survey.

2.4 Constraints

The protected species surveyed for are transient in nature and this survey provides a snapshot of the activity on site.

3. SURVEY RESULTS

3.1 Desk Study

The results of the desk study are provided in the table below.

Table 2: Desk Study Results

Source	**Information Provided**			
SiteLink	**Site name**	**Designation**[16]	**Distance and orientation**	**Features**
	Rescobie and Balgavies Lochs	SSSI	4.5km N	Vascular plant assemblage Transition open fen Basin fen
	Dilty Moss	SSSI	5.5km SE	Raised bog
Local Plan	No non-statutory designations are applicable to the site.			
Sketchmap	**Woodland name**		**Distance and orientation**	**Category (Antiquity Woodland Categories**[17]**)**
	Ascurry Wood		0.23km SE	Long-established (of Plantation origin)
	Ascurry Wood/ Cotton of Gask Wood		0.72km SW	Long-established (of Plantation origin)
	No name		1km N	Long-established (of Plantation origin)
	Idves Strip		1.5km NW	Long-established (of Plantation origin)
NBN Gateway	**Species occurring within 5km of the site**		**Distance and orientation**	**Source/date**
	Brown Hare (*Lepus europaeus*)		Two records 3km N and E	People's Trust for Endangered Species (29/05/2012) Biological Records Centre (20/05/2008)
	Otter (*Lutra lutra*)		Five records, closest 1.5km NW	JNCC (02/12/2004)
	Pine Marten (*Martes martes*)		One record 4.5km W	Biological Records Centre (20/05/2008)
	Eurasian Badger (*Meles meles*)		Three records, closest 3.5km NE	Biological Records Centre (20/05/2008)

[16] Site of Special Scientific Interest (SSSI), Special Area of Conservation (SAC), Special Protection Area (SPA), Ramsar wetland designation (RAMSAR).
[17] Definition of antiquity categories, available from: http://www.snh.org.uk/publications/on-line/advisorynotes/95/95.html

	Daubentons bat (*Myotis daubentonii*)	Two records closest 1.5km N	BCT (29/05/2012)
	Common pipistrelle bat (*Pipistrellus pipistrellus*.)	One record, 4km SW	BCT (29/05/2012)
	Soprano pipistrelle bat (*Pipistrellus pygmaeus)*	One record 5km E	SNH (12/04/2007)
	Brown long-eared bat (*Plecotus auritus*)	Two records, closest 1km N	BCT (29/05/2012) SNH (12/04/2007)
	Red squirrel (*Sciurus vulgaris*)	Twelve records, closest 1km NW	SWT (19/04/2013)
JNCC	JNCC Article 17 reporting maps (2008) show that the distribution and range of the following species include that of the site area: Common pipistrelle (*Pipistrellus pipistrellus*), Brown long-eared (*Plecotus auritus*) Daubentons (*Myotis daubentonii*), Natterers (*Myotis nattereri*) and Soprano (*Pipistrellus pygmaeus*)		
LBAP (Tayside) and UKBAP	The following bat species are listed in UKBAP and LBAP and potentially relevant to the site: **Species:** • Badger (LBAP); • Pine marten(UKBAP); • Daubentons bat(UKBAP); • Soprano pipistrelle (UKBAP);and • Red squirrel(UKBAP) Please note that other bat species are included as UKBAP priority species but are not included here as they are not considered to be relevant to the region.		

The JNCC collation of taxon designations includes those species are that included within the following items:

- Bern Convention (Appendices 1, 2 and 3);
- Biodiversity Action Plan (BAP) UK priority species list;
- Global IUCN Red List;
- Habitats Directive (Annex 2 (priority species), Annex 2 (non-priority species), Annexes 4 and 5);
- Nationally Rare/Scarce (not based on IUCN criteria);
- National Red Lists (including red listings based on IUCN guidelines);
- Species of principal importance in Scotland (NERC section 41 & 42 lists, Scottish Biodiversity List);
- The Conservation (Natural Habitats, &c.) Regulations 1994 (Schedules 2, 3 & 4) and
- Wildlife and Countryside Act 1981 (Schedules 1, 5 & 8).

The table below lists notable plant species included within the JNCC collation of taxon designations recorded for the 10 km grid square in which the site is located (NO54 between 1993-2013)

Vernacular name	Scientific name
Annual Knawel	*Scleranthus annuus*
Black-bindweed	*Fallopia convolvulus*
Bluebell	*Hyacinthoides non-scripta*
Bogbean	*Menyanthes trifoliata*
Box	*Buxus sempervirens*
Charlock	*Sinapis arvensis*
Chicory	*Cichorium intybus*
Coralroot Orchid	*Corallorhiza trifida*
Corn Mint	*Mentha arvensis*
Eyebright	*Euphrasia arctica subsp. borealis*
Field Madder	*Sherardia arvensis*
Harebell	*Campanula rotundifolia*
Heath Cudweed	*Gnaphalium sylvaticum*
Heather	*Calluna vulgaris*
Hoary Plantain	*Plantago media*
Lesser Butterfly-orchid	*Platanthera bifolia*
Monk's-rhubarb	*Rumex alpinus*
Primrose	*Primula vulgaris*
Scandinavian Small-reed	*Calamagrostis purpurea*
Sun Spurge	*Euphorbia helioscopia*
Wall Germander	*Teucrium chamaedrys*
Welsh Poppy	*Meconopsis cambrica*
Wild Pansy	*Viola tricolor*
Wood Crane's-bill	*Geranium sylvaticum*

3.2 Phase 1 Habitat Survey

This section describes the habitats identified within the site. When considering this section, reference should be made to the supporting maps, target notes and photographs provided in the appendices of this report.

A total of twelve habitat types were identified within the site boundaries.

- A1.1.1 semi-natural broad-leaved woodland;
- A2.2 scattered scrub;
- A3.1 broad-leaved scattered trees;
- B1.2 semi-improved grassland;
- B3 improved grassland;
- C3.1 tall ruderal vegetation;
- J1.1 arable;
- J2.5 wall;
- J2.6 dry ditch;
- J3.4 fence.
- J3.6 buildings; and
- J4 bare ground.

Semi-natural broad-leaved woodland
Woodland is defined as vegetation dominated by trees more than 5m high when mature, forming a distinct although sometimes open canopy. Semi natural woodland comprises all stands which do not obviously originate from planting. This habitat is located in the south east of the site and north east of the site and comprises a mixture of beech (*Fagus sylvatica)*, willow (*Salix* sp.) and sycamore (*Acer pseudoplatanus)* with an understory of bramble (*Rubus fruticosa*), gorse *(Ulex europaeus*), common nettle *(Urtica dioica)* and broom (*Genista scoparia).*

Scattered scrub
Scrub is seral or climax vegetation dominated by locally native shrubs, usually less than 5m tall. This habitat is present along the dry ditch to the north of the turbine location. The species composition is primarily gorse *(Ulex europaeus*) and hawthorn *(Crataegus monogyna).*

Broad-leaved scattered trees
Scattered trees are located along the field boundaries in the west of the site. The species include ash (*Fraxinus excelsior)* and rowan (*Sorbus aucuparia).* These trees may provide suitable nesting habitat for birds and commuting corridors for bats.

Semi-improved grassland
Semi-improved grassland is a transition category made up of grassland which have been modified by artificial fertilisers, slurry and intensive grazing and consequently have a range of species which are less diverse and natural than unimproved grassland. This habitat is located in the field to the east of the proposed turbine location and in the north of the site. The species composition includes cocks foot (*Dactylis glomerata*), fescues (*Festuca* sp.), common bent (*Agrostis capillaris*), perennial ryegrass (*Lolium perenne*), daisy (*Bellis perennis*), white clover (*Trifolium repens*), creeping buttercup (*Ranunculus repens)* and common thistle *(Cirsium vulgare).*

Improved grassland
This habitat is similar to that above but has undergone more intensive grazing reducing its overall species diversity. This habitat is present in the north east of the site.

Tall ruderal
Areas of tall ruderal vegetation were present along the field boundaries throughout the site and adjacent to the dry ditch to the north and north east of the proposed turbine location. The species present within this habitat included rosebay willowherb *(Chamerion angustifolium)*, common nettle *(Urtica dioica)*, broadleaf dock *(Rumex obtusifolius)*, and ragwort *(Jacobaea vulgaris)*. The longer vegetation may provide suitable cover and shelter for commuting mammals.

Arable
This habitat is the dominant habitat throughout the site. It is found in the field of the turbine location as well as the surrounding fields. It is considered to offer low ecological value, although the tree lines and tall ruderal vegetation along some of the field boundaries may provide suitable commuting corridors for small mammals.

Wall
A stone wall is present around the field boundaries in the west of the site.

Dry ditch
A dry ditch was present to the north and north east of the turbine location, no standing water was recorded and the ditch was noted to be overgrown with tall ruderal vegetation.

Fence
A post and wire fencing is present around the fields in the south and east of the site.

Building
A derelict outbuilding is present in west of the site and is described in detail below.

Bare ground
This habitat includes bare soil and other substrates (including tarmac). This habitat is present in the form of an unnamed road running north south in the east of the site.. It is considered to be of low ecological value.

3.2.1 Faunal Species

During the site walk-over, an assessment was made of the potential presence of nationally or internationally protected species and species of local importance as highlighted during the desk study. The following sections present the results of the survey.

3.2.1.1 Otter Survey

No otter field signs were identified during the survey.

No suitable habitat for otters was identified within the site as the ditch was recorded to be dry.

3.2.1.2 Water Vole Survey

No water vole field signs were identified during the survey.

No suitable habitat for water voles was identified within the site as the ditch was recorded to be dry.

3.2.1.3 Badger Survey

Habitat Survey
The survey identified generally flat lying improved and semi-improved grassland fields in the east and north of the site separated by post and wire fencing, tall ruderal vegetation and stone walls. In most places soils appeared to be free draining, providing both a suitable substrate for sett excavation and foraging. In general, the survey area presented some of the features required by sheltering and commuting badgers, particularly the tall ruderal vegetation and tree lines.

Sett Survey
Despite suitable habitat for badgers being identified, there was no evidence of badger setts at the site.

Field Signs Survey
Although generic mammal field signs were identified at the site, such as mammal paths, there was no evidence of badger field signs.

3.2.1.4 Red Squirrel Survey

As demonstrated in the Phase 1 habitat survey, there was no suitable habitat for this species within the survey area.

3.2.1.5 Bat Roost Potential Survey

There is a derelict outbuilding present in the west of the site. It was identified to be comprised of stone and wooden slatted walls with a corrugated metal roof. Although gaps were present under the corrugated sheets, these were considered to be too large and exposed for sheltering bats. The buildings were therefore considered to have limited bat roost potential.

While the woodland in the north east and south east and the scattered trees along the field boundary in the north west of the site did not present any of the features listed in table 1, the trees are of a size and age that elevated surveys may result in cracks or crevices being found. These trees were considered to be Category 2. The remainder of trees on site were recoded as immature and multi-stemmed with no potential to support roosting bats. These were considered to be Category 3 trees.

The survey area supports a limited number of linear vegetation features which could support foraging and commuting bats. The mitigation section below provides recommendations for how to avoid affecting foraging and commuting bats.

3.2.1.6 Birds

No evidence of nesting birds was found during the survey. While the scattered scrub and trees around the site may provide suitable nesting habitat for birds the proposed turbine location, located on arable land, is unlikely to affect breeding birds.

4. FURTHER SURVEY

4.1 Further Survey

No further survey of the site is necessary.

A bird survey is not necessarily required if construction work can be either timed to avoid the bird breeding season or a pre-construction check of any vegetation to be removed is undertaken immediately prior to works.

Natural England has developed guidance[18] that provides information on how best to site turbines to avoid impacts to bat species. This guidance states that:

"*A bat survey should normally be recommended for applications for turbines that will be located within 50 m of the following features:*

- *buildings or other features or structures that provide potential as bat roosts, including bridges, mines etc;*
- *woodland;*
- *hedgerows;*
- *rivers or lakes; and*
- *within or adjacent to a site designated for bats (SSSI or SAC)."*

Therefore, 50m should be the minimum distance between the tip of the turbine blade to the nearest feature which may be used by bats. This distance should not be measured from the base of the turbine but instead should take into account the height of the feature. In order to accurately measure this stand-off distance from the blade tip Natural England have produced the following equation[19]:

$$b = \sqrt{(50 + bl)^2 - (hh - fh)^2}$$

b = the minimum distance
bl = blade length (27m)
hh = hub height (50m)
fh = feature height (4m)

At Ascurry the minimum distance equates to **61.75m**.

As the proposed turbine is located approximately **115m** from the nearest linear feature, it is unlikely to affect any feature that may be used by roosting, foraging or commuting bats.

No further survey for bats is required.

[18] Natural England (2009). Natural England Technical Information Note TIN059 – Bats and Single Large Wind Turbines: Joint Agencies Interim Guidance
[19] Natural England (2012). Natural England Technical Information Note TIN051 – Bats and Onshore Wind Turbines (second edition)

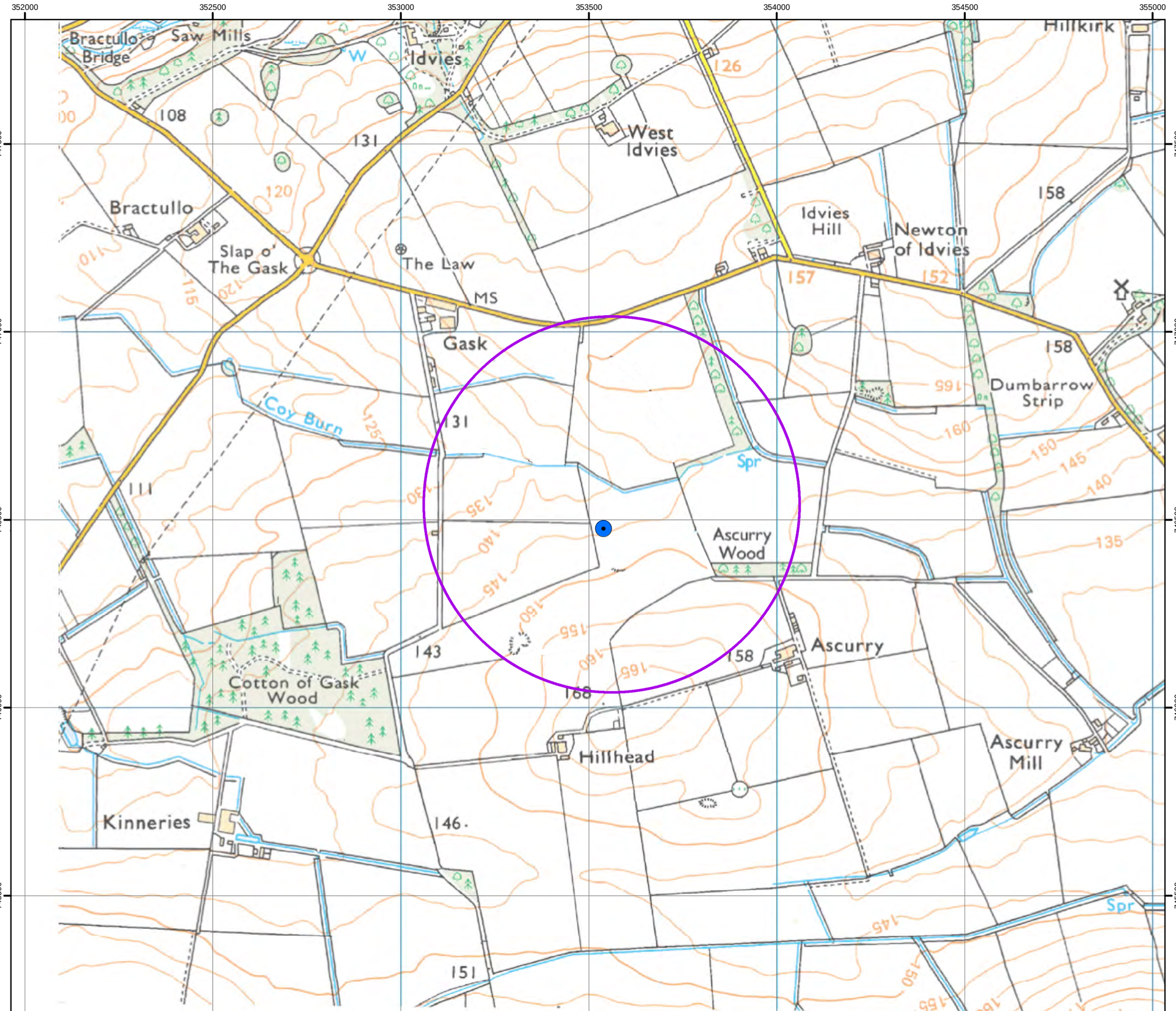
4.2 Protected Species Licensing

It is unlikely that a protected species licence will be required for this development. Should a protected species, or evidence of a protected species, be discovered on site the licensing requirement will require to be reviewed.

4.2.1 General Good Practice Mitigation During Construction

1. Any vegetation removal should be undertaken outside the bird nesting season, which runs from March to August. If vegetation removal is planned during the nesting season, a suitably qualified ecologist should inspect the area for the presence of nests up to a maximum of one day prior to removal. If an active nest is discovered the vegetation cannot be removed and must be left until the young have fledged. In this scenario alternative approaches to the works should be proposed.
2. Any trenches or pits should be covered when unattended or a shallow angled plank inserted to allow animals to escape, should they become trapped inside them. The ends of any pipeline should be capped when unattended, or at the end of each working day to prevent animal access.
3. In the event that a protected species is discovered on site all work in that area must stop immediately and an ecologist contacted. Details of the local police Wildlife Crime Officer, SNH Area Officer and Scottish Society for the Prevention of Cruelty to Animals (SSPCA) relevant Officer could be held in site emergency procedure documents.

Appendix A: Site Location Plan



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Legend

- Turbine Location Updated Oct 2013
- Survey Area

Do not scale this map

Client: Locogen

Project: Hillhead of Ascurry Single Turbine

Title: Site Location Plan

Status: FINAL

Drawing No.: 164621-003

Revision: A

Scale: 1:10,000

A3

Date: 14 Oct 2013

Drawn	Checked	Approved
JI	MN	KH

ENVIRO Centre
Craighall Business Park, Eagle Street, Glasgow, G4 9XA
Tel: 0141 341 5040
Fax: 0141 341 5045

Appendix B: Site Photographs

Photograph 1: A view of the arable field in which the turbine is proposed.

Photograph 2: A view of the semi-natural woodland in the south east of the site.

Photograph 3: A view of the semi-improved grassland in the east of the site.

Photograph 4: A view of the semi-natural woodland in the north east of the site.

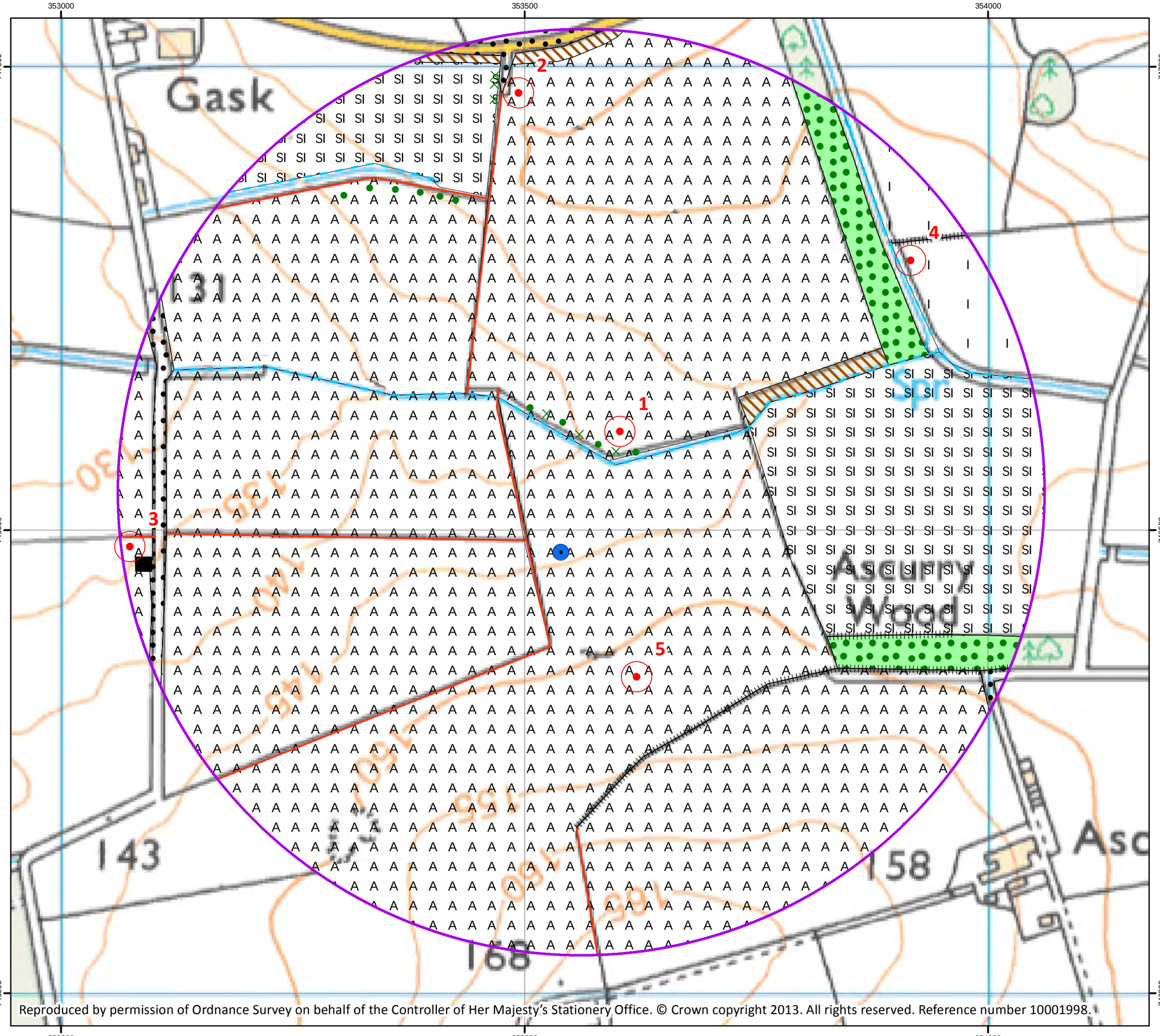
Photograph 5: A view of overgrown dry ditch in the north east of the site.

Photograph 6: A view of the disused building in the west of the site.

Photograph 7: A view of one of the stone wall boundaries in the west of the site.

Photograph 8: A view of the tree line along a field boundary in the north west of the site.

Appendix C: Phase 1 Habitat Map



Legend

- Turbine Location Updated Oct 2013
- Survey Area
- Target Note

JNCC Code

- A1.3.1 Broadleaf semi-natural woodland
- A2.2 Scattered Scrub
- A3.1 Scattered Broadleaved Trees
- B4 Improved Grassland
- B6 Poor Semi-Improved Grassland
- C3.1 Tall ruderal
- J1.1 Cultivated/disturbed land
- J2.4 Post & Wire Fence
- J2.5 Wall
- J2.6 Dry Ditch
- J3.6 Building
- J4 bare Ground

Do not scale this map

Client: Locogen

Project: Hillhead of Ascurry Single Turbine

Title: Phase 1 Habitat Survey

Status: FINAL

Drawing No.	Revision
164621-002	A

Scale		Date
1:4,000	A3	14 Oct 2013

Drawn	Checked	Approved
JI	MN	KH

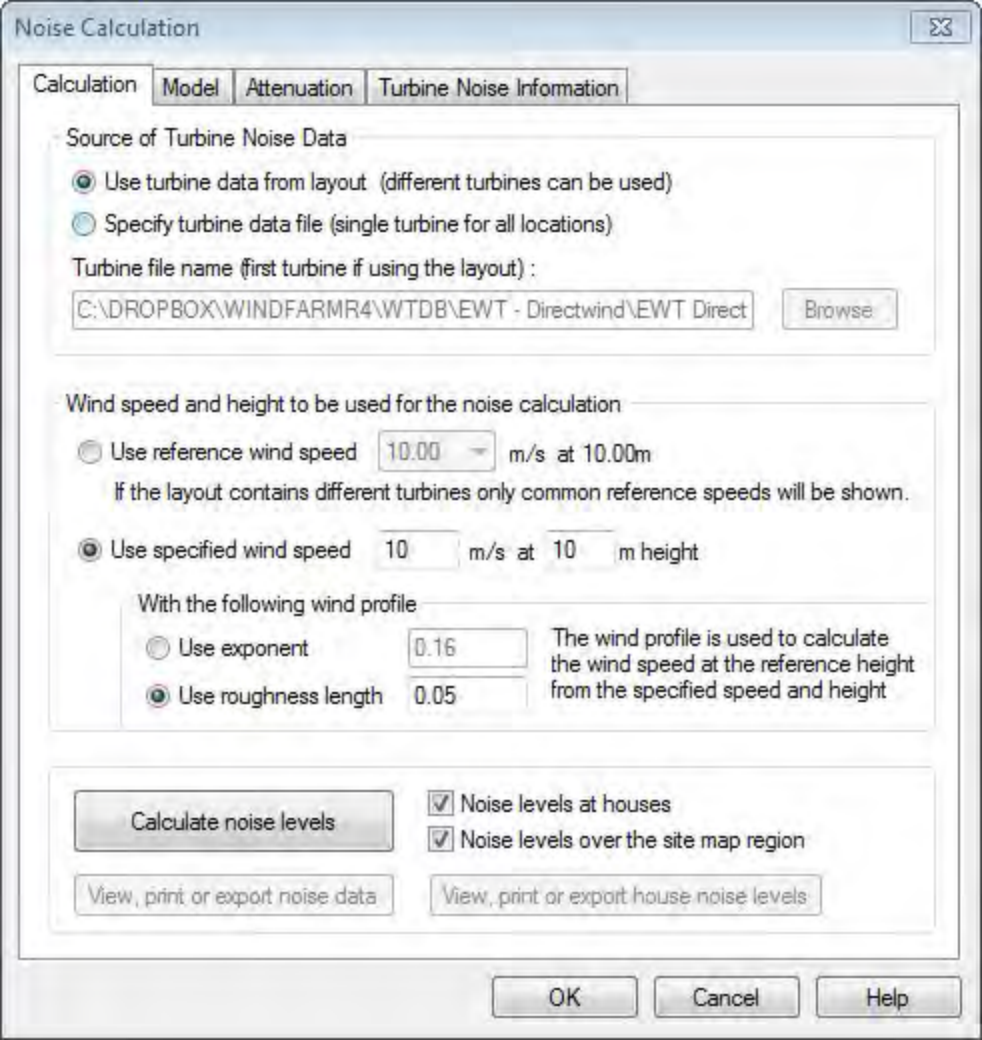
ENVIRO Centre
Craighall Business Park, Eagle Street, Glasgow, G4 9XA
Tel: 0141 341 5040
Fax: 0141 341 5045

Appendix D: Target Notes

Date of Survey: 30th August 2013
Recorder Name: Karen Hassard
Weather Conditions: Bright and clear with an air temperature of 19°C.

Target Note	Details
1.	**Feature:** Scattered scrub **Description:** This habitat is present to the north of the proposed turbine location. Although it is not continuous it may provide a suitable commuting and foraging route for gap tolerant bat species such as pipistrelles.
2.	**Feature:** Rubble pile **Description:** A large pile of building rubble was recorded adjacent to the road in the north of the site.
3.	**Feature:** Derelict building **Description:** There is a derelict outbuilding present in the west of the site. It was identified to be comprised of stone and wooden slatted walls with a corrugated metal roof. Although gaps were present under the corrugated sheets, these were considered to be too large and exposed for sheltering bats. The buildings were therefore considered to have limited bat roost potential.
4.	**Feature:** Dry ditch **Description:** A dry ditch was present to the north east of the turbine location, no standing water was recorded and the ditch was noted to be overgrown with tall ruderal vegetation. It was therefore not considered suitable habitat for otters or water voles.
5.	**Feature:** Arable land **Description:** This habitat is the dominant habitat throughout the site. It is found in the field of the turbine location as well as the surrounding fields. The main crop grown was identified to be a variety of wheat.

Appendix C – Manufacturer's Noise Data and ReSoft Windfarm Report Exports


Noise Calculation
Calculation
Model
Attenuation
Turbine Noise Information
Source of Turbine Noise Data
Use turbine data from layout (different turbines can be used)
Specify turbine data file (single turbine for all locations)
Turbine file name (first turbine if using the layout) :
C:\DROPBOX\WINDFARMR4\WTDB\EWT - Directwind\EWT Direct
Browse
Wind speed and height to be used for the noise calculation
Use reference wind speed
10.00
m/s at 10.00m
If the layout contains different turbines only common reference speeds will be shown.
Use specified wind speed
10
m/s at
10
m height
With the following wind profile
Use exponent
0.16
Use roughness length
0.05
The wind profile is used to calculate the wind speed at the reference height from the specified speed and height
Calculate noise levels
Noise levels at houses
Noise levels over the site map region
View, print or export noise data
View, print or export house noise levels
OK
Cancel
Help

Noise Calculation

Calculation | Model | Attenuation | Turbine Noise Information

Noise Model

- Danish noise standard
- ISO 9613

Noise spreading model

ISO 9613 suggests the 500Hz attenuation coefficient is used for broadband spreading. This suggests and it is recommended that 0.002 is used for the Danish model.

Only the alternate ISO 9613 ground model can be used with broadband spreading.

If the ISO 9613 model is used with broadband spreading and no ground attenuation the result will be 3dB lower than the Danish model because hard ground is not included as a default in the ISO 9613 model.

- Use broadband sound power level and attenuation : 0.005 dB(A) / m
- Use speading by octaves (attenuation is specified on the attenuation page)
- [x] Use line of sight distance (includes turbine hub height)

Additional Factors

- [ ] Add a base level noise of 0 dB(A)
- [ ] Use a distance limit of 5000 metres (noise ignored beyond this distance)

OK | Cancel | Help

Noise Calculation

Calculation | Model | Attenuation | Turbine Noise Information

Atmospheric Octave Attenuation

- ○ Use default attenuation for Danish model
- ○ Specify attenuation manually
- ◉ Use ISO 9613 attenuation (specify humidity and temperature)

Humidity (%) : 70% ▾ Temperature (deg C) : 10 ▾

Attenuation Coefficents (dB/m)

Hz	63	125	250	500	1000	2000	4000	8000
	0.00012	0.00041	0.00104	0.00193	0.00366	0.00966	0.0328	0.117

☐ Keep attenuation as default Reset attenuation to original defaults

Ground Attenuation

- ○ No ground attenuation (Danish = hard ground, 3dB more than with ISO 9613)
- ◉ ISO 9613
- ○ Alternative ISO 9613

Porosity Factor (0=hard, 1=soft)

Source porosity factor : 0.5 Middle : 0.5 Receiver : 0.5

Receiver height (m) : 4 ☐ Use receiver height and porosity from layout

OK | Cancel | Help

Noise Calculation

Calculation | Model | Attenuation | Turbine Noise Information

This turbine data is just for information. Use the Turbine Studio to change any values.

Turbine File : C:\DROPBOX\WINDFARMR4\WTDB\EWT - Directwind\EWT

Turbine broadband sound power level :	99.5	dB(A)
Reference measurement windspeed :	10	m/s at height : 10 m
Reference measurement roughness :	0.05	m
Variation of noise with wind speed :	0.8	dB(A) / m/s
Tonal penalty :	0	dB(A)

Octave data - dB(A)

Hz	63	125	250	500	1000	2000	4000	8000
	80.75	86.95	92.25	93.55	92.15	89.65	82.75	70.95

OK | Cancel | Help

Project name : ASCURRY
Layout name : HILLHEAD 77M FINAL LOCATION FG1.WFL

Noise data file name : NASCURRY.WFN
Created : 09:37:31 20-Aug-2013
Revised : 16:09:08 17-Oct-2013
Revision : 62
Title :
Author :
Comment :

Turbine noise data : From the layout
Turbine file (first) : ..\WTDB\EWT - Directwind\EWT Directwind - Measured 500kW ocata

NOISE MODEL
Noise standard : ISO 9613
Noise spreading model : Octaves
Use line-of-sight distance: Yes

ATMOSPHERIC ATTENUATION
Source of attenuation : ISO 9613
Humidity : 70 %
Temperature : 10 deg C
Attenuation coefficients
63 Hz : 0.00012
125 Hz : 0.00041
250 Hz : 0.00104
500 Hz : 0.00193
1000 Hz : 0.00366
2000 Hz : 0.00966
4000 Hz : 0.03280
8000 Hz : 0.11700

GROUND ATTENUATION
Formulation : ISO 9613
Source porosity : 0.50
Middle porosity : 0.50
Receiver porosity : 0.50
Receiver height : 4.00

WIND SPEED
Turbine reference : No
Wind speed : 10.00
Wind speed height : 10.0
Wind profile Z0 : 0.0500

ADDITIONAL FACTORS
Base noise level : None
Distance limit : None

House ID	Easting	Northing	Altitude	Noise (db)
1	353095	746862	0	31.72
2	353084	746903	0	31.13
3	353092	747040	0	29.68
4	353436	745929	0	32.28
5	354054	746083	0	30.75
6	353825	747162	0	29.35
7	354036	746253	0	32.49

	Emergya Wind Technologies BV
	DW54

Category:	Specification	Page 1 / 11
Doc code:	S-1005030	

Created by:	RH	Creation Date:	09-05-12
Checked by:	LE	Checked Date:	09-05-12
Approved by:	TY	Approved Date:	09-05-12

Title:

Specification

Sound power level DW54 - 500kW

Revision	Date	Author	Approved	Description of changes
01	17-08-12	RH	TY	corrected format
-	-	-	-	-
-	-	-	-	-
-	-	-	-	-
-	-	-	-	-
-	-	-	-	-

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Contents

1 Introduction

Following information with regard to the sound power level measurements, are distillated from measurement data of a *DIRECT**WIND*** 54 500kW turbine, located at the Elbaweg in Venhuizen, the Netherlands.

The measurements were performed by a third party according to the International Standard IEC 64100-11 December 2002: "Wind turbine generator systems – Part 11: Acoustic noise measurement techniques ".

2 Measurements

The measurements have been performed by measuring the sound pressure levels in the third octave bands of 25 Hz to 10,000 Hz at the reference point downwind of the operating turbine. The background noise level was measured during standstill of the turbine.

Measurements were carried out on the ground on a hard board according to the IEC standard. This method doubles the pressure on the microphone which raises the sound pressure level with +6 dB(A) compared to free field measurements.

The measured sound pressure levels can be found in Appendix 2 measured sound pressure levels.

3 Results

The sound power levels are calculated from the measured sound pressure levels according to IEC-61400-11. The wind velocities have been corrected for a reference roughness Z_0 of 0.05m by applying a factor of 1.1 on the measured wind velocity, and the sound power levels have been calculated for a reference height of 10m.

Sound power level Lwa in dB(A) **Wind speed at a height of 10m**		**middle frequency of the octave bands [hz]**								
		31.5	**63**	**125**	**250**	**500**	**1k**	**2k**	**4k**	**8k**
Wind 5 m/s	95.0 dB(A)	67.3	76.3	82.5	89.0	90.3	87.9	85.3	80.6	71.0
Wind 6 m/s	96.6 dB(A)	68.2	78.0	84.1	90.7	92.0	89.5	86.7	81.4	72.4
Wind 7 m/s	97.7 dB(A)	69.5	79.3	85.5	91.8	93.0	90.7	88.0	82.2	72.9
Wind 8 m/s	98.8 dB(A)	70.9	80.7	86.9	92.6	94.1	92.0	89.2	83.0	72.8
Wind 9 m/s	99.7 dB(A)	72.4	82.1	88.3	93.5	94.7	92.9	90.3	83.5	72.0
Wind 10 m/s	99.5 dB(A)	72.2	81.6	87.8	93.1	94.4	93.0	90.5	83.6	71.8

Table 3.1 gives the calculated sound power levels at the different wind speeds, and the calculated octave band power levels. Figure 3.1 gives the calculated 3rd octave band sound power levels, the values for these can be found in Appendix 1 Third octave band sound power levels.

Sound power level Lwa in dB(A) **Wind speed at a height of 10m**		**middle frequency of the octave bands [hz]**								
		31.5	**63**	**125**	**250**	**500**	**1k**	**2k**	**4k**	**8k**
Wind 5 m/s	95.0 dB(A)	67.3	76.3	82.5	89.0	90.3	87.9	85.3	80.6	71.0
Wind 6 m/s	96.6 dB(A)	68.2	78.0	84.1	90.7	92.0	89.5	86.7	81.4	72.4
Wind 7 m/s	97.7 dB(A)	69.5	79.3	85.5	91.8	93.0	90.7	88.0	82.2	72.9
Wind 8 m/s	98.8 dB(A)	70.9	80.7	86.9	92.6	94.1	92.0	89.2	83.0	72.8
Wind 9 m/s	99.7 dB(A)	72.4	82.1	88.3	93.5	94.7	92.9	90.3	83.5	72.0
Wind 10 m/s	99.5 dB(A)	72.2	81.6	87.8	93.1	94.4	93.0	90.5	83.6	71.8

Table 3.1 Sound power levels and the octave band data

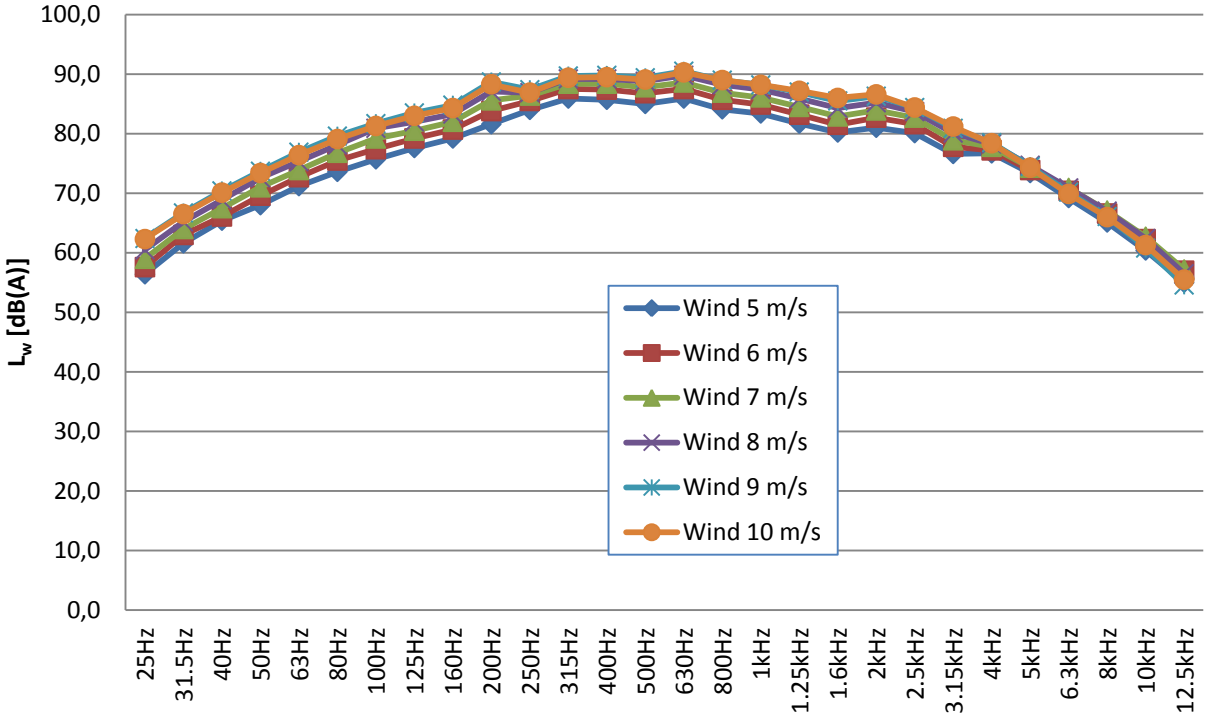


Figure 3.1 The 3rd octave band Sound Power Level spectra

3.1 Corrected sound power level graphical

Figure 3.2 and table 3.2 below provides all the calculated sound power levels at the different wind speeds at reference conditions (h = 10 m and z_0 = 0.05 m) and after correction for the background noise. The figure also gives the 4th order regression on this curve:

$$L_W = 0.0033V_{wind}^4 - 0.1327V_{wind}^3 + 1.7261V_{wind}^2 - 7.8733V_{wind} + 106.02\ dB(A)$$

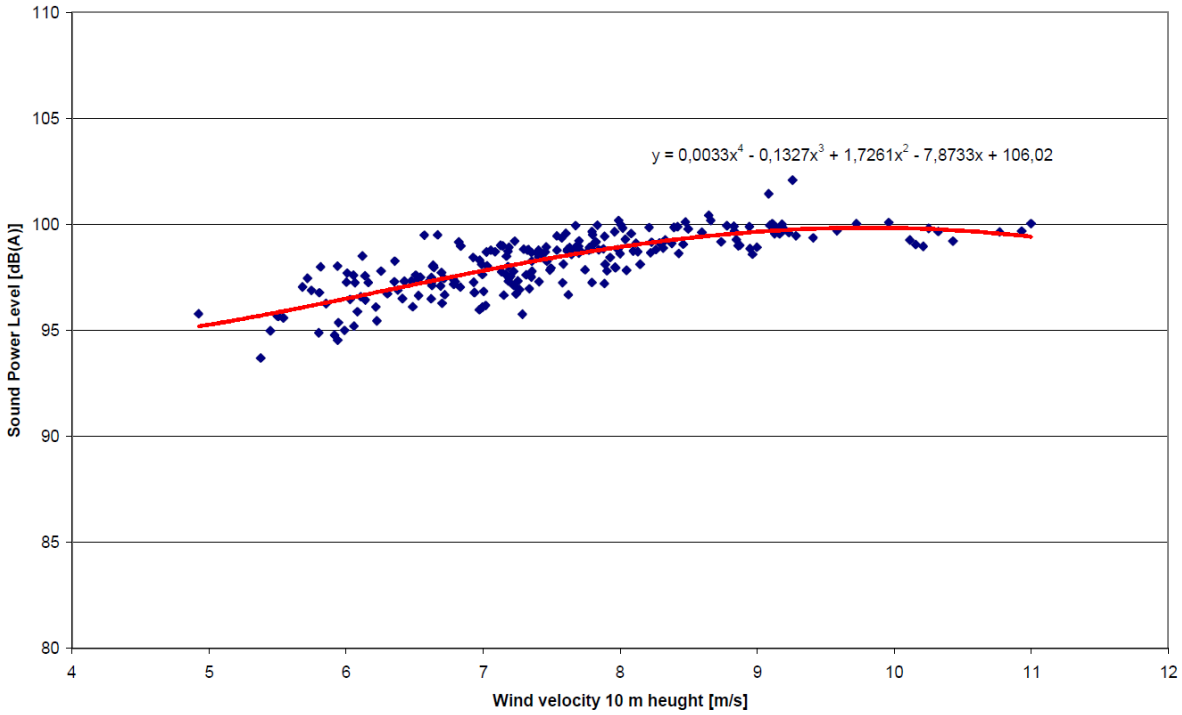


Figure 3.2 the calculated sound power level at different wind speeds

Sound power level with 4th Order regression in dB(A) **Wind speed at a height of 10m**	
Wind 5 m/s	95.3 dB(A)
Wind 6 m/s	96.5 dB(A)
Wind 7 m/s	97.8 dB(A)
Wind 8 m/s	98.9 dB(A)
Wind 9 m/s	99.6 dB(A)
Wind 10 m/s	99.8 dB(A)

Table 3.2 Sound Power Levels with 4th Order regression

3.2 Tonal Audibility

The audibility of the tones in the sound was analysed at the reference position and is given in Table 3.3 Tonal Audibility. The most important frequencies are 2.2 and 4.4 kHz. In Table 3.3 also the tonal penalty according to ETSU-R-97 (The assessment and rating of noise from wind farms – September 2006) is given. For the tone level of 3.3, the ETSU penalty of 2.5 dB can be found in Figure 3.3. No penalties are incurred for audibility levels below 2.0 dB.

According to ETSU-R-97, the tonal penalty should be added at the receiver for the specific wind speed at which the tonal audibility is present.

Wind @ 10 m ([m/s]	5	6	7	8	9
ΔL_A [dB(A)]	3.3	0.9	1.5	0.7	-0.7
ETSU Penalty [dB]	2.5	-	-	-	-

Table 3.3 Tonal Audibility

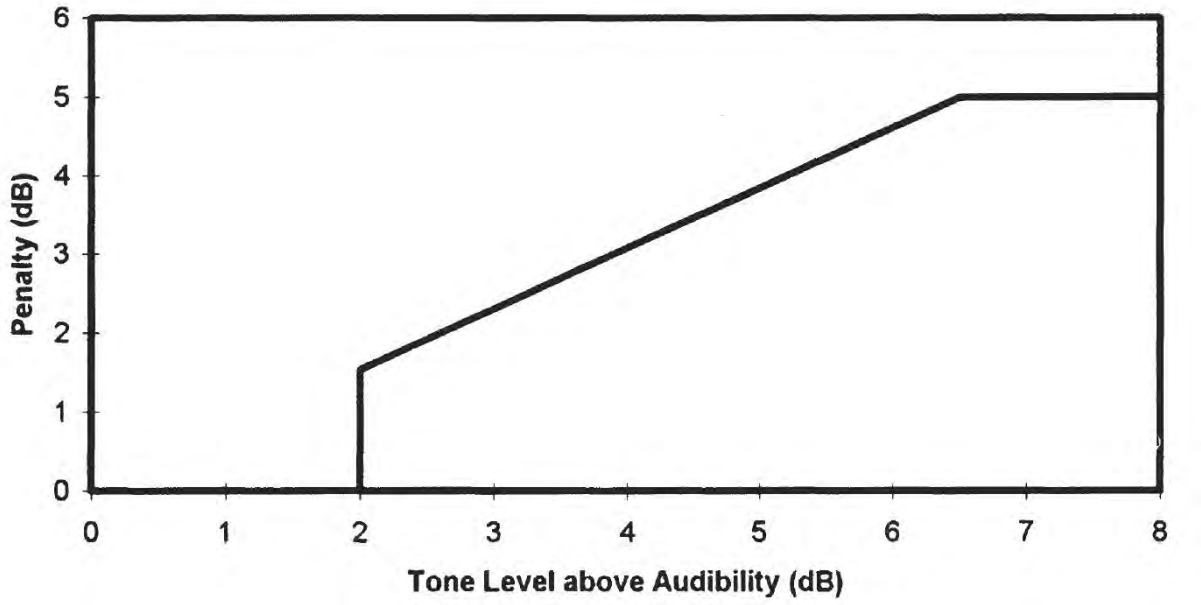


Figure 3.3 Tonal penalty according to ETSU-R-97

3.3 Uncertainty

The following Table 3.4 gives the number of measurements and the uncertainty in dB(A) for each different wind speed.

Wind Class	Number of measurements	Uncertainty [dB(A)]
Wind 5 m/s	4	1.7
Wind 6 m/s	37	1.4
Wind 7 m/s	77	1.2
Wind 8 m/s	68	0.9
Wind 9 m/s	26	0.9
Wind 10 m/s	9	0.7

Table 3.4 Number of measurements and uncertainty

Appendix 1 Third octave band sound power levels

V10[m/s]	25Hz	31.5Hz	40Hz	50Hz	63Hz	80Hz	100Hz	125Hz	160Hz
Wind 5 m/s	56,4	61,6	65,4	68,0	71,2	73,6	75,7	77,6	79,2
Wind 6 m/s	57,6	63,0	66,1	69,6	72,7	75,5	77,4	79,2	80,7
Wind 7 m/s	59,0	64,0	67,5	71,0	73,9	76,8	79,2	80,5	82,0
Wind 8 m/s	60,5	65,2	68,9	72,6	75,3	78,1	80,9	82,0	83,3
Wind 9 m/s	62,4	66,7	70,4	73,7	76,9	79,6	81,7	83,5	84,8
Wind 10 m/s	62,3	66,5	70,1	73,4	76,4	79,1	81,3	83,0	84,3

V10[m/s]	200Hz	250Hz	315Hz	400Hz	500Hz	630Hz	800Hz	1kHz	1.25kHz
Wind 5 m/s	81,6	84,0	85,9	85,7	85,0	85,9	84,1	83,4	81,7
Wind 6 m/s	83,8	85,5	87,5	87,4	86,8	87,5	85,7	84,9	83,2
Wind 7 m/s	85,6	86,4	88,4	88,4	87,8	88,6	86,9	86,1	84,5
Wind 8 m/s	87,1	86,9	89,2	89,2	88,8	89,8	88,2	87,4	85,9
Wind 9 m/s	88,7	87,4	89,7	89,8	89,4	90,5	89,0	88,2	87,0
Wind 10 m/s	88,3	86,9	89,4	89,5	89,1	90,3	89,0	88,2	87,2

V10[m/s]	1.6kHz	2kHz	2.5kHz	3.15kHz	4kHz	5kHz	6.3kHz	8kHz	10kHz	12.5kHz
Wind 5 m/s	80,2	81,0	80,1	76,6	76,7	73,4	69,2	65,1	60,4	55,0
Wind 6 m/s	81,5	82,7	81,6	77,8	77,2	73,9	70,4	66,6	62,3	57,0
Wind 7 m/s	82,9	83,9	82,7	78,9	77,8	74,3	70,9	67,1	62,7	57,2
Wind 8 m/s	84,3	85,2	83,7	80,1	78,3	74,7	70,9	67,0	62,4	56,5
Wind 9 m/s	85,5	86,3	84,4	80,9	78,5	74,5	70,2	66,1	60,8	54,6
Wind 10 m/s	86,0	86,6	84,4	81,2	78,4	74,3	69,9	66,0	61,3	55,5

Appendix 2 measured sound pressure levels

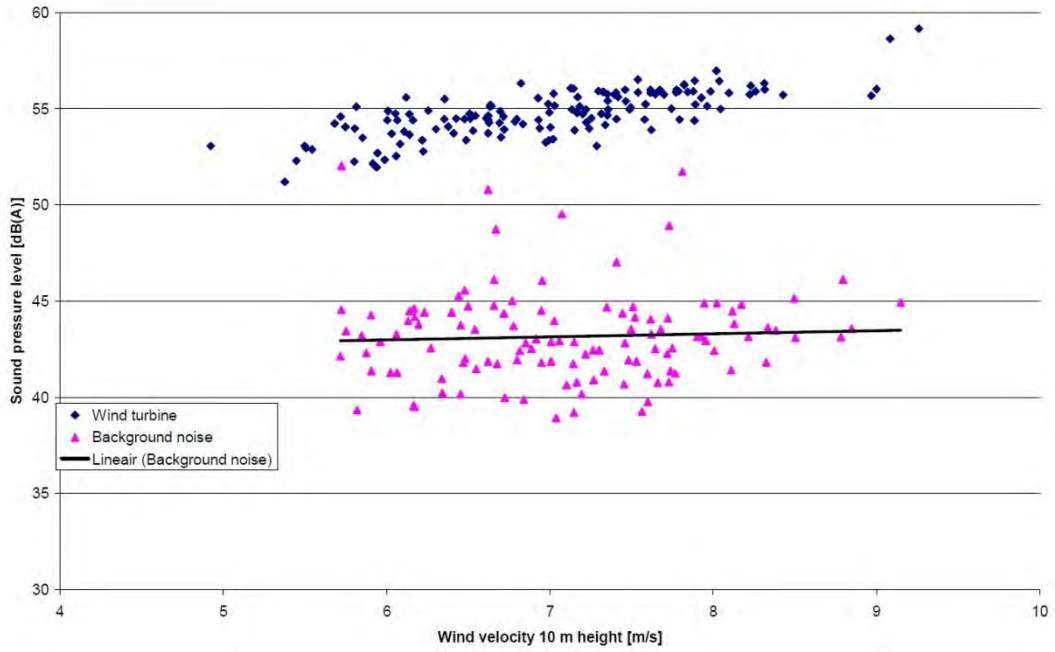


Figure 0.1 Measured sound pressure levels 11 November 2011

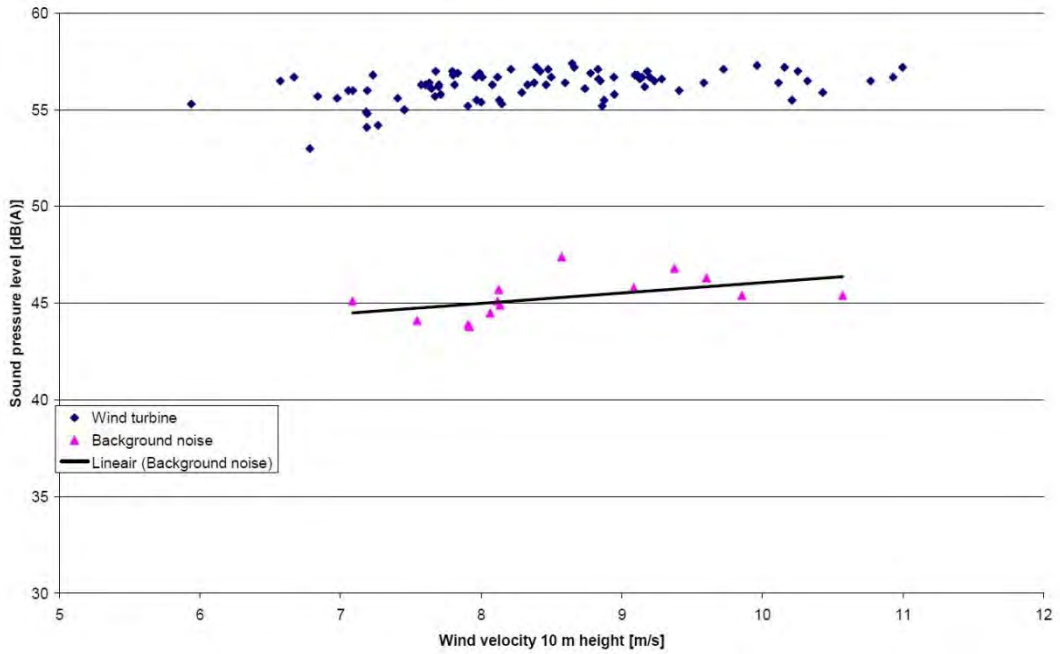


Figure 0.2 Measured sound pressure levels 15 February 2012

	Emergya Wind Technologies BV
	Engineering

Category:	Specification	Page 1 / 2
Doc code:	S-1005020	

Created by:	TY	Creation Date:	07-12-11
Checked by:	MS	Checked Date:	07-12-11
Approved by:	TY	Approved Date:	07-12-11

Title:

Specification

Sound power warranty levels DW52/54 500kW

Revision	Date	Author	Approved	Description of changes
02	14-03-12	AB	TY	Modifications based on new IEC measurements
01	09-12-11	AB	TY	correction
-	-	-	-	-
-	-	-	-	-
-	-	-	-	-
-	-	-	-	-

Emergya Wind Technologies BV
Building 'Le Soleil' - Computerweg 1 - 3821 AA Amersfoort - The Netherlands
T +31 (0)33 454 0520 - F +31 (0)33 456 3092 - www.ewtinternational.com

Sound power levels

The warranted sound power levels are presented with reference to IEC 61400-11:2002.

V_{wind} at 10m height	**DW52**	**DW54**
5 m/s	96,5 dB(A)	97.0 dB(A)
6 m/s	97.5 dB(A)	98.0 dB(A)
7 m/s	98.5 dB(A)	99.0 dB(A)
8 m/s	99.5 dB(A)	100.0 dB(A)
9 m/s	100.3 dB(A)	100.5 dB(A)
10 m/s	100.5 dB(A)	100.5 dB(A)

Sound power level Lw in dB(A)

The warranted sound power levels are based on actual measurements executed by an independent noise measurement institute according to the preferred methods set out in IEC-61400-11.

Uncertainty levels are included in the warranted sound power levels.

At 5m/s a maximum tonal noise penalty of 2,5dB shall be considered according to ETSU-R-97 guidelines.

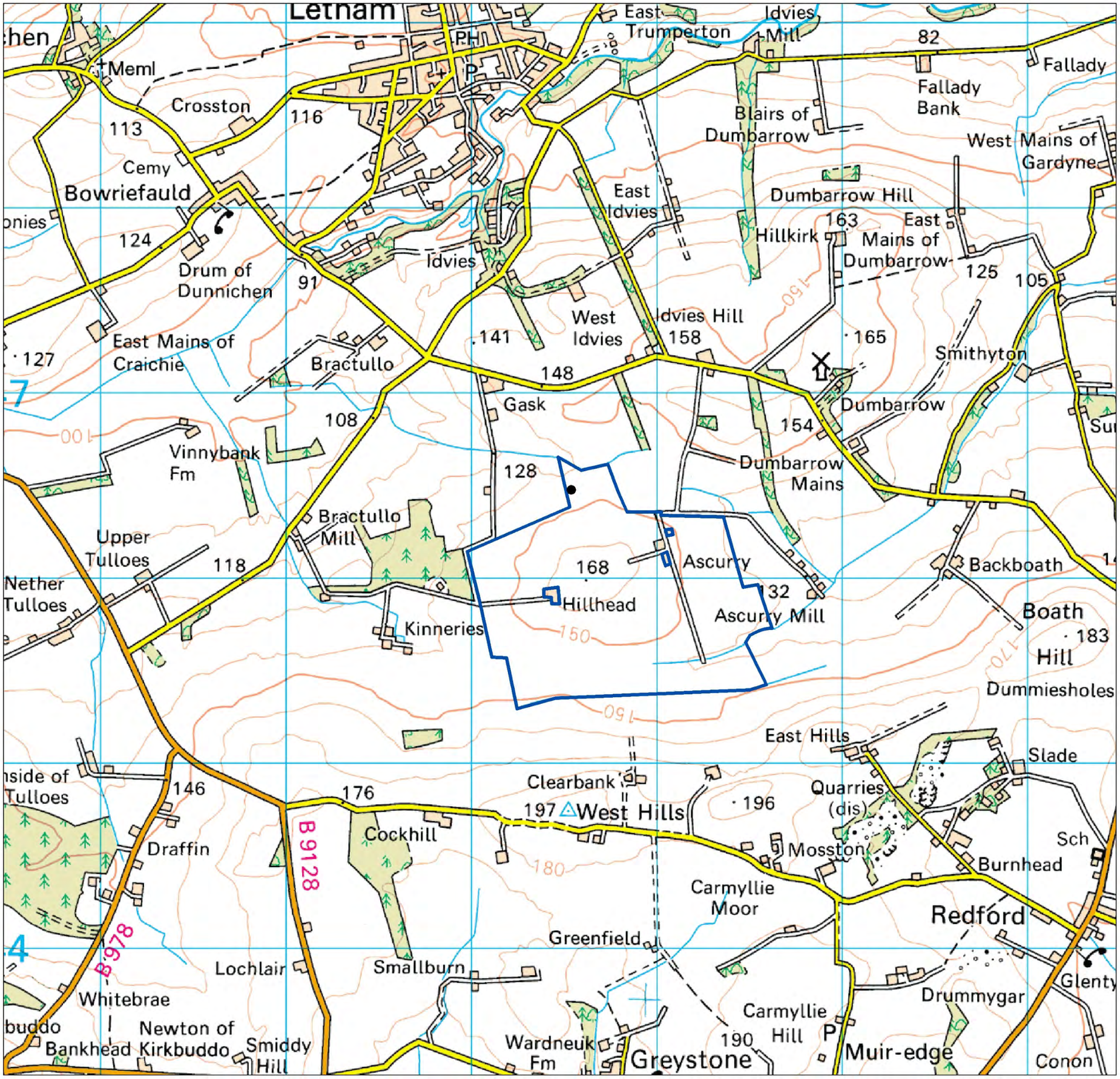
The measured third octave sound power levels are available upon request.

The values given in the table are valid for normal operational mode (rotation speed 0-24 RPM)

The calculation of the standardized wind speed at 10m height according to IEC 61400-11 is based on a terrain roughness length Z_0=0,05m.

In case validation measurements have to be performed, they should be executed according to the preferred methods set out in IEC-61400-11 by an independent measurement institute which is accredited to ISO/IEC 17025 to conduct measurements of wind turbine noise emissions.

EWT reserves the right to make modifications or adjust settings in order to comply with the warranted sound power levels.



ITEM 4

Loco$_2$gen

Locogen Ltd, 44 Constitution St, Edinburgh, EH6 6RS
Tel: +44 (0) 131 555 4745; Email: info@locogen.com
Company Number: SC370060; VAT Number: 983 3836 77

Project Description

Number of Turbine(s):	1
Turbine Model:	EWT Directwind 54
Hub Height:	50m
Blade diameter:	54m
Total height to blade tip:	77m
Turbine location:	353539 746476

Notes

This map shows the proposed turbine location in black and the boundary of land ownership in blue.

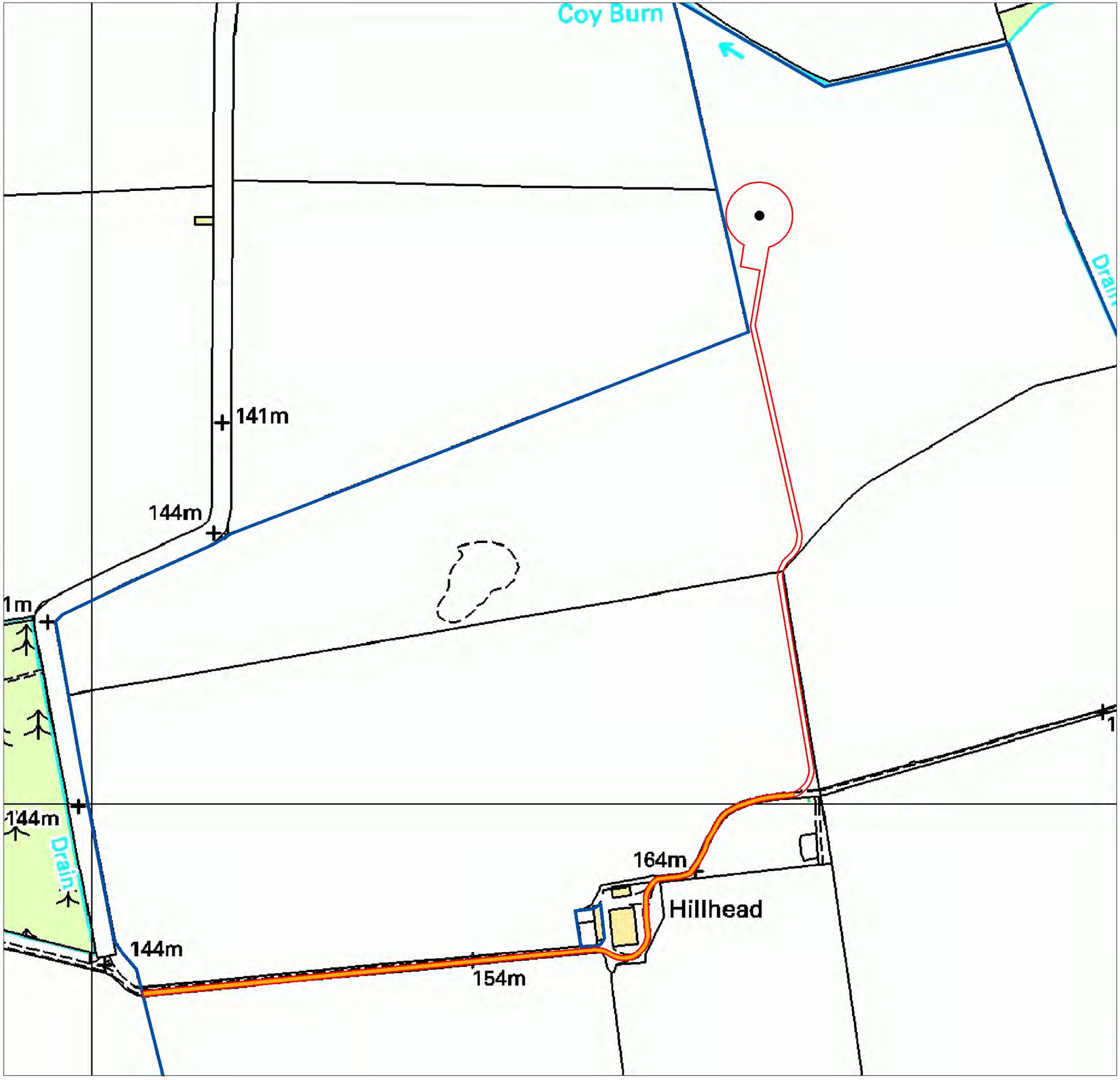
Legend

- Turbine Location
- Boundary of Land Ownership

PROJECT:	**Hillhead of Ascurry**
DRAWING TITLE:	Location Plan
DRAWING NO:	HOA001
DOCUMENT SIZE:	A3
SCALE:	1:20,000
DATE:	05/10/2013
DRAWING BY:	Franco Giovanetti
APPROVED BY:	Andy Lowe

N

0 500 1,000 1,500 m



Locogen Ltd, 44 Constitution St, Edinburgh, EH6 6RS
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Company Number: SC370060; VAT Number: 983 3836 77

Project Description

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Hub Height:	50m
Blade diameter:	54m
Total height to blade tip:	77m
Turbine location:	353539 746476

Notes

This map shows the proposed turbine site layout.

Legend

- Turbine Location
- Existing track requiring minor upgrades
- Application Area : 6,794 m^2
- Boundary of Land Ownership

PROJECT:	**Hillhead of Ascurry**
DRAWING TITLE:	Site Layout
DRAWING NO:	HOA002
DOCUMENT SIZE:	A3
SCALE:	1:3,000
DATE:	05/10/2013
DRAWING BY:	Franco Giovanetti
APPROVED BY:	Andy Lowe

N

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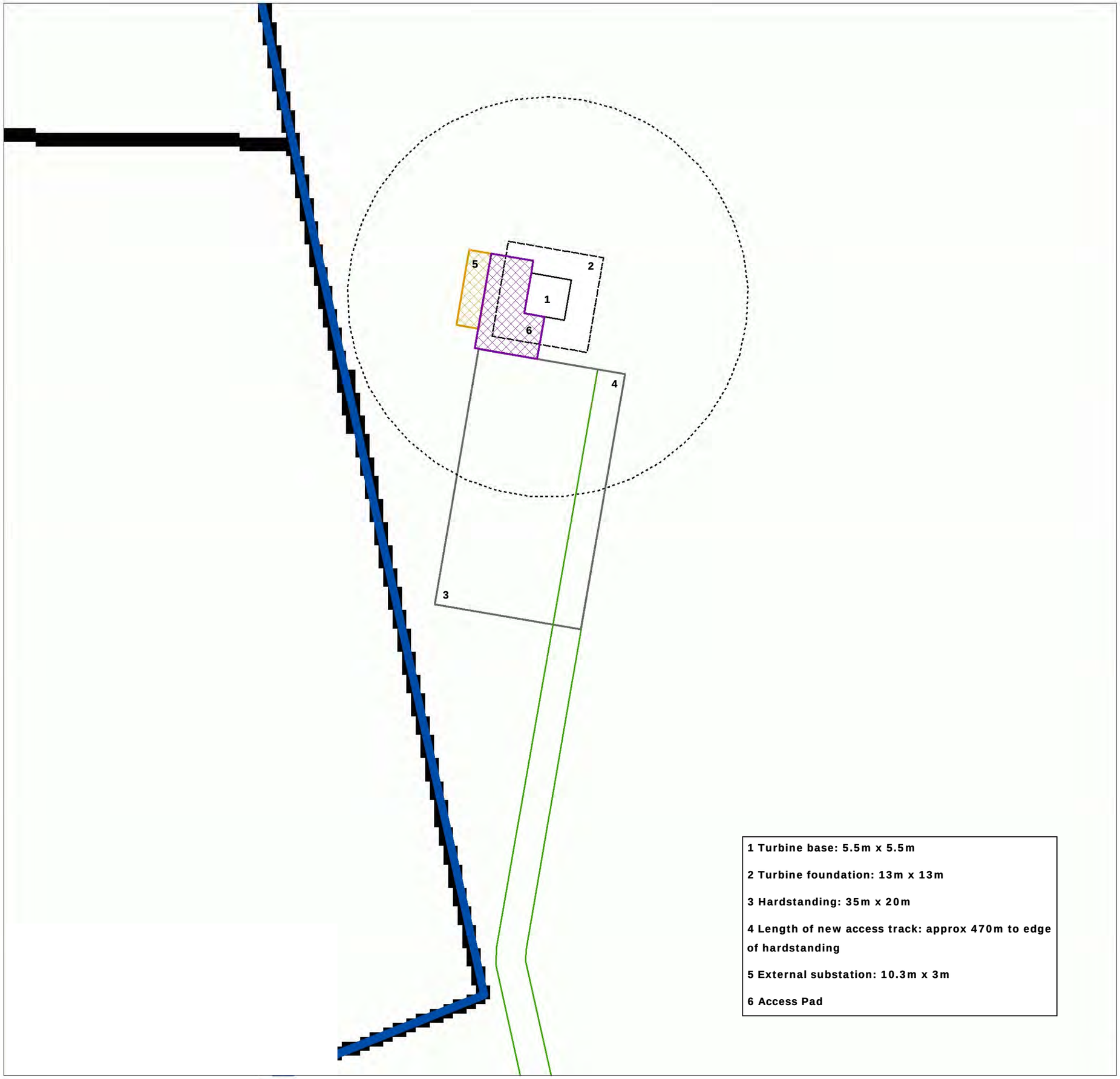

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Project Description

Number of Turbine(s):	1
Turbine Model:	EWT Directwind 54
Hub Height:	50m
Blade diameter:	54m
Total height to blade tip:	77m
Turbine location:	353539 746476

Notes

This drawing displays the block plan of the proposed wind turbine project at Hillhead of Ascurry.

The application site includes the turbine foundation, hardstanding, external substation, access track to the site and access pad.

Legend

- Blade Overhang
- New Access Track
- Turbine Base
- Foundation
- Hardstanding
- Substation
- Access Pad
- Boundary of Land Ownership

1 Turbine base: 5.5m x 5.5m

2 Turbine foundation: 13m x 13m

3 Hardstanding: 35m x 20m

4 Length of new access track: approx 470m to edge of hardstanding

5 External substation: 10.3m x 3m

6 Access Pad

PROJECT:	**Hillhead of Ascurry**
DRAWING TITLE:	Block Plan
DRAWING NO:	HOA003
DOCUMENT SIZE:	A3
SCALE:	1:500
DATE:	05/10/2013
DRAWING BY:	Franco Giovanetti
APPROVED BY:	Andy Lowe

N

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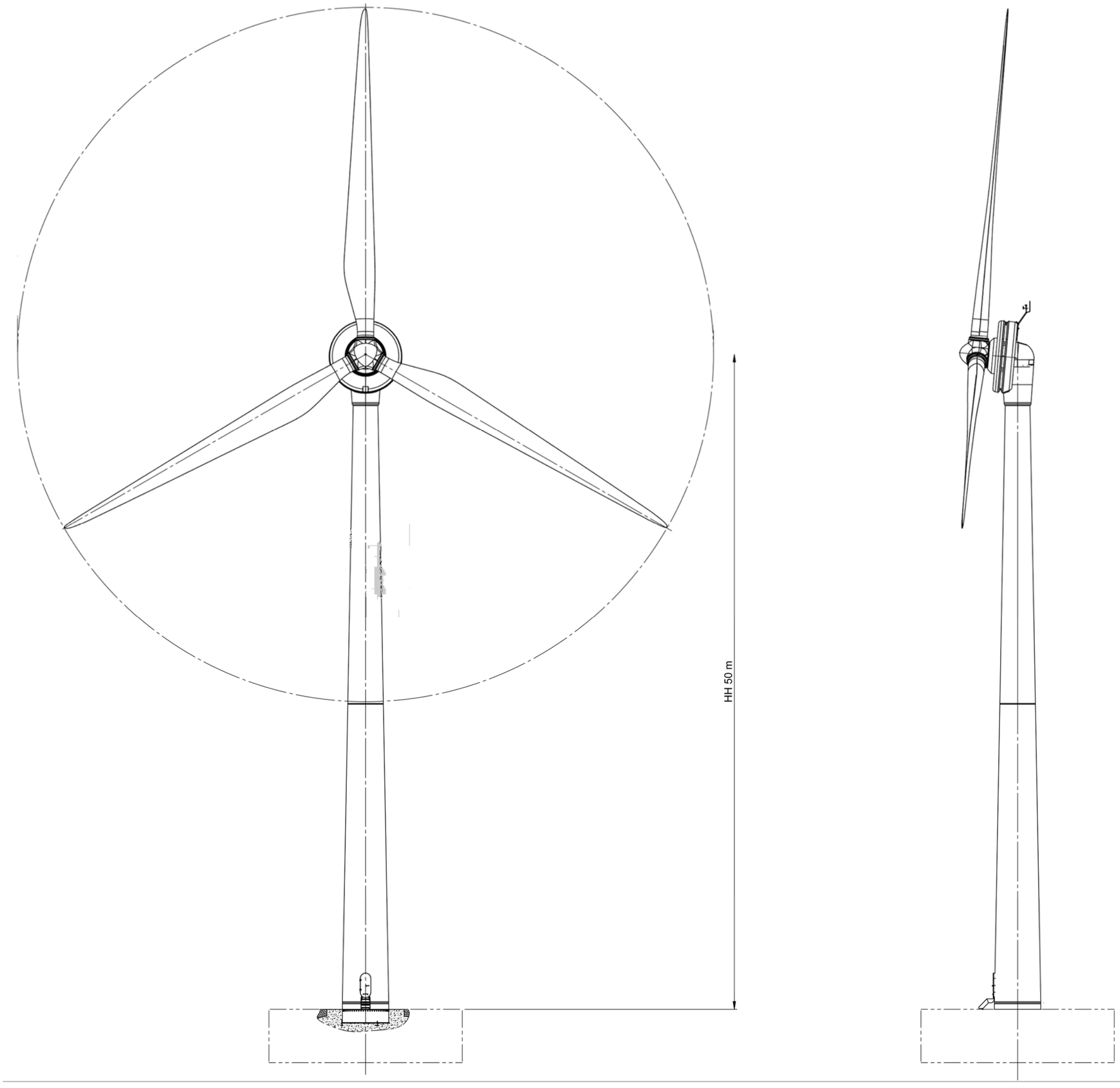

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Company Number: SC370060; VAT Number: 983 3836 77

Project Description

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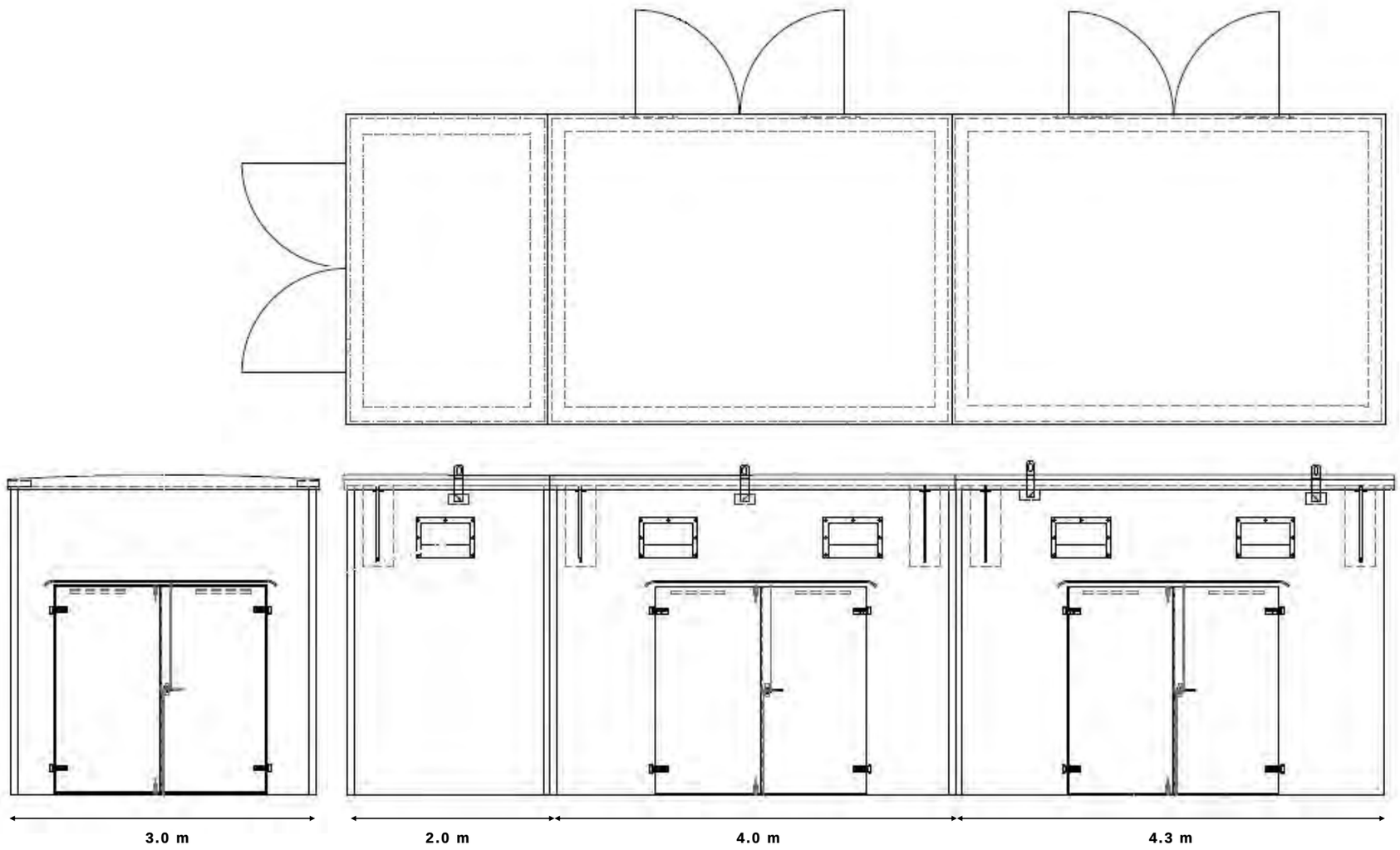
Turbine Model:	EWT Directwind 54
Hub Height:	50m
Blade diameter:	54m
Total height to blade tip:	77m
Turbine location:	353539 746476

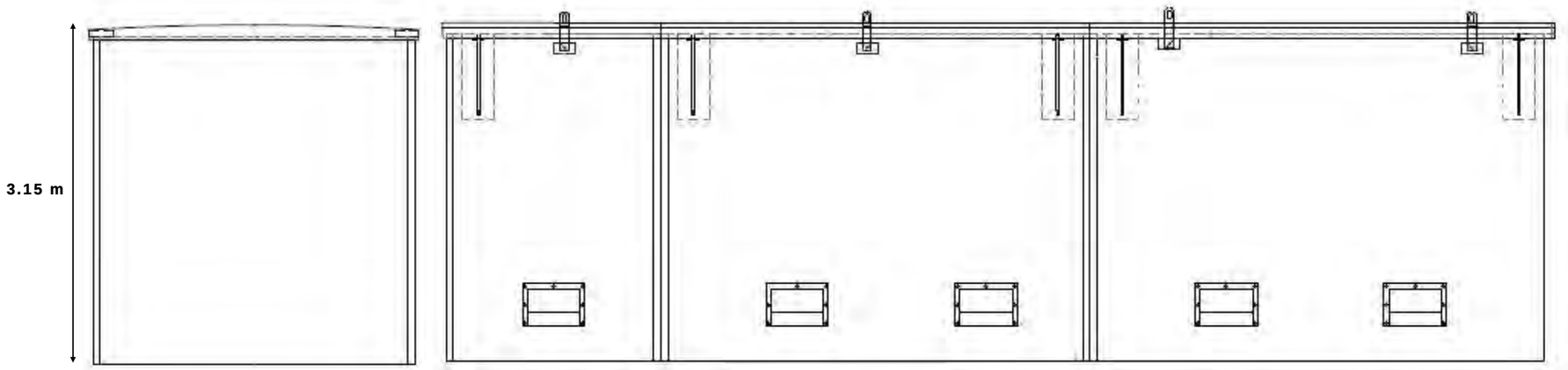
Notes

This drawing details the elevation of the proposed wind turbine.

PROJECT:	**Hillhead of Ascurry**
DRAWING TITLE:	Wind Turbine Elevation Drawings
DRAWING NO:	HOA004
DOCUMENT SIZE:	A3
SCALE:	1:300
DATE:	05/10/2013
DRAWING BY:	Franco Giovanetti
APPROVED BY:	Andy Lowe

0 5 10 15 20 m





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Company Number: SC370060; VAT Number: 983 3836 77

Project Description

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Hub Height:	50m
Blade diameter:	54m
Total height to blade tip:	77m
Turbine location:	353539 746476

Notes

This drawing shows the elevation and floor plan of the external sub-station building, as required by Scottish and Southern Energy.

The building will house the transformer, switch gear and safety equipment. The building will be constructed from Glass Reinforced Plastic (GRP) and painted green.

PROJECT:	**Hillhead of Ascurry**
DRAWING TITLE:	External Substation
DRAWING NO:	HOA005
DOCUMENT SIZE:	A3
SCALE:	1:50
DATE:	05/10/2013
DRAWING BY:	Franco Giovanetti
APPROVED BY:	Andy Lowe

0 1 2 3 4 m

Locogen Ltd, 44 Constitution St, Edinburgh, EH6 6RS
Tel: +44 (0) 131 555 4745; Email: info@locogen.com
Company Number: SC370060; VAT Number: 983 3836 77

Project Description

Number of Turbine(s):	1
Turbine Model:	EWT Directwind 54
Hub Height:	50m
Blade diameter:	54m
Total height to blade tip:	77m
Turbine location:	353539 746476

Notes

This map shows the designated landscape areas within 25km of the proposed site: country parks, gardens and designed landscapes, popular walking and cycling routes and local designated areas.

Radii: 5, 10, 15, 20 and 25km

Legend

- Turbine Location
- Historic Gardens and Designed Landscapes
- Country Parks
- National Cycle Route 1
- Fife Coastal Path
- Fife Council Special Landscape Areas

ID	Name	X Centre Point	Y Centre Point	Distance from Centre Point (km)
1	Guthrie Castle	356239	750485	4.8
2	House of Pitmuies	356628	749826	4.6
3	The Guynd	356785	741828	5.7
4	Kinnaird Castle	362757	757291	14.2
5	Brechin Castle	359250	759345	14.1
6	Glamis Catle	338699	748212	14.9
7	Dunninald	370216	754237	18.4
8	Baxter Park	341523	731474	19.2
9	Craig House	370230	756197	19.3
10	Cortachy Castle	339800	759358	18.8
11	House of Dun	366907	759873	18.9
12	Camperdown House	337283	732721	21.3
13	Balgay Park	337660	730724	22.4
14	Ascreavie	333241	757111	22.9
15	Edzell Castle	358505	769128	23.2
16	Drumkilbo	330341	744919	23.3
17	Airlie Castle	329286	752180	24.9

PROJECT:	**Hillhead of Ascurry**
DRAWING TITLE:	Designated Landscape Areas
DRAWING NO:	HOA006
DOCUMENT SIZE:	A3
SCALE:	1:180,000
DATE:	05/10/2013
DRAWING BY:	Franco Giovanetti
APPROVED BY:	Andy Lowe

N

0 5 10 15 km

Locogen Ltd, 44 Constitution St, Edinburgh, EH6 6RS
Tel: +44 (0) 131 555 4745; Email: info@locogen.com
Company Number: SC370060; VAT Number: 983 3836 77

Project Description

Number of Turbine(s):	1
Turbine Model:	EWT Directwind 54
Hub Height:	50m
Blade diameter:	54m
Total height to blade tip:	77m
Turbine location:	353539 746476

Notes

This map shows the Scheduled Monuments and A-Listed Buildings within 5km of the proposed wind turbine site.

Radius: 5km

Legend

- Turbine Location
- A-Listed Buildings
- Scheduled Monuments

A-Listed Buildings within 5km

ID	Name	X	Y	Distance (km)
a	Gardyne Castle	357369	748790	4.5
d	Pitmuies - Home Farm	356711	749836	4.6
b	Pitmuies House	356720	749762	4.6
c	Pitmuies - Home Farm	356726	749819	4.6
f	Pitmuies - Home Farm	356722	749853	4.6
e	Pitmuies - Home Farm	356738	749819	4.6

Scheduled Ancient Monuments within 5km

ID	Name	X	Y	Distance (km)
1	Dumbarrow Hill, fort	355155	747916	2.2
2	Pitmuies, cross slab	356665	749971	4.7
3	East Mains of Pitmuies, ring ditch	357025	749806	4.8
4	Pitmuies Cottages, ring ditches	357336	749669	5.0
5	Kirkbuddo Wood, Roman camp	349080	744228	5.0

PROJECT:	Hillhead of Ascurry
DRAWING TITLE:	Cultural Heritage
DRAWING NO:	HOA007
DOCUMENT SIZE:	A3
SCALE:	1:35,000
DATE:	05/10/2013
DRAWING BY:	Franco Giovanetti
APPROVED BY:	Andy Lowe

N

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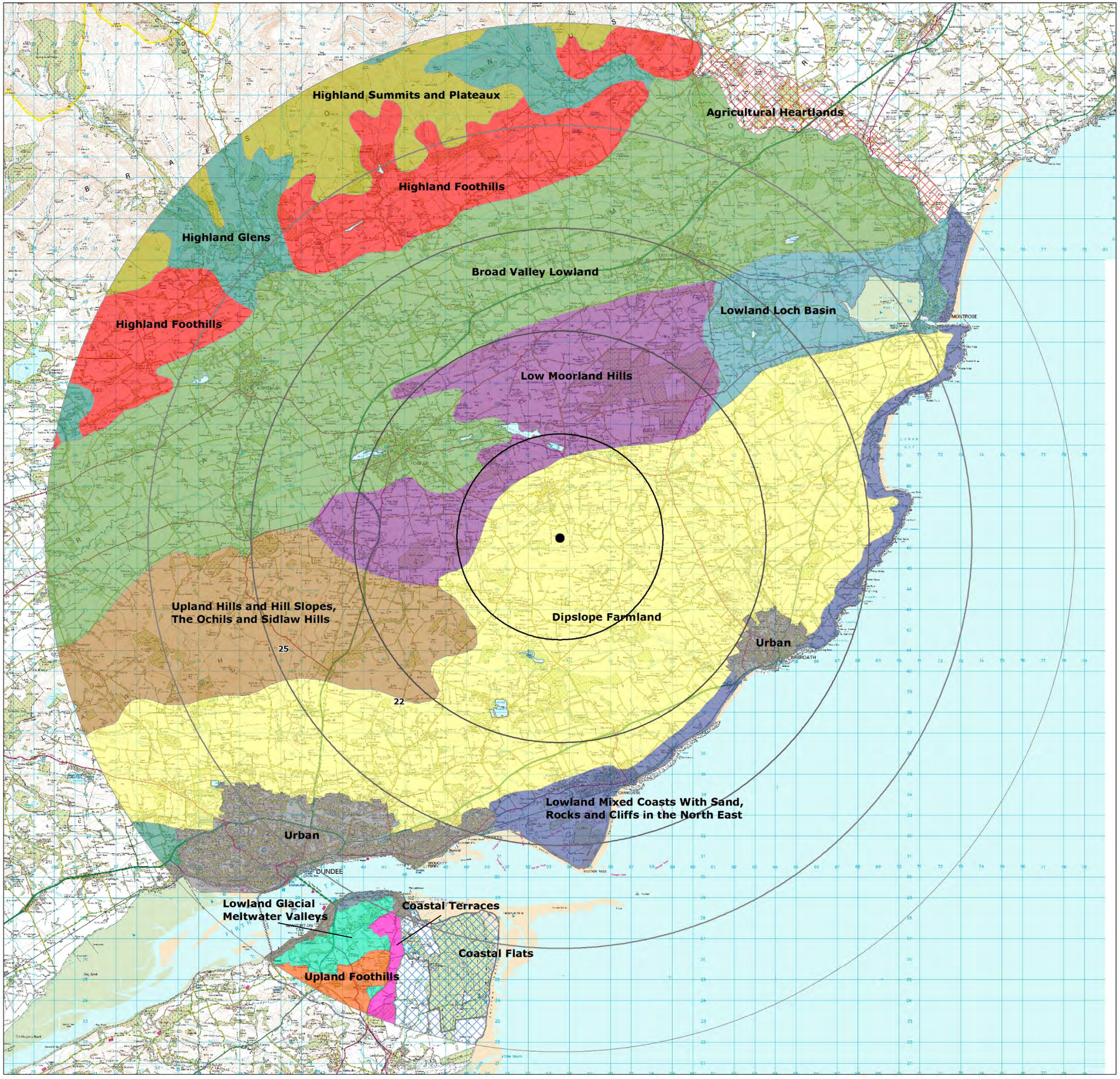


Locogen Ltd, 44 Constitution St, Edinburgh, EH6 6RS
Tel: +44 (0) 131 555 4745; Email: info@locogen.com
Company Number: SC370060; VAT Number: 983 3836 77

Project Description

Number of Turbine(s):	1
Turbine Model:	EWT Directwind 54
Hub Height:	50m
Blade diameter:	54m
Total height to blade tip:	77m
Turbine location:	353539 746476

Notes

This map shows the various Landscape Character Areas within 25km of the proposed wind turbine site.

Radii: 5, 10, 15, 20 and 25km

Legend

● Turbine Location

PROJECT:	**Hillhead of Ascurry**
DRAWING TITLE:	Landscape Character Type
DRAWING NO:	HOA008
DOCUMENT SIZE:	A3
SCALE:	1:180,000
DATE:	05/10/2013
DRAWING BY:	Franco Giovanetti
APPROVED BY:	Andy Lowe

N

0 5 10 15 km

Locogen Ltd, 44 Constitution St, Edinburgh, EH6 6RS
Tel: +44 (0) 131 555 4745; Email: info@locogen.com
Company Number: SC370060; VAT Number: 983 3836 77

Project Description

Number of Turbine(s):	1
Turbine Model:	EWT Directwind 54
Hub Height:	50m
Blade diameter:	54m
Total height to blade tip:	77m
Turbine location:	353539 746476

Notes

This map shows the Zone of Theoretical Visibility of the proposed wind turbine within 25km.

Radii: 5, 10, 15, 20 and 25km

Legend

● Turbine Location

This theoretical visibility map is based on a receptor viewing height of 1.8m AGL. The levels of theoretical visibility are based on the following colouring scheme:

Blue:	Only the blades are theoretically visible from these areas
Yellow:	At least the nacelle and blades are theoretically visible in these areas
Red:	The blades, nacelle and tower down to a point at least 1m AGL are theoretically visible in these areas

PROJECT:	**Hillhead of Ascurry**
DRAWING TITLE:	ZTV
DRAWING NO:	HOA009
DOCUMENT SIZE:	A3
SCALE:	1:180,000
DATE:	05/10/2013
DRAWING BY:	Franco Giovanetti
APPROVED BY:	Andy Lowe

N

0 5 10 15 km

Locogen Ltd, 44 Constitution St, Edinburgh, EH6 6RS
Tel: +44 (0) 131 555 4745; Email: info@locogen.com
Company Number: SC370060; VAT Number: 983 3836 77

Project Description

Number of Turbine(s):	1
Turbine Model:	EWT Directwind 54
Hub Height:	50m
Blade diameter:	54m
Total height to blade tip:	77m
Turbine location:	353539 746476

Notes

This map shows the proposed turbine Zone of Theoretical Visibility within 10km of the proposed site in a south east direction.

Radii: 5 and 10km

Legend

● Turbine Location

This theoretical visibility map is based on a receptor viewing height of 1.8m AGL. The levels of theoretical visibility are based on the following colouring scheme:

Blue: Only the blades are theoretically visible from these areas

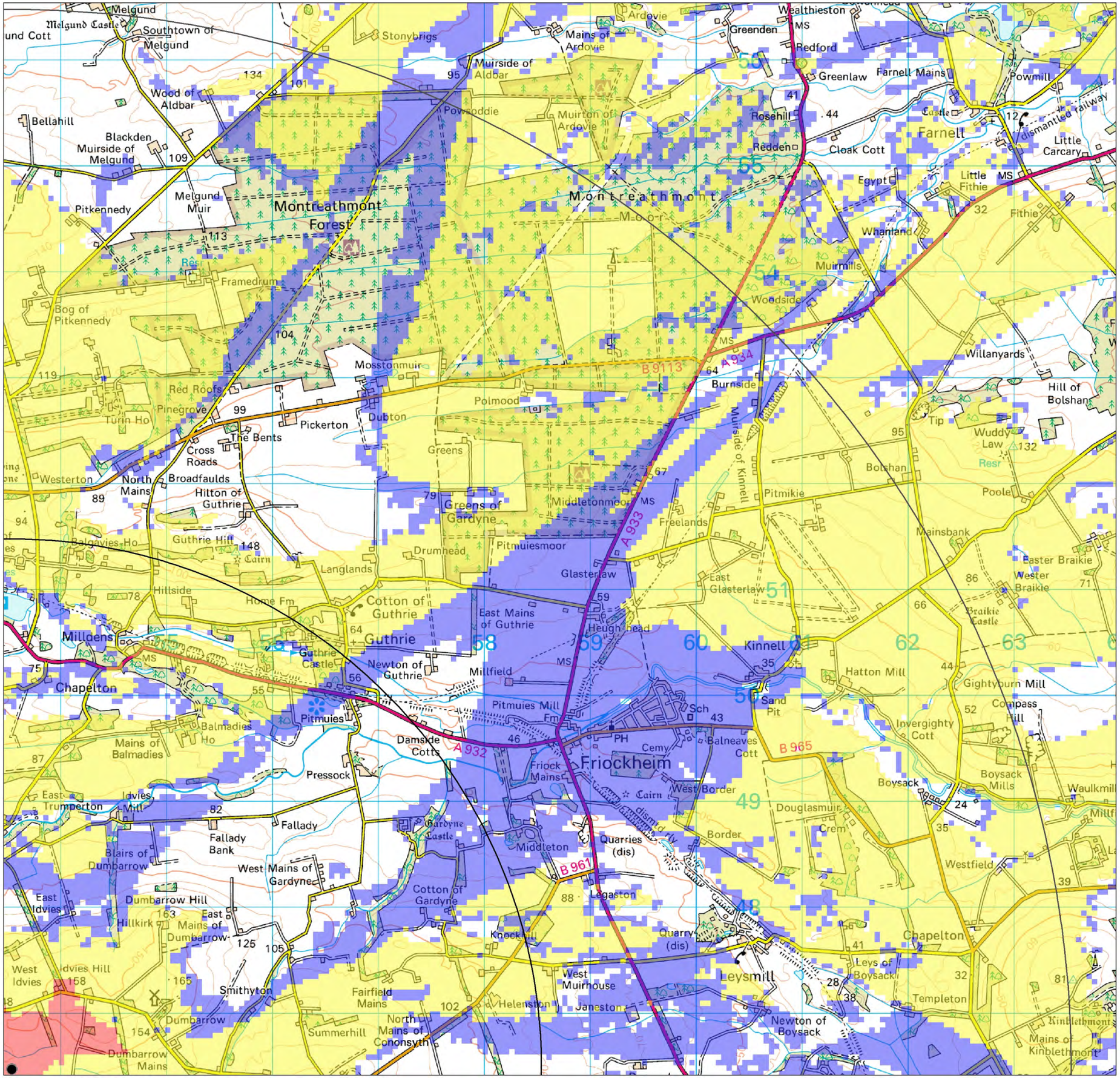
Yellow: At least the nacelle and blades are theoretically visible in these areas

Red: The blades, nacelle and tower down to a point at least 1m AGL are theoretically visible in these areas

PROJECT:	Hillhead of Ascurry
DRAWING TITLE:	ZTV 10km South East
DRAWING NO:	HOA010
DOCUMENT SIZE:	A3
SCALE:	1:35,000
DATE:	05/10/2013
DRAWING BY:	Franco Giovanetti
APPROVED BY:	Andy Lowe

N

0 1 2 3 km



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Company Number: SC370060; VAT Number: 983 3836 77

Project Description

Number of Turbine(s):	1
Turbine Model:	EWT Directwind 54
Hub Height:	50m
Blade diameter:	54m
Total height to blade tip:	77m
Turbine location:	353539 746476

Notes

This map shows the proposed turbine Zone of Theoretical Visibility within 10km of the proposed site in a north east direction.

Radii: 5 and 10km

Legend

● Turbine Location

This theoretical visibility map is based on a receptor viewing height of 1.8m AGL. The levels of theoretical visibility are based on the following colouring scheme:

Blue: Only the blades are theoretically visible from these areas

Yellow: At least the nacelle and blades are theoretically visible in these areas

Red: The blades, nacelle and tower down to a point at least 1m AGL are theoretically visible in these areas

PROJECT:	Hillhead of Ascurry
DRAWING TITLE:	ZTV 10km North East
DRAWING NO:	HOA011
DOCUMENT SIZE:	A3
SCALE:	1:35,000
DATE:	05/10/2013
DRAWING BY:	Franco Giovanetti
APPROVED BY:	Andy Lowe

N

0 1 2 3 km

Locogen Ltd, 44 Constitution St, Edinburgh, EH6 6RS
Tel: +44 (0) 131 555 4745; Email: info@locogen.com
Company Number: SC370060; VAT Number: 983 3836 77

Project Description

Number of Turbine(s):	1
Turbine Model:	EWT Directwind 54
Hub Height:	50m
Blade diameter:	54m
Total height to blade tip:	77m
Turbine location:	353539 746476

Notes

This map shows the proposed turbine Zone of Theoretical Visibility within 10km of the proposed site in a north west direction.

Radii: 5 and 10km

Legend

● Turbine Location

This theoretical visibility map is based on a receptor viewing height of 1.8m AGL. The levels of theoretical visibility are based on the following colouring scheme:

Blue: Only the blades are theoretically visible from these areas

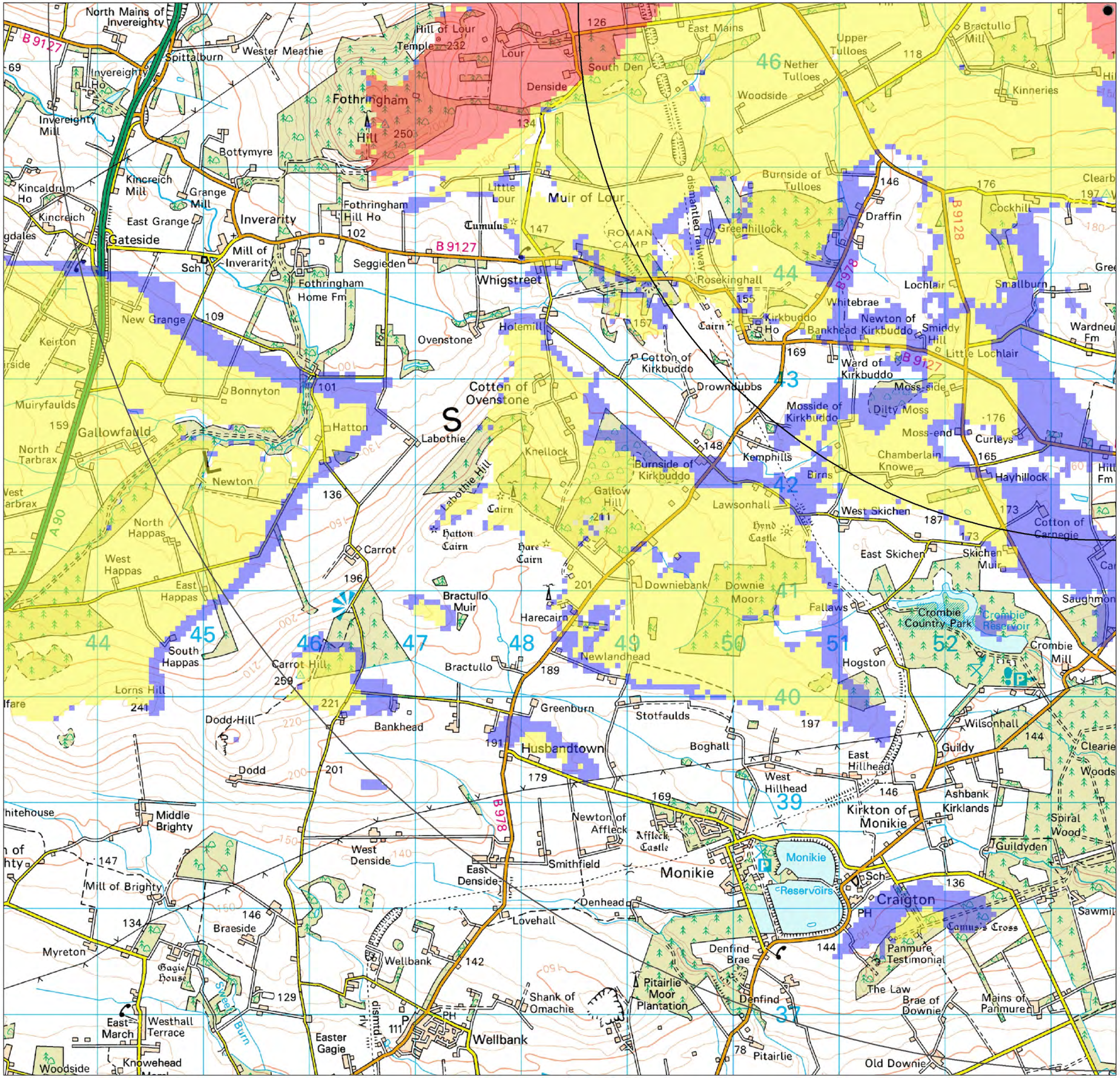
Yellow: At least the nacelle and blades are theoretically visible in these areas

Red: The blades, nacelle and tower down to a point at least 1m AGL are theoretically visible in these areas

PROJECT:	**Hillhead of Ascurry**
DRAWING TITLE:	ZTV 10km North West
DRAWING NO:	HOA012
DOCUMENT SIZE:	A3
SCALE:	1:35,000
DATE:	05/10/2013
DRAWING BY:	Franco Giovanetti
APPROVED BY:	Andy Lowe

N

0 1 2 3 km



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Project Description

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Blade diameter:	54m
Total height to blade tip:	77m
Turbine location:	353539 746476

Notes

This map shows the proposed turbine Zone of Theoretical Visibility within 10km of the proposed site in a south west direction.

Radii: 5 and 10km

Legend

● Turbine Location

This theoretical visibility map is based on a receptor viewing height of 1.8m AGL. The levels of theoretical visibility are based on the following colouring scheme:

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Yellow: At least the nacelle and blades are theoretically visible in these areas

Red: The blades, nacelle and tower down to a point at least 1m AGL are theoretically visible in these areas

PROJECT:	Hillhead of Ascurry
DRAWING TITLE:	ZTV 10km South West
DRAWING NO:	HOA013
DOCUMENT SIZE:	A3
SCALE:	1:35,000
DATE:	05/10/2013
DRAWING BY:	Franco Giovanetti
APPROVED BY:	Andy Lowe

N

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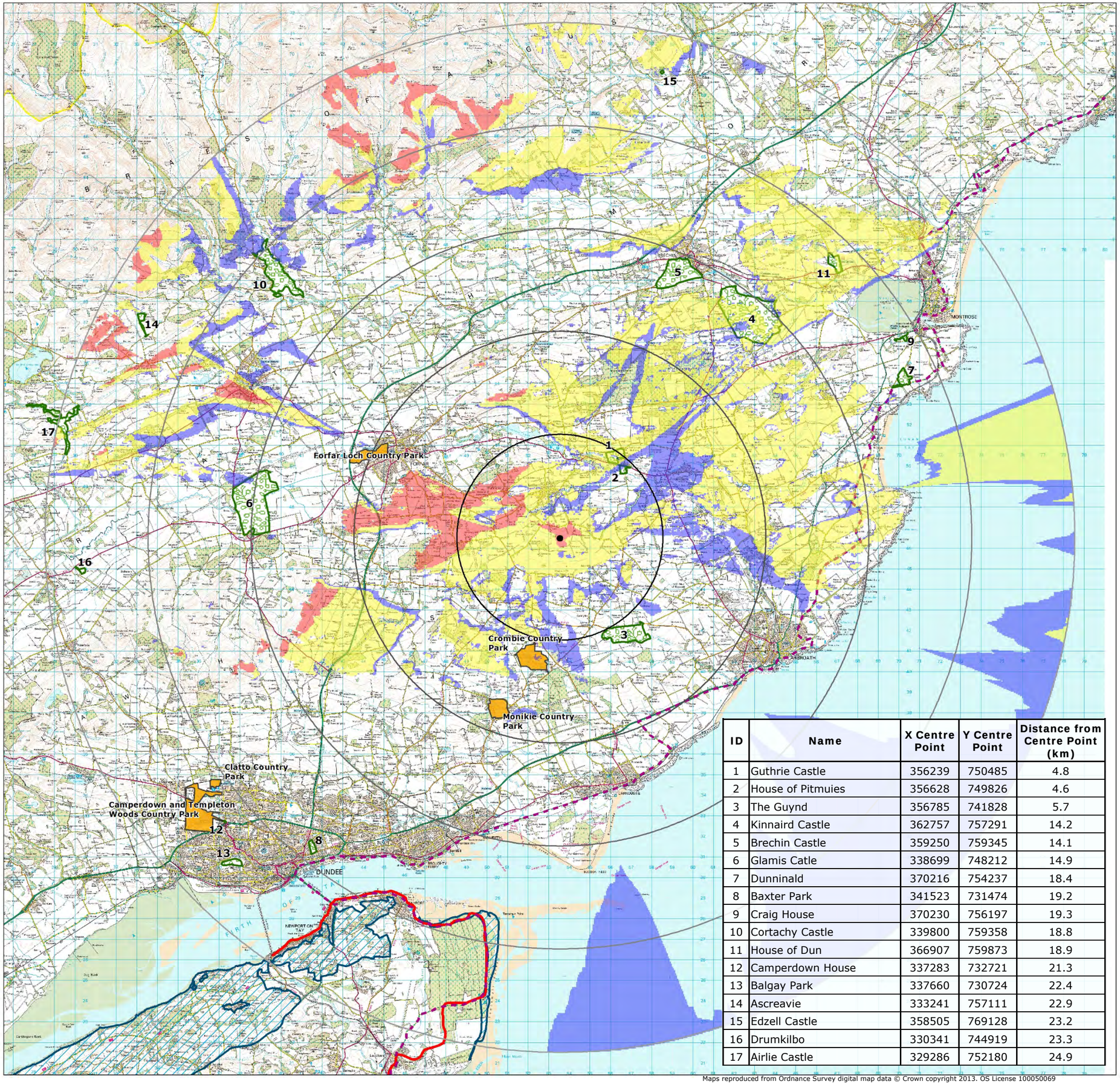

ID	Name	X Centre Point	Y Centre Point	Distance from Centre Point (km)
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10	Cortachy Castle	339800	759358	18.8
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12	Camperdown House	337283	732721	21.3
13	Balgay Park	337660	730724	22.4
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Turbine location:	353539 746476

Notes

This map shows the designated landscape areas within 25km of the proposed site: country parks, gardens and designed landscapes, popular walking and cycling routes and local designated areas.

Radii: 5, 10, 15, 20 and 25km

Legend

- Turbine Location
- Historic Gardens and Designed Landscapes
- Country Parks
- National Cycle Route 1
- Fife Coastal Path
- Fife Council Special Landscape Areas

This theoretical visibility map is based on a receptor viewing height of 1.8m AGL. The levels of theoretical visibility are based on the following colouring scheme:

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Red: The blades, nacelle and tower down to a point at least 1m AGL are theoretically visible in these areas

PROJECT:	Hillhead of Ascurry
DRAWING TITLE:	Designated Landscapes and ZTV
DRAWING NO:	HOA014
DOCUMENT SIZE:	A3
SCALE:	1:180,000
DATE:	05/10/2013
DRAWING BY:	Franco Giovanetti
APPROVED BY:	Andy Lowe

N

0 5 10 15 km

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Tel: +44 (0) 131 555 4745; Email: info@locogen.com
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Turbine location:	353539 746476

Notes

This map shows the Scheduled Monuments and A-Listed Buildings within 5km of the proposed wind turbine site.

Radius: 5km

Legend

- Turbine Location
- A-Listed Buildings
- Scheduled Monuments

This theoretical visibility map is based on a receptor viewing height of 1.8m AGL. The levels of theoretical visibility are based on the following colouring scheme:

Blue: Only the blades are theoretically visible from these areas

Yellow: At least the nacelle and blades are theoretically visible in these areas

Red: The blades, nacelle and tower down to a point at least 1m AGL are theoretically visible in these areas

A-Listed Buildings within 5km

ID	Name	X	Y	Distance (km)
a	Gardyne Castle	357369	748790	4.5
d	Pitmuies - Home Farm	356711	749836	4.6
b	Pitmuies House	356720	749762	4.6
c	Pitmuies - Home Farm	356726	749819	4.6
f	Pitmuies - Home Farm	356722	749853	4.6
e	Pitmuies - Home Farm	356738	749819	4.6

Scheduled Ancient Monuments within 5km

ID	Name	X	Y	Distance (km)
1	Dumbarrow Hill, fort	355155	747916	2.2
2	Pitmuies, cross slab	356665	749971	4.7
3	East Mains of Pitmuies, ring ditch	357025	749806	4.8
4	Pitmuies Cottages, ring ditches	357336	749669	5.0
5	Kirkbuddo Wood, Roman camp	349080	744228	5.0

PROJECT:	**Hillhead of Ascurry**
DRAWING TITLE:	Cultural Heritage and ZTV
DRAWING NO:	HOA015
DOCUMENT SIZE:	A3
SCALE:	1:35,000
DATE:	05/10/2013
DRAWING BY:	Franco Giovanetti
APPROVED BY:	Andy Lowe

N

0 1 2 3 km

Locogen Ltd, 44 Constitution St, Edinburgh, EH6 6RS
Tel: +44 (0) 131 555 4745; Email: info@locogen.com
Company Number: SC370060; VAT Number: 983 3836 77

Project Description

Number of Turbine(s):	1
Turbine Model:	EWT Directwind 54
Hub Height:	50m
Blade diameter:	54m
Total height to blade tip:	77m
Turbine location:	353539 746476

Notes

This map shows the proposed wind turbine ZTV and Landscape Characters within 25km of the proposed wind turbine site.

Radii: 5, 10, 15, 20 and 25km

Legend

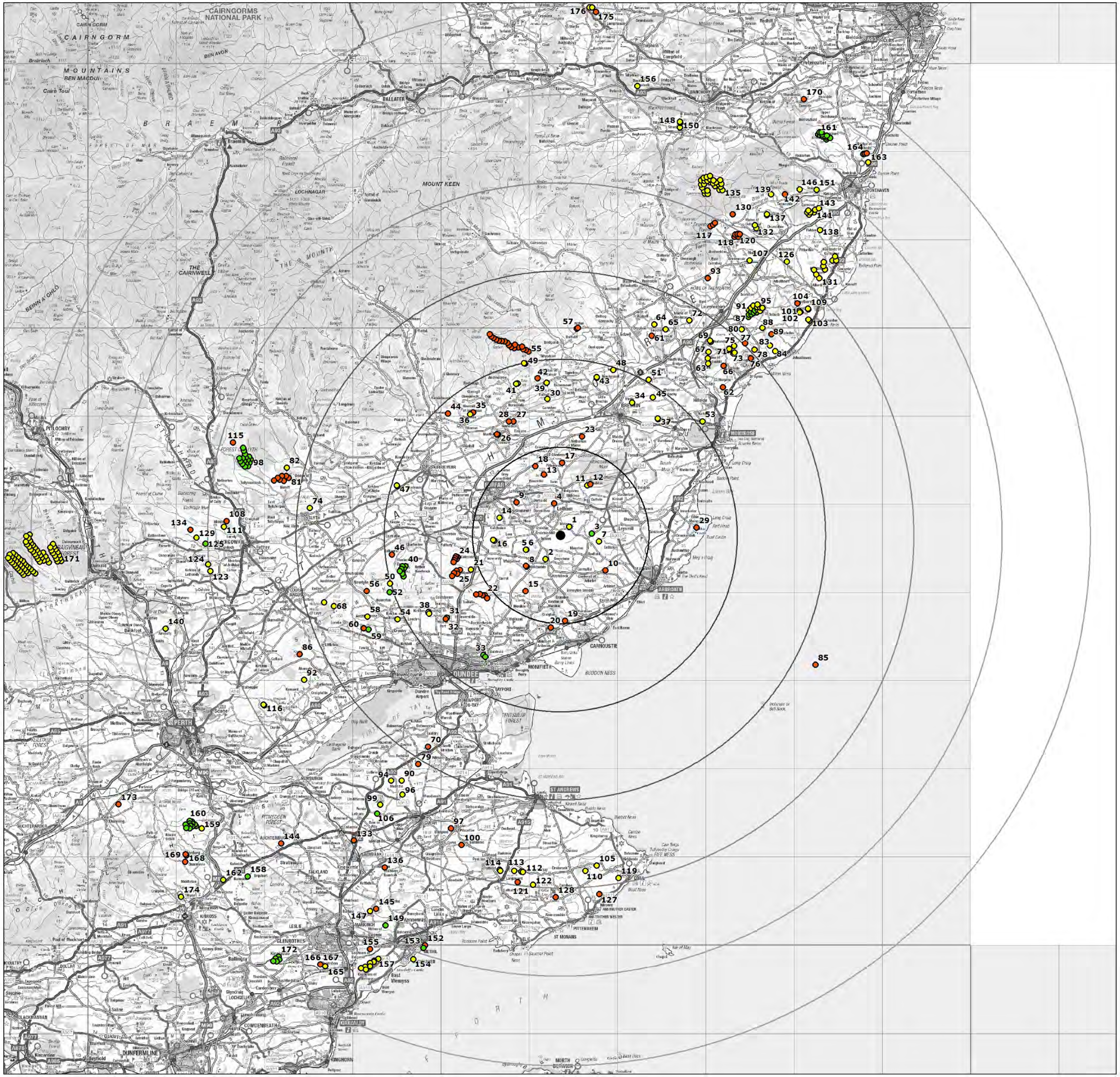
● Turbine Location

This theoretical visibility map is based on a receptor viewing height of 1.8m AGL.

PROJECT:	**Hillhead of Ascurry**
DRAWING TITLE:	Landscape Character Type and ZTV
DRAWING NO:	HOA016
DOCUMENT SIZE:	A3
SCALE:	1:180,000
DATE:	05/10/2013
DRAWING BY:	Franco Giovanetti
APPROVED BY:	Andy Lowe

N

0 5 10 15 km



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Tel: +44 (0) 131 555 4745; Email: info@locogen.com
Company Number: SC370060; VAT Number: 983 3836 77

Project Description

Number of Turbine(s):	1
Turbine Model:	EWT Directwind 54
Hub Height:	50m
Blade diameter:	54m
Total height to blade tip:	77m
Turbine location:	353539 746476

Notes

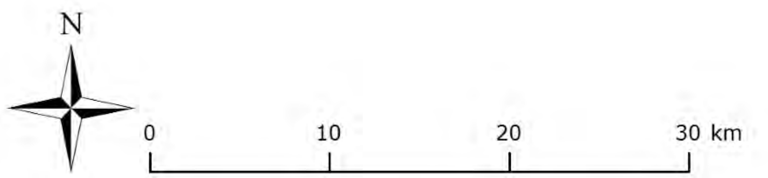
This map shows the cumulative base plan around the proposed turbine location.

Radii: 10, 20, 30, 40, 50 and 60km

Legend

- Turbine Location
- 60km Cumulative Status
  - Installed
  - Approved
  - Pending

PROJECT:	**Hillhead of Ascurry**
DRAWING TITLE:	Cumulative Base Plan
DRAWING NO:	HOA017
DOCUMENT SIZE:	A3
SCALE:	1:420,000
DATE:	05/10/2013
DRAWING BY:	Franco Giovanetti
APPROVED BY:	Andy Lowe



Label	Location	Turbines	Tip (m)	Status	Distance (km)
1	Newton Of Idvies Farm	1	47.5	Approved	1.4
2	Lochlair Farmhouse	1	47	Approved	3.2
3	North Mains Of Cononsyth	1	66.7	Installed	3.5
4	Newmill Of Balgavies	1	66.5	Pending	3.7
5	Greenhillock 2	1	67	Pending	4.2
6	Greenhillock 1	1	45.9	Approved	4.2
7	Parkconon Farm	1	45	Approved	4.4
8	Drowndubbs Farm	2	46.5	Pending	5.2
9	Golf Course Cunninghill	1	77	Pending	6.3
10	Cuthlie	1	77	Pending	6.4
11	Pickerton	1	77	Approved	6.4
12	Dubton Farm	1	77	Pending	6.7
13	West Mains Of Turin	1	49	Pending	7.2
14	Craignathro	1	35	Approved	7.2
15	Stotfaulds Farm	1	77	Pending	7.5
16	Wester Meathie Farm	2	46.6	Approved	7.6
17	Pitkennedy Farm	1	74	Pending	8.3
18	Carsegownie	1	34.2	Pending	8.4
19	Upper Balmachie Farm	1	77	Pending	9.7
20	New Downie Farm	1	54	Pending	10.5
21	North Tarbax	1	45.9	Approved	10.9
22	Dodd Hill Wind Farm	5	126.5	Pending	10.9
23	Balnacake Farm	1	67	Pending	11.5
24	Govals Wind Farm	6	87	Pending	11.9
25	Frawney Wind Farm	5	80	Pending	12.1
26	Kalulu House	2	44.8	Pending	13.5
27	West Cottage	1	77	Pending	14.0
28	Broom Farm	1	49.5	Pending	14.2
29	Ethie Barns Farm	1	45	Pending	15.4
30	Dunswood	1	77	Approved	15.6
31	Tealing	1	86.5	Approved	15.9
32	Former Tealing Airfield	1	86.5	Pending	16.1
33	Michelin Tyres	2	120	Installed	16.1
34	East Pitforthie Farm	1	47	Approved	17.1
35	White Top	1	86.5	Pending	17.1
36	East Memus	1	86.5	Approved	17.2
37	Arrat Farm	2	46	Approved	17.2
38	Balkemback Farm	2	46.5	Approved	17.3
39	Balhall Lodge 1	1	47.5	Approved	17.4
40	Arkhill	8	79.6	Installed	17.9
41	Afflochie Farm	2	46.9	Approved	17.9
42	Balhall Lodge 2	1	49	Pending	18.0
43	Balrownie Farm	2	46.5	Approved	18.3
44	Gallow Hill	1	46.5	Pending	18.8
45	Whitefield Of Dun Farm	1	67	Approved	18.9
46	Ingliston Farm	1	77	Planning	19.3
47	Reedie Farm	2	46.9	Approved	19.3
48	Auchenreoch Farm	1	45.9	Approved	19.7
49	Glen Trusta	2	46.9	Approved	19.9
50	Henderston Quarry	1	66	Approved	20.1
51	Hill Of Stracathro	1	79.6	Approved	20.3
52	Scotson	1	79	Installed	20.4
53	Newbigging Farm	1	24.8	Approved	20.6
54	North Leoch	1	45.6	Approved	20.8
55	Nathro Hill	17	135	Pending	21.2
56	Davidston Farm	1	62	Pending	22.9
57	Wilton Farm	2	74	Pending	23.6
58	West Mains Farmhouse	1	61	Approved	23.8
59	West Adamston Farm	1	47.5	Installed	24.3
60	Lundie Castle Farm	1	48.5	Pending	24.7
61	Steelstrath Farm	1	84	Pending	24.9
62	Stone of Morphie Cottage	1	77	Pending	24.9
63	Grangehall	2	37	Approved	26.1
64	Moss Side of Esslie	1	45.5	Approved	26.2
65	Gossesslie Farm	1	47.5	Approved	26.3
66	Pitbeadlie Farm	1	76	Pending	26.7
67	South Balmakelly	1	45.5	Approved	26.8
68	House On The Hill	2	45.4	Approved	26.9
69	Dykelands	2	40.2	Approved	27.8
70	Wester Kilmany Farm	1	86.5	Pending	28.3
71	Hospital Shields Farm	2	46.5	Approved	28.4
72	Brigton Farm	1	81	Approved	28.4
73	Criggie Farmhouse	2	45.5	Approved	28.5
74	Loyal Farm	1	47	Approved	28.6
75	Windy Corner	1	63.5	Approved	29.1
76	Mains of Woodstone	1	80	Pending	29.5

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Project Description

Number of Turbine(s):	1
Turbine Model:	EWT Directwind 54
Hub Height:	50m
Blade diameter:	54m
Total height to blade tip:	77m
Turbine location:	353539 746476

Notes

Details of cumulative developments shown in the Cumulative Base Plan drawing HOA017 within 30km of Hillhead of Ascurry

PROJECT:	**Hillhead of Ascurry**
DRAWING TITLE:	Cumulative Base Plan List 1
DRAWING NO:	HOA018a
DOCUMENT SIZE:	A3
SCALE:	n/a
DATE:	05/10/2013
DRAWING BY:	Franco Giovanetti
APPROVED BY:	Andy Lowe

Label	Location	Turbines	Tip (m)	Status	Distance (km)
77	South Bradieston	1	66	Pending	30.2
78	Chapelfield Farm	1	43.5	Approved	30.4
79	Lochmalony Farm	1	67	Pending	30.5
80	Smiddyhill	1	40.5	Approved	31.1
81	Bamff Wind Farm	7	111	Pending	31.5
82	Wester Derry Farm	1	45	Approved	32.0
83	Jackston Farm	1	46.5	Approved	32.0
84	Mains of Bridgeton	1	77	Approved	32.1
85	Inchcape Windfarm	213	215	Pending	32.4
86	Glenbran Farm	1	56.3	Pending	32.5
87	Tullo	7	122	Installed	32.7
88	Redford Farm	1	53.88	Approved	32.8
89	Paul Matthew Hill	1	99.5	Pending	33.0
90	Lordscairnie Farm	1	45.7	Approved	33.1
91	The Sheils	3	100	Approved	33.3
92	Outfield Farm Abernyte	1	40	Approved	33.4
93	West Cairnbeg	1	77	Pending	33.6
94	Newington Farm	1	41.5	Approved	33.8
95	Tullo Farm Extension	7	100	Approved	33.9
96	Pitbladdo Farm	1	51	Approved	34.4
97	Easter Pitscottie Farm	1	48.7	Pending	35.5
98	Drumderg	16	107	Installed	36.2
99	Lumbennie Hill Pitcairlie	1	84	Approved	36.8
100	North Callange Farm	1	47	Pending	36.8
101	Craig Garbil 2	1	79	Pending	37.2
102	Craig Garbil	2	45.5	Approved	37.2
103	Nether Benholm	2	45.5	Approved	37.2
104	Peattie	1	67	Pending	37.6
105	Muirhead Farm	1	35.83	Approved	37.7
106	Westhall Cupar Fife	1	45.5	Installed	37.8
107	Fordoun Sawmill	1	77	Approved	37.8
108	Netheraird of Glasclune	1	67	Pending	37.9
109	Dendoldrum	2	45.7	Approved	38.0
110	Airdrie Farm	1	74	Approved	38.1
111	Muirton Of Drumlochy	1	20	Approved	38.2
112	North Baldutho Farm	2	25	Approved	38.4
113	North Cassingray Farm	1	34.2	Approved	38.4
114	Higham Farm	2	34	Approved	38.5
115	The Corb Bridge	1	84	Pending	38.6
116	Shandry Farm	2	45.5	Approved	38.7
117	Denside	3	92.5	Pending	39.0
118	Herscha Hill Extension	2	79	Pending	39.2
119	Kirkmay Farm	1	45	Approved	39.4
120	Herscha Hill Cluster	3	79.6	Pending	39.5
121	South Cassingray Farm	1	50	Pending	39.6
122	South Baldutho Farm	1	47.5	Approved	39.7
123	Hill Of Lethendy Farm	1	66.6	Approved	39.9
124	Wester Essendy Farm	2	32.1	Approved	40.1
125	Wester Kinloch Farm	1	27	Installed	40.3
126	Wairds of Alpity	1	79	Approved	40.3
127	Cornceres Farm	1	53.7	Pending	40.9
128	Scotshall Farm	1	35.5	Pending	41.0
129	East Gormack Farm	1	66.7	Approved	41.3
130	Chapleton Farm	1	49	Pending	41.3
131	St John's Hill	9	80	Approved	41.3
132	Droop Hill	2	100	Approved	41.3
133	Lower Melville Wood	1	85	Pending	41.8
134	Easter Logie	1	47	Pending	42.0
135	Mid Hill Extension	25	125	Approved	42.1
136	Crossgates Cottages	1	49	Pending	42.6
137	Jacksbank	3	100	Approved	43.2
138	Ferniebrae	1	67	Approved	45.5
139	East Town Farm	1	79	Approved	45.5
140	Stewart Tower Farm	1	45	Approved	46.0
141	Clochnahill	4	81	Approved	46.0
142	Annamuick	1	75	Pending	46.3
143	Hillhead of Auquhirie	3	92.5	Approved	46.6
144	Demperston Farmhouse	1	54	Pending	47.1
145	Carriston Farm	1	56.7	Pending	47.2
146	Upper Wyndings	1	47.5	Approved	47.7
147	Langside Farmhouse	1	39	Approved	47.8
148	Shampher Cottage	1	40	Approved	48.2
149	Newton Of Kingsdale	1	33.6	Installed	48.5
150	Ardlair	2	27	Approved	48.8
151	Tewel Farm	1	67	Approved	48.8
152	EFFC	1	81	Pending	49.0
153	Methil Docks	1	81	Installed	49.3
154	Methil Offshore	1	179	Approved	50.9
155	Balgonie	1	86.5	Pending	51.6
156	Sluie Hill	1	35	Approved	51.7
157	Earlseat Farm	8	120.5	Approved	52.3
158	Lacesston Farm	1	48	Installed	52.5
159	Easter Fordel	1	27	Approved	52.5
160	Lochelbank	12	86.5	Installed	52.8
161	Meikle Carewe	12	70	Installed	54.0
162	Cuthill Towers Farm	1	40	Approved	54.7
163	Logie	1	45.5	Approved	54.8
164	Kempstone Hill	3	52.5	Pending	55.2
165	Noble Foods Thornton	1	110	Approved	55.7
166	Skeddoway Farm 1	1	110	Approved	55.8
167	Skeddoway Farm 2	1	126	Pending	55.8
168	East Blair Farm	2	45.5	Pending	55.8
169	Temple Hill	1	84	Pending	56.4
170	Bogenraith	1	23	Pending	56.6
171	Griffin	68	130.5	Approved	56.7
172	Westfield	5	110	Installed	57.5
173	Drumside	1	46	Pending	58.6
174	Netherhall Steadings	1	27	Approved	59.4
175	Boghead	1	79	Pending	59.5
176	Bankhead	3	27	Approved	60.0

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Company Number: SC370060; VAT Number: 983 3836 77

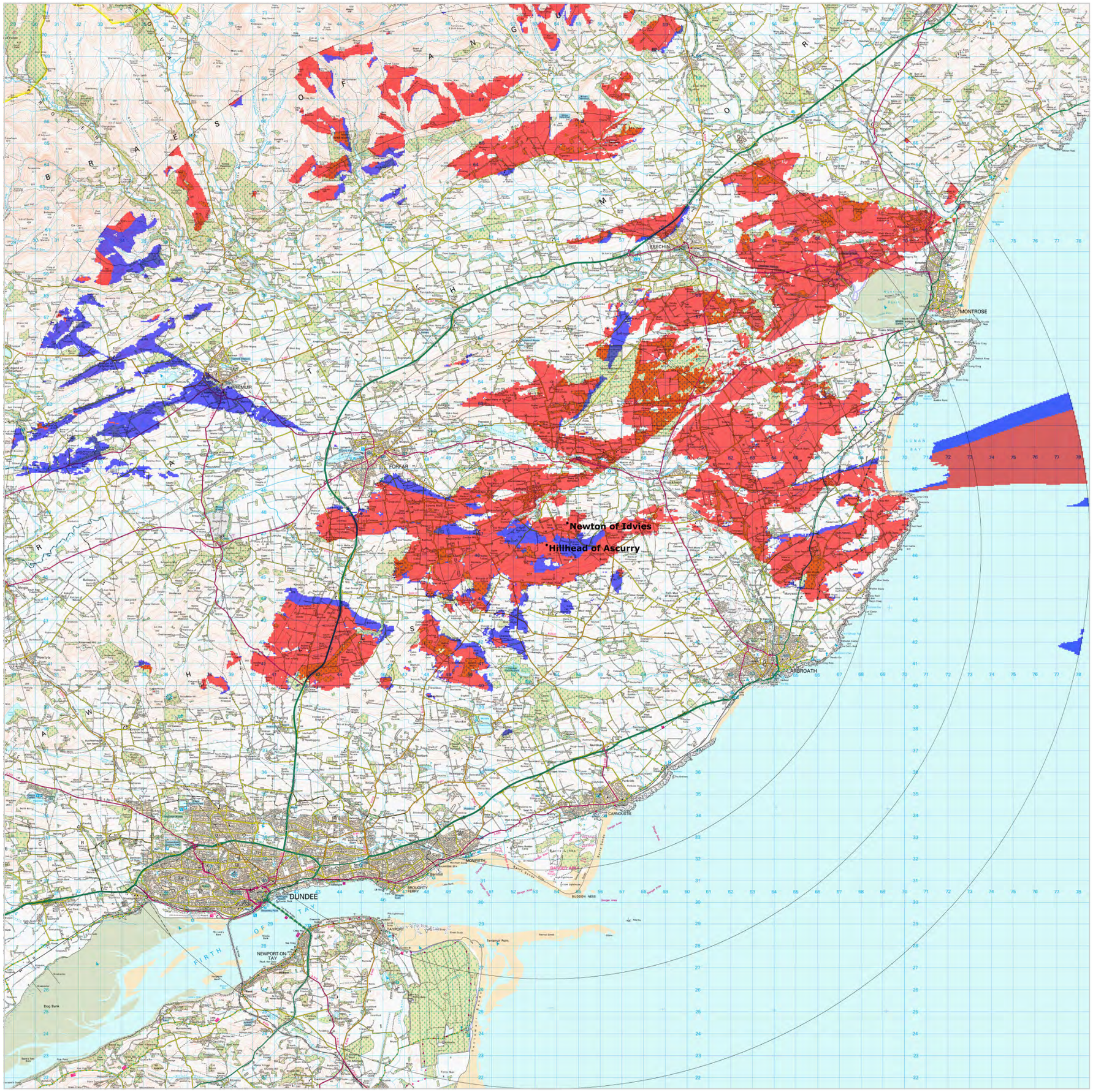
Project Description

Number of Turbine(s):	1
Turbine Model:	EWT Directwind 54
Hub Height:	50m
Blade diameter:	54m
Total height to blade tip:	77m
Turbine location:	353539 746476

Notes

Details of cumulative developments shown in the Cumulative Base Plan drawing HOA018 between 30km and 60km from Hillhead of Ascurry

PROJECT:	**Hillhead of Ascurry**
DRAWING TITLE:	Cumulative Base Plan List 2
DRAWING NO:	HOA018b
DOCUMENT SIZE:	A3
SCALE:	n/a
DATE:	05/10/2013
DRAWING BY:	Franco Giovanetti
APPROVED BY:	Andy Lowe



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Company Number: SC370060; VAT Number: 983 3836 77

Project Description

Number of Turbine(s):	1
Turbine Model:	EWT Directwind 54
Hub Height:	50m
Blade diameter:	54m
Total height to blade tip:	77m
Turbine location:	353539 746476

Notes

This map shows the cumulative zone of visibility of the proposed Hillhead of Ascurry turbine and the approved Newton of Idvies development.

Radii: 5, 10, 15, 20 and 25km

Legend

This theoretical visibility map is based on a receptor viewing height of 1.8m AGL. The levels of theoretical visibility are based on the following colouring scheme:

Blue: Only Hillhead of Ascurry turbine visible

Red: At least the nacelle of the Hillhead of Ascurry turbine and the Newton of Idvies turbine will be visible

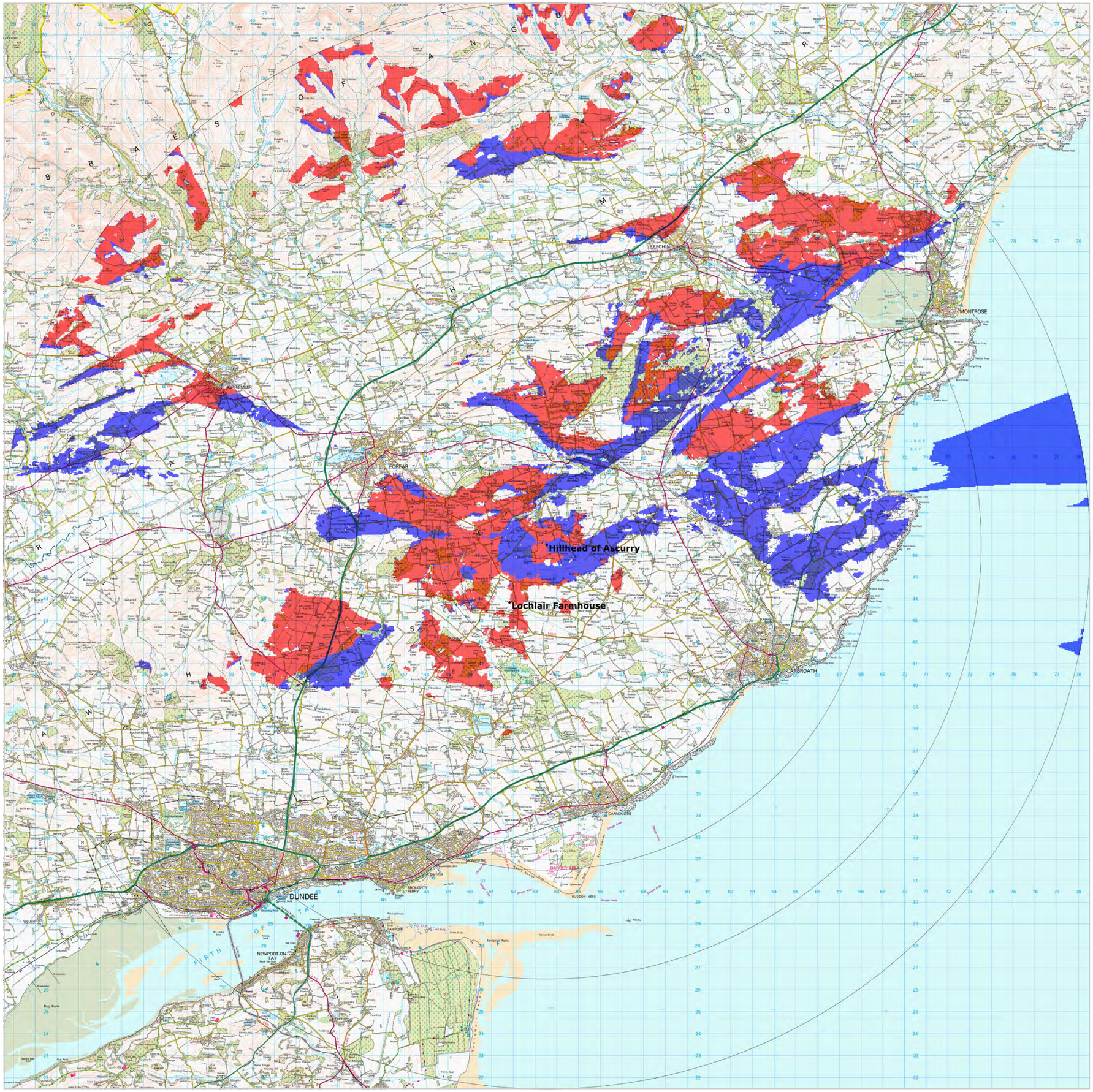
Newton of Idvies details

No of turbines:	1
Distance from Hillhead of Ascurry:	1.4km
Height to blade tip:	47.5m
Status:	Approved

PROJECT:	**Hillhead of Ascurry**
DRAWING TITLE:	Cumulative ZTV—Newton of Idvies Farm
DRAWING NO:	HOA019
DOCUMENT SIZE:	A3
SCALE:	1:170,000
DATE:	07/10/2013
DRAWING BY:	Franco Giovanetti
APPROVED BY:	Andy Lowe

N

0 5 10 15km



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Company Number: SC370060; VAT Number: 983 3836 77

Project Description

Number of Turbines:	1
Turbine Model:	EWT Directwind 54
Hub Height:	50m
Blade diameter:	54m
Total height to blade tip:	77m
Turbine location:	353539 746476

Notes

This map shows the cumulative zone of visibility of the proposed Hillhead of Ascurry turbine and the approved Lochlair Farmhouse development.

Radii: 5, 10, 15, 20 and 25km

Legend

This theoretical visibility map is based on a receptor viewing height of 1.8m AGL. The levels of theoretical visibility are based on the following colouring scheme:

Blue: Only Hillhead of Ascurry turbine visible

Red: At least the nacelle of the Hillhead of Ascurry turbine and the Lochlair Farmhouse turbine will be visible

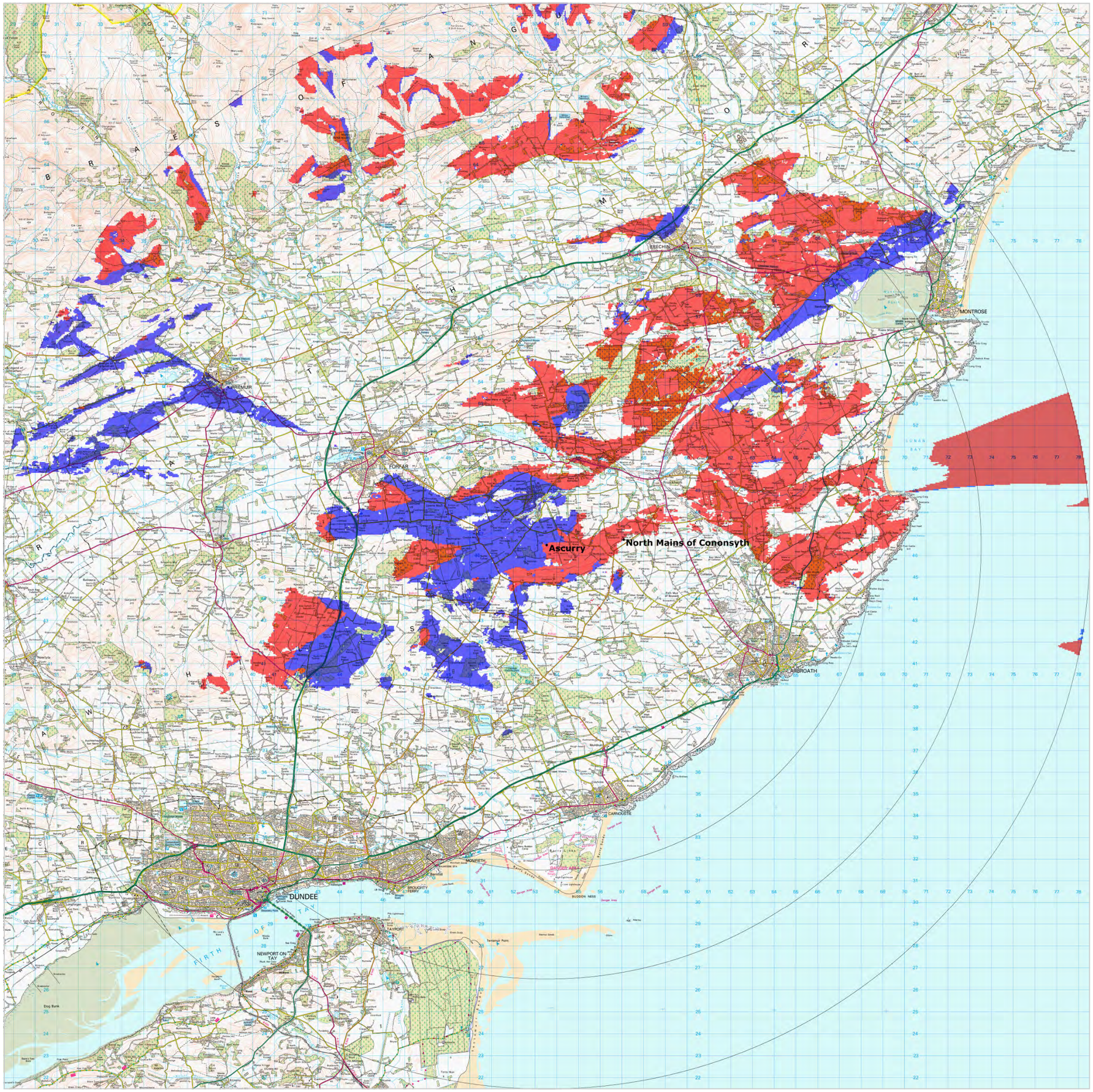
Lochlair Farmhouse details

No of turbines:	1
Distance from Hillhead of Ascurry:	3.2km
Height to blade tip:	47.0m
Status:	Approved

PROJECT:	**Hillhead of Ascurry**
DRAWING TITLE:	Cumulative ZTV—Lochlair Farmhouse
DRAWING NO:	HOA020
DOCUMENT SIZE:	A3
SCALE:	1:170,000
DATE:	07/10/2013
DRAWING BY:	Franco Giovanetti
APPROVED BY:	Andy Lowe

N

0 5 10 15km



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Company Number: SC370060; VAT Number: 983 3836 77

Project Description

Number of Turbines:	1
Turbine Model:	EWT Directwind 54
Hub Height:	50m
Blade diameter:	54m
Total height to blade tip:	77m
Turbine location:	353539 746476

Notes

This map shows the cumulative zone of visibility of the proposed Hillhead of Ascurry turbine and the operational North Mains of Cononsyth development.

Radii: 5, 10, 15, 20 and 25km

Legend

This theoretical visibility map is based on a receptor viewing height of 1.8m AGL. The levels of theoretical visibility are based on the following colouring scheme:

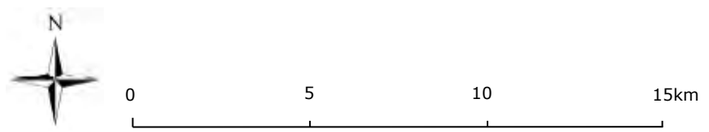
Blue: Only Hillhead of Ascurry turbine visible

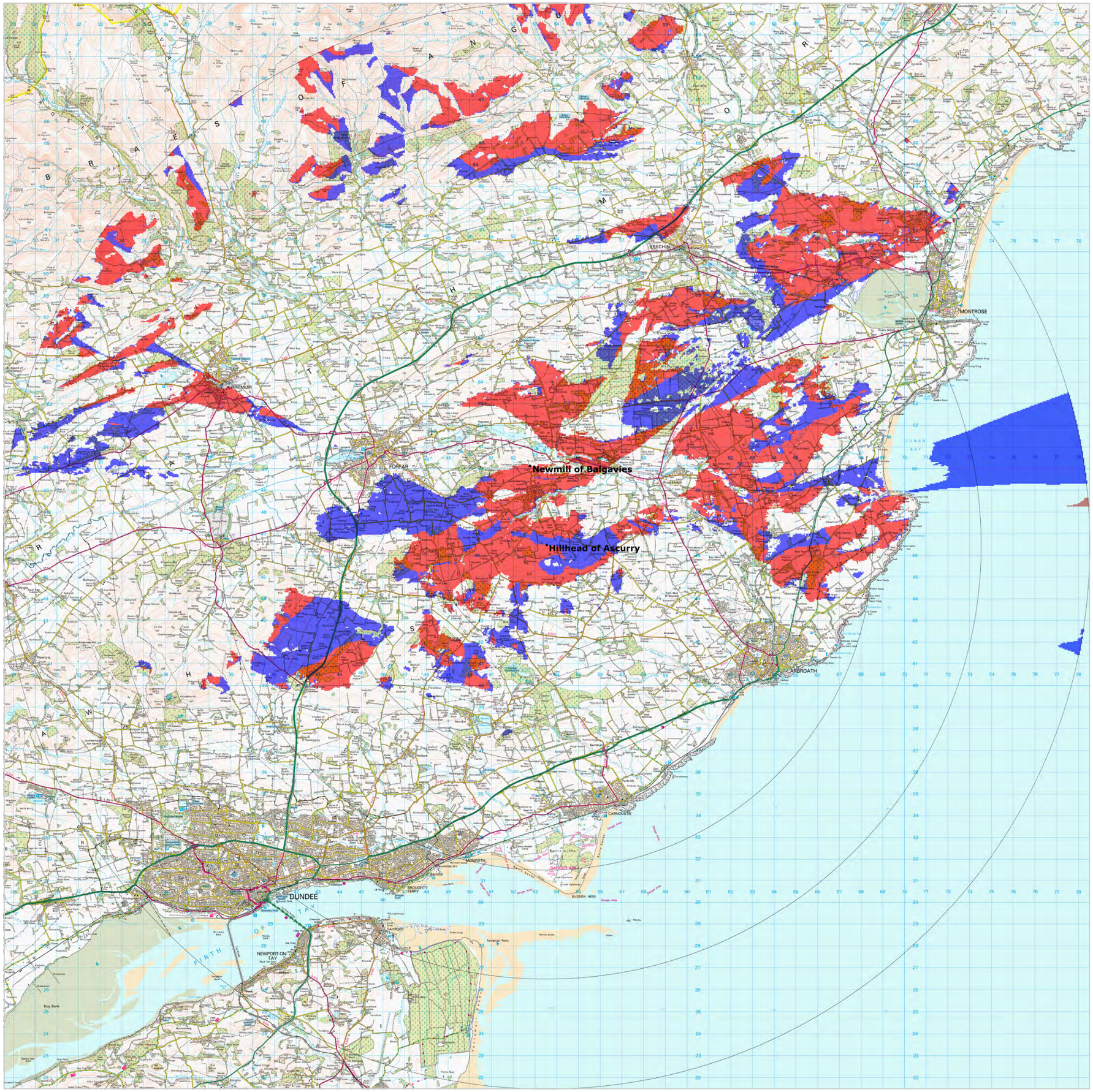
Red: At least the nacelle of the Hillhead of Ascurry turbine and the North Mains of Cononsyth turbine will be visible

North Mains of Cononsyth details

No of turbines:	1
Distance from Hillhead of Ascurry:	3.5km
Height to blade tip:	66.7m
Status:	Operational

PROJECT:	**Hillhead of Ascurry**
DRAWING TITLE:	Cumulative ZTV—N. Mains of Cononsyth
DRAWING NO:	HOA021
DOCUMENT SIZE:	A3
SCALE:	1:170,000
DATE:	07/10/2013
DRAWING BY:	Franco Giovanetti
APPROVED BY:	Andy Lowe





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Project Description

Number of Turbines:	1
Turbine Model:	EWT Directwind 54
Hub Height:	50m
Blade diameter:	54m
Total height to blade tip:	77m
Turbine location:	353539 746476

Notes

This map shows the cumulative zone of visibility of the proposed Hillhead of Ascurry turbine and the proposed Newmill of Balgavies development.

Radii: 5, 10, 15, 20 and 25km

Legend

This theoretical visibility map is based on a receptor viewing height of 1.8m AGL. The levels of theoretical visibility are based on the following colouring scheme:

Blue: Only Hillhead of Ascurry turbine visible

Red: At least the nacelle of the Hillhead of Ascurry turbine and the Newmill of Balgavies turbine will be visible

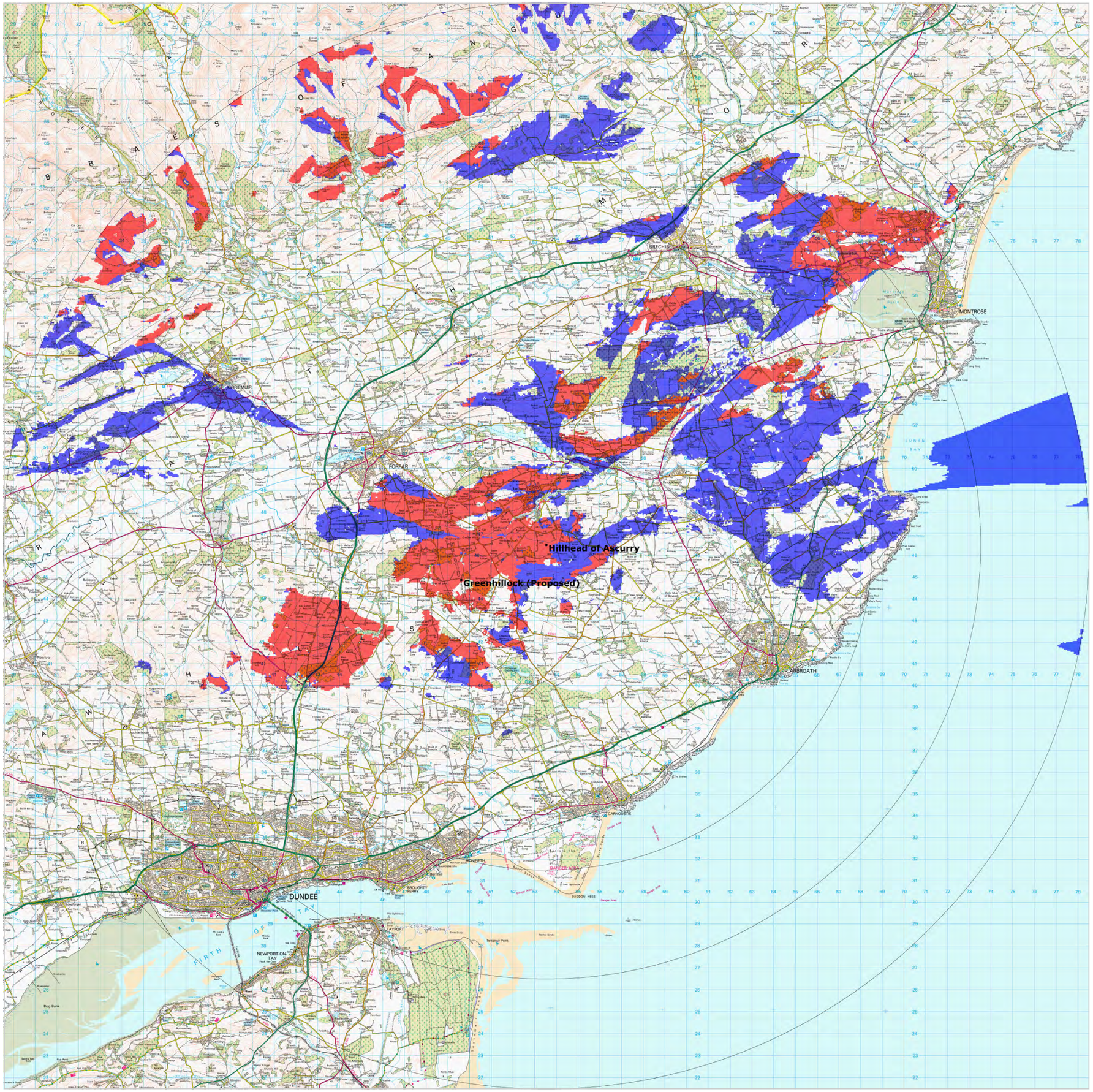
Newmill of Balgavies details

No of turbines:	1
Distance from Hillhead of Ascurry:	3.7km
Height to blade tip:	66.5m
Status:	Proposed

PROJECT:	**Hillhead of Ascurry**
DRAWING TITLE:	Cumulative ZTV—Newmill of Balgavies
DRAWING NO:	HOA022
DOCUMENT SIZE:	A3
SCALE:	1:170,000
DATE:	07/10/2013
DRAWING BY:	Franco Giovanetti
APPROVED BY:	Andy Lowe

N

0 5 10 15km



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Project Description

Number of Turbines:	1
Turbine Model:	EWT Directwind 54
Hub Height:	50m
Blade diameter:	54m
Total height to blade tip:	77m
Turbine location:	353539 746476

Notes

This map shows the cumulative zone of visibility of the proposed Hillhead of Ascurry turbine and the proposed Greenhillock development.

Radii: 5, 10, 15, 20 and 25km

Legend

This theoretical visibility map is based on a receptor viewing height of 1.8m AGL. The levels of theoretical visibility are based on the following colouring scheme:

Blue: Only Hillhead of Ascurry turbine visible

Red: At least the nacelle of the Hillhead of Ascurry turbine and the proposed Greenhillock development will be visible

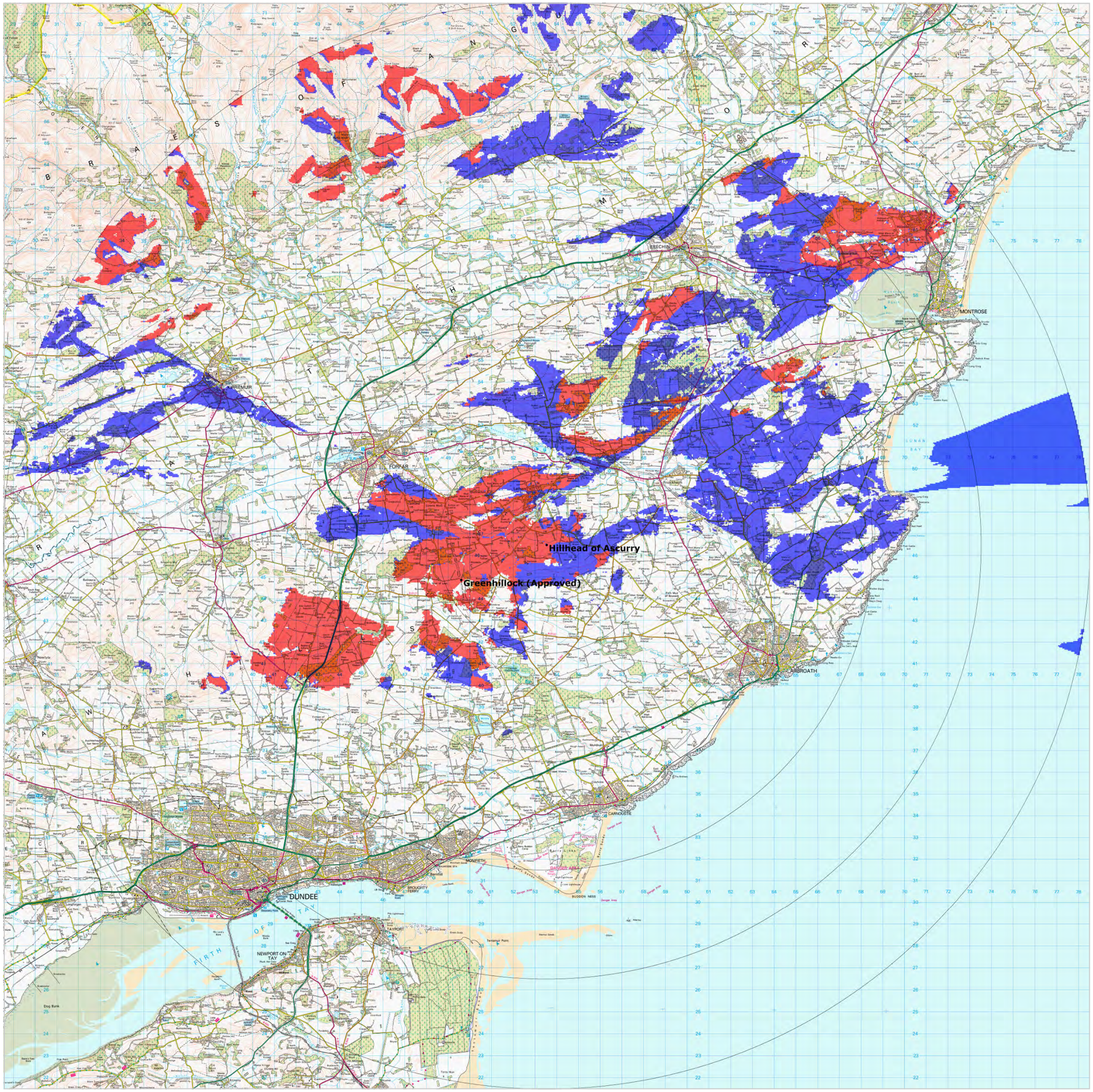
Greenhillock (proposed) details

No of turbines:	1
Distance from Hillhead of Ascurry:	4.2km
Height to blade tip:	67.5m
Status:	Proposed

PROJECT:	**Hillhead of Ascurry**
DRAWING TITLE:	Cumulative ZTV— Greenhillock-Proposed
DRAWING NO:	HOA023
DOCUMENT SIZE:	A3
SCALE:	1:170,000
DATE:	07/10/2013
DRAWING BY:	Franco Giovanetti
APPROVED BY:	Andy Lowe

N

0 5 10 15km



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Tel: +44 (0) 131 555 4745; Email: info@locogen.com
Company Number: SC370060; VAT Number: 983 3836 77

Project Description

Number of Turbines:	1
Turbine Model:	EWT Directwind 54
Hub Height:	50m
Blade diameter:	54m
Total height to blade tip:	77m
Turbine location:	353539 746476

Notes

This map shows the cumulative zone of visibility of the proposed Hillhead of Ascurry turbine and the approved Greenhillock development.

Radii: 5, 10, 15, 20 and 25km

Legend

This theoretical visibility map is based on a receptor viewing height of 1.8m AGL. The levels of theoretical visibility are based on the following colouring scheme:

Blue: Only Hillhead of Ascurry turbine visible

Red: At least the nacelle of the Hillhead of Ascurry turbine and the approved Greenhillock development will be visible

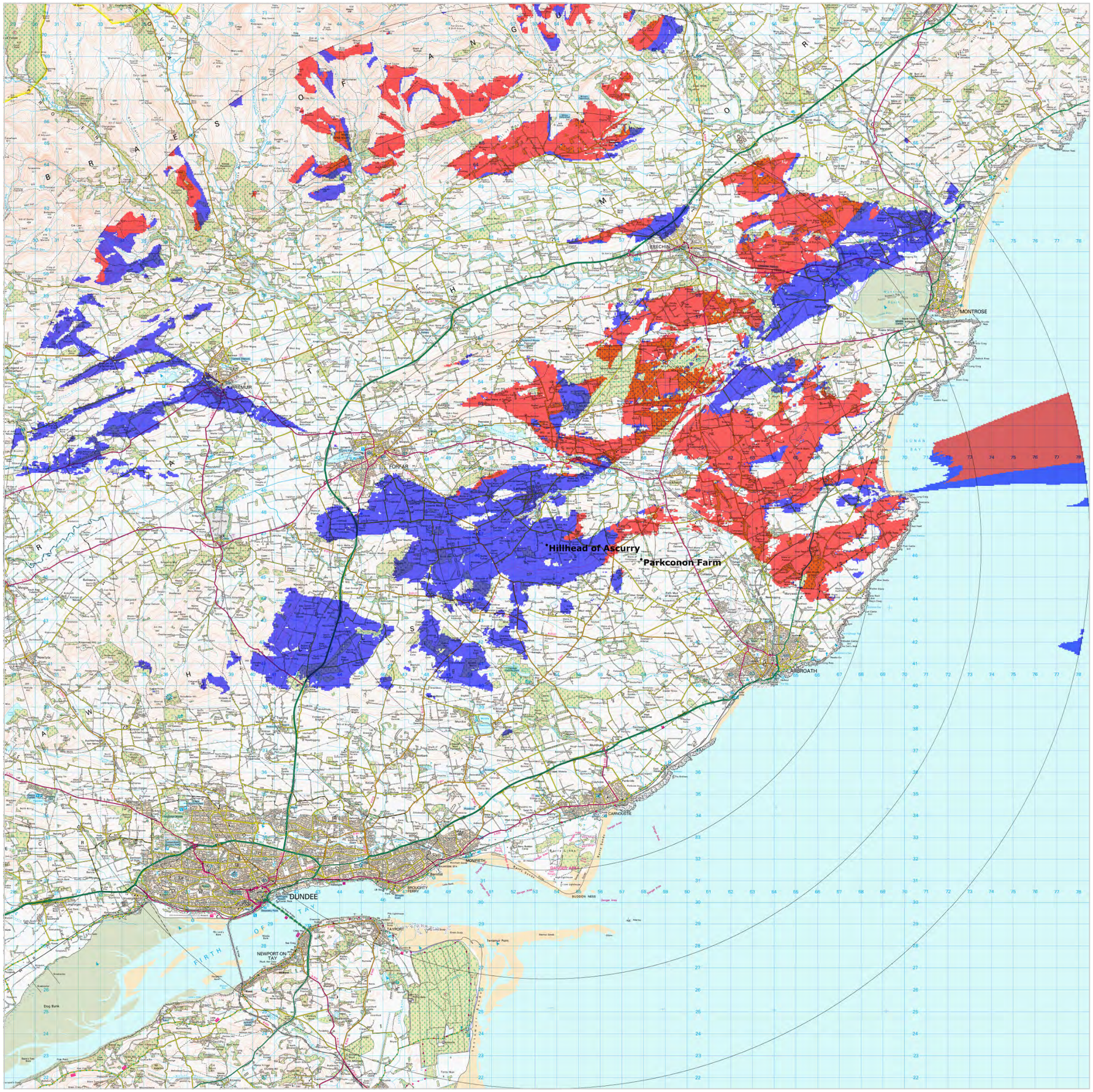
Greenhillock (approved) details

No of turbines:	1
Distance from Hillhead of Ascurry:	4.2km
Height to blade tip:	45.9m
Status:	Approved

PROJECT:	**Hillhead of Ascurry**
DRAWING TITLE:	Cumulative ZTV— Greenhillock-Approved
DRAWING NO:	HOA024
DOCUMENT SIZE:	A3
SCALE:	1:170,000
DATE:	07/10/2013
DRAWING BY:	Franco Giovanetti
APPROVED BY:	Andy Lowe

N

0 5 10 15km



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Company Number: SC370060; VAT Number: 983 3836 77

Project Description

Number of Turbines:	1
Turbine Model:	EWT Directwind 54
Hub Height:	50m
Blade diameter:	54m
Total height to blade tip:	77m
Turbine location:	353539 746476

Notes

This map shows the cumulative zone of visibility of the proposed Hillhead of Ascurry turbine and the approved Parkconon Farm development.

Radii: 5, 10, 15, 20 and 25km

Legend

This theoretical visibility map is based on a receptor viewing height of 1.8m AGL. The levels of theoretical visibility are based on the following colouring scheme:

Blue: Only Hillhead of Ascurry turbine visible

Red: At least the nacelle of the Hillhead of Ascurry turbine and the Parkconon turbine will be visible

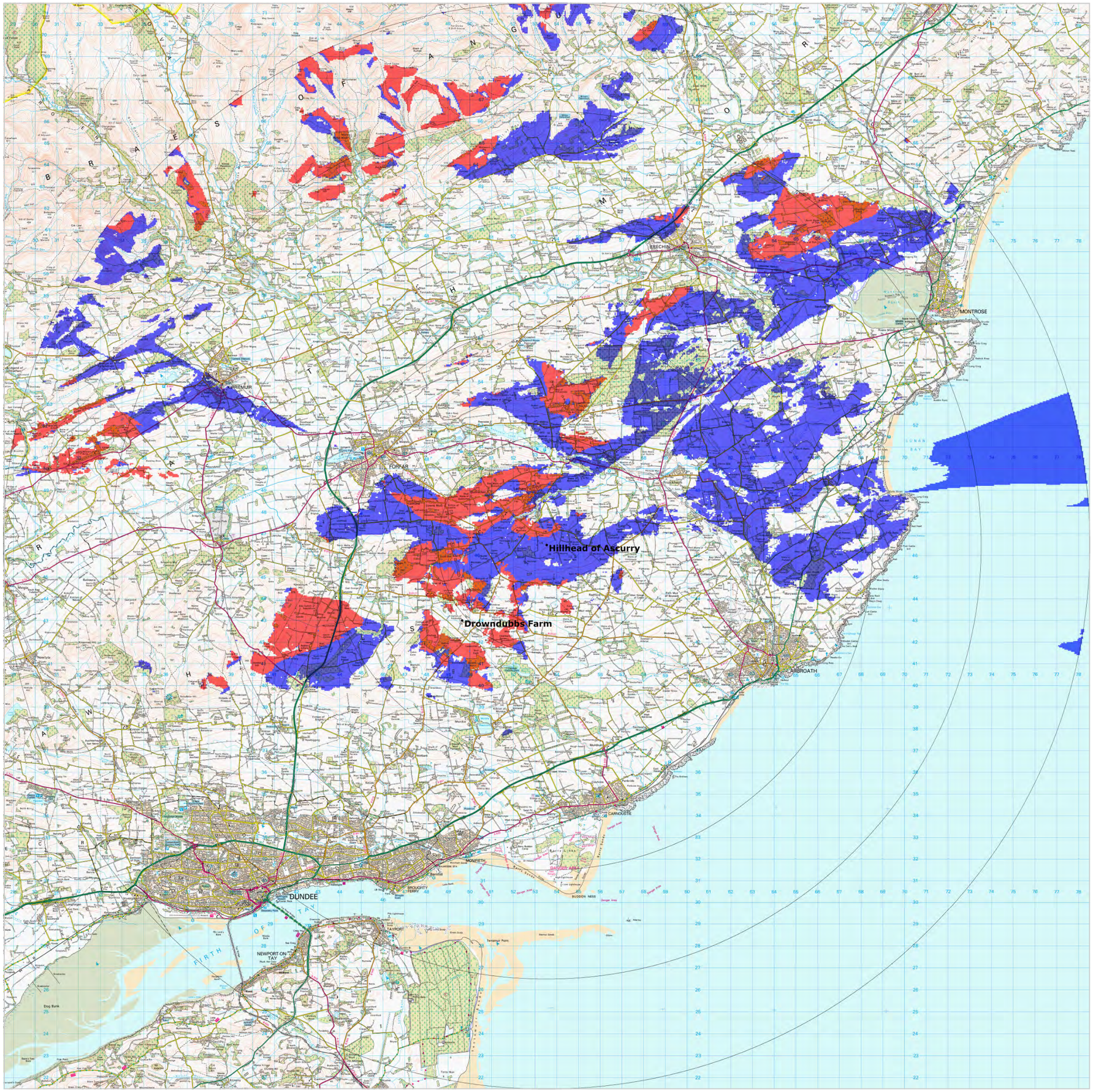
Parkconon details

No of turbines:	1
Distance from Hillhead of Ascurry:	4.4km
Height to blade tip:	45m
Status:	Approved

PROJECT:	**Hillhead of Ascurry**
DRAWING TITLE:	Cumulative ZTV—Parkconon Farm
DRAWING NO:	HOA025
DOCUMENT SIZE:	A3
SCALE:	1:170,000
DATE:	07/10/2013
DRAWING BY:	Franco Giovanetti
APPROVED BY:	Andy Lowe

N

0 5 10 15km



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Company Number: SC370060; VAT Number: 983 3836 77

Project Description

Number of Turbines:	1
Turbine Model:	EWT Directwind 54
Hub Height:	50m
Blade diameter:	54m
Total height to blade tip:	77m
Turbine location:	353539 746476

Notes

This map shows the cumulative zone of visibility of the proposed Hillhead of Ascurry turbine and the proposed Drowndubbs development.

Radii: 5, 10, 15, 20 and 25km

Legend

This theoretical visibility map is based on a receptor viewing height of 1.8m AGL. The levels of theoretical visibility are based on the following colouring scheme:

Blue: Only Hillhead of Ascurry turbine visible

Red: At least the nacelle of the Hillhead of Ascurry turbine and the Drowndubbs turbines will be visible

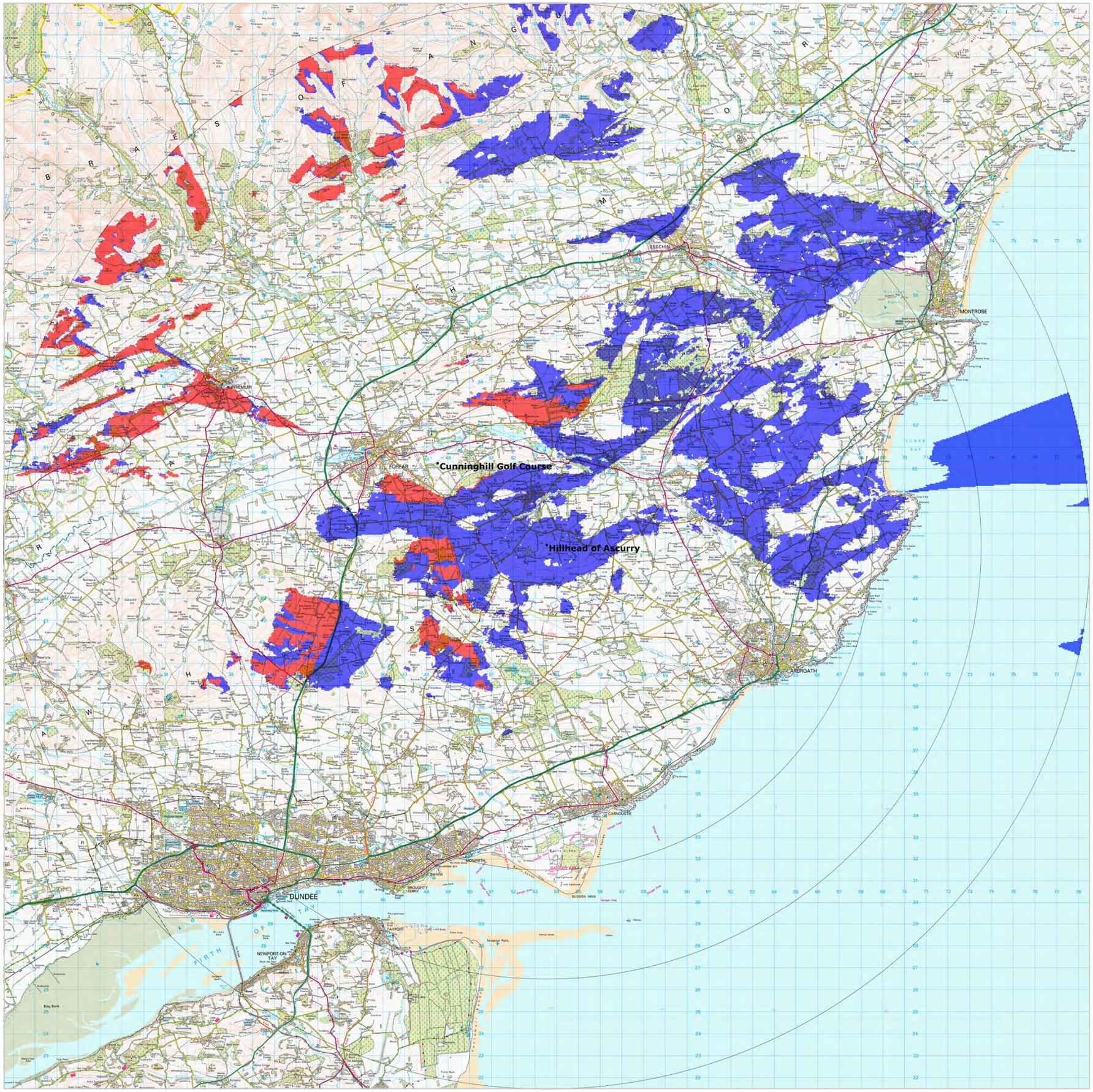
Drowndubbs details

No of turbines:	2
Distance from Hillhead of Ascurry:	5.2km
Height to blade tip:	46.5m
Status:	Proposed

PROJECT:	**Hillhead of Ascurry**
DRAWING TITLE:	Cumulative ZTV—Drowndubbs
DRAWING NO:	HOA026
DOCUMENT SIZE:	A3
SCALE:	1:170,000
DATE:	07/10/2013
DRAWING BY:	Franco Giovanetti
APPROVED BY:	Andy Lowe

N

0 5 10 15km



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Company Number: SC370060; VAT Number: 983 3836 77

Project Description

Number of Turbines:	1
Turbine Model:	EWT Directwind 54
Hub Height:	50m
Blade diameter:	54m
Total height to blade tip:	77m
Turbine location:	353539 746476

Notes

This map shows the cumulative zone of visibility of the proposed Hillhead of Ascurry turbine and the proposed Cunninghill Golf Course development.

Radii: 5, 10, 15, 20 and 25km

Legend

This theoretical visibility map is based on a receptor viewing height of 1.8m AGL. The levels of theoretical visibility are based on the following colouring scheme:

Blue: Only Hillhead of Ascurry turbine visible

Red: At least the nacelle of the Hillhead of Ascurry turbine and the Cunninghill Golf Course turbine will be visible

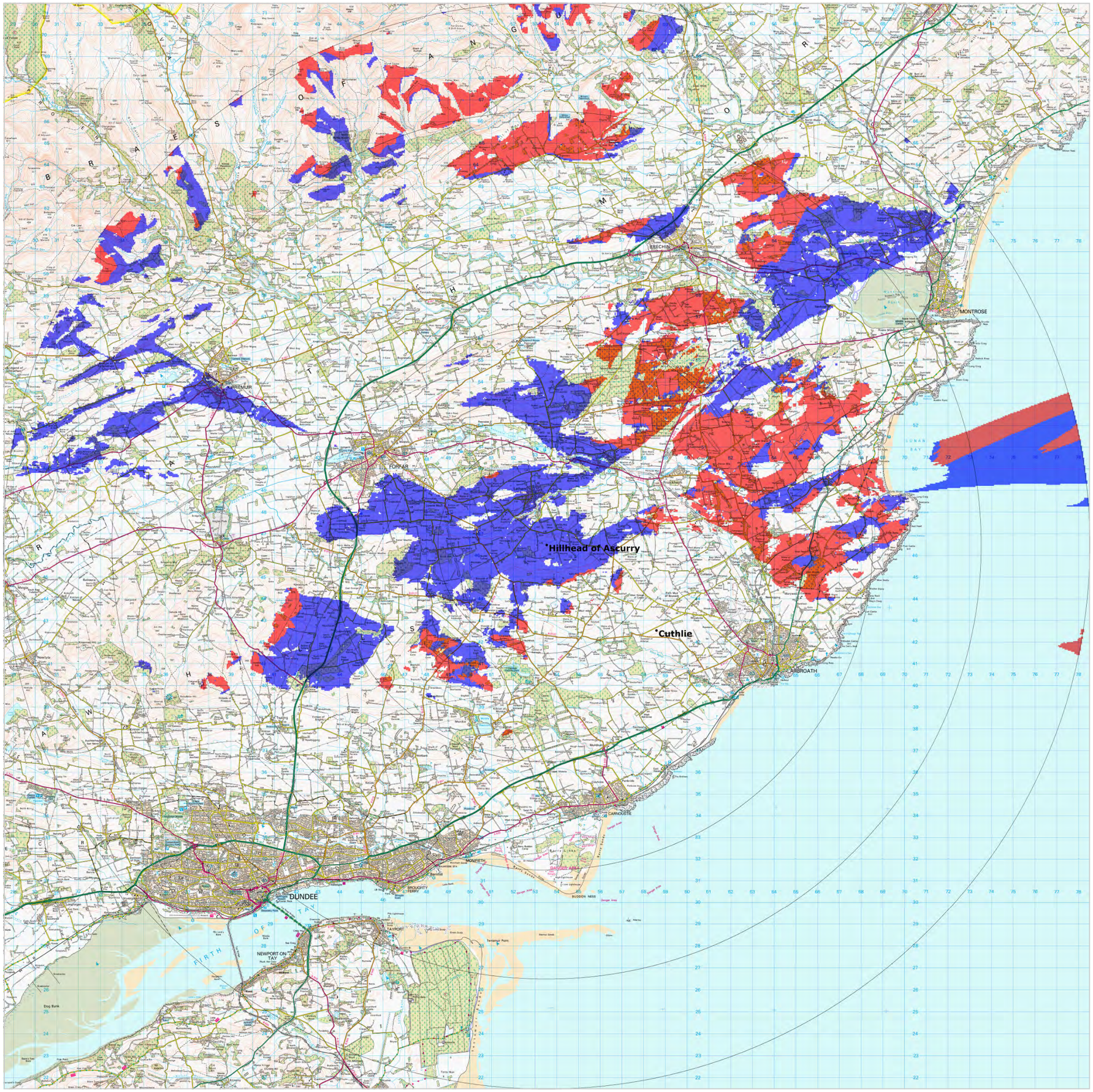
Cunninghill Golf Course details

No of turbines:	1
Distance from Hillhead of Ascurry:	6.3km
Height to blade tip:	77.0m
Status:	Proposed

PROJECT:	**Hillhead of Ascurry**
DRAWING TITLE:	Cumulative ZTV— Cunninghill Golf Course
DRAWING NO:	HOA027
DOCUMENT SIZE:	A3
SCALE:	1:170,000
DATE:	07/10/2013
DRAWING BY:	Franco Giovanetti
APPROVED BY:	Andy Lowe

N

0 5 10 15km



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Company Number: SC370060; VAT Number: 983 3836 77

Project Description

Number of Turbines:	1
Turbine Model:	EWT Directwind 54
Hub Height:	50m
Blade diameter:	54m
Total height to blade tip:	77m
Turbine location:	353539 746476

Notes

This map shows the cumulative zone of visibility of the proposed Hillhead of Ascurry turbine and the proposed Cuthlie development.

Radii: 5, 10, 15, 20 and 25km

Legend

This theoretical visibility map is based on a receptor viewing height of 1.8m AGL. The levels of theoretical visibility are based on the following colouring scheme:

Blue: Only Hillhead of Ascurry turbine visible

Red: At least the nacelle of the Hillhead of Ascurry turbine and the Cuthlie turbine will be visible

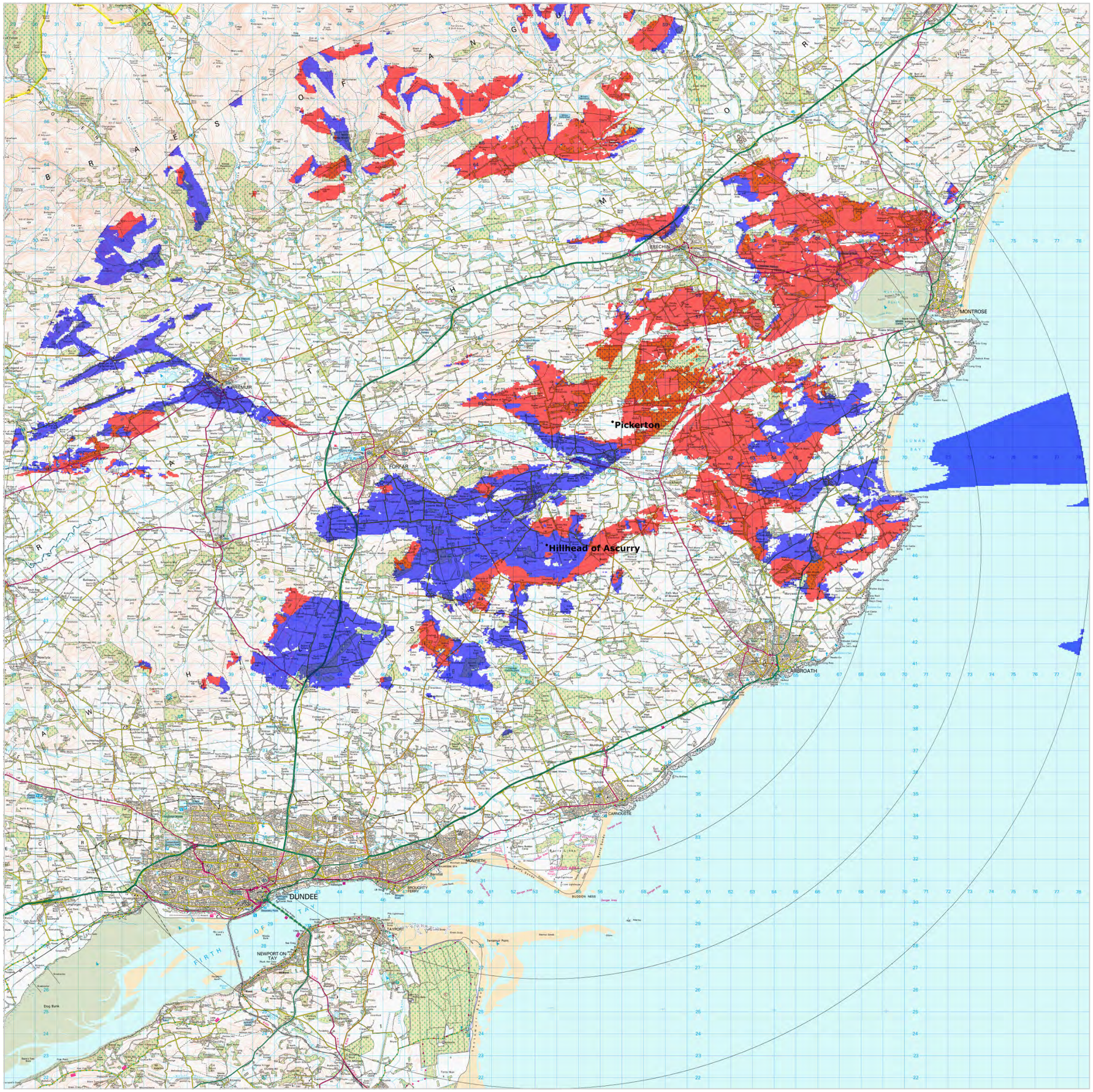
Cuthlie details

No of turbines:	1
Distance from Hillhead of Ascurry:	6.4km
Height to blade tip:	77.0m
Status:	Proposed

PROJECT:	**Hillhead of Ascurry**
DRAWING TITLE:	Cumulative ZTV—Cuthlie
DRAWING NO:	HOA028
DOCUMENT SIZE:	A3
SCALE:	1:170,000
DATE:	07/10/2013
DRAWING BY:	Franco Giovanetti
APPROVED BY:	Andy Lowe

N

0 5 10 15km



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Company Number: SC370060; VAT Number: 983 3836 77

Project Description

Number of Turbines:	1
Turbine Model:	EWT Directwind 54
Hub Height:	50m
Blade diameter:	54m
Total height to blade tip:	77m
Turbine location:	353539 746476

Notes

This map shows the cumulative zone of visibility of the proposed Hillhead of Ascurry turbine and the approved Pickerton development.

Radii: 5, 10, 15, 20 and 25km

Legend

This theoretical visibility map is based on a receptor viewing height of 1.8m AGL. The levels of theoretical visibility are based on the following colouring scheme:

Blue: Only Hillhead of Ascurry turbine visible

Red: At least the nacelle of the Hillhead of Ascurry turbine and the Pickerton turbine will be visible

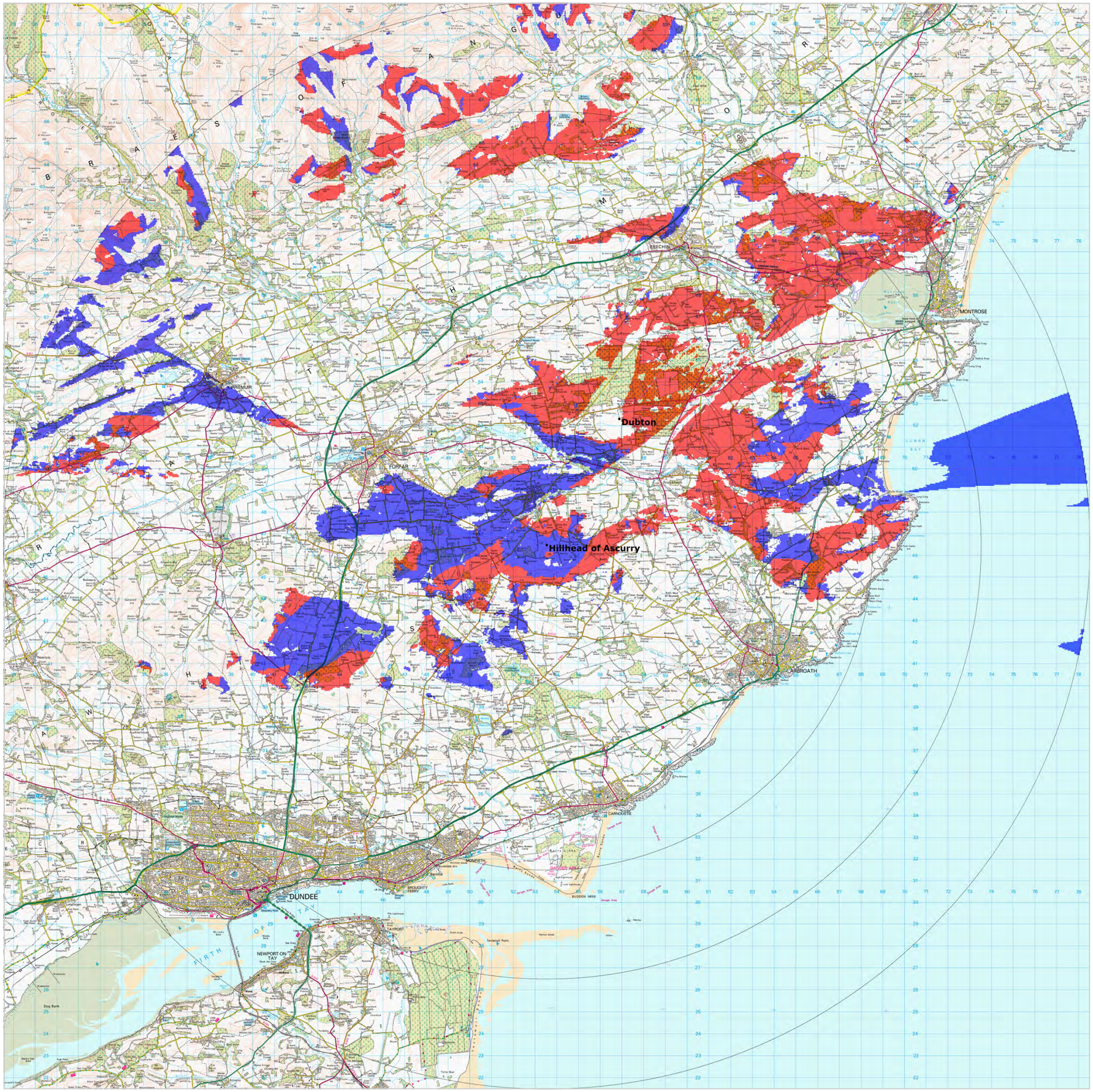
Pickerton details

No of turbines:	1
Distance from Hillhead of Ascurry:	6.4km
Height to blade tip:	77m
Status:	Approved

PROJECT:	**Hillhead of Ascurry**
DRAWING TITLE:	Cumulative ZTV—Pickerton
DRAWING NO:	HOA029
DOCUMENT SIZE:	A3
SCALE:	1:170,000
DATE:	07/10/2013
DRAWING BY:	Franco Giovanetti
APPROVED BY:	Andy Lowe

N

0 5 10 15km



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Company Number: SC370060; VAT Number: 983 3836 77

Project Description

Number of Turbines:	1
Turbine Model:	EWT Directwind 54
Hub Height:	50m
Blade diameter:	54m
Total height to blade tip:	77m
Turbine location:	353539 746476

Notes

This map shows the cumulative zone of visibility of the proposed Hillhead of Ascurry turbine and the proposed Dubton development.

Radii: 5, 10, 15, 20 and 25km

Legend

This theoretical visibility map is based on a receptor viewing height of 1.8m AGL. The levels of theoretical visibility are based on the following colouring scheme:

Blue: Only Hillhead of Ascurry turbine visible

Red: At least the nacelle of the Hillhead of Ascurry turbine and the Dubton turbine will be visible

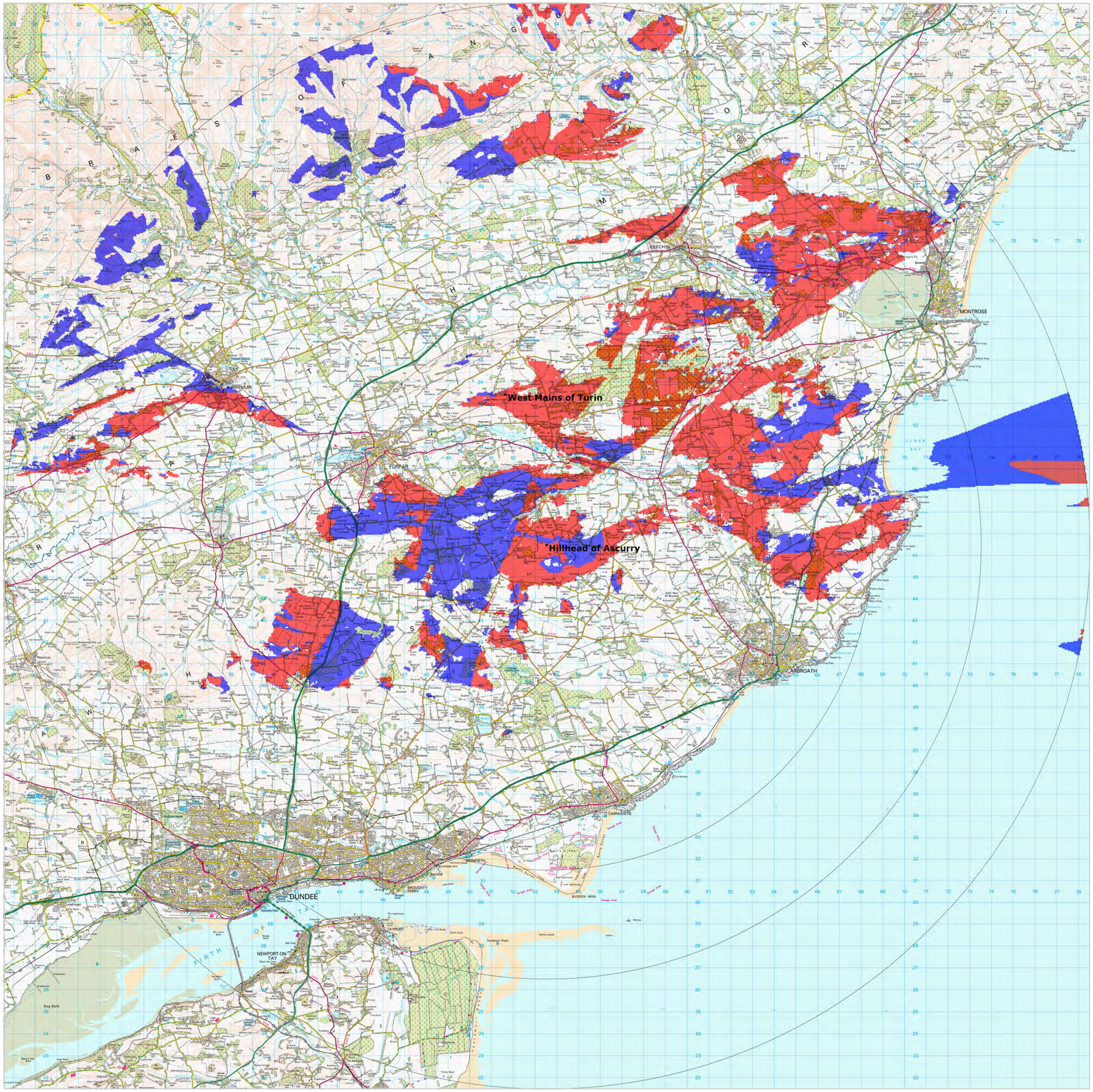
Dubton details

No of turbines:	1
Distance from Hillhead of Ascurry:	6.7km
Height to blade tip:	77m
Status:	Proposed

PROJECT:	**Hillhead of Ascurry**
DRAWING TITLE:	Cumulative ZTV—Dubton
DRAWING NO:	HOA030
DOCUMENT SIZE:	A3
SCALE:	1:170,000
DATE:	07/10/2013
DRAWING BY:	Franco Giovanetti
APPROVED BY:	Andy Lowe

N

0 5 10 15km



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Project Description

Number of Turbines:	1
Turbine Model:	EWT Directwind 54
Hub Height:	50m
Blade diameter:	54m
Total height to blade tip:	77m
Turbine location:	353539 746476

Notes

This map shows the cumulative zone of visibility of the proposed Hillhead of Ascurry turbine and the proposed West Mains of Turin development.

Radii: 5, 10, 15, 20 and 25km

Legend

This theoretical visibility map is based on a receptor viewing height of 1.8m AGL. The levels of theoretical visibility are based on the following colouring scheme:

Blue: Only Hillhead of Ascurry turbine visible

Red: At least the nacelle of the Hillhead of Ascurry turbine and the West Mains of Turin turbine will be visible

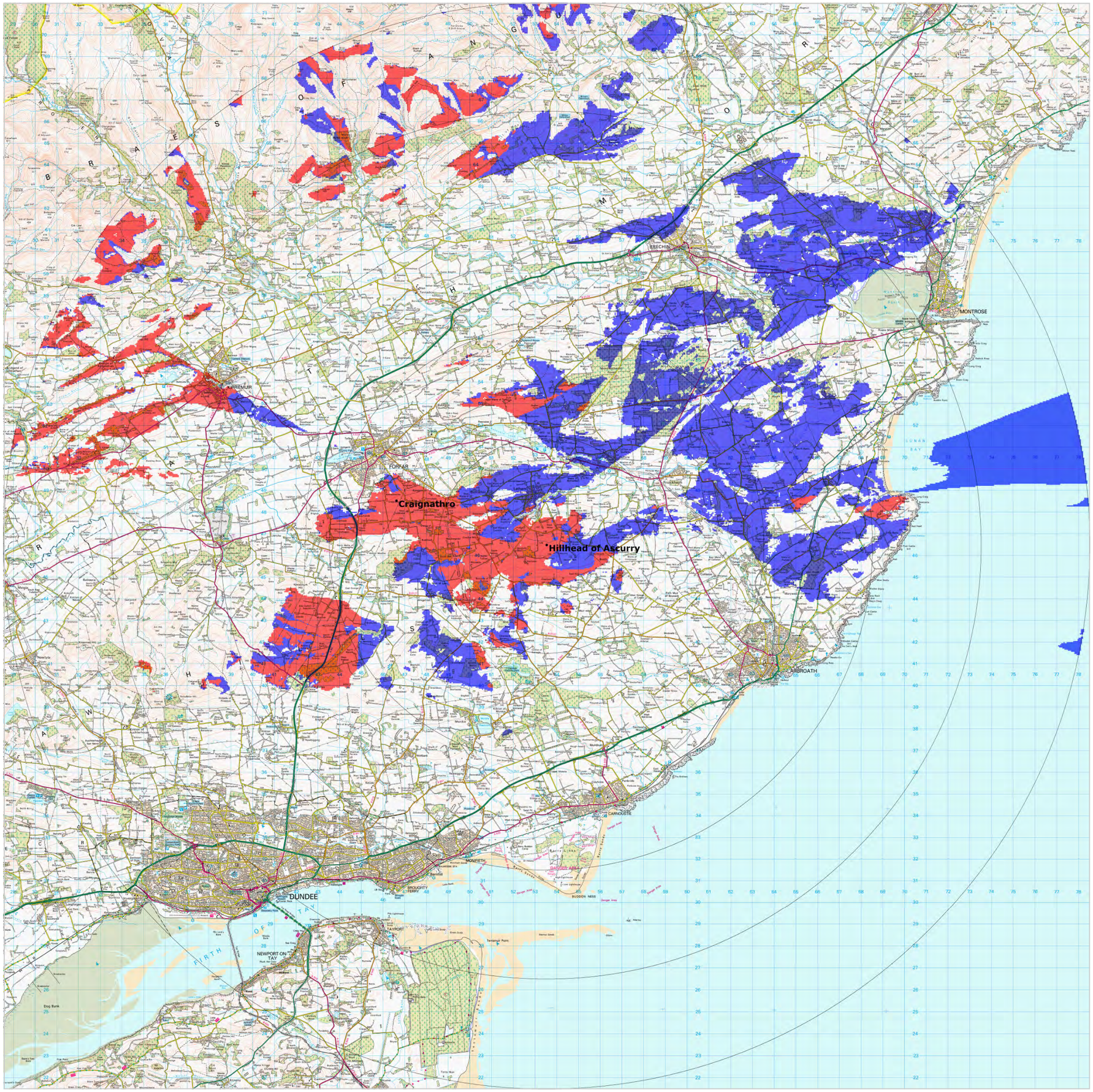
West Mains of Turin details

No of turbines:	1
Distance from Hillhead of Ascurry:	7.2km
Height to blade tip:	49m
Status:	Proposed

PROJECT:	**Hillhead of Ascurry**
DRAWING TITLE:	Cumulative ZTV—West Mains of Turin
DRAWING NO:	HOA031
DOCUMENT SIZE:	A3
SCALE:	1:170,000
DATE:	07/10/2013
DRAWING BY:	Franco Giovanetti
APPROVED BY:	Andy Lowe

N

0 5 10 15km



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Company Number: SC370060; VAT Number: 983 3836 77

Project Description

Number of Turbines:	1
Turbine Model:	EWT Directwind 54
Hub Height:	50m
Blade diameter:	54m
Total height to blade tip:	77m
Turbine location:	353539 746476

Notes

This map shows the cumulative zone of visibility of the proposed Hillhead of Ascurry turbine and the approved Craignathro development.

Radii: 5, 10, 15, 20 and 25km

Legend

This theoretical visibility map is based on a receptor viewing height of 1.8m AGL. The levels of theoretical visibility are based on the following colouring scheme:

Blue: Only Hillhead of Ascurry turbine visible

Red: At least the nacelle of the Hillhead of Ascurry turbine and the Craignathro turbine will be visible

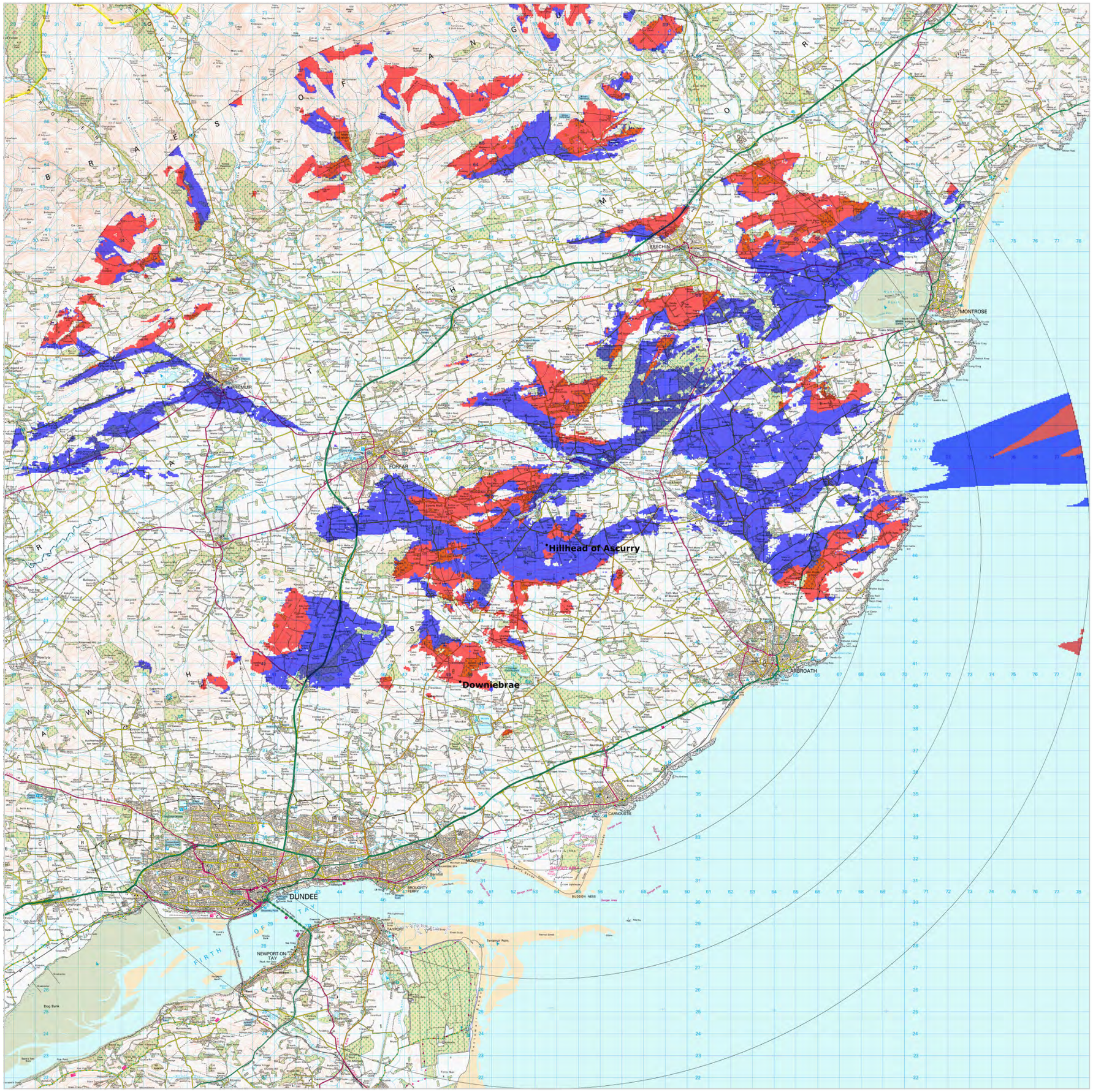
Craignathro details

No of turbines:	1
Distance from Hillhead of Ascurry:	7.2km
Height to blade tip:	35.0m
Status:	Approved

PROJECT:	**Hillhead of Ascurry**
DRAWING TITLE:	Cumulative ZTV—Craignathro
DRAWING NO:	HOA032
DOCUMENT SIZE:	A3
SCALE:	1:170,000
DATE:	07/10/2013
DRAWING BY:	Franco Giovanetti
APPROVED BY:	Andy Lowe

N

0 5 10 15km



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Company Number: SC370060; VAT Number: 983 3836 77

Project Description

Number of Turbines:	1
Turbine Model:	EWT Directwind 54
Hub Height:	50m
Blade diameter:	54m
Total height to blade tip:	77m
Turbine location:	353539 746476

Notes

This map shows the cumulative zone of visibility of the proposed Hillhead of Ascurry turbine and the proposed Downiebrae development.

Radii: 5, 10, 15, 20 and 25km

Legend

This theoretical visibility map is based on a receptor viewing height of 1.8m AGL. The levels of theoretical visibility are based on the following colouring scheme:

Blue: Only Hillhead of Ascurry turbine visible

Red: At least the nacelle of the Hillhead of Ascurry turbine and the Downiebrae turbine will be visible

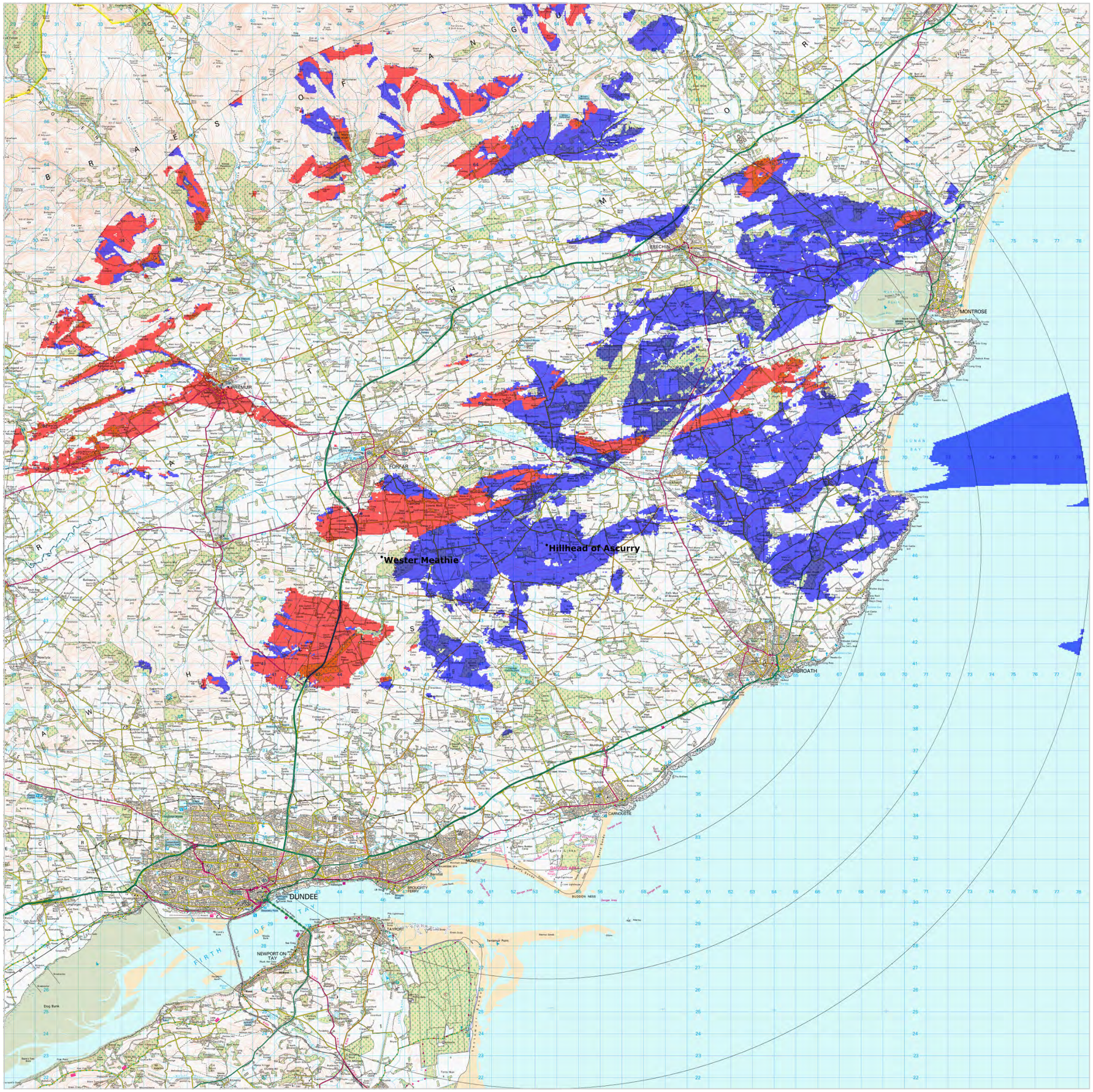
Downiebrae details

No of turbines:	1
Distance from Hillhead of Ascurry:	7.5km
Height to blade tip:	77.0m
Status:	Proposed

PROJECT:	**Hillhead of Ascurry**
DRAWING TITLE:	Cumulative ZTV—Downiebrae
DRAWING NO:	HOA033
DOCUMENT SIZE:	A3
SCALE:	1:170,000
DATE:	07/10/2013
DRAWING BY:	Franco Giovanetti
APPROVED BY:	Andy Lowe

N

0 5 10 15km



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Company Number: SC370060; VAT Number: 983 3836 77

Project Description

Number of Turbines:	1
Turbine Model:	EWT Directwind 54
Hub Height:	50m
Blade diameter:	54m
Total height to blade tip:	77m
Turbine location:	353539 746476

Notes

This map shows the cumulative zone of visibility of the proposed Hillhead of Ascurry turbine and the approved Wester Meathie development.

Legend

This theoretical visibility map is based on a receptor viewing height of 1.8m AGL. The levels of theoretical visibility are based on the following colouring scheme:

Blue: Only Hillhead of Ascurry turbine visible

Red: At least the nacelle of the Hillhead of Ascurry turbine and the Wester Meathie turbines will be visible

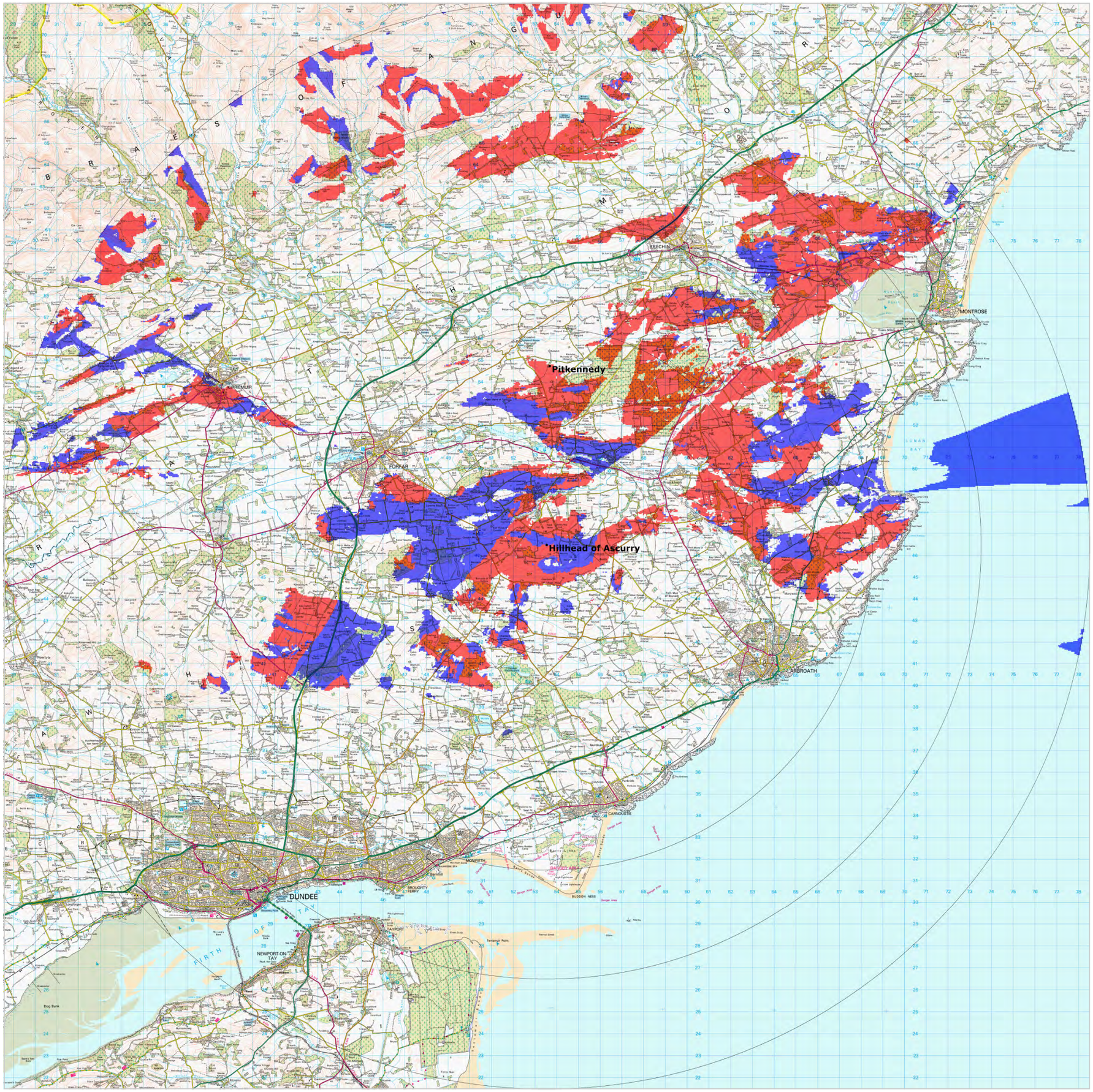
Wester Meathie details

No of turbines:	2
Distance from Hillhead of Ascurry:	7.6km
Height to blade tip:	46.6m
Status:	Approved

PROJECT:	**Hillhead of Ascurry**
DRAWING TITLE:	Cumulative ZTV—Wester Meathie
DRAWING NO:	HOA034
DOCUMENT SIZE:	A3
SCALE:	1:170,000
DATE:	07/10/2013
DRAWING BY:	Franco Giovanetti
APPROVED BY:	Andy Lowe

N

0 5 10 15km



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Company Number: SC370060; VAT Number: 983 3836 77

Project Description

Number of Turbines:	1
Turbine Model:	EWT Directwind 54
Hub Height:	50m
Blade diameter:	54m
Total height to blade tip:	77m
Turbine location:	353539 746476

Notes

This map shows the cumulative zone of visibility of the proposed Hillhead of Ascurry turbine and the proposed Pitkennedy development.

Radii: 5, 10, 15, 20 and 25km

Legend

This theoretical visibility map is based on a receptor viewing height of 1.8m AGL. The levels of theoretical visibility are based on the following colouring scheme:

Blue: Only Hillhead of Ascurry turbine visible

Red: At least the nacelle of the Hillhead of Ascurry turbine and the Pitkennedy turbine will be visible

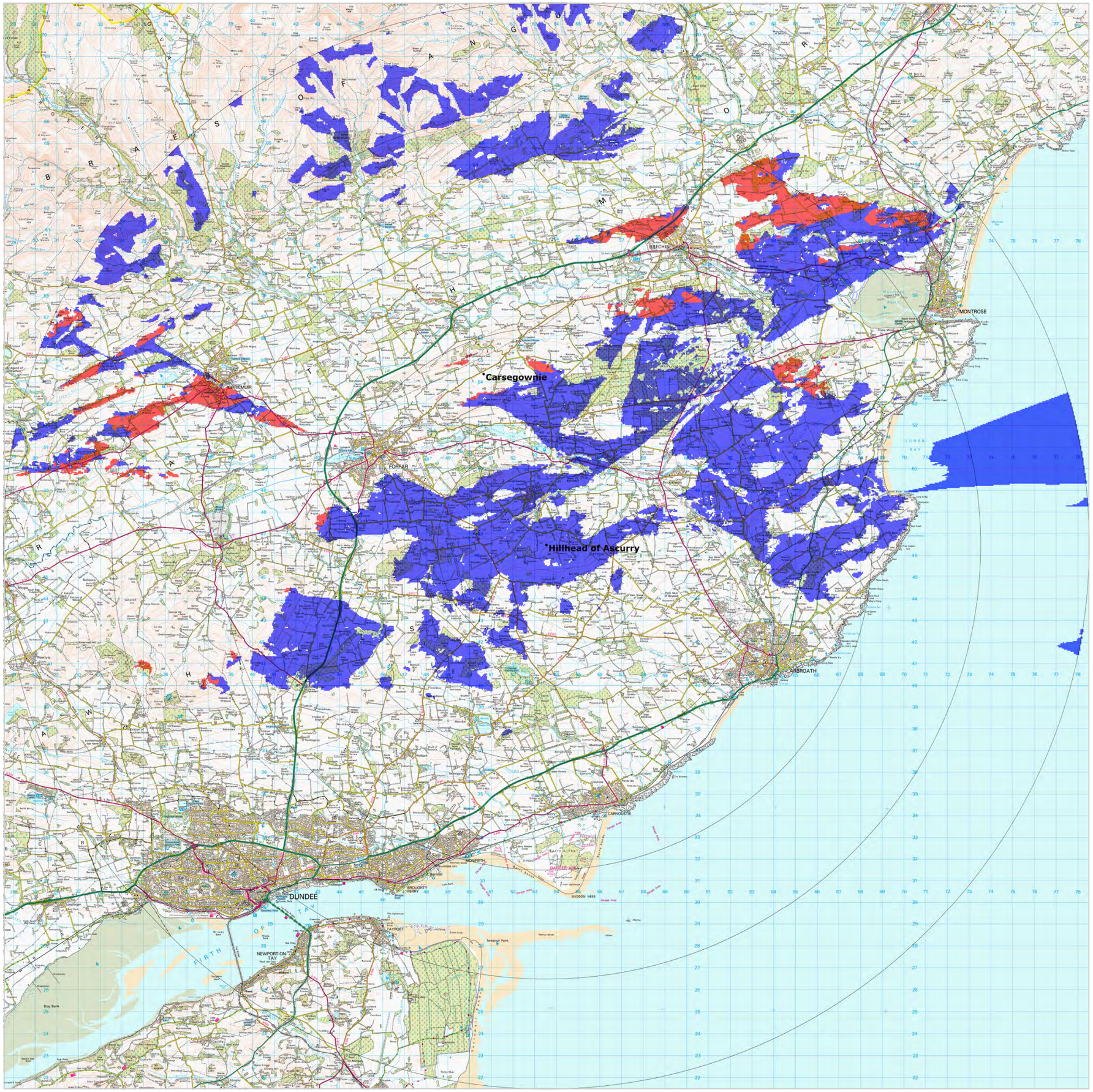
Pitkennedy details

No of turbines:	1
Distance from Hillhead of Ascurry:	83km
Height to blade tip:	74m
Status:	Proposed

PROJECT:	**Hillhead of Ascurry**
DRAWING TITLE:	Cumulative ZTV—Pitkennedy
DRAWING NO:	HOA035
DOCUMENT SIZE:	A3
SCALE:	1:170,000
DATE:	07/10/2013
DRAWING BY:	Franco Giovanetti
APPROVED BY:	Andy Lowe

N

0 5 10 15km



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Company Number: SC370060; VAT Number: 983 3836 77

Project Description

Number of Turbines:	1
Turbine Model:	EWT Directwind 54
Hub Height:	50m
Blade diameter:	54m
Total height to blade tip:	77m
Turbine location:	353539 746476

Notes

This map shows the cumulative zone of visibility of the proposed Hillhead of Ascurry turbine and the proposed Carsegownie development.

Radii: 5, 10, 15, 20 and 25km

Legend

This theoretical visibility map is based on a receptor viewing height of 1.8m AGL. The levels of theoretical visibility are based on the following colouring scheme:

Blue: Only Hillhead of Ascurry turbine visible

Red: At least the nacelle of the Hillhead of Ascurry turbine and the Carsegownie turbine will be visible

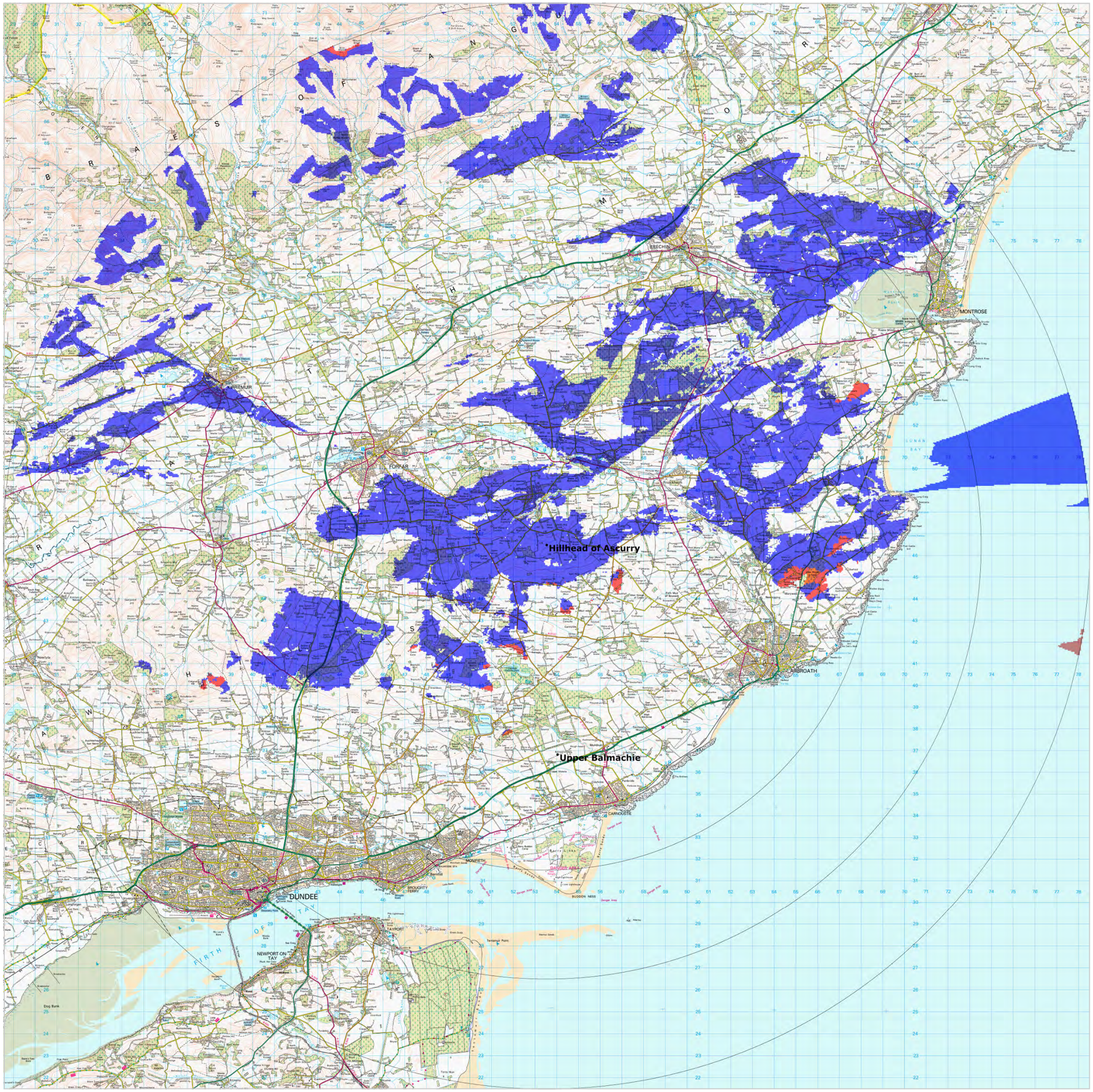
Carsegownie details

No of turbines:	1
Distance from Hillhead of Ascurry:	8.4km
Height to blade tip:	34.2m
Status:	Proposed

PROJECT:	**Hillhead of Ascurry**
DRAWING TITLE:	Cumulative ZTV—Carsegownie
DRAWING NO:	HOA036
DOCUMENT SIZE:	A3
SCALE:	1:170,000
DATE:	07/10/2013
DRAWING BY:	Franco Giovanetti
APPROVED BY:	Andy Lowe

N

0 5 10 15km



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Company Number: SC370060; VAT Number: 983 3836 77

Project Description

Number of Turbines:	1
Turbine Model:	EWT Directwind 54
Hub Height:	50m
Blade diameter:	54m
Total height to blade tip:	77m
Turbine location:	353539 746476

Notes

This map shows the cumulative zone of visibility of the proposed Hillhead of Ascurry turbine and the proposed Upper Balmachie development.

Legend

This theoretical visibility map is based on a receptor viewing height of 1.8m AGL. The levels of theoretical visibility are based on the following colouring scheme:

Blue: Only Hillhead of Ascurry turbine visible

Red: At least the nacelle of the Hillhead of Ascurry turbine and the Upper Balmachie turbine will be visible

Upper Balmachie details

No of turbines:	1
Distance from Hillhead of Ascurry:	9.7km
Height to blade tip:	77.0m
Status:	Proposed

PROJECT:	**Hillhead of Ascurry**
DRAWING TITLE:	Cumulative ZTV—Upper Balmachie
DRAWING NO:	HOA037
DOCUMENT SIZE:	A3
SCALE:	1:170,000
DATE:	07/10/2013
DRAWING BY:	Franco Giovanetti
APPROVED BY:	Andy Lowe

N

0 5 10 15km

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Tel: +44 (0) 131 555 4745; Email: info@locogen.com
Company Number: SC370060; VAT Number: 983 3836 77

Project Description

Number of Turbine(s):	1
Turbine Model:	EWT Directwind 54
Hub Height:	50m
Blade diameter:	54m
Total height to blade tip:	77m
Turbine location:	353539 746476

Notes

This map illustrates the selected viewpoints for the LVIA study and the turbine ZTV.

Radii: 5, 10 and 15km

Legend

- Turbine Location
- Viewpoints

This theoretical visibility map is based on a receptor viewing height of 1.8m AGL. The levels of theoretical visibility are based on the following colouring scheme:

Blue:	Only the blades are theoretically visible from these areas
Yellow:	At least the nacelle and blades are theoretically visible in these areas
Red:	The blades, nacelle and tower down to a point at least 1m AGL are theoretically visible in these areas

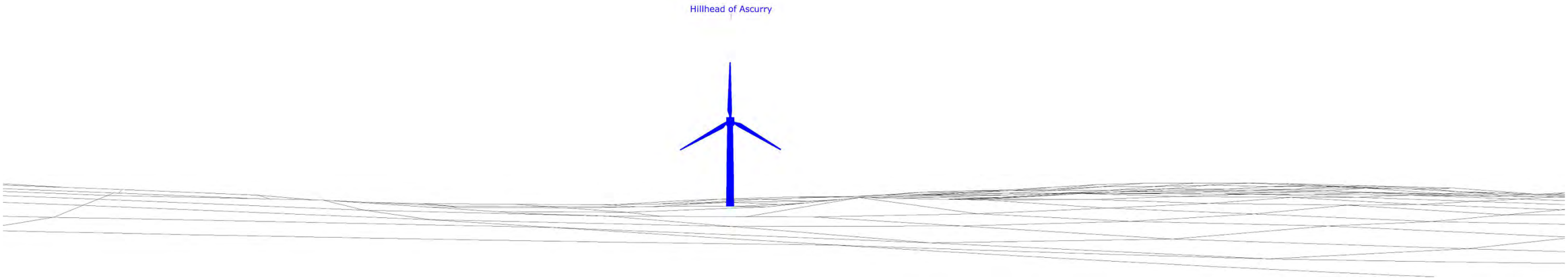
ID	Viewpoint Title	Distance (km)
1	Local road near Gask	0.5
2	Hillhead	0.8
3	Ascurry Mill	1.1
4	Hillkirk/Dunbarrow Hill	1.9
5	Dunnichen	3.4
6	Junction at Girdle Stone	3.4
7	A 932 at Guthrie Castle	4.3
8	B 961 near Helenston	4.3
9	Bankhead	5.2
10	Turin Hill	7.3
11	Balmashanner	7.8
12	Local road near Mainsbank	9.8

PROJECT:	**Hillhead of Ascurry**
DRAWING TITLE:	Viewpoints and ZTV
DRAWING NO:	HOA038
DOCUMENT SIZE:	A3
SCALE:	1:70,000
DATE:	05/10/2013
DRAWING BY:	Franco Giovanetti
APPROVED BY:	Andy Lowe

N

0 1 2 3 km

Existing view from local road near Gask



Computer generated wireframe showing proposed turbine in blue

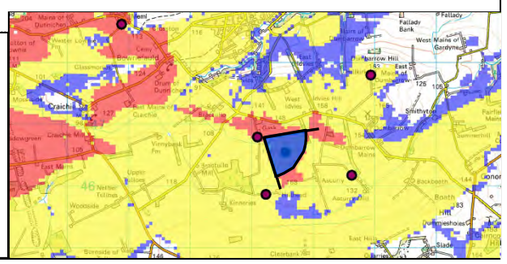
Photomontage showing proposed development

Locogen Ltd, 44 Constitution St, Edinburgh, EH6 6RS
Tel:+44(0)131 624 8968;
Email: info@locogen.com
Company Number: SC370060

Project:	Hillhead of Ascurry
Drawing no:	HOA039
Drawing by:	Franco Giovanetti
Approved by:	Andy Lowe
OS Licence N°:	100050069

Viewpoint No:	VP01
Viewpoint Location:	E353092 N746791
Field of View:	80°
View direction:	122.65°
Dist to turbine:	0.5 km
Title:	Local Road Near Gask

Camera:	Nikon D60
Effective Focal Length:	50mm
Viewing Distance:	23.8 cm
Elevation:	1.8m
Date taken:	29-Aug
Time taken:	14:39:00



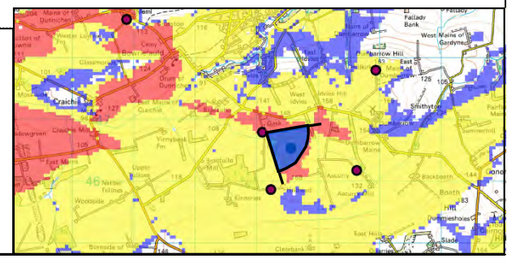
Photomontage showing proposed development

Locogen Ltd, 44 Constitution St, Edinburgh, EH6 6RS
Tel:+44(0)131 624 8968;
Email: info@locogen.com
Company Number: SC370060

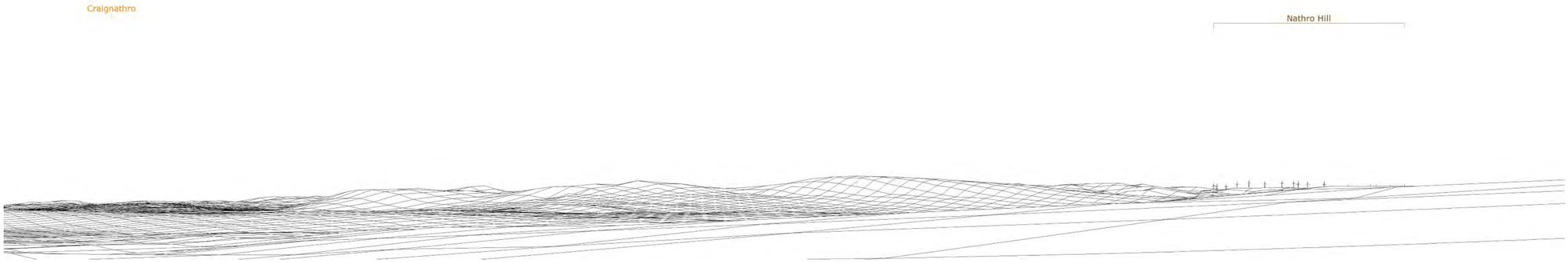
Project:	Hillhead of Ascurry
Drawing no:	HOA040
Drawing by:	Franco Giovanetti
Approved by:	Andy Lowe
OS Licence N°:	100050069

Viewpoint No:	VP01
Viewpoint Location:	E353092 N746791
Field of View:	45°
View direction:	122.65°
Dist to turbine:	0.5 km
Title:	Local Road Near Gask

Camera:	Nikon D60
Effective Focal Length:	50mm
Viewing Distance:	48.3 cm
Elevation:	1.8m
Date taken:	29-Aug
Time taken:	14:39:00



Computer generated wireframe showing cumulative development



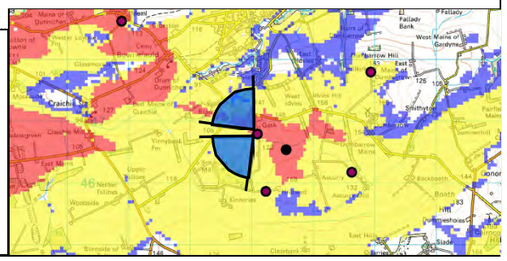
Computer generated wireframe showing cumulative development

Locogen Ltd, 44 Constitution St, Edinburgh, EH6 6RS
Tel:+44(0)131 624 8968;
Email: info@locogen.com
Company Number: SC370060

Project:	Hillhead of Ascurry
Drawing no:	HOA041
Drawing by:	Franco Giovanetti
Approved by:	Andy Lowe
OS Licence N°:	100050069

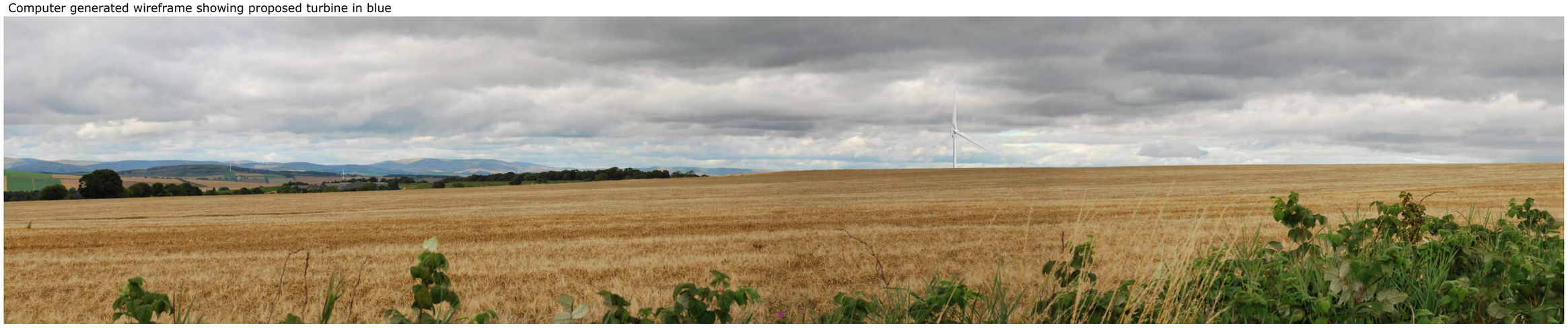
Viewpoint No:	VP01
Viewpoint Location:	E353092 N746791
Field of View:	80°
View direction:	229.4° (top), 319.4° (bottom)
Dist to turbine:	0.5 km
Title:	Local Road Near Gask

Camera:	Nikon D60
Effective Focal Length:	50mm
Viewing Distance:	23.8 cm
Elevation:	1.8m
Date taken:	29-Aug
Time taken:	14:39:00



Existing view from Hillhead

Computer generated wireframe showing proposed turbine in blue



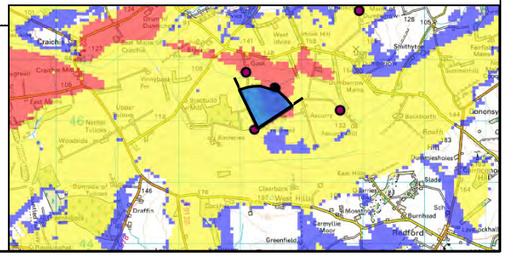
Photomontage showing proposed development

Locogen Ltd, 44 Constitution St, Edinburgh, EH6 6RS
Tel:+44(0)131 624 8968;
Email: info@locogen.com
Company Number: SC370060

Project:	Hillhead of Ascurry
Drawing no:	HOA042
Drawing by:	Franco Giovanetti
Approved by:	Andy Lowe
OS Licence N°:	100050069

Viewpoint No:	VP02
Viewpoint Location:	E353230 N745864
Field of View:	80°
View direction:	16.5°
Dist to turbine:	0.8 km
Title:	Hillhead

Camera:	Nikon D60
Effective Focal Length:	50mm
Viewing Distance:	23.8 cm
Elevation:	1.8m
Date taken:	29-Aug
Time taken:	14:59:00



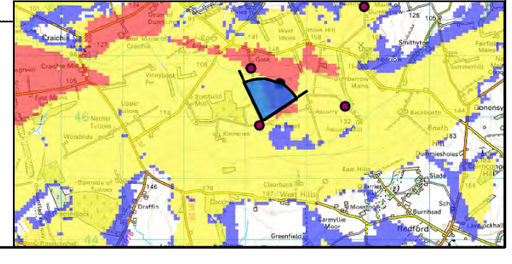
Photomontage showing proposed development

Locogen Ltd, 44 Constitution St, Edinburgh, EH6 6RS
Tel:+44(0)131 624 8968;
Email: info@locogen.com
Company Number: SC370060

Project:	Hillhead of Ascurry
Drawing no:	HOA043
Drawing by:	Franco Giovanetti
Approved by:	Andy Lowe
OS Licence N°:	100050069

Viewpoint No:	VP02
Viewpoint Location:	E353230 N745864
Field of View:	45°
View direction:	16.5°
Dist to turbine:	0.8 km
Title:	Hillhead

Camera:	Nikon D60
Effective Focal Length:	50mm
Viewing Distance:	48.3 cm
Elevation:	1.8m
Date taken:	29-Aug
Time taken:	14:59:00



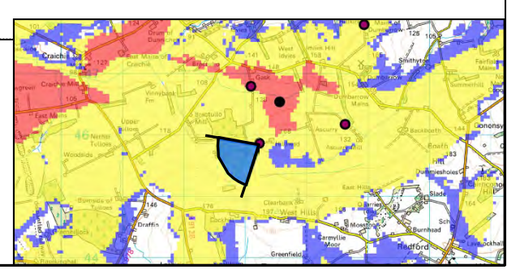
Computer generated wireframe showing cumulative development

Locogen Ltd, 44 Constitution St, Edinburgh, EH6 6RS
Tel:+44(0)131 624 8968;
Email: info@locogen.com
Company Number: SC370060

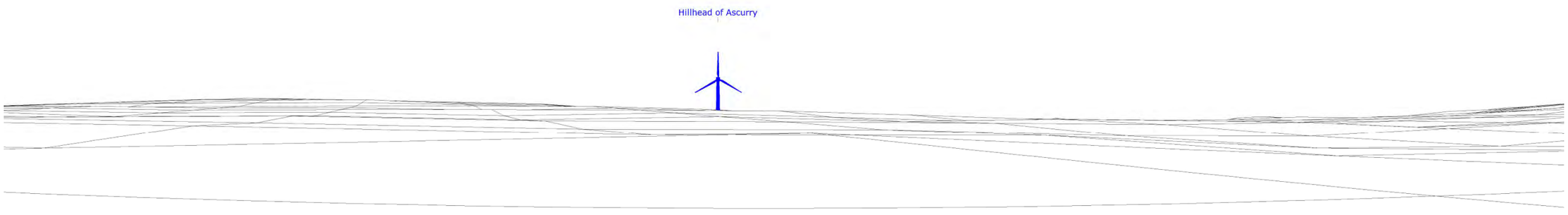
Project:	Hillhead of Ascurry
Drawing no:	HOA044
Drawing by:	Franco Giovanetti
Approved by:	Andy Lowe
OS Licence N°:	100050069

Viewpoint No:	VP02
Viewpoint Location:	E353230 N745864
Field of View:	80°
View direction:	240°
Dist to turbine:	0.8 km
Title:	Hillhead

Camera:	Nikon D60
Effective Focal Length:	50mm
Viewing Distance:	23.8 cm
Elevation:	1.8m
Date taken:	29-Aug
Time taken:	14:59:00



Existing view from Mill of Ascurry



Computer generated wireframe showing proposed turbine in blue

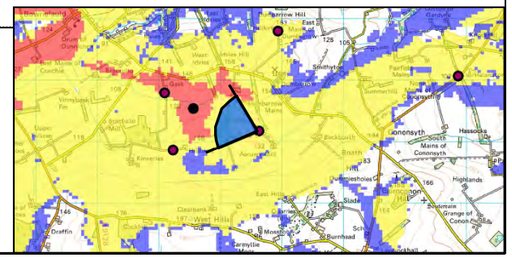
Photomontage showing proposed development

Locogen Ltd, 44 Constitution St, Edinburgh, EH6 6RS
Tel:+44(0)131 624 8968;
Email: info@locogen.com
Company Number: SC370060

Project:	Hillhead of Ascurry
Drawing no:	HOA045
Drawing by:	Franco Giovanetti
Approved by:	Andy Lowe
OS Licence N°:	100050069

Viewpoint No:	VP03
Viewpoint Location:	E354624 N746174
Field of View:	80°
View direction:	289°
Dist to turbine:	1.1 km
Title:	Ascurry Mill

Camera:	Nikon D60
Effective Focal Length:	50mm
Viewing Distance:	23.8 cm
Elevation:	1.8m
Date taken:	29-Aug
Time taken:	13:58:00



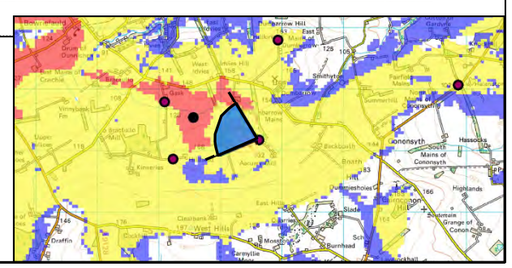
Photomontage showing proposed development

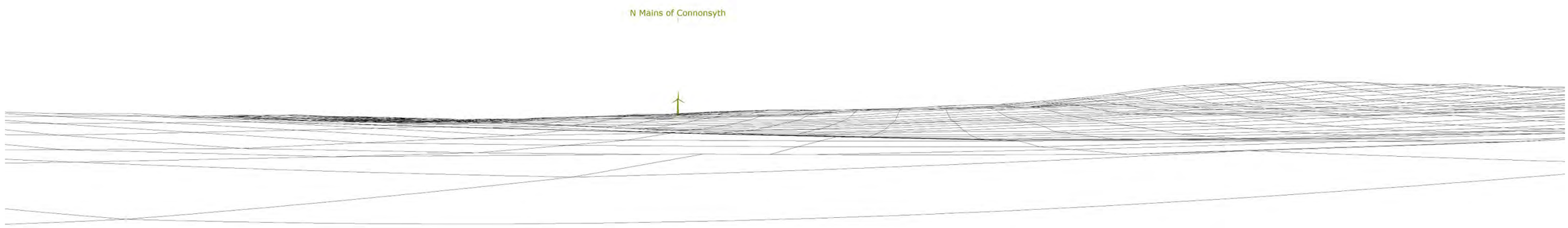
Locogen Ltd, 44 Constitution St, Edinburgh, EH6 6RS
Tel:+44(0)131 624 8968;
Email: info@locogen.com
Company Number: SC370060

Project:	Hillhead of Ascurry
Drawing no:	HOA046
Drawing by:	Franco Giovanetti
Approved by:	Andy Lowe
OS Licence N°:	100050069

Viewpoint No:	VP03
Viewpoint Location:	E354624 N746174
Field of View:	45°
View direction:	289°
Dist to turbine:	1.1 km
Title:	Ascurry Mill

Camera:	Nikon D60
Effective Focal Length:	50mm
Viewing Distance:	48.3 cm
Elevation:	1.8m
Date taken:	29-Aug
Time taken:	13:58:00





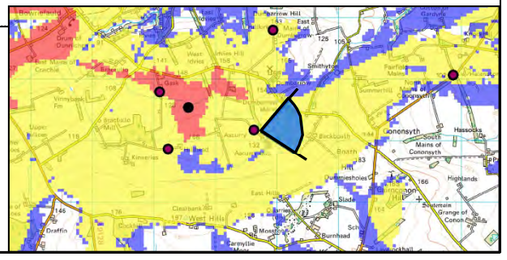
Computer generated wireframe showing cumulative development

Locogen Ltd, 44 Constitution St, Edinburgh, EH6 6RS
Tel:+44(0)131 624 8968;
Email: info@locogen.com
Company Number: SC370060

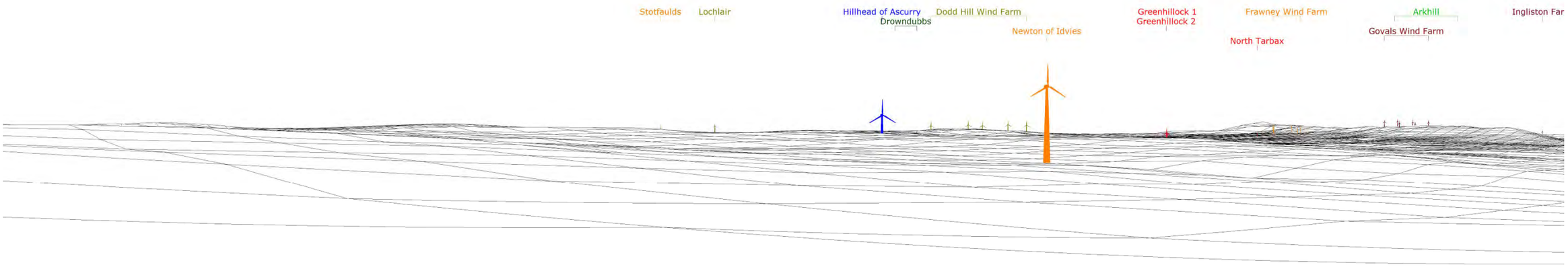
Project:	Hillhead of Ascurry
Drawing no:	HOA047
Drawing by:	Franco Giovanetti
Approved by:	Andy Lowe
OS Licence N°:	100050069

Viewpoint No:	VP03
Viewpoint Location:	E354624 N746174
Field of View:	80°
View direction:	82.9°
Dist to turbine:	1.1 km
Title:	Ascurry Mill

Camera:	Nikon D60
Effective Focal Length:	50mm
Viewing Distance:	23.8 cm
Elevation:	1.8m
Date taken:	29-Aug
Time taken:	13:58:00



Existing view from Hillkirk



Computer generated wireframe showing proposed turbine in blue

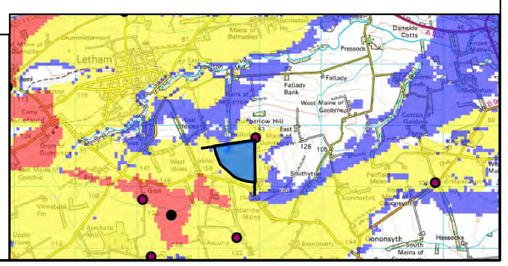
Photomontage showing proposed development

Locogen Ltd, 44 Constitution St, Edinburgh, EH6 6RS
Tel:+44(0)131 624 8968;
Email: info@locogen.com
Company Number: SC370060

Project:	Hillhead of Ascurry
Drawing no:	HOA048
Drawing by:	Franco Giovanetti
Approved by:	Andy Lowe
OS Licence N°:	100050069

Viewpoint No:	VP04
Viewpoint Location:	E354935 N747798
Field of View:	80°
View direction:	221.5°
Dist to turbine:	1.9 km
Title:	Hillkirk/Dunbarrow Hill

Camera:	Nikon D60
Effective Focal Length:	50mm
Viewing Distance:	23.8 cm
Elevation:	1.8m
Date taken:	29-Aug
Time taken:	14:30:00



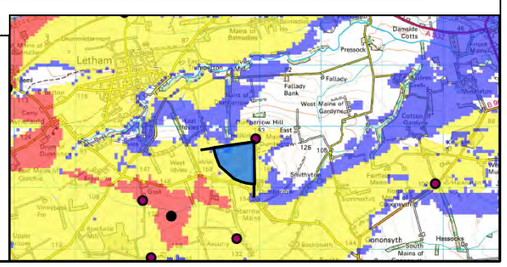
Photomontage showing proposed development

Locogen Ltd, 44 Constitution St, Edinburgh, EH6 6RS
Tel:+44(0)131 624 8968;
Email: info@locogen.com
Company Number: SC370060

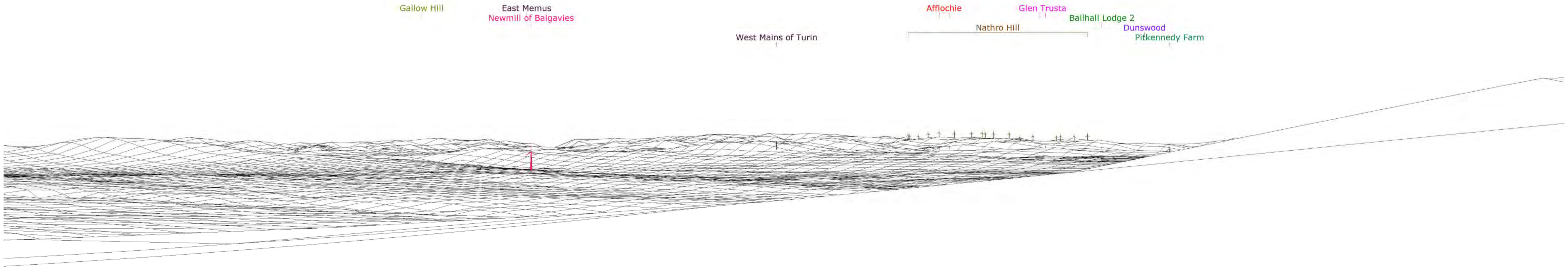
Project:	Hillhead of Ascurry
Drawing no:	HOA049
Drawing by:	Franco Giovanetti
Approved by:	Andy Lowe
OS Licence N°:	100050069

Viewpoint No:	VP04
Viewpoint Location:	E354935 N747798
Field of View:	45°
View direction:	221.5°
Dist to turbine:	1.9 km
Title:	Hillkirk/Dunbarrow Hill

Camera:	Nikon D60
Effective Focal Length:	50mm
Viewing Distance:	48.3 cm
Elevation:	1.8m
Date taken:	29-Aug
Time taken:	14:30:00



Computer generated wireframe showing cumulative development



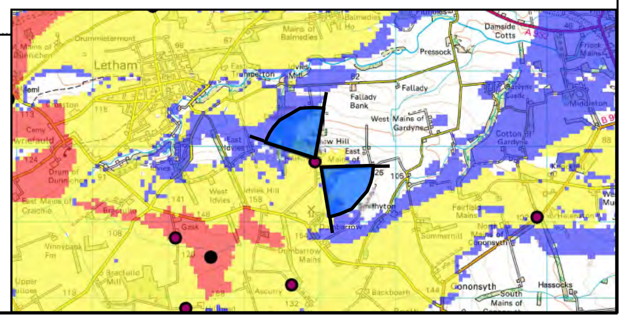
Computer generated wireframe showing cumulative development

Locogen Ltd, 44 Constitution St, Edinburgh, EH6 6RS
Tel:+44(0)131 624 8968;
Email: info@locogen.com
Company Number: SC370060

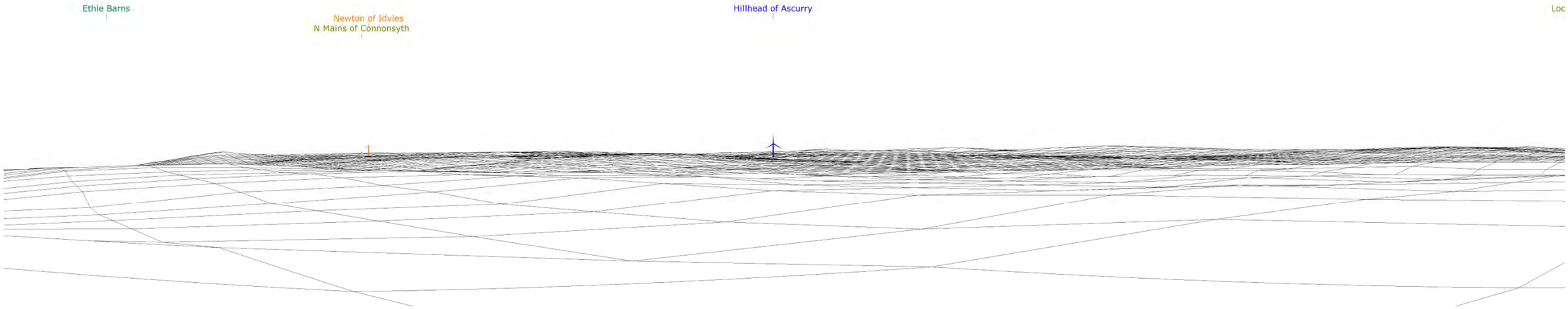
Project:	Hillhead of Ascurry
Drawing no:	HOA050
Drawing by:	Franco Giovanetti
Approved by:	Andy Lowe
OS Licence N°:	100050069

Viewpoint No:	VP04
Viewpoint Location:	E354935 N747798
Field of View:	80°
View direction:	130.6° (top), 330° (bottom)
Dist to turbine:	1.9 km
Title:	Hillkirk/Dunbarrow Hill

Camera:	Nikon D60
Effective Focal Length:	50mm
Viewing Distance:	23.8 cm
Elevation:	1.8m
Date taken:	29-Aug
Time taken:	14:30:00



Existing view from Dunnichen



Computer generated wireframe showing proposed turbine in blue

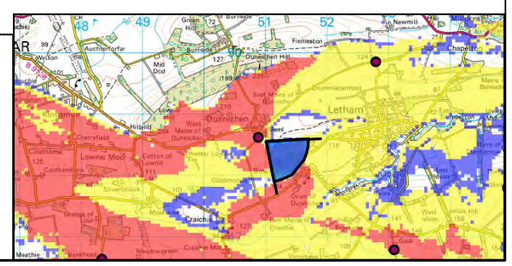
Photomontage showing proposed development

Locogen Ltd, 44 Constitution St, Edinburgh, EH6 6RS
Tel:+44(0)131 624 8968;
Email: info@locogen.com
Company Number: SC370060

Project:	Hillhead of Ascurry
Drawing no:	HOA051
Drawing by:	Franco Giovanetti
Approved by:	Andy Lowe
OS Licence N°:	100050069

Viewpoint No:	VP05
Viewpoint Location:	E350883 N748620
Field of View:	80°
View direction:	128.7°
Dist to turbine:	3.4 km
Title:	Dunnichen

Camera:	Nikon D60
Effective Focal Length:	50mm
Viewing Distance:	23.8 cm
Elevation:	1.8m
Date taken:	29-Aug
Time taken:	15:40:00



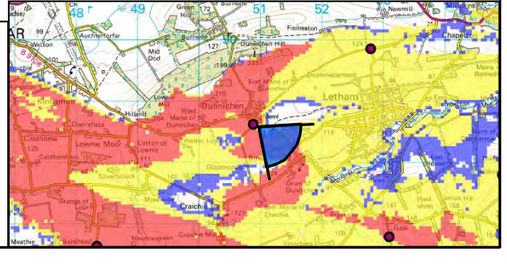
Photomontage showing proposed development

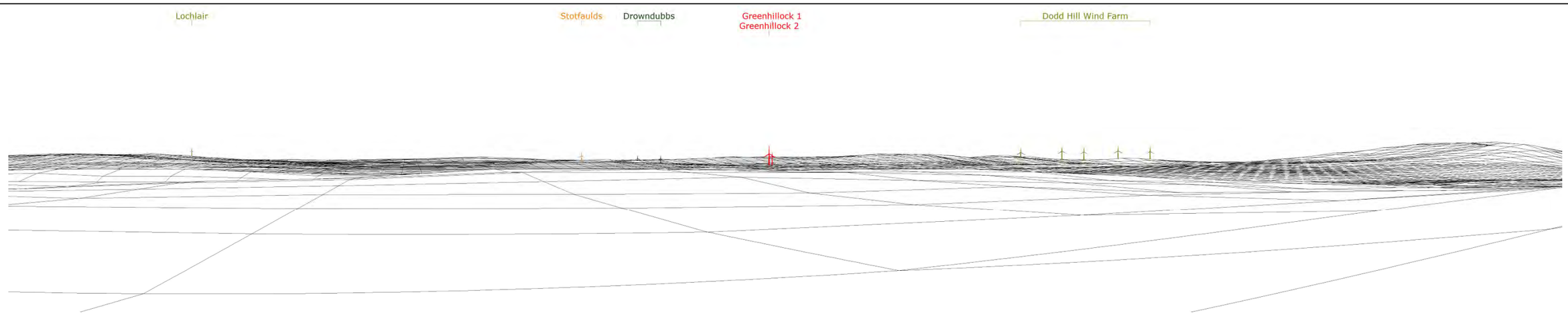
Locogen Ltd, 44 Constitution St, Edinburgh, EH6 6RS
Tel:+44(0)131 624 8968;
Email: info@locogen.com
Company Number: SC370060

Project:	Hillhead of Ascurry
Drawing no:	HOA052
Drawing by:	Franco Giovanetti
Approved by:	Andy Lowe
OS Licence N°:	100050069

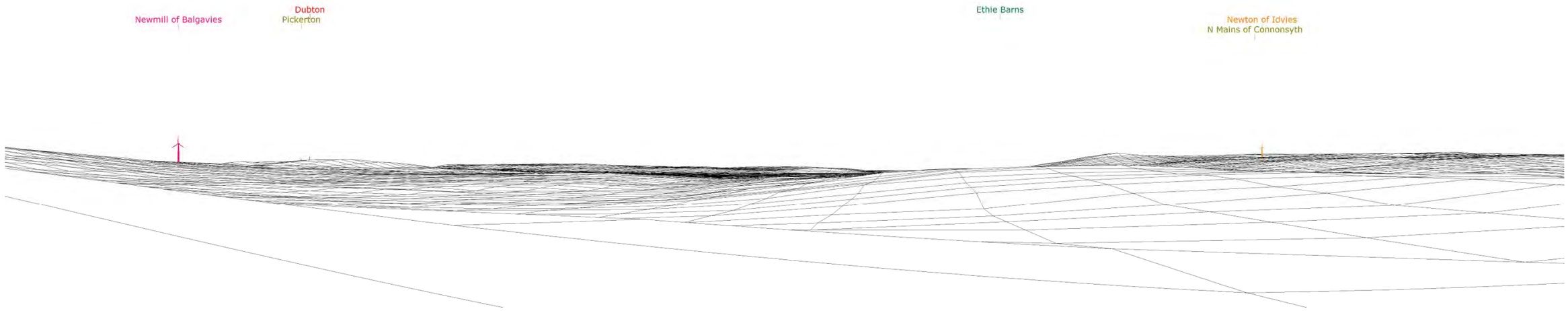
Viewpoint No:	VP05
Viewpoint Location:	E350883 N748620
Field of View:	45°
View direction:	128.7°
Dist to turbine:	3.4 km
Title:	Dunnichen

Camera:	Nikon D60
Effective Focal Length:	50mm
Viewing Distance:	48.3 cm
Elevation:	1.8m
Date taken:	29-Aug
Time taken:	15:40:00





Computer generated wireframe showing cumulative development



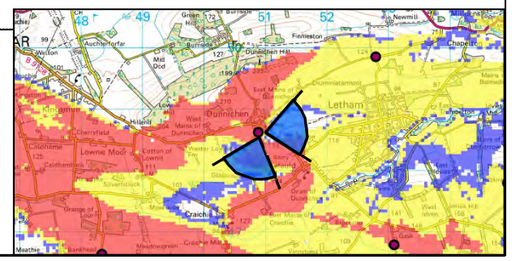
Computer generated wireframe showing cumulative development

Locogen Ltd, 44 Constitution St, Edinburgh, EH6 6RS
Tel:+44(0)131 624 8968;
Email: info@locogen.com
Company Number: SC370060

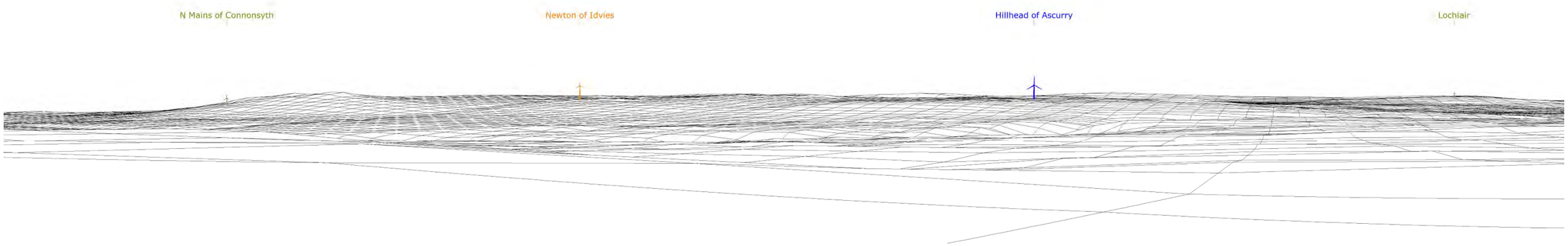
Project:	Hillhead of Ascurry
Drawing no:	HOA053
Drawing by:	Franco Giovanetti
Approved by:	Andy Lowe
OS Licence N°:	100050069

Viewpoint No:	VP05
Viewpoint Location:	E350883 N748620
Field of View:	80°
View direction:	199.4 (top), 82.9 (bottom)°
Dist to turbine:	3.4 km
Title:	Dunnichen

Camera:	Nikon D60
Effective Focal Length:	50mm
Viewing Distance:	23.8 cm
Elevation:	1.8m
Date taken:	29-Aug
Time taken:	15:40:00



Existing view from Girdle Lane



Computer generated wireframe showing proposed turbine in blue

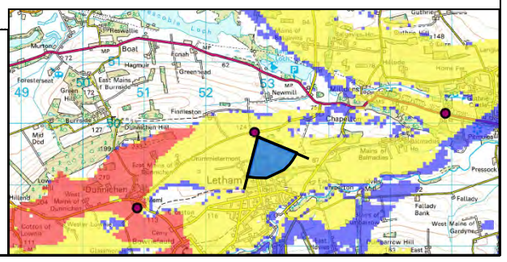
Photomontage showing proposed development screened by vegetation

Locogen Ltd, 44 Constitution St, Edinburgh, EH6 6RS
Tel:+44(0)131 624 8968;
Email: info@locogen.com
Company Number: SC370060

Project:	Hillhead of Ascurry
Drawing no:	HOA054
Drawing by:	Franco Giovanetti
Approved by:	Andy Lowe
OS Licence N°:	100050069

Viewpoint No:	VP06
Viewpoint Location:	E352792 N749851
Field of View:	80°
View direction:	154.7°
Dist to turbine:	3.4 km
Title:	Junction at Girdle Stone

Camera:	Nikon D60
Effective Focal Length:	50mm
Viewing Distance:	23.8 cm
Elevation:	1.8m
Date taken:	29-Aug
Time taken:	15:30:00



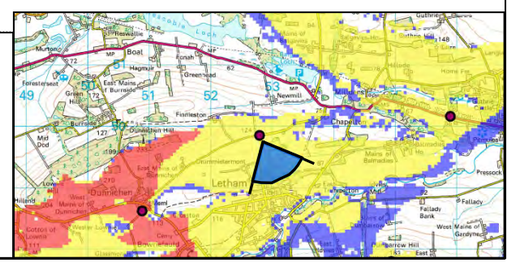
Photomontage showing proposed development

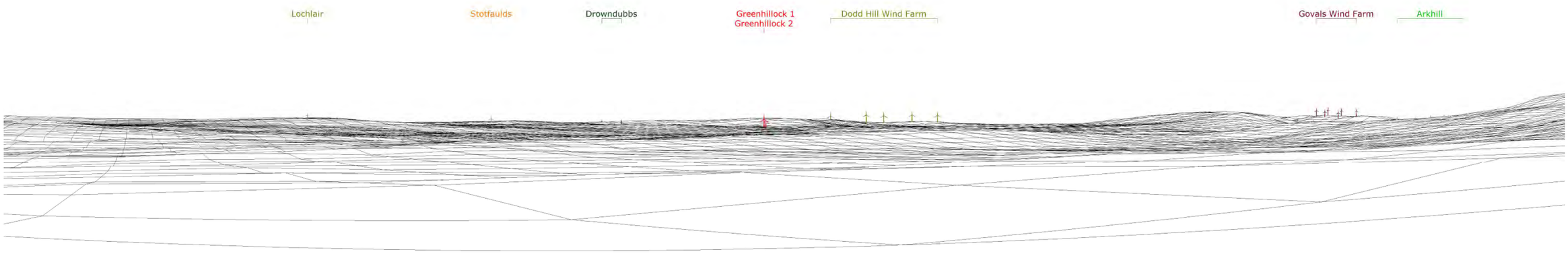
Locogen Ltd, 44 Constitution St, Edinburgh, EH6 6RS
Tel:+44(0)131 624 8968;
Email: info@locogen.com
Company Number: SC370060

Project:	Hillhead of Ascurry
Drawing no:	HOA055
Drawing by:	Franco Giovanetti
Approved by:	Andy Lowe
OS Licence N°:	100050069

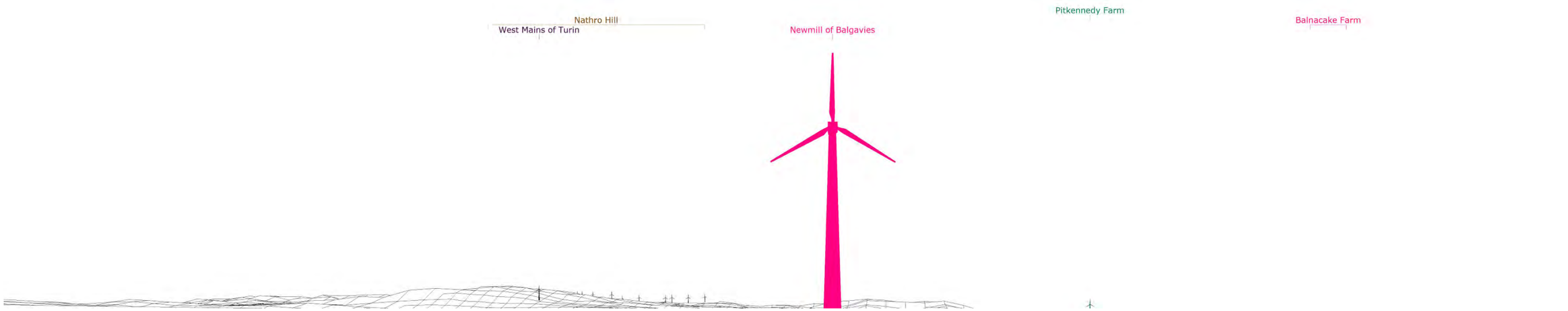
Viewpoint No:	VP06
Viewpoint Location:	E352792 N749851
Field of View:	45°
View direction:	157.7°
Dist to turbine:	3.4 km
Title:	Junction at Girdle Stone

Camera:	Nikon D60
Effective Focal Length:	50mm
Viewing Distance:	48.3 cm
Elevation:	1.8m
Date taken:	29-Aug
Time taken:	15:30:00

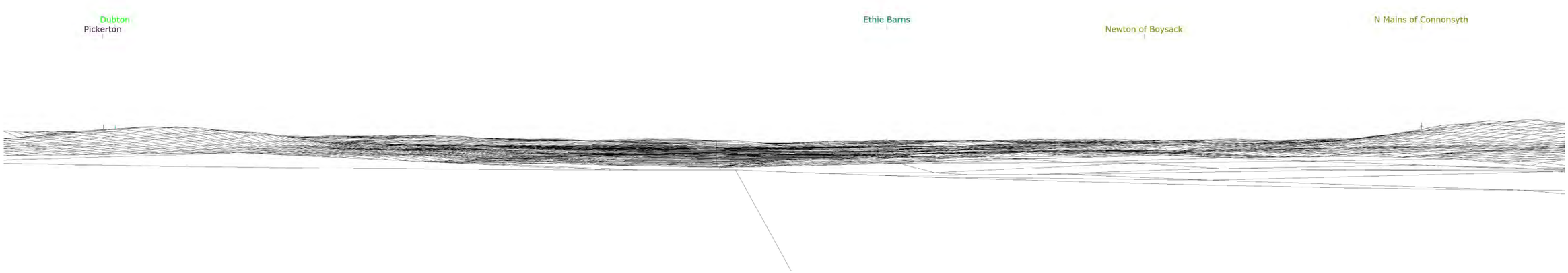




Computer generated wireframe showing cumulative development



Computer generated wireframe showing cumulative development



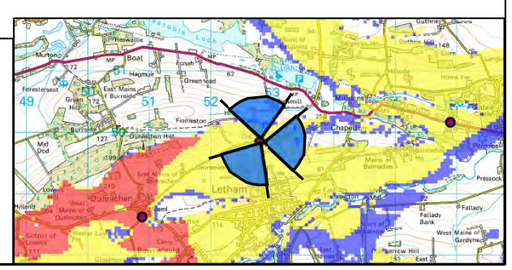
Computer generated wireframe showing cumulative development

Locogen Ltd, 44 Constitution St, Edinburgh, EH6 6RS
Tel:+44(0)131 624 8968;
Email: info@locogen.com
Company Number: SC370060

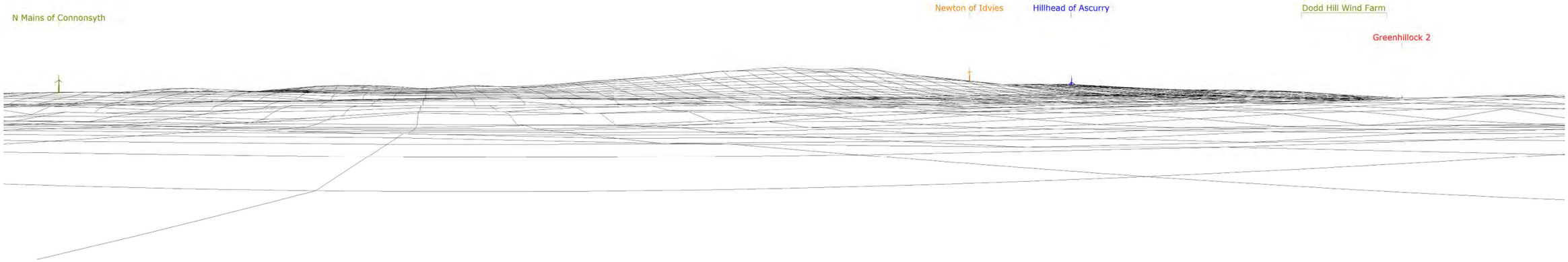
Project:	Hillhead of Ascurry
Drawing no:	HOA056
Drawing by:	Franco Giovanetti
Approved by:	Andy Lowe
OS Licence N°:	100050069

Viewpoint No:	VP06
Viewpoint Location:	E352792 N749851
Field of View:	80°
View direction:	213.5 (top), 354.7 (middle), 93.5 (bottom)°
Dist to turbine:	3.4 km
Title:	Junction at Girdle Stone

Camera:	Nikon D60
Effective Focal Length:	50mm
Viewing Distance:	23.8 cm
Elevation:	1.8m
Date taken:	29-Aug
Time taken:	15:30:00



Existing view from A932 at Guthrie Castle



Computer generated wireframe showing proposed turbine in blue

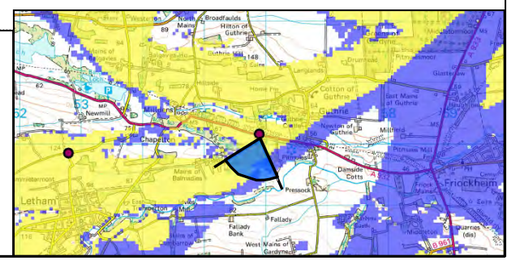
Photomontage showing proposed development

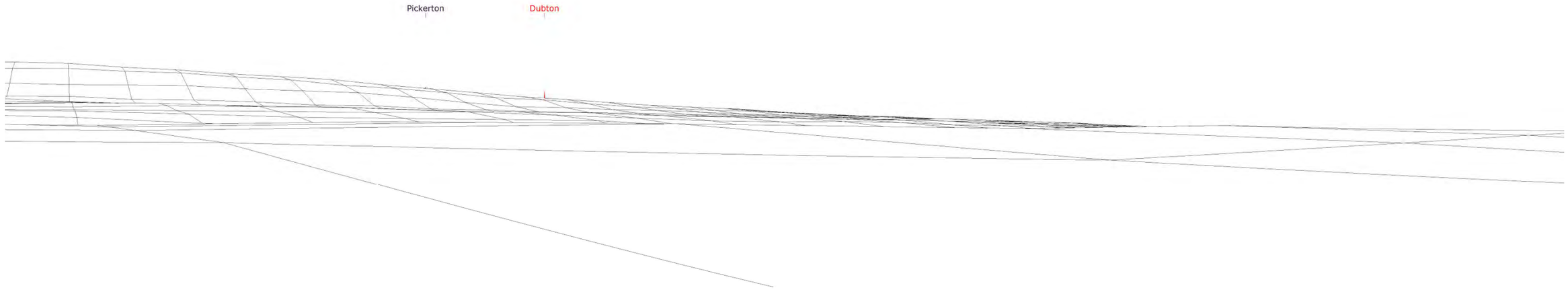
Locogen Ltd, 44 Constitution St, Edinburgh, EH6 6RS
Tel:+44(0)131 624 8968;
Email: info@locogen.com
Company Number: SC370060

Project:	Hillhead of Ascurry
Drawing no:	HOA057
Drawing by:	Franco Giovanetti
Approved by:	Andy Lowe
OS Licence N°:	100050069

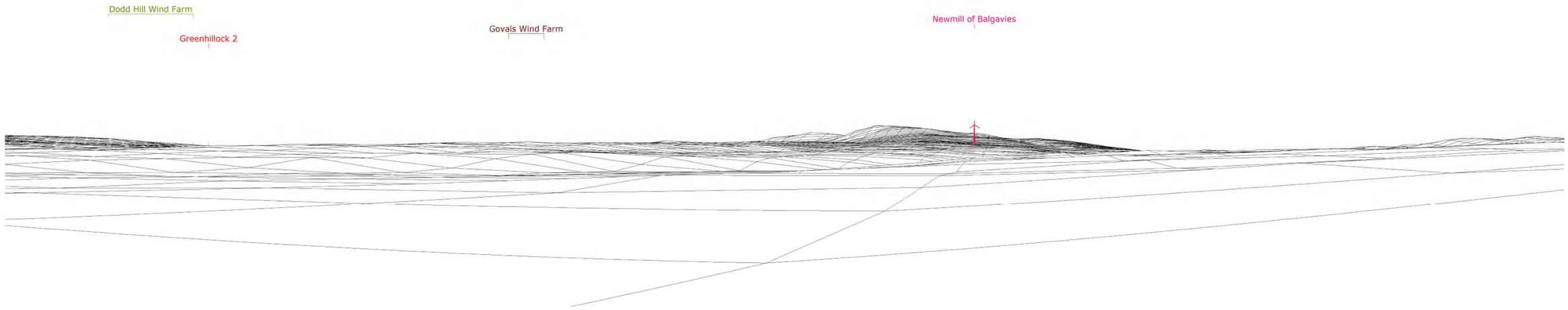
Viewpoint No:	VP07
Viewpoint Location:	E355894 N750159
Field of View:	80°
View direction:	198.2°
Dist to turbine:	4.3 km
Title:	A932 at Guthrie Castle

Camera:	Nikon D60
Effective Focal Length:	50mm
Viewing Distance:	23.8 cm
Elevation:	1.8m
Date taken:	29-Aug
Time taken:	13:23:00





Computer generated wireframe showing cumulative development



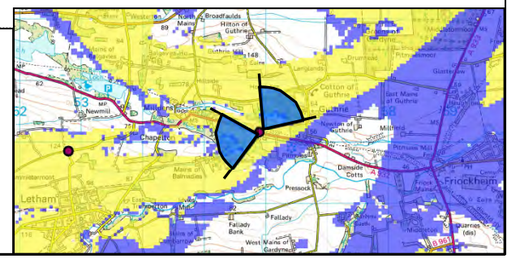
Computer generated wireframe showing cumulative development

Locogen Ltd, 44 Constitution St, Edinburgh, EH6 6RS
Tel:+44(0)131 624 8968;
Email: info@locogen.com
Company Number: SC370060

Project:	Hillhead of Ascurry
Drawing no:	HOA058
Drawing by:	Franco Giovanetti
Approved by:	Andy Lowe
OS Licence N°:	100050069

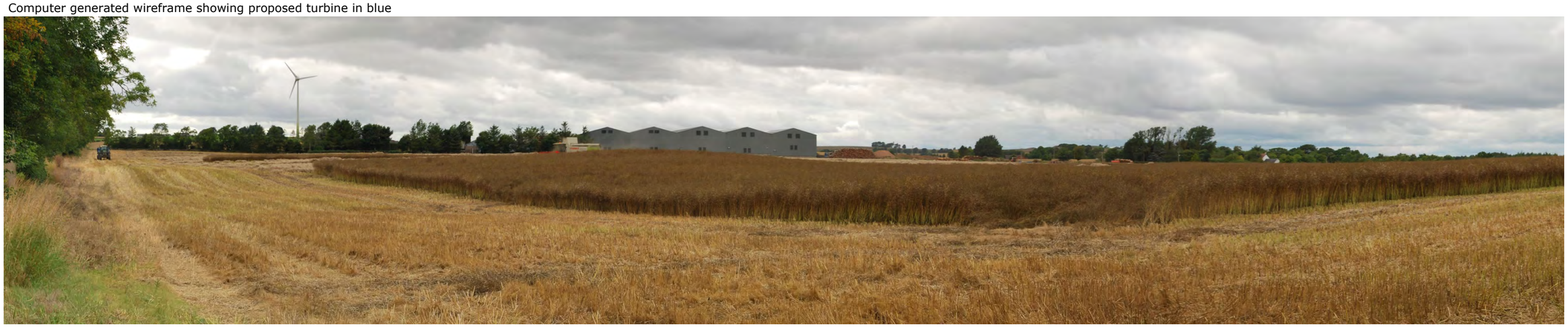
Viewpoint No:	VP07
Viewpoint Location:	E355894 N750159
Field of View:	80°
View direction:	37.1 (top), 259.4 (bottom)°
Dist to turbine:	4.3 km
Title:	A932 at Guthrie Castle

Camera:	Nikon D60
Effective Focal Length:	50mm
Viewing Distance:	23.8 cm
Elevation:	1.8m
Date taken:	29-Aug
Time taken:	13:23:00



Existing view from B961 near Helenston

Computer generated wireframe showing proposed turbine in blue



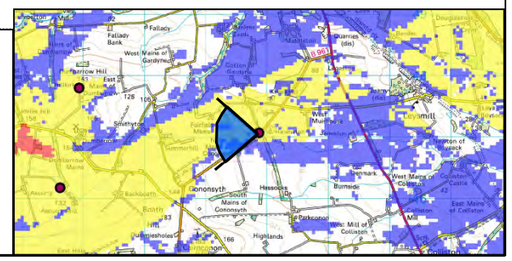
Photomontage showing proposed development

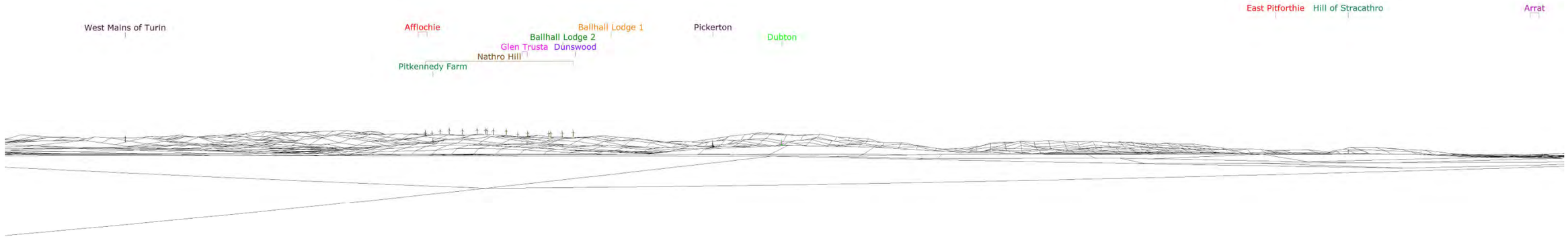
Locogen Ltd, 44 Constitution St, Edinburgh, EH6 6RS
Tel:+44(0)131 624 8968;
Email: info@locogen.com
Company Number: SC370060

Project:	Hillhead of Ascurry
Drawing no:	HOA059
Drawing by:	Franco Giovanetti
Approved by:	Andy Lowe
OS Licence N°:	100050069

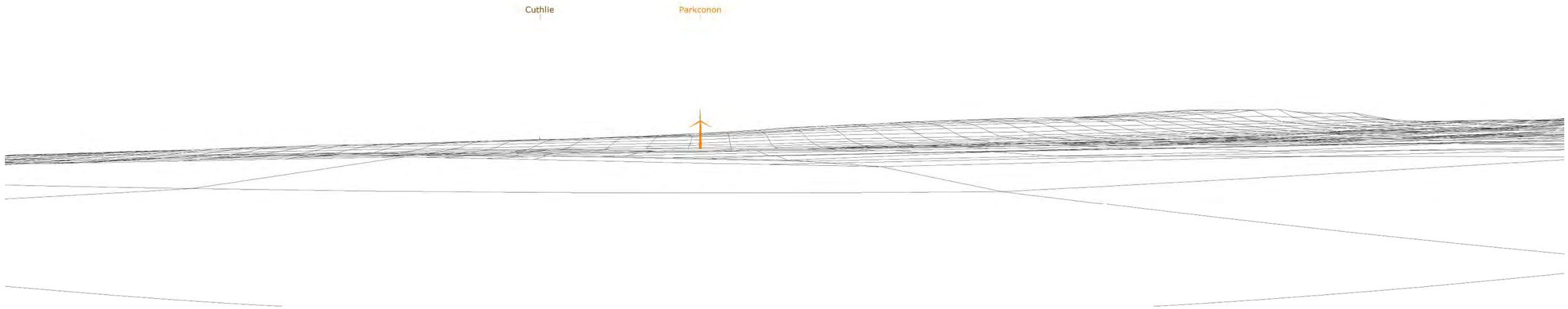
Viewpoint No:	VP08
Viewpoint Location:	E357867 N747065
Field of View:	80°
View direction:	271.5°
Dist to turbine:	4.3 km
Title:	B961 near Helenston

Camera:	Nikon D60
Effective Focal Length:	50mm
Viewing Distance:	23.8 cm
Elevation:	1.8m
Date taken:	29-Aug
Time taken:	13:44:00

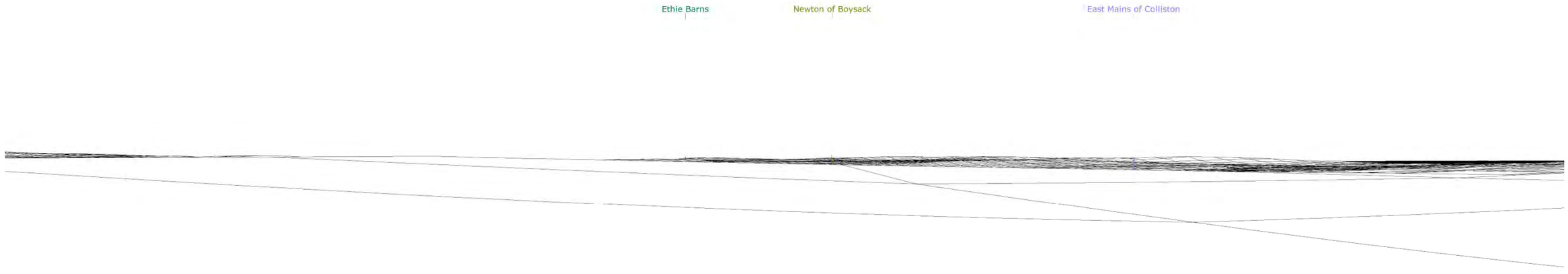




Computer generated wireframe showing cumulative development



Computer generated wireframe showing cumulative development



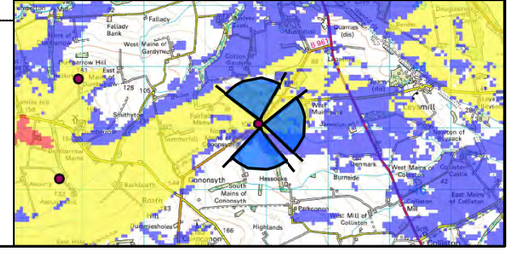
Computer generated wireframe showing cumulative development

Locogen Ltd, 44 Constitution St, Edinburgh, EH6 6RS
Tel:+44(0)131 624 8968;
Email: info@locogen.com
Company Number: SC370060

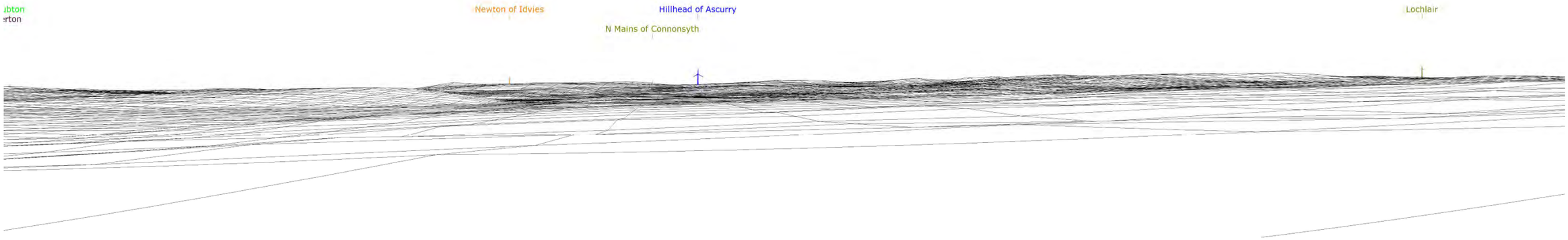
Project:	Hillhead of Ascurry
Drawing no:	HOA060
Drawing by:	Franco Giovanetti
Approved by:	Andy Lowe
OS Licence N°:	100050069

Viewpoint No:	VP08
Viewpoint Location:	E357867 N747065
Field of View:	80°
View direction:	349.4° (top), 183.5° (middle), 93.5° (bottom)
Dist to turbine:	4.3 km
Title:	B961 near Helenston

Camera:	Nikon D60
Effective Focal Length:	50mm
Viewing Distance:	23.8 cm
Elevation:	1.8m
Date taken:	29-Aug
Time taken:	13:44:00



Existing view from Bankhead



Computer generated wireframe showing proposed turbine in blue

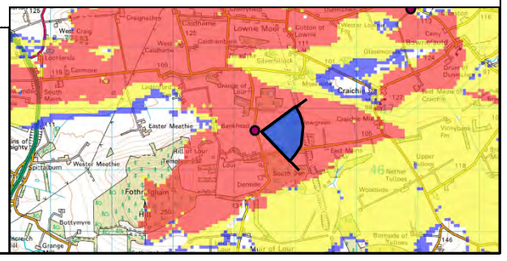
Photomontage showing proposed development screened by vegetation

Locogen Ltd, 44 Constitution St, Edinburgh, EH6 6RS
Tel:+44(0)131 624 8968;
Email: info@locogen.com
Company Number: SC370060

Project:	Hillhead of Ascurry
Drawing no:	HOA061
Drawing by:	Franco Giovanetti
Approved by:	Andy Lowe
OS Licence N°:	100050069

Viewpoint No:	VP09
Viewpoint Location:	E348337 N746639
Field of View:	80°
View direction:	96.2°
Dist to turbine:	5.2 km
Title:	Bankhead

Camera:	Nikon D60
Effective Focal Length:	50mm
Viewing Distance:	23.8 cm
Elevation:	1.8m
Date taken:	29-Aug
Time taken:	16:20:00



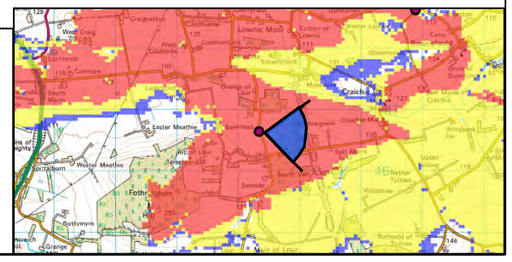
Photomontage showing proposed development screened by vegetation

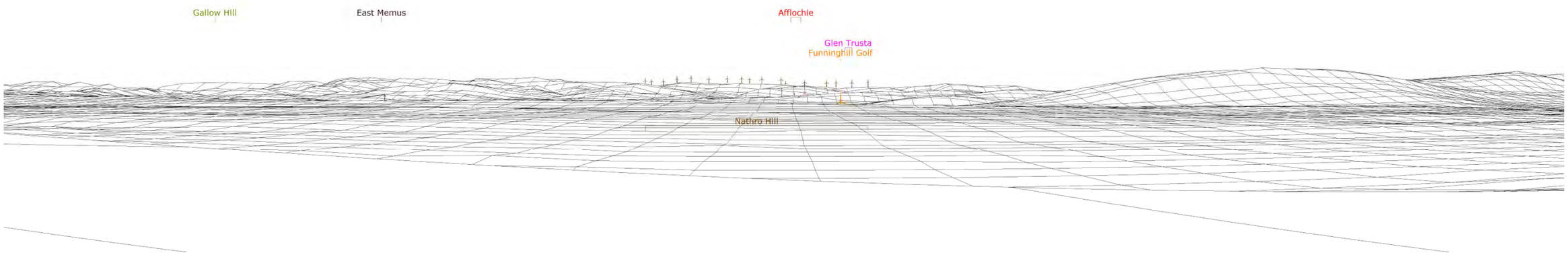
Locogen Ltd, 44 Constitution St, Edinburgh, EH6 6RS
Tel:+44(0)131 624 8968;
Email: info@locogen.com
Company Number: SC370060

Project:	Hillhead of Ascurry
Drawing no:	HOA062
Drawing by:	Franco Giovanetti
Approved by:	Andy Lowe
OS Licence N°:	100050069

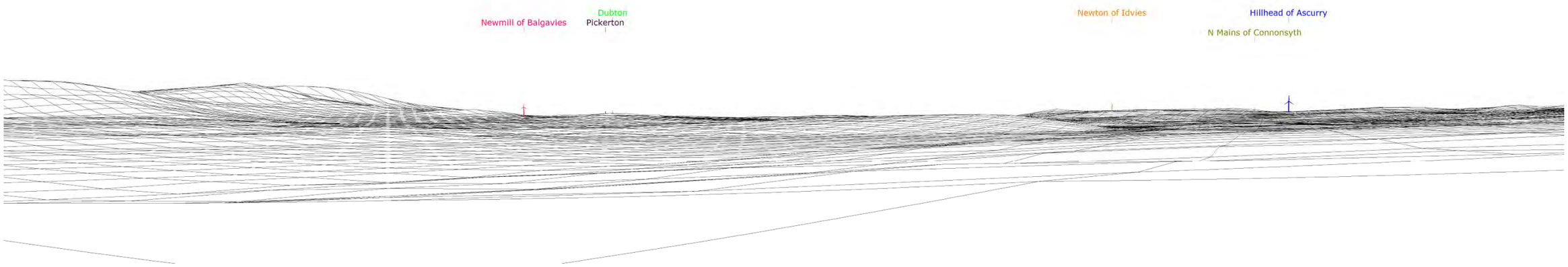
Viewpoint No:	VP09
Viewpoint Location:	E348337 N746639
Field of View:	45°
View direction:	96.2°
Dist to turbine:	5.2 km
Title:	Bankhead

Camera:	Nikon D60
Effective Focal Length:	50mm
Viewing Distance:	48.3 cm
Elevation:	1.8m
Date taken:	29-Aug
Time taken:	16:20:00





Computer generated wireframe showing cumulative development



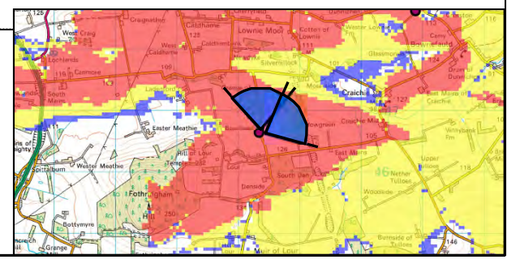
Computer generated wireframe showing cumulative development

Locogen Ltd, 44 Constitution St, Edinburgh, EH6 6RS
Tel:+44(0)131 624 8968;
Email: info@locogen.com
Company Number: SC370060

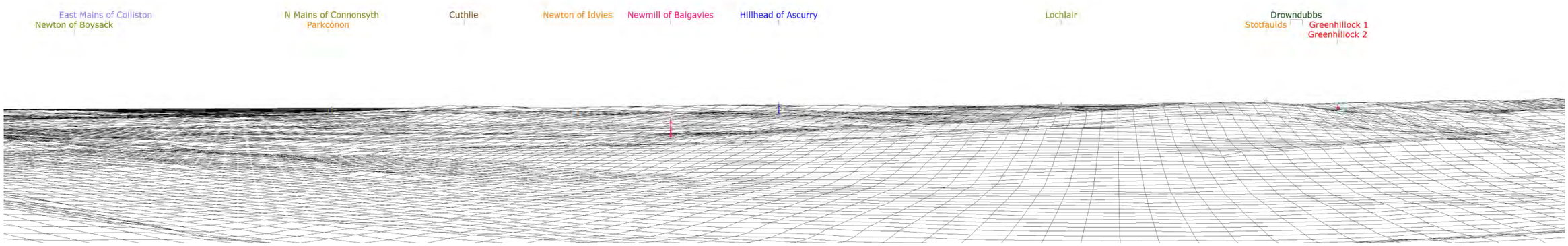
Project:	Hillhead of Ascurry
Drawing no:	HOA063
Drawing by:	Franco Giovanetti
Approved by:	Andy Lowe
OS Licence N°:	100050069

Viewpoint No:	VP09
Viewpoint Location:	E348337 N746639
Field of View:	80°
View direction:	0° (top), 65.3° (bottom)
Dist to turbine:	5.2 km
Title:	Bankhead

Camera:	Nikon D60
Effective Focal Length:	50mm
Viewing Distance:	23.8 cm
Elevation:	2.8m
Date taken:	29-Aug
Time taken:	16:20:00



Existing view from Turin Hill



Computer generated wireframe showing proposed turbine in blue

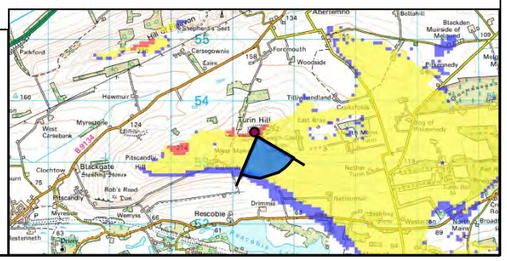
Photomontage showing proposed development

Locogen Ltd, 44 Constitution St, Edinburgh, EH6 6RS
Tel:+44(0)131 624 8968;
Email: info@locogen.com
Company Number: SC370060

Project:	Hillhead of Ascurry
Drawing no:	HOA064
Drawing by:	Franco Giovanetti
Approved by:	Andy Lowe
OS Licence N°:	100050069

Viewpoint No:	VP10
Viewpoint Location:	E351355 N753495
Field of View:	80°
View direction:	163°
Dist to turbine:	7.3 km
Title:	Turin Hill

Camera:	Nikon D60
Effective Focal Length:	50mm
Viewing Distance:	23.8 cm
Elevation:	1.8m
Date taken:	29-Aug
Time taken:	12:30:00



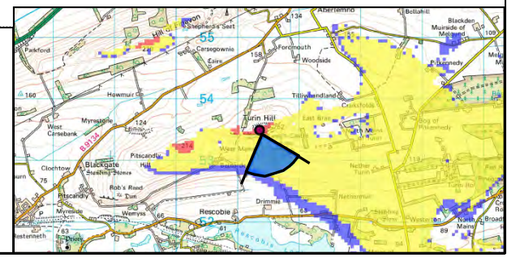
Photomontage showing proposed development

Locogen Ltd, 44 Constitution St, Edinburgh, EH6 6RS
Tel:+44(0)131 624 8968;
Email: info@locogen.com
Company Number: SC370060

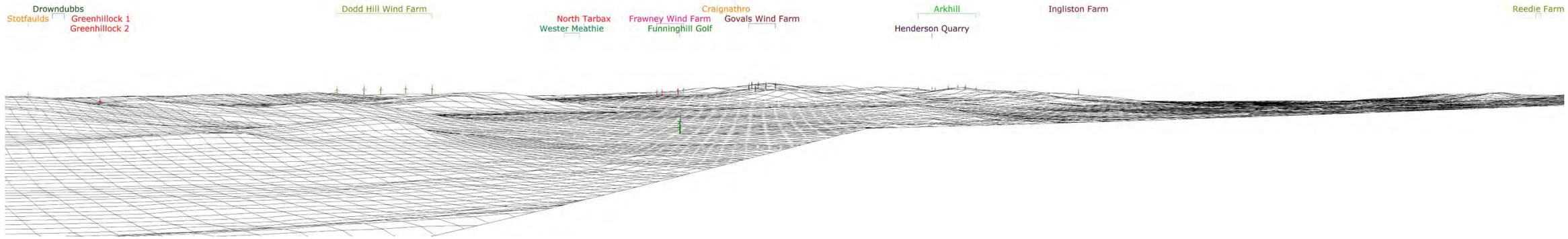
Project:	Hillhead of Ascurry
Drawing no:	HOA065
Drawing by:	Franco Giovanetti
Approved by:	Andy Lowe
OS Licence N°:	100050069

Viewpoint No:	VP10
Viewpoint Location:	E351355 N753495
Field of View:	45°
View direction:	163°
Dist to turbine:	7.3 km
Title:	Turin Hill

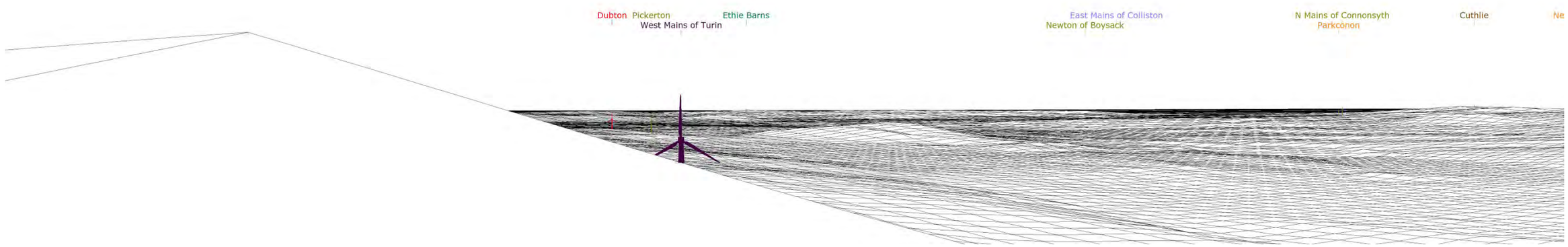
Camera:	Nikon D60
Effective Focal Length:	50mm
Viewing Distance:	48.3 cm
Elevation:	1.8m
Date taken:	29-Aug
Time taken:	12:30:00



Computer generated wireframe showing cumulative development



Computer generated wireframe showing cumulative development



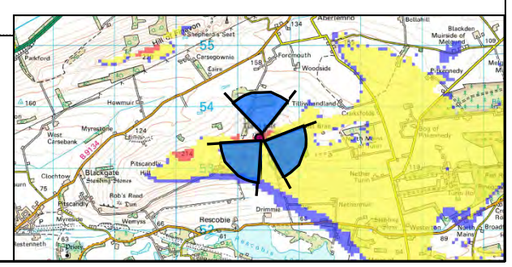
Computer generated wireframe showing cumulative development

Locogen Ltd, 44 Constitution St, Edinburgh, EH6 6RS
Tel:+44(0)131 624 8968;
Email: info@locogen.com
Company Number: SC370060

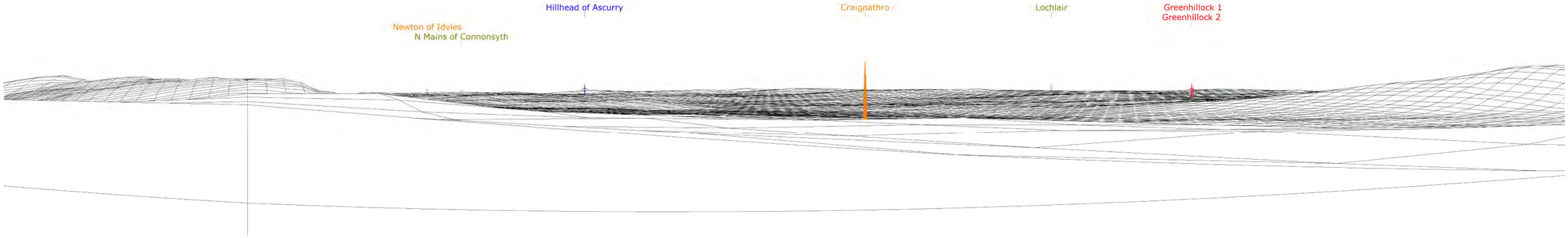
Project:	Hillhead of Ascurry
Drawing no:	HOA066
Drawing by:	Franco Giovanetti
Approved by:	Andy Lowe
OS Licence N°:	100050069

Viewpoint No:	VP10
Viewpoint Location:	E351355 N753495
Field of View:	80°
View direction:	358.2° (top), 226.5° (middle), 111.2° (bottom)
Dist to turbine:	7.3 km
Title:	Turin Hill

Camera:	Nikon D60
Effective Focal Length:	50mm
Viewing Distance:	23.8 cm
Elevation:	1.8m
Date taken:	29-Aug
Time taken:	12:30:00



Existing view from Balmashanner



Computer generated wireframe showing proposed turbine in blue

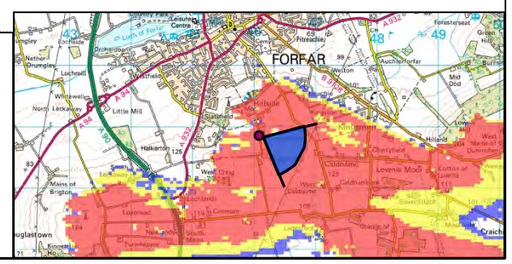
Photomontage showing proposed development

Locogen Ltd, 44 Constitution St, Edinburgh, EH6 6RS
Tel:+44(0)131 624 8968;
Email: info@locogen.com
Company Number: SC370060

Project:	Hillhead of Ascurry
Drawing no:	HOA067
Drawing by:	Franco Giovanetti
Approved by:	Andy Lowe
OS Licence N°:	100050069

Viewpoint No:	VP11
Viewpoint Location:	E346082 N748853
Field of View:	80°
View direction:	117.5°
Dist to turbine:	7.8 km
Title:	Balshanner

Camera:	Nikon D60
Effective Focal Length:	50mm
Viewing Distance:	23.8 cm
Elevation:	1.8m
Date taken:	29-Aug
Time taken:	16:09:00



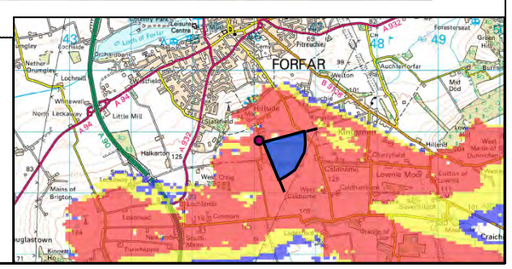
Photomontage showing proposed development

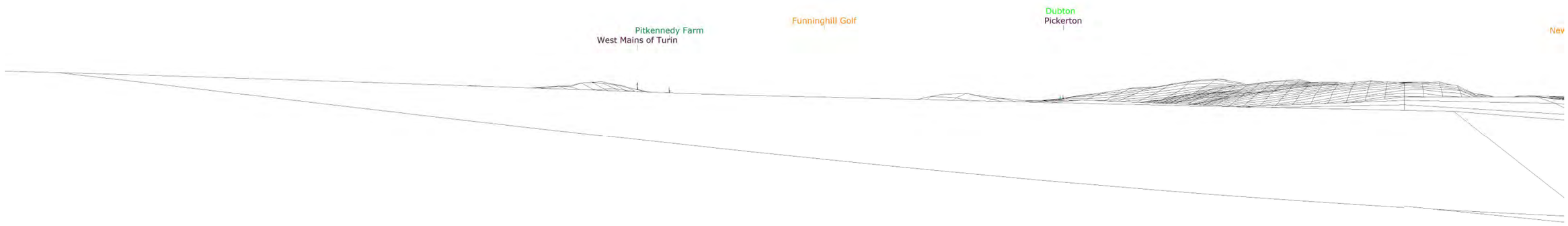
Locogen Ltd, 44 Constitution St, Edinburgh, EH6 6RS
Tel:+44(0)131 624 8968;
Email: info@locogen.com
Company Number: SC370060

Project:	Hillhead of Ascurry
Drawing no:	HOA068
Drawing by:	Franco Giovanetti
Approved by:	Andy Lowe
OS Licence N°:	100050069

Viewpoint No:	VP11
Viewpoint Location:	E346082 N748853
Field of View:	45°
View direction:	117.5°
Dist to turbine:	7.8 km
Title:	Balshanner

Camera:	Nikon D60
Effective Focal Length:	50mm
Viewing Distance:	48.3 cm
Elevation:	1.8m
Date taken:	29-Aug
Time taken:	16:09:00





Computer generated wireframe showing cumulative development

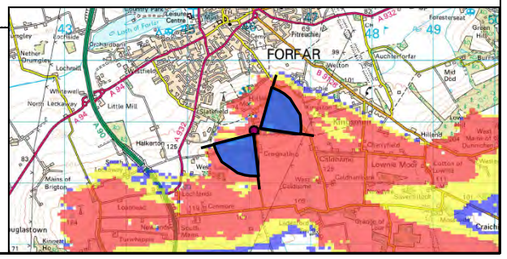
Computer generated wireframe showing cumulative development

Locogen Ltd, 44 Constitution St, Edinburgh, EH6 6RS
Tel:+44(0)131 624 8968;
Email: info@locogen.com
Company Number: SC370060

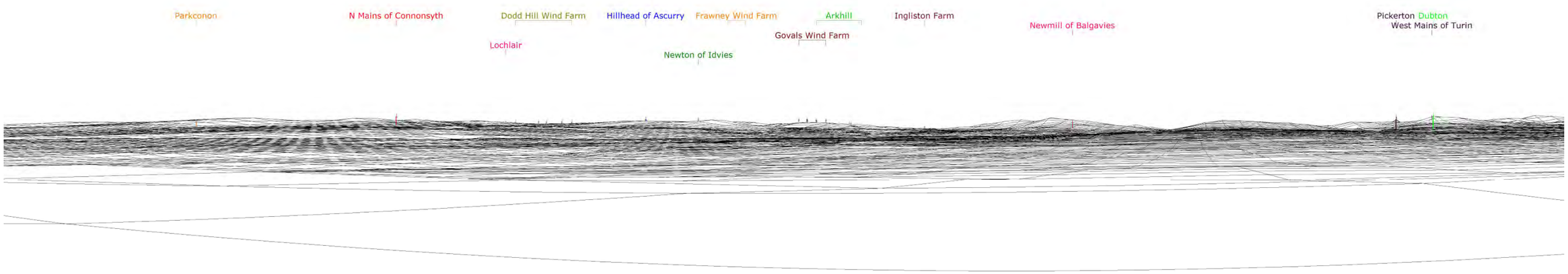
Project:	Hillhead of Ascurry
Drawing no:	HOA069
Drawing by:	Franco Giovanetti
Approved by:	Andy Lowe
OS Licence N°:	100050069

Viewpoint No:	VP11
Viewpoint Location:	E346082 N748853
Field of View:	80°
View direction:	58.2° (top), 215.3° (bottom)
Dist to turbine:	7.8 km
Title:	Balshanner

Camera:	Nikon D60
Effective Focal Length:	50mm
Viewing Distance:	23.8 cm
Elevation:	1.8m
Date taken:	29-Aug
Time taken:	16:09:00



Existing view from local road near Mainsbank



Computer generated wireframe showing proposed turbine in blue

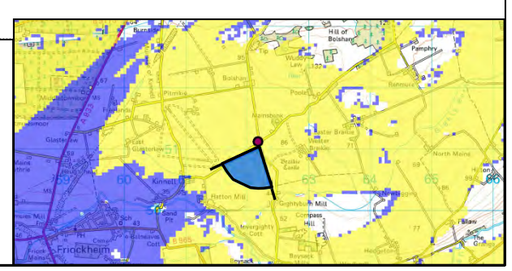
Photomontage showing proposed development

Locogen Ltd, 44 Constitution St, Edinburgh, EH6 6RS
Tel:+44(0)131 624 8968;
Email: info@locogen.com
Company Number: SC370060

Project:	Hillhead of Ascurry
Drawing no:	HOA070
Drawing by:	Franco Giovanetti
Approved by:	Andy Lowe
OS Licence N°:	100050069

Viewpoint No:	VP12
Viewpoint Location:	E362172 N751122
Field of View:	80°
View direction:	205°
Dist to turbine:	9.8 km
Title:	Local road near Mainsbank

Camera:	Nikon D60
Effective Focal Length:	50mm
Viewing Distance:	23.8 cm
Elevation:	1.8m
Date taken:	29-Aug
Time taken:	10:36:00



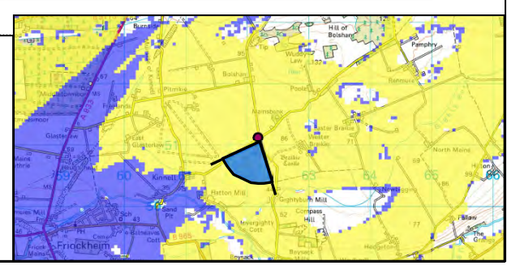
Photomontage showing proposed development

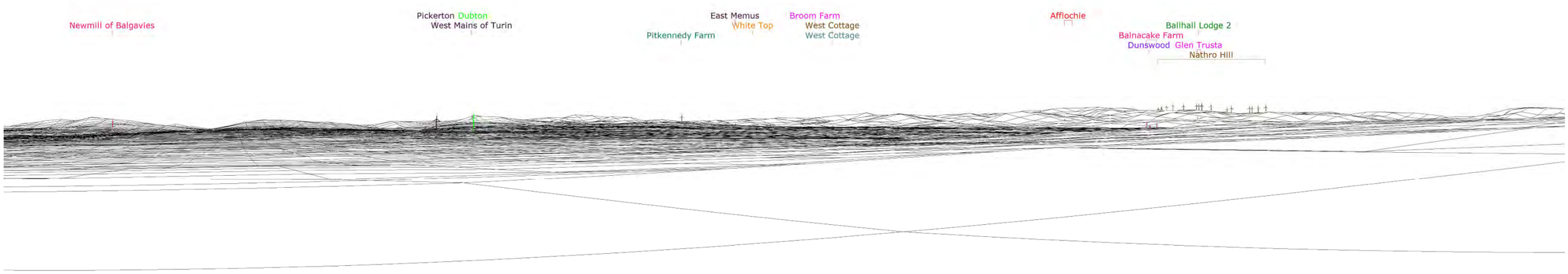
Locogen Ltd, 44 Constitution St, Edinburgh, EH6 6RS
Tel:+44(0)131 624 8968;
Email: info@locogen.com
Company Number: SC370060

Project:	Hillhead of Ascurry
Drawing no:	HOA071
Drawing by:	Franco Giovanetti
Approved by:	Andy Lowe
OS Licence N°:	100050069

Viewpoint No:	VP12
Viewpoint Location:	E362172 N751122
Field of View:	45°
View direction:	205°
Dist to turbine:	9.8 km
Title:	Local road near Mainsbank

Camera:	Nikon D60
Effective Focal Length:	50mm
Viewing Distance:	48.3 cm
Elevation:	1.8m
Date taken:	29-Aug
Time taken:	10:36:00





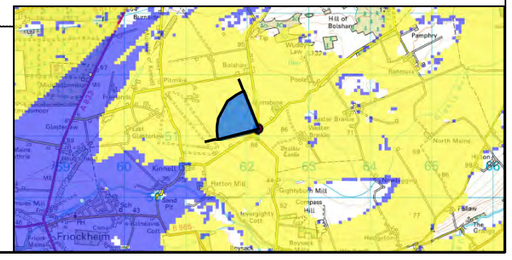
Computer generated wireframe showing cumulative development

Locogen Ltd, 44 Constitution St, Edinburgh, EH6 6RS
Tel:+44(0)131 624 8968;
Email: info@locogen.com
Company Number: SC370060

Project:	Hillhead of Ascurry
Drawing no:	HOA072
Drawing by:	Franco Giovanetti
Approved by:	Andy Lowe
OS Licence N°:	100050069

Viewpoint No:	VP12
Viewpoint Location:	E362172 N751122
Field of View:	80°
View direction:	298.2°
Dist to turbine:	9.8 km
Title:	Local road near Mainsbank

Camera:	Nikon D60
Effective Focal Length:	50mm
Viewing Distance:	23.8 cm
Elevation:	1.8m
Date taken:	29-Aug
Time taken:	10:36:00



ITEM 6

Locogen Ltd
44 Constitution Street
Edinburgh, EH6 6RS

25/11/2013

Mr Ruari Kelly
Development Standards
Angus Council
County Buildings
Market Street
Forfar
DD8 3LG

13/01029/FULL – Addition noise report information

Dear Mr Kelly,

With regard to the above application, it has been brought to my attention that there is a single property which lies immediately to the south of the farm buildings at Ascurry Farm, Letham. This dwelling has been omitted from the noise assessments included in Chapter 11 of the Supporting Environmental Document which was submitted to Angus Council on 29th October 2013. I have amended the assessments below to include the dwelling (denoted below as property H8). The amended assessment does not affect the conclusions made in Section 11.6 of the Supporting Environmental Document.

I trust the above is self-explanatory, however please let me know if you require any further information.

Yours sincerely,

Andy Lowe
Senior Wind Developer

Locogen Ltd.

Amended Noise Assessment Information (see Chapter 11 of Supporting Environmental Document)

11.2.3. Site Context

The 8 residential locations closest to the proposed turbine are numbered in Figure 1 below with details provided in Table 1. The distances measured are from the proposed turbine to the nearest part of the property curtilage and therefore include outdoor amenity areas.

Figure 1: Residential dwellings surrounding the proposed turbine

House	Easting	Northing	Distance to turbine
H1	353095	746862	588m
H2	353084	746903	623m
H3	353092	747040	719m
H4	353436	745929	556m
H5	354054	746083	647m
H6	353852	747162	743m
H7	354036	746253	544m
H8	354022	746129	594m

Table 1: Details of the dwellings in proximity to the proposed turbine

11.4. Results

The ETSU Guidelines state that the L_{A90} noise descriptor should be adopted for both background and wind farm noise levels and that, for the wind farm noise, this is likely to be between 1.5 and 2.5 dB less than the L_{Aeq} levels over the same period. Use of the L_{A90} descriptor for wind farm noise allows reliable measurements to be made without corruption from relatively loud, transitory noise events from other sources.

Noise predictions were carried out for a wind speed of 10m/s at 10m height. The receiver was set at a 4m height above ground level. The results are plotted in the form of noise contours shown in Figure 2 below. It should be noted that this represents downwind propagation in all directions simultaneously, which clearly cannot happen in practice. The predicted turbine noise L_{Aeq} has been adjusted by subtracting 2dB to give the equivalent L_{A90} as suggested in ETSU-R- 97. The L_{A90} figures with the uncertainty factor of 1.15dB outlined are included in Appendix C of the Supporting Environmental Document. These have been inserted manually into the ReSoft Windfarm software, to prepare the model in Figure 2 below.

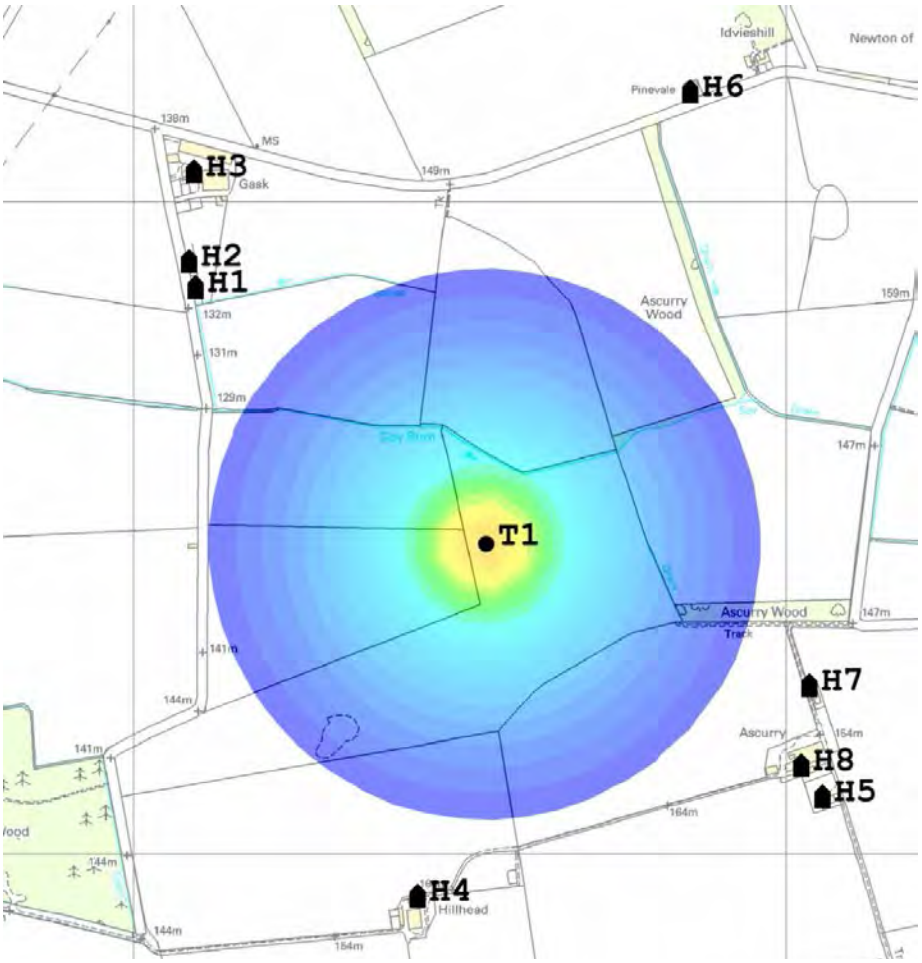


Figure 2: Hillhead of Ascurry Noise Model (using ReSoft Windfarm and L_{A90} data)

As is shown by the above noise assessment, the maximum expected noise levels at the nearest residential areas will be under 35db(A). Based on the ETSU guidance this is considered to be within acceptable levels and background noise measurements are not considered necessary. It should also be noted that:

- Wind turbine noise is modelled at its rated power output and consequently the rated sound power level;
- The model assumes a direct line of sight and does not consider terrain; and
- The noise model assumes that the wind direction is always blowing from the wind turbine to each house simultaneously. Noise levels can be expected to be 2 dB less during cross winds (i.e. where the wind blows across a path between the turbine and the house).

The results of the noise assessment for each house shown in the baseline assessment are shown in Table 2 below.

House no	Predicted Noise (dB)
H1	31.72
H2	31.13
H3	29.68
H4	32.28
H5	30.75
H6	29.35
H7	32.49
H8	31.61

Table 2: Calculated noise levels at surrounding properties

11.6. Conclusions

The following conclusions have been made regarding noise considerations and the proposed wind development:

- The area is rural in nature and is expected to have relatively low background noise;
- The nearest property (house and or boundary) to the turbine is measured as being 544m from the turbine position;
- The proposed turbine (EWT Directwind 54) is a modern turbine design with a low noise signature compared with other turbines of a similar size;
- Noise modelling was completed for the proposed development using ReSoft Windfarm software and the guaranteed noise levels for the proposed wind turbine at normal operation. This model is based on ISO 9613;
- The noise at the nearest residential dwellings (applicant and non-applicant owned) to the proposed turbine site is shown not to exceed 35 dB(A) (L_{A90}) at a wind speed of 10m/s and at a received height of 4m, in accordance with ETSU and the guidance from the Institute of Acoustics; and
- ETSU guidance states that in the above scenario the wind turbine development is not considered to require detailed background noise modelling as the turbine noise would be below what is expected to be seen as background noise in a low noise environment.

Overall, noise impacts are predicted to be low and assessed levels are well within ETSU guideline limits.

ENDS

ITEM 7

Locogen Ltd
44 Constitution Street
Edinburgh, EH6 6RS

24/03/2014

Mr Ruari Kelly
Development Standards
Angus Council
County Buildings
Market Street
Forfar
DD8 3LG

13/01029/FULL – Shadow Flicker

Dear Mr Kelly,

With regard to the above application, I note that there have been responses to your department raising concerns over shadow flicker at Lewiston Cottage.

Shadow flicker only occurs inside buildings where the flicker appears through a narrow window opening. Only properties within 130 degrees either side of north of the turbine can be affected at UK latitudes, and shadow flicker can occur only within ten rotor diameters of a turbine position.

As outlined in Section 10 of the Supporting Environmental Document which was submitted with this application, a detailed shadow flicker assessment has been completed using ReSoft Windfarm Software to quantify the areas of potential impact. The model was run using conservative, worst case assumptions. **The assessment concluded that no shadow flicker impacts will be experienced at nearby properties**. I also note that screening from trees at Ascurry Wood has not been considered during this assessment, which further reduces the impact of shadow flicker.

As noted above, shadow flicker occurs through narrow window openings within a certain distance and orientation from a wind turbine, as opposed to in open outside space. Nevertheless, to alleviate any perceived impact, the applicant is happy to completely mitigate even the casting of a shadow over any part of the curtilage of Lewiston Cottage by simply programming the turbine to switch off during the identified times when a shadow may be cast. This is a straight forward procedure and the applicant would accept a planning condition to this effect.

Yours sincerely,

Andy Lowe
Senior Wind Developer
Locogen Ltd.

Locogen Ltd
44 Constitution Street
Edinburgh, EH6 6RS

20/12/2013

Mr Ruari Kelly
Development Standards
Angus Council
County Buildings
Market Street
Forfar
DD8 3LG

13/01029/FULL – Strategic Landscape Capacity Assessment for Wind Energy in Angus (2013)

Dear Mr Kelly,

With regard to the above application, I am pleased to see that the recently published Strategic Landscape Capacity Assessment for Wind Energy in Angus has concluded that the proposed wind turbine at Hillhead of Ascurry lies within the Redford Farmland sub-area, classified as having medium capacity for 50m – <80m turbines. I also note that the proposed location is within an area classified as having the highest underlying capacity for development, as outlined in the attached drawing.

Such areas are judged to have the capacity to accommodate larger sizes of turbine and/or greater numbers and concentrations relative to other areas of landscape in Angus. This is based on a combination of one or more factors including suitable landscape character, lower visual sensitivity or lower value.

Located within the Redford Farmland sub-area, the assessment describes the landscape and landscape capacity as:

"This sub-area is the largest scale, highest and most open within the Dipslope Farmland and this is partly reflected in the scale of farms and field sizes. There are areas with minimal settlement and roads although it borders the populated coastal area in the south. This has the highest capacity for wind energy in the Dipslope Farmland and can accommodate medium/large turbines, subject to local constraints."

"The largest size turbines (medium/large) would be most suitable in the largest scale areas located in the centre and north of the sub-area."

I appreciate the proposed turbine is located within an area where cumulative impact is considered to limit some development, however the location is close to the edge of this area, and is located a significant distance from the cluster of wind turbines which are considered to result in this classification. Indeed, the detailed Landscape and Visual Assessment included within our Supporting Environmental Document concluded that minimal cumulative effects are predicted as a result of the proposed development.

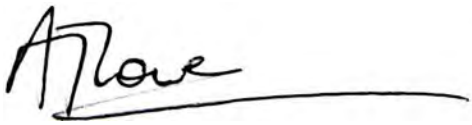
I also note that the following is included within the assessment, with regard to the outlined separation distances between turbines:

"In all cases the distances are an approximate range intended for guidance. Separation distances between specific proposals should therefore be considered in more detail on a case by case basis."

Reviewing the recent Strategic Landscape Capacity Assessment alongside the other conclusions within our Supporting Environmental Document, I am confident that a development of the size proposed at Hillhead of Ascurry will be of an acceptable scale given both the landscape capacity and other local considerations.

I hope the above proves useful. Please let me know if you need anything additional from me at this stage.

Yours sincerely,



Andy Lowe
Senior Wind Developer

Locogen Ltd.

ITEM 8

Locogen Ltd, 44 Constitution St, Edinburgh, EH6 6RS
Tel: +44 (0) 131 555 4745; Email: info@locogen.com
Company Number: SC370060; VAT Number: 983 3836 77

Project Description

Number of Turbine(s):	1
Turbine Model:	EWT Directwind 54
Hub Height:	50m
Blade diameter:	54m
Total height to blade tip:	77m
Turbine location:	353539 746476

Notes

This map shows the preferred and constrained areas for medium/large (50m-80m) wind energy developments around the proposed turbine.

Legend

- Turbine Location
- Medium Capacity
- Low Capacity
- Areas with Highest Underlying Capacity
- Areas where Cumulative Impact Limits Development

PROJECT:	Hillhead of Ascurry
DRAWING TITLE:	Angus Capacity Study for Wind Energy
DRAWING NO:	HOA073
DOCUMENT SIZE:	A3
SCALE:	1:80,000
DATE:	19/12/2013
DRAWING BY:	Bojan Jevtic
APPROVED BY:	Andy Lowe

N

0 5 km

ITEM 9

Locogen Ltd
44 Constitution Street
Edinburgh
EH6 6RS

24/03/2014

Corporate Services
Angus Council
Angus House
Orchardbank
Forfar
DD8 1AN

Request for Development Management Review
Non Determination of Planning Application Reference: 13/01029/FULL
Land at Hillhead of Ascurry Farm

Dear Sir/Madam,

The above application was validated by Angus Council on 4th November 2013. Its target determination date was 4th January 2014. We are now 11 weeks beyond that date and, although there are no objections from statutory consultees, it is considered that there is likely to be further delay for the Development Standards Department to complete their assessment of the application.

We have provided a comprehensive and professional planning submission, including all the required information. Post-submission we have made three additional submissions to provide more clarity on the application, covering noise, shadow flicker and landscape character. The applicant has also recently written directly to the Council outlining his further comments on the application.

In summary, the proposed single wind turbine is of vital importance to A. M. McEwan's farming business. Mr McEwan is a local farmer and employs 10 local people on a full time basis and 12 further part time and seasonal staff.

The main objectives of the proposal are as follows:

- To improve attractiveness of food produce to suppliers through improved sustainability credentials;
- To support existing employment and create new job opportunities;
- To provide renewable energy to meet demand;
- To reduce the overall carbon footprint of the farming business through offsetting energy usage, which currently costs in the region of £120,000 per annum;
- To increase direct business revenue and thus support the continued viability of the existing farming business;
- To promote the use of green energy generation in the area and contribute towards achieving stated renewable energy generation and carbon reduction targets; and
- To spread the farmer's risk into a non-agricultural sector.

The development of wind energy at the site by the applicant will also maximise the local benefits from renewable development as the revenue from the project will stay in the local economy. It is also Mr McEwan's desire to use local contractors, where possible, for

different aspects of the wind turbine installation. Again, this will keep investment in the local area.

The proposed turbine will be situated at the edge of an arable field. The site has been carefully chosen to maintain statutory separation distances from nearby sensitive receptors, and as outlined in the detailed Landscape and Visual Impact Assessment included within Chapter 5 of the Supporting Environmental Document, there will be no significant long term impacts on the overall integrity of the landscape character or any landscape designations.

Given that this application is a 'local development' and has not been determined within the target determination period, it is the applicant's desire to seek a review by the Council's Development Management Review Committee. As required, we submit the following documents:

- Notice of Review;
- Supporting Environmental Document and associated graphics; and
- Additional information submitted in support of the application.

Please acknowledge safe receipt of this letter and enclosures.

Please do not hesitate to contact me directly should you wish to discuss.

Yours faithfully,

Andy Lowe
Senior Wind Developer

Locogen Ltd.

A.M. McEWAN

WEST MAINS OF COLLISTON
BY ARBROATH
DD11 3RT

Mr Ruari Kelly
Development Standards
Angus Council
County Buildings
Market Street
Forfar
DD8 3LG

24 March 2014

Planning application 13/01029/FULL
Erection Of Wind Turbine Of 50 Metres To Hub Height And 77 Metres To Blade Tip Field 500M North West Of Ascurry Farm Ascurry Letham

Dear Mr Kelly

As the applicant of the above planning application I would like this letter to be added to the supporting documentation from my agent Locogen Limited.

I am a partner in the farming business A M McEwan which is now in its third generation of farming 2,300 acres in Angus. We employ ten full time and twelve part time staff. We always use local companies where possible and feel that we make a large contribution to the Angus economy.

We have applied for a wind turbine on this carefully chosen location for several reasons. One reason is that we sell potatoes to customers who supply the major supermarkets. More and more top down pressure is being put on us from customers to demonstrate a reduction in our carbon emissions. This comes from the pressure put on our retail customers by Government to respond to the climate change agenda. Without a commitment from us to adhere to this the business might be unable to sell to this market in the future. This would obviously have a drastic effect on our business and as a consequence the Angus economy. A letter in support from Albert Bartlett and Sons Ltd illustrates this point.

The wind turbine will also increase the revenue of the business and support the continued viability of the farming business and safeguard employment.

The model of wind turbine chosen is one of the quietest and most efficient 500kW machines available today. It will generate approximately the same amount of electricity as six turbines rated at 100kW that are almost 50m high. It would seem to me that if Angus Council wishes to limit the amount of turbines in the landscape then by allowing single efficient turbines such as this type instead of six or seven smaller capacity turbines, that are almost as high, would achieve this. It would also contribute better towards the Government's targets for renewable energy.

I feel that the location of the turbine has been well chosen to minimise the impact on the landscape and local residents.

When the application was submitted in October 2013 the new landscape and visual assessment was not published and as such I submitted this application along with the application fee based on the planning policies in place at this time. I now find that this application is now being considered against a new set of policies and criteria not available at the time of submission.

That said, as the turbine sits in the Redford Farmland sub-area as detailed in the new SLCA document I feel that the location fits perfectly with this new criteria as well as the landscape assessment and I refer to the letter from my agent on 20 December 2013 which sets out how the new location complies with the new criteria. I have attached a copy of that letter for easy reference. I think it is also worth pointing out that the nearest village of Letham has little or no views of the turbine as it is screened by the topography of the rising land to the south and the dense trees and vegetation of Idvies House policies between the turbine and the village.

When you are actually standing on the proposed turbine location due to the topography of the ground, farm buildings, the natural screening of Ascurry Wood and nearby hedgerows, it is only just possible to partially see one of the nearest eight houses that are documented in the supporting documentation submitted my agent Locogen. This is because the turbine would sit down in a natural bowl. It is also the case that the turbine will not be directly in front of any of these houses.

It should be noted that the turbine is also a good distance from the nearest unclassified road and again is well screened from by the topography, trees and farm buildings.

I note that at the date of this letter there have been no objections from any statutory or Angus Council consultees. These are summarised below.

Consultee	Reason for consultation	Reply	Outcome
AC Environmental Health	Noise	Yes	No objection
NERL safeguarding	Aircraft safety	Yes	No objection
Spectrum Licensing	Radio communications	Yes	No objection
Civil Aviation Authority	Aircraft safety	Yes	No objection
Dundee Airport	Aircraft safety	Yes	No objection
Atkins	Radio communications	Yes	No objection
AC Roads Department	Road safety	Yes	No objection
Scottish Water	Water supply	Yes	No objection
JRC	Radio communications	No	No concerns agreed with Locogen
RSPB	Wildlife	No	No comments
Community Council		No	No comments
MOD	Radar	No	No comments
AC Natural and Build		No	No comments

I also note that there have been 15 letters of support and 28 letters of objection (several of which are multiple objections from the same household and 17 from locations distant from the turbine location including several letters from individuals that object to all wind turbine applications regardless of the location).

I think it is important to note the level of objections and support from the nearest eight houses. These are summarised below:

Number per Locogen	House name (if known)	Distance from turbine	Number of objection letters submitted	Number of support letters submitted
H1	No2 Gask Cottage	588m	1	None
H2	Gask Bungalow	623m	1	None
H3	Gask Farm House	719m	None	None
H4	Hillhead Farm House	556m	None	None
H5	Ascurry Farm Bungalow	647m	None	1
H6	Bungalow on unclassified road	743m	None	None
H7	Lewiston Cottage	544m	5	None
H8	Ascurry Farmhouse	594m	None	None

Therefore out of the nearest eight houses, five houses have either supported the application or have not objected with only three households raising objections. I feel that the objections from these three households have been adequately answered either by the statutory consultees or additional information supplied by my agent.

I also wish to point out that none of these eight houses are owned or controlled by me, my business or any relatives.

I also think it is significant that in the appeal decision for the wind farm at the Govals Farm, Kincaldrum, Forfar Angus, the Scottish reporter stated:

"of course, merely being able to see a wind farm or any other major development should not normally be sufficient on its own to refuse them. There is no automatic right to a view or have your prospect unchanged"

He went on further to say "*wind farms are now part of the Scottish countryside"*

I feel that along with the supporting documentation from my agent and the points in this letter demonstrate that the proposed turbine can be adequately accommodated in the landscape without any detrimental effects on the amenity of the nearest households.

This is a major investment for an Angus based business and we will use our policy of using local business' where possible in the construction of the turbine civil infrastructure such as the road, the base and associated landscaping. This will be a considerable amount for local companies resulting in the benefits being felt in the Angus economy as well as ensuring the continued prosperity for our farming business with the revenue raised from the project also staying in the local economy.

Yours sincerely

Graham McEwan
Partner

Locogen Ltd
44 Constitution Street
Edinburgh, EH6 6RS

20/12/2013

Mr Ruari Kelly
Development Standards
Angus Council
County Buildings
Market Street
Forfar
DD8 3LG

13/01029/FULL – Strategic Landscape Capacity Assessment for Wind Energy in Angus (2013)

Dear Mr Kelly,

With regard to the above application, I am pleased to see that the recently published Strategic Landscape Capacity Assessment for Wind Energy in Angus has concluded that the proposed wind turbine at Hillhead of Ascurry lies within the Redford Farmland sub-area, classified as having medium capacity for 50m – <80m turbines. I also note that the proposed location is within an area classified as having the highest underlying capacity for development, as outlined in the attached drawing.

Such areas are judged to have the capacity to accommodate larger sizes of turbine and/or greater numbers and concentrations relative to other areas of landscape in Angus. This is based on a combination of one or more factors including suitable landscape character, lower visual sensitivity or lower value.

Located within the Redford Farmland sub-area, the assessment describes the landscape and landscape capacity as:

"This sub-area is the largest scale, highest and most open within the Dipslope Farmland and this is partly reflected in the scale of farms and field sizes. There are areas with minimal settlement and roads although it borders the populated coastal area in the south. This has the highest capacity for wind energy in the Dipslope Farmland and can accommodate medium/large turbines, subject to local constraints."

"The largest size turbines (medium/large) would be most suitable in the largest scale areas located in the centre and north of the sub-area."

I appreciate the proposed turbine is located within an area where cumulative impact is considered to limit some development, however the location is close to the edge of this area, and is located a significant distance from the cluster of wind turbines which are considered to result in this classification. Indeed, the detailed Landscape and Visual Assessment included within our Supporting Environmental Document concluded that minimal cumulative effects are predicted as a result of the proposed development.

I also note that the following is included within the assessment, with regard to the outlined separation distances between turbines:

"In all cases the distances are an approximate range intended for guidance. Separation distances between specific proposals should therefore be considered in more detail on a case by case basis."

Reviewing the recent Strategic Landscape Capacity Assessment alongside the other conclusions within our Supporting Environmental Document, I am confident that a development of the size proposed at Hillhead of Ascurry will be of an acceptable scale given both the landscape capacity and other local considerations.

I hope the above proves useful. Please let me know if you need anything additional from me at this stage.

Yours sincerely,

Andy Lowe
Senior Wind Developer

Locogen Ltd.

APPENDIX 3

FURTHER REPRESENTATIONS BY INTERESTED PARTIES

ForsythSL

From:	Andrew Vivers <
Sent:	05 April 2014 20:11
To:	ForsythSL
Subject:	13/01029/full

I write to add to my objection to this application.

First, before any "material considerations" such as visual, landscape or cumulative impacts, MUST be the consideration of the known, well documented and peer reviewed evidence of the detrimental health effects that turbine emissions have on humans and other life forms.

1. Despite the prevailing wind, noise and vibrations emissions from turbines, and the pressure changes caused by the turning blades, are omnidirectional. Reports from around the world indicate that those living near turbines are likely to experience symptoms such as insomnia, headaches, dizziness and tinnitus, and in time, other chronic health problems are created or accelerated, probably by infrasound-induced increased levels of cortisol. Animals (pets, livestock and wildlife) could also feel these effects - with birds, bats, insects and spiders exposed to the additional risk of impact from a blade (approximately 100million birds and bats are killed annually by wind turbines) . The wind industry is well aware of these harmful effects, and it is probably one of the main reasons why few large turbines are erected near centres of population or industry – where the power is most needed.
   a) Australia: sleep deprivation, tinnitus, headaches, dizziness. Today Tonight report: http://bit.ly/1l0Berf
   b) Australia: comparison between acute and chronic symptoms.
   http://chrisback.com.au/HotIssues/tabid/88/articleType/ArticleView/articleId/252/Wind-turbines--the-untold-story.aspx
   c) Australia: infrasound. http://www.youtube.com/watch?v=HvZiuKcXTB0
   d) Portugal: increasing symptoms with time chart, thickening of pericardium and blood vessel walls.
   http://www.youtube.com/watch?v=yDBB5xL5TIw
   e) Canada: http://waubrafoundation.org.au/resources/canadian-tv-interview-wind-turbine-adverse-health-effects/
   e) USA, France, Denmark, Germany, Sweden, Netherlands, Spain, Switzerland, Belgium, Ireland, Japan and others:
   http://www.epaw.org/documents.php?lang=en&matter=noise
   https://www.wind-watch.org/ww-noise-health.php
   f) Detrimental health effects of Infrasound and Low frequency Noise – resulting in probable early death.
   http://www.epaw.org/documents.php?lang=en&article=ns50

2. Understandably, few people choose to live near large wind turbines and it is reported that neighbouring property values will decrease wherever large turbines are erected.
   a) Telegraph report "Wind farms do bring down property values": http://bit.ly/1l0BzKl
   b) https://www.wind-watch.org/documents/gone-with-the-wind-valuing-the-local-impacts-of-wind-turbines-through-house-prices/

3. I understand this is a 500Kw application. Assuming all the electricity generated by these turbine(s) is sold to the grid, and that the turbine(s) manage to operate at 30% efficiency/capacity, it/they should generate an income of around £257,412 per for the landowner and developer/agent. Only about 24.34% of this money is from sale of electricity (export), the remainder is basically a subsidy that comes from increases to our electricity and energy bills. This subsidy (£194,758) equates to approximately 1947 households in the neighbourhood having to pay an extra £100 per year on their electricity and energy bills. This is on top of whatever extra is already being paid for other income earning turbines in the area and throughout the country.

   If this Government`s energy policy is allowed to meet its target, every household in the country is likely to have to pay at least an extra £700 per year on their energy bills.
   Spectator report "Blackout Britain - The real energy scandal": http://bit.ly/1l0D6jD

4. Turbine Applications often quote that the proposal would meet the energy requirements of a certain number of houses. Our Government is keen to promote community ownership. Therefore, these houses that are benefiting from the wind generated electricity should also be the ones paying for its production. This would show that the electricity bills of these houses would be up to 6 times higher, using Feed In Tarriff or "FIT" rates (http://www.lifelongenergy.co.uk/about-us/journal/156-fits-wind.html), than houses that are not enjoying the benefits intermittent and variable wind generated electricity.
   The quoted number of houses would, of course, also need to spend considerable amounts of money on huge battery banks to store surplus electricity when produced and not needed, or invest in polluting petrol or diesel generators with fuel running costs and the appropriate switching gear, to provide electricity when there insufficient wind electricity for their needs.
   Larger proposals onshore and offshore with ROC incomes would probably fall into the same % bracket and costs per household.
   I suggest that no sensible community would ever support so outrageously expensive, inefficient, and unreliable an electricity source were it not that the true costs have been hidden from the public by subsidies and the distortion of market forces through legislation.

5. Please understand this:
   - Every time you see a turbine go up that is connected to the grid, you know your electricity/energy prices will go up.
   - Most of the "green" money taken from us has been handed to the turbine landowner and the developer/agent, or squandered.

   The main effect of green policies has been:
   - to increase bills, and not reduce CO2 emissions;
   - to undermine industrial competitiveness;
   - to force energy-intensive businesses to consider leaving the country, taking their investment and tax revenues with them, and causing job losses;
   - to drive millions of households and pensioners into fuel poverty.

What will the public do when they realise that so much of their money has been squandered?
Roger Helmer MEP: "EU energy policy worlds most expensive failure: http://bit.ly/1l0DnTF

6. In 2013, we paid wind factories over **£32million to <u>not</u> produce electricity** when the wind was blowing. This money came from additions to our energy bills. Since 2007, over 5 million trees have been cut down and replaced by turbines and associated developments – this is likely to increase considerably with the Forestry Commission's new renewable energy tender across Scotland.

7. Regarding the issuing of Renewable Energy Certificates to wind farms, Senator Madigan (Australia) said the issue involved "***the pain and suffering of people living in rural Australia, environmental damage, fraud on a grand scale, deception, lies and concealment.***" The Australian 31 Dec 2013 http://epaw.org/echoes.php?article=n141

8. I have heard of an American tour guide suggesting to his clients that it will soon not be worth visiting Scotland as it will be covered in wind turbines. I am sure the same applies elsewhere.

9. Since energy can neither be lost nor renewed, the term Renewable Energy is an incorrect concept. What we should be investing in is the most efficient way of producing the maximum amount of electricity with the least harm to humans and the environment, whilst also reducing greenhouse emissions.

10. Scotland remains the prime target for the wind industries "assault on the UK". I believe that their use of the word "assault" accurately describes the threat of a planned, military style operation.

Why is it that whenever a new country is targeted by the wind industry, the experiences (financial, environmental, health, efficiency, reliability of supply, etc) of previous countries is ignored by the wind industry, politicians and therefore Councils? Why is it that each country has to re-learn the lessons of previous countries?

When will the increasing evidence from around the world regarding the detrimental effects on health and well-being caused by turbine emissions be legally obliged to be considered in turbine applications and Council planning decisions? To continue to deliberately ignore the issue will not solve it.

11. There won't be much left of the world after the wind industry has 'saved' it.
http://www.epaw.org/documents.php?article=re1

Andrew Vivers, Arniefoul, Glamis, Angus, DD8 1UD

Fighting for our wee bit hill and glen

ForsythSL

From: Andrew Vivers
Sent: 05 April 2014 20:12
To: ForsythSL
Subject: 13/01029/full

I write to add to my objection

Ark Hill wind turbines (8 x 80m Enercon E48 turbines) - **One Year On**
5 Mar 2013 – 4 April 2014

I live at Arniefoul which is 5km East of the Ark Hill wind turbines and 1.6km West of the proposed Govals wind turbines (6 x 87m turbines). The prevailing wind is from the West.

Ark Hill was commissioned on 5 March 2013 and at that time I started to have continuous headaches with some light-headedness and tinnitus. Further to this, I also started to suffer frequent sleep disturbance. When I awoke I could often hear the whooshing of the turbine blades. Assuming it was the audible sound that was disturbing me, I moved my bed further away from the window and slept with the window closed. This made no difference to my sleep deprivation – usually being woken at around 3am until 5am. With the window closed I rarely hear the turbine noise, but I can sometimes feel their rhythm and therefore deduce that it is an inaudible noise (Low Frequency Noise and Infrasound) that is causing the lack of sleep.

In June 2013 I had two dizzy spells when out walking on the hills surrounding Arniefoul. It was at this time I noticed a correlation between the turbines, the wind direction and the above symptoms. My tinnitus became constant and on some nights extremely loud.

My symptoms appear to be worse when there is a Southerly wind. The Ark Hill turbines rotate clockwise and therefore it is probably an emission during the down stroke that creates the harmful effects. This suggests it may have little to do with the supporting structure and therefore an 'upwind' or 'downwind' design of turbine will make little difference.

Surprisingly, the prevailing Westerly wind seems to cause slightly less symptoms than a Southerly wind. Turbine noise, however, is most audible when there is little prevailing wind at ground level and at treetop level, but sufficient wind at turbine blade area to turn the blades at a critical speed. In similar conditions to these, when there is an Easterly wind we can easily hear traffic on the A90, 5km to our East, even though there is the huge bund of the Sidlaw Hills between us.

A North or East wind causes slightly less symptoms again, although should the Govals wind turbines be erected, I expect to suffer greatly from those turbines during these wind directions.

January and February 2014 were particularly bad months with predominately Southerly and Westerly winds causing much sleep deprivation, loud tinnitus, lack of concentration and irritability.

On 9 February 2014, I started recording my blood pressure morning and evening. It fluctuates considerably with a recorded high of 185/105. On 28 March for instance, after several days of Easterly wind, it was at a more 'acceptable' 140/83. There appear to be correlations between wind, atmospheric and weather conditions.

Whilst my body may be building some form of resistance to the turbine noises (audible and inaudible) I also believe it is getting more sensitive in certain ways. I sometimes get my "turbine headache" out to at least

10km from the turbines. Also, I have recently noticed I need to clear my ears more frequently, similar to going up in an airplane or scuba diving.

From 6 – 12 March we stayed near Tarfside, Glen Esk (currently no turbines near there). All my symptoms reduced noticeably, with my blood pressure reaching a low of 136/81.

An obvious option is to sell my property and move (where to?). My work is in the local area and therefore this is not really a business option. Nor is it an emotional option since my family has enjoyed being at Arniefoul for nearly a century.

I have heard of landowners with turbines who now regret having turbines on their land, yet are unable to speak out due to 'non disclosure clauses' in their contracts with developers. Also, I suspect that there are many people living near wind turbines who suffer similar conditions to mine but who remain silent for fear of property devaluation, tenancy or employment concerns, and the like.

I am sure that should the Govals and Frawney (5 x 80m, same make as Ark Hill and West Knock Farm, Buchan) wind turbines be erected, with Forfar and Letham being on the down-wind side, there will be people with similar sensitivity as myself who will suffer. Children are thought to be more sensitive to turbine noises than adults.

People sometimes say that I look well considering the symptoms I describe. I am reluctant to take drugs/medication, with their own potential side effects, when I do not believe they are treating the root cause. I have always made considerable efforts to maintain a high level of fitness.

I understand that:

- Low frequency noise and Infrasound (such as emitted by wind turbines) are sound waves that are felt by the body rather than heard, probably by the utricle. Depending upon the amplitude or intensity, it produces feelings of extreme discomfort, a feeling that the body is vibrating. Depending upon the frequency and intensity, infrasound can keep you awake, or induce sleep. Therefore, it can cause sleep deprivation.
- Infrasound induces stress and causes the body to secrete the hormone Cortisol. This effect is a medically recognized danger of long-term infrasound exposure.
- Cortisol, plays a vital role in preparing our body for stressful "fight or flight" episodes. It increases blood pressure and blood sugar levels, and has an immunosuppressive action that provides needed alertness and energy during stressful experiences. However, during long term stress, or if Cortisol production is prolonged, its effects on the human body can become severe. A weakened or suppressed immune system will allow existing health problems to accelerate, and make it easier for new ones to be created.
- Exposure to infrasound during early sleep hours can be particularly harmful. This is when the body normally produces the lowest levels of Cortisol. This might explain my 3am awakening and subsequent wakefulness. Artificially stimulating Cortisol production during sleep means that the Cortisol is not used and remains in the body, potentially damaging essential body functions.
- A sound wave in air is a sequence of pressure changes. A sound wave in a liquid or solid is more like a vibration. This helps explain how Low Frequency Noise and Infrasound travel great distances and easily pass through solid walls, and can set up vibrations or resonances in rooms and body cavities.

There is well-documented and peer-reviewed evidence of the detrimental health effects that turbine emissions have on humans. It is unethical to expose people to something already suspected of being harmful.

Where is the 'Duty of Care'?

Andrew Vivers
Arniefoul, Glamis, DD8 1UD
4 April 2014

Mr & Mrs B. Menzies,
Lewiston Cottage,
Ascurry Farm
By Letham
DD8 2QQ

12th April 2014

Application No 13/01029/Full (Non Determination)
DMRC – 3-14

Dear Ms Forsyth,

As objectors to the above planning application we would like to take this opportunity to address some concerns that we have.

Whilst we understand that businesses are facing increased energy costs (as we all are!) and climate change is an issue that must be tackled, there are alternative means of power generation which ***do not*** have such a significant detrimental impact on other peoples lives. For instance the installation of solar panels on farm buildings which will have no significant visual or audible impact on surrounding properties. We have noticed that the applicants have existing solar panels on farm buildings at a different location and have recently applied for an extension to these and, if such an application was submitted at Ascurry, then we would have no objection to this as these would obviously be a far less intrusive addition to the views from our property and surrounding landscape.

In Mr McEwan's recently submitted letter to Angus Council Planning Department, we ***also*** think it is significant that in the appeal decision for the wind farm at the Govals Farm, Kincaldrum, Forfar, Angus, the Scottish Reporter stated:
'of course, merely being able to see a wind farm or any other major development should not normally be sufficient on its own to refuse them. There is no automatic right to a view or have your prospect unchanged'
But the paragraph ***then*** goes on to say:
'At all of the locations we visited, the views of the turbine, often rotating, could be annoying to residents and might, to some, make the houses less pleasant places to live'
We feel that the size, scale and proximity of the proposed development at Ascurry ***would*** make life extremely unpleasant living at our property.
With reference to the EU Convention of Human Rights, Protocol 1, Article 1, it states:
'Every person is entitled to peaceful enjoyment of property'
The proposed turbine would contravene that entitlement.

We have noticed that on page 2 of Mr McEwan's letter he claims that:
'When you are actually standing on the proposed turbine location due to the topography of the ground, farm buildings, the natural screening of Ascurry Wood and nearby hedgerows, it is only just possible to partially see one of the nearest eight houses that are documented in the supporting documentation submitted by my agent Locogen. This is because the turbine would sit down in a natural bowl.'
While it is true that from the base of the proposed turbine our house is almost not visible, the ***point is*** the visibility of the turbine from our house!. Mr McEwan fails to recognise that he is less than 2m tall, whereas the proposed turbine is 77m. The viewpoint should be from ***our*** property, ***not*** the base of the turbine.
Equally misleading:
'It is also the case that the turbine will not be directly in front of any of these houses'
Enclosed is a photograph showing the view from directly in front of our house with an accurately

scaled representation of the proposed turbine at a 70mm focal length.
The photo shows quite clearly that:

1. The turbine would be visible (54m of the 77m structure) from our house including direct views from our two main rooms ie sitting and dining room which face due west.
2. The turbine would **NOT** be screened by Ascurry Wood, farm buildings, or hedgerows.
3. The turbine would destroy the main view line from our house.

We notice Locogen have attempted to address the concerns over shadow flicker regarding our property and they mention that:
'*screening from trees at Ascurry Wood has not been considered during this assessment , which further reduces the impact of shadow flicker*'
Again, by looking at the photograph we have enclosed, it clearly shows that the turbine would ***not*** be screened by the trees.
We also notice that no further attempt has been made to address our concerns regarding noise (operational ***not*** constructional) and at this point we would like to highlight that with the siting of the proposed turbine in an area below the level of our house, we would be in direct line with the upper half of the turbine i.e. the blades!. Therefore being in such close proximity (just 544m) to the proposed development, noise ***would*** be of significant concern.
This comes as no surprise as in our previous letters of objection we highlighted that our property (H7), although recognised as being the closest in proximity, has been ***completely*** omitted from the Visual Assessment documentation! There is no mention in any of the tables as to the impact the proposed development would have on ***our property.***

We therefore ***do not*** feel that the supporting documentation from the agent Locogen and the points in Mr McEwan's letter demonstrate that the proposed turbine can be adequately accommodated in the landscape without any detrimental effects on the amenity of the nearest households. And also with regards to guidelines set out in Angus Council's 'Strategic Landscape Capacity Assessment for Wind Energy in Angus (Nov.2013)' regarding size, scale and cumulative effect, clearly this proposal should ***not*** be given approval.

Yours sincerely,

Bruce Menzies
Susan Menzies

/01029/FULL Hillhead of Ascurry
notomontage: 77m EWT Directwind turbine, Ascurry Farm
stance :560m Viewpoint elevation: 154m Turbine elevation 145m
noto Canon 350D, 70mm
ewpoint location: NO 54042 46240

1029/FULL Hillhead of Ascurry
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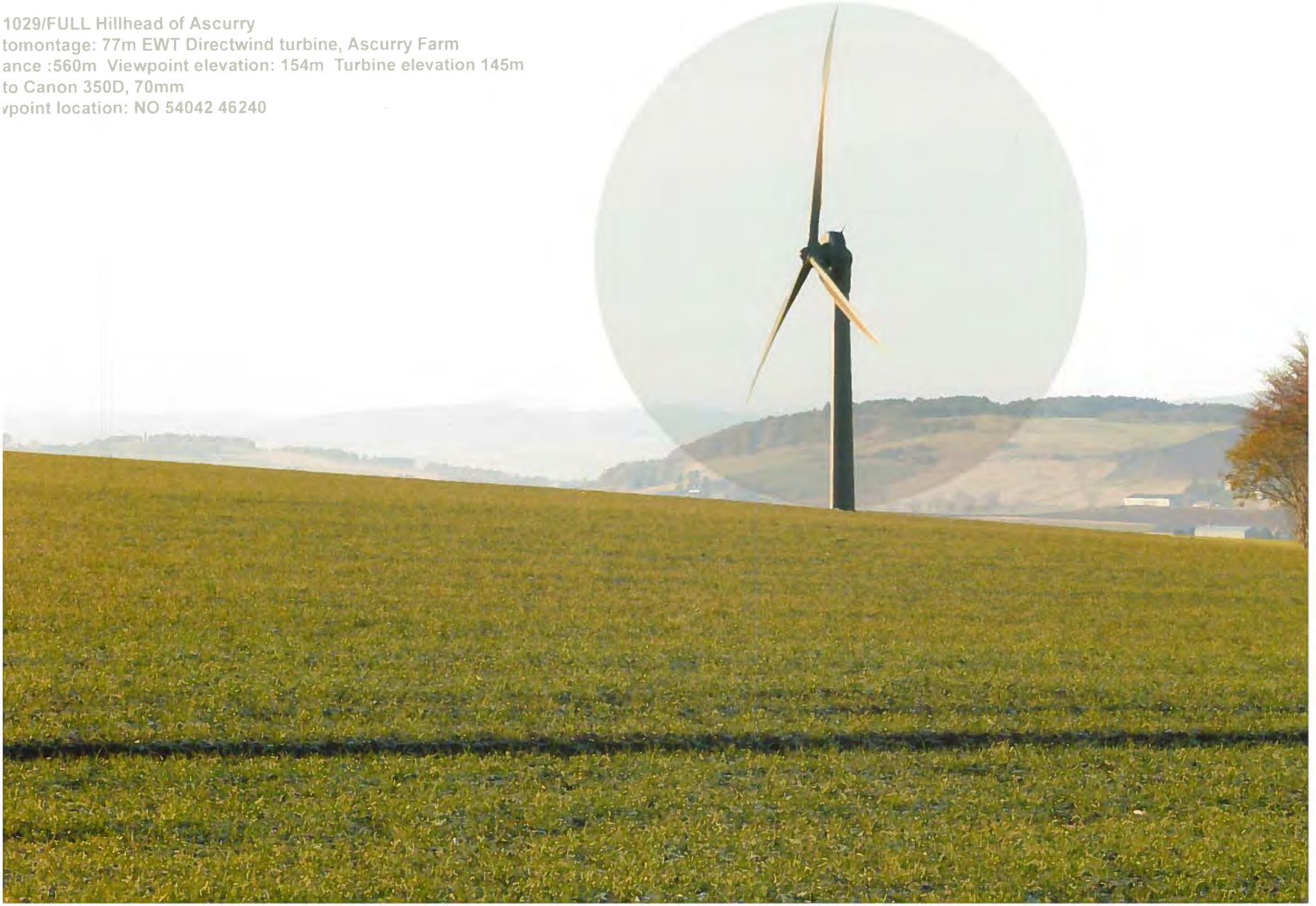


APPENDIX 4

APPLICANT'S RESPONSE TO FURTHER REPRESENTATIONS

Locogen Ltd
44 Constitution Street
Edinburgh, EH6 6RS

06/05/2014

Sarah Forsyth
Angus Council
Angus House
Orchardbank Business Park
Forfar
DD8 1AN

Dear Ms Forsyth,

13/01029/FULL (Non Determination) – Response to additional representations

With regard to the above appeal, I would like to address some of the comments raised by Mr & Mrs Menzies of Lewiston Cottage and Mr Andrew Vivers of Arniefoul.

Comments from Mr & Mrs Menzies

It is noted in the submitted response that there are alternative means of power generation which Mr and Mrs Menzies believe do not have such a significant impact on other people. As they mention, the Applicant is looking into solar photovoltaics at a nearby farm. If these panels are installed they will generate circa 84,000kWh of electricity. This electricity will primarily be used on site, enabling the Applicant to reduce their carbon emissions and energy bills, thus boosting the self-sufficiency of the farming business. However, as noted in the Supporting Environmental Document, the farming business spends circa £120,000 per annum on electricity. The solar panels will therefore generate enough electricity to satisfy 6-8% of the total electricity of the farm. The wind turbine will generate in the region of 1,650,000kWh per annum. This is almost 20 times the generation of the solar installation which the Applicant is considering, and will offset the large part of the remaining electricity usage across the farming business. To generate the same level of electricity through solar power would require a circa 2MW ground mounted solar farm, which would take up 10-12 acres of prime agricultural land out of arable rotation. This is 15-20 times the area of permanent hardstanding required for the proposed wind turbine.

With regard to the comments raised over the Scottish Government Reporter's quotations included within Mr McEwan's recently submitted letter, it is worthwhile including the whole of the relevant paragraph from the Reporter's decision letter for the Govals Wind Farm. The paragraph states:

> *"Of course, merely being able to see a wind farm or any other major development, should not normally be sufficient on its own to refuse them. There is no automatic right to a view or to have your prospect unchanged. At all of the locations we visited, the views of the turbines, often rotating, could be annoying to residents and might, to some, make the houses less pleasant places to live. That said, and although the turbines would be large objects in clear view, no house would be overshadowed or dwarfed by the turbines and principal views would not be blocked. In our opinion, no home would be so oppressed or dominated by the sight of turbines that they would be unattractive places to live and relatively few properties would suffer a significant loss of amenity."*

The nearest property to the Govals Wind Farm is 540m away. The nearest property to the Hillhead of Ascurry wind turbine is 544m away. For the avoidance of doubt, the Govals Wind Farm is an approved development, with the Reporter concluding the following:

> *"Taking all of the above reasoning together, we conclude that the proposed development would not unduly harm the landscape or the visual amenity of the area and would not unacceptably affect residential amenity at nearby properties. The limited harm we have found would be outweighed by the benefit of renewable energy generation and the other benefits of the scheme. The proposed development would accord with the development plan as a whole. We have taken into account all other matters raised but find that these are not sufficient to outweigh the development plan support for the proposed wind farm."*

It is also noted that the Govals Wind Farm is a 6 turbine development, whereas Mr McEwan is only seeking a single turbine installation.

Mr and Mrs Menzies have submitted a photomontage of the proposed wind turbine. Based on the grid reference supplied with the photomontage, the photograph has been taken from near the front door of the property, and at an angle of circa 40^{o} from the principal direction of view of the house. However, as none of the property's curtilage, nor the road, wall or fence is included within the photograph, it is also considered that this image has either been cropped accordingly, or taken from the field side of the wall, and therefore at a different grid reference to that stated. Based on the information provided, we can also calculate that the field of view is slightly over 18^{o}. As a standalone image this is not considered enough of a field of view to demonstrate the wider openness of the area.

In response to these comments, please find attached the following three images:

- Drawing HOA073, outlining the direction of view of the below two drawings;
- Drawing HOA074, facing the direction of Lewiston Cottage's view, with a field of view of 80^{o}. Images are provided at two different heights to demonstrate the view likely to be experienced by persons standing and sitting in the property, both pre and post-construction; and
- Drawing HOA075, taken in the direction of the turbine from a point on the public highway in front of Lewiston Cottage, with a field of view of 80^{o}.

It is noted that the turbine would be visible from the property's curtilage. From within the property however, the primary view would not be disrupted by the proposed turbine as it sits over 40^{o} from the main direction of view. These submitted visualisations have been prepared in line with national guidance. It is considered that the turbine is clearly in scale with the surrounding landforms.

Mr and Mrs Menzies also raise further concerns relating to noise and shadow flicker. It is felt that our Supported Environmental Document and the letter submitted to Angus Council dated 24th March 2014 should satisfy any concerns regarding the perceived impact of noise and shadow flicker. It is also noted that Angus Council's Environmental Health Officer has not objected to the proposal. In her response to the Case Officer, dated 18th November 2013, she states:

> *"I refer to the above application and can advise that I have visited the site and reviewed the information submitted which indicates that the proposed turbine does not exceed the recognised noise limit for this type of development. I would therefore, not object to this proposal."*

The Applicant is happy to adhere to the conditions suggested by the Environmental Health Officer in the same response.

Drawing again on the Reporter's decision notice for the Govals Wind Farm, it states the following:

> *"Other matters of concern raised by local residents and considered in the Environmental Statement include noise and shadow flicker. The Council's Environmental Health Service agrees that these can be controlled by planning conditions such that no harm would arise in terms of residential amenity."*

It is felt that this statement is also relevant here.

In summary, it is considered that none of the concerns raised by Mr and Mrs Menzies are suitably significant to inhibit the proposed development at Hillhead of Ascurry.

Comments from Mr A Vivers

Mr Vivers has raised concerns over the impact the Ark Hill Wind Farm is having on his health. These comments are not considered to be relevant to this proposal. Hillhead of Ascurry is circa 15km from Mr Vivers' property and is a single turbine development, as opposed to an 8 turbine development at Ark Hill. The wind turbine at Hillhead of Ascurry is also a quieter machine to those at Ark Hill. It is therefore considered that none of the health effects outlined in his representation would be exacerbated by the proposed development. As noted above, the Council's Environmental Health Officer has raised no objections to the proposal.

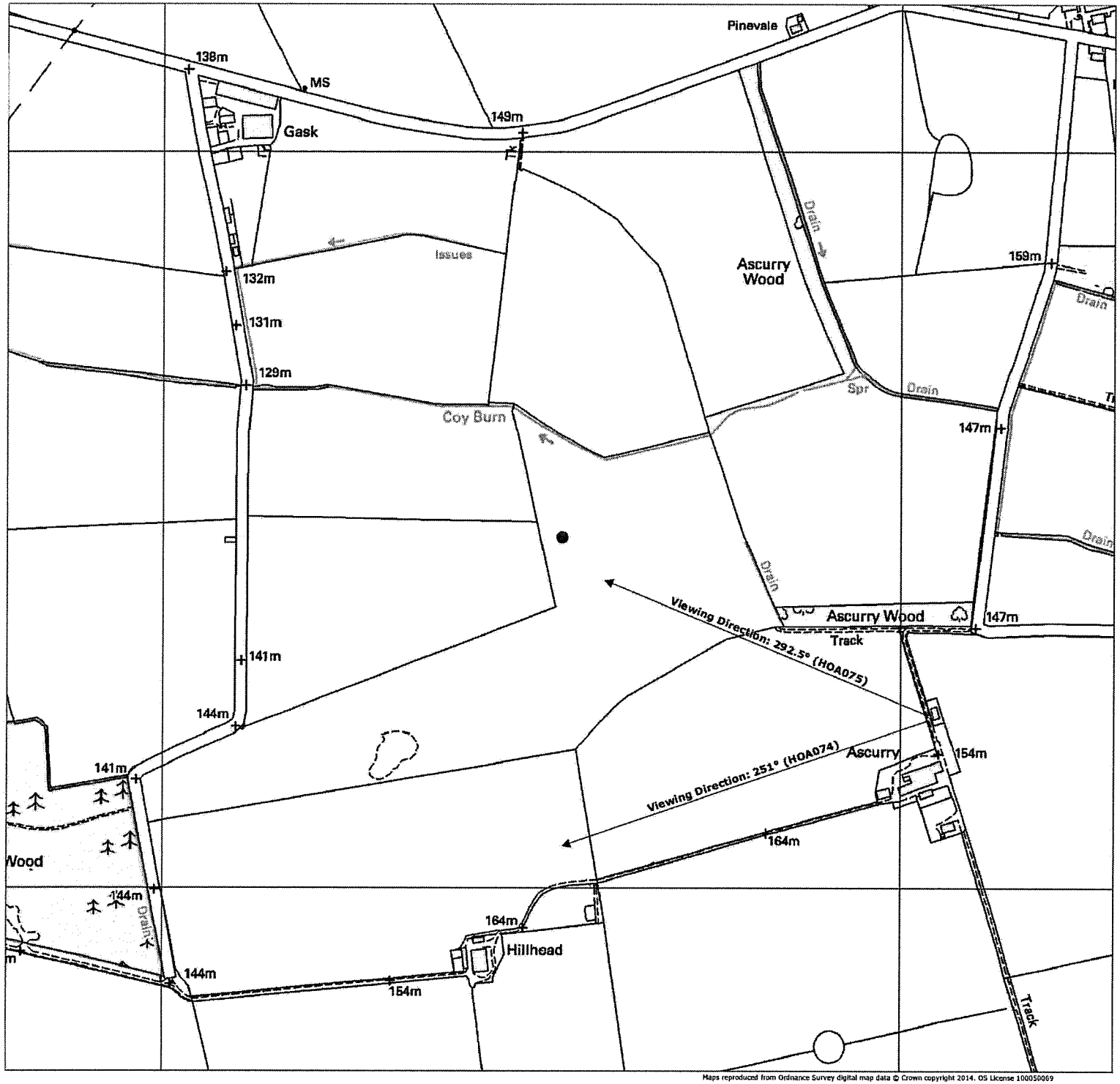
Mr Vivers has made a second representation. However it is considered that none of the comments raised in this response are directly relevant to the consideration of this appeal. Rather, they are complaints about the wider renewables industry in the UK.

It should also be noted here that Mr Vivers has objected to almost every wind turbine of this scale in Angus, Perth and Kinross, Fife and Aberdeenshire. As mentioned above, it is also important to note that he lives circa 15km away from the development. Although this does not preclude him from raising an objection, I would hope his comments would be given their due weighting.

I hope the above statements are clear, however we would be happy to make further representation to the Local Review Body, should they request it.

Yours sincerely,

Andy Lowe
Senior Wind Developer
Locogen Ltd.



Locogen Ltd, 44 Constitution St, Edinburgh, EH6 6RS
Tel: +44 (0) 131 555 4745; Email: info@locogen.com
Company Number: SC370060; VAT Number: 983 3836 77

Project Description

Number of Turbine(s):	1
Turbine Model:	EWT Directwind 54
Hub Height:	50m
Blade diameter:	54m
Total height to blade tip:	77m
Turbine location:	353539 746476

Notes

This drawing shows the direction of view of photomontages HOA074 and HOA075

Legend

View Direction

Turbine Location

PROJECT:	
DRAWING TITLE:	Lewiston Cottage viewing direction
DRAWING NO:	HOA073
DOCUMENT SIZE:	A3
SCALE:	1:5,000
DATE:	01/05/2014
DRAWING BY:	FG
APPROVED BY:	AL

N

0 100 200 300 400 m

Existing and post-construction view from Lewiston Cottage front door E354037 N746235 — 1.8m viewing

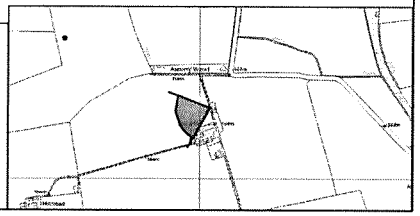
Existing and post-construction view from Lewiston Cottage from approximate location of living room window E354040 N746226 — 1.2m viewing height

Locogen Ltd, 44 Constitution St, Edinburgh, EH6 6RS
Tel:+44(0)131 624 8968;
Email: info@locogen.com
Company Number: SC370060

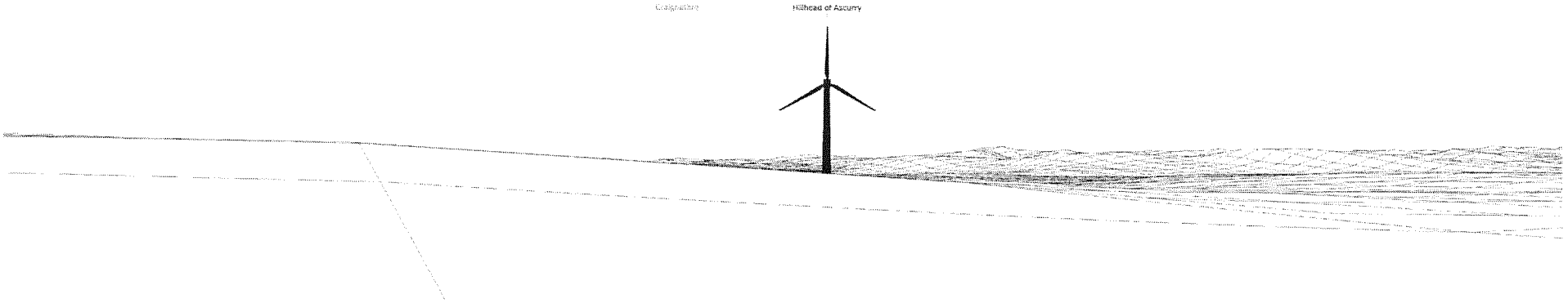
Project:	Hillhead of Ascurry
Drawing no:	HOA074
Drawing by:	Franco Giovanetti
Approved by:	Andy Lowe
OS Licence N°:	100050069

Viewpoint No:	VP13
Field of View:	80°
View direction:	251°
Dist to turbine:	0.54 km
Title:	Lewiston Cottage

Camera:	Nikon D60
Effective Focal Length:	50mm
Viewing Distance:	23.8 cm
Elevation:	1.8m
Date taken:	24/04/2014
Time taken:	16:25



Existing view from Lewiston Cottage



Computer generated wireframe showing proposed turbine in blue

Photomontage showing proposed development

Locogen Ltd, 44 Constitution St, Edinburgh, EH6 6RS
Tel:+44(0)131 624 8968;
Email: info@locogen.com
Company Number: SC370060

Project:	Hillhead of Ascurry
Drawing no:	HOA075
Drawing by:	Franco Giovanetti
Approved by:	Andy Lowe
OS Licence N°:	100050069

Viewpoint No:	VP13
Viewpoint Location:	E354037 N746235
Field of View:	80°
View direction:	292.5°
Dist to turbine:	0.54 km
Title:	Lewiston Cottage

Camera:	Nikon D60
Effective Focal Length:	50mm
Viewing Distance:	23.8 cm
Elevation:	1.8m
Date taken:	24/04/2014
Time taken:	16:20