APPENDIX 6-6

KERRY SLUG SURVEY REPORT

Planning and Environmental Consultants

Kerry Slug Survey Report

Cleanrath WindFarm

DOCUMENT DETAILS

Client:	**Cleanrath Windfarm Ltd**
Project Title:	**Cleanrath WindFarm**
Project Number:	**191223-a**
Document Title:	**Kerry Slug Survey Report**
Document File Name:	**KSSR F – 191223-a – 2020.07.17**
Prepared By:	**MKO** **Tuam Road** **Galway** **Ireland** **H91 VW84**

Planning and Environmental Consultants

Rev	Status	Date	Author(s)	Approved By
01	Final	17/07/2020	DMN	PR

Table of Contents

1. INTRODUCTION

1.1 Background

All surveys[1] were undertaken under licence from the NPWS and all Kerry slug translocation[2] work was undertaken under derogation licence, also issued by the NPWS. Both the initial survey licence and the derogation licence, which includes details of the survey and translocation methodologies, are included in Appendix 1 of this report.

Kerry slug (*Geomalacus maculosus*) is protected by the Wildlife (Amendment) Act 2000 and listed on Annex II and Annex IV of the Habitats Directive. It is therefore strictly protected from injury, or disturbance/damage to their breeding or resting place wherever it occurs.

The overall conservation status of the species has been reported as *favourable* and it is not currently considered threatened within its range (NPWS, 2019).

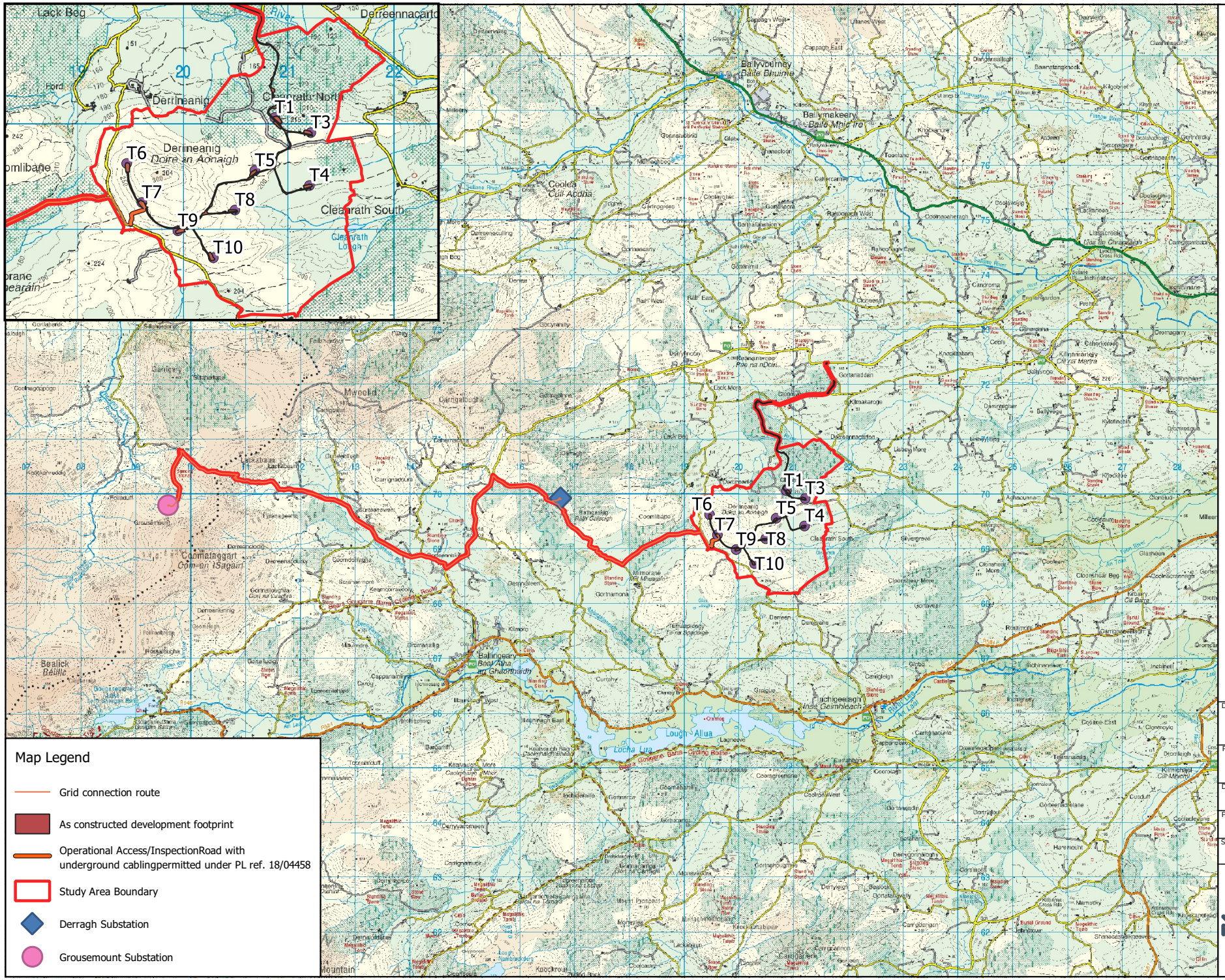
1.2 Site Location

The site is located at Cleanrath, approximately 12km southwest of Macroom, Co. Cork. A site location map is presented in Figure 1.1. The site layout is provided in Figure 1.2

1.3 Statement of Authority

Kerry slug surveying and translocation was undertaken in 2019 by David McNicholas (B.Sc, M.Sc, MCIEEM). This report has been prepared by David McNicholas. David has over 9 years professional ecological consultancy experience and is a full member of the Chartered Institute of Ecology and Environmental Management (CIEEM). This report has been reviewed by Pat Roberts (B.Sc., MCIEEM) who has over 14 years' professional experience in ecological consultancy and management.

[1] *DER-KERRY SLUG-2018-88-Cleanrath Windfarm*
[2] *DER-KERRY SLUG–94-Cleanrath Windfarm*



N

Drawing Title

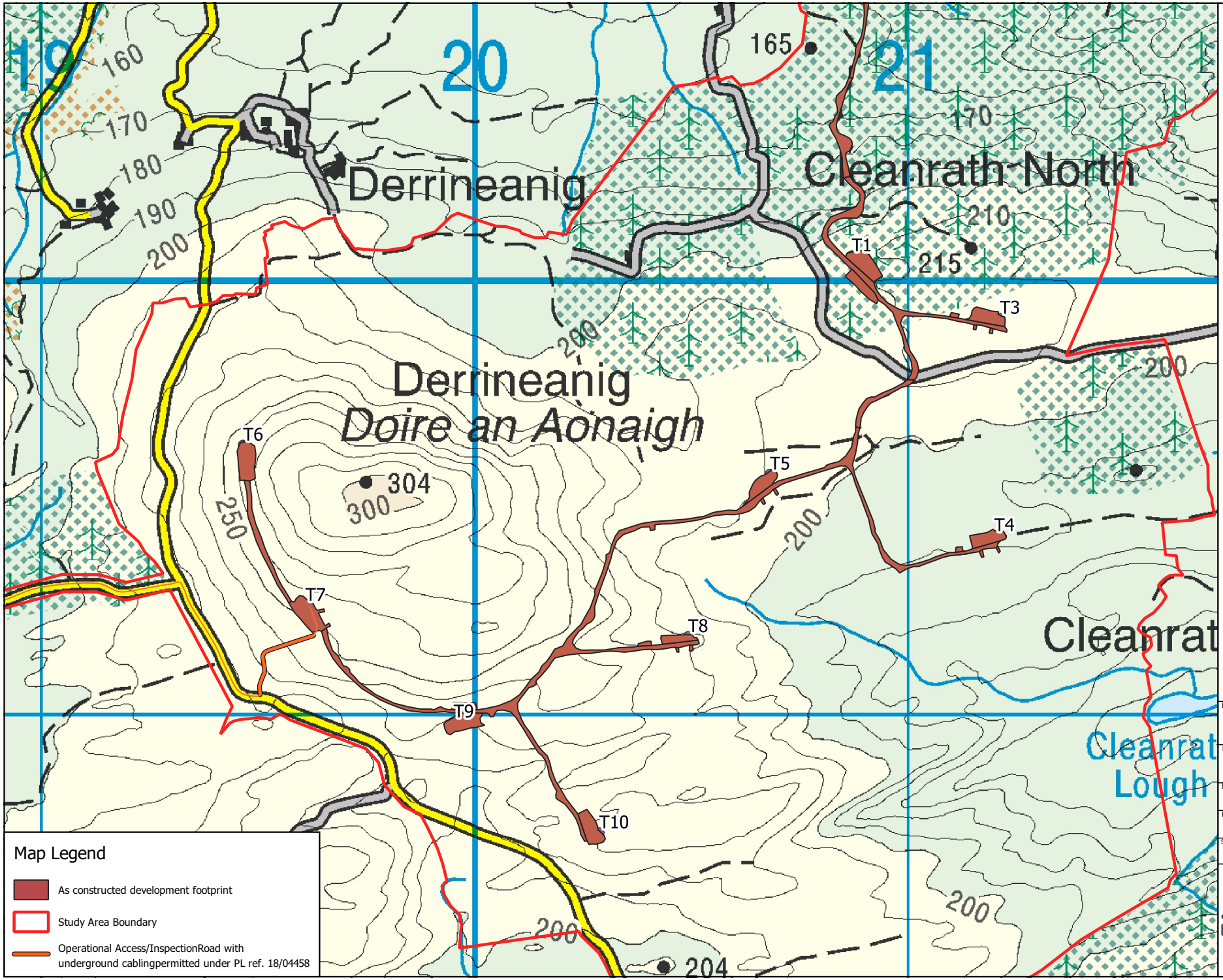
Site location

Project Title

Cleanrath WindFarm

Drawn By	PR
DMN	PR
Project No.	Drawing No.
191223a	Figure 1-1
Scale	Date
1:90000	20.05.2020

MKO
Planning and Environmental Consultants
Tuam Road, Galway
Ireland, H91 VW84
+353 (0) 91 735611
email:info@mkoireland.ie
Website: ww.mkoireland.ie



Map Legend

- As constructed development footprint
- Study Area Boundary
- Operational Access/InspectionRoad with underground cablingpermitted under PL ref. 18/04458

N

Drawing Title: Site layout

Project Title: Cleanrath WindFarm

Drawn By	DMN
DMN	PR
Project No.	Drawing No.
191223a	Figure 1-2
Scale	Date
1:11387	20.05.2020

MKO
Planning and Environmental Consultants
Tuam Road, Galway
Ireland, H91 VW84
+353 (0) 91 735611
email:info@mkoireland.ie
Website: ww.mkoireland.ie

2. METHODOLOGY

2.1 Desk Study/Background

Following a review of National Biodiversity Data Centre (NBDC) records, Kerry slug is known to occur in the hectad (W86) in which the site is located. The closest records to the site was from the All Ireland Non-Marine Molluscan Database, dated 1987 (W86) and 2012 (W17).

2.2 2011 Kerry Slug Surveys Methodology

A Kerry slug survey was carried out on 25th August and 6th September 2011 by Dixon.Brosnan Environmental Consultants. This survey followed the methodology specified by the National Roads Authority's guidelines on the Ecological Surveying Techniques of Protected Flora and Fauna During the Planning of National Road Schemes (NRA, 2008). Transects were searched at 20 m intervals along three routes through bog, heath and oak woodland habitat around T14, T11 and T9, T10 and an area of heath east of T10, with a total of 35 transects searched across these three areas.

2.3 2016 Kerry slug surveys of the grid connection route

Field surveys were undertaken on the 24th of March 2016 by Mr. Barry O'Loughlin (MSc., BSc., MCIEEM). The field survey assessment was carried out in accordance with best practice guidelines to survey for the presence of Kerry Slug (NRA, 2009).

The survey methods were undertaken having regard to the following key elements:

- An assessment of suitable Kerry Slug habitat within the footprint of the proposed cable route and adjoining habitats during daylight hours.
- A search for Kerry Slug in areas identified as suitable habitat during optimal weather conditions (damp wet conditions) during daylight hours; and
- A nocturnal survey for Kerry Slug incorporating a fixed route transect walked at 20m intervals throughout suitable habitat using torchlight. A visual count for slugs was carried out within 5 metres of the fixed route transect.

Surveys were undertaken during optimal weather conditions (cloudy, overcast and damp conditions with occasional dry spells in the afternoon). Particular attention was paid to lichen covered boulders and areas of rock outcrop. The habitat suitability survey and initial survey of rocky outcrops within a 10 to 20m buffer of the proposed cable was conducted during daylight hours. The nocturnal survey was carried out by torchlight in areas identified as suitable habitat and the footprint of the proposed cable route in the northern section. In addition to the above surveys undertaken in 2016, a pre-commencement walkover of this area (grid connection route) for Kerry Slug was undertaken by Pat Roberts on the 10th September 2018.

2.4 2018 Kerry Slug Surveys Methodology

Kerry slug surveys were undertaken prior to the commencement of construction works at the site and to inform the application for a derogation licence[3]. The surveys were undertaken under licence from the

[3] *'Where there is no satisfactory alternative to continuing with an operation or activity which might affect an Annex IV species, a derogation licence must be sought from the Minister under Regulation 25 of the Habitats Regulations before any works can proceed' (NPWS, 2010).*

NPWS between the 27th November 2018 and 20th December 2018. A copy of the survey licence is provided in Appendix 1. There are two main survey approaches that are used to survey for Kerry slug. These include hand-searching techniques and live refuge trapping (metric traps[4]) (McDonnell et al., 2013). The method used during the 2018 surveys included a combination of both hand-searching and live refuge trapping. Metric traps were placed on a variety of habitat types within the infrastructure corridor, including rocky outcrops, boulders, heath vegetation, conifers within heath and coniferous plantation forestry (including mature and immature), see Plates 2.1 - 2.4. In addition, metric traps were also placed on individual conifers growing on heath, as a result of natural colonisation from seed dispersal.

Plate 2.1 Metric trap placed on heath habitat

Plate 2.2 Metric trap placed on rocky outcrop within heath

Plate 2.3 Metric trap placed on tree stump within second rotation forestry

Plate 2.4 Metric trap placed on individual tree within heath habitat

[4] *Metric traps are a refuge trap technique. The metric traps (0.25 m^2), manufactured by De Sangosse (Pont du Casse, France), are made up of absorbent material covered with a reflective upper surface and a black plastic on the underside. They are wetted in advance of being laid out.*

Initially, a walked transect was undertaken along the infrastructure footprint on the 27th November 2018, during which metric traps were also installed. The aim of the 2018 surveys was to determine the abundance and distribution of Kerry slug throughout the site.

During the initial walkover transect of the site, 18 metric traps were set out in potentially suitable Kerry slug habitat within the wind farm site, see Table 2.1. These were placed on a variety of features including exposed rocky outcrop, vegetated heath, scattered trees or tree stumps within coniferous plantation forestry. The metric traps were checked again on the 20th December 2018. These survey findings were used to inform the application for a Kerry slug derogation licence and to inform future survey effort.

Table 2.1 Location of Metric Traps

Trap number	Feature	Latitude	Longitude
1	Rocky outcrop	51.87578	-9.14688
2	Rocky outcrop	51.87625	-9.14456
3	Rocky outcrop	51.87699	-9.14404
4	Wet heath	51.87691	-9.14313
5	Wet heath	51.87684	-9.14498
6	Rocky outcrop	51.87684	-9.14528
7	Wet heath	51.87659	-9.14577
8	Tree	51.87591	-9.148
9	Tree	51.87592	-9.148
10	Rocky outcrop	51.87084	-9.16799
11	Rocky outcrop	51.87048	-9.16792
12	Tree	51.8692	-9.1673
13	Rocky outcrop	51.86863	-9.16465
14	Rocky outcrop	51.86763	-9.16035
15	Rocky outcrop	51.86743	-9.1598
16	Rocky outcrop	51.86729	-9.15936
17	Rocky outcrop	51.86657	-9.15927
18	Rocky outcrop	51.86566	-9.15844

2.5 2019 Kerry Slug Translocation Methodology

A derogation licence was issued by the NPWS on the 21st December 2018 (DER-KERRY SLUG94-Cleanrath Windfarm). The licence is provided in Appendix 1. The licence is for the translocation of Kerry slug away from the infrastructure footprint. Translocation was undertaken using both hand-searching and the deployment of metric traps along the entire length of the infrastructure footprint. Surveys were undertaken on the 3rd, 4th & 28th January 2019, 7th, 8th, 20th and 21st March 2019. The

surveys were undertaken on a staged basis as the development progressed, in order to minimise recolonisation of the works area.

During the application for the derogation licence, a detailed and site-specific survey methodology was agreed with the NPWS following standard, and evolving, best practice methodologies. The Kerry slug survey methodologies employed during the translocation are provided below:

- Collect Kerry slugs for translocation along the construction corridor,
    - Using both hand-searching and metric trapping. This will be done by one of two methods:
        1. On a phased basis, by undertaking translocation along the infrastructure corridor prior to the commencement of works at each new section of the windfarm development as the works progress, or
        2. By undertaking translocation followed by the removal of surface vegetation and boulders (suitable Kerry slug habitat). This material will be placed to one side of the infrastructure footprint (to be used for reinstatement works).
    - Survey effort will be conducted by undertaking hand searches for approximately 45 minutes/ha (as per survey methods employed by Kelleher & O'Meara at Galway Wind Park). Metric traps will be checked weekly and all Kerry slug individuals recorded will be translocated.
- Translocate to suitable habitat within 50m either side of the site track (or to suitable habitat within a number of monitoring plots: 20x20)?
    - *Note: Kerry slugs found on trees will be placed on similar trees in nearby suitable habitat. Kerry slugs recorded in areas of rocky outcrop/wet heath habitat will be translocated to similar habitat adjacent to the development footprint.*
- Submit report to NPWS on the estimated population within the study area and the total number of individuals moved.

3. RESULTS

3.1 2011 Survey Findings

The surveys undertaken in 2011 identified a total of 18 Kerry slugs. These were recorded from 14 of the 35 transects searched. Kerry Slugs were recorded in all three transects in the oak woodland habitat, with a patchier occurrence in the bog/heath habitat. The survey findings are provided in full in Appendix 2 of this report.

3.2 2016 Kerry slug surveys of the grid connection route

During surveys of the grid connection route on the 24th of March 2016, no records of Kerry Slug records were identified. The survey findings are provided in full in Appendix 3 of this report.

3.3 2018 Pre-Translocation Survey Findings

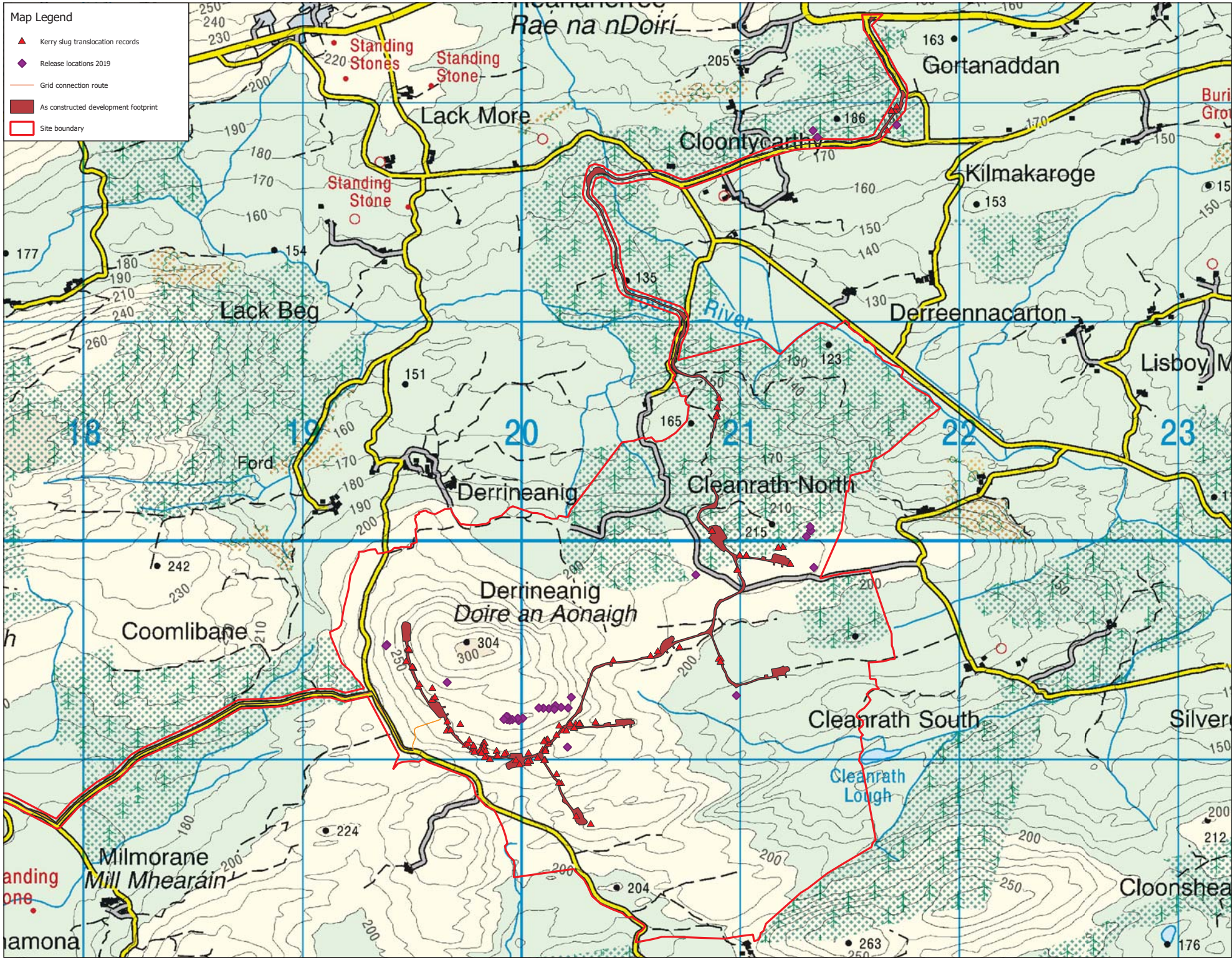
Kerry slug records from the initial walkover survey are provided in Table 3.1. All Kerry slug records were from exposed rocky outcrop features and boulders, with none recorded within vegetated heath. A small number of individuals were recorded on tree stumps within or adjacent to second rotation coniferous plantation forestry and on scattered individual trees within the heathland habitat.

Table 3.1: Kerry slug records during survey transects

Feature	Number of individuals	Latitude	Longitude
Tree stump	1	51.87684	-9.14527
Tree stump	1	51.87683	-9.14544
Scattered trees	3	51.87592	-9.14801
Scattered trees	1	51.87592	-9.148
Rocky outcrop	1	51.87121	-9.17128
Rocky outcrop	2	51.871	-9.16837
Rocky outcrop	1	51.87048	-9.16792
Tree	1	51.86917	-9.16729
Rocky outcrop	1	51.86737	-9.15979
Total	**13**		

3.4 2019 Translocation Survey Results

In total 142 Kerry slugs were translocated from within the construction footprint in advance of site works. The location of all Kerry slug records, and associated release locations, are provided in Figure 3.1. Table 3.2 and Figure 3.2 provide an overview of the number of individuals translocated from each habitat type within the construction corridor. Over 53% of all Kerry slugs translocated from within the development footprint were located on rocky outcrop features, predominantly within heath type habitat. However, some were recorded on rocky outcrop features within young forestry (WD4). Boulders, primarily located on heath habitat were regularly found to support Kerry slug (~7%), this is likely due to the amount of lichen growing on these features. Only one individual was recorded on open heath habitat. Although Kerry slug was recorded within coniferous plantation forestry, the numbers recorded were significantly less than those recorded on heath/rocky outcrop. Most records



Drawing Title: Kerry Slug Translocation Records

Project Title: Cleanrath WindFarm

Drawn By	Checked By
DMN	PR
Project No.	Drawing No.
191223a	Figure 3.1
Scale	Date
1:15217	18.05.2020

MKO
Planning and Environmental Consultants
Tuam Road, Galway
Ireland, H91 VW84
+353 (0) 91 735611
email:info@mkoireland.ie
Website: www.mkoireland.ie

were from second rotation forestry where slugs were recorded beneath the bark of rotting tree stumps (~11%).

Table 3.2 Kerry slug records during all translocation surveys (including both hand-searching and metric trap records)

Habitat type	Number of individuals	% of total
Rocky Outcrop	76	53.52
Tree stump	16	11.27
Coniferous tree	11	7.75
Boulder	10	7.04
Heath	1	0.70
Willow	1	0.70
Other	27	19.01
Total	**142**	

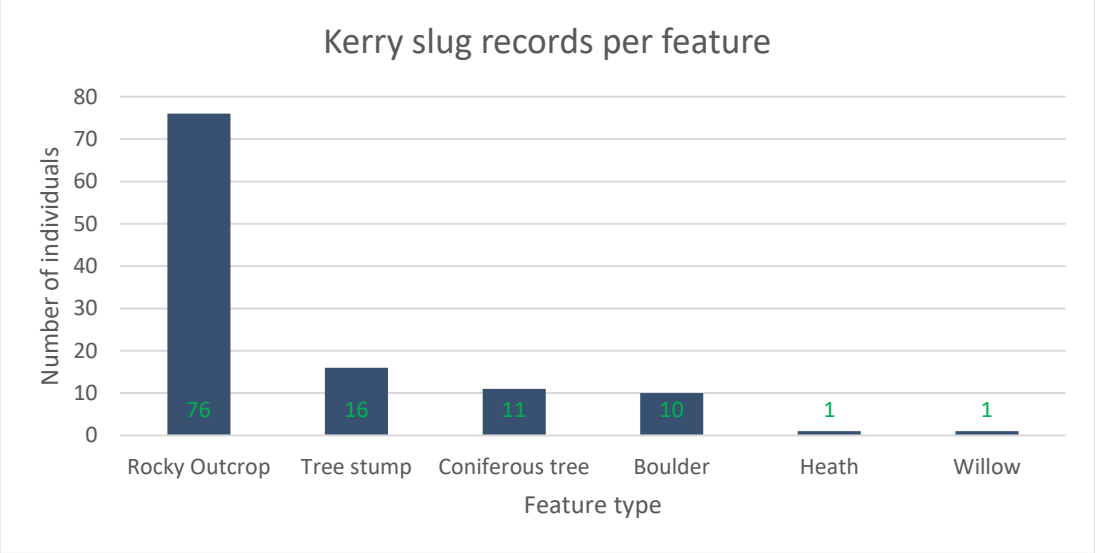


Figure 3.2. Number of Kerry slugs translocated from within the development footprint per habitat type, in advance of construction

3.4.1 Search method effectiveness

The majority (88%) of Kerry slug records were located during hand-searching. Although individuals were recorded under metric traps (~12%), given the extent of the survey area and the nature of the habitats within the site, hand searching proved to be the most effective method.

When collecting individual Kerry slugs for translocation, the aspect of each was recorded, for the majority of records. Almost 50% of records were recorded within a South or south-easterly aspect. It is likely that this is because the southern part of the site, largely within heath and rocky outcrop habitat, is in a largely southerly aspect and as the survey effort was undertaken during the winter months, the southern aspect may be warmer at this time of year, see Table 3.3 and Figure 3.3.

Table 3.3 Number of individuals translocated and associated aspect

Aspect	Number of individuals	% occurrance
South	*32*	*28.70*
SouthEast	*16*	*14.81*
On top of rock	*11*	*11.11*
North East	*10*	*9.26*
South West	*10*	*9.26*
West	*9*	*8.33*
North West	*9*	*8.33*
North	*8*	*7.41*
East	*3*	*2.78*

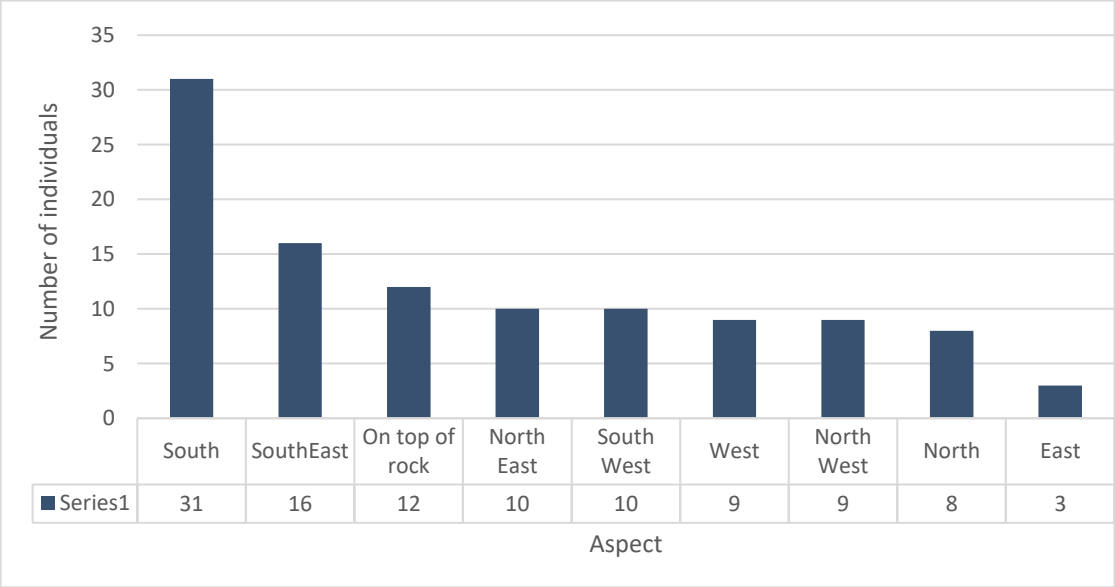


Figure 3.3 Kerry slug records and associated aspect

3.4.2 Release locations

Kerry slugs found on trees within the plantation forestry were translocated to similar trees in nearby suitable habitat. Kerry slugs recorded in areas of rocky outcrop/wet heath habitat were translocated to similar habitat away from the development footprint. This was undertaken as the species has differing colour/pigmentation due to the variations in the levels of exposure to sunlight/ UV radiation associated with forestry cover (O'Hanlon et al, 2017[5]). The location of all release locations is provided in Figure 3.1.

[5] *O'Hanlon, Aidan & Feeney, Kristina & Dockery, Peter & Gormally, Michael. (2017). Quantifying phenotype-environment matching in the protected Kerry spotted slug (Mollusca: Gastropoda) using digital photography: Exposure to UV radiation determines cryptic colour morphs. Frontiers in Zoology. 14. 10.1186/s12983-017-0218-9.*

It was noted during all surveys that Kerry slug abundance and presence was largely reduced where evidence of past burning was identified (within the last year - two years). Therefore, the majority of the release locations were subsequently chosen as locations where future burning were less likely, i.e. on the upper slopes of the site on elevated lands above the infrastructure footprint.

4. INCORPORATION OF MITIGATION

The derogation licence issued from the National Parks and Wildlife Service (NPWS) incorporated both construction and post-construction Kerry slug monitoring requirements. The following subsections describes both the methods implemented on site and the results of these measures.

4.1 Construction and Post-Construction Monitoring Requirements

As described in the Derogation licence issued by the NPWS, see Appendix 1, the following measures were implemented on site during the construction phase of the development:

1. During construction, turves and boulders/exposed rock will be stored adjacent to the infrastructure footprint for reinstated along the construction corridor. This will maintain suitable habitat for the species along the infrastructure footprint.

2. Where works will require the felling of forestry (along parts of the proposed access route within the north of the site and round turbines), tree stumps will be left in place to provide suitable habitat for Kerry slug.

3. As per condition 11 of the survey licence (DER/KERRY SLUG 2018-88 and any subsequent licences issued); as works near completed, three areas within the development footprint will be chosen to undertake trials to promote lichen growth. Three areas of newly exposed rock (road side embankment) within the development footprint will be painted with a mix of yogurt and lichen. The aim is to promote lichen growth and thus provide suitable feeding habitat for Kerry slug. These areas will be monitored (photos taken yearly for three years) during ongoing/all future surveys as part of post construction monitoring. Results will be form part of yearly compliance reporting.

As described in the Derogation licence issued by the NPWS, see Appendix 1, the following measures were implemented on site during the post-construction phase of the development:

1. Metric trapping and walked transects to be undertaken along areas of newly exposed rock and within suitable habitat adjacent to the infrastructure route. Surveys of tree stumps within areas of forestry to the north of the site will also be undertaken for comparison.

2. Monitoring of lichen regrowth within three study areas on areas of newly exposed rock.

3. Surveys within translocated areas, to survey for viable populations (Hand searching and metric trapping).

4. Surveys will aim to determine the following:

    - Are slugs using exposed rock within the newly constructed site infrastructure (determined using metric traps and walked transects)?,

    - Monitor relative abundance within suitable habitat adjacent to the development footprint (walked transects and metric trapping). Compare with pre-construction survey findings.

    - Monitor areas in which Kerry slug have been translocated to (walked transects and metric trapping).

In addition to the above, please note that all road construction and surfacing materials will be sourced on site within borrow pits. Site track surfacing material will be crushed and screened on site.

4.2 Habitat Reinstatement and Enhancement Measures Implemented on Site

The following subsections describe the measures implemented on site during the construction phase of the proposed development for Kerry slug habitat enhancement along the construction corridor.

4.2.1 Turves and boulders/exposed rock reinstatement

Turves and boulders/exposed rock were stored adjacent to the infrastructure footprint for reinstated along the construction corridor. The boulders, containing lichen growth, were placed to on side during construction and have since been reinstated, see Plates 4.1 - 4.4. This has resulted in the provision of suitable habitat within the construction corridor for Kerry slug. In addition, vegetated turves have been reinstated along the construction corridor and any areas of reinstated peatland have also been reseeded with an appropriate seed mix to promote revegetation of exposed material. This will further promote habitat restoration along the construction corridor.

In addition, forestry felling around the proposed infrastructure has resulted in the tree stumps being left to decay naturally. This will further provide suitable habitat for Kerry slug, see Plate 4.2.

Plate 4.1 Example of boulders and exposed rock retained and placed along the site track infrastructure

Plate 4.2 Example of exposed rock retained along the edge of the site track infrastructure

Plate 4.3 Example of boulder retained and reinstated along the infrastructure footprint.

Plate 4.4 Example of boulder retained and reinstated along the infrastructure footprint.

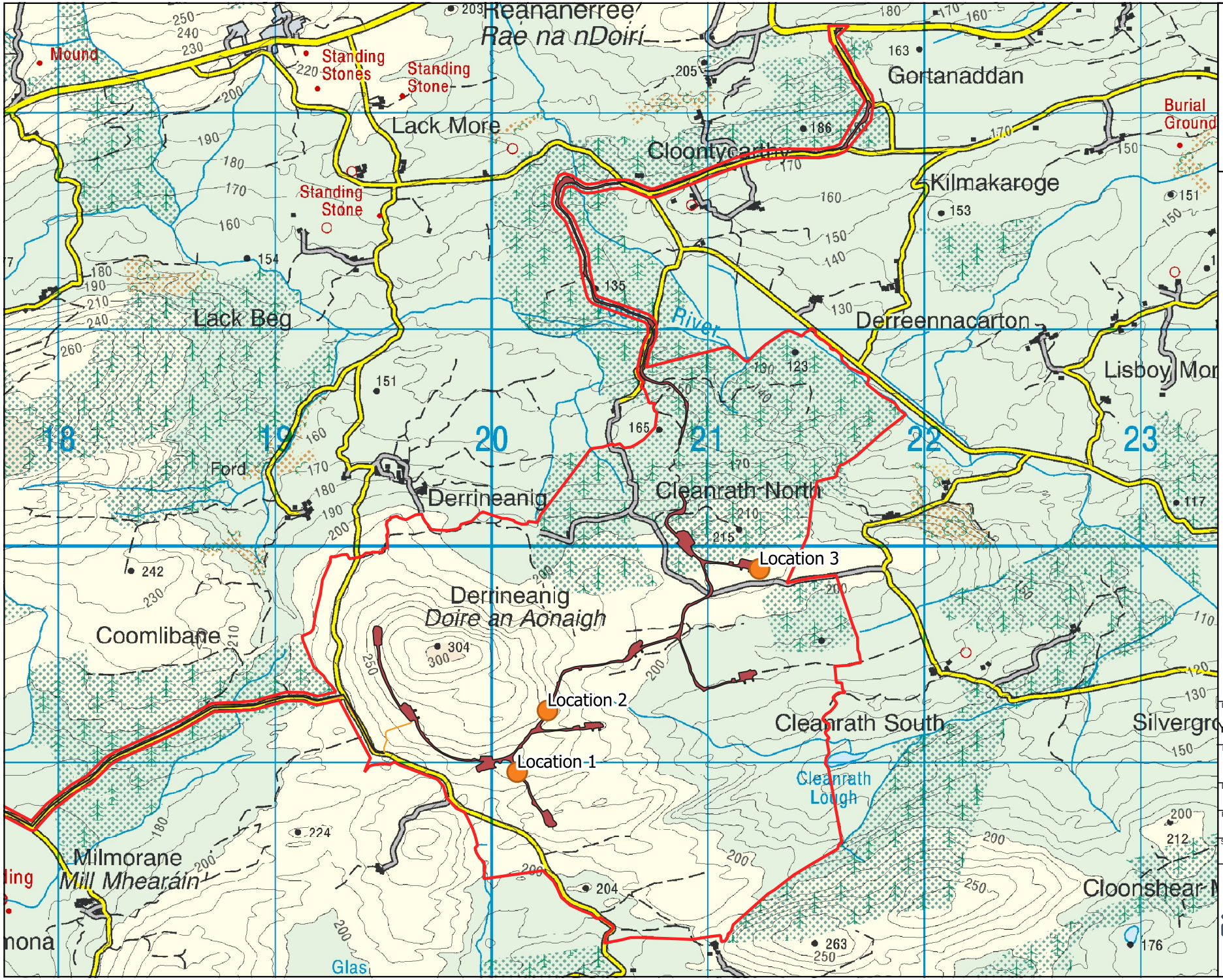
4.2.2 Forestry felling and tree stump retention

As part of development, forestry felling was required around a number of turbines and along site access tracks, see Plate 4.5. As described above, the tree stumps have been left in place and, as they begin to decompose, will be provide suitable Kerry slug habitat.

Plate 4.5 Example of forestry felling undertaken around Turbine no. 11 with tree stumps and heath vegetation retained

4.2.3 Newly exposed bare rock lichen establishment

As per condition 11 of the survey licence (DER/KERRY SLUG 2018-88), three areas within the development footprint were chosen to undertake trials to promote lichen growth on newly exposed bare rock. These are located along roadside embankment. The location of each is provide in Figure 4.1. Each of the three areas of exposed rock were painted with a mix of yogurt, inoculated lichens and some mosses found within the study area, on the 25th September 2019; see Plate 4.6. These areas were then fenced off using post and rope so that the areas would be easily identifiable during subsequent surveys and would not be disturbed during any future site maintenance. The aim is to promote lichen growth and thus provide suitable feeding habitat for Kerry slug. These areas will be monitored (photos taken yearly for three years) during ongoing/all future surveys as part of post construction monitoring. Results will be form part of yearly compliance reporting.



Map Legend

- Yogurt painting trial location
- Grid connection route
- Infrastructure layout
- Study Area Boundary

N

Drawing Title: Yogurt painting trial locations

Project Title: Cleanrath WindFarm

Drawn By	PR
DMN	PR
Project No.	Drawing No.
191223a	Figure 4.1
Scale	Date
1:22805	20.05.2020

MKO
Planning and Environmental Consultants
Tuam Road, Galway
Ireland, H91 VW84
+353 (0) 91 735611
email:info@mkoireland.ie
Website: ww.mkoireland.ie

Plate 4.6 Example of newly exposed rock painted with a yogurt inoculated with locally sourced lichens and mosses (Location 1).

Plate 4.7 Example of newly exposed rock painted with a yogurt inoculated with locally sourced lichens and mosses (Location 2).

Plate 4.8 Example of newly exposed rock painted with a yogurt inoculated with locally sourced lichens and mosses (Location 3).

Initial findings indicate that the yogurt has disappeared from the exposed rocks, likely due to heavy rainfall and exposure. Although this was expected, some of the mosses/material mixed through the yogurt still remains (as of 30th March and 14th May 2020), see Plates 4.9 and 4.10.

Plate 4.9 Example of exposed rock at Location 2 on the 30/03/2020 (6 months after painting) showing some signs of possible algal growth (green) and vegetation (mosses mixed through yogurt) remaining within crevices.

Plate 4.10 Example of exposed rock at Location 2 on the 14/05/2020 (8 months after painting) showing some signs of possible absence of algal growth (possibly due to prolonged dry weather) and vegetation (mosses mixed through yogurt) remaining within crevices.

5. ONGOING MONITORING

As part of the conditions associated with the derogation licence, see Appendix 1, the following surveys and monitoring will be undertaken at the site:

1. Metric trapping and walked transects will be undertaken along areas of newly exposed rock and within suitable habitat adjacent to the infrastructure route. Surveys of tree stumps within areas of forestry will be undertaken for comparison. *Note: forestry felling and site maintenance work has only been complete in early 2020 and thus surveys will take place later in 2020.*
2. Monitoring of lichen regrowth has been undertaken within the three study areas on areas of newly exposed rock and will continue to be monitored for three years post construction.
3. Surveys within translocated areas, will be survey for viable populations (Hand searching and metric trapping).

The results of all survey work and associated findings will be reported to the National Parks and Wildlife Service as part of compliance with the derogation licence.

6. CONCLUSION

The site is located within the core distribution range of the Kerry slug (*Geomalacus maculosus*) in Ireland (Reich *et al.* 2012) and is situated within a larger landscape which contains significant suitable habitat for the species. As such, prior to the commencement of construction on site, Kerry slug translocation was undertaken along the infrastructure footprint under a derogation licence from the NPWS. The aim was to avoid potential for significant impact on the species locally.

In total 142 Kerry slugs were translocated from within the construction footprint in advance of site works. Over 53% of all Kerry slugs translocated from within the development footprint were located on rocky outcrop features, predominantly within heath type habitat. The majority (88%) of Kerry slug records were located during hand-searching. Although individuals were recorded under metric traps (~12%), given the extent of the survey area and the nature of the habitats within the site, hand searching proved to be the most effective method.

During the construction phase of the development, reinstatement measures were undertaken along edges of the infrastructure footprint to allow for the creation and reinstatement of Kerry slug habitat.

Post-construction measures and monitoring have been undertaken, and continue, at the site. This included the painting of three areas of exposed rock with yogurt, inoculated with local lichens and mosses, to promote the revegetation of the rock by lichens.

7. REFERENCES

NPWS (2019). The Status of EU Protected Habitats and Species in Ireland. Volume 3: Species Assessments. Unpublished NPWS report. Edited by: Deirdre Lynn and Fionnuala O'Neill

Reich, I., O'Meara, K., Mc Donnell, R.J. and Gormally, M.J. (2012). An assessment of the use of conifer plantations by the Kerry Slug (*Geomalacus maculosus*) with reference to the impact of forestry operations. Irish Wildlife Manuals, No. 64. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht, Ireland.

NRA (2009). Ecological Surveying Techniques for Protected Flora and Fauna during the Planning of National Road Schemes.

NPWS (2019). The Status of EU Protected Habitats and Species in Ireland. Volume 3: Species Assessments. Unpublished NPWS report. Edited by: Deirdre Lynn and Fionnuala O'Neill

APPENDIX 1

NPWS SURVEY LICENCES

An Roinn Cultúir,
Oidhreachta agus Gaeltachta
Department of Culture,
Heritage and the Gaeltacht

Licence No.: DER/KERRY SLUG-2018-88

EUROPEAN COMMUNITIES (BIRDS AND NATURAL HABITATS) REGULATIONS 2011 (S. I. No 477 of 2011)

DEROGATION LICENCE

Granted under Regulation 54 of the European Communities (Birds and Natural Habitats) Regulations 2011, hereinafter referred to as "the Habitats Regulations".

Introduction

The Minister for Arts, Heritage and the Gaeltacht, (hereinafter referred to as "the Minister"), after obtaining professional advice, is satisfied that: -

(A) this licence should be granted for the purpose of protecting wild fauna and conserving natural habitats, and

(B) there is no satisfactory alternative, and the action authorised by this licence will not be detrimental to the maintenance of the population of **KERRY SLUG** referred to below at a favourable conservation status in their natural range.

Licence

The Minister, in exercise of the powers conferred on her by Regulation 54 of the Habitats Regulations hereby grants to **Cleanrath Windfarm Ltd.** ("the licensee") a licence in respect of the **Kerry Slug**. This licence authorises the following:

(a) disturbance;

This licence is subject to the terms and conditions set out overleaf.

National Parks & Wildlife Services
LICENCE

Terms and Conditions

1. This licence is granted solely in respect of the **initial survey pre-commencement of the construction of Cleanrath Wind Farm Co. Cork, Pl. Ref. 15/06966. The estimated number of individuals to be translocated within the site will be determined and agreed to with NPWS following the initial survey** activities specified in connection with the **Cleanrath Windfarm.**

2. The authorised actions shall be carried out on the licensee's behalf by, or under the authorisation and supervision of **David McNicholas** of **McCarthy Keville O'Sullivan** ("the scientific agent").

3. All activities authorised by this licence, and all equipment used in connection herewith, shall be carried out, constructed and maintained (as the case may be) so as to avoid unnecessary injury or distress to the species concerned.

4. The authorised action is to **survey and map only**. Following formal consultation with NPWS on the results of the surveys, individual Kerry slugs will be translocated from the development footprint to an area of agreed habitat within the site.

5. This licence may be modified or revoked, for stated reasons, at any time.

6. The actions to which this licence authorises shall be completed between the **13th November 2018** and the **13th December 2019.**

7. An experienced ecological expert shall supervise the mitigation measures as outlined by the scientific agent and shall liaise directly with **Dr. Brian Nelson** of the **National Parks and Wildlife Service** (**brian.nelson@chg.gov.ie, 01-8883294**) prior to any works taking place under the terms of this licence.

8. No agent or servant of the licensee, nor any other person, shall carry out any of the activities to which this licence applies unless authorised in writing by the licensee. Any such agent, servant or other person shall make a copy of the written authorisation available for and shall produce it on demand to any member of An Garda Síochána or an authorised officer.

9. This licence is granted subject to the licensee, including their servants and the scientific agent, adhering to the mitigation measures as set out by the scientific agent in the application and any additional measures requested by the National Parks and Wildlife Service.

10. The mitigation measures outlined in the report (**Habitat Restoration and Enhancement Plan, pp 1-9**) are to be adhered to in respect of **survey and map** work.

11. The painting of rocks with yogurt is done on no more than 50% of exposed rock and this is monitored for 3 years to evaluate its effectiveness and compared to control, untreated area.

12. A protocol for monitoring the presence of **Kerry Slug** within the proposed development site during the construction period and for two years post construction must be devised and submitted to NPWS for prior approval.

National Parks & Wildlife Services
LICENCE

13. Post construction monitoring is applied for three years.

14. During the progress of the activities to which this licence applies, the licensee shall make a copy of the licence available for inspection on each site where the activities are taking place, and shall produce it on demand to any member of An Garda Síochána or an authorised officer appointed under Regulation 7 of the Habitats Regulations (hereinafter referred to as "an authorised officer").

15. Within 5 working days of being requested to do so by an authorised officer, the licensee shall provide a report on the progress of the work covered by this licence.

16. The licensee shall, within 14 days of completion of the actions which this licence authorises, submit a written report to the address below, describing the activities carried out and the mitigation measures implemented in pursuance of this licence.

17. The local NPWS **District Conservation Officer Declan O'Donnell, declan.o'donnell@ahg.gov.ie, (028-37347 / 087-2646452)** shall be contacted prior to any work being carried out under the terms of this licence.

Gerry Leckey
(a person authorised by the Minister to sign on her behalf)

13th December 2018

Licensing Unit
Department of Culture, Heritage and the Gaeltacht
Wildlife Licensing Unit
R. 2.03
90 North King Street
Smithfield
Dublin 7
D07 N7CV

NOTES (1 to 2).

- This licence is granted for the period specified and subject to compliance with the conditions specified. Anything done other than in accordance with the terms of this licence may constitute an offence.

- This licence applies to the **Kerry Slug** and to no other species.

National Parks & Wildlife Services
LICENCE

An Roinn Cultúir,
Oidhreachta agus Gaeltachta
Department of Culture,
Heritage and the Gaeltacht

DER-KERRY SLUG-94-Cleanrath Windfarm

EUROPEAN COMMUNITIES (NATURAL HABITATS) REGULATIONS, 1997 – 2005
(S. I. Nos 94 of 1997, 233 of 1998 and 378 of 2005)

DEROGATION LICENCE

granted under Regulation 25 of the European Communities (Natural Habitats) Regulations 1997 (as amended), hereinafter referred to as "the Habitats Regulations".

Introduction

The Minister for Culture, Heritage and the Gaeltacht, (hereinafter referred to as "the Minister"), after obtaining professional advice, is satisfied that: -

(A) this licence should be granted for the purpose of protecting wild fauna and conserving natural habitats, and

(B) there is no satisfactory alternative, and the action authorised by this licence will not be detrimental to the maintenance of the population of **KERRY SLUG** referred to below at a favourable conservation status in their natural range.

Licence

The Minister, in exercise of the powers conferred on him by Regulation 25 of the Habitats Regulations hereby grants to **Cleanrath Windfarm Ltd** ("the licensee") a licence in respect of the **Kerry Slug**. This licence authorises the following:

(a) disturbance;
(b) damage or destruction of breeding sites or resting places;
("the authorised actions").

This licence is subject to the terms and conditions set out overleaf.

Terms and Conditions

1. This licence is granted solely in respect of the activities specified in connection with the **construction of windfarm at Cleanrath, County Kerry.**

2. The authorised actions shall be carried out on the licensee's behalf by, or under the authorisation of **David McNicholas BSc, MSc, MCIEEM, Senior Ecologist** of **McCarthy Keville O'Sullivan Ltd,Planning & Environmental Consultants** ("the scientific agent").

3. All activities authorised by this licence, and all equipment used in connection herewith, shall be carried out, constructed and maintained (as the case may be) so as to avoid unnecessary injury or distress to the species concerned.

4. This licence may be modified or revoked, for stated reasons, at any time.

5. The actions to which this licence authorises shall be completed between the **4th January 2019** and the **4th January 2020.**

6. No agent or servant of the licensee, nor any other person, shall carry out any of the activities to which this licence applies unless authorised in writing by the licensee. Any such agent, servant or other person shall make a copy of the written authorisation available for and shall produce it on demand to any member of An Garda Síochána or an authorised officer.

7. This licence is granted subject to the licensee, including his or her servants and the scientific agent, adhering to the mitigation measures as set out by the scientific agent, these mitigation measures being subject to amendment or addition by the National Parks and Wildlife Service, in order to utilise more up-to-date research and/or in order to comply with planning conditions.

8. An experienced ecological expert shall supervise the mitigation measures as outlined by the scientific agent and shall liase directly with **Dr. Brian Nelson** of the **National Parks and Wildlife Service** (**01-8883294**) prior to any works taking place under the terms of this licence.

9. The methodology is to be as agreed:

Kerry Slug Translocation and Monitoring Methodology

Pre-commencement surveys and translocation:
Prior to the commencement of works the following methodologies will be applied for the translocation of Kerry slug:

- Collect Kerry slugs for translocation along the construction corridor,
    - Using both hand searching and metric trapping. This will be done by one of two methods:
        1. On a phased basis, by undertaking translocation along the infrastructure corridor prior to the commencement of works at each new section of the windfarm development as the works progress, or
        2. By undertaking translocation followed by the removal of surface vegetation and boulders (suitable Kerry slug habitat). This material will be placed to one side of the infrastructure footprint (to be used for reinstatement works).

10. During the progress of the activities to which this licence applies, the licensee shall make a copy of the licence available for inspection on each site where the activities are taking place, and shall produce it on demand to any member of An Garda Síochána or an authorised officer appointed under Regulation 7 of the Habitats Regulations (hereinafter referred to as "an authorised officer").

11. Within 5 working days of being requested to do so by an authorised officer, the licensee shall provide a report on the progress of the work covered by this licence and of the mitigation measures implemented.

12. The licensee shall, within 14 days of completion of the actions which this licence authorises, submit a written report to the address below, describing the activities carried out and the mitigation measures implemented in pursuance of this licence.

13. The licensee shall provide for and implement a scientific programme (hereinafter referred to as "the scientific programme") of the operation of the mitigation measures, to investigate and provide data on the effectiveness of the mitigation measures. The scientific programme will provide for supplementary mitigation measures informed by data obtained from this monitoring programme.

14. The licensee shall, within **3 calendar months** of the submission of the report under 11 above, submit to the signatory at the address below an interim report on the continued monitoring under the scientific programme. The licensee shall submit a further report by the **13th (final report)** calendar month after the submission of the report under 11 above, setting out the results of the monitoring carried out over these periods and particulars of any supplementary mitigation measures taken.

15. The reporting requirements under this licence will continue in force after the completion of the actions which it authorises, until their completion and the licensee shall be responsible for ensuring that these requirements are met in full.

16. The local NPWS District Conservation Officer **Declan O'Donnell, 087-2646452** shall be contacted by the contractor prior to any work being carried out under the terms of this licence.

National Parks & Wildlife Service
LICENCE

    - Survey effort will be conducted by undertaking hand searches for approximately 45 minutes/ha (as per survey methods employed by Kelleher & O'Meara at Galway Wind Park). Metric traps will be checked weekly and all Kerry slug individuals recorded will be translocated.
- Translocate to suitable habitat within 50m either side of the site track (or to suitable habitat within a number of monitoring plots: 20x20)?
    - *Note: Kerry slugs found on trees will be placed on similar trees in nearby suitable habitat. Kerry slugs recorded in areas of rocky outcrop/wet heath habitat will be translocated to similar habitat adjacent to the development footprint.*
- Submit report to NPWS on the estimated population within the study area and the total number of individuals moved.

Monitoring during construction:

- During construction, strapped turves and boulders/exposed rock will be stored adjacent to the infrastructure footprint for reinstated along the construction corridor. This will maintain suitable along the infrastructure footprint.
- Where works will require the felling of forestry (along parts of the proposed access route within the north of the site and at T15), tree stumps will be left in place to provide suitable habitat for Kerry slug.
- As per condition 11 of the survey licence (DER/KERRY SLUG 2018-88 and any subsequent licences issued); as works near completed, three areas within the development footprint will be chosen to undertake trials to promote lichen growth. Three areas of newly exposed rock (road side embankment) within the development footprint will be painted with a mix of yogurt and lichen. The aim is to promote lichen growth and thus provide suitable feeding habitat for Kerry slug. These areas will be monitored (photos taken yearly for three years) during ongoing/all future surveys as part of post construction monitoring. Results will be form part of yearly compliance reporting.

Post-construction monitoring:

- Metric trapping and walked transects to be undertaken along areas of newly exposed rock and within suitable habitat adjacent to the infrastructure route. Surveys of tree stumps within areas of forestry to the north of the site will also be undertaken for comparison.
- Monitoring of lichen regrowth within three study areas on areas of newly exposed rock.
- Surveys within translocated areas, to survey for viable populations (Hand searching and metric trapping).
- Surveys will aim to determine the following:
    - Are slugs using exposed rock within the newly constructed site infrastructure (determined using metric traps and walked transects)?,
    - Monitor relative abundance within suitable habitat adjacent to the development footprint (walked transects and metric trapping). Compare with pre-construction survey findings.
    - Monitor areas in which Kerry slug have been translocated to (walked transects and metric trapping).

In addition to the above, please note that all road construction and surfacing materials will be sourced on site within borrow pits. Site track surfacing material will be crushed and screened on site.

Gerry Leckey
(a person authorised by the Minister to sign on his behalf)

21st December 2018

Department of Culture, Heritage and the Gaeltacht
Wildlife Licensing Unit
R. 2.03
90 North King Street
Smithfield
Dublin 7
D07 N7CV

NOTES (1 to 2).

- This licence is granted for the period specified and subject to compliance with the conditions specified. Anything done other than in accordance with the terms of this licence may constitute an offence.

- This licence applies to the **Kerry Slug** and to no other species.

National Parks & Wildlife Service
LICENCE

APPENDIX 2

2011 KERRY SLUG SURVEY REPORT

DixonBrosnan

environmental consultants

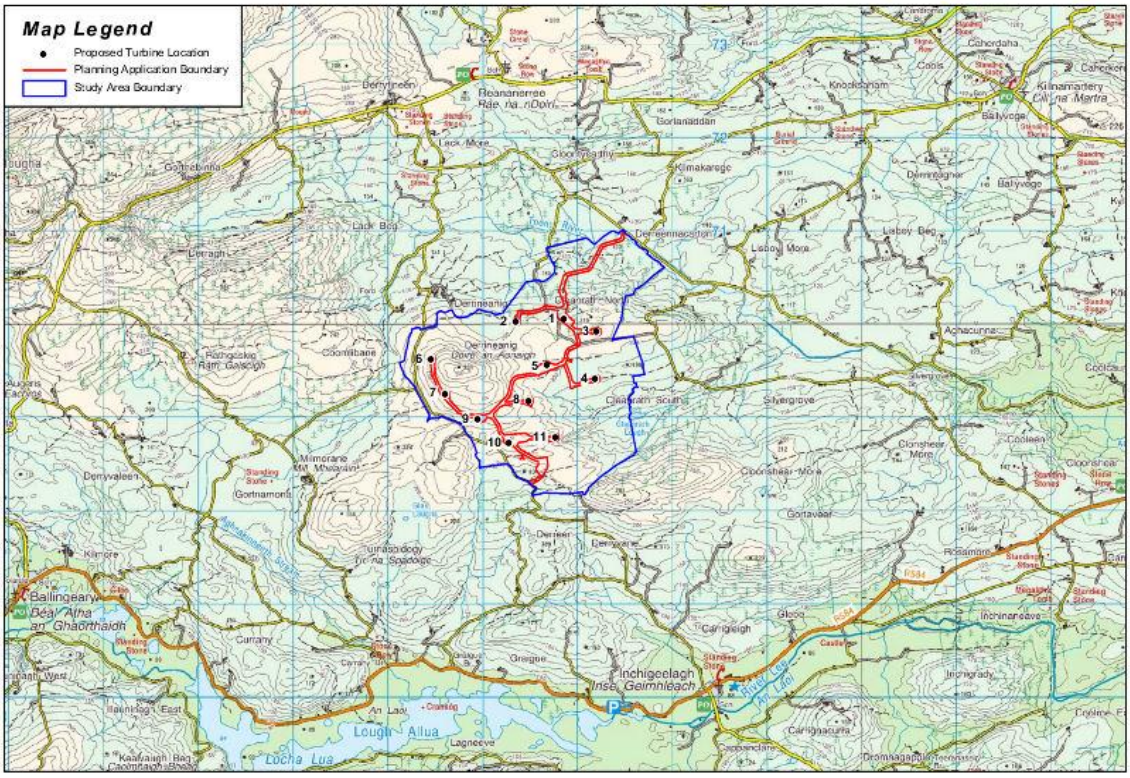
Project	**An assessment of Kerry slug *Geomalacus maculosus* populations on the site of a proposed wind farm at Cleanrath, Inchigeelagh, Co. Cork.**		
Client	Enerco		
Project ref	Report no	Client ref	
1158	1158		

DixonBrosnan The Cedars, Bridewood, Ovens, Co Cork
Tel 086 851 1437| carl@dixonbrosnan.com | www.dixonbrosnan.com

Date	Rev	Status	Prepared by	
23/12/11	0	issue to client	Carl Dixon M.Sc.	
			Vincent Murphy M. Sc.	

1. Introduction

The EIS ecology chapter for a wind farm development at Cleanrath, Inchigeelagh, Co. Cork was prepared by DixonBrosnan Environmental Consultants who concluded that there was suitable habitat within the proposed development area for Kerry slug *Geomalacus maculosus.* A Kerry slug survey was recommended in the EIS chapter. Subsequent to the submission of the EIS, a survey for this species was requested by Cork County Council. DixonBrosnan Environmental Consultants were commissioned to conduct this survey, which was carried out on by Carl Dixon M.Sc. and Vincent Murphy M. Sc. on 25-08-2011 and 07-09-2011. The proposed site is approximately 3km north of Inchigeelagh, Co. Cork. The proposed development consists of 11 wind turbines and the final development footprint will occupy 5.5 hectares. The general area in which the site is located is shown below in **Fig. 1**.



2. Legal status

Kerry slug is a protected species throughout its range of southwest Ireland and the north of the Iberian peninsula. Within Ireland it is protected under the Wildlife Act, 1976 & Wildlife (Amendment) Act, 2000, and is also protected under Annex II and Annex IV of EU Habitats Directive [Council Directive 92/43/EEC] and seven Special Areas of Conservation (SACs) have been designated for its protection in Ireland.

To date, little work has been carried out on this species in Ireland. While some knowledge of life history exists, there is a lack of data on the habitat size needed to sustain a population, the management needed within sites and genetic variation either within Ireland or in its worldwide range. Based on the limited knowledge available, the IUCN has now downgraded the threat to the Kerry Slug from vulnerable in 1994 (Groombridge, 1994) to least concern in 2006 (IUCN, 2006). In a recent study Moorkens (2006) did not find enough evidence to place it on the list of Ireland's threatened molluscs.

The Kerry slug is protected under the fifth schedule of the Wildlife Act 1976 under Statutory Instrument No. 112 of 1990. This legislation does not protect the slug from authorised or unauthorised indirect damage, only from wilful direct damage such as collecting. The Kerry slug is also listed on Annex II and IV of the EU Habitats Directive and seven Special Areas of Conservation (SACs) have been designated for its protection in Ireland.

Article 12 of the Habitats Directive reads as follows:

1. Member States shall take the requisite measures to establish a system of strict protection for the animal species listed in Annex IV (a) in their natural range, prohibiting:

(a) all forms of deliberate capture or killing of specimens of these species in the wild;

(b) deliberate disturbance of these species, particularly during the period of breeding, rearing, hibernation and migration;

(c) deliberate destruction or taking of eggs from the wild;

(d) deterioration or destruction of breeding sites or resting places.

2. For these species, Member States shall prohibit the keeping, transport and sale or exchange, and offering for sale or exchange, of specimens taken from the wild, except for those taken legally before this Directive is implemented.

3. The prohibition referred to in paragraph 1 (a) and (b) and paragraph 2 shall apply to all stages of life of the animals to which this Article applies.

4. Member States shall establish a system to monitor the incidental capture and killing of the animal species listed in Annex IV (a). In the light of the information gathered, Member States shall take further research or conservation measures as required to ensure that incidental capture and killing does not have a significant negative impact on the species concerned.

The derogation provisions for Annex IV species including the Kerry Slug are set out in Regulation 25 of the Habitats Regulations as follows:

25. (1) Where there is no satisfactory alternative and the derogation is not detrimental to the maintenance of the populations of the species to which the Habitats Directive relates at a favourable conservation status in their natural range, the Minister may, in respect of those species, grant a licence to one or more persons permitting a derogation from complying with the requirements of the provisions of section 21 of the Principal Act and Regulations 23 and 24 where it is—

(a) in the interests of protecting wild fauna and flora and conserving natural habitats, or

(b) to prevent serious damage, in particular to crops, livestock, forests, fisheries

and water and other types of property, or

(c) in the interests of public health and public safety, or for other imperative reasons of overriding public interest, including those of a social or economic nature and beneficial consequences of primary importance for the environment, or

(d) for the purpose of research and education, of repopulating and re-introducing these species and for the breeding operations necessary for these purposes, including the artificial propagation of plants,

(e) to allow, under strictly supervised conditions, on a selective basis and to a limited extent, the taking or keeping of certain specimens of the species to the extent (if any) specified therein, which are set out in the First Schedule (Annex IV(a) species).

(2) The Minister shall forward to the Commission every two years a report, in accordance with a format established by the Commission, on the derogations to which paragraph (1) relates.

(3) The report referred to in paragraph (2) shall specify—

(a) the species which are subject to the derogations and the reason for the derogation, including the nature of the risk with, if appropriate, a reference to alternatives rejected and scientific data used;

(b) the means, devices or methods authorised for the capture or killing of animal species and the reasons for their use;

(c) the circumstances of when and where such derogations are granted;

(d) the authority empowered to declare and check that the required conditions obtain and to decide what means, devices or methods may be used, within what limits and by what agencies, and which persons are to carry out the task;

(e) the supervisory measures used and the results obtained.

A person convicted of an offence shall be liable on summary conviction

---

4. Current status

The biggest threat currently posed to the Kerry slug is due to changes and disturbance to semi-natural and unimproved habitats on which it depends for its lichen or moss-rich diet. Threats to the species as described by Moorkens (2006) include intensification of land use, tourism and general development pressure, expansion of coniferous plantation forestry, and spread of exotic species such as Rhododendron into its semi-natural woodland habitat. Furthermore, as lichens are particularly sensitive to atmospheric pollution (Hawkesworth & Rose, 1976), any factors leading to a reduction in lichen abundance is likely to similarly affect *Geomalacus*. While there is no evidence of threat from climate change to date, this may become an issue if sufficient humid conditions are reduced. If so, the Irish population may be less affected than the Iberian population and become of even greater significance.

Insufficient data currently exists to be able to assess the current or potential future impact of the above causes on the status of *Geomalacus*. Areas identified as warranting further investigation include the level of separation of individual populations, the potential permeability through corridors and potential factors that may lead to isolation and

fragmentation, the population size variability, ease of dispersal, requirements of refugia micro-habitat, and consequent requirements for land management (NPWS, 2008).

The Kerry Slug is listed as a selection feature for seven cSACs namely 000090 Glengarriff Harbour and Woodland Cork, 000093 Caha Mountains Cork/Kerry, 000102 Sheep's Head Cork, 000365 Killarney National Park, Macgillycuddy's Reeks, Caragh River catchment Cork/Kerry000370, Lough Yganavan and Lough Nambrackdarrig Kerry 001342, Cloonee and Inchiquin Loughs, Uragh Wood Kerry 002173 Blackwater River (Kerry) Kerry.

These cSACs collectively cover some 95,337 hectares of land within the range of the Kerry Slug. While not all habitats within the area are suitable, this represents a significant proportion of the known range of the species. Conservation Plans and objectives are currently in preparation for all of these sites. These plans will include a specific objective for the maintenance of the species' habitat and population within each cSAC.

A number of other cSACs within the range of the Kerry Slug also support the species, including two sites where it is referred to in the site synopses –001873 – Derryclogher (Knockboy) Bog, and 002189 – Farranamanagh Lough A Conservation Plan (2006-2011) has been published for Derryclogher Bog. The plan also refers to the presence of the Kerry Slug and the objectives for maintaining and enhancing the blanket bog habitat are of direct relevance to the species.(NPWS, 2006) Current action plans outlined by the National Parks and Wildlife service (NPWS) include maintaining the 2010 range of the Kerry slug i.e. fifty 10km grid squares and maintaining the current population of the species. The 2010 published range of this species is shown below in **Fig.2**

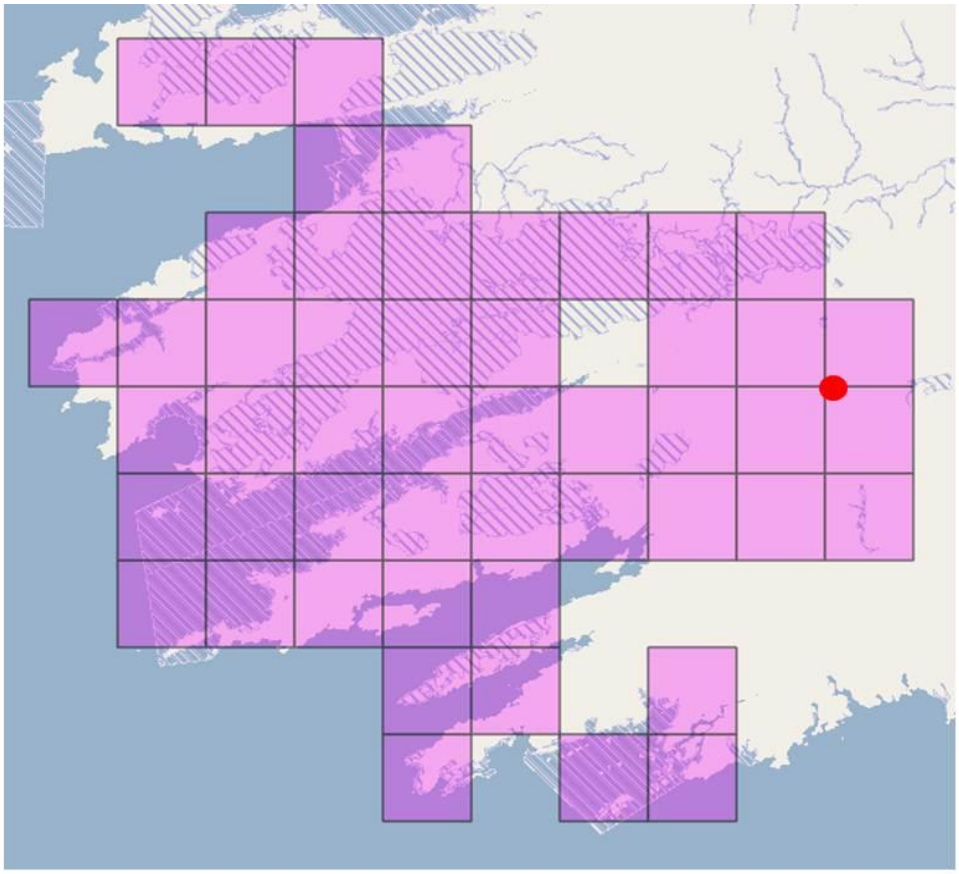


Figure 2. **10km grid squares showing range 2010 (EHLG, 2010) in relation to the proposed development area under the red circle (not to scale).**

In recent surveys (March 09-March 2011) for which results were published in 2011 *G. maculosus* was also collected in six hectads where there are no previous records of the species. These include reported gaps in the range (V82, V93, V94 and V97) highlighted in the recent Kerry Slug Threat Response Plan (NPWS 2010) and hectad V48. During the survey, G. maculosus was recorded from a total of 44 hectads and from a range of habitats including deciduous forest, blanket bog and heath. Specimens were also observed in rather atypical habitats such as conifer plantations, clearfell sites and wet grassland but all of these sites contained sandstone outcrops. These data comprise a range of 4,400 km^2 in Co. Cork and Co. Kerry. (McDonnell et al, 2011)

Of particular interest is the record of the species in hectad Q91 as this area is outside of the previously known range of the species. Interestingly, this record is from a conifer plantation which is the habitat where G. maculosus has recently been found in Co. Galway (Kearney 2010). The occurrence of G. maculosus in conifer woods in Kerry and Connemara is contrary

to expectation as conifer woodland, especially closed canopy modern plantations, has not been considered a suitable habitat. (McDonnell, 2011)

3. Identification and habitat requirements

3.1 Kerry slug

The Kerry slug is marked with white or yellow spots, and two colour forms exist: a blue/grey slug with white spots; and a ginger or brown form with yellow spots. Both varieties co-exist in Ireland. Adults can appear up to 70 to 80mm long, but may contract into a ball shape when disturbed, unlike any other Irish slug. They are also able to elongate and flatten themselves to take refuge in crevices. Photos are included in **Appendix 1.**

The Kerry slug was generally considered to be restricted in Ireland to the sandstone geology of West Cork and Kerry although a recent population was discovered in Galway. Within its Cork/Kerry range this species it is restricted to three broad habitat types and is absent unless sufficient sandstone outcrops and boulders, largely bare of vegetation except for lichens and mosses, are emergent within the area. The Kerry slug's diet consists of lichens, liverworts and mosses. These are found growing on rock outcrops in both habitat types as well as on mature trees and timber (Boycott & Oldham, 1930; Platts & Speight, 1988; Rodriguez et al., 1993; Speight, 1996).

4. Survey methodology

This survey methodology for Kerry slug follows the National Roads Authority (NRA) guidelines on the *Ecological surveying techniques of protected flora and fauna during the planning of national road schemes* (NRA, 2008). Surveys were carried out within 100 meters of the proposed access track, proposed wind turbines and the proposed site compound within suitable habitat types. Maps showing the survey locations are included in **Figure's 3,4 and 5.**

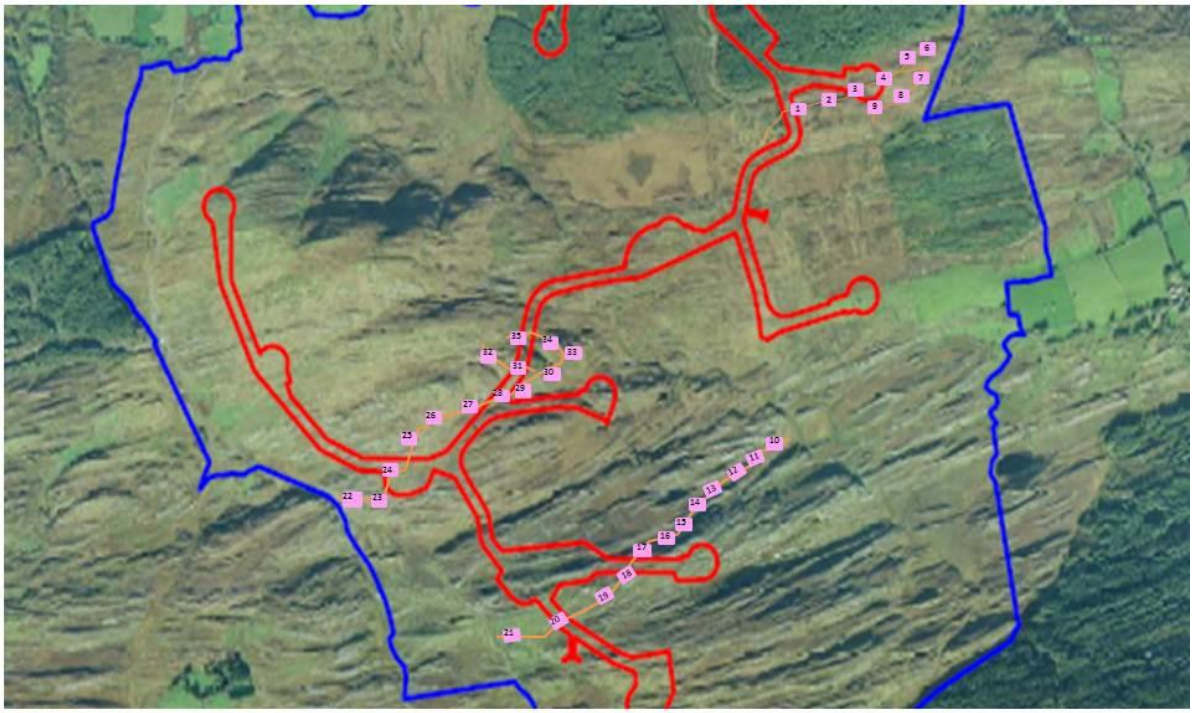


Fig. 3 Transect locations

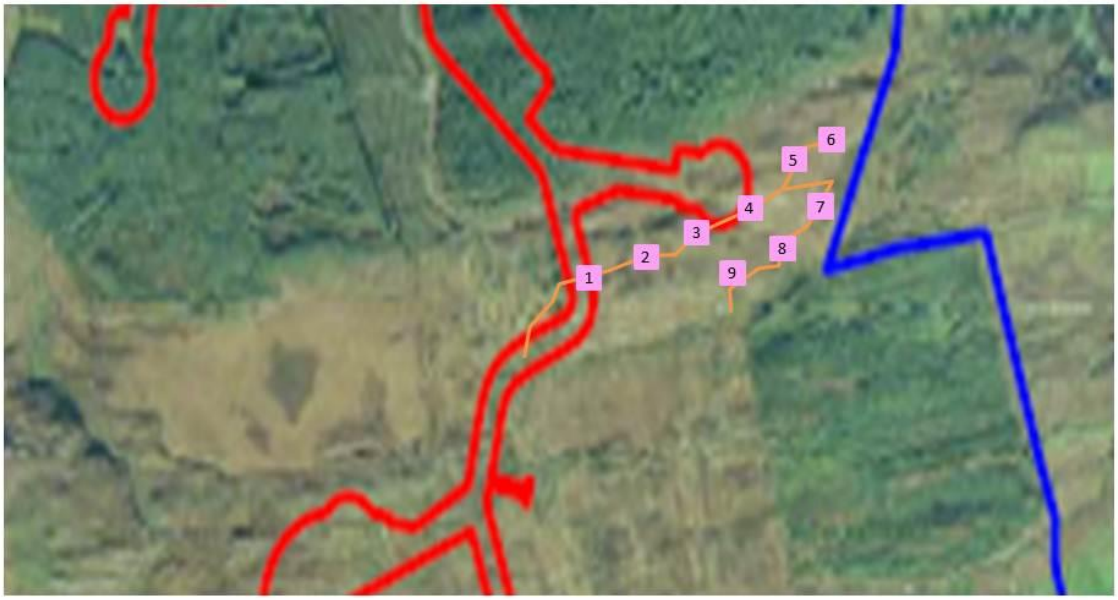


Fig. 4 Slug survey points

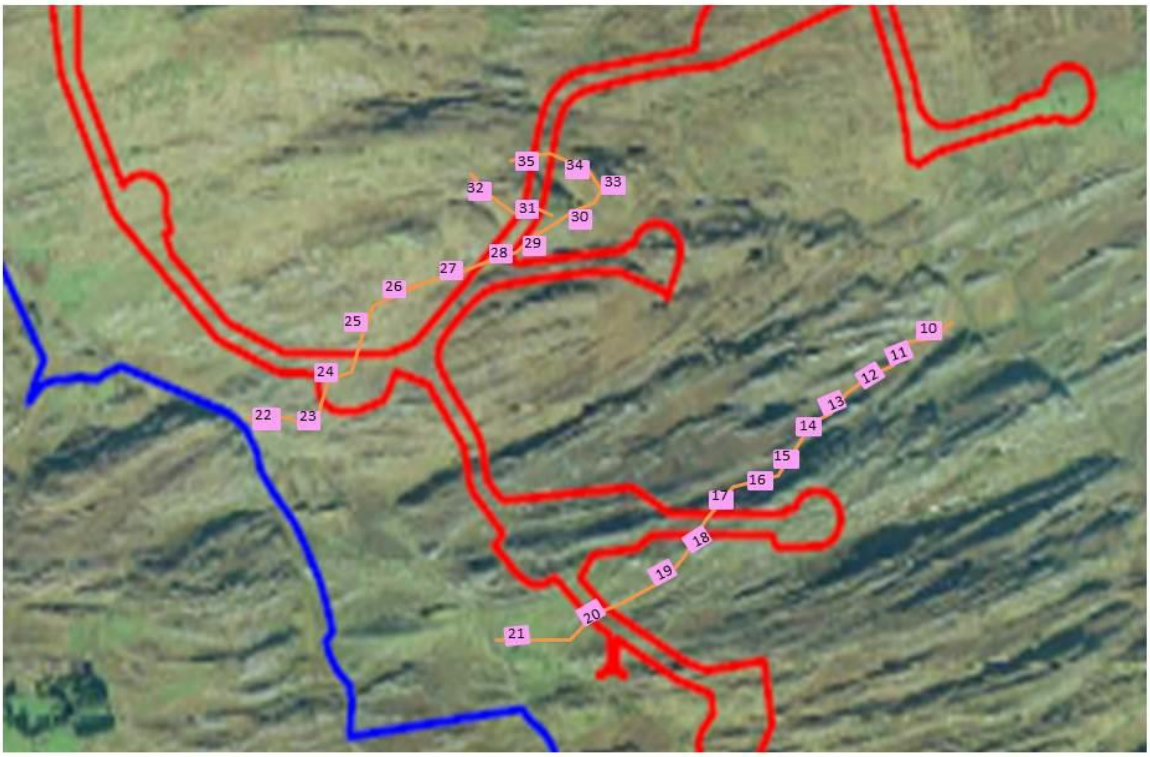


Figure 5. Slug survey points

4.1 Kerry slug survey methodology

The guidelines recommend that fixed-route transects should be walked at 20m intervals throughout oak woodland or bog habitat, ideally at night using torchlight, and a visual count made of the number of individuals observed within five metres of the transect. This will involve a careful search of features on which the animals are likely to be feeding, especially tree trunks, moss-covered timber close to water, and lichen covered boulders and outcrops. Transects should be covered over a fixed time period to provide indices of relative abundance and allow comparison between sites in those situations where such data would be useful.

Assuming there are no significant health and safety implications, surveys should be conducted at night, particularly during damp and humid conditions. Periods of excessive cold or drought should be avoided as survey efficiency during these periods is considerably reduced. Whilst surveys can be carried out on cloudy, damp days, the efficiency of these searches will be lower than for nocturnal surveys.

The primary aim of this survey is to ascertain presence and absence. The habitat types surveyed as part of this exercise include small oak woodlands in ravines, mountainous heathlands, bog communities and exposed siliceous rock wherever present. In line with NRA

recommendations surveys began before dusk and were conducted for approximately 4-6 hours after dusk. The dates of the surveys were determined by weather conditions as humid weather to damp wet conditions is preferred. Both survey nights followed periods of rainfall with humid misty conditions and periodic light showers. Both nights were also relatively warm with air temperatures between 11 and 14^{o} C. Each survey event was limited to 15mins per transect and involved fingertip searches through vegetation, particularly surrounding boulders or rock outcrops. Potential refuges were also inspected. It is noted that the extent of the survey was determined to a degree by the difficulties inherent in accessing upland habitats at night. The emphasis during the survey was to determine the general occurrence of slugs within the habitats types found on site.

5 Results

5.1 Kerry slug

The results of the Kerry slug survey are detailed below in **Table 1.**

Table 1. Habitat, locations and recordings of Kerry slug.

Date	Point No	Time	Habitat type	Position on site	GPS Co-ords	No. of Kerry slugs	Comment
25-08-2011	1	17.40	HH1 heath with boulders	50m south of track	121059 69854	0	
25-08-2011	2	17.55	PB2 bog with heath	20m south of track	121142 69882	0	
25-08-2011	3	18.15	PB2 bog with heath and rock outcrop	Around base of T3	121210 69905	0	
25-08-2011	4	18.30	PB2 bog with heath and rock outcrop	Around base of T3	121252 69922	0	
25-08-2011	5	18.50	Large rock outcrop with bog below	East of T3	121340 69970	1	On large rock outcrop
25-08-2011	6	19.05	Heath with Molinia and large boulders and rock outcrop	East of T3	121423 69984	2	Both present on a large boulder, 20cm apart
25-08-2011	7	19.20	Bog communities	East of T3	121367 69933	0	

Date	Point No	Time	Habitat type	Position on site	GPS Co-ords	No. of Kerry slugs	Comment
			with some heath species				
25-08-2011	8	19.35	Bog communities with some heath species and rock outcrops	East of T3	121317 69901	0	
25-08-2011	9	19.55	Bog communities with some heath species and rock outcrops	Between T3 and existing track	121243 69853	0	
25-08-2011	10		WN1 Oak woodland	Woodland south of T8	120857 69126	1	On moss covered oak.
25-08-2011	11	20.45	WN1 Oak woodland	Woodland south of T8	120806 69106	2	Slugs climbing moss covered tree.
25-08-2011	12	21.00	WN1 Oak woodland	Woodland south of T8	120708 69066	1	Climbing a moss covered tree
25-08-2011	13	21.25	Dry heath and exposed rock outcrop	Open area between T8 and T11	120670 69013	0	
25-08-2011	14	21.55	Dry heath and exposed rock outcrop	Open area between T8 and T11	120625 68976	0	
25-08-2011	15	22.20	Bog community	Open area between T8 and T11	120665 68921	0	
25-08-2011	16	22.45	Mostly rock outcrop with thin heath vegetation	Open area between T8 and T11	120723 68849	1	On open rock surface

Date	Point No	Time	Habitat type	Position on site	GPS Co-ords	No. of Kerry slugs	Comment
25-08-2011	17	23.10	Dry heath and exposed rock outcrop	North of track	120663 68823	0	
25-08-2011	18	23.30	Heath with *Molinia* and rock outcrop	On track to T11	120530 68794	0	
25-08-2011	19	23.55	Heavily grazed heath	Between T10 and T11	120431 68749	0	
26-08-2011	20	00.25	Heath with grass species well established.	East of proposed track	120329 68673	0	
26-08-2011	21	00.50	Gorse and grazed grasses. Some GA1 vegetation	West of proposed track	120255 68632	0	
06-09-2011	22	20.40	Heath and molinia adjacent to existing track	Off an existing track south of T9	119826 68894	0	
06-09-2011	23	21.05	Heath and molinia adjacent to existing track	Adjacent to T9	119936 68939	0	
06-09-2011	24	21.25	Heath and Molinia with some bounders	Adjacent to T9	119954 68946	0	
06-09-2011	25	21.50	Heath and Molinia with some bounders	North of proposed tract between T9 and T5	120044 69072	1	On rock outcrop
06-09-2011	26	22.10	Heath and rock outcrops	North of proposed tract between T9 and T5	120062 69101	1	On rock outcrop
06-09-2011	27	22.35	Heath and rock outcrops with heath and Molinia below	North of proposed tract between T9 and T5	120110 69110	1	On rock outcrop

Date	Point No	Time	Habitat type	Position on site	GPS Co-ords	No. of Kerry slugs	Comment
06-09-2011	28	23.00	Boulders on heath	North of proposed tract between T9 and T5	120206 69140	0	
06-09-2011	29	23.20	Large rock outcrop	North of proposed tract between T9 and T5	120273 69204	0	
06-09-2011	30	23.45	Large rock outcrop	North of proposed tract between T9 and T5	120323 69201	1	On rock outcrop
07-09-2011	31	00.10	Mossy wet rock outcrop	North of proposed tract between T9 and T5	120232 69216	1	On rock outcrop
07-09-2011	32	00.30	Rock outcrop with heath	North of proposed tract between T9 and T5	120170 69258	1	On rock outcrop
07-09-2011	33	01.00	Large rock outcrop	North of proposed tract between T9 and T5	120371 69242	1	On bounder
07-09-2011	34	01.20	Large rock outcrop	North of proposed tract between T9 and T5	120338 69278	2	On rock outcrop
07-09-2011	35	01.40	Large rock outcrop	North of proposed tract between T9 and T5	120301 69395	1	On rock outcrop

A total of 18 Kerry slugs were recorded from 35 transects and were heavily associated with rock outcrops or woodland habitats. All pockets of woodland surveyed supported Kerry slug. The distribution of slugs within the remaining upland habitats is uneven and generally quite low although it is noted that the results of such surveys should not be considered definitive. The uneven distribution may be related to the Kerry slug's requirement for specific microhabitats.

7. Estimate of Kerry Slug population size

7.1 Published estimates of population size

The Threat Response Plan Kerry Slug *Geomalacus maculosus* (Draft for consultation) noted that present information on abundance is restricted to anecdotal observations and limited field work. Studies associated with the proposed road route at Ballyvourney (Anderson unpublished) estimated the populations density for this type of habitat (vicinity of large boulders in bog/heath biotopes) at up to 2 adults per square meter of exposed lichen or moss-clad rock. The report notes that "*It was not possible to determine absolute abundance during this work so the figures represent significant under-estimation of absolute values*." In its judgment C-183/05, the European Court of Justice found against Ireland in that the monitoring in place for the Kerry Slug was inadequate.

The *Geomalacus maculosus* (1024) Conservation Status Assessment Report notes that "*the estimation of any invertebrate species is difficult to undertake for a number of reasons. Firstly, survey for Geomalacus individuals when the slugs are not active can itself have a negative impact on the species micro-habitat. Secondly, numbers of active slugs may vary considerably with weather conditions. Thirdly, invertebrate numbers can fluctuate with climatic conditions in an episodic or cyclical manner, and thus the combination of confounding factors contributing to an overall Irish population estimation make the number somewhat meaningless, as the maximum and minimum estimates are likely to be very different. No comprehensive population estimate exists for this species. In the absence of such information, the number of 10km squares occupied by the species (50) is taken as a proxy for population."*

In a recent study during which the efficacy of a range of refuge traps were tested, moistened metric traps placed on sandstone outcrops and wrapped in a continuous band around tree trunks proved to be the most successful for capturing the species. (McDonnell et al, 2011)

7.3 Population size based on available microhabitat

Previous surveys have recorded this species throughout this type of habitat in West Cork/Kerry in 50 10km squares. The *Geomalacus maculosus* (1024) Conservation Status Assessment Report notes that "*Until more detailed information becomes available on micro-habitat availability and usage, the extent of macro-habitat present for G. maculosus can be estimated from the extent of Old Red Sandstone within*

the slug's range – 3,529km². The true extent of suitable micro-habitat, when it is established, is likely to be significantly smaller than this area." A recent survey (March 2009-March 2011) recorded this species from a total of 44 hectads. These data comprise a range of 4400km² in Co. Cork and Co. Kerry. (McDonnell et al, 2011)

7.4 Population size conclusions

In reality the distribution of slug is difficult to estimate with a high degree of accuracy as they rely on lichens as a food source and thus the available microhabitat is important. It is not possible via analysis of aerial photography to identify rocky outcrops with sufficient lichen cover from those without. Within the limitations discussed above however it does appear that the national population of this species, although within a restricted geographical distribution, is large. There is no indication that the species is under threat or that impacts, pressures and threats to *Geomalacus* in the Republic of Ireland are significant at present. The *Geomalacus maculosus* (1024) Conservation Status Assessment Report notes that "*Considering the impacts, pressures and threats to Geomalacus in the Republic of Ireland today, the overall Conservation Status for Future Prospects is Favourable*."

8. Alternatives to removal of slug habitats

Kerry slug was detected at low density on upland heath habitat which forms the bulk of the habitat available in this area. Thus removal of habitat which could potentially support slug populations cannot realistically be avoided. It is noted that precluding development on the basis of Kerry slug populations would effectively sterilise large areas of upland habitat.

9. Potential impact in the absence of mitigation

9.1. Removal of habitat

As recorded by the slug survey above, the slug populations are widely scattered throughout the site on peat habitats, which will be impacted and in native woodland habitats which will not be directly affected by the development. It is considered prudent therefore to adopt a worst case scenario approach and consider the entire upland heath/bog habitat to be affected by the development as suitable for slugs. Taking a worst case scenario and assuming that all upland heath/bog/rock habitat to be removed is suitable for Kerry slug, the total area of potential slug habitat to be removed under the development footprint is 3.54 ha.

Developing an accurate measure of the total slug population potentially affected remains problematic and the surveys carried out to date, although limited in scope, indicate that they are unevenly distributed throughout the site. This is to be expected as they require micro-habitats within their broader range which will by their nature be patchily distributed. With invertebrates it is preferable to consider the range for a given species rather than individual numbers when estimating population size. (E.Moorkens pers. Comm.).

However based on known distribution of this species, the large area of equivalent habitat within a 10km radius of the area to be developed and the overall distribution of this species it appears highly improbable that this development, which will impact on 3.54 ha of habitat will impact significantly on the population of this species at a local level or within its overall range.

10. Mitigation

10.1 Replacement habitat

The net loss of potential habitat will be 3.54ha and it is proposed that this area of habitat will be recreated. The final detail on how habitats will be replaced will be carried out in consultation with the NPWS. It is noted that the client is committed to replacing the habitat lost by the most effective means possible. Although it is considered unlikely that the development will have a significant, detrimental long-term impact on this species, given the legislative requirements of the Habitats Directive and taking a worst case approach it is proposed that 3.54 to 4 ha of suitable replacement habitat be provided for this species.

Kerry slug utilise, and are generally associated with three specific habitat types namely: deciduous woodland, blanket bog and unimproved oligotrophic open moor, and lake shores. Thus, there a number of alternatives available in relation to creating replacement habitat as discussed below.

Option 1 Creation of woodland habitat

Woodland habitat can be created elsewhere within or outside the land holding on areas which are not of value for Kerry slug at present. The Kerry slug may occur in deciduous woodland of rowan, holly, birch, ash and oak. The habitat is often sloping, with outcropping of rock or with boulders scattered amongst the trees. Both trees and rock are in undisturbed, humid conditions and clean air, with a good lichen, or mixture of lichen, liverwort and moss flora. In this habitat, slugs can graze the organic film of the lichen and associated flora of both trees and rocks. Kerry slugs have been recorded under damp moss on horizontal or near horizontal branches and deep in crevices on tree trunks. (Forestry and Kerry Slug Guidelines, 2009). However, sandstone ruins of old buildings, walls and archaeology on the edge of plantations, in open spaces, gaps in the canopy, beside roads or other areas where there is sufficient light (for lichen growth) can be utilised by Kerry Slug.

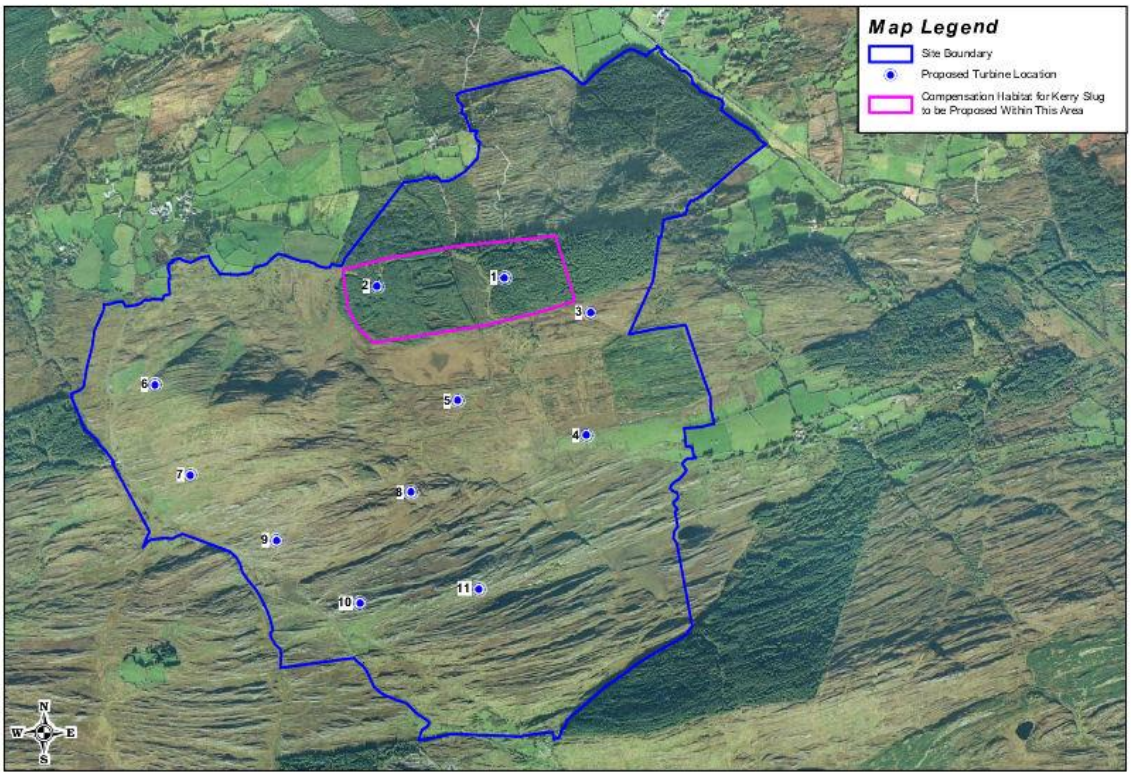
Option 2 Rehabilitation of unsuitable habitat.

Very low numbers or no records of the Kerry slug were recorded for *Rhododendron* thicket or close canopy conifer plantation (Forestry and Kerry Slug Guidelines, 2009). Rehabilitation of these areas can provide new slug habitat either by allowing underlying natural heath/bog habitat to regenerate where not irreversibly damaged or by planting with new deciduous woodland habitat.

Although G. maculosus has been recorded from coniferous woodland in recent studies the density was significantly greater on outcrops on a blanket bog compared to an adjacent high density conifer site, low density conifer site and clearfell area. (McDonnell et al, 2011). Further surveys may be required to determine if the areas of mature conifers on site earmarked as replacement habitat currently support Kerry slug.

The area shown on **Fig. 3** is currently dominated by coniferous forestry and has been earmarked as an area within which replacement habitat could be provided. Although the applicant commits to recreating the same area of slug habitat the exact methodologies have not been specifically detailed in this report as the mitigation measures as outlined above may require agreement with other land owners or purchase of additional land. This would create a considerable financial burden for the applicant if such agreements or purchases were put in place prior to the granting of permission to proceed. If there is a time lag between granting of planning and commencement of construction, planned landowner agreements, purchases etc may no longer be valid. In addition habitat conditions may change i.e. conifer plantations earmarked for replacement habitat may be felled. In addition there may be changes in policy in relation to agriculture and forestry which may have a bearing on the availability of replacement habitat i.e. changes to forestry premia, agri-enviromental schemes etc. If the areas outlined in Fig. 3 become unavailable or proves on further investigation to be unsuitable, other suitable lands will be identified and used to create replacement habitat in line with the terms of the derogation licence from the National Parks and Wildlife Service.

Fig. 3 Proposed area for 3.54-4 ha of habitat recreation (Approximate size of area identified is 28ha approx).



10.3 Other mitigation measures

The footprint of the development will be kept the minimum necessary to complete works at the site.

Machinery will confine itself to designated access roads and the clearly marked development footprint.

All fuel stored on site will be appropriately bunded and machinery will be maintained in good order to prevent ground contamination.

Subject to the provisions of the derogation licence, a suitable monitoring strategy will be put in place to monitor the health of populations on replacement habitat.

Roads will be constructed using siliceous sandstone derived from local sources as this is the preferred underlying geology for this species.

11. Conclusions

As noted above the Kerry Slug typically occurs in three habitats namely oak dominated woodland, open situations of unimproved oligotrophic open moor or blanket bog and on lake shores. Of these habitats the first is uncommon, and native sessile oak woodland is high conservation priority in its own right. However within the sandstone geology of West Cork and Kerry where the slug occurs, unimproved oligotrophic open moor and blanket bog is extremely common and accounts for the distribution of this species within a large geographic area. This habitat dominates a high percentage of the Beara, Iveragh and Dingle peninsulas in particular.

Although there are no accurate estimates available of the current numbers of Kerry slug within its range the available evidence does suggest that it is common and widely distributed within its range. The IUCN has now downgraded the threat to the Kerry Slug from vulnerable in 1994 (Groombridge, 1994) to least concern in 2006 (IUCN, 2006). In a recent study Moorkens (2006) did not find enough evidence to place it on the list of Ireland's threatened molluscs.

Given the availability of similar habitats to that which the development proposes removing, both within the immediate area and within the southwest of Ireland as a whole, it is considered highly improbable that this development will in its own right have a significant negative impact on this species or on its conservation status.

However given the strict protection afforded this species, possible future cumulative impacts, and in line with the precautionary principle, it is proposed that the same area of replacement habitat will be created under the supervision of a qualified molluscan expert.

The measures to be employed will include some or all of the following: recreation of rock and wet heath habitat on embankments within the development area, retention of boulders which will be relocated to suitable areas of peat habitat, creation of at least 3.54 ha of new woodland or reinstatement of peat land habitat with appropriate feeding resources either within or outside the applicants current landholding and rehabilitation of habitat either outside or within the applicants current landholding. These have been agreed as suitable in principle with a qualified molluscan expert (Evelyn Moorkens pers. comm.)

As Kerry slug are adapted to feeding on exposed siliceous rock the provision of access roads using this building material is not expected to cause habitat fragmentation or create barriers to movement.

Provided the mitigation measures outlined above are effectively implemented the long term impact on the population of this species is not expected to be significant, and no significant loss of slug habitat is expected to occur.

12. References

Boycott, A. E. & Oldham, C. (1930). The food of *Geomalacus maculosus*. *Journal of Conchology* 19: 36.

Department of the Environment, Heratagle and Local government EHLG (2010). Threat response plan. Kerry slug *Geomalacus maculosus*

NRA, 2008. The *Ecological surveying techniques of protected flora and fauna during the planning of national road schemes*

Mc Donnell, R.J. and Gormally, M.J. (2011). Distribution and population dynamics of the Kerry Slug, Geomalacus maculosus (Arionidae). Irish Wildlife Manuals, No. 54. National Parks and Wildlife
Service, Department of Arts, Heritage and the Gaeltacht, Dublin, Ireland.

Moorkens, E.A., (2003) Final Baseline Report on Molluscan Surveys of Pollardstown Fen 1998-2003. Report to Kildare County Council.

Office of Public Works OPW (2009). SERIES OF ECOLOGICAL ASSESSMENTS
ON ARTERIAL DRAINAGE MAINTENANCE No 11. Ecological Impact Assessment (EcIA) of the Effects of Statutory Arterial Drainage Maintenance Activities on Fens, Mires & Whorl Snails

Platts, E.A. & Speight, M.C.D. (1988). The taxonomy and distribution of the Kerry slug, *Geomalacus maculosus*

Rodriguez T, Ondina P, Outeiro A & Castillejo J (1993). Slugs of Portugal. III. Revision of the genus *Geomalacus*

Speight, M.C.D. (1996) *Geomalacus maculosus* Allman, 1843. In: Van Helsdingen, P.J., Willemse, L. & Speight, M.C.D. (eds.) Background information on invertebrates of the Habitats Directive and the Bern Convention. Pt.III: Mollusca and Echinodermata. Nature and Environment, No.81: 433-437. Council of Europe, Strasbourg.

Appendix 1. Photographs

Photograph 1. Kerry slug at survey location 5.

Photograph 2. Kerry slug at survey location 6

Photograph 3. Kerry slug in woodland at location 10.

Photograph 4. Kerry slug at survey location 16.

APPENDIX 3

2016 KERRY SLUG SURVEY REPORT

Kerry Slug Survey Report

Proposed Grid Connection for Cleanrath Wind Farm Development

Planning & Environmental Consultants

DOCUMENT DETAILS

Client:	Cleanrath Windfarm Ltd.
Project title:	Cleanrath Wind Farm

Project Number:	110721c
Document Title:	Kerry Slug Survey Report
Doc. File Name:	110721c – KSS – 2016.04.07 – F
Prepared By:	McCarthy Keville O'Sullivan Ltd. Planning & Environmental Consultants Block 1, G.F.S.C. Moneenageisha Road, Galway

Document Issue:

Rev	Status	Issue Date	Document File Name	Author(s)	Approved By:
01	Draft		110721c – KSS – 2016.04.04 – D1	PB &BOL	PR
02	Draft	05/04/2016	110721c – KSS – 2016.04.04 – D2	BOL	PR
03	Draft	07/04/2016	110721c – KSS – 2016.04.07 – F	BOL	PR

Table of Contents

1 INTRODUCTION

1.1 General Introduction

This report has been prepared in response to a request for Further Information by Kerry County Council to provide information regarding the potential presence of Kerry Slug (*Geomalacus maculosus*) on the proposed underground cable route that commences at the Cleanrath wind farm development, Co. Cork and connects to Coomataggart substation, Co. Kerry. This assessment focuses on the Kerry section of the proposed cable route and addresses Items 1(b), 1(c), 1(d) and 1(e) of the Further Information Request by Kerry County Council reproduced in the paragraphs below:

> 1(b) *''A survey for Kerry slug along the footprint of the proposed development, carried out by a suitably competent zoologist during appropriate weather conditions''.*
>
> 1(c) *''If a Regulation 54 derogation licence is required on the basis of the survey, this should be applied for and, if granted, be available prior to the decision to grant permission for the development''*.
>
> 1(d) *''If Kerry slug habitat is to be lost as a result of the proposed development, then the EIS should include a supplementary assessment of the efficacy of the options for recreating habitat in sufficient detail so that the conclusion of no adverse effects on the species and its habitat can be justified''*.
>
> 1(e) *''Where specimens of Kerry slug are found to occur in the works area, then the procedure for removing specimens of this species from areas where they are likely to be killed or disturbed due to works for the proposed development should be assessed in the EIS''*.

This assessment aims to identify the presence of suitable habitat for Kerry Slug (and individuals if present) within the footprint of the proposed cable route and if necessary, to prescribe measures to prevent any significant impacts on this species as a result of the proposed development.

1.2 Background

The proposed Cleanrath grid connection will be via the proposed onsite substation to the Coomataggart Substation, 10 kilometres west of the proposed Cleanrath Wind Farm development. The Coomataggart substation and associated access track (which have been granted permission under Pl. Ref. 15/262) since the latter part of 2015. The underground cabling will follow the route of the existing public road corridor for the majority of the proposed route within Co. Cork. The proposed grid connection occurs within County Kerry for approximately 2 kilometers and travels west for approximately 0.8 kilometres (referred to in this report as northern section) before traveling south for approximately 1.2 kilometres (referred to in this report as the southern section) where it terminates at the Coomataggart Substation (refer to Figure 1.1).

1.3 Kerry Slug Ecology

The Kerry Slug has a very restricted global range and occurs only in Ireland, Spain and Portugal. The species is marked with white or yellow spots and two colour forms exist: a blue/grey slug with white spots and a ginger or brown form with yellow spots. Adults can grow to 80 millimeters in length but may contract into a ball shape when disturbed or may lie flat

and elongate themselves to fit into cracks and crevices. Kerry Slugs are capable of self-fertilisation and produce eggs between July and October. The eggs are large, laid in batches of 18 to 30, and will hatch between six and eight weeks. Individuals can live for up to seven years.

The species feeds on lichens, liverworts and mosses on rocky outcrops or on mature trees and timber. The species is largely active at night, throughout the year, and will emerge during the daylight hours during damp or humid conditions. In Ireland, Kerry Slug is largely restricted to west Cork and Kerry from fifty 10km squares. Within its range, it occurs within two broad habitat types:

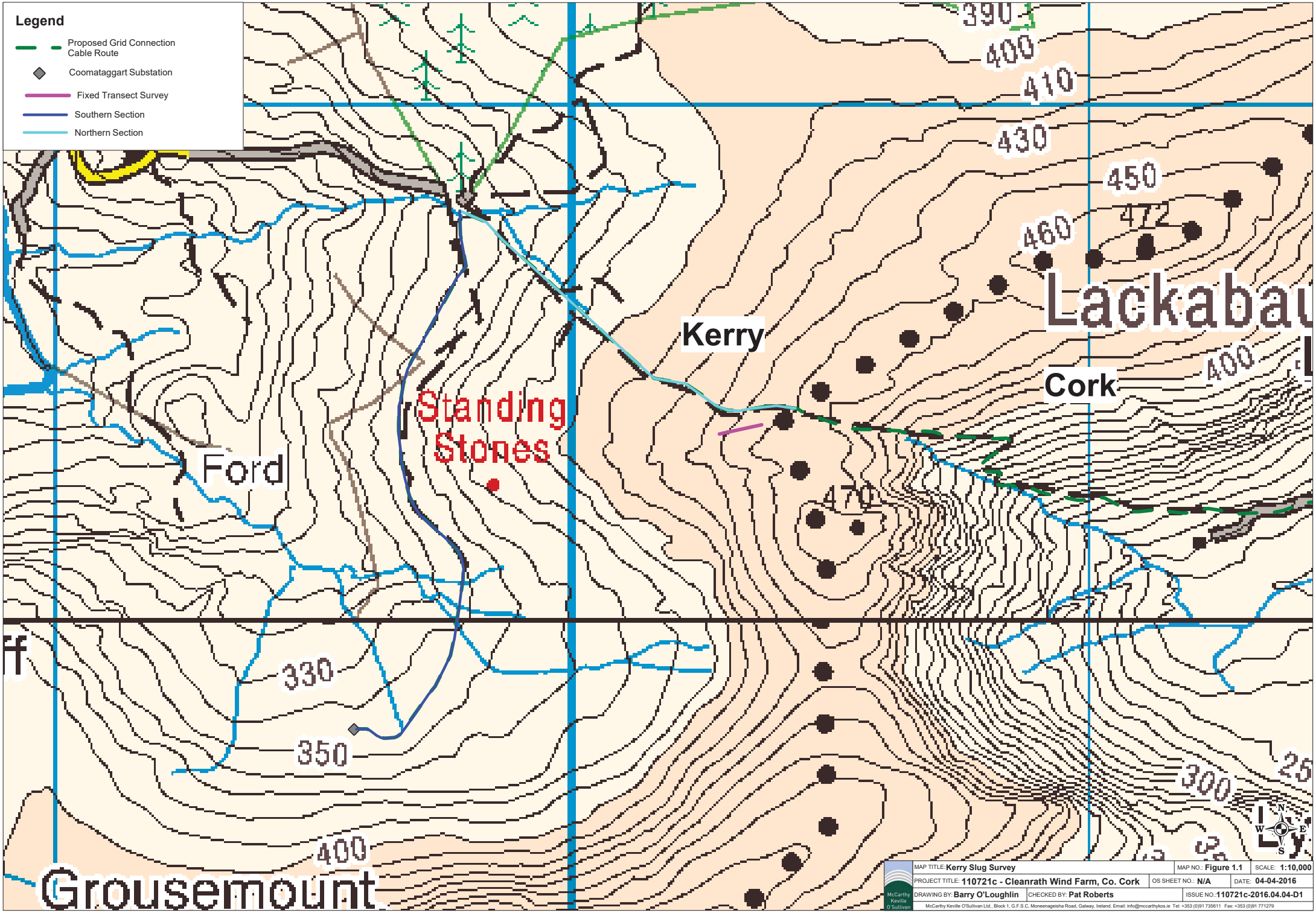
- Oak-dominated or mixed deciduous woodland with a mixture of oak and birch. Woodlands with rocky outcrops or boulders are particularly favoured.
- Unimproved oligotrophic open moor or blanket bog with sandstone outcrops or boulders. These areas are largely devoid of vegetation except for lichens and mosses which provide sufficient grazing material for the species.

1.4 Legal Protection

Kerry Slug is a protected species under the Wildlife Act, 1976 and Wildlife (Amendment) Act, 2000, in Ireland and is also protected under Annex II and Annex IV of the EU Habitats Directive (Council Directive 92/43/EEC) resulting in the designation of seven Special Areas of Conservation (SACs) for the species protection in Ireland. The nearest European Site designated for Kerry Slug is Killarney National Park, Macgillycuddy's Reeks and Caragh River Catchment SAC (000365), located 8.4 kilometres north of the proposed works.

1.5 Statement of Competence

The survey work was conducted by suitably qualified ecologist, Mr. Barry O'Loughlin (MSc., BSc., MCIEEM). Barry has extensive experience undertaking targeted Kerry Slug surveys for various infrastructural development led projects in Counties Cork and Kerry. He has undertaken habitat suitability assessments, nocturnal transect surveys, metric trap surveys under derogation licence and diurnal surveys under suitable weather conditions. He possesses over six years professional work experience in the area of ecological consultancy services and is a full member of the Chartered Institute of Ecology and Environmental Management (CIEEM).



MAP TITLE: Kerry Slug Survey		MAP NO.: Figure 1.1	SCALE: 1:10,000
PROJECT TITLE: 110721c - Cleanrath Wind Farm, Co. Cork		OS SHEET NO.: N/A	DATE: 04-04-2016
DRAWING BY: Barry O'Loughlin	CHECKED BY: Pat Roberts		ISSUE NO.: 110721c-2016.04.04-D1

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

2 METHODOLOGY

2.1 Desk Study

The following data sources were consulted as part of desk studies (31st of March 2016):

- National Parks and Wildlife Service online services (MapViewer, Site Synopsis and Conservation Objectives, rare species database http://www.npws.ie/) for information pertaining to Kerry Slug.
- National Biodiversity Data Centre (NBDC) (rare and protected species) (http://www.biodiversityireland.ie/).

A search was also undertaken for previous Kerry Slug survey reports that have been prepared in the wider study area and are outlined below:

- All Ireland Non-Marine Mollusc Database (National Biodiversity Data Centre; Database last updated 21st October 2015)
- Kerry Slug Survey 2013 (NUIG/Biology.ie)
- NPWS Article 17 Range and distribution maps
- NPWS Threat Response Plan for Kerry Slug (*Geomalacus maculosus*).

2.2 Field Survey

Field surveys were undertaken on the 24th of March 2016 by Mr. Barry O'Loughlin, Ecologist with McCarthy Keville O'Sullivan. The field survey assessment was carried out in accordance with best practice guidelines to survey for the presence of Kerry Slug (NRA, 2009). In accordance with the NRA Guidelines (NRA, 2009), Kerry Slug surveys are only required within the species' geographical range and where desktop and walkover surveys identify habitats suitable for use by the species. Specific surveys may also be appropriate if, in the absence of existing records, areas of particularly suitable habitat are identified. Where records exist, surveys should focus on suitable patches of habitat within the vicinity of the known record. The survey methods were undertaken having regard to the following key elements:

- An assessment of suitable Kerry Slug habitat within the footprint of the proposed cable route and adjoining habitats during daylight hours.
- A search for Kerry Slug in areas identified as suitable habitat during optimal weather conditions (damp wet conditions) during daylight hours; and
- A nocturnal survey for Kerry Slug incorporating a fixed route transect walked at 20m intervals throughout suitable habitat using torchlight. A visual count for slugs was carried out within 5 metres of the fixed route transect.

Surveys were undertaken during optimal weather conditions (cloudy, overcast and damp conditions with occasional dry spells in the afternoon). Particular attention was paid to lichen covered boulders and areas of rock outcrop. The habitat suitability survey and initial survey of rocky outcrops within a 10 to 20m buffer of the proposed cable was conducted during daylight hours. The nocturnal survey was carried out by torchlight in areas identified as suitable habitat and the footprint of the proposed cable route in the northern section. A derogation licence from NPWS to survey for the presence of Kerry Slug was not sought as the survey methods employed did not require the deliberate capture of the species.

2.3 Limitations and Constraints

As per the NRA (2009) guidelines, surveys for Kerry Slug can be completed all year round. It is recommended to conduct surveys at night during damp or humid conditions. Surveys can also be completed during daylight hours on cloudy, damp days, though these surveys are considered to have a lower efficiency. Surveys were completed on the 24th of March 2016. Weather conditions were overcast and damp during daylight hours in the early part of the day with dry periods in the afternoon. Weather conditions during nocturnal surveys were overcast and ground conditions were wet and damp underfoot. Based on the above, it is considered that the Kerry Slug surveys were not subject to constraints or limitations.

3 RESULTS

3.1 Desktop Study

The following sections outline the results of the desk study. The study area overlaps with three hectads: W06, W07 and W17.

3.1.1 European Designated sites

The nearest European site (i.e. Special Area of Conservation or Special Protection Area) to the study area is Kilgarven Ice House SAC (000364), 7.2 kilometres north-west of the proposed works. This site is designated for the conservation of the Lesser Horseshoe Bat. The nearest European Site designated for Kerry Slug is Killarney National Park, Macgillycuddy's Reeks and Caragh River Catchment SAC (000365), 8.4 kilometres north of the proposed works.

3.1.2 NPWS Rare and Protected Species Database

The NPWS database was consulted with regard to their Rare and Protected Species Database for the hectads which overlap the study area. The nearest record for Kerry Slug is 2.3 kilometres north of the proposed grid connection route in habitat recorded as rough grazing upland (http://www.npws.ie/).

3.1.3 Biodiversity Ireland Database

The National Biodiversity Database was accessed on 31st of March 2016. The database contains records from the All-Ireland Bob-Marine Molluscan Database. There are 33 records for Kerry Slug in hectad W17, the most recent record being from 2012, one record for hectad W07, most recent being 1998 and two records for W06, the most recent being 2015.

3.1.4 Kerry Slug Survey

The 2013 Kerry Slug Survey is a project ran in conjunction between the National University of Ireland, Galway (NUIG) and Biology.ie. The survey aims to aquire modern records of the species in order to produce the most up-to-date hectad level distribution maps. The project encourages members of the public to submit sightings with photographs for confirmation by experts. The nearest records for the species from the proposed cable route occurs 5.4 kilometres east in the townland of Augeris, Co. Cork.

3.1.5 Review of Aerial Photography

The potential Kerry Slug habitats assessed in this document were first identified from studies of aerial photographs and OSI, Discovery Range 1:50,000 mapping of the area in the preliminary desk studies undertaken prior to commencing field survey works.

3.1.6 Desk Study Conclusions

Based on the desk study results the following points of note were identified:

- The nearest SAC designated for Kerry Slug (Killarney National Park, Macgillycuddy's Reeks and Caragh River Catchment SAC) is sufficiently removed from the proposed grid connection works so that impacts on the SAC population are not considered likely and further assessment within the SAC is not deemed necessary.
- There are a number of records for Kerry Slug from hectads W17, W07 and W06 which overlap with the proposed grid connection, the nearest occurring 2.3 kilometres north of the proposed route.
- Based on the results of the desk study, it is considered possible that Kerry Slug may occur within the zone of influence of the proposed cable route, should suitable habitat be identified. Detailed field surveys were carried out to investigate whether potential

slug populations were present during field surveys. The field survey results are described and outlined in the section below.

3.2 Field Survey

Field Surveys were undertaken on the 24th of March 2016. A description of the northern and southern sections of the proposed cable route surveyed for the presence of Kerry Slug are outlined in the paragraphs below.

Northern Section

The northern section of the proposed cable route was surveyed for the presence of Kerry Slug and an assessment for suitable habitat was undertaken. The proposed cable route is restricted to an existing track (refer to Plate 3.1). Following a walkover survey, the track was identified as unsuitable to support populations of Kerry Slug. The surrounding habitats comprise Wet Heath (HH3) with small occurrences of exposed siliceous rock outcrop noted in an area >20m south of the existing track within the Kerry border. The wet heath component extends along the area surrounding the northern section of the proposed cable route and occurs in association with pockets of acid grassland before turning south to the Coomataggart substation. Plant species associated with this habitat type encountered during field surveys included Purple Moor-grass (*Molinia caerulea*), Ling Heather (*Calluna vulgaris*), Cross-leaved Heath (*Erica tetralix*), Common Cotton-grass (*Eriophorum angustifolium*), Hare's-tail Cottongrass (*Eriophorum vaginatum*) and the mosses *Sphagnum capillifolium*, *Hylocomium splendens* and *Racomitrium uliginosum*. In addition, the lichen species *Cladonia uncialis* was recorded. A livestock proof fence bounds the area of wet heath from the existing track. No records of Kerry Slug were identified following a search of rocky outcrops and boulders along the northern section during daylight hours. A nocturnal survey for Kerry Slug was devised along a fixed route transect in an area of wet heath and exposed siliceous rock outcrop south of the existing track (refer to Figure 1.1). A visual count for slugs was carried out within 5 metres of the fixed route transect using torchlight. No records of Kerry Slug were recorded following this search. Particular attention was paid to cracks and crevices of boulders and areas of rock outcrop. As a precautionary approach, the existing track of the proposed cable route was surveyed to identify potential slug records. No records were identified. Ground conditions were wet and damp underfoot. A summary of the survey effort is provided in Table 3.1 below.

Southern Section

It was found that the southern section contained no suitable Kerry Slug habitat within the footprint of the proposed cable route. This section was under construction at the time surveys were conducted (granted under Pl. Ref. 15/262). The surrounding habitats have been heavily disturbed due to construction works. The habitats along the southern section of the proposed cable route are dominated by Spoil and bare ground (ED2) and Acid grassland (GS3). There were some small occurrences of rock outcrop in association with acid grassland observed in surrounding areas, however, following a target survey, no records of Kerry Slug were observed during daylight hours. A nocturnal transect survey for the species in the southern section was deemed inappropriate given the absence of suitable habitat within the proposed works area.

Plate 3.1: The northern section of the proposed grid connection utilises an existing track and is surrounded by wet heath (HH3). No specimens of Kerry Slug were recorded.

Plate 3.2: The southern section of the grid connection route was under construction at the time field surveys were undertaken in March 2016. No suitable Kerry Slug habitat was recorded within the footprint of the proposed cable route.

Table 3.1 Summary of survey effort and findings of the Kerry Slug survey undertaken as part of the proposed cable route grid connection.

Townland	Habitat Suitability	Survey conducted	Survey results
Southern section	No suitable habitat occurs within the proposed development footprint (existing track). Acid grassland and small occurrences of rock outcrop occur in the wider surroundings.	Habitat Suitability Species activity (Daylight)	No records identified in surrounding habitats. The habitat is deemed to be unsuitable.
Northern Section	No suitable habitat occurs within the proposed development footprint (existing track). Rocky outcrop and wet heath identified south of the proposed cable route (>20m).	Habitat Suitability, Species activity (Daylight) Species activity (nocturnal fixed transect torchlight survey)	A small area of exposed siliceous rock outcrop was identified south-east of the proposed cable route in the surroundings. The habitat could potentially offer suitable habitat to support Kerry Slug. This area was located >20m south of the existing track. No suitable habitat was recorded within the development footprint. Transect nocturnal survey undertaken in an area south of the proposed cable route within the Kerry border and along the existing access track. No individuals identified along fixed transect route or along the existing access track of the proposed cable route.

3.3 Discussion and Recommendations

The proposed cable route development will not result in the loss of Kerry Slug habitat. The footprint of the proposed cable route is deemed to be unsuitable to support populations of Kerry Slug (existing track). An area of wet heath and exposed siliceous rock outcrop was identified to the south of the northern section within Co. Kerry. Areas of rock outcrop in association with wet heath are >20m from the proposed cable route. As a precautionary approach, a nocturnal survey was undertaken at this location and along the existing track of the proposed cable route (northern section). No records of Kerry Slug were identified. No records of Kerry Slug were identified during daylight searches in surrounding areas. The southern section of the proposed cable route is highly modified due to the construction of a new access track and substation building granted under Pl. Ref. 15/262.

In line with best practice guidelines, the following measures will be implemented and adhered to during construction works:

- Areas of suitable habitat (i.e. exposed siliceous rock outcrop in association with wet heath) outside the footprint of the proposed development will be avoided during construction works.
- Stockpiling of spoil and earthen material will avoid areas of wet heath and areas of exposed rock outcrop.

Based on the findings of the field surveys, no specimens of Kerry Slug were identified within the zone of influence of the proposed cable route. No further mitigation or rehabilitation measures are considered necessary in relation to this species.

4 CONCLUSIONS

Based on the findings of field surveys undertaken during March 2016, the proposed cable route will not result on impacts on Kerry Slug based on the following:

- Absence of suitable Kerry Slug habitat recorded within the footprint of the proposed cable route.
- No records of Kerry Slug specimens recorded within and surrounding the footprint of the proposed cable route.
- The proposed cable route is restricted to an existing track (unsuitable habitat) and will not result in the loss of suitable Kerry Slug habitat.

The following concluding paragraphs address Items 1(b), 1(c), 1(d) and 1(e) of the Further Information Request by Kerry County Council:

1(b): This report includes the provision of a Kerry Slug survey carried out by a suitably qualified Ecologist under suitable weather conditions. The appointed Ecologist has previous experience undertaking specialist Kerry Slug surveys for a range of electrical infrastructural development led projects in Counties Cork and Kerry.

1(c): A Regulation 54 derogation licence was not required as the survey methods employed did not require the deliberate capture of Kerry Slug or trapping techniques (i.e. metric traps). Survey methods were in line with NRA (2009).

1(d): This assessment concludes that no specimens of Kerry Slug were encountered along the proposed development footprint or in areas of suitable habitat in the wider surroundings. The proposed development will not result in the loss of Kerry Slug habitat. As a consequence, there will be no requirement to alter the EIS findings in relation to Kerry Slug, however, it is recommended that areas of wet heath and exposed rock outcrop be avoided during construction works and this mitigation measure will apply.

1(e): No records of Kerry Slug were identified in the works area and additional measures are not required. As a consequence, there will be no requirement for the removal of specimens during construction works.

Based on the information outlined above, no impacts on Kerry Slug are foreseen as a result of the proposed development.

5 BIBLIOGRAPHY

European Communities (Birds and Natural Habitats) Regulations (2011). S.I. No. 477/2011

European Communities (Birds and Natural Habitats) (Amendment) Regulations (2015). S.I. No. 355/2015.

European Union Habitats Directive (1992) Council Directives 92/43/EEC of 21 May 1992 on the conservation of natural habitats and of wild fauna and flora.

McDonnell, R.J.& Gormally, M.J. (2011) Distribution and population dynamics of the Kerry Slug, *Geomalacus maculosus* (*Arionidae*). *Irish Wildlife Manuals.* No. 54. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht, Dublin, Ireland.

NBDC (2015) All Ireland Non-marine Mollusc Database. Last updated: 21st October 2015. http://maps.biodiversityireland.ie/#/DataSet/226 Last Accessed: 31/03/2016

NBDC (2015) National Biodiversity Database Centre http://maps.biodiversityireland.ie/# Last Accessed: 31/03/2016

NPWS (2015) Rare and Protected Species Database. www.npws.ie Last Accessed: 31/03/2016

NPWS (2013a) *The Status of EU Protected Habitats and Species. Article 17 Overview Report. Volume 1.* Unpublished Report, National Parks and Wildlife Services. Department of Arts, Heritage and the Gaeltacht, Dublin, Ireland.

NPWS (2013b) *The Status of EU Protected Habitats and Species in Ireland.* Habitat Assessments Volume 2. Version 1.1. Unpublished Report, National Parks and Wildlife Services. Department of Arts, Heritage and the Gaeltacht. Dublin, Ireland.

NPWS (2013c) *The Status of EU Protected Habitats and Species in Ireland.* Species Assessments Volume 3. Version 1.0. Unpublished Report, National Parks & Wildlife Services. Department of Arts, Heritage and the Gaeltacht. Dublin, Ireland.

NPWS (2010) *Threat Response Plan for Kerry Slug (Geomalacus maculosus)*. National Parks and Wildlife Service, Department of Environment, Heritage and Local Government.

NRA (2009a) *Ecological Surveying Techniques for Protected Flora and Fauna during the Planning of National Road Schemes*. National Roads Authority, Dublin, Ireland.

NRA (2009b) *Guidelines for Assessment of Ecological Impacts of National Roads Schemes.* National Roads Authority, Dublin, Ireland.

NUIG (2013) Kerry Slug Survey – 2013. www.biology.ie Last Accessed: 31/03/2016

Wildlife Act (1976) Wildlife Act, Ireland, 22 December 1976, No. 39 of 1976.

Wildlife Amendment Act (2000) Wildlife Amendment Act, Ireland, 18 December 2000, No. 38 of 2000.