

7 ORNITHOLOGY

7.1 Introduction

This chapter presents the ornithological survey and results and assesses the likely significant effects that the proposed wind farm and grid connection (the ‘Proposed Development’) may have on birds. Particular attention has been paid to species of ornithological importance. These include species with national and international protection under the Wildlife Acts 1979-2012 and the EU Birds Directive 2009/147/EC among other relevant legislation. Where potential effects are identified, mitigation is prescribed and residual impacts on avian receptors are assessed.

This chapter is supported by Technical Appendices 7.1 to 7.4, which contains the data from the surveys undertaken including full details of the survey times, weather conditions, surveyors and other relevant information together with the bird records themselves.

The chapter is structured as follows:

- The Introduction provides a description of the Proposed Development and the legislation, guidance and policy context regarding ornithology.
- This is followed by a comprehensive description of ornithological survey and impact assessment methodologies that were followed to inform the robust assessment of likely significant effects on avian receptors.
- A description of the Baseline Ornithological Conditions and Receptor Evaluation is then provided. This is followed by an Assessment of Effects, which as per SNH Guidance (2014), includes direct habitat loss, displacement and death from collision. Effects are described with regard to each phase of the Proposed Development: construction phase, operational phase and decommissioning. Potential cumulative effects in combination with other plans and projects are fully assessed.
- Proposed mitigation and best practice measures to ameliorate the identified effects are described and discussed. This is followed by an assessment of residual effects taking into consideration the effect of the proposed mitigation and best practice measures.
- The conclusion provides a summary statement on the overall significance of predicted effects on ornithology

The following defines terms used in this chapter:

- “Key Ornithological Receptor” (KOR) is defined as a species occurring within the zone of influence of the development upon which likely significant effects are anticipated and assessed.
- “Zones of Influence” (ZOI) for individual ornithological receptors refers to the zone within which potential effects are anticipated ZOIs were assigned following best available guidance (SNH 2016 and McGuinness et.al 2015).

7.1.1 Proposed Development Description

The full development description is provided in Chapter 4 of the EIAR. The Proposed Development comprises the construction of a wind farm comprising 19 wind turbines and all associated works. The proposed turbines will have a maximum blade tip height of up to 156.5 metres. The application is seeking a 30-year planning permission. The

full description of the Proposed Development, as per the public planning notices, is as follows:

- I. Up to 19 no. wind turbines with a generating capacity in excess of 50MW, maximum overall ground to blade tip height of up to 156.5 metres;
- II. 1 no. permanent Meteorological Mast up to a maximum height of 110 metres;
- III. 1 no. 110kV Electrical substation with 2 no. control buildings with welfare facilities, associated electrical plant and equipment, security fencing and waste water holding tank;
- IV. Internal wind farm underground cabling;
- V. 110kV underground grid connection cabling;
- VI. Upgrade of access junctions;
- VII. Upgrade of existing tracks, roads and provision of new site access roads and hardstand areas;
- VIII. 3 no. borrow pits;
- IX. 2 no. temporary construction compounds;
- X. Recreation and amenity works, including marked trails (upgrade of existing tracks and provision of new tracks), picnic, amenity and play areas, car parking and vehicular access;
- XI. Site drainage;
- XII. Forestry Felling;
- XIII. Permanent signage;
- XIV. All associated site development and ancillary works

7.1.2 Legislation, Guidance and Policy Context

This EIAR is prepared in accordance with the requirements of the 2011 EIA Directive as amended by EIA Directive 2014/52/EU.

The following are the key legislative provisions applicable to habitats and fauna in Ireland:

- Irish Wildlife Act 1976 to 2012
- The European Communities (Birds and Natural Habitats) Regulations 2011 (transposes EU Birds Directive 2009/147/EC and EU Habitats Directive 2009/147/EC, 92/43/EC)
- The International Convention on Wetlands of International Importance 1971.

In the absence of specific National Irish Ornithological Survey Guidance, the guidance documents published by Scottish Natural Heritage (SNH) have been followed to inform this assessment:

- SNH (2014). *Recommended bird survey methods to inform impact assessment of onshore wind farms*. Scottish Natural Heritage.
- SNH (2016) *Avoidance rate information & guidance note: Use of avoidance rates in the SNH wind farm collision risk model*. Scottish Natural Heritage, Edinburgh, UK. <http://www.snh.gov.uk/docs/B721137.pdf> [accessed 08 Aug 2013].
- SNH (2016). *Assessing Connectivity with Special Protection Areas (SPAs)*. Scottish Natural Heritage.
- SNH (2012). *Assessing the Cumulative Impact of Onshore Wind Energy Developments*. Scottish Natural Heritage.
- SNH (2006). *Assessing Significance of Impacts from Onshore Windfarms on Birds Outwith Designated Sites*. Scottish Natural Heritage.

- SNH (2009). *Monitoring the impact of onshore wind farms on birds*. Scottish Natural Heritage.
- SNH (2000). *Wind farms and birds: calculating a theoretical collision risk assuming no avoidance action*. SNH Guidance Note.

The following Irish Guidance documents were also consulted:

- Percival, S.M. (2003). *Birds and wind farms in Ireland: A review of potential issues and impact assessment*. Ecological Consulting.
- McGuinness, D., Muldoon, C., Tierney, N., Cummins, S., Murray, A., Egan, S. & Crowe, O. (2015). *Bird Sensitivity Mapping for Wind Energy Developments and Associated Infrastructure in the Republic of Ireland*. Guidance Document. Birdwatch Ireland.
- Birds of Conservation Concern in Ireland 2014-2019 (Colhoun, K. and Cummins, S. 2013).

This assessment has been prepared with respect to the various planning policies and strategy guidance documents listed below:

- Planning and Development Acts 2000 - 2015
- Donegal County Council (2014). County Donegal Development Plan 2012 – 2018.
- EPA (2017). *Draft revised guidelines on the information to be contained in Environmental Impact Statements*. Environmental Protection Agency.
- DoEHLG (2013). *Guidelines for Planning Authorities and An Bord Pleanála on Carrying out Environmental Impact Assessment*. Department of the Environment, Community and Local Government (where relevant).
- European Commission (2011). *Wind energy development and Natura 2000*. Guidance document.
- EPA (2003). *Advice notes on current practice (in the preparation of Environmental Impact Statements)* (where relevant).
- EPA (2002). *Guidelines on the information to be contained in Environmental Impact Statements*. Environmental Protection Agency (where relevant).
- NRA (2009). *Guidelines for Assessment of Ecological Impacts of National Road Schemes (Revision 2)*. National Roads Authority.
- European Commission (2002). *Assessment of plans and projects significantly affecting Natura 2000 sites*

7.1.3 Statement of Authority and Competence

This ornithology chapter has been prepared by Mr. John Hynes (BSc, MSc) with the assistance of Mr Stephen Corrigan (BSc.) ecologists with McCarthy Keville O’Sullivan Ltd. (MKO). Both are suitably qualified competent professional ecologists with extensive experience of completing avifaunal assessments and are competent experts for the purposes of the preparation of this EIAR.

Field surveys were undertaken by Alan Dunne, Alan Lauder & Collin Gallagher (Alan Lauder Consulting), Andrew O’Donoghue (BSc.). Anthony Robb, Barbara McInerney, Chris Peppiatt (PhD), Donnacha McGeever, Harry Hussey (BSc), Joe Kelly (BSc.) Kate Bismilla, Pdraig Cregg, (M.Sc.), Rob Wheeldon and Tom Ryan (B.Sc.) All the above surveyors are competent experts for the purposes of the preparation of this EIAR and suitably qualified to complete the bird survey work, analysis and assessment of the likely effects that is included in this chapter of the EIAR. CVs for the authors of this report are provided in Appendix 7.5 of the EIAR.

7.2 Assessment Approach and Methodology

7.2.1 Desk Study

A comprehensive desk study was undertaken to search for any relevant information on species of conservation concern which may potentially make use of the study area. The assessment included a thorough review of the available ornithological data including:

- Review of online web-mappers: National Parks and Wildlife Service (NPWS), National Biodiversity Data Centre (NBDC), Irish Wetland Bird Survey I-WeBS.
- Review of Bird Atlases: (Sharrock, 1976; Lack, 1986; Gibbons et al., 1993; Balmer et al., 2013).
- Review of Birds of Conservation Concern (BoCCI) in Ireland 2014-2019 (Colhoun & Cummins, 2013)
- Review of specially requested records from the NPWS Rare and Protected Species Database.
- Review of impact assessments associated with nearby developments including wind farms

7.2.2 Consultation

7.2.2.1 Scoping and Consultation

Consultation was undertaken with the relevant statutory and non-statutory organisations in the Republic of Ireland and Northern Ireland as part of the EIAR scoping to inform the current assessment

Section 2.6.2 of Chapter 2 of this EIAR provides a list of the organisations consulted with regard to Ornithology during the scoping process, and notes where scoping responses were received.

Copies of all scoping responses are included in Appendix 2.1 of this EIAR. The recommendations of the consultees have informed the EIAR preparation process and the contents of this chapter. Table 2.3 in Chapter 2 of this EIAR describes where the comments raised in the scoping responses received have been addressed in this assessment.

Table 6.1 Scoping Response Summary

No.	Consultee	Response to Consultation
Republic of Ireland		
1	An Taisce	No response to date
2	BirdWatch Ireland	No response to date
3	Department of Agriculture, Food and the Marine	No response to date
4	Department of Arts, Heritage, Regional, Rural and Gaeltacht Affairs	Response received on 9 th January 2017 and 3 rd February 2017
5	Department of Communications, Climate Action & Environment	No response to date

No.	Consultee	Response to Consultation
Republic of Ireland		
6	Donegal County Council Environment Section	No response to date
7	Inland Fisheries Ireland	Response received on 8 th December 2016
8	Irish Peatland Conservation Council	Response received on 15 th December 2016
9	Irish Raptor Study Group	No response to date
10	Irish Red Grouse Association	No response to date
11	Irish Wildlife Trust	No response to date
12	The Heritage Council	No response to date
Northern Ireland		
	Derry City and Strabane District Council	Response received on 18 th May 2017
	NIEA – DAERA – Planning response team	Response received on 22 nd March 2017
	NI Water – Windfarms / strategic applications	Response received on 30 th January 2017
	Rivers Agency – Planning Advisory Unit	Response received on 27 th January 2017
	Royal Society for the Protection of Birds (RSPB)	Response received on 27 th January 2017

7.2.2.2 Pre-planning Meeting with the NPWS

On the 14th of February 2017 the project team held a pre-planning meeting with Louise McAlavey, Tim Roderick and Carl Byrne Boyle of the NPWS at their office in Boyle County Roscommon. The NPWS informed the project team that the proposed windfarm site was located in a non-designated regionally importance area for Hen Harrier and presented information from a non-published post hoc analysis report of the 2015 Irish Hen Harrier survey. It was recommended by the NPWS to submit a formal request for the unpublished report and records of hen harrier from the area. This was undertaken and the data received is included in the Desk Study.

7.2.3 Identification of Target Species and Key Ornithological Receptors

- The methodology for assessment followed a precautionary screening approach with regard to the identification of Key Ornithological Receptors. Following a comprehensive desk study, initial site visits and consultation, a list of “Target species” likely to occur in the zone of influence of the Proposed Development was derived. The observation/survey work carried out on the site was specifically designed to survey for these identified target species in accordance with SNH guidance (2014). The target species list (see Appendix 7.1) was drawn from:
 - Annex I of the Birds Directive
 - Special Conservation Interests (SCI) of Special Protection Areas (SPA) within the zone of likely significant effects

- Species protected under the fourth schedule of the Wildlife Acts 1976-2012
- Red and Amber listed birds of Conservation Concern

- Following analysis of the collated bird survey data, it was possible to sift the list of Target species to identify “**Key Ornithological Receptors**” and exclude species which were not recorded during the extensive surveys and those for which pathways for significant effect could not be identified.

7.2.4 Field Surveys

This section of the report describes the criteria used for the selection of target species; the various field survey methodologies employed and survey rationale for the various survey methods employed. Field surveys were undertaken during the survey period 2015-2017. The data provided in this report is robust and allows clear, precise and definitive conclusions to be made on the avian receptors identified within the subject site. Field survey methodologies have been devised to survey for the bird species composition and assemblages that occur within the study area.

7.2.4.1 Initial Site Assessment

Based on the results of the desk study, consultation and reconnaissance site visits, the likely importance of the study area for bird species was ascertained. Based on the collated information available from the above preliminary assessment and adopting a precautionary approach, a site-specific scope for the ornithological survey was developed.

7.2.4.2 Survey Season 2015-2017

The survey work undertaken between April 2015 and September 2017 forms the core dataset for the assessment of effects on ornithology.

In the absence of specific national bird survey guidelines the ornithological surveys were designed and undertaken in full accordance with *Survey methods for use in assessing the impacts of onshore windfarms on bird communities* (SNH, 2014).

The various survey types undertaken are described below.






7.2.4.3 Vantage Point Survey

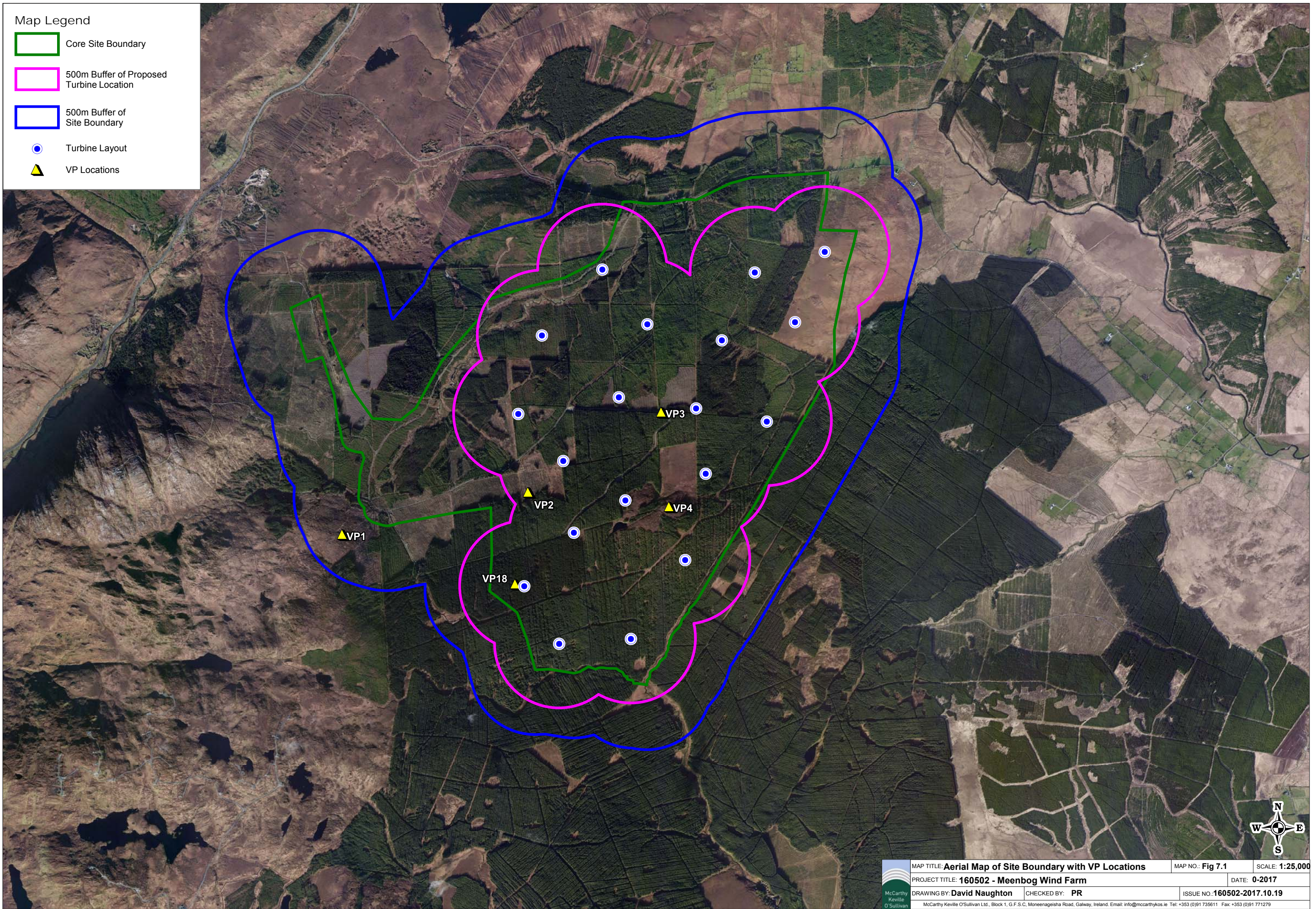
Vantage point surveys were undertaken in accordance with SNH guidance from April 2015 to September 2017. Initially four fixed point vantage points were utilised (VPs 1-4). However due to a design change in May 2016 an extra VP (VP 18) was added to allow comprehensive coverage of the study area.

Data on bird observations and flight activity was collected from a scanning arc of 180° and a 2km radius by an observer at each fixed location for six hours per month. Due to weather constraints, some surveys may have to end early. Surveys were orientated to provide a spread over the full daylight period including dawn and dusk watches to coincide with the highest periods of bird activity. Target species were as per listed in Table 1 of Appendix 7.1.

Survey effort for vantage point watches is presented in Appendix 7.2, Table 1. This includes full details of dates, times, survey locations, survey duration and weather conditions for each survey. Table 7.1 below shows a summary of the VP survey work undertaken. Figure 7.1 shows the locations of vantage points.

Map Legend

-  Core Site Boundary
-  500m Buffer of Proposed Turbine Location
-  500m Buffer of Site Boundary
-  Turbine Layout
-  VP Locations




	MAP TITLE: Aerial Map of Site Boundary with VP Locations	MAP NO.: Fig 7.1	SCALE: 1:25,000
	PROJECT TITLE: 160502 - Meenbog Wind Farm		DATE: 0-2017
	DRAWING BY: David Naughton	CHECKED BY: PR	ISSUE NO.: 160502-2017.10.19
	McCarthy Keville O'Sullivan Ltd., Block 1, G.F.S.C. Moneenageisha Road, Galway, Ireland. Email: info@mccarthynos.ie Tel: +353 (0)91 735611 Fax: +353 (0)91 771279		

Table 7.1 VP Survey Effort Summary

VPs	Months	Minimum Effort/month
2015 Breeding Season (4VPs)	Apr-Sep	6 hours/VP/month
2015/2016 Non-Breeding Season (4VPs)	Oct-Mar	6 hours/VP/month
2016 Breeding Season (5VPs)	Apr-Sep	6 hours/VP/month
2016/2017 Non-Breeding Season (5VPs)	Oct-Mar	6 hours/VP/month
2017 Breeding Season (5VPs)	Apr-Sep	6 hours/VP/month

Observed flight activity was recorded as per defined flight bands which were chosen in relation to the dimensions of proposed turbine models for the site. Bands were split into 0-10m, 10-25m, 25m-175m and 175m+. The band 25-175m is considered potential collision height (PCH).

Each flight observation was assigned a unique identifier and mapped using GIS technology.

Viewshed Analysis





Viewshed analysis was carried out to inform coverage of the study area from fixed vantage point locations (VPs 1, 2, 3, 4, & 18). Viewsheds were calculated using Resoft Wind Farm ZTV (Zone of Theoretical Visibility) software in combination with Mapinfo Professional (Version 10.0) using a notional layer suspended at 30.05m, which represents the potential lowermost height passed through by the rotor blade tips used in the current assessment. While the relevance of being able to view as much of the site to ground level is acknowledged, the SNH guidance emphasises the importance of visibility of the ‘collision risk volume’ when the data is to be used to estimate the risk of collision with turbines by birds.

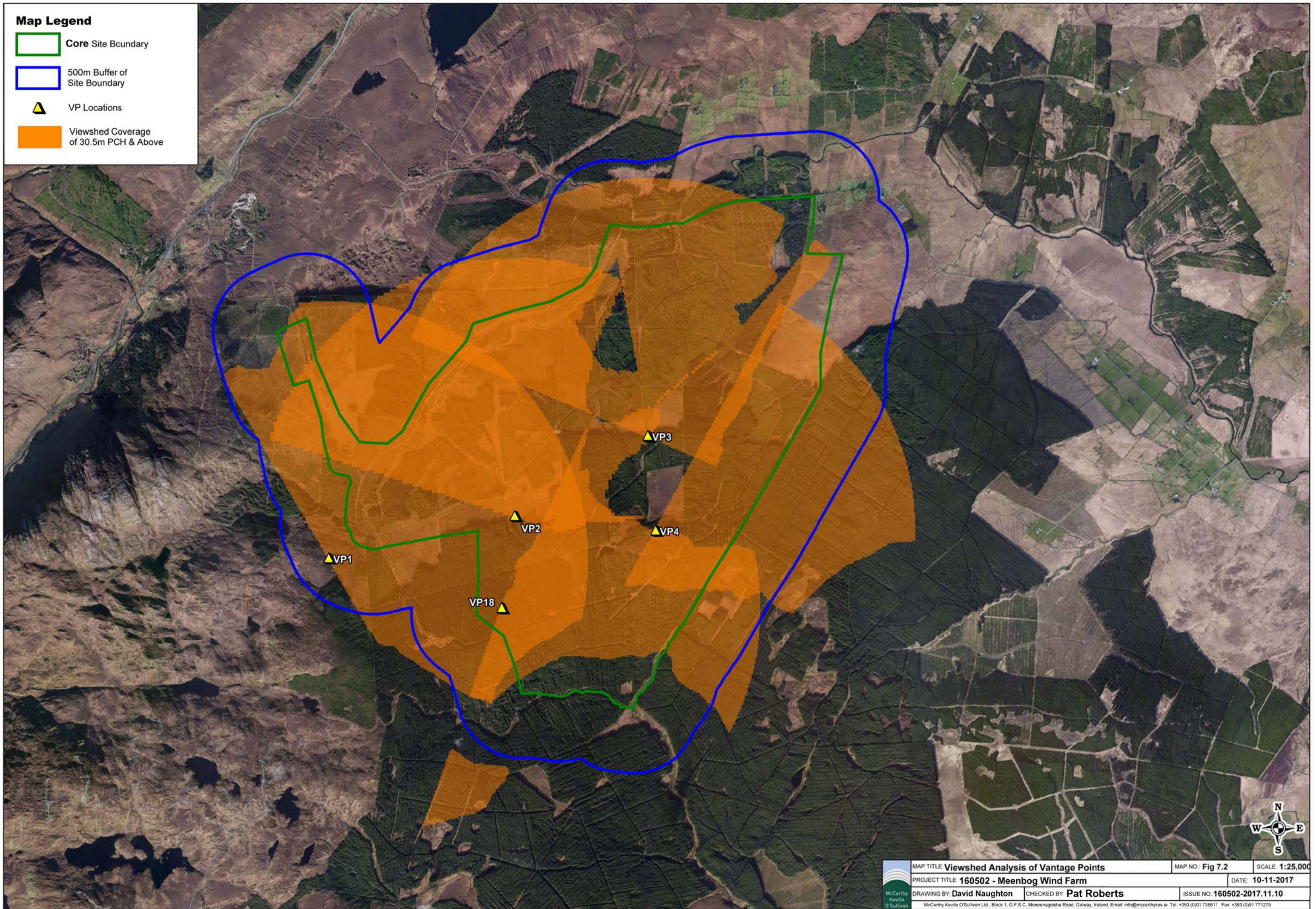
The viewshed analysis involved testing each VP location for its visibility coverage by creating a view shed point two metres in height (to represent the height of observer) on a map using 10 metre contours terrain data. The relative height of forestry and its effects on visibility is also accounted for. Using the ZTV software, a viewshed of 360 degrees was produced calculating an area 10 metres from ground level up to a 2km radius. The resulting viewshed image was then cropped to 180 degrees to give the viewshed from each VP location in line with SNH (2014). A 500m buffer was applied to the outer most turbines of the proposed wind farm development in line with SNH (2014). The viewshed analysis offers maximum views of the study area with adequate coverage of the proposed turbine layout. The visible view sheds are presented on Figures 7.2a to 7.2 e

Barnesmore Gap Commuting/Migratory Bird VP

Based on the results of the desk study, consultation and reconnaissance site visits, the Barnesmore Gap was identified as a potential commuting/migratory corridor for bird species. Watches at this VP were undertaken from October 2015 to September 2017. Figure 7.3 shows the location of vantage point. Survey effort for vantage point watches is presented in Appendix 7.2, Table 2. This includes full details of dates, times, survey locations, survey duration and weather conditions for each survey





Map Legend

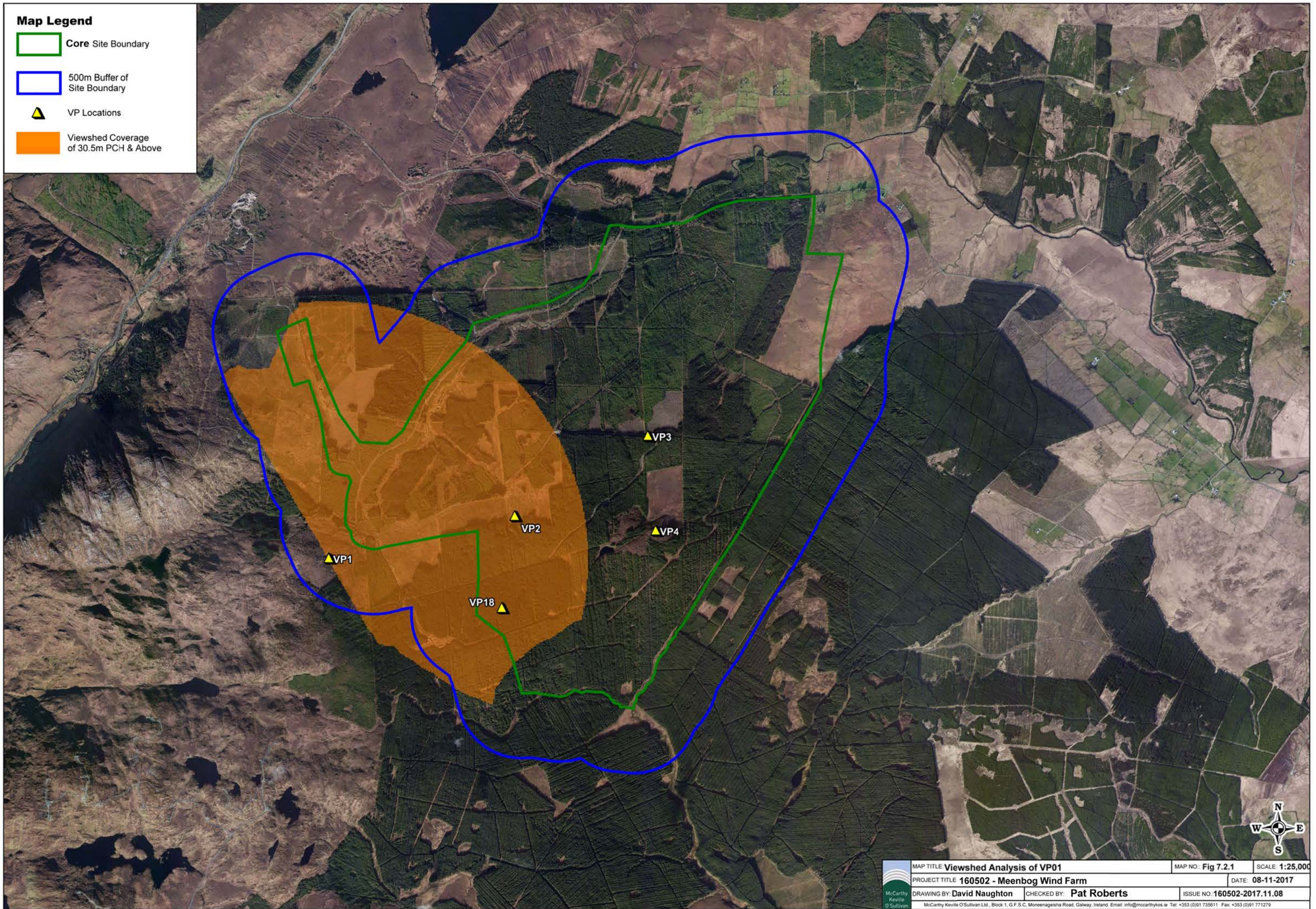
-  Core Site Boundary
-  500m Buffer of Site Boundary
-  VP Locations
-  Viewshed Coverage of 30.5m PCH & Above



	MAP TITLE: Viewshed Analysis of Vantage Points	MAP NO.: Fig 7.2	SCALE: 1:25,000
	PROJECT TITLE: 160502 - Meenbog Wind Farm		DATE: 10-11-2017
	DRAWING BY: David Naughton	CHECKED BY: Pat Roberts	ISSUE NO.: 160502-2017.11.10
	<small>McCarthy Keville O'Sullivan Ltd, Block 1, G.F.S.C. Moneenagesha Road, Galway, Ireland. Email: info@mcCarthykos.ie Tel: +353 (0)91 735611 Fax: +353 (0)91 771279</small>		





Map Legend

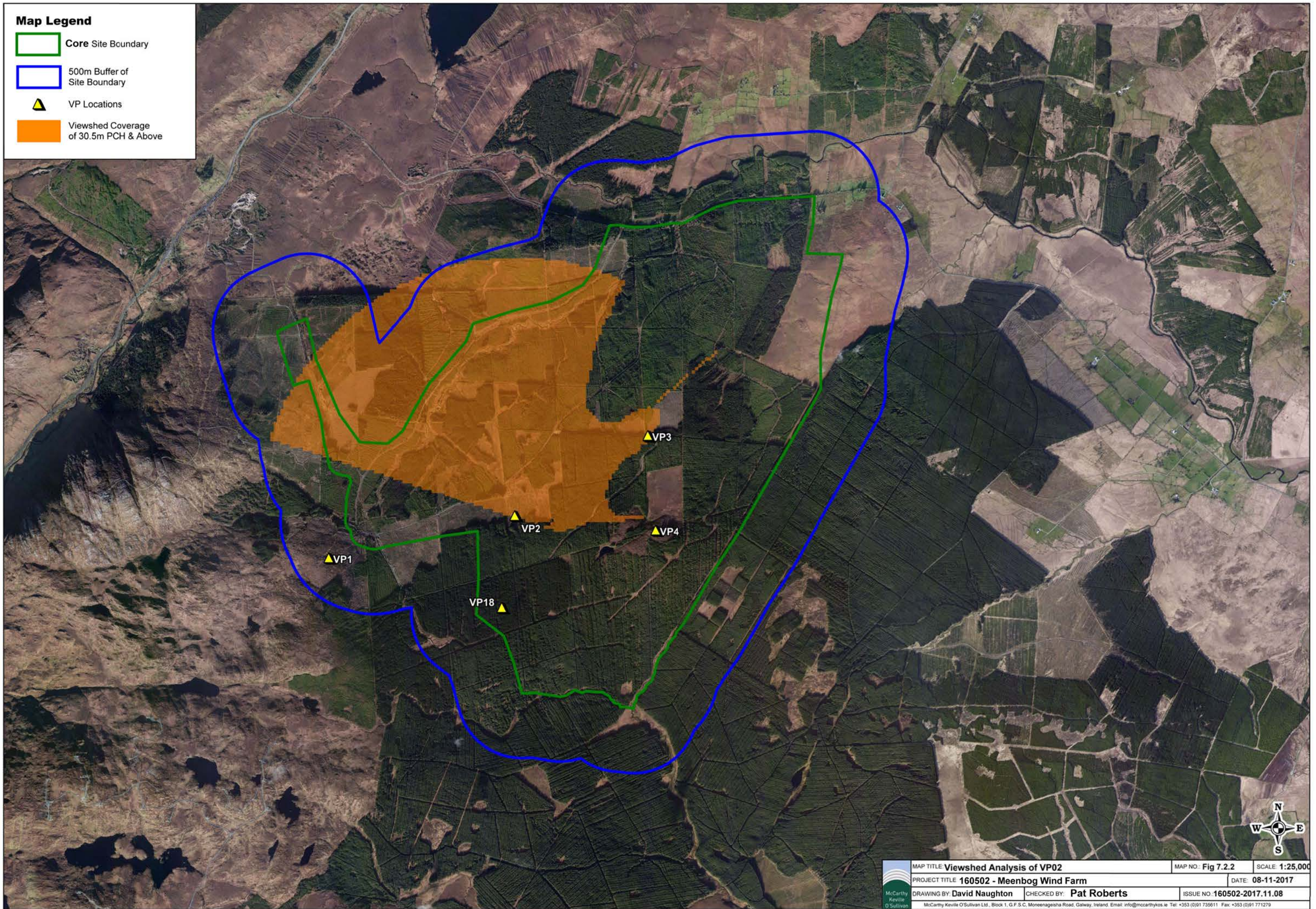
-  Core Site Boundary
-  500m Buffer of Site Boundary
-  VP Locations
-  Viewshed Coverage of 30.5m PCH & Above



	MAP TITLE: Viewshed Analysis of VP01	MAP NO.: Fig 7.2.1	SCALE: 1:25,000
	PROJECT TITLE: 160502 - Meenbog Wind Farm		DATE: 08-11-2017
	DRAWING BY: David Naughton	CHECKED BY: Pat Roberts	ISSUE NO: 160502-2017.11.08
	<small>McCarthy Keville O'Sullivan Ltd. Block 1, G.F.S.C. Moneenagesha Road, Galway, Ireland. Email: info@mcCarthykos.ie Tel: +353 (0)01 735611 Fax: +353 (0)91 771279</small>		





Map Legend

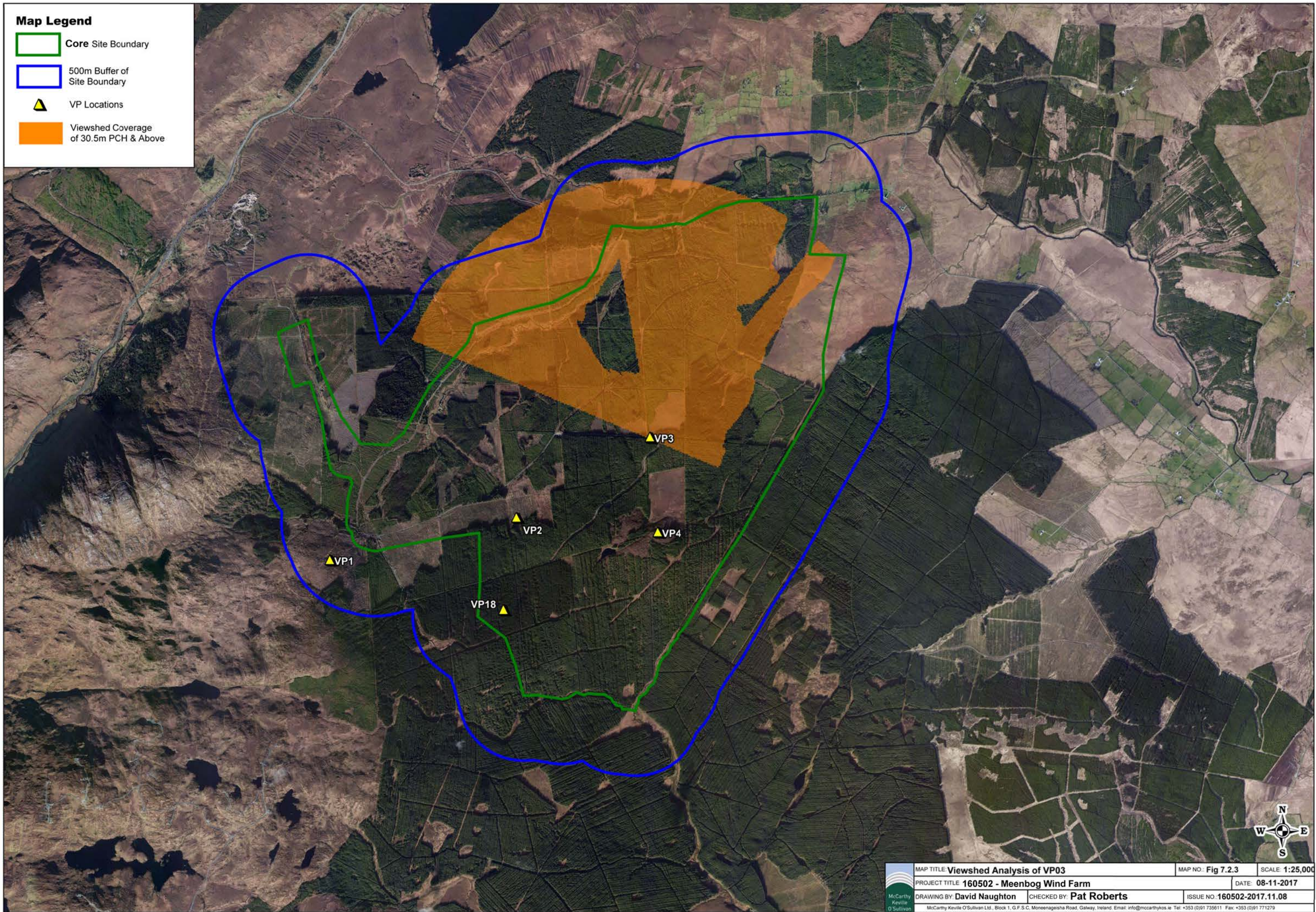
-  Core Site Boundary
-  500m Buffer of Site Boundary
-  VP Locations
-  Viewshed Coverage of 30.5m PCH & Above




	MAP TITLE: Viewshed Analysis of VP02	MAP NO.: Fig 7.2.2	SCALE: 1:25,000
	PROJECT TITLE: 160502 - Meenbog Wind Farm		DATE: 08-11-2017
	DRAWING BY: David Naughton	CHECKED BY: Pat Roberts	ISSUE NO: 160502-2017.11.08
	<small>McCarthy Keville O'Sullivan Ltd. Block 1, G.F.S.C. Moneenagesha Road, Galway, Ireland. Email: info@mcCarthykos.ie Tel: +353 (0)91 735611 Fax: +353 (0)91 771279</small>		





Map Legend

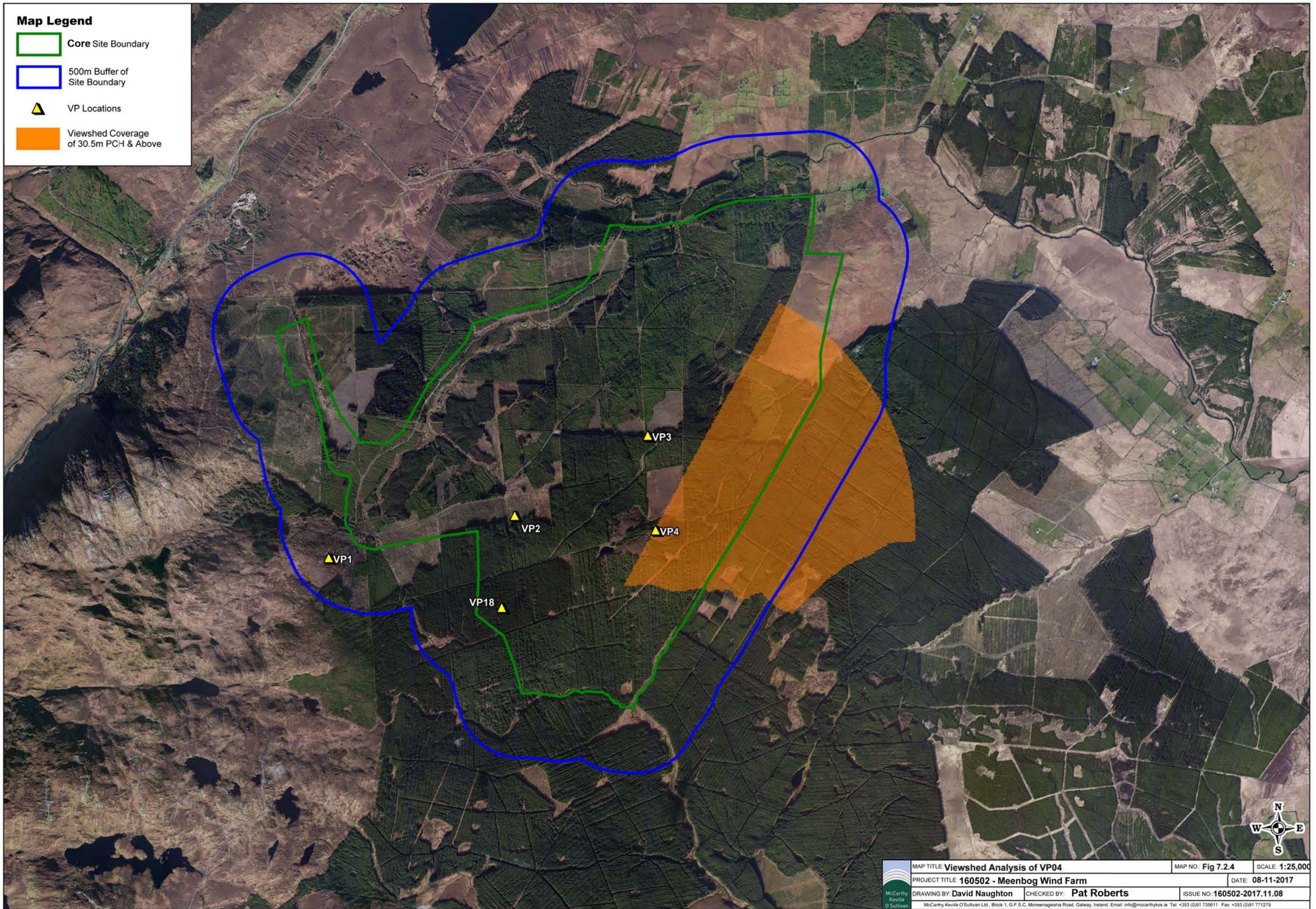
-  Core Site Boundary
-  500m Buffer of Site Boundary
-  VP Locations
-  Viewshed Coverage of 30.5m PCH & Above



	MAP TITLE: Viewshed Analysis of VP03	MAP NO.: Fig 7.2.3	SCALE: 1:25,000
	PROJECT TITLE: 160502 - Meenbog Wind Farm		DATE: 08-11-2017
	DRAWING BY: David Naughton	CHECKED BY: Pat Roberts	ISSUE NO: 160502-2017.11.08
	<small>McCarthy Keville O'Sullivan Ltd, Block 1, G.F.S.C. Moneenagesha Road, Galway, Ireland. Email: info@mcCarthykos.ie Tel: +353 (0)01 735611 Fax: +353 (0)91 771279</small>		





Map Legend

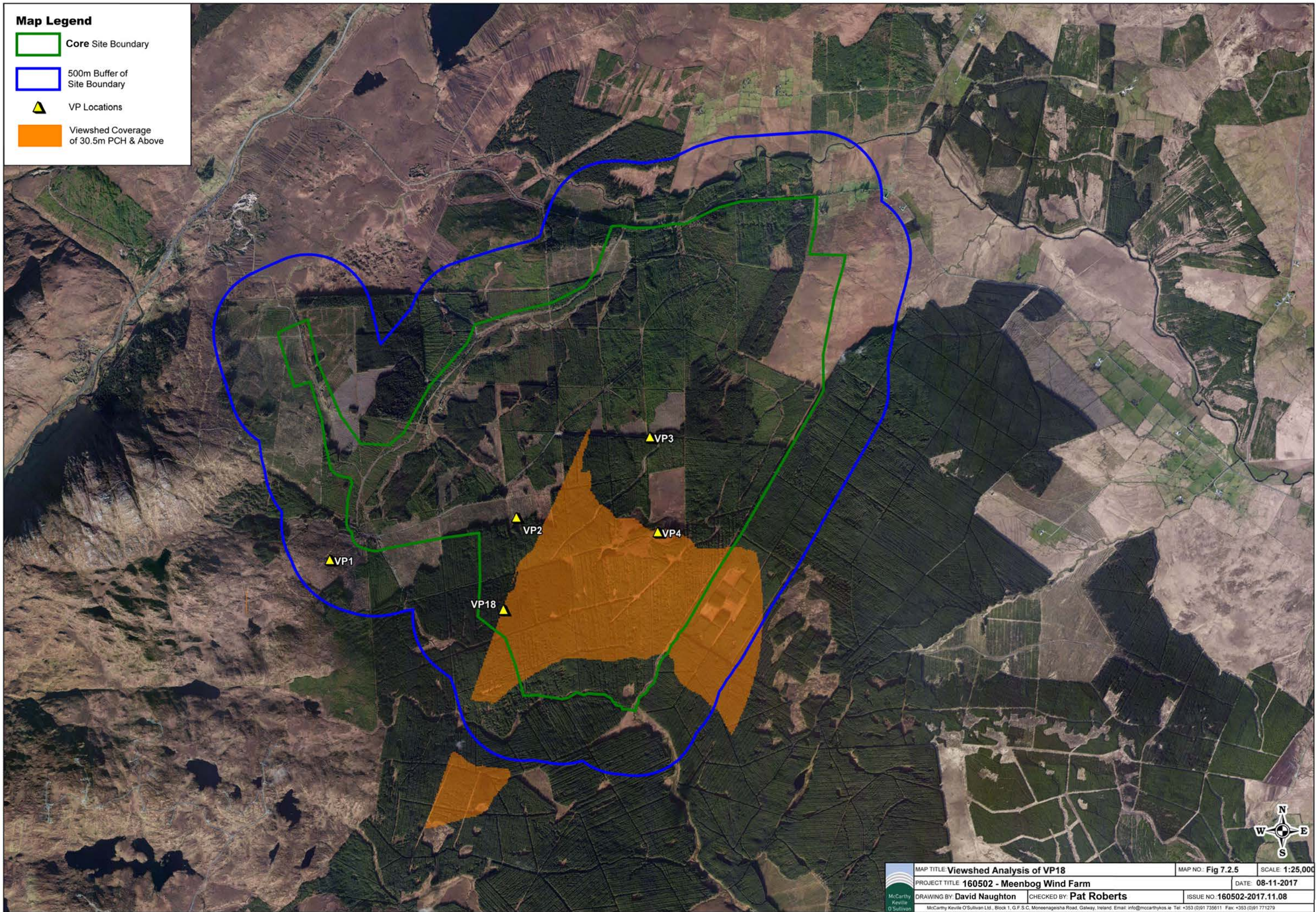
-  Core Site Boundary
-  500m Buffer of Site Boundary
-  VP Locations
-  Viewshed Coverage of 30.5m PCH & Above



	MAP TITLE: Viewshed Analysis of VP04	MAP NO.: Fig 7.2.4	SCALE: 1:25,000
	PROJECT TITLE: 160502 - Meenbog Wind Farm		DATE: 08-11-2017
	DRAWING BY: David Naughton	CHECKED BY: Pat Roberts	ISSUE NO: 160502-2017.11.08
	<small>McCarthy Keville O'Sullivan Ltd. Block 1, G.F.S.C. Moneenagesha Road, Galway, Ireland. Email: info@mcCarthykos.ie Tel: +353 (0)01 735611 Fax: +353 (0)91 771279</small>		





Map Legend

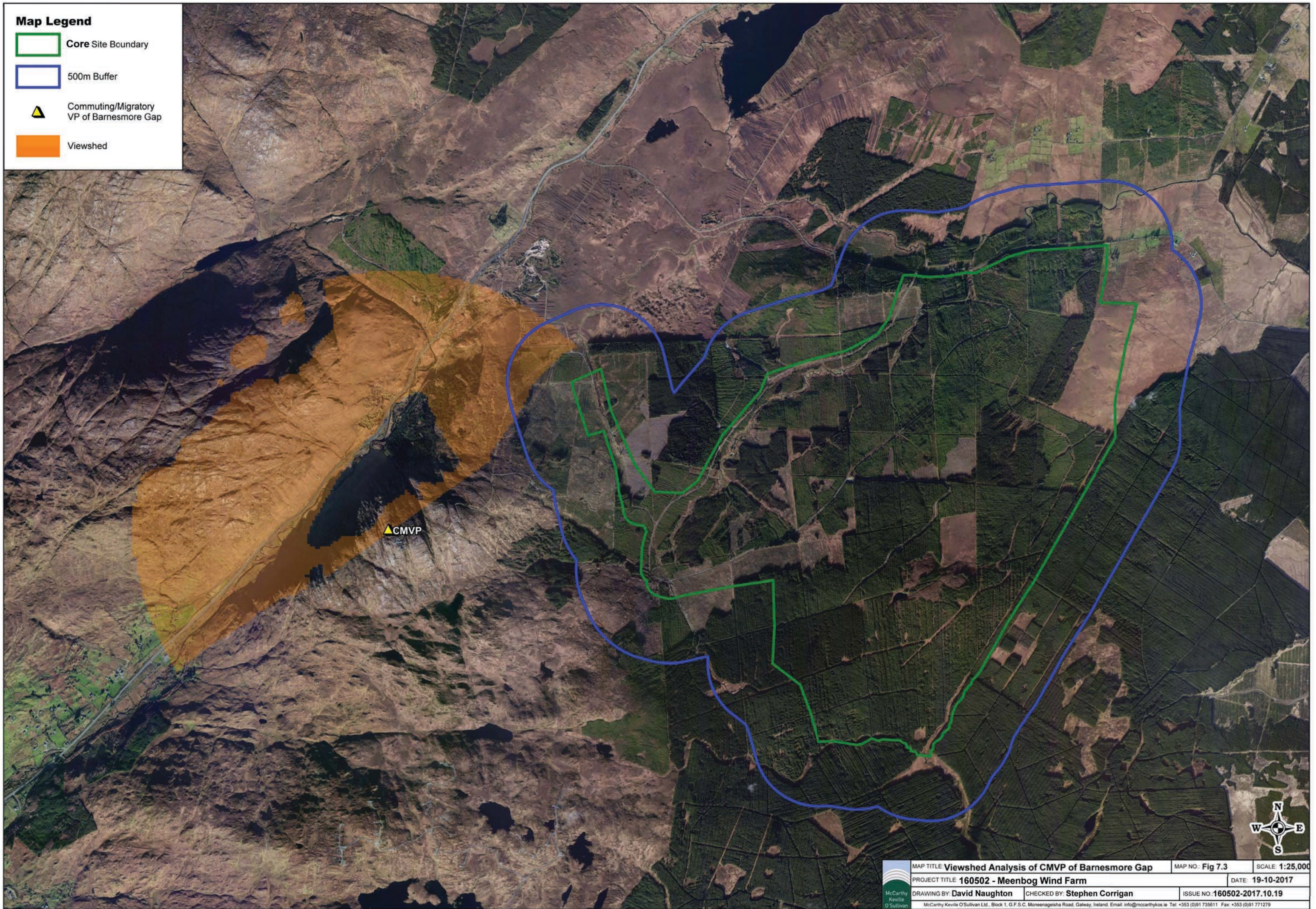
-  Core Site Boundary
-  500m Buffer of Site Boundary
-  VP Locations
-  Viewshed Coverage of 30.5m PCH & Above



	MAP TITLE: Viewshed Analysis of VP18	MAP NO.: Fig 7.2.5	SCALE: 1:25,000
	PROJECT TITLE: 160502 - Meenbog Wind Farm		DATE: 08-11-2017
	DRAWING BY: David Naughton	CHECKED BY: Pat Roberts	ISSUE NO: 160502-2017.11.08
	<small>McCarthy Keville O'Sullivan Ltd, Block 1, G.F.S.C. Moneenagesha Road, Galway, Ireland. Email: info@mcCarthykos.ie Tel: +353 (0)01 735611 Fax: +353 (0)91 771279</small>		

Map Legend

-  Core Site Boundary
-  500m Buffer
-  Commuting/Migratory VP of Barnesmore Gap
-  Viewshed



MAP TITLE: Viewshed Analysis of CMVP of Barnesmore Gap	MAP NO: Fig 7.3	SCALE: 1:25,000
PROJECT TITLE: 160502 - Meenbog Wind Farm	DATE: 19-10-2017	
DRAWING BY: David Naughton	CHECKED BY: Stephen Corrigan	ISSUE NO: 160502-2017.10.19
<small>McCarthy Keville O'Sullivan McCarthy Keville O'Sullivan Ltd. Block 1, G.F.S.C. Moneenageisha Road, Galway, Ireland. Email: info@mcCarthykos.ie Tel: +353 (0)91 735611 Fax: +353 (0)91 771279</small>		

Data from this VP was not be used to inform the collision risk modelling analysis as its function was to supplement information on bird species, their movements and distribution within the wider area.

7.2.4.4 Breeding Birds (Quadrat/Walkover Survey)

Surveys were conducted following the O'Brien and Smith methods in 2015 and 2017. Quadrat surveys following methodology adapted from Brown and Shepherd (1993) and SNH (2014) ('adapted Brown and Shepherd surveys') were conducted to evaluate the use of the study area by breeding birds in 2016. The survey area extended 500m beyond the site boundary and was sectioned into four larger sections with four quadrats each. Transects were also placed taking into account the nature of the habitats within the site with the aims to survey all of the study area within 500m of the transects on the site via aural and visual registrations. Quadrat surveys target potential breeding territories of raptors, waterbirds and ground birds of conservation concern, with particular emphasis on species likely to breed in open or moorland habitats (*e.g.* waders). All other species observed were recorded to assess the importance of the study area for breeding. Transect surveys were employed to identify breeding birds and the presence of passerines to inform on likely habitat loss. The survey area was defined following a review of aerial imagery and a site visit. The area was surveyed during the core breeding season (April, May, June, July), cumulating in four visits in total per breeding season. The total survey effort is presented in Appendix 7.2 Tables 3-5. Figures 7.4 and 7.5 show the areas surveyed.

7.2.4.5 Breeding Raptor Survey

Breeding raptor surveys (*i.e.* birds of prey and owls) were conducted within the study area and its immediate surrounds. The survey area extended 2km beyond the site boundary. The aim of these surveys was to identify attempted or successful breeding attempts by raptor pairs, and ascertain their territories within the study area. Methodology followed Hardey *et al.* (2009). Raptor surveys, in the form of walked transects, were conducted within the study area and lands up to 2km outside the study area boundary on a monthly basis during the core breeding season (April, May, June and July 2015 and 2016).

Following consultation with the NPWS regarding the potential presence of Hen Harrier within the study area, the survey effort was increased in 2017 to include transects and VP watches.




Survey effort details are provided in Appendix 7.2 Table 6 to this report. Figure 7.6 shows the 2km buffer of the areas surveyed with defined survey sections and vantage points for each section. Each section was allocated based on the ability of the surveyor to cover it in one survey period.

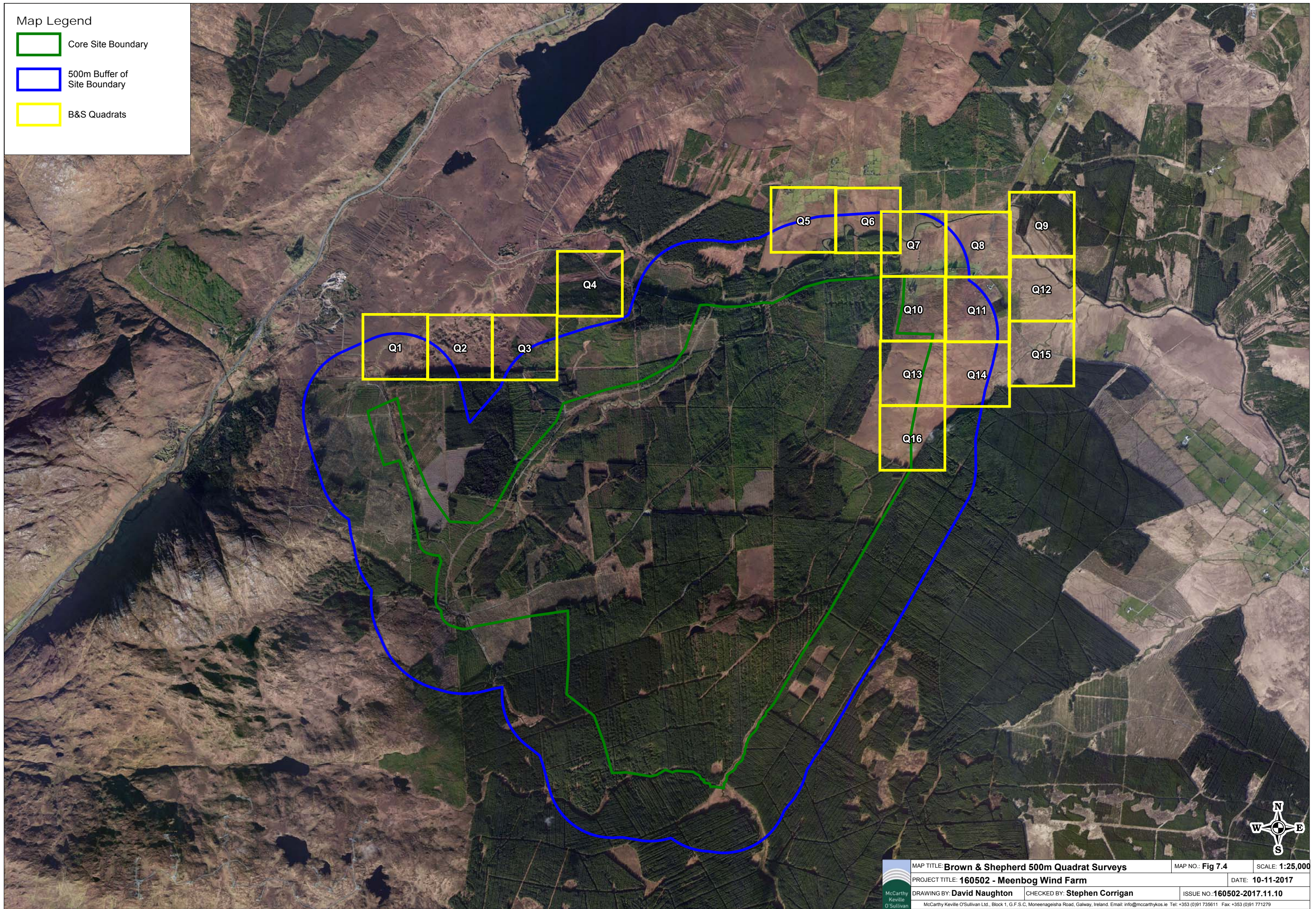
7.2.4.6 Red Grouse Survey

Red Grouse surveys were conducted during (March) 2016 and (March) 2017. Methodology was derived from that described in Bibby *et al.* (2000) and the survey methods for the most recent national Red Grouse survey (2006/2007 to 2007/2008) coordinated by BirdWatch Ireland and submitted to the NPWS (Murray *et al.*, 2013). The survey area extended 500m beyond the site boundary. The survey consisted of tape luring transects. Survey details are provided in Appendix 7.2, Table 7. Figure 7.7 shows the areas surveyed

The work was carried out under NPWS Licence Nos 004/2016 & 010/2017.





Map Legend

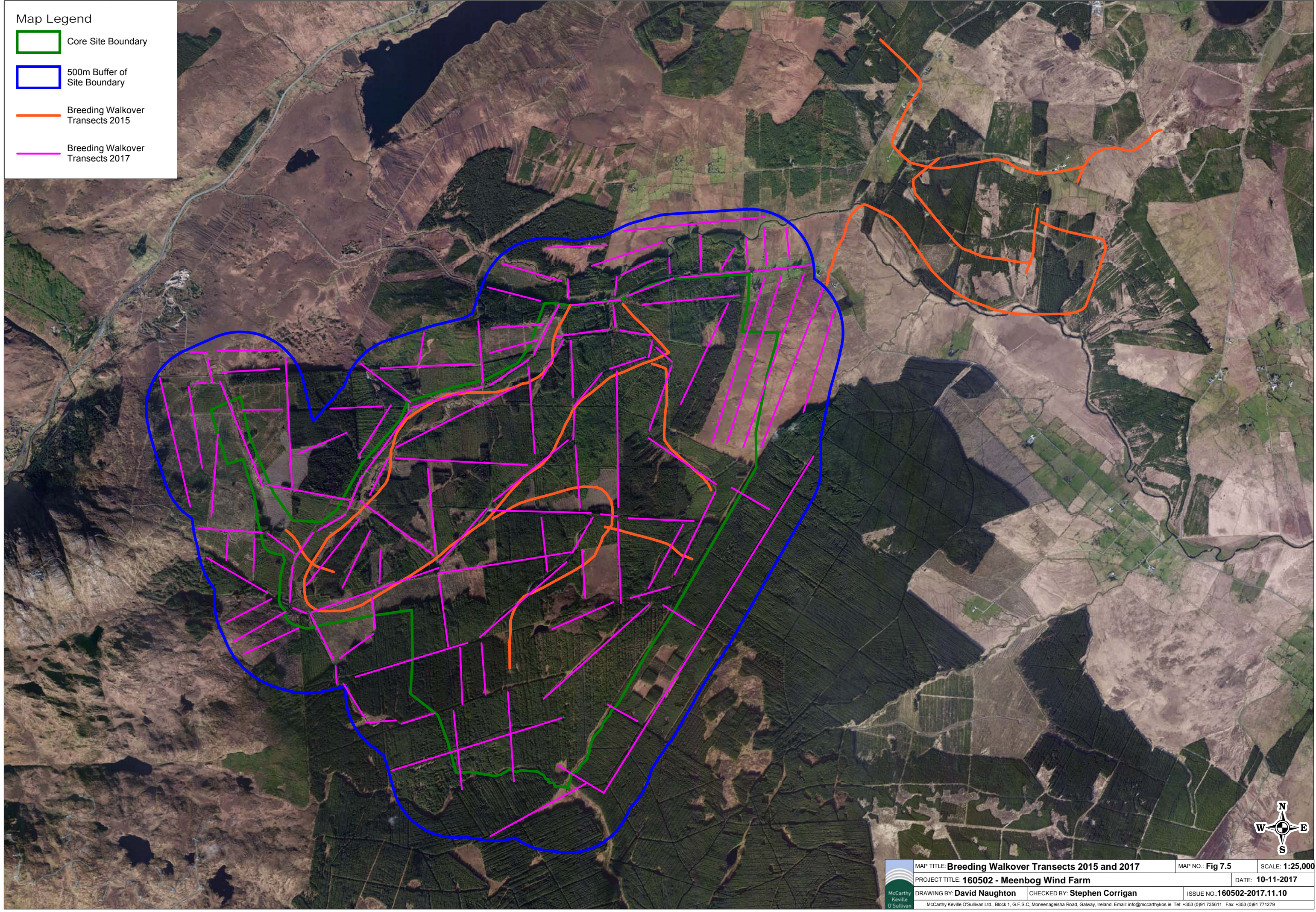
-  Core Site Boundary
-  500m Buffer of Site Boundary
-  B&S Quadrats



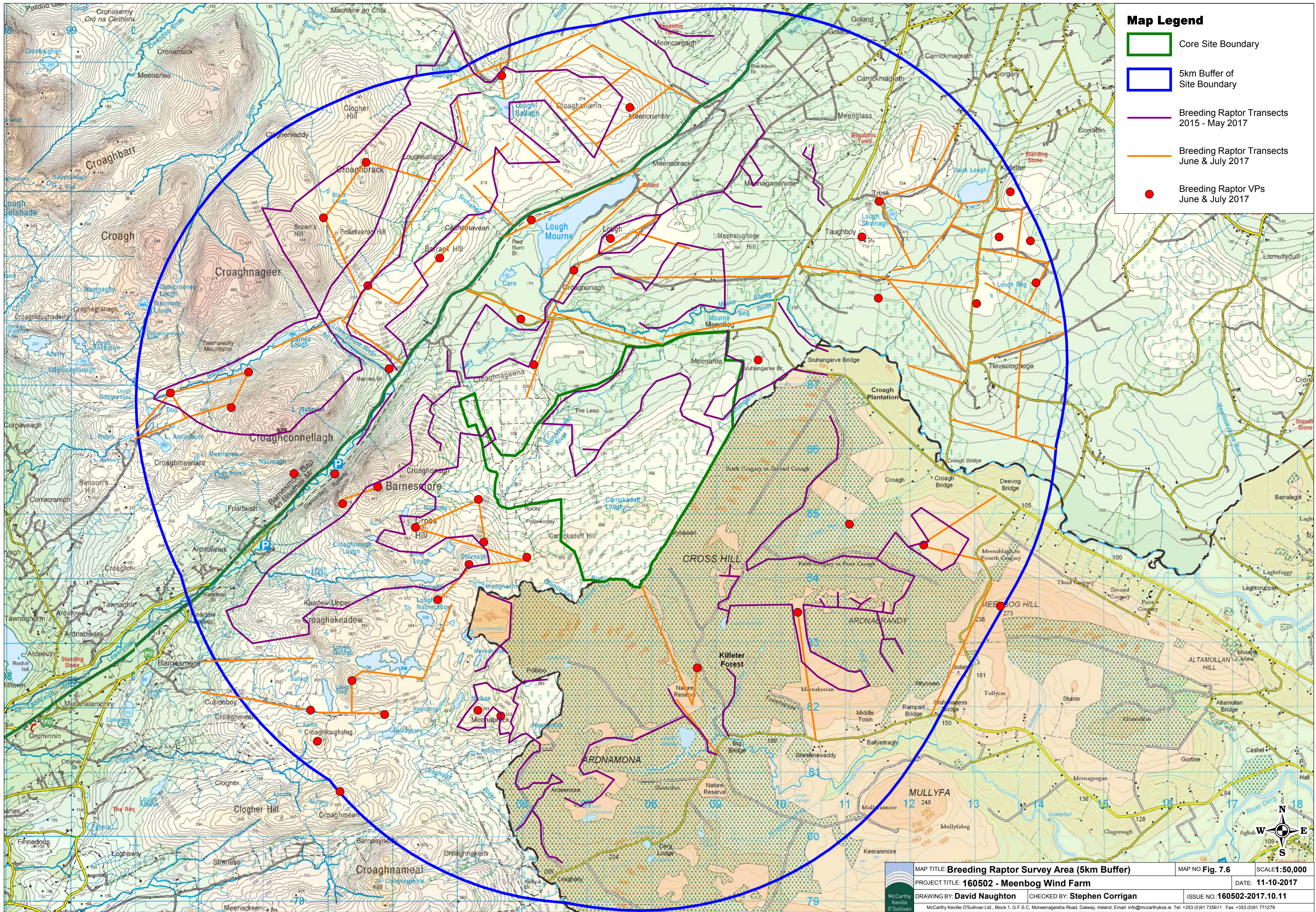
	MAP TITLE: Brown & Shepherd 500m Quadrat Surveys	MAP NO.: Fig 7.4	SCALE: 1:25,000
	PROJECT TITLE: 160502 - Meenbog Wind Farm	DATE: 10-11-2017	
	DRAWING BY: David Naughton	CHECKED BY: Stephen Corrigan	ISSUE NO.: 160502-2017.11.10
<small>McCarthy Keville O'Sullivan Ltd., Block 1, G.F.S.C. Moneenageisha Road, Galway, Ireland. Email: info@mcCarthykos.ie Tel: +353 (0)91 735611 Fax: +353 (0)91 771279</small>			

Map Legend

-  Core Site Boundary
-  500m Buffer of Site Boundary
-  Breeding Walkover Transects 2015
-  Breeding Walkover Transects 2017



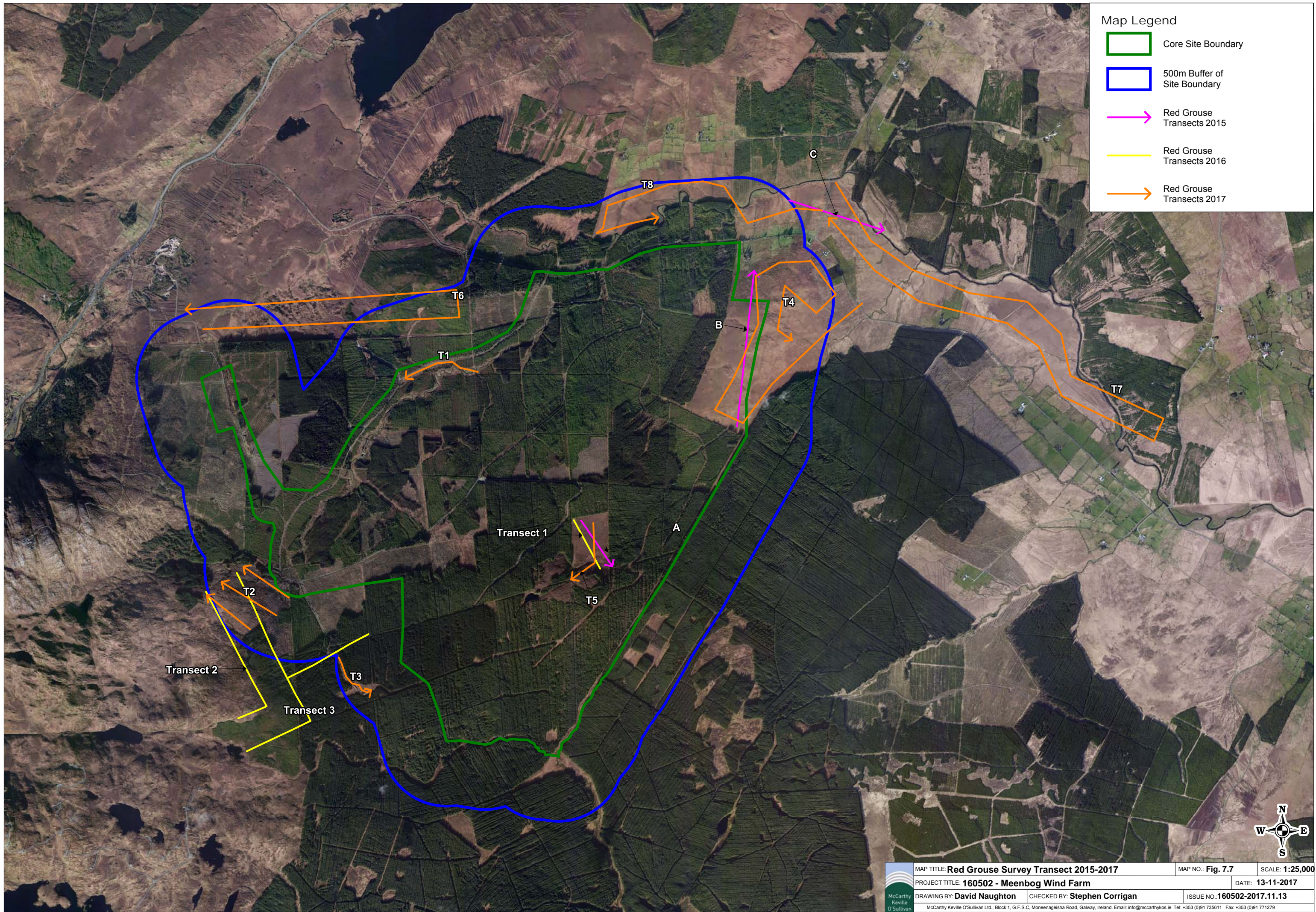
	MAP TITLE: Breeding Walkover Transects 2015 and 2017	MAP NO.: Fig 7.5	SCALE: 1:25,000
	PROJECT TITLE: 160502 - Meenbog Wind Farm		DATE: 10-11-2017
	DRAWING BY: David Naughton	CHECKED BY: Stephen Corrigan	ISSUE NO.: 160502-2017.11.10
	McCarthy Keville O'Sullivan Ltd., Block 1, G.F.S.C. Moneenageisha Road, Galway, Ireland. Email: info@mccarthynos.ie Tel: +353 (0)91 735611 Fax: +353 (0)91 771279		



Map Legend

- Core Site Boundary
- 5km Buffer of Site Boundary
- Breeding Raptor Transects 2015 - May 2017
- Breeding Raptor Transects June & July 2017
- Breeding Raptor VPs June & July 2017

MAP TITLE: Breeding Raptor Survey Area (5km Buffer)	MAP NO: Fig. 7.6	SCALE: 1:50,000
PROJECT TITLE: 160502 - Meenbog Wind Farm	DATE: 11-10-2017	
DRAWING BY: David Naughton	CHECKED BY: Stephen Corrigan	ISSUE NO.: 160502-2017.10.11
McCarthy Keville O'Sullivan McCarthy Keville O'Sullivan Ltd., Block 1, G.F.S.C. Moneenagaisha Road, Galway, Ireland. Email: info@mcCarthykos.ie Tel: +353 (0)91 735611 Fax: +353 (0)91 771279		



	MAP TITLE: Red Grouse Survey Transect 2015-2017	MAP NO.: Fig. 7.7	SCALE: 1:25,000
	PROJECT TITLE: 160502 - Meenbog Wind Farm	DATE: 13-11-2017	
	DRAWING BY: David Naughton	CHECKED BY: Stephen Corrigan	ISSUE NO.: 160502-2017.11.13
<small>McCarthy Keville O'Sullivan, Block 1, G.F.S.C. Moneenageisha Road, Galway, Ireland. Email: info@mccarthynos.ie Tel: +353 (0)91 735611 Fax: +353 (0)91 771279</small>			

7.2.4.7 Goshawk Survey

In March 2017 a single Goshawk was recorded from a VP watch survey. Adopting a precautionary approach, a dedicated Goshawk survey was conducted in March 2017 in line with SNH guidance. The survey involved VP watches of areas above the canopy of commercial forestry. Survey effort details are provided in Appendix 7.2, Table 8. Figure 7.8 shows the areas surveyed

7.2.4.8 Woodcock Survey

Breeding season surveys were conducted in accordance with Gilbert et.al. (1998). The survey area extended 500m outside the site boundary. Five site visits were conducted in areas of suitable habitat between May and June 2016 and six visits were conducted in June 2016. Surveys commenced one hour before sunset and finished one hour after sunset or until it was too dark to see. Survey effort including details of survey duration and weather condition is presented in Appendix 7.2, Table 10. Figure 7.10 shows the surveyed area.

7.2.4.9 Winter Transect survey

Winter transect surveys were conducted to determine the presence of bird species of high conservation concern within area of potential suitable habitat in the study area. The survey area extended 500m outside the site boundary.

Transect routes were devised to ensure coverage of different habitat complexes between vantage point locations within the study area. Methodology was broadly based on methods described in Bibby *et al.* (2000). Target species were raptors, waterbirds, gulls and ground birds of conservation interest. Along with target species, all additional species observed were recorded to inform the evaluation of supporting habitat.

Survey effort including details of survey duration and weather condition is presented in Appendix 7.2, Table 11 Figure 7.11 shows the surveyed area.

7.2.4.10 Wetland and Waterbird Counts

Significant wetland sites within 10km to the study area were surveyed for waterbird populations (*i.e.* waders, waterfowl, gulls, grebes and rails). The survey area extended approximately 10km outside the site boundary which exceeds the 500m recommendation stipulated in SNH Guidance. The extensive surveys aimed to provide contextual information for the Proposed Development site when compared to areas of suitable wintering habitat elsewhere in the surrounding hinterland. Count methodology was in line with survey methodology guidelines issued by SNH (2014) and BirdWatch Ireland (2015). Monthly counts were undertaken at each target wetland site to cover the winter season. Counts were conducted during daylight hours (ideally at dawn or before dusk) from suitable vantage points at the wetland sites. Survey effort is presented in Appendix 7.2, Table 12, Figure 7.12 shows the wetland site survey locations.

7.2.5 Ornithological Evaluation Criteria and Impact Assessment Methodology

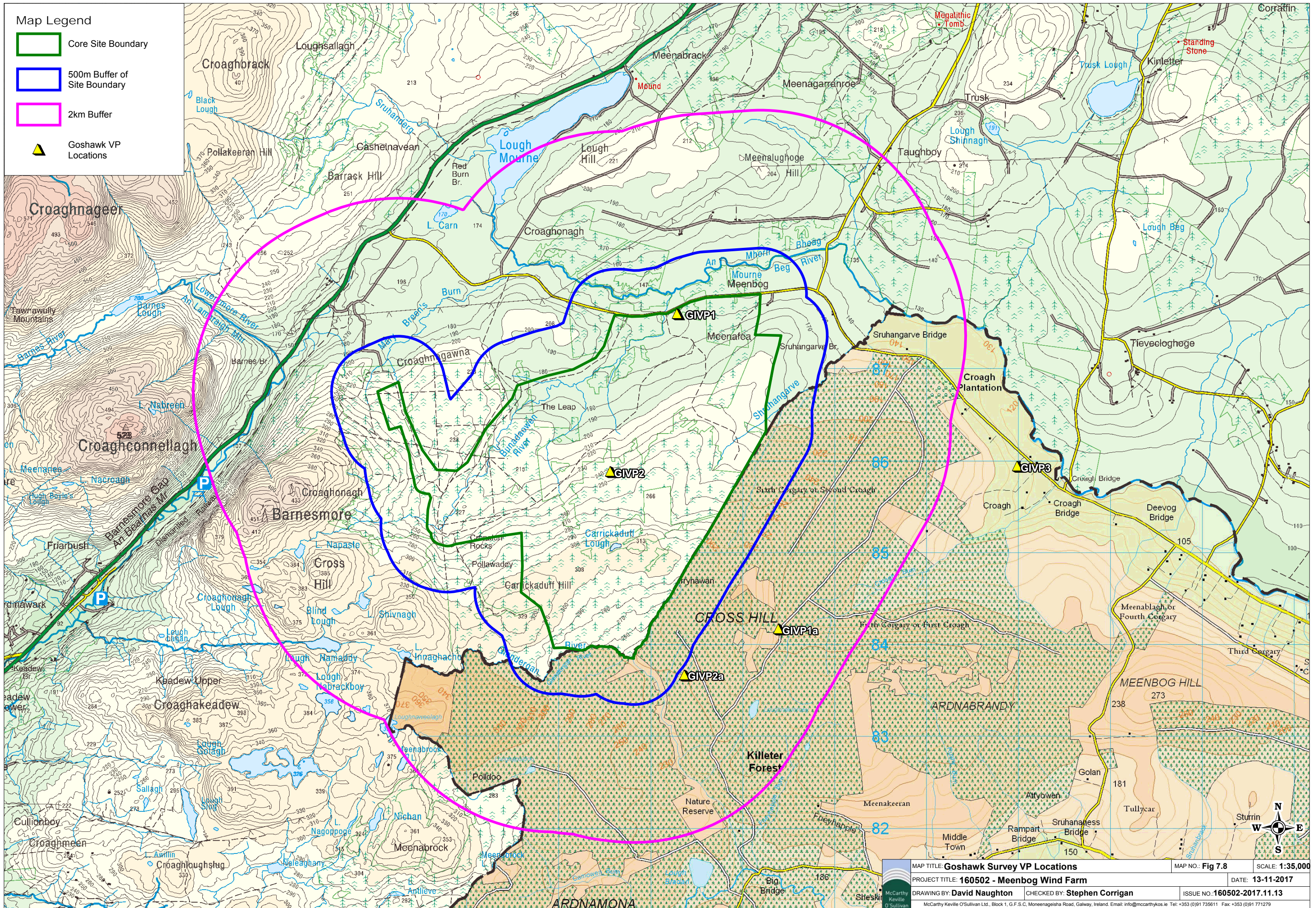
7.2.5.1 Potential Effects Associated with Windfarm Development

As per SNH Guidance, wind farms present three potential risks to birds (Drewitt & Langston 2006, 2008; Band *et al.* 2007):

- **Direct habitat loss** through construction of wind farm infrastructure;
- **Displacement** (sometimes called indirect habitat loss) if birds avoid the wind farm and its surrounding area due to turbine construction and






Map Legend

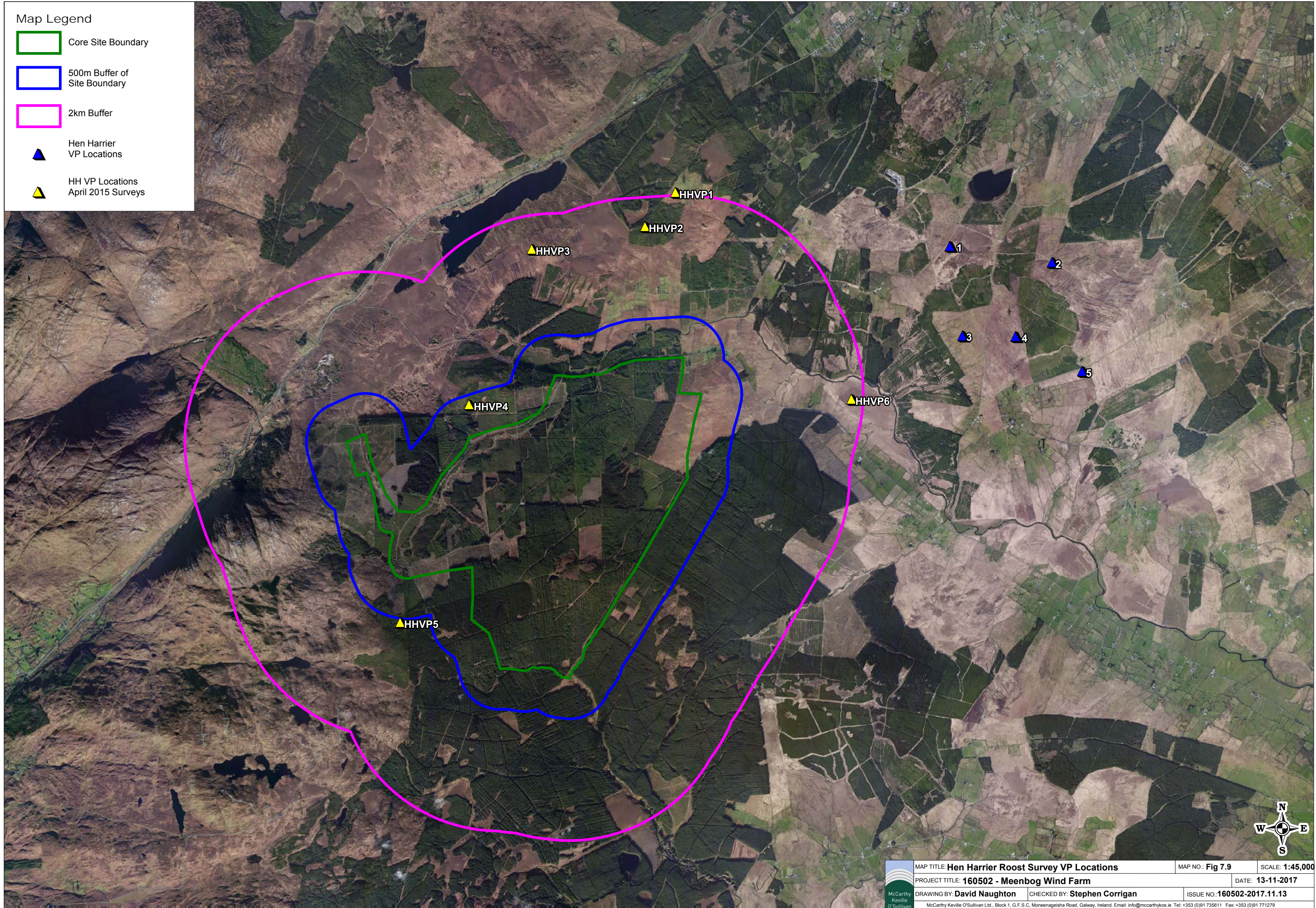
- Core Site Boundary
- 500m Buffer of Site Boundary
- 2km Buffer
- Goshawk VP Locations




MAP TITLE: Goshawk Survey VP Locations	MAP NO.: Fig 7.8	SCALE: 1:35,000
PROJECT TITLE: 160502 - Meenbog Wind Farm	DATE: 13-11-2017	
DRAWING BY: David Naughton	CHECKED BY: Stephen Corrigan	ISSUE NO.: 160502-2017.11.13





Map Legend

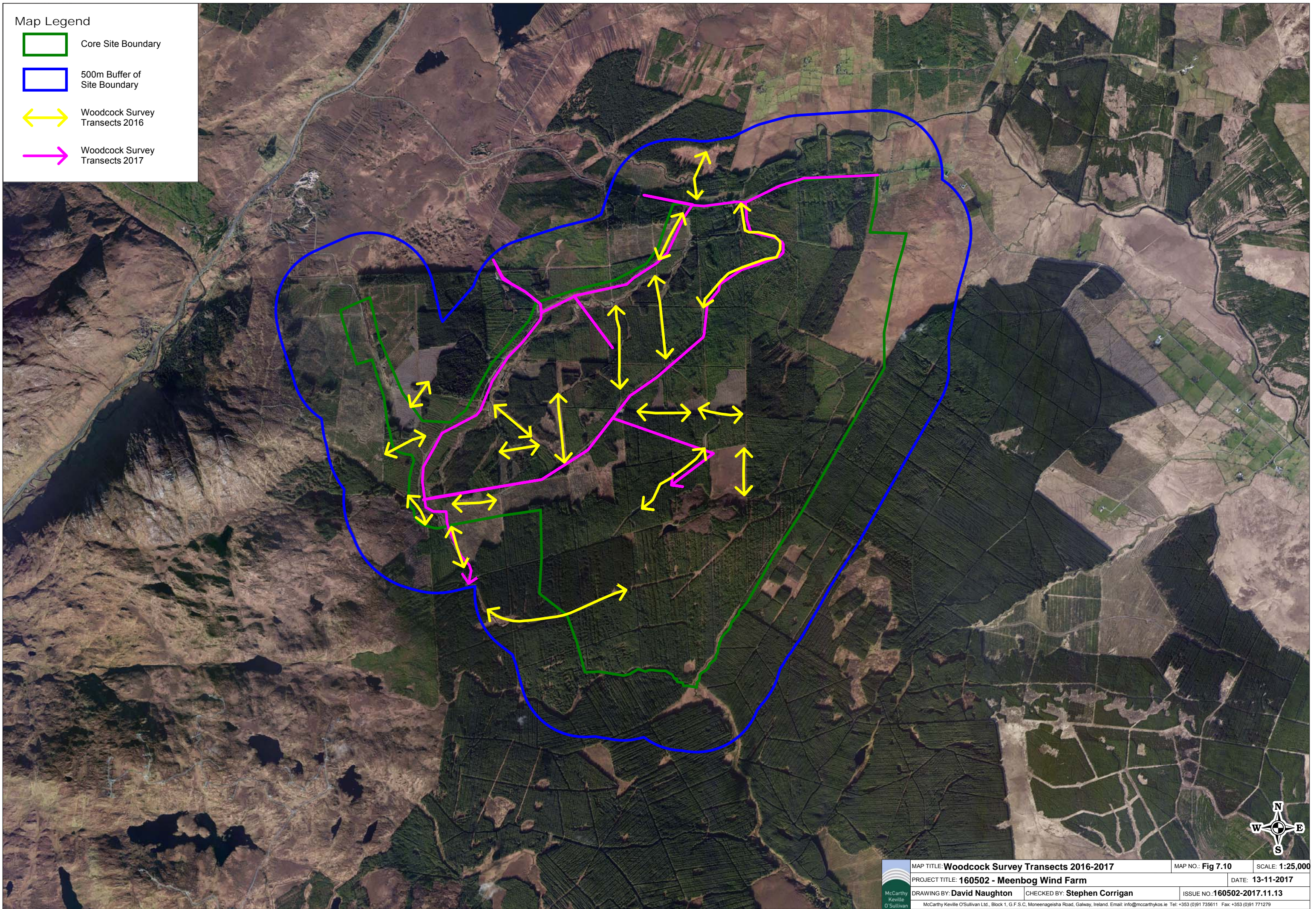
-  Core Site Boundary
-  500m Buffer of Site Boundary
-  2km Buffer
-  Hen Harrier VP Locations
-  HH VP Locations April 2015 Surveys



	MAP TITLE: Hen Harrier Roost Survey VP Locations	MAP NO.: Fig 7.9	SCALE: 1:45,000
	PROJECT TITLE: 160502 - Meenbog Wind Farm	DATE: 13-11-2017	
	DRAWING BY: David Naughton	CHECKED BY: Stephen Corrigan	ISSUE NO.: 160502-2017.11.13
<small>McCarthy Keville O'Sullivan Ltd., Block 1, G.F.S.C. Moneenageisha Road, Galway, Ireland. Email: info@mcCarthykos.ie Tel: +353 (0)91 735611 Fax: +353 (0)91 771279</small>			



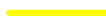
Map Legend

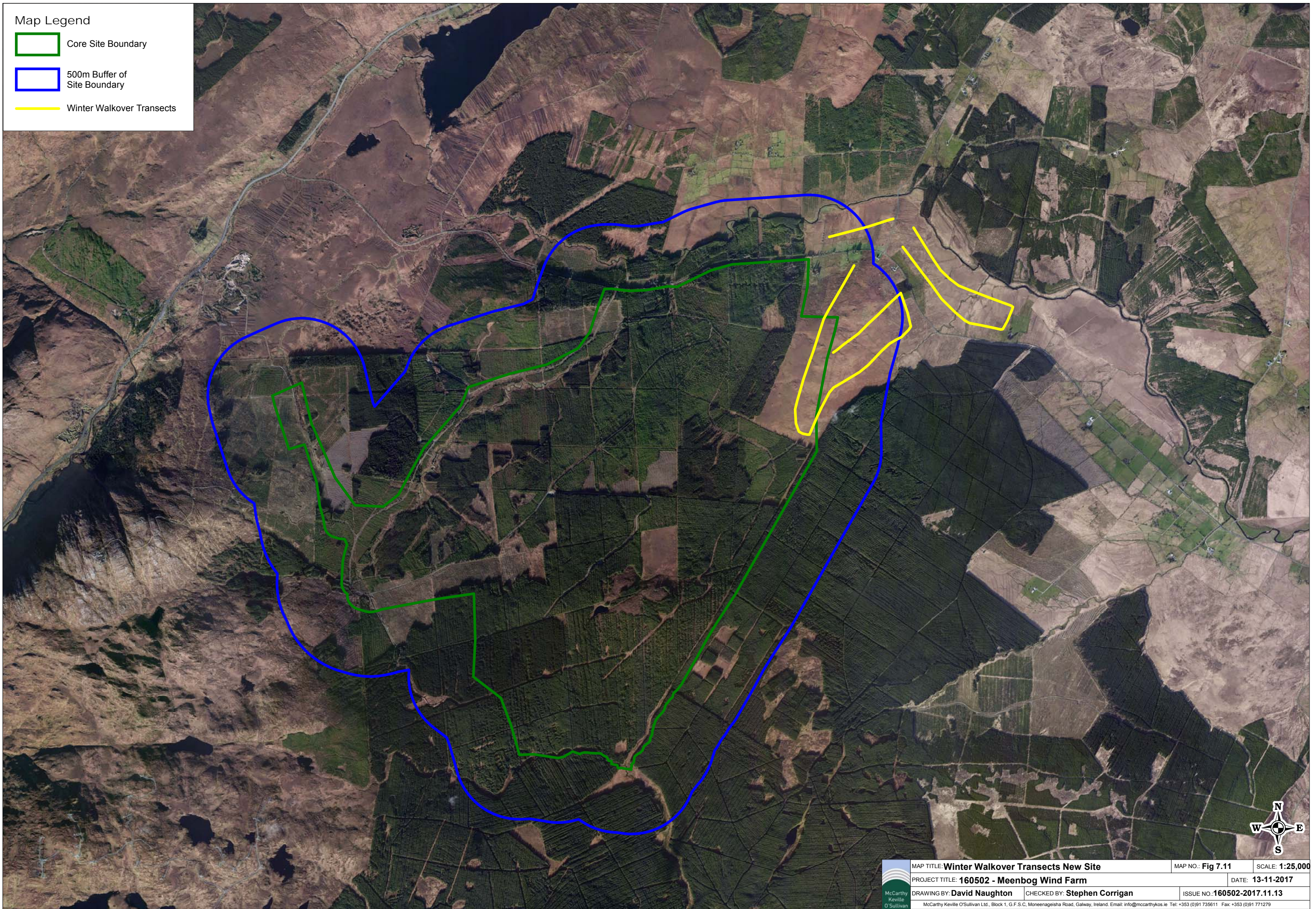
-  Core Site Boundary
-  500m Buffer of Site Boundary
-  Woodcock Survey Transects 2016
-  Woodcock Survey Transects 2017



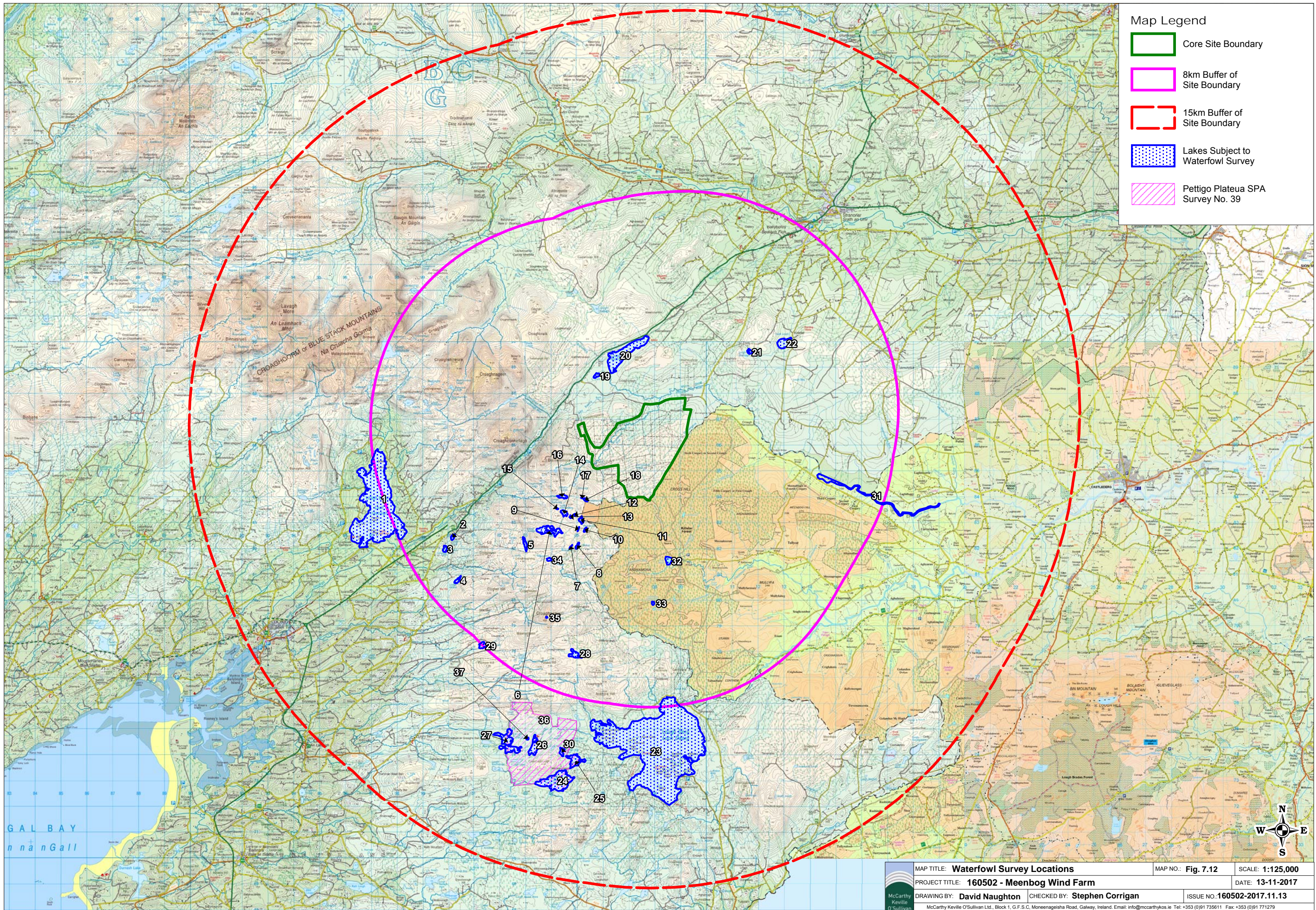
	MAP TITLE: Woodcock Survey Transects 2016-2017	MAP NO.: Fig 7.10	SCALE: 1:25,000
	PROJECT TITLE: 160502 - Meenbog Wind Farm		DATE: 13-11-2017
	DRAWING BY: David Naughton	CHECKED BY: Stephen Corrigan	ISSUE NO.: 160502-2017.11.13
	McCarthy Keville O'Sullivan, Block 1, G.F.S.C. Moneenageisha Road, Galway, Ireland. Email: info@mcCarthykos.ie Tel: +353 (0)91 735611 Fax: +353 (0)91 771279		

Map Legend

-  Core Site Boundary
-  500m Buffer of Site Boundary
-  Winter Walkover Transects



	MAP TITLE: Winter Walkover Transects New Site	MAP NO.: Fig 7.11	SCALE: 1:25,000
	PROJECT TITLE: 160502 - Meenbog Wind Farm		DATE: 13-11-2017
	DRAWING BY: David Naughton	CHECKED BY: Stephen Corrigan	ISSUE NO.: 160502-2017.11.13
<small>McCarthy Keville O'Sullivan Ltd., Block 1, G.F.S.C. Moneenageisha Road, Galway, Ireland. Email: info@mccarthynos.ie Tel: +353 (0)91 735611 Fax: +353 (0)91 771279</small>			



Map Legend

- Core Site Boundary
- 8km Buffer of Site Boundary
- 15km Buffer of Site Boundary
- Lakes Subject to Waterfowl Survey
- Pettigo Plateau SPA Survey No. 39

MAP TITLE: Waterfowl Survey Locations	MAP NO.: Fig. 7.12	SCALE: 1:125,000
PROJECT TITLE: 160502 - Meenbog Wind Farm	DATE: 13-11-2017	
DRAWING BY: David Naughton	CHECKED BY: Stephen Corrigan	ISSUE NO.: 160502-2017.11.13
McCarthy Keville O'Sullivan McCarthy Keville O'Sullivan Ltd., Block 1, G.F.S.C. Moneenageisha Road, Galway, Ireland. Email: info@mccarthykos.ie Tel: +353 (0)91 735611 Fax: +353 (0)91 771279		

- operation. Displacement may also include barrier effects in which birds are deterred from using normal routes to feeding or roosting grounds;
- Death through **Collision** or interaction with turbine blades and other infrastructure.

For each of these three risks, the detailed knowledge of bird distribution and flight activity within and surrounding the site has been utilised to predict the potential effects of the wind farm on birds. Effects are assessed with regard to the construction phase, the operational phase, decommissioning and cumulatively in consideration with other plans and projects.

7.2.5.2 Geographical Framework

Guidance on Ecological Impact Assessment (CIEEM 2016) recommends categories of ornithological or nature conservation value that relate to a geographical framework (e.g. international, through to local). This assessment utilises the geographical framework described in *Guidelines for Assessment of Ecological Impact of National Road Schemes* (NRA 2009). The guidelines provide a basis for determination of whether any particular site is of importance on the following scales:

- International
- National
- County
- Local Importance (Higher Value)
- Local Importance (Lower Value)

Locally Important (lower value) receptors contain habitats and species that are widespread and of low ecological significance and of any importance only in the local area. Internationally Important sites are designated for conservation as part of the Natura 2000 Network (SAC or SPA) or provide the best examples of habitats or internationally important populations of protected flora and fauna.

7.2.5.3 Receptor Evaluation and Impact Assessment (Percival 2003)

Percival’s (2003) methodology for assessing the effects of wind farms on birds has been applied to assess the sensitivity of a species to the development type, the magnitude of the effect and the significance of the potential impact. The following tables (Table 7.2 - Sensitivity, 7.3 – Magnitude of effect, 7.4 – Determination of significance) outline the assessment criteria for each stage.

Table 7.2 Evaluation of Sensitivity for Birds (Percival 2003)

Sensitivity	Determining Factor
Very High	Species that form the cited interest of SPA’s and other statutorily protected nature conservation areas. Cited means mentioned in the citation text for the site as a species for which the site is designated.
High	Species that contribute to the integrity of an SPA but which are not cited as species for which the site is designated. Ecologically sensitive species including the following: divers, common scoter, hen harrier, golden eagle, red necked phalarope, roseate tern and cough. Species present in nationally important numbers (>1% Irish population)
Medium	Species on Annex 1 of the EU Birds Directive. Species present in regionally important numbers (>1% regional (county) population). Other species on BirdWatch Ireland’s red list of Birds of

Sensitivity	Determining Factor
	Conservation Concern
Low	Any other species of conservation interest, including species on BirdWatch Ireland’s amber list of Birds of Conservation Concern not covered above.

Table 7.3 Determination of Magnitude Effects (Percival 2003)

Magnitude	Description
Very High	Total loss or very major alteration to key elements/ features of the baseline conditions such that the post development character/ composition/ attributes will be fundamentally changed and may be lost from the site altogether. <i>Guide: < 20% of population / habitat remains</i>
High	Major loss or major alteration to key elements/ features of the baseline (pre-development) conditions such that post development character/ composition/ attributes will be fundamentally changed. <i>Guide: 20-80% of population/ habitat lost</i>
Medium	Loss or alteration to one or more key elements/features of the baseline conditions such that post development character/composition/attributes of baseline will be partially changed. <i>Guide: 5-20% of population/ habitat lost</i>
Low	Minor shift away from baseline conditions. Change arising from the loss/alteration will be discernible but underlying character/composition/attributes of baseline condition will be similar to pre-development circumstances/patterns. <i>Guide: 1-5% of population/ habitat lost</i>
Negligible	Very slight change from baseline condition. Change barely distinguishable, approximating to the “no change” situation. <i>Guide: < 1% population/ habitat lost</i>

Table 7.4 Significance matrix: combining magnitude and sensitivity to assess significance (Percival 2003)

Significance		Sensitivity			
		Very High	High	Medium	Low
Magnitude	Very High	Very High	Very High	High	Medium
	High	Very High	Very High	Medium	Low
	Medium	Very High	High	Low	Very Low
	Low	Medium	Low	Low	Very Low
	Negligible	Low	Very Low	Very Low	Very Low

7.2.5.4 Impact Assessment –EPA Criteria (2002)

Effects identified as per the Percival 2003 criteria have been equated with EPA impact assessment criteria described below.

The following terms were utilised when quantifying duration:

- Temporary – up to 1 year
- Short-term – 1 to 7 years
- Medium term – 7 to 15 years
- Long term – 15 to 60 years
- Permanent – over 60 years

Criteria for assessing impact significance and impact quality are provided in Tables 7.5 and Table 7.6 respectively.

Table 7.5 Criteria for assessing impact significance based on (EPA, 2002)

Impact Magnitude	Definition
No change	No discernible change in the ecology of the affected feature
Imperceptible Impact	An impact capable of measurement but without noticeable consequences
Slight Impact	An impact which causes noticeable changes in the character of the environment without affecting its sensitivities
Moderate Impact	An impact that alters the character of the environment that is consistent with existing and emerging trends
Significant Impact	An impact which, by its character, its magnitude, duration or intensity alters a sensitive aspect of the environment
Profound Impact	An impact which obliterates sensitive characteristics

Table 7.6 Criteria for assessing impact quality based on (EPA, 2002)

Impact Type	Criteria
Positive	A change which improves the quality of the environment e.g. increasing species diversity, improving reproductive capacity of an ecosystem or removing nuisances
Neutral	A change which does not affect the quality of the environment
Negative	A change which reduces the quality of the environment e.g. lessening species diversity or reducing the reproductive capacity of an ecosystem

7.2.5.5 Collision Risk Assessment

Collision risk is calculated using a mathematical model to predict the numbers of individual birds, of a particular species, that may be killed by collision with moving wind turbine rotor blades. The modelling method used in this collision risk calculation follows Scottish Natural Heritage (SNH) guidance which is sometimes referred to as the Band Model (Band *et al.* (2007).

Two stages are involved in the model:

- Stage 1: Determination of the number of birds or flights passing through the air space swept by the rotor blades of the wind turbines
- Stage 2: Calculation of the probability of a bird strike occurring.

Please see Appendix 7.6 for full details on the modelling method.

In 2016 SNH published a guidance document (*Wind farm proposal on afforested sites*) which provides suggest methods for assessing post-felling collision risk. In relation to the current proposal the following assessment method was deemed to be the most suitable given the nature of the site and the data available:

- Using forest plans and flight activity data:

A data request was sent to Coillte with the aim of obtaining their forestry plans for the windfarm site. It was then possible to use the forest management plan to work out how the proportion of open, replanted and maturing areas within the forest will vary over time, when compared to the proportions at the time surveys are carried out. This was then combined with the flight activity recorded during survey to predict how site suitability and therefore flight activity may change during the lifetime of the wind farm.

7.2.6 Survey Justification

A comprehensive suite of bird surveys have been undertaken at the Proposed Development site between 2015 and 2017.

Results from 2015-2017 are derived from a continuous two and a half years of surveying undertaken in strict accordance with SNH Guidance. These are the results that are analysed to inform this assessment.

Detailed bird surveys were not undertaken or required along the route of the grid connection. The proposed cable route will be located within the carriageway/verge of existing public roads for the majority of its length. The existing habitats do not have potential to support species of conservation interest in the area. The grid connection does not have the potential to result in any habitat loss or displacement of bird species of conservation interest.

The surveys undertaken provide the information necessary to allow a complete, comprehensive and robust assessment of the potential impacts of the Proposed Development on avian receptors. The survey duration and scope is considered entirely satisfactory based on the following considerations:

- The Proposed Development site and footprint are dominated by conifer plantation which does not provide optimal habitat for the Target species identified.
- Results from previously completed ornithological surveys (see Section 7.3.1.7) at and in the vicinity of the current study area corroborate the findings of the 2015-2017 surveys with respect to species assemblage and the low levels of activity recorded.
- The vantage points comprehensively covered the study area in accordance with SNH Guidance
- Based on the extensive suite of surveys undertaken there is no evidence to suggest that the site is of importance to breeding populations of bird species of conservation concern.
- There is no evidence to suggest that the wind farm is on a migratory or commuting route for bird species therefore no requirement for night time bird surveys were identified.

7.2.6.1 Mitigation

The development has been designed to specifically avoid, reduce and minimise effects on all Ornithological Receptors. Where potential effects on KORs are predicted, mitigation has been prescribed to avoid, reduce and remove such effects.

Proposed best practice design and mitigation measures are specifically set out and are realistic in terms of cost and practicality. They have been subject to detailed design and will effectively address the effects on the identified KORs.

The potential effects of the Proposed Development were considered and assessed to ensure that all effects on KORs are adequately addressed and no significant residual effects are likely to remain following the implementation of mitigation measures / best practice.

7.2.6.2 Limitations

The information provided in this EIAR chapter accurately and comprehensively describes the baseline environment; provides an accurate prediction of the likely

effects of the Proposed Development; prescribes mitigation as necessary; and describes the predicted residual impacts. The specialist studies, analysis and reporting have been undertaken in accordance with the appropriate guidelines.

No significant limitations in the scope, scale or context of the assessment have been identified.

7.3 Baseline Conditions and Receptor Evaluation

7.3.1.1 Identification of Designated Sites within the Likely Zone of Influence of the Development

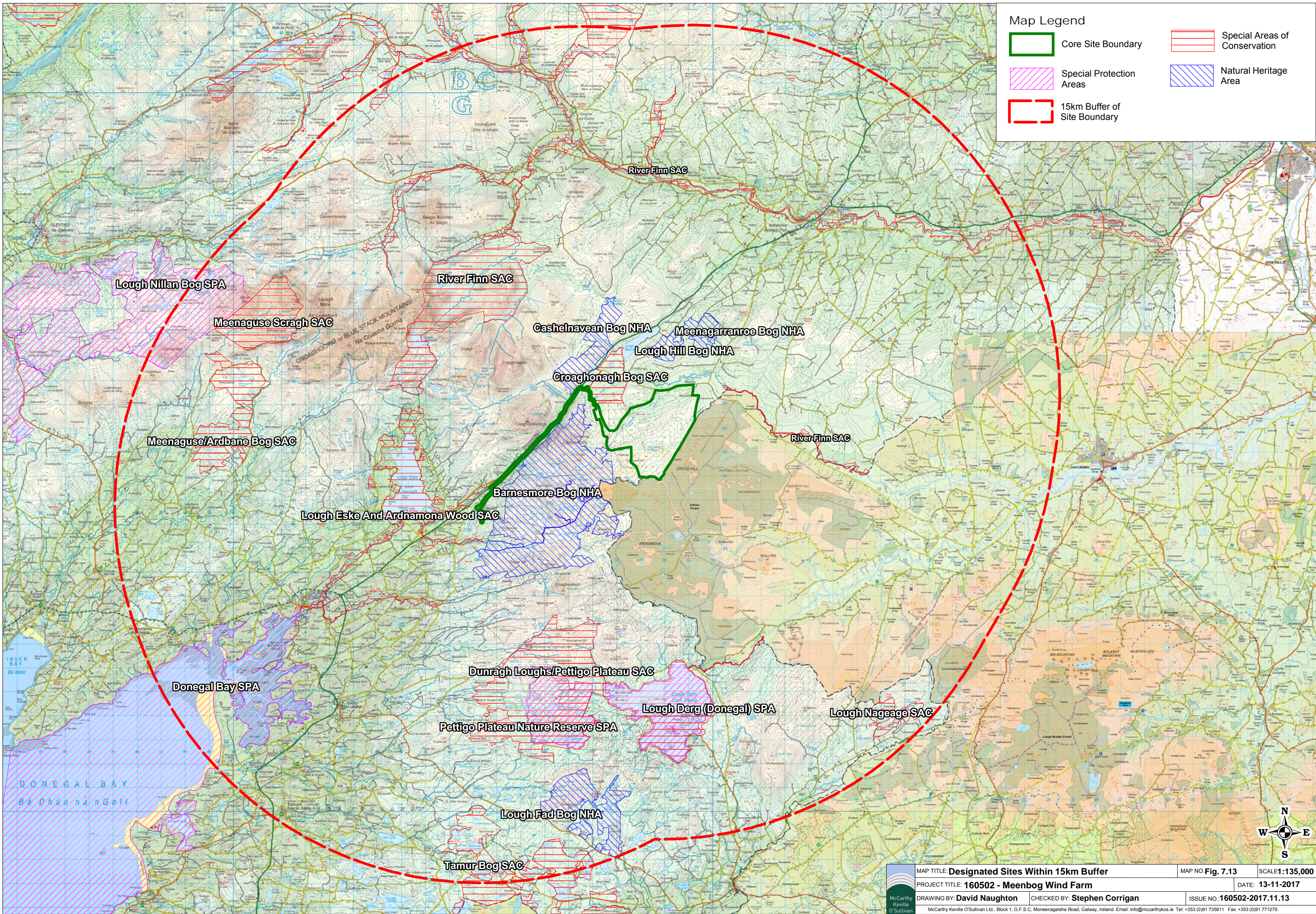
A screening assessment and Natura Impact Statement were prepared to provide the public authority with the information necessary to complete an Appropriate Assessment for the Proposed Development in compliance with Article 6(3) of the Habitats Directive.

As per EPA draft Guidance 2017, “a biodiversity section of an EIAR, should not repeat the detailed assessment of potential effects on European sites contained in a Natura Impact Statement” but should “incorporate their key findings as available and appropriate”. This section provides a summary of the key screening assessment findings with regard to Special Protection Areas. A summary of key assessment findings with regard to Special Areas of Conservation is provided in Chapter 6.

Using GIS software, sites designated for nature conservation within the potential ZOI of the Proposed Development were identified. The ZOI was derived utilising a precautionary approach. Initially, sites within a 15 kilometer radius of the proposed works were identified. Then designated sites located outside the 15km buffer zone were taken into account and assessed. In this case, no potential for impacts outside the 15km buffer was identified.

In addition and in the absence of any specific European or Irish guidance, the Scottish Natural Heritage (SNH) Guidance, *‘Assessing Connectivity with Special Protection Areas (SPA)’* (2016) was consulted. This document provides guidance in relation to the identification of connectivity between Proposed Development proposals and Special Protection Areas. The guidance takes into consideration the distances some species may travel beyond the boundary of their SPAs and outlines information on dispersal and foraging ranges of bird species which are frequently encountered when considering plans and projects.

Designated sites located within the Likely Zone of Influence of the development are listed below in Table 7.7 and illustrated on Figure 7.13.



Map Legend

- Core Site Boundary
- 15km Buffer of Site Boundary
- Special Protection Areas
- Special Areas of Conservation
- Natural Heritage Area

	MAP TITLE: Designated Sites Within 15km Buffer	MAP NO: Fig. 7.13	SCALE: 1:135,000
	PROJECT TITLE: 160502 - Meenbog Wind Farm	DATE: 13-11-2017	
	DRAWING BY: David Naughton	CHECKED BY: Stephen Corrigan	ISSUE NO: 160502-2017.11.13

McCarthy Keville O'Sullivan Ltd., Block 1, G.F.S.C. Moneenageisha Road, Galway, Ireland. Email: info@mcCarthykos.ie Tel: +353 (0)91 735611 Fax: +353 (0)91 771279

Ordnance Survey Ireland Licence No. AR 0021817 © Ordnance Survey Ireland/Government of Ireland



Table 7.7 Designated Sites in the Zone of Influence

European Site	Distance from proposed works (km)	Qualifying Interests/Special Conservation Interests for which the European Site has been designated (www.npws.ie , 21/11/2017)	Conservation Objectives	Identification of Pathways for Effect
Special Protection Area				
Lough Derg (Donegal) SPA (004057)	7.6 km South of Wind farm site 8.5km from nearest off site works location.	<ul style="list-style-type: none"> ▪ Lesser Black-backed Gull (<i>Larus fuscus</i>) [A183] ▪ Herring Gull (<i>Larus argentatus</i>) [A184] 	<p>This site has the generic conservation objective:</p> <p><i>‘To maintain or restore the favourable conservation condition of the bird species listed as Special Conservation Interests of this SPA’.</i> (NPWS Generic version 5.0, 2016)</p>	<p>Ongoing bird activity surveys have not revealed the site of the Proposed Development to be of significance to the SCI species. Only one observation of Lesser Black-backed Gull was recorded and Herring Gull was never recorded. The breeding populations for which the SPA are designated are centered on Inishgoosk Island located in the North eastern extent of Lough Derg.</p> <p>The SCI species are not identified as particularly vulnerable to wind energy development in Mc Guinness et.al (2015).</p> <p>Consequently the potential for direct and indirect impacts on SCI species cannot be discounted as this stage of the assessment process and further assessment is required.</p>
Pettigo Plateau Nature Reserve SPA (004099)	8.7km South of wind farm site and 6.3 km from the	<ul style="list-style-type: none"> ▪ Greenland White-fronted Goose (<i>Anser albifrons flavirostris</i>) [A395] 	<p>This site has the generic conservation objective:</p>	<p>At the time this Special Protection Area (SPA) was designated it was being utilised by a Greenland White-fronted Goose population. In the 1980s, the</p>

European Site	Distance from proposed works (km)	Qualifying Interests/Special Conservation Interests for which the European Site has been designated (www.npws.ie , 21/11/2017)	Conservation Objectives	Identification of Pathways for Effect
	nearest off site works location		<p><i>'To maintain or restore the favourable conservation condition of the bird species listed as Special Conservation Interests of this SPA'. (NPWS Generic version 5.0, 2016)</i></p>	<p>Greenland White -fronted Goose flock utilising this site largely deserted the bogs in favour of coastal grassland sites. Reduced number of Greenland White-fronted Goose still occurs within this site and it is one of the few places where this species continues to utilise peatland habitats (NPWS Site Synopsis).</p> <p>In accordance with SNH Guidelines (2016), the core foraging range of Greenland White-fronted Goose is 5-8km. The Proposed Development is located greater than 8km from the SPA and is therefore outside the foraging distance of the SCI species during the wintering period. Ongoing bird activity surveys have not revealed the site of the Proposed Development to be located on an identifiable migration route and the specie was never recorded traversing or utilising habitat within the site boundary.</p> <p>Based on the above, potential impacts on the Greenland White -fronted Goose flock for which the SPA was designated can be excluded.</p>

European Site	Distance from proposed works (km)	Qualifying Interests/Special Conservation Interests for which the European Site has been designated (www.npws.ie , 21/11/2017)	Conservation Objectives	Identification of Pathways for Effect
Donegal Bay SPA (004151)	Donegal Bay SPA (004151) 14.3 km South-west wind farm site and 8.2km for nearest off site works location	<ul style="list-style-type: none"> ▪ Great Northern Diver (Gavia immer) [A003] ▪ Light-bellied Brent Goose (Branta bernicla hrota) [A046] ▪ Common Scoter (Melanitta nigra) [A065] ▪ Sanderling (Calidris alba) [A144] ▪ Wetland and Waterbirds [A999] 	Detailed conservation objectives for this site (Version 1, May 2012) were reviewed as part of the assessment and are available at www.npws.ie	<p>SCI species associated with this SPA were not recorded during the extensive and comprehensive ornithological surveys undertaken. Given the distance and intervening natural buffers between the development site and the SPA, direct or indirect impacts on SCI species are not anticipated.</p> <p>There will be no direct effects on the supporting wetland habitat of waterbirds within the SPA. The grid connection for the Proposed Development is located within the Donegal Bay North WFD catchment which drains to Donegal Bay. The straight line distance between the SPA and the study area is 8.2km. The hydrological distance, via surface waters, is in excess of 10km. The extent of the proposed works within the Donegal Bay North WFD catchment are minor (grid connection cable will be laid in the existing road carriageway for the majority of its length) Due to the nature of the supporting wetland habitat within the SPA (coastal/marine habitats), the small scale nature of the works in the</p>

European Site	Distance from proposed works (km)	Qualifying Interests/Special Conservation Interests for which the European Site has been designated (www.npws.ie , 21/11/2017)	Conservation Objectives	Identification of Pathways for Effect
				Donegal Bay North WFD catchment, the hydrological distance from the proposed works to Donegal Bay and the dilution factor involved (including buffer of Lough Eske), significant impacts on the SPA due to reduction in water quality are not anticipated.
Lough Nillan Bog (Carrickatlieve) SPA (004110)	14.9km West of wind farm site and 12.6km from the nearest off site works location.	<ul style="list-style-type: none"> ▪ Merlin (<i>Falco columbarius</i>) [A098] ▪ Golden Plover (<i>Pluvialis apricaria</i>) [A140] ▪ Greenland White-fronted Goose (<i>Anser albifrons flavirostris</i>) [A395] ▪ Dunlin (<i>Calidris alpina schinzii</i>) [A466] 	<p>This site has the generic conservation objective:</p> <p><i>'To maintain or restore the favourable conservation condition of the bird species listed as Special Conservation Interests of this SPA.'</i> (NPWS Generic version 5.0, 2016)</p>	<p>In accordance with SNH Guidelines (2016), the development is located outside the potential core foraging range of SCI species associated with the SPA. Consequently the potential for direct and indirect impacts on populations of SCI species associated with the SPA species can be discounted.</p> <p>There will be no direct effects on the supporting wetland habitat of waterbirds within the SPA. There is no potential for indirect effects with regard to surface water pollution as the development site has no identifiable connectivity with the SPA.</p>

Nationally Designated Sites

Other than sites, which are encompassed by the above listed of SPAs, no nationally designated sites of ornithological significance occur within the potential ZOI.

7.3.1.2 Breeding and Winter Bird Atlas Records

Bird Atlas 2007.11: The breeding and wintering birds of Britain and Ireland (Balmer et al., 2013) is the most recent comprehensive work on wintering and breeding birds in Ireland.

The study area lies within hectad H08. Table 7.8 presents a list of species of conservation interest recorded from the relevant hectad:

Table 7.8 Breeding Bird Atlas Data (Hectad H08)

Species Name	Breeding Atlas 68-72	Breeding Atlas 88-91	Breeding Atlas 07.11	Conservation Status
	H08	H08	H08	
Peregrine (<i>Falco peregrinus</i>)	Poss	Breed	Poss	BD
Hen Harrier (<i>Circus cyaneus</i>)	Poss	-	Conf	BD
Merlin (<i>Falco columbarius</i>)	-	-	-	BD
Dunlin (<i>Calidris alpina schinzi</i>)	Prob	-	-	BD
Nightjar (<i>Caprimulgus europaeus</i>)	-	-	-	BD, RL
Corncrake (<i>Crex crex</i>)	Prob	-	-	BD, RL
Golden Plover (<i>Pluvialis apricaria</i>)	Conf	Breed	Prob	BD, RL
Kingfisher (<i>Alcedo atthis</i>)	Poss	-	-	BD
Golden Eagle (<i>Aquila chrysaetos</i>)	-	-	Within 50 km radius of the site	RL
Barn Owl (<i>Tyto alba</i>)	-	-	Prob	RL
Red Grouse (<i>Lagopus lagopus</i>)	Conf	Breed	Prob	RL
Lapwing (<i>Vanellus vanellus</i>)	Conf	-	-	RL
Curlew (<i>Numenius arquata</i>)	Conf	Breed	-	RL
Black-headed Gull (<i>Chroicocephalus ridibundus</i>)	Conf	-	-	RL
Twite (<i>Carduelis flavirostris</i>)	Poss	-	-	RL
Yellowhammer (<i>Emberiza cintrinella</i>)	Conf	-	-	RL
Herring Gull (<i>Larus argentatus</i>)	-	-	-	RL
Redshank (<i>Tringa totanus</i>)	-	-	-	RL
Grey Partridge (<i>Perdix perdix</i>)	-	-	-	RL
Tufted Duck (<i>Aythya fuligula</i>)	-	-	-	RL

BD = Birds Directive; RL= BoCCI Red List; Seen = recorded; Breed = breeding; Non-B = non-breeding; Poss = possible breeding; Prob = probable breeding; Conf = confirmed breeding

Table 7.9 shows those species recorded in the relevant hectad (H08) in the wintering birds atlases that are also protected under the EU Birds Directive, or mentioned on the Birds of Conservation Concern in Ireland (BoCCI) red list.

Table 7.9 Wintering Bird Atlas Data (Hectad H08)

Species Name	Wintering Atlas 81-84	Wintering Atlas 07.11	Conservation Status
	H08	H08	
Whooper Swan (<i>Cygnus cygnus</i>)	-	-	BD
Kingfisher (<i>Alcedo atthis</i>)	-	-	BD
Hen Harrier (<i>Circus cyaneus</i>)	Pres	-	BD
Peregrine (<i>Falco peregrinus</i>)	-	-	BD
Merlin (<i>Falco columbarius</i>)	-	-	BD
Golden Plover (<i>Pluvialis apricaria</i>)	Pres	Pres	BD, RL
Golden Eagle (<i>Aquila chrysaetos</i>)	-	Within 50 km radius of the site	RL
Pintail (<i>Anas acuta</i>)			RL
Black-headed Gull (<i>Chroicocephalus ridibundus</i>)	Pres	-	RL
Red Grouse (<i>Lagopus lagopus</i>)	Pres	Pres	RL
Yellowhammer (<i>Emberiza cintrinella</i>)	-	-	RL
Lapwing (<i>Vanellus vanellus</i>)	Pres	-	RL
Curlew (<i>Numenius arquata</i>)	Pres	-	RL
Wigeon (<i>Anas penelope</i>)	-	-	RL
Pochard (<i>Aythya ferina</i>)			RL
Tufted Duck (<i>Aythya fuligula</i>)	-	-	RL
Goldeneye (<i>Bucephala clangula</i>)	Pres	-	RL
Herring Gull (<i>Larus argentatus</i>)	-	-	

Pres = Present in hectad
- = not recorded in hectad

7.3.1.3 Bird Sensitivity Mapping Tool

A Bird Sensitivity Mapping Tool for wind energy development was developed by BirdWatch Ireland and provides a measured spatial indication of where protected birds are likely to be sensitive to wind energy developments. The tool can be accessed via the National Biodiversity Data Centre Website (www.biodiversityireland.ie) and is accompanied by a guidance document (McGuinness et al. (2015)). The criteria for estimating a zone of sensitivity (i.e. 'low', 'medium', 'high' and 'highest') is based on a review of the behavioural, ecological and distributional data available for each species.

The Meenbog Study area is located within an area identified as a 'Low' bird sensitivity Zone. 'Moderate' sensitivity zones are located to the west and north-west of the site boundary. An area of 'High' sensitivity is located to the north west of the site boundary within the Barnesmore Gap. There are no 'highest' sensitivity areas within a 20km radius of the site boundary.

7.3.1.4 Irish Wetland Bird Survey (IWeBS) Records

The development site is not covered by an IWeBS site. There are no IWeBS sites within 10km of the study area and there are no inland IWeBS sites within 20km of the study area.

7.3.1.5 Identification of potential waterfowl habitat

A search for suitable waterfowl roost habitat using aerial photography and ordnance survey maps was undertaken alongside reconnaissance surveys within a 1-27km radius of the site. Suitable roost sites (e.g. ponds, rivers, lakes, reservoirs) deemed suitable to support wintering and migratory bird species were identified and hinterland vantage point watches were conducted at these sites (Table 7.10) to detect any movement of wintering and migratory birds from these areas to the study area at Meenbog.

Table 7.10 Suitable Wintering/Migratory Waterfowl Sites

Location	GIS Code	Easting	Northing	Distance from Site Boundary (km)
Lough Innaghacho	18	205324	383874	1.22
Un-named Lake #4	17	205193	383948	1.23
Lough Namaddy	16	204421	384003	1.52
Lough Mourne	20	206572	389503	1.67
Lough Carn	19	205772	388690	1.78
Loughnaweelagh	11	205156	383091	1.90
Un-named Lake #1	12	204910	383292	1.92
Meenabrock Lough	10	205309	382720	1.96
Lough Nabrackboy	14	204497	383350	2.00
Un-named Lake #2	13	204743	383219	2.05
Un-named Lake #3	15	204223	383540	2.10
Barnesmore	9	205045	382746	2.18
Lough Bradan	32	208545	381518	2.27
Lough Nichan	8	205009	382098	2.56
Lough Golagh (North)	6	203931	382657	2.71
Lough Nagoppoge	7	204756	382065	2.81
Lough Shinnagh	21	211689	389628	2.98
Lough Naleaghany	34	203926	381571	3.77
Lough Slug	5	202982	382155	3.82
Limestone Lough	33	207934	379864	3.92
Trusk Lough	22	213028	389948	4.11
First Corgary along Mourne Beg River	31	216287	384067	5.24
Croghnameal	35	203817	379325	5.56
Lough Craig	2	200191	382431	5.95
Lough Mulreavy	28	204987	377929	6.24
Cullionboy Lough	3	199882	381981	6.45
Lough Atlieve	4	200369	380786	6.63
Lough Eske	1	197299	383933	7.54
Lough Derg	23	207739	374149	7.63
Lough Cuill	29	201352	378249	7.87
Pettigo Plateau SPA	36	203769	374319	8.74
Lough Haderg	26	203318	374385	9.85
Dunragh Beg	30	204406	374109	10.02
Lough Golagh (South)	27	202291	374531	10.04
Small lake just to east of Lough Golagh (South)	37	203067	374629	10.05
Dunragh Middle Lough	25	204937	373753	10.12
Dunragh Lough	24	206125	373004	10.81

7.3.1.6 Hen Harrier

In a submission on a previous windfarm application at the Proposed Development site the DAU/NPWS referred to evidence from 2013 of confirmed Hen Harrier breeding. The records were from two 1km grid squares H07 88 and H07 87 which are located within a 2km buffer of the proposed windfarm.

The 2015 National Survey of Breeding Hen Harrier in Ireland identified one confirmed breeding pair from hectad H08 (Ruddock *et al.*, 2016). This represents a decline of 50% since the previous Breeding survey in 2010. The survey identified confirmed breeding pairs in the surrounding hectads to the north, north-east, south and south-east. Two possible breeding pairs were identified in the hectad immediately to the east.

Table 7.11 below presents breeding Hen Harrier records obtained from the NPWS in November 2017. The records highlight the historic significance of the area for breeding Hen Harrier. The 2015 survey record from within the site boundary relates to a food pass observed between and male and female Hen Harrier near Carrickaduff Lough. No nest site was recorded and the outcome/breeding success is classified as “unknown”.

From April 2015 onward, MKO undertook extensive and comprehensive surveys of the Meenbog site. The surveys covered the area surrounding Carrickaduff Lough. No evidence of breeding Hen Harrier was recorded and no fledged/juvenile birds were recorded during any surveys in the 2015 breeding season.

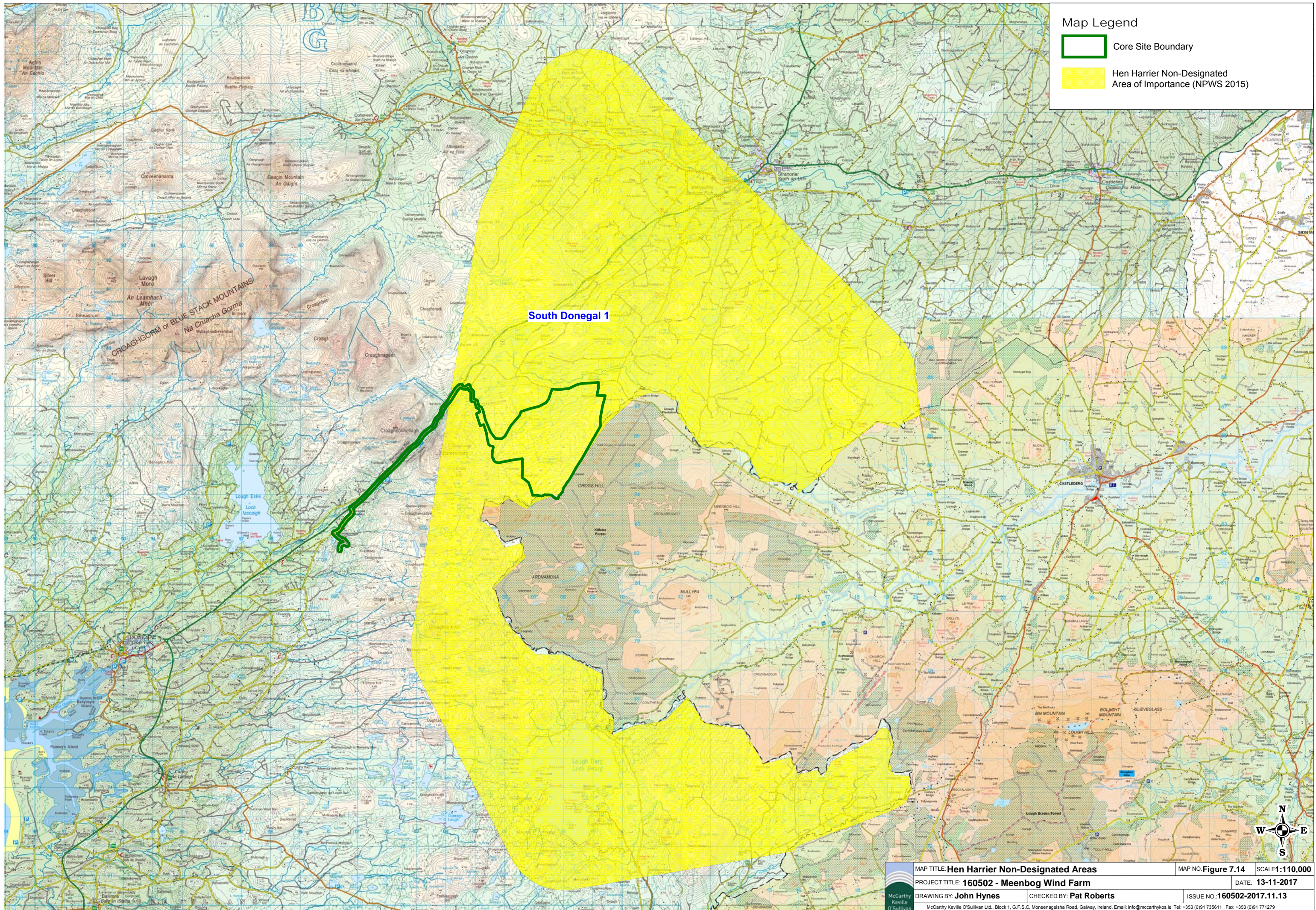
Table 7.11 NPWS Hen Harrier Records (November 2017)

Year	Within Site Boundary	0-1km from site boundary	1-3km from site boundary	3-5km from site boundary
2015	1 record of confirmed breeding	No records	1 record of possible breeding	1 record of confirmed breeding
2010	1 record of confirmed breeding	1 record of confirmed breeding	3 records of confirmed breeding	No records
2005	2 sightings	No records	5 sightings	5 sightings
1998-2004	No Records	2 record of confirmed breeding	1 record of confirmed breeding	No records

In 2016 the NPWS prepared an unpublished post hoc analysis report of the 2015 Hen Harrier survey which identified a range of relatively important yet non-SPA designated areas for breeding Hen Harriers. The proposed wind farms site is located in the non-SPA designated area South Donegal 1. Summary data for this non-designated area is provided in Table 7.12. A map showing the overlap of the non-designated area and the proposed windfarm site is provided as Figure 7.14. A population of five pairs was from the South Donegal 1 area in 2010. Eleven pairs were identified in 2015 which correlates to a 120% increase in occupancy between 2010 and 2015.

Table 7.12 Summary of 2015 National Survey data for South Donegal 1

Confirmed Pairs	Possible Pairs	Total number of territories	% of National population	Total number of young	Productivity /successful pair
8	3	11	7.0%	1	1.0



Map Legend

- Core Site Boundary
- Hen Harrier Non-Designated Area of Importance (NPWS 2015)

South Donegal 1



	MAP TITLE: Hen Harrier Non-Designated Areas		MAP NO: Figure 7.14	SCALE: 1:110,000
	PROJECT TITLE: 160502 - Meenbog Wind Farm		DATE: 13-11-2017	
	DRAWING BY: John Hynes		CHECKED BY: Pat Roberts	
	ISSUE NO: 160502-2017.11.13		<small>McCarthy Keville O'Sullivan Ltd., Block 1, G.F.S.C. Moneenageisha Road, Galway, Ireland. Email: info@mccarthysos.ie Tel: +353 (0)91 735611 Fax: +353 (0)91 771279</small>	

7.3.1.7 Pre 2015 Ornithological surveys

A number of surveys were carried out as part of a previous larger windfarm application which encompassed the current study area. The following surveys were undertaken; Red Grouse survey (March 2014) and Vantage Point surveys summer (April 2014-September 2014) and winter (October 2013-March 2014). The results provided below related to the larger study area associated with a previous windfarm application.

Red Grouse Survey 2014

The methodology was improvised from the national Red Grouse survey by BirdWatch Ireland and was as follows: instead of two observers, a single worker walked transects that were generally either single or parallel and 250 metres apart, so that (although the number of observers was halved) all transects were travelled by a worker broadcasting calls from the megaphone, rather than half of them (as in the national survey methodology). The routes of the transects were devised before the survey and GPS equipment (Garmin Etrex, Olathe, USA) was used to navigate them.

No responses from grouse were recorded during the survey on the 26th and 27th of March. Additionally, no signs of grouse (i.e. feathers or droppings) were recorded during any of the ecological work within the site.

The tape luring survey work did not indicate that grouse were present at the cutover, upland blanket bog and heath habitats within the study area.

Red Grouse calls were heard on the 28th of February 2014 by an observer carrying out a vantage point survey at vantage point (VP) number one. The individual(s) concerned were outside of the study area in open upland bog/heath to the west of the study area itself and to the west of the forestry at the top of Carrickaduff hill.

Vantage Point (VP) Surveys

The methodology employed for the study area was as detailed in '*Survey methods for use in assessing the impacts of onshore windfarms on bird communities*' and '*Recommended methodology for assessment of impacts of proposed windfarms on breeding Hen Harrier within the known range of the species in Ireland*' (Anon., 2005; Anon., 2003), both similar VP methods. Watches were carried out for three or six hour periods at any one VP. Fourteen vantage points were used in the October 2013-March 2014 watches. The number of VPs used for the April-September 2014 surveys was expanded to sixteen in order to cover an expansion of the study area.

During the winter VP survey Hen Harrier, Merlin, Peregrine, Whooper Swan, Golden Plover and Bar-tailed Godwit were all recorded. All of these six species are listed in Annex I of the E.U. Birds Directive. BoCCI red list species Woodcock, Meadow Pipit and Grey Wagtail were also recorded. Hen Harrier, Merlin, Peregrine, Golden Eagle, Golden Plover and Curlew were recorded during the summer VP survey. The first five of these species are listed in Annex I of the E.U. Birds Directive, while the last three are listed in the BoCCI red list.

Hen Harrier

Hen Harrier were recorded for most of the year, in all months except for July and August. In total, there were 78 sightings of one to three birds. A minimum of three birds were present at a winter roost site located 2.5km east of the current windfarm site boundary. A minimum of three birds were recorded during the summer VP survey work also. Display by male bird(s) was recorded in the 26th of March and was also observed in April and May 2014. Nest building behaviour was observed at one site in the

Carrickaduff hill area and there was a failed breeding attempt during the 2014 breeding season.

Merlin

Six sightings of single merlin were recorded. None of the birds recorded were flying at heights above ten metres. There were no indications of breeding behaviour in the near vicinity.

Peregrine

Single Peregrine were recorded during survey work with most of these sightings were made during winter between November and February. There were no indications of breeding behaviour in the near vicinity.

Whooper Swan

Whooper Swan was recorded in flight through the study area on six occasions between the 25th of October 2013 and the 30th of March 2014. Flocks ranged in size from 3-14 birds.

Golden Plover

Golden Plover were recorded on 64 occasions at the study area from September to April, i.e. from the 3rd of October 2013 to the 27th of April 2014 and from the 18th September 2014 onwards. Although breeding Golden Plover are found in Co. Donegal, there was no evidence of summer occupancy of the study area or breeding behaviour by this vocal and easily-detected species. The majority of records were from areas outside and to the east of the Meenbog site boundary.

Golden Eagle

Golden Eagle was recorded on three occasions in flight over the study area. A pair of eagles was recorded outside and to the south-west of the study area in the vicinity of Lough Shivnagh on the 17th of August 2014.

Curlew

Curlew were recorded in flight twice on the same day in late July 2014. No evidence of breeding was recorded.

7.3.2 Field Survey Results 2015-2017

A comprehensive list of all bird species recorded during surveys (including wetlands in the surrounding area) is provided in Table 2 of Appendix 7.1.

The target species listed were recorded within the zone of influence of the Proposed Development during the ornithological surveys. The list is ordered in accordance with conservation significance: Annex I species, SCIs of designated sites, Red listed species and raptors.

- Whooper Swan
- Golden Plover
- Merlin
- Peregrine
- Hen Harrier
- Goshawk
- Golden Eagle
- Lesser Black-backed Gull
- Herring Gull
- Red Grouse
- Woodcock

- Wigeon
- Common Buzzard
- Eurasian Sparrowhawk
- Common Kestrel

The following sections describe the observations of each target species under the individual survey headings. Survey data and mapping for each target species is provided in the technical appendices.

Appendix 7.3 presents results summary tables including:

- Summary of the monthly distribution of flight activity recorded for the target species during the vantage point watches.
- Summary of observations at Potential Collision Height for target species during vantage point watches.
- Summary of monthly distribution of flight activity recorded for the target species during the vantage point watch at the Commuting/Migratory Bird VP of the Barnesmore Gap.
- Summary of Red Grouse Survey results
- Summary of monthly breeding territory distribution
- Summary of monthly distribution of Breeding Raptor Survey results
- Summary of Woodcock survey results
- Summary of Waterfowl Survey observations for relevant target species.

7.3.2.1 Whooper Swan

Raw survey data for Whooper Swan is provided in Appendix 7.4. Results summary tables are presented in Appendix 7.3.

Vantage Points Surveys

During the 2015-2017 surveys, a single Whooper Swan was recorded on one occasion in April 2016 (see Appendix 7.4, Figure 7.4.1). The recorded flight was not within the potential collision risk zone. Given the lack of flight activity, there is no evidence to suggest that the development site is located on a migratory route or commuting corridor for the species.

Migratory bird VP watches (VP17) were undertaken outside of the windfarm site during the 2015/2016 and 2016/2017 migratory periods. The VP covered the Barnesmore Gap with the aim of identifying any commuting/migratory flightlines along the Barnesmore Gap corridor. In 2015, Whooper Swan were recorded on eight occasions (See Appendix 7.4 Figure 7.4.2). Observations were of individual birds and flocks of up to 30 birds. Whooper Swan were not recorded during VP 17 surveys undertaken in 2016 or 2017.

Winter Walkover Survey

The species was not recorded utilising habitats within the site boundary during the surveys undertaken between 2015 and 2017.

Wetland Waterbird Counts

The species was recorded offsite, at five wetland sites during the surveys (See Table 7.13 below). These sites are located a minimum distance of 1.7km from the proposed windfarm site. No connectivity between the Proposed Development site and any supporting wetland habitat for this species was recorded. Monthly distribution of records is presented in Table 9 of Appendix 7.3.

Table 7.13 Results summary

Location	No of Visits	Number of dates observations recorded	Max number individuals	Min number individuals
Lough Bradan (GIS Code 32)	14	1	9	-
Lough Cuill (GIS Code 29)	14	3	8	2
Lough Eske (GIS Code 1)	14	3	8	1
Lough Mourne (GIS Code 20)	14	1	13	-
Lough Shinnagh (GIS Code 21)	14	1	6	-

Incidental records

Incidental observations of this species are provided in Table 7.14 below

Table 7.14 Incidental Observations

Survey type	Date	Observation
Breeding raptor Survey	11/04/2016	Species recorded resting on Lough Mourne which is located 1.7km to the north of the site boundary
Breeding Bird Surveys	17/04/2015	Single bird was recorded flying across forestry to the north of the development site in the direction of Lough Mourne.

No additional evidence of this species was recorded during the extensive surveys between 2015 and 2017.

7.3.2.2 Golden Plover

Raw survey data for Golden Plover is provided in Appendix 7.4. Results summary tables are presented in Appendix 7.3.

Vantage Points Surveys

During the 2015-2017 surveys, a single observation of a flock of 30 birds was recorded in January 2017 (see Appendix 7.4, Figure 7.4.3). The recorded flight was within the potential collision risk zone. Given the lack of flight activity, there is no evidence to suggest that the development site is on a migratory route or commuting corridor for the species.

In February 2017, a flock of 30 Golden Plover was recorded on one occasion at the migratory bird VP17 which covers the Barnesmore Gap (see Appendix 7.4, Figure 7.4.4). The species was not recorded in surveys undertaken in 2015 and 2016 at this VP.

Breeding Bird Surveys

No evidence of breeding activity was recorded during the surveys undertaken between 2015 and 2017. One record of a flock of 30 birds was recorded at the early breeding/late wintering period in April 2017. The flock is likely to be associated with a lingering wintering population.

Winter Walkover Survey

The species was not recorded utilising habitats within the site boundary during the surveys undertaken between 2015 and 2017. This species was recorded on two

occasions within a 500m buffer of the site boundary from a peatland area located to the north-east of the development site. The flock sizes recorded were small consisting of three and 24 birds.

Wetland Waterbird Counts

The species was recorded offsite, at seven wetland sites during the surveys (See Table 7.15 below). These sites are located a minimum distance of 1.67km from the proposed windfarm site. No connectivity between the Proposed Development site and any supporting wetland habitat for this species was recorded. Monthly distribution of records is presented in Table 10 of Appendix 7.3.

Table 7.15 Results Summary

Location	No of Visits	Number of dates observations recorded	Max number individuals	Min number individuals
Lough Derg (GIS Code 23)	14	1	21	-
Lough Golagh (North) (GIS Code 6)	14	1	18	-
Lough Golagh (South) (GIS Code 27)	14	1	1	-
Lough Innaghacho (GIS Code 18)	14	1	1	-
Loughnaweelagh (GIS Code 11)	14	2	-	-
Meenabrock Lough (GIS Code 10)	14	3	60	14
Pettigo Plateau SPA (GIS Code 36)	14	1	1	-

Incidental records

Incidental observations were recorded outside the windfarm site boundary during Raptor surveys undertaken in 2015 and 2017 (See Table 7.16 below).

Table 7.16 Incidental Observations

Survey type	Dates	Observation
Raptor Surveys	17/04/2015, 17/04/2015, 21/04/2015, 21/04/2015, 23/04/2015, 23/04/2015, 04/04/2017, 18/04/2017, 23/04/2017	Observations included calling birds and flocks of varying sizes (6-126). All the observations were from areas outside the site boundary.
Breeding raptor Survey	06/05/2017	A presumed breeding bird recorded adjacent to a bog pool in the Barnesmore Gap

No additional evidence of this species was recorded during the extensive surveys between 2015 and 2017.

7.3.2.3 Merlin

Raw survey data for Merlin is provided in Appendix 7.4. Results summary tables are presented in Appendix 7.3.

Vantage Points Surveys

During the 2015-2017 surveys, Merlin was observed on three occasions between July and October 2016 (see Appendix 7.4, Figure 7.4.5). None of the flights were within the potential collision risk zone.

No additional records of this species were recorded during VP surveys

Breeding Raptor Survey

No evidence of Merlin was recorded at the windfarm site during the surveys undertaken between 2015 and 2016.

In 2016 and 2017 Merlin was recorded from Barrack Hill located approximately 1.7km to the north west of the windfarm site (see Appendix 7.4, Figure 7.4.6). Evidence of *probable* breeding activity was recorded in the form of agitated behaviour and alarm calls.

No additional evidence of this species was recorded during the extensive surveys between 2015 and 2017.

7.3.2.4 Peregrine

Raw survey data for Peregrine is provided in Appendix 7.4. Results summary tables are presented in Appendix 7.3.

Vantage Points Surveys

During the 2015-2017 surveys, Peregrine was not recorded during VP surveys of the windfarm site. The species was recorded from the migratory bird VP over the Barnesmore Gap on one occasion in February 2017 (see Appendix 7.4, Figure 7.4.7). The observation was of a single bird.

Breeding Raptor Survey

This species was not recorded breeding at the Proposed Development site. Peregrine was observed on three occasions in the Barnesmore Gap area and a *confirmed* nest site was identified (see Appendix 7.4, Figure 7.4.8).

Incidental records

Incidental observations are provided in Table 7.17 below.

Table 7.17 Incidental Observations

Survey type	Dates	Observation
Wetland Waterbird Count	13/04/2016	Individual recorded offsite on one occasion in the vicinity of Croghnameal which is located approximately 5.5km from the proposed windfarm site. The observation was of a flying bird.
VP Survey	18/08/2016	Individual recorded whilst leaving VP 18

No additional evidence of this species was recorded during the extensive surveys between 2015 and 2017.

7.3.2.5 Hen Harrier

Raw survey data for Hen Harrier is provided in Appendix 7.4. Results summary tables are presented in Appendix 7.3.

Vantage Points Surveys

During the 2015-2017 surveys, Hen Harrier was observed on five occasions. Twice in April 2015, twice in the wintering period of 2016 and once in July 2017 (see Appendix 7.4, Figure 7.4.9). Three of the flights were within the potential collision risk zone.

Breeding Bird Surveys.

Two observations of Hen Harrier were recorded on the 26th of April 2017. The first observation was of a solitary male bird. The second was of a pair flying close together over conifer forestry. No evidence of display or breeding activity was recorded. This observation occurred outside the mid May to June breeding window and corresponds with the non-breeding status 'Seen'. (NPWS 2015).

Breeding Raptor Survey

Four observations of Hen Harrier were recorded between 2015 and 2017 (see Appendix 7.4, Figure 7.4.10). Only two observations were within the proposed windfarm site. The record from July 2015 was of a solitary adult male. The flight recorded in 2016 was of a female. No evidence of display or breeding activity was recorded. This species was not observed during the core breeding season (i.e. mid May to June)

Hen Harrier Roost Survey

A roost site was identified approximately 2.5km from the study area boundary. Evidence of roosting behavior was recorded from VP watches of the area with a maximum number of 2 birds utilising the area. The identified roosting area is identified on Figure 7.4.11 of Appendix 7.4.

Incidental records

Incidental observations are provided in Table 7.18 below.

Table 7.18 Incidental Observations

Survey type	Dates	Observation
Wetland Waterbird Count	08/05/2017	Lough Derg (GIS Code 23): Male HH perched on conifer. Female HH seen and heard calling briefly at
Wetland Waterbird Count	26/09/2017	Lough Golagh (South) (GIS Code 27): Adult Female Flew south along the west side of lough Golagh into forestry. Hunting observed along lake edge
Waterfowl Survey	25/09/2017	Immature female judged by size. Hunting along access road all the way to the gate of windfarm then turning back out the same road Wes
Goshawk Survey	30/03/2017	Male observed (from vehicle) in flight heading South. Approx. 4 km away from site boundary

No additional evidence of this species was recorded during the extensive surveys between 2015 and 2017.

7.3.2.6 Goshawk

Raw survey data for Goshawk is provided in Appendix 7.4. Results summary tables are presented in Appendix 7.3.

Vantage Points Surveys

During the 2015-2017 surveys, Goshawk was observed on one occasion in March 2017 (see Appendix 7.4, Figure 7.4.12). The flight was not within the potential collision risk zone.

Breeding Raptor Survey and Goshawk Survey

No evidence of Goshawk was recorded during breeding raptor surveys or during dedicated Goshawk surveys undertaken in March 2017.

No additional evidence of this species was recorded during the extensive surveys between 2015 and 2017.

7.3.2.7 Golden Eagle

Raw survey data for Golden Eagle is provided in Appendix 7.4. Results summary tables are presented in Appendix 7.3.

Vantage Points Surveys

During the 2015-2017 surveys, Golden Eagle was observed on one occasion in March 2016 (see Appendix 7.4, Figure 7.4.13). The flight was not within the potential collision risk zone.

No additional records of this species were recorded during VP surveys

Breeding Raptor Survey

No evidence of Golden Eagle was recorded at the windfarm site during the surveys undertaken between 2015 and 2016.

In 2017, Golden Eagle was recorded from the Barnsmore Gap area located approximately 1.6km to the west of the windfarm site (see Appendix 7.4, Figure 7.4.14). No evidence of breeding activity was recorded.

Incidental records

Incidental observations are provided in Table 7.19 below.

Table 7.19 Results Summary

Survey type	Dates	Observation
Wetland Waterbird Count	13/04/2016	Croaghnameal (GIS Code 35): Perched on bog and flushed by Surveyor
Wetland Waterbird Count	26/09/2017	Pettigo Plateau SPA (GIS Code 36): Individual recorded soaring in the wind

No additional evidence of this species was recorded during the extensive surveys between 2015 and 2017.

7.3.2.8 Lesser Black-backed Gull

Raw survey data for Lesser Black-backed Gull is provided in Appendix 7.4. Results summary tables are presented in Appendix 7.3.

Vantage Points Surveys

During the 2015-2017 surveys, a single Lesser Black-backed Gull was observed on one occasion in June 2017 (see Appendix 7.4, Figure 7.4.15). The flight was within the potential collision risk zone.

No additional records of this species were recorded during VP surveys

Wetland Waterbird Counts

The species was recorded offsite, at four wetland sites during the surveys (See Table 7.20 below). These sites are located a minimum distance of 3km from the proposed

windfarm site. No connectivity between the Proposed Development site and any supporting wetland habitat for this species was recorded. Monthly distribution of records is presented in Table 11 of Appendix 7.3.

Table 7.20 Results Summary

Location	No of Visits	Number of dates observations recorded	Max number individuals	Min number individuals
Lough Eske (GIS Code 1)	14	2	7	3
Lough Slug (GIS Code 5)	14	1	10	-
Trusk Lough (GIS Code 22)	14	1	3	-
Lough Derg (GIS Code 23)	14	1	21	-

No additional evidence of this species was recorded during the extensive surveys between 2015 and 2017.

7.3.2.9 Herring Gull

Raw survey data for Herring Gull is provided in Appendix 7.4. Results summary tables are presented in Appendix 7.3.

Vantage Points Surveys

During the 2015-2017 surveys, Herring Gull was not recorded during VP surveys of the windfarm site. The species was recorded from the migratory bird VP over the Barnesmore Gap on three occasions in April 2017 (see Appendix 7.4, Figure 7.4.16). The observations were of two single birds and a flock of 8.

No additional records of this species were recorded during VP surveys

Wetland Waterbird Counts

The species was recorded offsite at Lough Eske which is located 7.5km from the proposed development site (See Table 7.21). No connectivity between the Proposed Development site and any supporting wetland habitat for this species was recorded. Monthly distribution of records is presented in Table 12 of Appendix 7.4.

Table 7.21 Results Summary

Location	No of Visits	Number of dates observations recorded	Max number individuals	Min number individuals
Lough Eske (GIS Code 1)	14	1	2	-

No additional evidence of this species was recorded during the extensive surveys between 2015 and 2017.

7.3.2.10 Red Grouse

Raw survey data for Red Grouse is provided in Appendix 7.4. Results summary tables are presented in Appendix 7.3.

Vantage Points Surveys

During the 2015-2017 surveys, a single flight from a pair of Red Grouse was recorded outside the survey area to south west of the site boundary. The flight was not within the potential collision risk zone (see Appendix 7.4, Figure 7.4.17).

Two incidental records of calling birds and one visual observation of a perched bird was recorded in the vicinity of VP 1 during the 2016 and 2017 surveys.

No additional records of this species were recorded during VP surveys

Breeding Birds and Red Grouse Survey

No evidence of Red Grouse was recorded from within the proposed windfarm site during the dedicated surveys. Three observations of birds were recorded approximately 500m outside and to the south of the proposed windfarm site. One breeding territory was also noted from this area during breeding bird surveys. (see Appendix 7.4, Figure 7.4.18).

No additional evidence of this species was recorded during the extensive surveys between 2015 and 2017.

7.3.2.11 Woodcock

Raw survey data for Woodcock is provided in Appendix 7.4. Results summary tables are presented in Appendix 7.3.

Vantage Points Surveys

During the 2015-2017 surveys, single woodcock were recorded on seven occasions (see Appendix 7.4, Figure 7.4.19). Three records were from the wintering period and four records were from the breeding period. None of the flights were within the potential collision risk zone.

No additional records of this species were recorded during VP surveys

Woodcock Survey Results

One observation of a roding male was recorded near VP 18 in May 2016 (see Appendix 7.4, Figure 7.4.20). No subsequent observation were recorded. Survey results are provided in Table 7.22 below.

Table 7.22 Summary of Woodcock Survey results

Survey Dates	Observation
27/05/2016	Number: Single male recorded Behaviour: Roding and calling over mature woodland around VP18 Habitat : Conifer Plantation (WD4)
08/06/2016	No observations
22/06/2017	No observations
24/06/2017	No observations
27/06/2017	No observations
20/06/2017	No observations

Survey Dates	Observation
21/06/2017	No observations

Incidental records

Incidental observations are provided in Table 7.23 below.

Table 7.23 Incidental Observations

Survey type	Dates	Observation
Commute to VP Surveys	26/01/2017, 26/01/2017, 01/02/2017, 17/02/2017, 18/02/2017, 18/02/2017	On six occasions surveyors flushed woodcock whilst driving on forestry tracks. The observation were from the wintering period and were recorded near VPs 1, 3 and 18.

No additional evidence of this species was recorded during the extensive surveys between 2015 and 2017.

7.3.2.12 Wigeon

Raw survey data for Wigeon is provided in Appendix 7.4. Results summary tables are presented in Appendix 7.3.

Vantage Points Surveys

During the 2015-2017 surveys, two Wigeon were recorded on one occasion in February 2017 (see Appendix 7.4, Figure 7.4.21). Flight activity was not within the potential collision risk zone.

No additional records of this species were recorded during VP surveys

Wetland Waterbird Counts

The species was recorded offsite at two wetland sites during the surveys (See Table 7.24). These sites are located a minimum distance of 3km from the proposed windfarm site. The observations were of single birds. No flocks were recorded. No connectivity between the Proposed Development site and any supporting wetland habitat for this species was recorded. Monthly distribution of records is presented in Table 13 of Appendix 7.4.

Table 7.24 Results Summary

Location	No of Visits	Number of dates observations recorded	Max number individuals	Min number individuals
Lough Mourne (GIS Code 20)	14	1	2	-
Lough Trusk (GIS Code 22)	14	1	1	-

No additional evidence of this species was recorded during the extensive surveys between 2015 and 2017.

7.3.2.13 Buzzard

Raw survey data for Buzzard is provided in Appendix 7.4. Results summary tables are presented in Appendix 7.3.

Vantage Points Surveys

During the 2015-2017 surveys, 40 flights were recorded which were distributed across the breeding season (see Appendix 7.4, Figure 7.4.22). . No flights were recorded in the wintering period. 17 flights were within the potential collision risk zone. Observations were of individual birds.

Breeding Bird Surveys

There were a total of eleven observations of Buzzard from the breeding seasons of 2015, 2016 and 2017 (see Appendix 7.4, Figure 7.4.23). No evidence of breeding activity was recorded.

Breeding Raptor Survey

There were 13 observations of buzzard during the 2016 and 2017 breeding seasons. Only one observation was within the proposed windfarm site boundary. No evidence of breeding activity was recorded.

Incidental Sightings

There were 13 incidental observations of this species during the surveys. Activity recorded including soaring and hunting. The majority of the records were from outside the windfarm site boundary.

7.3.2.14 Sparrowhawk

Raw survey data for Sparrowhawk is provided in Appendix 7.4. Results summary tables are presented in Appendix 7.3.

Vantage Points Surveys

During the 2015-2017 surveys, 18 flights were recorded. No flights were recorded in the 2015 breeding Season or the 2015/2016 winter season. Only one flight was within the potential collision risk zone. Observations consisted solely of individual birds.

Breeding Bird Surveys

There were two observations of Sparrowhawk recorded during the 2017 breeding season (see Appendix 7.4, Figure 7.4.24). The observations were of birds in flight and no evidence of breeding activity recorded.

Breeding Raptor Survey

There were 4 observations of Sparrowhawk during the 2016 and 2017 breeding seasons (see Appendix 7.4, Figure 7.4.25). Only one observation was within the proposed windfarm site boundary. No evidence of breeding activity was recorded.

Incidental Sightings

There were two incidental observations of this species during the surveys. Only flight activity including soaring was recorded.

7.3.2.15 Kestrel

Raw survey data for Kestrel is provided in Appendix 7.4. Results summary tables are presented in Appendix 7.3.

Vantage Points Surveys

During the 2015-2017 surveys, 10 flights were recorded which were distributed across all seasons (see Appendix 7.4, Figure 7.4.26). Six flights were within the potential collision risk zone. Observations were of individual birds.

Breeding Bird Surveys

There was one sighting of a Kestrel in flight recorded in May 2016. No evidence of breeding activity was recorded.

Breeding Raptor Survey

There were three observations of Kestrel from the Barnesmore Gap area during the 2017 breeding season (see Appendix 7.4, Figure 7.4.27). No evidence of this species was recorded from within the windfarm site. The pair recorded at the Barnesmore Gap in June 2017 were assigned *probable* breeding status.

Incidental Sightings

There were four incidental observations of this species during the surveys. Activity recorded including hunting, hovering and a perched male bird.

7.3.2.16 Passerines (Red listed Species)

The BoCCI Red listed species Meadow Pipit, Grey Wagtail and Yellowhammer were recorded during the surveys undertaken. No evidence of Grey Wagtail or Yellowhammer breeding activity was recorded. Meadow Pipit were confirmed breeding within the study area and a breeding territory map is provided as Figure 7.1.28 of Appendix 7.4.

7.3.2.17 General Wetland Waterbird Counts & Breeding Red-throated Diver Survey

Sites deemed suitable to support wintering and migratory bird species were identified within an approximate 10km radius of the study area and waterfowl counts were conducted. The sites are listed in Table 7.10 above.

A breeding pair or Red Throated Diver were identified from Durnough Lough in 2016. The windfarm site is located 10.8km from the breeding site and is located outside the core foraging range of the species as per SNH guidance (i.e. 8km). A breeding season survey was conducted of Durnough Lough to identify if any connectivity could be identified between the breeding site and the Windfarm site but no such connectivity was identified. Foraging activity was confined to the lake network of Pettigo Plateau with regular flights to Lough Nasheeoge recorded.

The aim of the wetland waterbird count surveys was to detect any movement of wintering and migratory birds from these areas to the study area at Meenbog. No such connectivity was identified.

The surveys identified a number of target species which were not recorded at the Meenbog wind farm site (including 500m buffer):

- Greenland White-fronted Goose
- Common Gull
- Tufted Duck
- Lapwing
- Great Northern Diver
- Red-throated Diver
- Curlew

The Proposed Development has no potential to result in direct habitat loss, displacement or barrier effect on any of the species listed above. No pathways for direct or indirect effects exist. Therefore the species listed above are not considered further in this assessment.

7.4 Evaluation

A determination of population importance of birds within the likely zone of influence is provided in the sections below following criteria described in Section 7.2.5. Estimates of National population sizes were obtained from the NPWS Article 12 Reporting (2008-2012) which details the status and trends of Irelands Bird species. Where relevant, estimates for mean county populations has been derived following a review of I-WeBS sites in the county.

7.4.1 Whooper Swan

Wintering

There was only one observation of a single Whooper Swan over the windfarm site. Numbers of ecological significance as per NRA criteria were not recorded. No evidence of feeding or roosting activity was recorded within the windfarm site or 500m buffer. No flights were recorded within the potential collision risk zone. The development site is not of significance to the species

7.4.2 Golden Plover

Wintering

This species was only recorded once with the windfarm site boundary and twice within the 500m buffer of the boundary. No regularly occurring population was recorded at or near the proposed windfarm site and the species was not dependent on the habitats within the study area for feeding, loafing or roosting.

The estimated national wintering population of Golden Plover in Ireland is 99,870. 1% of the ROI National wintering population of Golden Plover is 999. As per NRA 2009, a regularly occurring population of 999 Golden Plover is required for classification as Nationally Important. The maximum number of birds recorded from the winter season was 30 birds. This maximum number does not correspond with the classification criteria for National or International Importance (Crowe and Holt, 2013).

To estimate the county population, a review of Donegal I-WeBS sites was conducted. It should be noted Donegal I-WeBS sites are mainly coastal in nature and the population estimate provided based on I WeBS figures below is likely to be an underestimate of the county population. The following mean count values have been recorded for Donegal I-WeBS sites over the most recent 10-season period, i.e. for the period 2005/06 – 2014/15:

- Clooney Lough (mean 0)
- Culduff (mean 0)
- Donegal Bay (mean 38)
- Dunfanaghy Estuary (mean 22)
- Dunfanagh New Lake (mean 0)
- Fanad north Coast (mean 0)
- Gweebarra Bay (mean 0)
- Kiltorris Lough (mean 0)
- Lough Acapple (mean 0)
- Lough Effish (mean 0)
- Lough Fern (mean 0)
- Lough Foyle (mean 0)
- Lough Inn (mean 0)
- Lough Naminn (mean 0)
- Lough Shavnagh (Tully) (mean 0)
- Lough Swilly (mean 2273)

- Lough Akibbon and Nacally (mean 0)
- Maghery Lough (mean 0)
- Mintiags Lough (mean 0)
- River Foyle (mean 0)
- Sheskinmore Lough (mean 57)
- Trawbreaga Bay (mean 0)

The figures above sum up to an estimated mean wintering population from Donegal I-WeBS sites of 2390. Therefore, taking a precautionary approach, a regularly occurring population of 24 birds (1% of county population) is considered of County importance in the context of the Donegal population.

Rare occurrences of flocks of **County Importance** were recorded during VP watches and during the winter walkover surveys. The windfarm site is not of significance to the species.

Breeding

No evidence of breeding activity was recorded.

7.4.3 Merlin

There were only three observations of this species at the windfarm site. Numbers of ecological significance as per NRA criteria were not recorded. No evidence of breeding or roosting activity was recorded within the windfarm site. No flights were recorded within the potential collision risk zone.

Taking a precautionary approach the *probable* breeding population recorded approximately 1.7km to the east of the windfarm site was assigned **Local Importance (Higher Value)** on the basis of a resident/regularly occurring population assessed to be important at the local level.

7.4.4 Peregrine

There was only one incidental observation of this species over the windfarm site. Numbers of ecological significance as per NRA criteria were not recorded. No evidence of breeding or roosting activity was recorded within the study area. No flights were recorded within the potential collision risk zone.

Taking a precautionary approach the *confirmed* breeding population recorded from the Barnesmore Gap was assigned **Local Importance (Higher Value)** on the basis of a resident/regularly occurring population assessed to be important at the local level.

7.4.5 Hen Harrier

Wintering

The estimated national wintering population of Hen Harrier in Ireland is 269-349 therefore 1% of the ROI National wintering population is 2-3 birds. As per NRA 2009, a regularly occurring wintering population of 2-3 Hen Harrier is required for classification as Nationally/Internationally Importance. This species was not dependent on the habitat of the windfarm site. Taking a precautionary approach it is assumed that the individuals recorded during the winter season are associated with a **Nationally/Internationally important** wintering population identified roosting 2.5km from the site boundary.

Breeding

Based on the latest Breeding Hen Harrier Survey (NPWS 2015), the ROI National breeding population is in the range of 108-157 pairs. Therefore a single breeding pair in Ireland conforms to International Importance as per NRA criteria. No evidence of breeding activity was recorded for this species at or within the 2km survey buffer of the development site boundary. In addition this species was not observed within the study area during the core breeding season of Mid May –June.

Taking a precautionary approach, it is likely that the individuals recorded outside the core breeding season are associated with a **Nationally/Internationally** important population from the wider area.

7.4.6 Goshawk

There was only one observation of this species over the windfarm site. Numbers of ecological significance as per NRA criteria were not recorded. No evidence of breeding or roosting activity was recorded within the study area. No flights were recorded within the potential collision risk zone.

7.4.7 Golden Eagle

There was only one observation of this species over the windfarm site. Numbers of ecological significance as per NRA criteria were not recorded. No evidence of breeding or roosting activity was recorded within the study area. No flights were recorded within the potential collision risk zone.

7.4.8 Lesser Black-backed Gull

There was only one observation of this species over the windfarm site. Numbers of ecological significance as per NRA criteria were not recorded. No evidence of breeding or roosting activity was recorded within the study area. No flights were recorded within the potential collision risk zone.

7.4.9 Herring Gull

There were no observations of this species at the windfarm site. Numbers of ecological significance as per NRA criteria were not recorded. No evidence of breeding or roosting activity was recorded within the study area. No flights were recorded within the potential collision risk zone.

7.4.10 Red Grouse

The species is Red listed in Ireland. The resident population recorded outside the development site boundary was assigned **Local Importance (Higher Value)**.

7.4.11 Woodcock

Woodcock is Red listed during the breeding season in Ireland.

In 2017, the first national survey for the species has been launched by University College Cork. The survey method, which was consistent with best practice standards, involved counting calling males. Due to the uncertainty that exists between the ratio of calling males to breeding pairs it is unlikely that a reliable population estimate can be reported.

Prior to 2017, no dedicated national survey has been conducted to estimate the breeding population size of Woodcock in Ireland. Furthermore due to the crepuscular behaviour of this species which is associated with woodlands the methodology and

timing of activities employed by previous bird atlases did not directly lead to robust population estimates.

‘Birds in Europe II’ supplied a population estimate (2500 – 9999) in part based on the breeding range as reported in Gibbons’ Breeding Atlas (BirdLife International, 2004). This is a very broad estimate and cannot be broken down on a county by county basis.

A single calling male was recorded on one occasion during the dedicated surveys. The location where the observation was recorded was subject to follow up visits but no further observation was recorded. There is no evidence to suggest that the windfarm site is of significance to breeding woodcock. Taking an extremely precautionary approach, the identified calling male is likely to be associated with potential local breeding population of **Local Importance (Higher Value)**.

7.4.12 Wigeon

There was only one observation of this species over the windfarm site. Numbers of ecological significance as per NRA criteria were not recorded. No evidence of breeding or roosting activity was recorded within the study area. No flights were recorded within the potential collision risk zone.

7.4.13 Common Buzzard

Buzzard is not listed on Annex I of the Birds Directive. The species is Green listed in Ireland (BoCCI). No evidence of breeding activity was recorded within the 2km buffer of the site boundary. The birds recorded during the breeding season are likely to be associated with a breeding population from the wider area and were assigned **Local Importance (Higher Value)**.

7.4.14 Eurasian Sparrowhawk

Sparrowhawk is not listed on Annex I of the Birds Directive. The species is Amber listed in Ireland (BoCCI). The population recorded across the seasons was assigned **Local Importance (Higher Value)** on the basis of a resident/regularly occurring population assessed to be important at the local level.

7.4.15 Common Kestrel

Kestrel is not listed on Annex I of the Birds Directive. The species is Amber listed in Ireland (BoCCI). The population recorded across the seasons was assigned **Local Importance (Higher Value)** on the basis of a resident/regularly occurring population assessed to be important at the local level.

7.4.16 Passerines (Red listed species)

Grey Wagtail, Yellowhammer and Meadow Pipit are Red listed in Ireland. Populations recorded were deemed to be of no greater than **Local importance (lower Value)**.

7.4.17 Identification of Key Ornithological Receptors

Table 7.25 Avifauna Receptor Evaluation and Selection Criteria

Name	Conservation Status	NRA Evaluation (NRA, 2009)	Rational for inclusion/exclusion as KOR	KOR Yes/No
Whooper Swan	Annex I, EU Birds Directive; BoCCI Amber List & Irish Wildlife Act.	Wintering N/A	<p>This species was not recorded utilising habitat within the site boundary The development footprint is dominated by conifer planation, which does not provide suitable habitat for the species. There is no potential for direct habitat loss.</p> <p>The species was not recorded utilising habitat within a 1.7km radius of the site boundary. Therefore the development is outside the 600m sensitivity buffer of the species as identified in McGuinness et al 2015</p> <p>Only one observation of flight activity bird was recorded during the extensive surveys. There is no evidence to suggest that the development site lies on a commuting or migratory route for the species. No potential for displacement effect exists.</p> <p>The single flight recorded was outside the potential collision risk zone. While collision risk modelling cannot be carried out, this does not mean that the collision risk cannot be assessed, but instead it means that the collision risk, within the accuracy levels available to the assessment, is zero.</p>	No
Golden Plover	Annex I, EU Birds Directive; BoCCI Red List & Irish Wildlife Act.	Wintering Rare observations of flocks of County importance recorded	<p>The development footprint is dominated by conifer plantation, which does not provide suitable foraging, loafing or roosting habitat for the species. There is no potential for loss of significant habitat for this species given that flocks were only recorded within the 500m buffer of the site on two occasion between 2015 and 2017. However, taking a precautionary approach, the potential for displacement exists and required assessment.</p> <p>A flock of 30 birds was recorded on one occasion flying over the site. The flight was within the potential collision risk zone. A collision risk assessment is required.</p>	Yes
Merlin	Annex I, EU Birds Directive; BoCCI	All Seasons Population of ecological	The potential for habitat loss, while minimal, cannot be excluded. An assessment of direct habitat loss is required.	Yes

Name	Conservation Status	NRA Evaluation (NRA, 2009)	Rational for inclusion/exclusion as KOR	KOR Yes/No
	Amber List & Irish Wildlife Act.	significance not recorded within study area	<p>The species was recorded within the site boundary. An assessment of displacement effect is required.</p> <p>No flight activity was recorded within the potential collision risk zone. While collision risk modelling cannot be carried out, this does not mean that the collision risk cannot be assessed, but instead it means that the collision risk, within the accuracy levels available to the assessment, is zero.</p>	
Peregrine	Annex I, EU Birds Directive; BoCCI Green List & Irish Wildlife Act.	<u>N/A</u>	<p>Only one incidental sighting was observed. There is no evidence to suggest that the development site is of significance to this species.</p> <p>This species was not recorded flying within the potential collision risk zone during the extensive VP survey work undertaken. While collision risk modelling cannot be carried out, this does not mean that the collision risk cannot be assessed, but instead it means that the collision risk, within the accuracy levels available to the assessment, is zero.</p> <p>No pathways for direct or indirect effects were identified.</p>	No
Hen Harrier	Annex I, EU Birds Directive; BoCCI Amber List & Irish Wildlife Act.	<u>All Seasons</u> National/ International Importance	<p>There are no Hen Harrier breeding or roosting sites within the study area. Suitable foraging habitat was recorded within and surrounding the windfarm site. The potential for habitat loss, while minimal, cannot be excluded. An assessment of direct habitat loss is required.</p> <p>Hen Harrier were recorded within the site boundary and 500m buffer. An assessment of displacement effects is required.</p> <p>Three flights were recorded at potential collision risk height. A collision risk assessment is required.</p>	Yes
Goshawk	Annex I, EU Birds Directive; Irish Wildlife Act.	<u>N/A</u>	<p>Only one sighting was observed. There is no evidence to suggest that the development site is of significance to this species.</p> <p>This species was not recorded flying within the potential collision risk zone during the extensive VP survey work undertaken. While collision risk modelling cannot be carried out, this does not mean that the collision risk cannot be assessed, but</p>	No

Name	Conservation Status	NRA Evaluation (NRA, 2009)	Rational for inclusion/exclusion as KOR	KOR Yes/No
			<p>instead it means that the collision risk, within the accuracy levels available to the assessment, is zero.</p> <p>No pathways for direct or indirect effects were identified.</p>	
Golden Eagle	Annex I, EU Birds Directive; Irish Wildlife Act.	<u>N/A</u>	<p>Only one sighting was observed. There is no evidence to suggest that the development site is of significance to this species.</p> <p>This species was not recorded flying within the potential collision risk zone during the extensive VP survey work undertaken. While collision risk modelling cannot be carried out, this does not mean that the collision risk cannot be assessed, but instead it means that the collision risk, within the accuracy levels available to the assessment, is zero.</p> <p>No pathways for direct or indirect effects were identified.</p>	No
Lesser Black-backed Gull	BoCCI Amber List & Irish Wildlife Act	<u>N/A</u>	<p>Only one sighting was observed. There is no evidence to suggest that the development site is of significance to this species. There is no potential for direct habitat loss or displacement of this species</p> <p>No pathways for significant direct or indirect effects were identified.</p>	No
Herring Gull	BoCCI Red List & Irish Wildlife Act	<u>N/A</u>	<p>This species was never recorded within the 500m buffer of the windfarm site.</p> <p>No pathways for direct or indirect effects were identified.</p>	No
Red Grouse	BoCCI Red List & Irish Wildlife Act.	<u>All Seasons</u> Local Importance (Higher value)	<p>This species was not recorded utilising habitat within the site boundary. The development footprint is dominated by conifer plantation, which does not provide suitable habitat for the species. There is no potential for direct habitat loss.</p> <p>During the breeding season, the species was recorded approximately 500m from the site boundary. Taking a precautionary approach, an assessment of displacement effect is required.</p> <p>This species is sedentary. No flights were recorded within the potential collision risk zone. While collision risk modelling cannot be carried out, this does not mean</p>	Yes

Name	Conservation Status	NRA Evaluation (NRA, 2009)	Rational for inclusion/exclusion as KOR	KOR Yes/No
			that the collision risk cannot be assessed, but instead it means that the collision risk, within the accuracy levels available to the assessment, is zero.	
Woodcock	BoCCI Red List & Irish Wildlife Act.	Breeding and Wintering Local Importance (Higher value)	This species was recorded during the dedicated breeding surveys undertaken. An assessment of direct habitat loss and displacement is required. This species is sedentary. No flights were recorded within the potential collision risk zone.	Yes
Wigeon	BoCCI Red List & Irish Wildlife Act.	N/A	Only one sighting was observed. There is no evidence to suggest that the development site is of significance to this species. This species was not recorded flying within the potential collision risk zone during the extensive VP survey work undertaken. While collision risk modelling cannot be carried out, this does not mean that the collision risk cannot be assessed, but instead it means that the collision risk, within the accuracy levels available to the assessment, is zero. No pathways for direct or indirect effects were identified.	No
Buzzard	BoCCI Amber List & Irish Wildlife Act.	All Seasons Local Importance (Higher value)	The potential for habitat loss, while minimal, cannot be excluded. An assessment of direct habitat loss is required. The species was recorded within the site boundary. An assessment of displacement effect is required. This species was recorded flying over the site within the potential collision risk zone. A collision risk assessment is required	Yes
Sparrowhawk	BoCCI Amber List & Irish Wildlife Act.	All Seasons Local Importance (Higher value)	The potential for habitat loss, while minimal, cannot be excluded. An assessment of direct habitat loss is required. The species was recorded within the site boundary. An assessment of displacement effect is required. This species was recorded flying over the site within the potential collision risk zone. A collision risk assessment is required	Yes

Name	Conservation Status	NRA Evaluation (NRA, 2009)	Rational for inclusion/exclusion as KOR	KOR Yes/No
Kestrel	BoCCI Amber List & Irish Wildlife Act.	All Seasons Local Importance (Higher value)	<p>The potential for habitat loss, while minimal, cannot be excluded. An assessment of direct habitat loss is required.</p> <p>The species was recorded within the site boundary. An assessment of displacement effect is required.</p> <p>This species was recorded flying over the site within the potential collision risk zone. A collision risk assessment is required</p>	Yes
Passerines (Red listed species)	Irish Wildlife Act.	All Seasons Local Importance (higher value)	<p>Significant effects are not anticipated given the nature of the habitats within the development footprint and the assemblage of bird species recorded. As per SNH guidance, it is generally considered that passerine species are not significantly impacted by wind farms.</p>	No

7.4.18 KOR Sensitivity Determination

Criteria developed by Percival (2003) is presented in Table 2.2 (Section 2.5.2) for assessing bird sensitivity within the study area.

The following species are cited interests of SPAs within the zone of influence of the Proposed Development. These species are classified as **Very High** sensitivity as per Percival 2003.

- Golden Plover (Annex I species and SCI of nearby SPA)
- Merlin (Annex I species and SCI of nearby SPA)

Hen Harrier was the only **High Sensitivity** KOR identified

Medium Sensitivity KORs include:

- Red Grouse (Red listed species in breeding season)
- Woodcock (Red listed species in breeding season)

The remaining KORs identified in the study area were classed as **Low Sensitivity**.

- Buzzard
- Sparrowhawk
- Kestrel

7.5 Likely and Significant Effects

This assessment of effects is structured as follows:

- Assessment of ‘Do nothing’ Effect
- Assessment of effects in relation to sites designated for nature conservation
- Assessment of effects in relation to Key Ornithological Receptors
- Summary of potential effects associated with proposed infrastructure

All elements of the Proposed Development have been considered in assessing effects on ecological receptors, including:

- Turbines (including Hardstanding areas)
- Borrow Pit
- Substation and Grid Connection
- Other Infrastructure (Roads, Construction Compounds, Met Mast)
- Junction Accommodation and road upgrade works
- Construction and decommissioning

7.5.1 Do-Nothing Effect

The land that forms the study area is dominated by commercial forestry plantations at various stages in the rotational cycle.

If the wind energy development for which this EIAR has been prepared does not go ahead, it is to be assumed that the character of the landscape and its uses will remain much as they are today.

7.5.2 Effects on Designated Areas

The Proposed Development is not located within the boundaries of any European or Nationally designated sites important for nature conservation (Figure 7.1). There will be no direct effects on any designated site as a result of the construction, operation and decommissioning of the Proposed Development.

None of the NHAs or pNHAs or ASSIs within the ZOI were considered as KERs in their own right for the following reasons:

- Distance/buffer from the Proposed Development
- Nature of the conservation sites (e.g. terrestrial nature of habitats)
- There are no sites with hydrological connectivity which could potentially be affected (See Chapter 8 of the EIAR).
- Where a nationally designated site overlaps with the boundary of a European designated site the potential for impacts has been considered under the European designation.

With regard to European Sites, an AA Screening assessment was carried out to provide the public authority with the information necessary to complete a Screening for Appropriate Assessment for the Proposed Development in compliance with Article 6(3) of the Habitats Directive. As part of this assessment, the potential for the Proposed Development to have an effect on any European sites in the ZOI was considered. No potential for impact on Special Protection Areas were identified. Potential for impacts on Special Areas of Conservation is considered in Chapter 6.

7.5.3 Effects on Key Ornithological Receptors

7.5.3.1 Golden Plover (Construction and Operation)

7.26 Impact Characterisation for Ecological Receptors based on Percival (2003) & EPA (2002)).

Analysis of potential effects during construction and operational phases of the Proposed Development		Magnitude and Significance of potential effect (Percival 2003)	Significance of potential effect (EPA 2002)
Construction Phase			
Direct Habitat Loss	This species was never recorded utilising habitats within the proposed site boundary for breeding roosting or foraging. Golden Plover was recorded loafing within the 500m buffer in an area of peatland to the north east. No evidence of foraging activity was recorded at this location. The development footprint is dominated by conifer plantation, which does not provide suitable habitat for the species. Effects with regard to direct habitat loss are not anticipated.	No Effect	No Effect
Displacement	No breeding or roosting sites were recorded within the study area and there is no evidence to suggest the windfarm site is of significance to wintering populations. Disturbance during construction is unlikely to discourage flight activity or foraging in the vicinity of the Proposed Development particularly given the low levels of activity recorded. Significant displacement effects are not anticipated.	The magnitude of the effect is assessed as <i>negligible</i> . The cross tabulation of <i>Very High</i> sensitivity species and <i>Negligible</i> Impact corresponds to a Low effect significance	Short-term Slight Negative Effect
Operational Phase			
Direct Habitat Loss	This species was never recorded utilising habitats within the proposed site boundary for roosting but was recorded loafing within the 500m buffer in an area of peatland to the north east. No evidence of foraging activity was recorded. The development footprint is dominated by conifer plantation, which does not provide suitable habitat for the species. Effects with regard to direct habitat loss are not anticipated.	No Effect	No Effect
Displacement	A study by (Pearce-Higgins et al. 2009) found reduced use of habitat surrounding operating turbines, to within 200 m of the turbine base. A	The magnitude of the effect is assessed as <i>negligible</i> .	Long-term Slight Negative Effect

Analysis of potential effects during construction and operational phases of the Proposed Development	Magnitude and Significance of potential effect (Percival 2003)	Significance of potential effect (EPA 2002)
<p>review of 29 other studies suggests Golden Plover will approach wind turbines to an average distance of 175 m in non-breeding season (Hötker et al. 2006). Furthermore, post-construction monitoring at 15 upland wind farms showed no significant decline in populations post construction (Pearce-Higgins et al. 2012). There are extensive areas of suitable habitat in the wider area, outside any potential displacement buffer, should any potential displacement effect occur.</p> <p>Significant displacement effects are not anticipated.</p>	<p>The cross tabulation of <i>Very High</i> sensitivity species and <i>Negligible</i> Impact corresponds to a Low effect significance</p>	
<p>Collision</p> <p>Collision risk for waders is generally deemed to be low, due to a relatively low cursory flight path, coupled with high flight manoeuvrability (McGuinness et.al 2015). A review of pan-European collision assessments revealed much lower Golden Plover collision records than other species, though this was not controlled for survey effort or corpse recovery rates (Hötker et al. 2006).</p> <p>Golden Plover was recorded flying within the potential collision risk zone during VP surveys. A collision risk has been undertaken and full details are provided in Appendix 7.6</p> <p>The collision risk has been calculated at a ratio of 0.0624 collisions per year which equates to one bird every 16 years. The loss of 0.0624 golden plover per year equates to an annual potential loss of 0.02% of the estimated Donegal County population. This is insignificant in the context of the local, county, national and international population.</p> <p>No significant effects are anticipated regarding collision risk at any geographical scale.</p>	<p>The magnitude of the effect is assessed as <i>negligible</i>. The cross tabulation of <i>Very High</i> sensitivity species and <i>Negligible</i> Impact corresponds to a Low effect significance</p>	<p>Long-term Slight Negative Effect</p>

7.5.3.2 Merlin (Construction and Operation)

Table 7.27 Impact Characterisation for Ecological Receptors based on Percival (2003) & EPA (2002)).

Analysis of potential effects during construction and operational phases of the Proposed Development		Magnitude and Significance of potential effect (Percival 2003)	Significance of potential effect (EPA 2002)
Construction Phase			
Direct Habitat Loss	This species was not recorded utilising habitat within the site boundary for roosting or breeding. The development footprint is dominated conifer plantation (semi-mature/mature) consequently; direct loss of potential foraging habitat will be minimal. Substantial areas of undisturbed suitable foraging habitat will remain.	The magnitude of the effect is assessed as <i>negligible</i> . The cross tabulation of <i>Very High</i> sensitivity species and <i>Negligible</i> Impact corresponds to a Low effect significance	Long -term Slight Negative Effect
Displacement	No breeding or roosting sites were recorded within the study area. Disturbance during construction is unlikely to discourage flight activity or foraging in the vicinity of the Proposed Development particularly given the low levels of activity recorded. Significant displacement effects are not anticipated.	The magnitude of the effect is assessed as <i>negligible</i> . The cross tabulation of <i>Very High</i> sensitivity species and <i>Negligible</i> Impact corresponds to a Low effect significance	Short-term Slight Negative Effect
Operational Phase			
Direct Habitat Loss	Direct or indirect effects are not anticipated	No Effect	No Effect
Displacement & barrier effect	Significant effects are not anticipated particularly given the low levels of activity recorded. Extensive areas of suitable foraging habitat will remain post construction and there is an abundance of suitable habitat in the surrounding area. Disturbance during operation is unlikely to discourage flight activity or foraging in the vicinity of the Proposed Development.	The magnitude of the effect is assessed as <i>negligible</i> . The cross tabulation of <i>Very High</i> sensitivity species and <i>Negligible</i> Impact corresponds to a Low effect significance	Long-term Slight Negative Effect
Collision	No flight activity was recorded within the potential collision risk zone. While collision risk modelling cannot be carried out, this does not mean that the	No Effect	No Effect

Analysis of potential effects during construction and operational phases of the Proposed Development	Magnitude and Significance of potential effect (Percival 2003)	Significance of potential effect (EPA 2002)
collision risk cannot be assessed, but instead it means that the collision risk, within the accuracy levels available to the assessment, is zero.		

7.5.3.3 Hen Harrier (Construction and Operation)

Table 7.28 Impact Characterisation for Ecological Receptors based on Percival (2003) & EPA (2002).

Analysis of potential effects during construction and operational phases of the Proposed Development	Magnitude and Significance of potential effect (Percival 2003)	Significance of potential effect (EPA 2002)	
Construction Phase			
Direct Habitat Loss	<p>This species was not recorded utilising habitat within the site boundary for roosting or breeding between April 2015 and September 2017. The development footprint is dominated by conifer plantation (semi-mature/mature) consequently; direct loss of potential supporting habitat will be insignificant.</p> <p>The felling of forestry associated with the construction of the development has the potential to create new areas of potential supporting habitat.</p>	<p>The magnitude of the effect is assessed as <i>low</i>. The cross tabulation of <i>High</i> Sensitivity species and <i>Low</i> Impact corresponds to a Very Low effect significance</p>	Long-term Slight Negative Effect
Displacement	<p>No breeding or roosting sites were recorded within the site boundary and the species was not recorded during the core breeding period of mid-May to June (Ruddock et.al 2015) in any breeding season (i.e. 2015, 2016, and 2017).</p> <p>Very few observations of Hen Harrier were recorded between 2015 and 2017 Based on the lack of records and the current forestry conditions there is no evidence to suggest that potential for significant displacement effect exists.</p> <p>A recent assessment of the effects of a wind farm on an existing population of breeding Hen Harriers reported regular flights at close proximity to turbine bases, some of which were at rotor height (Madden & Porter 2007). Madden & Porter (2007) revealed that, although reductions in flight activity</p>	<p>The magnitude of the effect is assessed as <i>Negligible</i>. The cross tabulation of <i>High</i> Sensitivity species and <i>Low</i> Impact corresponds to a Very Low effect significance</p>	Short-term Slight Negative Effect

Analysis of potential effects during construction and operational phases of the Proposed Development	Magnitude and Significance of potential effect (Percival 2003)	Significance of potential effect (EPA 2002)	
around turbines were observed during the construction phase, the activity of bird populations quickly returned to pre-construction levels.			
Operational Phase			
Direct Habitat Loss	Direct or indirect effects are not anticipated	No Effect	No Effect
Displacement	<p>No breeding or roosting sites were recorded within the study area between April 2015 and September 2017. The species was not recorded at the site during the core breeding period of mid-May to June as defined by Ruddock et.al (2015). Based on the core dataset there is no potential for significant displacement effect given that Hen Harrier were not dependent on the habitats within the study area for roosting, foraging or breeding.</p> <p>However, given the historical significance of the study area to Hen Harrier further assessment has been undertaken on a precautionary basis below.</p> <p>The development site is located in a non-designated regionally important area for Hen Harrier (South Donegal 1) as identified by the NPWS. Hen Harrier has previously bred within the site boundary and there is potential for the species to reoccupy the area in the future. The potential for re-occupancy is directly correlated to Coillte’s forestry management of the site. Forestry plantations in their initial years, prior to closed canopy, have potential to support breeding and foraging Hen Harrier. Therefore as forestry matures/is felled there is potential for ongoing loss/creation of supporting habitat for Hen Harrier.</p> <p>Turbine avoidance by Hen Harriers observed at one wind farm installation extended to within 250 m of turbines (Pearce-Higgins et al. 2009). The assessment of displacement provided below relies on the following precautionary assumptions:</p> <ul style="list-style-type: none"> • 100% displacement within the 250m buffer of the turbines • Hen Harrier have reoccupied the area 	<p>No Effect</p> <p>The magnitude of the effect is assessed as <i>low</i>. The cross tabulation of <i>High</i> Sensitivity species and <i>Low</i> Impact corresponds to a Very Low effect significance.</p>	<p>Long-term Slight Negative Effect</p>

Analysis of potential effects during construction and operational phases of the Proposed Development	Magnitude and Significance of potential effect (Percival 2003)	Significance of potential effect (EPA 2002)
<ul style="list-style-type: none"> The non-designated area South Donegal 1 corresponds to the area utilised by the local Hen Harrier population. <p>Following analysis of Coillte’s felling/replanting schedule it has been determined that on average 33.89% of the area within the 250m buffer zone would be available for Hen Harrier in any given year during the operational phase of the development (i.e. 2020-2050). This means that Hen Harrier could potentially avoid 126ha of potential suitable habitat on average per year between 2020 and 2050.</p> <p>The non-designated regionally important area South Donegal 1 is approximately: 24,320ha. The potential area of avoidance (i.e.126ha) corresponds to 0.5% of the South Donegal 1 area. The magnitude of this effect is considered negligible as it equates to less than 1% loss/avoidance of suitable habitat area at the local level.</p> <p>Furthermore, taking into consideration the historic significance of the study area to hen harrier; a habitat enhancement plan has been devised with the aim of creating suitable foraging and breeding habitat for the species within the South Donegal 1 area but outside a 2km buffer of the Proposed Development boundary. This plan has the potential to have a positive impact on the species at the local level.</p>		
<p>Collision</p> <p>The species was recorded flying within the potential collision risk zone during VP surveys. A collision risk has been undertaken and full details are provided in Appendix 7.6</p> <p>The collision risk has been calculated at a rate of 0.0069 collisions per year or one bird every 144 years. The predicted collision risk is insignificant in the context of the local, county, national and international population. No significant effects are anticipated regarding collision risk at any geographical scale.</p>	<p>The magnitude of the effect is assessed as <i>low</i>. The cross tabulation of <i>High</i> Sensitivity species and <i>Low</i> Impact corresponds to a <i>Very Low</i> effect significance</p>	<p>Long-term Slight Negative Effect</p>

Analysis of potential effects during construction and operational phases of the Proposed Development	Magnitude and Significance of potential effect (Percival 2003)	Significance of potential effect (EPA 2002)
<p>In 2016 SNH published a guidance document (<i>Wind farm proposal on afforested sites</i>) which provides suggested methods for assessing post-felling collision risk. In relation to the current proposal, the following assessment method was deemed to be the most suitable given the nature of the site and the data available:</p> <ul style="list-style-type: none"> Using forest plans and flight activity data: <p>A data request was sent to Coillte with the aim of obtaining their forestry plans for the wind farm site. It was then possible to use the forest management plan to work out how the proportion of open, replanted and maturing areas within the forest will vary over time, when compared to the proportions at the time surveys are carried out. This was then combined with the flight activity recorded during survey to predict how site suitability and therefore flight activity may change during the lifetime of the wind farm.</p> <p>The review of the forestry plans revealed that the average area of suitable Hen Harrier habitat across the windfarm site over the 30 year operational lifetime of the windfarm is 294.6 ha which equates to 33.3% of the windfarm site. This is similar to the levels encountered during the 2015-2017 survey period (i.e. 258.3ha which equates to 29.2 %). Therefore no significant changes in the availability of suitable habitat or flight activity during the lifetime of the wind farm are anticipated.</p> <p>However it is acknowledged that there may be potential for breeding Hen Harrier to reoccupy the study area at some stage in the future. In terms of collision, the common flight height of Hen Harriers while feeding has been measured at a mean of 10-20 m above the ground, largely ruling out the possibility of collision with active turbines. One study revealed that between 60 – 80% of a Hen Harrier’s flight was less than 2 m (Whitfield & Madders 2006). This species may be at greater risk, however, during display flights and inexperienced fledgling flight (Madders 2004). SNH Guidance also</p>		

Analysis of potential effects during construction and operational phases of the Proposed Development	Magnitude and Significance of potential effect (Percival 2003)	Significance of potential effect (EPA 2002)
references a 99% turbine avoidance rate for Hen Harrier which further emphasises the low risk associated with this species.		

7.5.3.4 Red Grouse (Construction and Operation)

Table 7.29 Impact Characterisation for Ecological Receptors based on Percival (2003) & EPA (2002).

Analysis of potential effects during construction and operational phases of the Proposed Development	Magnitude and Significance of potential effect (Percival 2003)	Significance of potential effect (EPA 2002)
Construction Phase		
Direct Habitat Loss	This species was not recorded utilising habitats within the site boundary for roosting or foraging. The development footprint is dominated by conifer plantation, which does not provide suitable habitat for the species. Significant effects with regard to direct habitat loss are not anticipated.	No Effect
Displacement & barrier effect	<p>Disturbance during construction is unlikely to discourage foraging or breeding attempts as the areas of suitable habitat located outside the site boundary and buffered from windfarm infrastructure by extensive band of forestry plantation.</p> <p>The occurrence of Red Grouse near wind energy access routes in a Scottish case study was found to be higher than in the surrounding moor (Pearce-Higgins et al. 2009). Additionally, populations of Red Grouse were found to recover within one year after disturbance caused by construction of wind farms (Pearce-Higgins et al. 2012).</p> <p>Significant displacement effects are not anticipated.</p>	The magnitude of the effect is assessed as <i>negligible</i> . The cross tabulation of <i>Medium</i> Sensitivity species and <i>Negligible</i> Impact corresponds to a Very Low effect significance
Operational Phase		
Direct Habitat Loss	Direct or indirect effects are not anticipated	No Effect
Displacement & barrier effect	Operation is unlikely to discourage foraging or breeding attempts in areas of suitable habitat located outside the windfarm development site.	The magnitude of the effect is assessed as <i>negligible</i> .
		Long-term Slight Negative Effect

Analysis of potential effects during construction and operational phases of the Proposed Development		Magnitude and Significance of potential effect (Percival 2003)	Significance of potential effect (EPA 2002)
	<p>A study by Douglas et.al (2011) found no significant change in the relationships between grouse occurrence and either turbine or track proximity and found, no evidence for re-distribution in Red Grouse in response to wind farm operation.</p> <p>Significant effects are not anticipated.</p>	The cross tabulation of <i>Medium</i> Sensitivity species and <i>Negligible</i> Impact corresponds to a Very Low effect significance	
Collision	This species was not recorded flying at the potential collision risk height during the extensive VP survey work undertaken.	No Effect	No Effect

7.5.3.5 Woodcock (Construction and Operation)

Table 7.30 Impact Characterisation for Ecological Receptors based on Percival (2003) & EPA (2002).

Analysis of potential effects during construction and operational phases of the Proposed Development		Magnitude and Significance of potential effect (Percival 2003)	Significance of potential effect (EPA 2002)
Construction Phase			
Direct Habitat Loss	Direct loss of habitat will be minimal. The felling of forestry may temporarily reduce the distribution and availability of daytime roosting sites. However significant areas of forestry with potential roosting sites will remain within the site and surrounding area.	The magnitude of the effect is assessed as <i>negligible</i> . The cross tabulation of <i>Medium</i> Sensitivity species and <i>Negligible</i> Impact corresponds to a Very Low effect significance	Long-term Slight Negative Effect
Displacement & barrier effect	On a precautionary basis it is assumed that some temporary displacement may occur. However, given the extent of suitable habitat in the wider area and the crepuscular/nocturnal habitat of the species significant displacement during the construction phase is not anticipated.	The magnitude of the effect is assessed as <i>negligible</i> . The cross tabulation of <i>Medium</i> Sensitivity species and <i>Negligible</i> Impact corresponds to a Very Low effect significance	Short-term Slight Negative Effect

Analysis of potential effects during construction and operational phases of the Proposed Development		Magnitude and Significance of potential effect (Percival 2003)	Significance of potential effect (EPA 2002)
Operational Phase			
Direct Habitat Loss	Direct or indirect effects are not anticipated	No Effect	No Effect
Displacement & barrier effect	Only one roding male was recorded during the dedicated breeding woodcock surveys. In subsequent visits to the area no further evidence of breeding activity was recorded. The site is not of significance to breeding woodcock. There are extensive areas of suitable habitat in the wider area, outside any potential displacement buffer, should any potential displacement effect occur.	The magnitude of the effect is assessed as <i>negligible</i> . The cross tabulation of <i>Medium</i> Sensitivity species and <i>Negligible</i> Impact corresponds to a Very Low effect significance	Long-term Slight Negative Effect
Collision	This species was not recorded flying within the potential collision risk zone during the extensive VP survey work undertaken. The site does not support a high density of woodcock with only calling male recorded during the dedicated surveys. Roding woodcock generally fly just above the canopy level which is well below the lowest point of the rotor swept area of the proposed turbines. No significant collision risk exists for this species.	The magnitude of the effect is assessed as <i>negligible</i> . The cross tabulation of <i>Medium</i> Sensitivity species and <i>Negligible</i> Impact corresponds to a Very Low effect significance	Long-term Slight Negative Effect

7.5.3.6 Buzzard (Construction and Operation)

Table 7.31 Impact Characterisation for Ecological Receptors based on Percival (2003) & EPA (2002)).

Analysis of potential effects during construction and operational phases of the Proposed Development		Magnitude and Significance of potential effect (Percival 2003)	Significance of potential effect (EPA 2002)
Construction Phase			
Direct Habitat Loss	The Proposed Development site is dominated by commercial forestry plantation which does not provide optimal habitat for the species. Direct loss of breeding and foraging habitat will be minimal.	The magnitude of the effect is assessed as <i>negligible</i> . The cross tabulation of <i>Low</i> Sensitivity species and <i>Negligible</i> Impact	Long-term Slight Negative Effect

Analysis of potential effects during construction and operational phases of the Proposed Development		Magnitude and Significance of potential effect (Percival 2003)	Significance of potential effect (EPA 2002)
	<p>The felling of forestry may temporarily reduce the distribution and availability of trees of sufficient stature to provide potential nest sites. However significant areas of forestry edge suitable for breeding will remain.</p> <p>Substantial areas of undisturbed suitable foraging habitat will remain.</p>	corresponds to a Very Low effect significance	
Displacement & barrier effect	<p>Disturbance during construction is unlikely to discourage flight activity, foraging or breeding attempts in the vicinity of the Proposed Development. There are extensive areas of suitable habitat in the wider area, outside any potential displacement buffer, should any potential displacement effect occur.</p> <p>Significant displacement effects are not anticipated.</p>	<p>The magnitude of the effect is assessed as <i>negligible</i>. The cross tabulation of <i>Low</i> Sensitivity species and <i>Negligible</i> Impact corresponds to a Very Low effect significance</p>	Short-term Slight Negative Effect
Operational Phase			
Direct Habitat Loss	Direct or indirect effects are not anticipated	No Effect	No Effect
Displacement & barrier effect	The development footprint is dominated by conifer plantation, which does not provide optimal habitat for this species. Pearce Higgins (2009) describes that buzzard has been found to show significant turbine avoidance extending to at least 500m. Despite this significant effects are not anticipated, given that extensive areas of suitable foraging habitat exist and will remain in the wider area (i.e. outside the 500m buffer zone).	<p>The magnitude of the effect is assessed as <i>negligible</i>. The cross tabulation of <i>Low</i> Sensitivity species and <i>Negligible</i> Impact corresponds to a Very Low effect significance</p>	Long-term Slight Negative Effect
Collision	<p>The species was recorded flying with the potential collision risk zone on during VP surveys. A collision risk has been undertaken and full details are provided in Appendix 7.6.</p> <p>The collision risk has been calculated at a ratio of 0.242 collisions per year which equates to approximately 1 collision every four years. The predicted collision risk is insignificant in the context of the county, national and international population. No significant effects are anticipated regarding collision risk at any geographical scale.</p>	<p>The magnitude of the effect is assessed as <i>negligible</i>. The cross tabulation of <i>Low</i> Sensitivity species and <i>Negligible</i> Impact corresponds to a Very Low effect significance</p>	Long-term Slight Negative Effect

7.5.3.7 Kestrel (Construction and Operation)

Table 7.32 Impact Characterisation for Ecological Receptors based on Percival (2003) & EPA (2002)).

Analysis of potential effects during construction and operational phases of the Proposed Development		Magnitude and Significance of potential effect (Percival 2003)	Significance of potential effect (EPA 2002)
Construction Phase			
Direct Habitat Loss	<p>The Proposed Development site is dominated by commercial forestry plantation which does not provide optimal habitat for the species. Direct loss of breeding and foraging habitat will be minimal.</p> <p>The felling of forestry may temporarily reduce the distribution and availability of trees of sufficient stature to provide potential nest sites. However significant areas of forestry edge suitable for breeding will remain.</p> <p>Substantial areas of undisturbed suitable foraging habitat will remain.</p>	<p>The magnitude of the effect is assessed as <i>negligible</i>. The cross tabulation of <i>Low</i> Sensitivity species and <i>Negligible</i> Impact corresponds to a Very Low effect significance</p>	Long-term Slight Negative Effect
Displacement & barrier effect	<p>Disturbance during construction is unlikely to discourage flight activity, foraging or breeding attempts in the vicinity of the Proposed Development.</p> <p>Previous analyses for raptors have generally found only low levels of turbine avoidance (Hötker 2006; Hötker <i>et al.</i> 2006; Madders & Whitfield 2006), with some species, such as kestrels, known to continue foraging activity close to turbines (Pearce Higgins <i>et al.</i> 2009).</p> <p>Significant displacement effects are not anticipated.</p>	<p>The magnitude of the effect is assessed as <i>negligible</i>. The cross tabulation of <i>Low</i> Sensitivity species and <i>Negligible</i> Impact corresponds to a Very Low effect significance</p>	Short-term Slight Negative Effect
Operational Phase			
Direct Habitat Loss	Direct or indirect effects are not anticipated	No Effect	No Effect
Displacement & barrier effect	Significant effects are not anticipated. Extensive areas of suitable foraging habitat will remain post construction. Disturbance from operation is unlikely to discourage breeding attempts and the species is expected to habituate to the operation of the windfarm development.	<p>The magnitude of the effect is assessed as <i>negligible</i>. The cross tabulation of <i>Low</i> Sensitivity species and <i>Negligible</i> Impact corresponds to a Very Low effect significance</p>	Long-term Slight Negative Effect

Analysis of potential effects during construction and operational phases of the Proposed Development		Magnitude and Significance of potential effect (Percival 2003)	Significance of potential effect (EPA 2002)
Collision	<p>The species was recorded flying within the potential collision risk zone during VP surveys. A collision risk has been undertaken and full details are provided in Appendix 7.6.</p> <p>The collision risk has been calculated at a ratio of 0.0055 collisions per year or one bird every 181 years. The predicted collision risk is insignificant in the context of the local, county, national and international population. No significant effects are anticipated regarding collision risk at any geographical scale.</p>	<p>The magnitude of the effect is assessed as <i>negligible</i>. The cross tabulation of <i>Low</i> Sensitivity species and <i>Negligible</i> Impact corresponds to a Very Low effect significance</p>	Long-term Slight Negative Effect

7.5.3.8 Sparrowhawk (Construction and Operation)

Table 7.33 Impact Characterisation for Ecological Receptors based on Percival (2003) & EPA (2002)).

Analysis of potential effects during construction and operational phases of the Proposed Development		Magnitude and Significance of potential effect (Percival 2003)	Significance of potential effect (EPA 2002)
Construction Phase			
Direct Habitat Loss	<p>The Proposed Development site is dominated by commercial forestry plantation which does not provide optimal habitat for the species. Direct loss of breeding and foraging habitat will be minimal.</p> <p>The felling of forestry may temporarily reduce the distribution and availability of trees of sufficient stature to provide potential nest sites. However significant areas of forestry edge suitable for breeding will remain.</p> <p>Substantial areas of undisturbed suitable foraging habitat will remain.</p>	<p>The magnitude of the effect is assessed as <i>negligible</i>. The cross tabulation of <i>Low</i> Sensitivity species and <i>Negligible</i> Impact corresponds to a Very Low effect significance</p>	Short-term Slight Negative Effect
Displacement & barrier effect	<p>Disturbance during construction is unlikely to discourage flight activity, foraging or breeding attempts in the vicinity of the Proposed Development.</p> <p>Significant displacement effects are not anticipated.</p>	<p>The magnitude of the effect is assessed as <i>negligible</i>. The cross tabulation of <i>Low</i> Sensitivity species and</p>	Short-term Slight Negative Effect

Analysis of potential effects during construction and operational phases of the Proposed Development		Magnitude and Significance of potential effect (Percival 2003)	Significance of potential effect (EPA 2002)
		<i>Negligible</i> Impact corresponds to a Very Low effect significance	
Operational Phase			
Direct Habitat Loss	Direct or indirect effects are not anticipated	No Effect	No Effect
Displacement & barrier effect	Significant effects are not anticipated. Disturbance from operation is unlikely to discourage breeding attempts and the species is expected to habituate to the operation of the windfarm development.	The magnitude of the effect is assessed as <i>negligible</i> . The cross tabulation of <i>Low</i> Sensitivity species and <i>Negligible</i> Impact corresponds to a Very Low effect significance	Long-term Slight Negative Effect
Collision	<p>The species was recorded flying within the potential collision risk zone during VP surveys. A collision risk has been undertaken and full details are provided in Appendix 7.6.</p> <p>The collision risk has been calculated at a ratio of 0.0237 collisions per year or one bird every 42 years. The predicted collision risk is insignificant in the context of the local, county, national and international population. No significant effects are anticipated regarding collision risk at any geographical scale.</p>	The magnitude of the effect is assessed as <i>negligible</i> . The cross tabulation of <i>Low</i> Sensitivity species and <i>Negligible</i> Impact corresponds to a Very Low effect significance	Long-term Slight Negative Effect

7.5.3.9 All species (Decommissioning)

Table 7.34 Impact Characterisation for Ecological Receptors based on Percival (2003) & EPA (2002)).

Analysis of potential effects during the decommissioning phase of the Proposed Development		Magnitude and Significance of potential effect (Percival 2003)	Significance of potential effect (EPA 2002)
Direct Habitat Loss	Direct or indirect effects are not anticipated.	No Effect	No Effect
Displacement	As above for construction phase	As above for construction phase for each KOR	As above for construction phase for each KOR

7.6 Mitigation and Best Practice Measures

This section describes the measures that are in place to mitigate adverse negative effects associated with the Proposed Development on avian receptors. Effects on avian receptors have been addressed in two ways:

- Design of the Proposed Development
- Management of development phases

7.6.1 Mitigation by Design

The project design has followed the basic principles outlined below to eliminate the potential for significant effects on avian receptors:

- The Proposed Development avoids wildlife refuge sites (e.g. waterbodies)
- Hard standing areas have been designed to the minimum size necessary to minimise habitat loss.
- The grid connection route has been selected to utilise built infrastructure for the majority of its length (i.e. cables to be laid within public roads). Cables will be laid underground to avoid effects on roadside hedgerows and disturbance to nesting birds.

7.6.2 Mitigation During Construction, Operation and Decommissioning

The following section describe the mitigation measures to be implemented during each phase of the Proposed Development.

7.6.2.1 Construction Phase Mitigation

The following measures are proposed for the construction phase:

- The removal of woody vegetation will be conducted outside the general bird breeding season which runs from the 1st of March to the 31st of August inclusive. Where sections of woody vegetation are removed for the purposes of the junction and road upgrades, these will be replaced with suitable hedge/tree species which are common in the local context.
- During the construction phase, noise limits, noise control measures, hours of operation (i.e. dusk and dawn is high faunal activity time) and selection of plant items will be considered in relation to disturbance of birds.
- Plant machinery will be turned off when not in use.
- All plant and equipment for use will comply with the Construction Plant and Equipment Permissible Noise Levels Regulations 1996 (SI 359/1996) and other relevant legislation.
- An Ecological Clerk of Works (ECoW) will be appointed. Duties will include:
 - Undertake a pre-construction transect/walkover bird survey to ensure that significant effects on breeding birds will be avoided.
 - Inform and educate on-site personnel of the ornithological and ecological sensitivities within the Proposed Development site.
 - Oversee management of ornithological and ecological issues during the construction period and advise on ornithological issues as they arise
 - Provide guidance to contractors to ensure legal compliance with respect to protected species onsite.
 - Liaise with officers of consenting authorities and other relevant bodies with regular updates in relation to construction progress.

7.6.2.2 Decommissioning Phase Mitigation

The following measures are proposed for the decommissioning phase:

- During the decommissioning phase, disturbance limitation measures will be as per the construction phase.
- Plant machinery will be turned off when not in use.
- All plant and equipment for use will comply with the Construction Plant and Equipment Permissible Noise Levels Regulations (SI 359/1996).

7.6.3 Hen Harrier Habitat Enhancement Plan

No potentially significant effects have been identified with regard to Hen Harrier. In acknowledgement of the historic significance of the study area to Hen Harrier a foraging habitat enhancement plan has been prepared (See Appendix 7.7). The plan also ensures that no potential for residual displacement effect within the South Donegal 1 no designated Hen Harrier area occurs in the event the Hen Harrier should reoccupy the Meenbog site during the operational phase of the project.

The plan follows an approach previously proposed on other proposed wind farm developments with input from the Department of Arts, Heritage and the Gaeltacht (National Parks and Wildlife Service), which were subsequently approved by their respective Planning Authorities.

The plan has been prepared taking account of the detailed forestry management plans already in place for the on-site and adjacent commercial forestry plantation owned and managed by Coillte located more than 2km (core foraging range in breeding season) from the site windfarm boundary. The plan objective is to enhance areas of forestry which would otherwise be closed canopy forestry and not suitable to Hen Harrier during the operational phase of the wind farm. The areas chosen are located within the South Donegal 1 non-designated area for Hen Harrier and are connected to extensive areas of suitable foraging habitat in the wider area.

Management prescriptions include:

- Pre-mature felling of closed-canopy forestry
- Extended fallow periods
- Planting varieties
- No fertiliser application
- Re-felling and re-planting
- Habitat enhancement and maintenance
- Monitoring

7.6.4 Commencement and Pre-Construction Monitoring (Hen Harrier)

Taking a precautionary approach, it is proposed that construction works will commence outside the bird nesting season (1st of March to 31st of August inclusive). Any requirement for construction works to run into the subsequent breeding season following commencement will be subject to pre-construction bird surveys to confirm the absence of breeding Hen Harrier. If breeding activity is identified, the nest site will be located and no works shall be undertaken within a 500m buffer (Forestry Commission Scotland 2006). No works within the buffer zone shall be permitted until it can be demonstrated that that Hen Harrier are no longer reliant on the nest site.

7.6.5 Post Construction Monitoring

A detailed post-construction Bird Monitoring Programme has been prepared for the operational phase of the Proposed Development and is presented in Appendix 7.8. The programme of works will monitor parameters associated with collision, displacement/barrier effects and habituation during the lifetime of the project. Surveys will be scheduled to coincide with Years 1, 2, 3, 5, 10 & 15 of the life-time of the wind farm. Monitoring measures are broadly based on guidelines issued by the Scottish Natural Heritage (SNH, 2009). The following individual components are proposed:

- Breeding Bird Surveys (Particular focus on Hen Harrier)
- Hen Harrier Roost Surveys
- Vantage Point Surveys (with an emphasis on migratory waterfowl during the autumn migration/wintering survey period)
- Targeted bird collision surveys (corpse searches)

7.7 Residual Effects

The following species were identified as KORs and were subject to detailed impact assessment:

- Golden Plover
- Merlin
- Hen Harrier
- Red Grouse
- Woodcock
- Buzzard
- Sparrowhawk
- Kestrel

As per Percival 2003 criteria, effect significance of greater than **Low** was not identified for any KOR.

As per EPA 2002 criteria, effect significance of greater than **slight** was not identified for any KOR.

Taking into consideration the effect significance levels identified and the proposed best practice and mitigation; significant residual effects on KORs with regard to direct habitat loss, displacement or collision mortality are not anticipated.

7.8 Assessment of Cumulative Effects

As per SNH guidance on *Assessing the Cumulative Impacts of onshore Wind Energy Developments* (2012), cumulative effects arising from two or more developments may be:

- **Additive** (i.e. a multiple independent additive model)
- **Antagonistic** (i.e. the sum of impacts are less than in a multiple independent additive model)
- **Synergistic** (i.e. the cumulative impact is greater than the sum of the multiple individual effects)

7.8.1 Projects Considered in Cumulative Assessment

The projects considered in relation to the potential for cumulative impacts and for which all relevant data was reviewed (e.g. individual EIS/EIAR's, layouts, drawings etc) include the following:

- **Ballybofey Stranorlor N15 Bypass**

The Ballybofey/Stranorlor Bypass comprises of approximately 15 kilometres of type two dual carriageway and will provide a bypass for the twin towns of Ballybofey and Stranorlor. The scheme includes a 1.2 kilometre road to link the bypass to the existing N15 at Ballybofey and a major bridge crossing of the River Finn. In October 2009, An Bord Pleanála made a decision to refuse to approve the proposed scheme. From discussion with Donegal County Council, it is intended that the scheme will be amended by Donegal County Council to accommodate the reasons for refusal notified by An Bord Pleanála. The previously proposed bypass is located approximately 3.5 kilometres from the proposed wind farm. Progression of this scheme through the planning phases has currently been suspended with no current plans to re-submit an application..
- **Clogher Substation**

Clogher 110kV Substation comprises a compound area measuring 1640m.sq, surrounded by a 2.6m high palisade fence, four end masts, associated site works and site roads at Cullionboy, Barnesmore, Co. Donegal. The constructed and operational substation will be located in a rural location east of the Barnesmore Gap and is required to connect permitted wind farms to the electricity grid. Permission was granted by Donegal County Council in April 2011.
- **Proposed Lough Mourne Surface Water Abstraction**

Donegal County Council is proposing to abstract surface water from the Bunadaowen River and pump it to the Lough Mourne Reservoir.
- **Stone Quarry**

The quarry consists of stone extraction, washing screening and crushing facility, settling ponds, open storage of crushed stone, store buildings, site shelter and ancillary site works at Croaghonagh, Ballybofey, Co. Donegal. The site is located off the local road from which access to the current proposal is achieved from the N15 in close proximity to Barnesmore Gap. The Quarry is also located within the study area boundary. The Quarry was subject to an application for substitute consent in April 2013 which was granted in November 2014.
- **Dromnahough – Lenalea Wind Farms Substation & Underground Grid Connection**

This proposed project consists of the provision of a 110kV electricity substation in the townland of Cark, Co. Donegal and associated underground electricity cabling and ancillary works to facilitate the connection of the permitted Dromnahough Wind Farm

development (Pl. Ref. 08/551609 as extended under Pl. Ref. 13/51609) and the permitted Lenalea Wind Farm development (Pl. Ref. 09/50116) to the national electricity grid at the Clogher substation located in the townland of Cullionboy, Co Donegal. The proposed 110kV substation is intended to replace the two substations previously permitted as part of the permitted Dromnahough and Lenalea wind farms. The proposal was processed by the Planning Authority under Pl. Ref. 17/50543, who refused permission and is currently the subject of a planning appeal with An Bord Pleanála under the reference PL 05E.248796.

▪ **Other Wind Farm Projects**

The wind farm projects previously detailed in Section 2.2 (Planning History) were also considered for the potential to give rise to cumulative impacts, these projects have been categorised into eight groups based on two considerations:

1. Their proximity to the proposed wind farm.
2. Whether the project is permitted/operational or pending/under appeal

The wind farm groups are divided as follows:

- Operational and Permitted Wind Farm Projects within 5 kilometres:
 - Lough Golagh Wind Farm (25 Turbines Operational)
 - Straness Wind Farm (28 Turbines Permitted)
 - Lough Cuil Wind Farm (8 Turbines Permitted)
 - Meenadreen Wind Farm and Extension (4 Turbines Operational 5 Turbines Permitted)
 - Meenakeeran Wind Farm (4 Turbines Permitted)
 - Total: 74 Turbines Operational and Permitted**
- Operational and Permitted Wind Farm Projects within 5-10 kilometres:
 - Crighshane Wind Farm and Extension (14 Turbines Permitted).
 - Craoghnameal Wind Farm (7 Turbines Permitted)
 - Altilow Windfarm (1 Turbine Permitted)
 - Total: 22 Turbines Permitted**
- Operational and Permitted Wind Farm Projects within 10-15 kilometres
 - Cuilliagh Wind Farm and Extension (21 Turbines Operational)
 - Meenanilta Wind Farm (6 Turbines Operational)
 - Church Hill Wind Farm (8 Turbines Operational)
 - Meentycat Wind Farm (9 Turbines Operational)
 - Meenhorna Wind Farm (7 Turbines Operational)
 - Anarget Wind Farm (6 Turbines Operational)
 - Meenalaban Wind Farm (7 Turbines Operational)
 - Meenagrauv Wind Farm (4 Turbines Operational)
 - Meenagrauv Extension (1 Turbine Permitted)
 - Seegronan Wind Farm (6 Turbines Permitted)
 - Seegronan Wind Farm Extension (3 Turbines Permitted)
 - Tievenamenta Wind Farm (15 Turbines Permitted)
 - Crilly/Tullylenn/Pettigo (4 Turbines Permitted)
 - Total: 97 Turbines Operational and Permitted**

- Proposed Wind Farm Projects within 10-15 kilometres
 - Church Hill Windfarm (1 Turbine Proposed)
 - Gronan Windfarm (4 Turbines Proposed)
 - Meenamullan Windfarm (5 Turbines Proposed)

Total: 10 Turbines Proposed

- Operational and Permitted Wind Farm Projects within 15-20 kilometres
 - Lough Hill Wind Farm (6 turbines Operational)
 - Ballystrang Wind Farm (6 Turbines Operating)
 - Altgolan Wind Farm (7 Turbines Permitted)
 - Lenalea Wind Farm (9 Turbines Permitted)
 - Dromnahough Wind Farm (15 Turbines Permitted)
 - Cark Wind Farm (24 Turbines Operational)
 - Cark Wind Farm Extension (6 Turbines Operational)
 - Cark/Largymore Wind Farm (9 Turbines Operational)
 - Bin Mountain Wind Farm (6 Turbines Operational)

Total: 88 Turbines Operational and Permitted

The potential for cumulative impacts arising from the proposed wind farm development and the projects have been set out in full in the relevant Sections of this EIAR, where appropriate. Detailed consideration of all potential cumulative impacts can therefore be found in the relevant sections of this EIAR.

7.8.2 Conclusion of Assessment of Cumulative Effects

Following consideration of the residual effects (post-mitigation) it is noted that the Proposed Development on its own, will not result in any significant effects on any of the identified KORs. No significant effects on receptors of International, National or County Importance were identified.

Important migratory routes for any species were not identified in any of the assessments undertaken. Therefore significant cumulative barrier effect is not anticipated.

No potentially significant cumulative disturbance, displacement or habitat loss effects on any of the KORs has been identified with regard to the Meenbog proposal.

No residual additive, antagonistic or synergistic effects have been identified with regard to habitat loss, displacement or collision mortality.

7.9 Summary

No significant effects are predicted on birds due to direct habitat loss or displacement during the construction or operational phases of the Proposed Development. Collision risk calculations do not indicate that the development will have significant effects on any KOR recorded either in isolation or cumulatively with other wind farms.

Effects of decommissioning are predicted to be shorter and less obtrusive effects arising from construction. Decommissioning will take place over a shorter period and decommissioning work will be significantly less than the works associated with construction.

The proposed Meenbog Wind farm development will not have any significant residual effects on any KOR either in isolation or cumulatively with other projects.