

Consulting Report

Energy Isles Wind Farm Appendix 10.2 Peat Landslide Hazard Risk Assessment

Shetland Islands

18-FEC-002-D-002v01

27/08/2021

© East Point Geo Ltd 2021

Prepared for
D Saunders

Client
Statkraft



DOCUMENT CONTROL

Version	Description	Prepared by	Approved by	Date
01	Issued as draft for review	AJM	DS	27/08/2021

CONTENTS

1.	INTRODUCTION	4
1.1.	Background	4
1.2.	Scope of Report	5
2.	ASSESSMENT OF REVISED LAYOUT	6
2.1.	Layout Changes and Source Zones.....	6
3.	UPDATED RISK ASSESSMENT	9
3.1.	Overview	9
3.2.	Calculated risks for source zone 17	9
3.3.	Calculated risks for source zone 22	9
3.4.	Other source zones	10
4.	SUMMARY	11

1. INTRODUCTION

1.1. Background

Energy Isles Shetland Ltd (the Applicant) are seeking consent under Section 36 of the Electricity Act 1989 for construction of the Energy Isles Wind Farm, Shetland (hereafter the 'Proposed Development'). The Proposed Development lies to the south and west of Gloop and is approximately 16.8km² (c. 1,679ha) in area. The site is relatively remote, with no major or minor transport routes within the site.

A Section 36 application was submitted in 2019 for a 29 turbine scheme (the '2019 EIA Report'), and following feedback from stakeholders a number of revisions were made ahead of a revised submission in August 2020 (the '2020 SEI'), including a reduction in turbine numbers from 29 to 23 (the '2020 Layout'). Since submission of the 2020 SEI, the layout has been updated, further reducing the number of turbines and their geographical spread.

This iteration of the Proposed Development (the '2021 Layout') is proposed to comprise:

- 18 wind turbines with a tip height of 180m, each with an associated transformer.
- A crane hardstanding area and blade laydown areas at each turbine location.
- A substation and control building.
- A network of buried electrical, telecommunications and control cables linking the substation/control building and turbines.
- 3 onsite temporary construction compounds.
- 4 temporary borrow pits for the extraction of stone (the method of extraction will be determined post-consent).
- 1 met mast.
- A network of access tracks and turning areas linking the turbines and the substation/control building.
- Widening of 0.523km of the Dalsetter Hill Road (known locally as the Old Cullivoe Road) which links the new access tracks to the A968.

The Scottish Government Best Practice Guidance (BPG) provides a screening tool to determine whether a peat landslide hazard and risk assessment (PLHRA) is required (Scottish Government, 2017). This is in the form of a flowchart, which indicates that where blanket peat is present, slopes exceed 2° and proposed infrastructure is located on peat, a PLHRA should be prepared. These conditions exist at the Proposed Development site and therefore a PLHRA is required. In a checking report prepared by Ironside Farrar for the Scottish Government's Energy Consents Unit (ECU), the PLHRA submitted in the 2019 EIA Report was noted to be "*appropriate and sufficiently robust. It is well structured, builds up a good understanding of the peat characteristics on the site and presents a competent risk assessment (with mitigation).*"

This report addresses changes since the 2020 SEI and their implications for peat landslide risk within and around the site boundary.

1.2. Scope of Report

An initial review of the 2021 Layout indicated that changes primarily comprise either removal of turbines and associated infrastructure, including borrow pit search areas, (in which case there is no impact to be assessed) or minor refinements to orientation of associated hardstandings. Accordingly, the fundamental inputs to the 2019 EIA Report PLHRA still stand.

This short report should be read in conjunction with the 2019 EIA Report, the 2020 SEI and the relevant sections of SEI 2 and compares the 2021 Layout with previously calculated peat landslide likelihoods to determine if there are any associated changes in calculated risk for identified site receptors.

Section 2 of this report summarises the key infrastructure changes and Section 3 updates the risk assessment results.

2. ASSESSMENT OF REVISED LAYOUT

2.1. Layout Changes and Source Zones

Layout changes since 2020 SEI comprise a removal of 5 turbines (T5, T6 and T9 on the southeast side of the Hill of Vigon, T8 to the north of Fugla Water and T10 to the southwest of Fugla Field, Plate 1), and minor changes to the position of hardstandings for the remaining 18 turbine locations. The changes are most easily understood visually, and Plate 1 shows the 2021 Layout in green superimposed on the 2020 Layout in orange. For reference, changes from the 2019 EIA Report Layout are presented in Figure 3.1 of SEI 2.

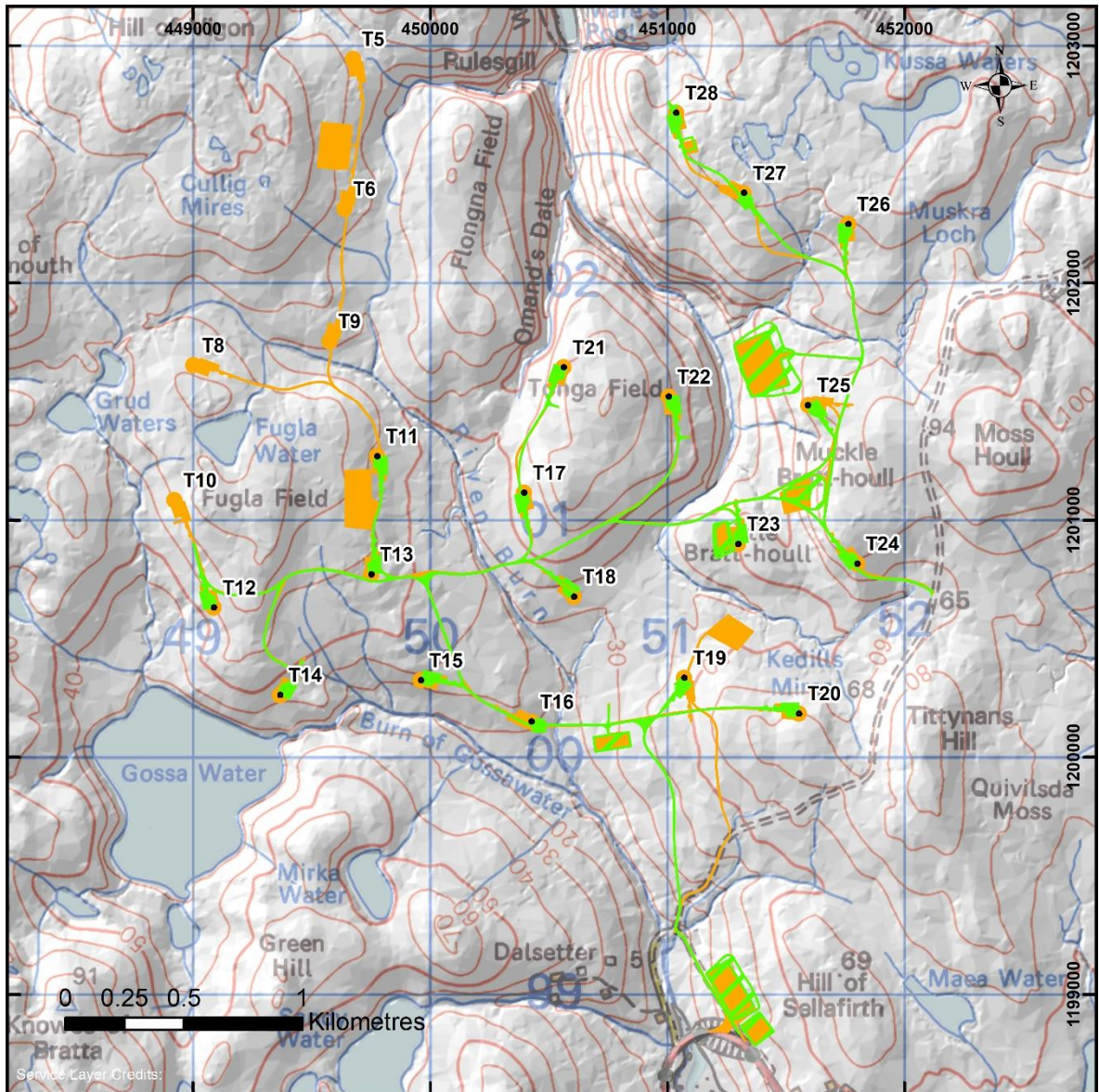


Plate 1. Updated 2021 Layout (light green) and 2020 Layout (orange) showing reduction in number of turbed and reduced geographic extent

As part of the previous analysis in the 2019 EIA Report, landslide source zones (see Plate 2) were identified where infrastructure overlapped with areas of Moderate or higher peat slide or bog burst likelihood. Landslide likelihood is a function of ground conditions and the assessment of this has not changed since either the 2019 EIA Report or the 2020 SEI. However, the location and extent of

source zones depends on the position of infrastructure relative to areas of Moderate or higher landslide likelihood, and the change in layout has required a review of the previously identified source zones.

The review indicates that changes to potential landslide source zones are very minor, and as follows:

- **Source zones 4, 5 and 10:** these source zones no longer apply due to removal of turbines 5, 6, 8, 9 and 10.
- **Source zone 17:** this zone, associated with Turbine 24 has expanded due to an increase in overlap with a moderate likelihood area by 18 m to the north.
- **Source zone 22:** this zone, associated with Turbine 25 has contracted due to a decrease in overlap with a moderate likelihood area by 26 m to the south.

There are no changes to source zones 8-9, 11-16 and 18-21.

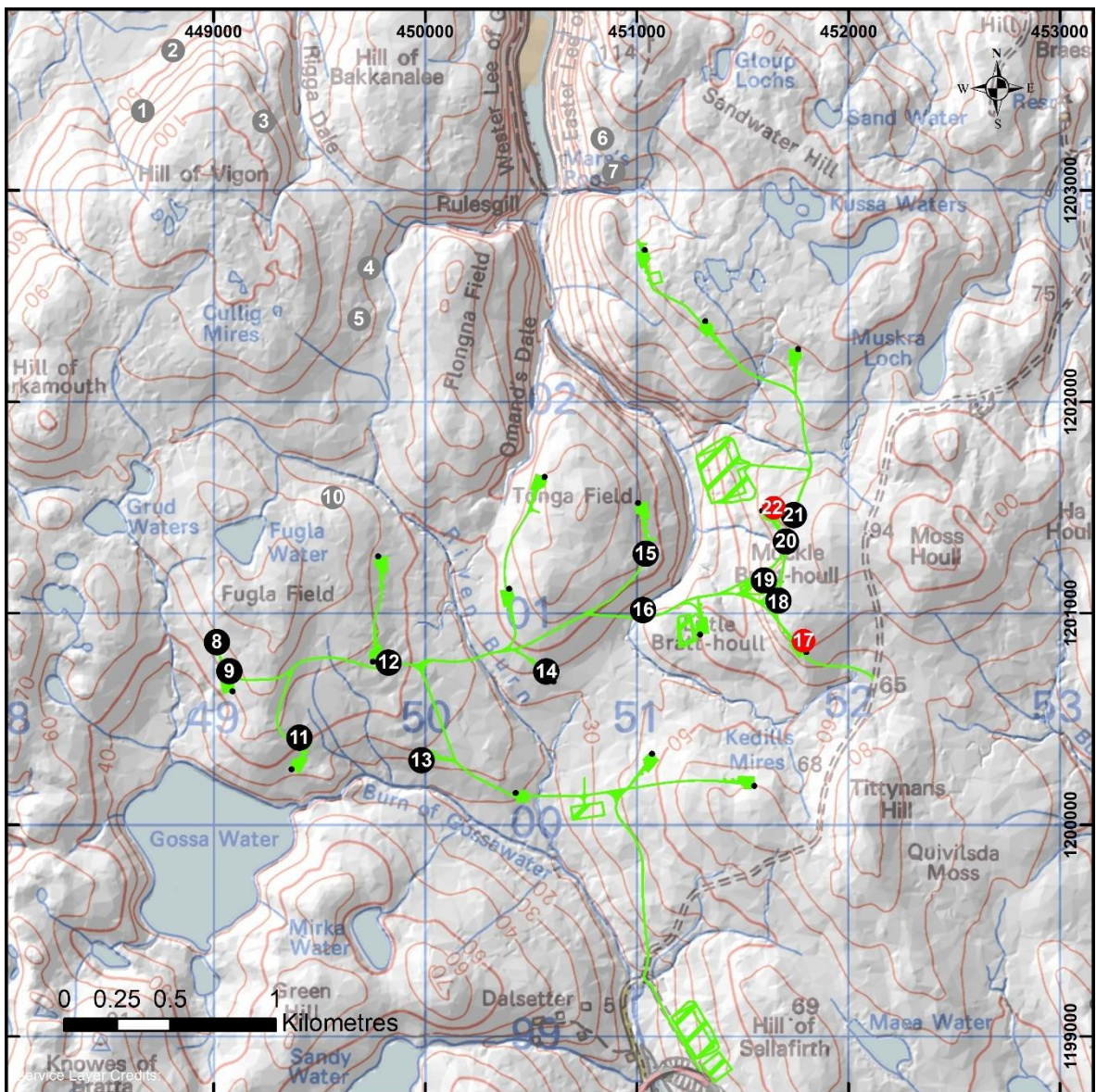


Plate 2. Changes to source zones (numbered circles) associated with updated layout – source zones with changes are highlighted in red, source zones with no changes in black and source zones that are no longer applicable are shown in grey

Note that source zones 1, 2, 3, 6 and 7 were removed from the analysis alongside their associated infrastructure in the northwest of the site boundary between the issue of the 2019 EIA Report and 2020 SEI. As a result, an updated PLHRA, reflecting the changes from 2019 Layout to the 2020 Layout, was not submitted as part of 2020 SEI.

The next section considers the implications of these minor changes to the risk assessment results.

3. UPDATED RISK ASSESSMENT

3.1. Overview

The risk assessment process documented in the 2019 EIA Report calculated risk as a function of the likelihood of a landslide occurring in each source zone and the consequences of that landslide for identified receptors. Runout zones were defined extending from the source zone over terrestrial habitat receptors and to watercourse receptors (if within the expected 500 m upper limit of runout).

Given the relatively minor changes in layout from the 2020 Layout to the 2021 Layout, no new receptors have been identified, and these remain as listed in the 2020 SEI. Watercourses were assigned a moderate consequence level (see Table 12 of the 2019 EIA Report) and waterbodies with a drinking water supply a very high consequence level.

Calculated risks for source zones 8-9, 11-16 and 18-21 remain as calculated in the 2020 SEI. Only source zones 17 and 22 have required review for this SEI 2. The receptor for these two source zones is a watercourse.

3.2. Calculated risks for source zone 17

Table 13 of the 2019 EIA Report indicated that source zone 17 (at Turbine 24) was located upslope of the Burn of Kedilsmires, with a 0.2 m runout thickness at the stream confluence in the event that a landslide were to occur within the source zone. An excerpt of the table is shown below in Table 1 and the source and runout zones are shown on Plate 3. The pre-mitigation risk level was calculated to be Low.

Increase in the lateral extent of the source zone by 18 m to the north increases the potential source volume, but also the runout extent across slope, distributing a slightly larger volume over a larger area with no overall increase in debris thickness at the confluence.

Because the presence of artificial drains in the source zone was one of the key contributory factors to the Moderate landslide likelihood score, and with location specific mitigation, it was considered that appropriate drainage management and careful monitoring during construction works would be sufficient to reduce calculated risks from Low to Negligible. The residual risk levels are shown for each runout zone (0-50 m, 50-100 m, 100-250 m, 250-500 m) on Plate 3.

Source Zone	Infrastructure	Key Receptor	Runout depth at key receptor	Calculated Risk Level	Location Specific Mitigation	Residual Risk
17	Turbine 24	Burn of Kedilsmires	0.2m	Low	<ul style="list-style-type: none"> Investigate and manage drains in source zone Close monitoring of excavation works 	Negligible
22	Turbine 25	Burn of Kedilsmires	0.2m	Low	<ul style="list-style-type: none"> Install catch fence set-back from stream to arrest minimal potential debris thickness (0.20m) Investigate and manage drains in source zone Ensure no connectivity between working area and upslope summit pool complex Drain pools overlapping footprint prior to construction Close monitoring of excavation works and track construction 	Negligible

Table 1. Excerpt of Table 13 from 2019 EIA Report showing calculated risks for source zones 17 and 22

3.3. Calculated risks for source zone 22

Table 13 of the 2019 EIA Report indicated that source zone 22 (at Turbine 25) was also located upslope of the Burn of Kedilsmires, with a 0.2 m runout thickness (see Table 1 above). Upslope of

the source zone a pool complex was identified that could contribute to risks associated with excavation (see Plate 3).

Reducing the lateral extent of source zone 22 by 26 m reduces the potential source volume and associated runout extent, again resulting in only a marginal change in potential debris thickness at the watercourse.

Table 1 indicates that management of artificial drains and any infrastructure overlap with the pool complex at the hill summit would be sufficient to reduce post-mitigation risks to Negligible from Low.

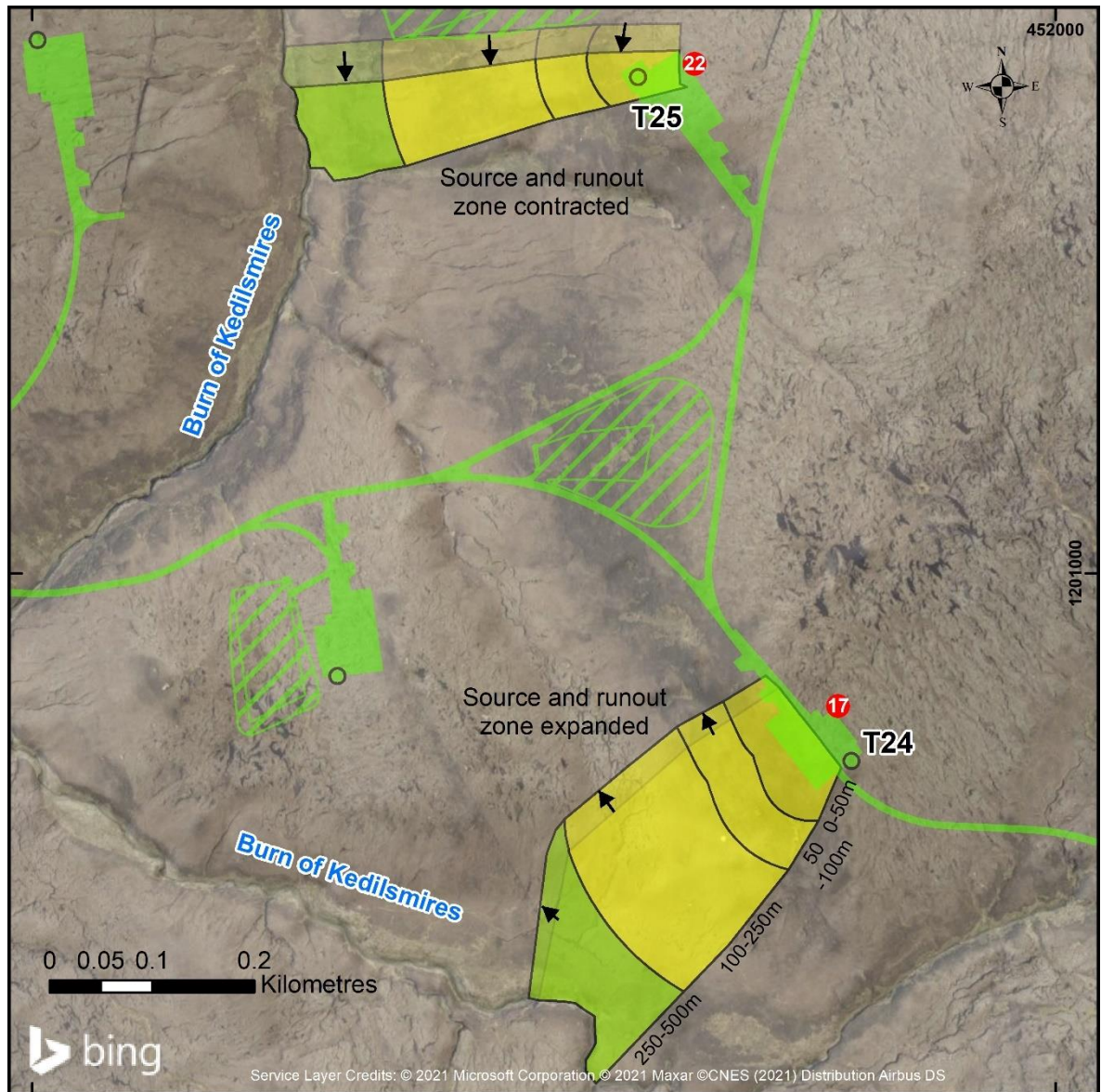


Plate 3. Runout zones and calculated risk for source zones 17 and 22 (yellow = Low risk, green = Negligible risk), black arrows show change in runout zone shape from 2020 SEI to SEI 2.

3.4. Other source zones

Other than the above, calculated risks remain as reported in the 2019 EIA Report, with the exception that the source zones 4, 5 and 10 no longer apply. This reduces the number of source zones with 'Low' post-mitigation risks from 9 to 8.

4. SUMMARY

Risks associated with peat landslides have been recalculated following revisions to the proposed Energy Isles Wind Farm layout (the 2021 Layout) on Yell. These revisions primarily comprise a reduction in turbine numbers and minor adjustments to crane hardstanding footprint and orientation and ancillary infrastructure footprints when compared to the 2020 Layout.

Based on these changes, there is a net reduction in site wide risk, consequent of the removal of five turbines and three associated landslide source zones. Of the remaining landslide source zones, only two required recalculation due to changes in infrastructure overlap with areas of landslide likelihood of moderate or higher. However, the changes to these source zones (17 and 22) and their downslope runoff zones resulted in no net change in calculated risks for these locations.

Therefore, given that 8 areas of Low risk remain, the potential impact of infrastructure on environmental receptors within and around the site boundary remains as previously reported.

REFERENCES

East Point Geo (2019) Appendix 10.4 Energy Isles Wind Farm, Shetland Islands, Peat Landslide Hazard and Risk Assessment. April 2019.

East Point Geo (2020) Appendix 10.4 Energy Isles Wind Farm, Shetland Islands, Peat Landslide Hazard and Risk Assessment. February 2020.

Scottish Government (2017) Peat Landslide Hazard and Risk Assessments, Best Practice Guide for Proposed Electricity Generation Developments (Second Edition). Scottish Government, 84p.