Nisthill Wind Farm

Supplementary Environmental Information Report – June 2024

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1. Introduction

1.1 Background

Nisthill Wind Farm Limited (hereafter referred to as "the Applicant") is proposing a renewable energy development, Nisthill Wind Farm (hereafter referred to as the "Proposed Development") on a site 5 km east of Birsay immediately west of the Loch of Swannay, Orkney. A planning application was submitted to Orkney Islands Council (OIC) on 26th August 2022 for the Proposed Development, described as:

"*Erect four wind turbines (maximum height of 180 metres, maximum generation capacity 26.4 MW total), a substation and maintenance building, create an access, and associated infrastructure including access tracks, underground cabling, crane hardstandings and borrow pit | Hundland Hill (Land Near), Birsay, Orkney*".

The planning application (reference 22/320/TPPMAJ) was supported by an Environmental Impact Assessment (EIA) Report prepared in accordance with The Town and Country Planning (Environmental Impact Assessment) (Scotland) Regulations 2017. The planning application was validated by OIC on 21st September 2022.

A supporting Supplementary Environmental Information Report (SEI Report) was submitted by the Applicant and validated by OIC on 17th April 2023 under Town and Country Planning (Environmental Impact Assessment) (Scotland) Regulations 2017 Regulation 26 – Supplementary information and evidence relating to EIA reports.

The SEI Report was reviewed by OIC, and on 25th July 2023 they requested additional information to ensure the planning application is in accordance Regulation 5 of the Town and Country Planning (Environmental Impact Assessment) (Scotland) Regulations 2017. There was also additional engagement with NatureScot regarding ornithological mitigation and enhancement commitments.

An updated SEI Report was therefore prepared and was submitted by the Applicant in late 2023, providing additional and revised information as well as reiterating unchanged information from the previous SEI for completeness. The updated SEI Report was validated by OIC in December 2023.

In March 2024, a planning application for the repowering of an operational single wind turbine within the Nisthill Wind Farm site area (referred to as "the Ludenhill turbine") has been approved by OIC (ref. 23/295/TPP). The application was to replace the existing Ludenhill turbine with a larger model, up to 76m tip height.

As has been stated by the Applicant in previous submissions, and as still maintained by the Applicant, the scenario whereby both the Ludenhill turbine (existing or repowered) operates concurrently with the Proposed Development, is not anticipated in practice. A commercial arrangement between the Applicant and the operator of the Ludenhill turbine is ongoing. However, given that the Ludenhill repowering application has now been granted planning permission, OIC has requested that the Applicant provides an update to cumulative impact assessments as previously presented for the Proposed Development, to take account of the repowered Ludenhill turbine.

This SEI Report therefore provides a review of and, where applicable, update to cumulative assessments for the various technical topics included in the EIA Report. This report is referred to as SEI Report (June 2024) and should be read in conjunction with the EIA Report and the December 2023 SEI Report.

A Non-Technical Summary of this SEI Report (June 2024) is provided separately, in accordance with the Town & Country Planning (Environmental Impact Assessment) (Scotland) Regulations 2017.

1.2 Structure of the SEI Report (June 2024)

The subsequent sections of this SEI Report (June 2024) follow the same numbering as the EIA Report, for ease of reference. For each technical topic, the cumulative assessment as presented in the EIA Report is

briefly reviewed, and an update is provided, as appropriate, to take account of the recently consented Ludenhill turbine repowering.

1.3 Availability of the SEI Report (June 2024)

Electronic copies of the Report (June 2024), including all figures, appendices and accompanying documents are available to view on the project website www.nisthillwindfarm.co.uk.

Electronic copies of the SEI Report (June 2024) can also be accessed at https://www.orkney.gov.uk/

A physical copy of the SEI Report (June 2024) is available for viewing at Birsay Community Hall.

Hard copies of the NTS are available free of charge from the Applicant (info@nisthillwindfarm.co.uk). The cost of a hard copy of the SEI Report (June 2024) is £250. In addition, for anyone who has difficulty accessing the information online, a USB copy can be made available on request by emailing info@nisthillwindfarm.co.uk. The price of the hard copy reflects the cost of producing all of the graphics and visualisations at the recommended size. As such, a DVD/USB version is recommended.

1.4 Representation to the SEI Report (June 2024)

Any representation to the application should be made by email, directly to OIC at:

planning@orkney.gov.uk

2. Site Selection and Alternatives

The recent granting of planning permission for the Ludenhill turbine repowering has no impact on the information previously presented in the EIA Report, with respect to site selection and alternatives.

3. Proposed Development Description

The site location and site boundary, and the proposed site layout, are unchanged, and are shown in **Figure 1.1 and Figure 1.2, Volume 2 of the EIA Report**. For ease of reference, these figures are also appended to this SEI Report (June 2024) as **Figure 1.1** and **Figure 1.2**.

Table 3.1 within the EIA Report provides information on relevant onshore wind farm developments considered within the cumulative assessments. An update to that table is provided below. Updated **Figure 3.2** (figure numbering retained from the original EIA Report) provides an updated illustration of the relevant cumulative developments in close proximity to the Proposed Development site.

Tale 3.1 – Cumulative Developments within 10km of the Proposed Development – updated June 2024

Development	Status	Number of Turbines	Approximate Distance to Nearest Turbine
Ludenhill (repower)	Consented	1	170 m
Costa Head	Consented	4	2.3 km
Burgar Hill	Operational	6	2.9 km
Holodke	Operational	1	5.4 km
Hammars Hill Extension	Consented	2	7.3 km
Hammars Hill	Operational	5	8.2 km

4. Approach to EIA

The recent granting of planning permission for the Ludenhill turbine repowering has no impact on the information previously presented in the EIA Report, with respect to the approach to EIA.

5. Policy Framework

The recent granting of planning permission for the Ludenhill turbine repowering has no impact on the information previously presented in the EIA Report and updated in the December 2023 SEI Report, with respect to the policy framework.

6. Landscape and Visual

6.1 Introduction

This section of the report presents SEI in respect of the Landscape and Visual Impact Assessment (LVIA) for the Proposed Development.

This SEI has been prepared in response to the proposed changes to the cumulative context of the Proposed Development, and details those changes to the LVIA, presented in the 2022 EIA Report, which would arise as a result of this change.

The difference in the cumulative context relates to the consent of a single turbine at Ludenhill to replace an existing single turbine in the same location. The existing turbine is 46.5m to blade tip, with a 30m hub height and 33m rotor diameter. This existing turbine forms parts of the baseline context and although it was referenced in the main assessment of the LVIA where relevant, it was not specifically considered in the cumulative assessment owing to its height below 50m, which is typically taken as the cut-off for exclusion of small-scale turbines in the cumulative assessment of an LVIA.

The replacement turbine is 76m to blade tip, with a 50m hub height and 52m rotor diameter (ref. 23/295/TPP – submitted by Constantine Wind Energy Limited). This was consented on 26 March 2024 and as a result, OIC has requested that a review of the cumulative assessment be carried out to confirm if there are any potential additional cumulative effects as a result of this development. Accordingly, this SEI to the LVIA considers how the replacement of a 46.5m turbine, with a 76m turbine would alter the cumulative assessment of the representative viewpoints and landscape receptors.

The SEI should be read in conjunction with the original assessment presented in Chapter 6: LVIA of the EIA Report and the original Figures 6.1 to 6.18, which show plans of the Study Area, landscape receptors, visual receptors and Zone of Theoretical Visibility (ZTVs) maps of the Proposed Development on its own and in combination with other cumulative windfarms, and Figures 6.19 to 6.37 which show the photographs, wirelines and photomontages from the representative viewpoints.

This SEI should also be read in conjunction with the accompanying updated wirelines (updated **Figures 6.19 to 6.37** (figure numbering retained from the 2022 EIA Report)) which support the revised cumulative assessment, showing the Proposed Development in conjunction with the recently consented 76m Ludenhill turbine.

6.2 Scope of the Supplementary Environmental Information

The purpose of this SEI is to present information that is supplementary to that presented in the LVIA, in respect to changes to the baseline conditions / cumulative context and changes to the EIA as a result of these changes. This section highlights those parts of the original LVIA that require to be updated and those parts which remain largely as originally presented.

There have been no notable changes to the baseline conditions of the Study Area since the EIA was submitted in March 2022.

There has been one notable change to the cumulative context, with the consent of a 76m high turbine to replace the existing 46.5m high turbine, in the same location on the site of the Proposed Development. This change to the cumulative context is considered further in the revised assessment below.

As there are no changes to the baseline conditions or the Proposed Development, the main assessment presented in the original LVIA remains unchanged. It is only the cumulative assessment that has been updated.

6.3 LVIA Methodology

The LVIA Methodology remains unchanged from that set out in Appendix 6.1 of the EIA Report.

6.4 Cumulative Assessment

6.4.1 Original Assessment

The original cumulative assessment presented in the 2022 EIA Report found that the significant cumulative effects would be limited to landscape and visual receptors occurring in localised parts around the Proposed Development. The most relevant wind farms to the cumulative assessment were considered to be operational and consented, with the Proposed Development located in close proximity to both operational Burgar Hill Wind Farm and consented Costa Head Wind Farm.

The assessment of cumulative effects on landscape and coastal character identified that significant cumulative effects would arise as a result of the addition of the Proposed Development within parts of five of the Landscape Character Types (LCTs) / Landscape Character Units (LCUs) that occur in the Study Area. Those parts of the LCTs / LCUS that would undergo significant cumulative effects were as follows:

- 302 Inclined Coastal Pasture LCT: 302A Evie LCU – localised patches north of Burgar Hill;
- 306 Coastal Hills and Heath LCT: 306A North Coast LCU – the north-eastern part of this LCU;
- 310 Loch Basin LCT: 310A Swannay LCU – all this LCU;
- 310 Loch Basin LCT: 310B West Mainland LCU - northern part of this LCU out to 4km; and
- 314 Moorland Hills LCT: 314A West Mainland LCU - northern part of this LCU out to 4km.

The assessment found that these significant cumulative effects would extend out to a radius of approximately 4km. The cumulative effect of the Proposed Development on all other LCTs / LCUs would be not significant and there would be no significant cumulative effects on the Regional Coastal Character Areas (RCCAs) / Local Coastal Character Areas (LCCAs) or on the Special Landscape Qualities (SLQs) of the Hoy and West Mainland National Scenic Area (NSA).

The assessment of cumulative effects on visual amenity identified that significant cumulative effects would arise as a result of the addition of the Proposed Development in respect of the following two representative viewpoints which lie within 2km radius of the Proposed Development:

- VP1: A966, Loch of Swannay; and
- VP3: Vinquin Hill, Costa.

These significant cumulative effects would occur where visual receptors would be experiencing the addition of the Proposed Development in close proximity to consented Costa Head and operational Burgar Hill. The generally small size of the cumulative wind farm developments, in terms of number and height of turbines means that the extent of significant cumulative effects would be limited and that significant effects would mostly be attributable to the solus effects of the Proposed Development.

This assessment also considered the in-combination cumulative effects that the Proposed Development, in combination with all other existing and proposed wind farms would give rise to, with the finding that the

extent of significant in-combination effects would correlate with the extent of significant in-conjunction effects, summarised above.

6.4.2 Revised Assessment

The revised cumulative assessment needs to take into account the replacement of the existing 46.5m high Ludenhill turbine with the consented 76m high Ludenhill turbine. The cumulative context, otherwise, remains largely unchanged with the most notable cumulative influences being consented Costa Head and operational Burgar Hill.

While the existing 46.5m high Ludenhill turbine was not specifically included in the cumulative assessment of the 2022 EIA, it should be noted that the consented 76m high Ludenhill turbine is small-scale and a single turbine and these key features would notably limit its influence on the cumulative context. Furthermore, and as set out in Section 1.1, it is not anticipated in practice that either the existing or consented Ludenhill turbine would operate concurrently with the Proposed Development and, therefore, there would be no additional cumulative effect and this assessment has been prepared only to address concerns raised by OIC.

6.4.3 Cumulative Visual Assessment

The revised cumulative assessment considers the effects of adding the Proposed Development to a cumulative context that comprises all other operational, under construction, consented and application wind farms and single turbines above 50m, including the consented 76m high Ludenhill turbine. The most relevant cumulative wind farms are consented Costa Head and operational Burgar Hill.

The cumulative visual assessment is presented in Table 6.1 below, setting out in the left hand column, the assessment taken from the 2022 EIA Report in which the consented 76m high Ludenhill turbine did not form part of the cumulative context and in the right hand column, the revised assessment including the consented 76m high Ludenhill turbine. A cumulative assessment is presented for each of the 19 representative viewpoints.

The revised assessment highlights the very limited additional influence that the consented 76m high Ludenhill turbine would have on the cumulative assessment, with none of the findings from the original assessment changing in any way.

Table 6.1 – Revised Cumulative Assessment

Original cumulative assessment (2022 EIA Report)	Revised cumulative assessment
Viewpoint 1: A966, Loch of Swannay	
Sensitivity: medium-high ***Magnitude of Change (MoC): medium*** ***Significance: moderate (significant)*** *The cumulative wireline in EIA Figure 6.19b shows that all four of the consented Costa Head turbines would be readily visible as large-scale structures owing to their close proximity on Costa Hill to the immediate north of the viewpoint at 0.2 km. Five of the six operational Burgar Hill turbines are also visible, albeit seen as small-scale structures set on the more distant moorland hills to the south. The Proposed Development would be seen to the south-west of the viewpoint where all four turbines would be seen to their full extent, set across Hundland Hill. The cumulative magnitude of change would be medium owing to the increased extent of the skyline that would be occupied by wind farm development and the location of the four proposed turbines in the opposite sector to*	***Sensitivity: medium-high*** ***MoC: medium*** ***Significance: moderate (significant)*** *The cumulative wireline in SEI Figure 6.19b shows the consented Ludenhill turbine set centrally between the four turbines of the Proposed Development. While the Ludenhill turbine would accentuate the scale of the proposed turbines it would not create a cumulative context in which the cumulative magnitude of change would rise above medium. For the purpose of the cumulative assessment, it is assumed that the Ludenhill turbine would already be present, and this would moderate the cumulative magnitude of change as the Proposed Development would not be seen to be added to an undeveloped location. Furthermore, the small scale of the turbine and its single status means that it would make a limited contribution to the cumulative context. In*

Original cumulative assessment (2022 EIA Report)	Revised cumulative assessment
Costa Head Wind Farm, that would increase the sense that the viewpoint was enclosed by wind farm development.	*summary, the cumulative effect would remain significant, but this effect is attributable to the addition of the Proposed Development within a cumulative context in which consented Costa Head would have a notable influence owing to its especially close range to the viewpoint.*
Viewpoint 2: A966, Hundland Road junction	
Sensitivity: medium-high ***MoC: medium-low*** ***Significance: moderate (not significant)*** *The cumulative wireline in Figure 6.20c shows that all four of the consented Costa Head turbines would be readily visible from this area, although screened from this specific viewpoint by the intervening residential property. They would be seen to the north-east of this viewpoint at a minimum of 1.4km. The six operational Burgar Hill turbines are also visible, albeit seen as small-scale structures partly screened by the intervening landform. The Proposed Development would be seen to the south-east of the viewpoint where all four turbines would be seen although not all to their full extent, owing to the screening effect of the ridgeline. The cumulative magnitude of change would be medium-low owing to the increased extent of the skyline that would be occupied by wind farm development and the location of the four proposed turbines in a different sector to Costa Head Wind Farm, such that the extent of wind farm development would be seen to increase. The cumulative magnitude of change is prevented from being rated higher than medium-low owing to the limited influence from Burgar Hill and other cumulative wind farms.*	***Sensitivity: medium-high*** ***MoC: medium-low*** ***Significance: moderate (not significant)*** *The cumulative wireline in SEI Figure 6.20c shows the consented Ludenhill turbine set centrally between the four turbines of the Proposed Development. While the Ludenhill turbine would accentuate the scale of the proposed turbines it would not create a cumulative context in which the cumulative magnitude of change would rise above medium-low. For the purpose of the cumulative assessment, it is assumed that the Ludenhill turbine would already be present, and this would moderate the cumulative magnitude of change as the Proposed Development would not be seen to be added to an undeveloped location. Furthermore, the small scale of the turbine and its single status means that it would make a limited contribution to the cumulative context. In summary, the cumulative effect is attributable to the addition of the Proposed Development within a cumulative context in which consented Costa Head would have an influence owing to its close range to the viewpoint, although this effect would be not significant owing to contained extents of the Proposed Development and consented Costa Head.*
Viewpoint 3: Vinquin Hill, Costa	
Sensitivity: medium-high ***MoC: medium-high*** ***Significance: major-moderate (significant)*** *The cumulative wireline in EIA Figure 6.21c shows that all four of the consented Costa Head turbines would be readily visible to the immediate north of the viewpoint at a minimum of 1.8km. The six operational Burgar Hill turbines are also visible, seen set on the moorland hills in the opposite sector to the south, at a minimum of 2.7km. The Proposed Development would be seen to the east of the viewpoint where all four turbines would be seen to practically their full extent, set across the low landform of Hundland Hill. The cumulative magnitude of change would be medium-high owing to the increased extent of wind farm*	***Sensitivity: medium-high*** ***MoC: medium-high*** ***Significance: major-moderate (significant)*** *The cumulative wireline in SEI Figure 6.21c shows the consented Ludenhill turbine set centrally between the four turbines of the Proposed Development. While the Ludenhill turbine would accentuate the scale of the proposed turbines it would not create a cumulative context in which the cumulative magnitude of change would rise above medium-high. For the purpose of the cumulative assessment, it is assumed that the Ludenhill turbine would already be present, and this would moderate the cumulative magnitude of change as the Proposed Development would not be seen to be added to an undeveloped location.*

Original cumulative assessment (2022 EIA Report)	Revised cumulative assessment
development visible from this viewpoint. Although the Proposed Development would comprise only four turbines, their proximity to the viewpoint would mean that they would occupy a notable proportion of the wider view. Furthermore, their larger scale would increase their prominence and their influence on the view. While the location of cumulative wind farms to the north and south means that the Proposed Development would not be increasing the spread of wind farm development, it would be seen to infill part of the gap that currently separates the other developments.	*Furthermore, the small scale of the turbine and its single status means that it would make a limited contribution to the cumulative context. In summary, the cumulative effect would remain significant, but this effect is attributable to the addition of the Proposed Development within a cumulative context in which consented Costa Head and operational Burgar Hill would have a notable influence owing to their close range to the viewpoint.*
Viewpoint 4: Mid Hill	
Sensitivity: medium-high ***MoC: medium-low*** ***Significance: moderate (not significant)*** *The cumulative wireline in Figure 6.22c shows that all six of the operational Burgar Hill turbines are readily visible as large-scale structures at a minimum of 1.3km, and the four consented Costa Hill turbines would also be visible at a minimum of 5.6km to the north. The Proposed Development would be added to the northern sector at the closer range of 3.2km. While the turbines would be readily visible, the lower parts of two of the turbines would be seen partly screened by the intervening landform. The cumulative magnitude of change would be medium-low. Although the Proposed Development would increase the extent of wind farm development in this view, the cumulative magnitude of change would be moderated by its location in the northerly sector, where there would be an influence from Costa Head Wind Farm and which ensures that the westerly and southerly sectors remain undeveloped. Furthermore, the Proposed Development comprises four turbines which form a compact group occupying only a small proportion of the wider 360 degree view. The effect is also moderated by the closer proximity of the Burgar Hill turbines, which by comparison would reduce the perceived scale of the proposed turbines.*	***Sensitivity: medium-high*** ***MoC: medium-low*** ***Significance: moderate (not significant)*** *The cumulative wireline in SEI Figure 6.22c shows the consented Ludenhill turbine set between the four turbines of the Proposed Development. While the Ludenhill turbine would accentuate the scale of the proposed turbines it would not create a cumulative context in which the cumulative magnitude of change would rise above medium-low. For the purpose of the cumulative assessment, it is assumed that the Ludenhill turbine would already be present, and this would moderate the cumulative magnitude of change as the Proposed Development would be seen to be added to a location where there is an existing influence from wind turbine development. Furthermore, the small scale of the turbine and its single status means that it would make a limited contribution to the cumulative context. In summary, the cumulative effect would remain not significant, and the principal cumulative relationship would continue to be with the close range Burgar Hill Wind Farm.*
Viewpoint 5: Kirbuster, Loch of Hundland	
Sensitivity: medium-high ***MoC: medium-low*** ***Significance: moderate (not significant)*** *The cumulative wireline in Figure 6.23c shows that all four of the consented Costa Head turbines would be readily visible at a minimum of 3.8km and set to the left of Hundland Hill on the western*	***Sensitivity: medium-high*** ***MoC: medium-low*** ***Significance: moderate (not significant)*** *The cumulative wireline in SEI Figure 6.23b shows the consented Ludenhill turbine set between the four turbines of the Proposed Development. While the Ludenhill turbine would accentuate the scale*

Original cumulative assessment (2022 EIA Report)	Revised cumulative assessment
side of Costa Hill. The six operational Burgar Hill turbines are also visible at a minimum distance of 5.0km and set along the ridge of the moorland hills to the right of Hundland Hill. The Costa Head turbines would be 125m to blade tip while the Burgar Hill turbines comprise turbines at 76m and 116m to blade tip. The Proposed Development would be seen to the east of the viewpoint where all four turbines would be seen set across Hundland Hill with the lower parts of two of the turbines screened by the intervening landform. The cumulative magnitude of change would be medium-low. The addition of the Proposed Development would not increase the spread of wind farm development into new sectors, as it would be contained within the same sector as consented Costa Head and operational Burgar Hill. It would, however, infill the gap between these developments and more notably present a much larger size of turbine that would accentuate the variance in scale with the other cumulative developments.	*of the proposed turbines it would not create a cumulative context in which the cumulative magnitude of change would rise above medium-low. For the purpose of the cumulative assessment, it is assumed that the Ludenhill turbine would already be present, and this would moderate the cumulative magnitude of change as the Proposed Development would be seen to be added to a location where there is an existing influence from wind turbine development. Furthermore, the small scale of the turbine and its single status means that it would make a limited contribution to the cumulative context. In summary, the cumulative effect would remain not significant – an assessment that relates principally to the limited influence of the cumulative wind farms owing to their more distant location from the viewpoint and smaller scale.*
Viewpoint 6: Brough of Birsay	
No cumulative assessment - although there is the potential for cumulative effects to arise, these would not be significant owing to the limited visibility and influence from the other cumulative wind farms.	*There is no visibility of the Ludenhill turbine from this viewpoint (see Figure 6.24b) and there would, therefore, be no additional cumulative effect.*
Viewpoint 7: A967, Birsay Community Hall	
No cumulative assessment - although there is the potential for cumulative effects to arise, these would not be significant owing to the very limited visibility and influence from the other cumulative wind farms.	*The Ludenhill turbine would only be visible as a tip at a minimum of approximately 5.1km (see Figure 6.25b) and there would, therefore, be no additional cumulative effect.*
Viewpoint 8: A967, Twatt	
No cumulative assessment - although there is the potential for cumulative effects to arise, these would not be significant owing to the limited visibility and influence from the other cumulative wind farms.	***Sensitivity: medium-high*** ***MoC: low*** ***Significance: moderate-minor (not significant)*** *The addition of the Proposed Development to a cumulative situation that includes consented Ludenhill as well as operational Burgar Hill, would give rise to a low cumulative magnitude of change, owing largely to the limited influence of the cumulative wind farms. The wireline in SEI Figure 6.26c illustrates the limited additional influence of the Ludenhill turbine owing to its containment between the turbines of the Proposed Development, its small scale and singular nature.*

Original cumulative assessment (2022 EIA Report)	Revised cumulative assessment
Viewpoint 9: A967, near Rosemire	
No cumulative assessment - although there is the potential for cumulative effects to arise, these would not be significant owing to the limited visibility and influence from the other cumulative wind farms.	***Sensitivity: medium-high*** ***MoC: low*** ***Significance: moderate-minor (not significant)*** *The addition of the Proposed Development to a cumulative situation that includes consented Ludenhill as well as consented Costa Head, would give rise to a low cumulative magnitude of change, owing largely to the limited influence of the cumulative wind farms. The wireline in SEI Figure 6.27b illustrates the limited additional influence of the Ludenhill turbine and the reduction in its influence owing to its containment between the turbines of the Proposed Development, its small scale and singular nature.*
Viewpoint 10: A967, near Queena	
No cumulative assessment - although there is the potential for cumulative effects to arise, these would not be significant owing to the limited visibility and influence from the Proposed Development and other cumulative wind farms.	***Sensitivity: medium-high*** ***MoC: low*** ***Significance: moderate-minor (not significant)*** *The addition of the Proposed Development to a cumulative situation that includes consented Ludenhill as well as operational Burgar Hill and consented Costa Head, would give rise to a low cumulative magnitude of change, owing largely to the limited influence of the cumulative wind farms. The wireline in Figure 6.28c illustrates the limited additional influence of the Ludenhill turbine and the reduction in its influence owing to its containment between the two central turbines of the Proposed Development, the extent of screening by intervening landform and its small scale and singular nature.*
Viewpoint 11: Ring of Brodgar	
No cumulative assessment - although there is the potential for cumulative effects to arise, these would not be significant owing to the limited visibility and influence from the Proposed Development and other cumulative wind farms.	***Sensitivity: high*** ***MoC: low*** ***Significance: moderate-minor (not significant)*** *The addition of the Proposed Development to a cumulative situation that includes consented Ludenhill as well as operational Burgar Hill and consented Costa Head, would give rise to a low cumulative magnitude of change, owing largely to the limited influence of the Proposed Development and cumulative wind farms. The wireline in Figure 6.29b illustrates the very limited visibility of the Ludenhill turbine and the containment of the Proposed Development and other cumulative wind farms behind the middle range skyline.*

Original cumulative assessment (2022 EIA Report)	Revised cumulative assessment
Viewpoint 12: Vishal Hill	
No cumulative assessment - although there is the potential for cumulative effects to arise, these would not be significant owing to the limited visibility and influence from the Proposed Development. The Proposed Development would only be visible as two blades and two tips at a minimum distance of 7.9km.	*There is no visibility of the Ludenhill turbine from this viewpoint (see Figure 6.30c) and there would, therefore, be no additional cumulative effect.*
Viewpoint 13: B9057 north-west of Dounby	
No cumulative assessment - although there is the potential for cumulative effects to arise, these would not be significant owing to the very limited visibility and influence from the other cumulative wind farms.	***Sensitivity: medium-high*** ***MoC: low*** ***Significance: moderate-minor (not significant)*** *The addition of the Proposed Development to a cumulative situation that includes consented Ludenhill as well as operational Burgar Hill and consented Costa Head, would give rise to a low cumulative magnitude of change, owing largely to the limited influence of the cumulative wind farms. The wireline in Figure 6.31b illustrates how although the smaller scale of the Ludenhill turbine might accentuate the larger scale of the proposed turbines, the additional cumulative effect would be limited by the fact that it is only a small-scale single turbine, which would be closely associated with consented Costa Head owing to its similar perceived scale and location.*
Viewpoint 14: Skara Brae	
No cumulative assessment - although there is the potential for cumulative effects to arise, these would not be significant owing to the very limited visibility and influence from the Proposed Development and other cumulative wind farms. The Proposed Development would only be visible as two blades at a minimum distance of 10.9km.	*There is no visibility of the Ludenhill turbine from this viewpoint (see Figure 6.23c) and there would, therefore, be no additional cumulative effect.*
Viewpoint 15: Vestra Fiold	
No cumulative assessment - although there is the potential for cumulative effects to arise, these would not be significant owing to the limited visibility and influence from the other cumulative wind farms.	***Sensitivity: medium-high*** ***MoC: low*** ***Significance: moderate-minor (not significant)*** *The addition of the Proposed Development to a cumulative situation that includes consented Ludenhill as well as operational Burgar Hill and consented Costa Head, would give rise to a low cumulative magnitude of change, owing largely to the limited influence of the cumulative wind farms. The wireline in SEI Figure 6.33b illustrates how although the smaller scale of the Ludenhill turbine might accentuate the larger scale of the proposed turbines, the additional cumulative effect would be limited by the fact that it is set between the turbines of the Proposed*

Original cumulative assessment (2022 EIA Report)	Revised cumulative assessment
	Development and is only a small single turbine, which would form a relatively small scale and distant feature in this view.
Viewpoint 16: A966 west of Abune the Hill	
Sensitivity: medium-high ***MoC: medium-low*** ***Significance: moderate (not significant)*** *The addition of the Proposed Development would not increase the spread of wind farm development into new sectors, as it would be contained within the same sector as operational Burgar Hill and consented Costa Head. It would, however, concentrate the influence of wind farm developments in this sector and more notably present a much larger size of turbine that would accentuate the variance in scale with the other cumulative developments. The cumulative magnitude of change is prevented from being rated higher than medium-low owing to the limited influence from Burgar Hill and Costa Head.*	***Sensitivity: medium-high*** ***MoC: medium-low*** ***Significance: moderate (not significant)*** *The addition of the Proposed Development to a cumulative situation that includes consented Ludenhill as well as operational Burgar Hill and consented Costa Head, would remain at a medium-low cumulative magnitude of change. The wireline in SEI Figure 6.34c illustrates how although the smaller scale of the Ludenhill turbine might accentuate the larger scale of the proposed turbines, the additional cumulative effect would be limited by the fact that it is only a small single turbine, which would be seen to be comparable in scale to the operational Burgar Hill turbines, seen in the same sector of the view and set between the turbines of the Proposed Development.*
Viewpoint 17: Westside, Rousay	
Sensitivity: medium-high ***MoC: medium-low*** ***Significance: moderate (not significant)*** *The Proposed Development would be seen set between Burgar Hill and Costa Head wind farms at a minimum of 7.0 km. Although these proposed turbines would be larger than the other cumulative turbines in the view, their location behind the coastal ridge means that the towers would be screened, and this would reduce their perceived scale. The cumulative magnitude of change would relate to the increased extent of the skyline that would be occupied by wind farm development and the location of the four proposed turbines in the gap between Burgar Hill and Costa Head. The cumulative magnitude of change is prevented from being rated higher than medium-low owing to the limited influence from Costa Head Wind Farm and the containment of wind farm development on the coastal edge of West Mainland and in the south to east sector of the view.*	***Sensitivity: medium-high*** ***MoC: medium-low*** ***Significance: moderate (not significant)*** *The addition of the Proposed Development to a cumulative situation that includes consented Ludenhill as well as operational Burgar Hill and consented Costa Head, would remain at a medium-low cumulative magnitude of change. The wireline in Figure 6.35c illustrates how although the smaller scale of the Ludenhill turbine might accentuate the larger scale of the proposed turbines, the additional cumulative effect would be limited by the fact that it is a small-scale single turbine, seen between the turbines of the Proposed Development. The effect would remain moderate and not significant, albeit attributable the relationship with the other cumulative wind farms.*
Viewpoint 18: Hillock Road, Shapinsay	
No cumulative assessment - although there is the potential for cumulative effects to arise, these would not be significant owing to the limited visibility and influence from the Proposed Development and cumulative developments.	*There is no visibility of the Ludenhill turbine from this viewpoint (see Figure 6.36c) and there would, therefore, be no additional cumulative effect.*

Original cumulative assessment (2022 EIA Report)	Revised cumulative assessment
Viewpoint 19: Ward Hill, Hoy	
No cumulative assessment - although there is the potential for cumulative effects to arise, these would not be significant owing to the limited visibility and influence from the Proposed Development and cumulative developments.	*At a minimum distance of 25.8km and 26.0km respectively, the Proposed Development and Ludenhill turbine would form distant features that would have a limited influence on the cumulative effect experienced from this viewpoint as illustrated in the wireline at Figure 6.37c. The cumulative effect would remain not significant.*

6.4.4 Cumulative Landscape Assessment

The findings from the cumulative visual assessment highlight the very limited additional cumulative influence that the consented 76m high Ludenhill turbine would have on the cumulative context. In respect of landscape character, the additional cumulative influence would typically be the same or less owing to the following factors.

Levels of cumulative magnitude of change on landscape character receptors are generally found to be lower than the magnitude of change on viewpoints that lie within these receptors. This means, for example, that if a viewpoint is assessed to undergo a medium to high cumulative magnitude of change it does not necessarily follow that the landscape character receptor within which it lies would also undergo a medium to high cumulative magnitude of change but may undergo a medium cumulative magnitude of change instead.

This is because the cumulative effects on viewpoints are assessed within the context of a specific outlook towards the site and are usually specifically selected to gain a direct view over the Proposed Development and other cumulative developments. The Proposed Development is, therefore, the principal consideration in the cumulative viewpoint assessment, and influences that lie in other areas of the view are of lesser relevance to the assessment. The landscape character of a receptor is not, however, determined so specifically by the outlook over the Proposed Development and other cumulative wind farms, and there are many other considerations, both visual and perceptual, that combine to give an area its landscape character. This means that the degree of influence of the Proposed Development and other cumulative developments on landscape character may be lower than its influence on a specific view.

This is particularly true of areas that lie slightly further away from the site. In the immediate vicinity of the site – typically up to around 2km to 3km away – the cumulative magnitude of change on viewpoints and landscape character is likely to be similar, but beyond this, the cumulative magnitude of change on landscape character is found to often diminish more rapidly as the influence of the turbines is subsumed in the many other influences on landscape character.

A detailed cumulative landscape assessment has not been carried out, as the revised cumulative visual assessment has demonstrated that the addition of the consented 76m high Ludenhill turbine would not change the original cumulative visual assessment and as the same or higher levels of cumulative magnitude of change typically apply to visual receptors compared to landscape receptors, then the conclusion can be drawn that there would be no change to the original cumulative landscape assessment, despite the addition of the consented 76m high Ludenhill turbine.

6.5 Summary

This SEI Report chapter presents an assessment of the landscape and visual effects of the Proposed Development in respect of the updated cumulative context and a summary of this revised assessment is presented here. The cumulative context has changed owing to the consent in March 2024 of the 76m high Ludenhill turbine which would replace the existing 46.5m high Ludenhill turbine in the same location.

This SEI has considered the cumulative effect that would arise as a result of adding the Proposed Development to the cumulative context comprising the consented 76m Ludenhill turbine, as well as the other operational, under construction, consented and application stage wind farms, most notably operational Burgar Hill and consented Costa Head, which are the two closest range wind farms to the Proposed Development.

In respect of the effects on the representative viewpoints, the cumulative effect of the Proposed Development, as assessed in the 2022 EIA, has not changed despite the addition of the consented 76m high Ludenhill turbine to the cumulative context. In respect of landscape character and landscape designations, the assessment of significant cumulative effects would also remain as assessed in the 2022 EIA.

The key reasons for the cumulative assessment remaining unchanged are as follows:

- There is an existing 46.5m to blade tip turbine in the same location which means there is already an influence from wind turbine development in this area;
- The consented 76m to blade tip turbine is still a relatively small-scale turbine compared to the turbines of the Proposed Development which would be up to 180m;
- The small scale and single nature of the 76m to blade tip turbine means that it has a very limited influence on the cumulative context; and
- The 76m to blade tip turbine would typically be seen between the proposed turbines and this would reduce its prominence in views.

While the location of the consented 76m high Ludenhill turbine would accentuate the larger scale of the turbines in the Proposed Development, the factors listed above would ensure that, overall, any change to the cumulative assessment would be negligible. Essentially, the 76m Ludenhill turbine would be seen as a 'domestic' turbine in the context of larger scale commercial wind farms. Domestic turbines are a common feature across the Western Mainland and the cumulative effects of the Proposed Development would relate specifically to the relationship with operational Burgar Hill and consented Costa Head, the effects of which are presented in the 2022 EIA Report.

The cumulative assessment of visual effects has helped inform the cumulative assessment of landscape effects with the conclusion being that the assessment of significant cumulative effects on landscape character and landscape designations would remain as assessed in the 2022 EIA.

7. Ecology

7.1 Background

Chapter 7 of the 2022 EIA Report provides an assessment of potential effects of the Proposed Development on ecology and biodiversity. Taking account of committed mitigation measures, the assessment concluded that there would be no significant adverse effects on ecological receptors. As noted in Chapter 7 of the 2022 EIA Report, the Applicant has committed to delivering a Habitat Management Plan (HMP) and Grazing Management Plan (GMP), which will provide biodiversity enhancement. Further details of the proposed HMP/GMP were provided in the December 2023 SEI Report.

The cumulative assessment presented in the 2022 EIA Report included consideration of potential cumulative effects from the Proposed Development in combination with the following wind energy developments in the vicinity: Costa Head; Burgar Hill; Hammars Hill; and Holodykes (single turbine). Although no significant adverse effects on relevant habitats or species were predicted to arise as a result of the construction or operation of the Proposed Development, a review was undertaken of the potential effects arising from the above-noted developments to determine whether there could be potential for effects to be significant when considered cumulatively. The assessment considered potential cumulative effects on habitats that had been scoped into the impact assessment for the Proposed Development, including blanket bog as well as heath and fen habitats associated with the Loch of Swannay Local Nature Conservation Site (LNCS). The cumulative assessment concluded there would be no significant adverse effects on those receptors.

With planning permission now having been granted for the repowering of the Ludenhill turbine, within the Proposed Development site boundary, consideration has been given to potential additional cumulative effects that may arise.

7.2 Information from the Ludenhill Repowering EIA Report

The Ludenhill repowering proposals include for replacing the existing turbine with a larger turbine model. The Site Plan included as part of the Ludenhill Repowering planning application package [1] shows the proposed repowered turbine being sited at the same location as the existing turbine, with essentially the same area of hardstanding, and associated access track.

The proposed new hardstanding area appears to be very slightly larger than the existing hardstanding, to accommodate construction of the larger turbine. Based on measurements taken from the scaled drawing, it is estimated that the new hardstanding will occupy approximately 350 m^2 additional area, compared to the existing hardstanding. The proposed access track leading to the repowered turbine is the same as existing (according to the above-noted drawing), with the exception of a new stretch of track between Dale Farm and Ludenhill Farm, approximately 220 m long.

Based on information in the Ludenhill EIA Report[2], the proposed new stretch of track would be temporary during construction. Chapter 4 (The Proposed Development) of the Ludenhill EIA Report suggests that the slightly extended area of hardstanding will also be temporary during construction, although this appears to be contradicted by information in Chapter 6 (Biodiversity), which refers to a very small but permanent area of habitat loss due to land take from the development.

Chapter 8 (Schedule of Mitigation Commitments) of the Ludenhill EIA Report indicates that all temporary trackway will comprise "suitable overlain matting" and will not be formed in a way that would allow permanency. All temporary trackway is to be removed on completion of construction / decommissioning phases.

Based on information from Chapter 6 of the Ludenhill EIA Report, it is considered that the intention may be for the extended area of hardstanding to remain in place during the operational phase of the Ludenhill repowered turbine. However, as noted above, this area is very small (~350 m^2) and is adjacent to the existing hardstanding.

7.3 Updated Cumulative Assessment

7.3.1 Habitats

The habitat surrounding the existing turbine base and hardstanding at the Ludenhill turbine site is B5 marshy grassland (National Vegetation Classification (NVC) community MG10 *Holcus lanatus – Juncus effusus* rush pasture). This habitat was not identified as an Important Ecological Receptor (IEF) in the 2022 EIA Report for the Proposed Development, nor the Ludenhill repowering EIA Report. It was estimated that 2.04 ha of marshy grassland habitat would be directly and permanently lost due to construction of the Proposed Development (refer to Table 7.9 of the 2022 EIA Report). No assessment of significance was made, given that this habitat was not identified as an IEF.

Based on information available from the Ludenhill repowering EIA Report (refer to Section 7.2 above), it is estimated that approximately 0.035 ha of B5 marshy grassland habitat would be lost due to extension of the existing hardstanding. As noted above, it is not entirely clear whether the intention is for that extended hardstanding area to be permanent or temporary during construction only. However, even if it is conservatively assumed that it may be permanent, the additional direct, permanent loss of marshy grassland habitat would be negligible, equating to approximately 1.7% additional to the 2.04 ha estimated to be directly, permanently lost due to the Proposed Development.

[1] Constantine Wind Energy, Drawing No. 3369-04-SP-01 Version B, dated 22/08/2022
[2] Ludenhill Turbine Repowering – Environmental Impact Assessment Report. Axis P.E.D. Ltd, August 2023.

Given the very small area of additional loss of a habitat type that has not been identified as an IEF, there is no potential for significant adverse cumulative effects on habitats to arise as a result of the repowered Ludenhill turbine, in combination with the Proposed Development and the other cumulative developments already considered.

7.3.2 Species

Negligible effects on protected or notable species were predicted to arise from the Proposed Development, and no consideration of cumulative effects on species was considered to be warranted, as given in the 2022 EIA Report. The Ludenhill repowering EIA Report identifies no potential effects on protected or notable species, therefore there is no change to the above conclusion.

7.3.3 Conclusion

It is therefore concluded that the inclusion of the Ludenhill repowering project in an updated cumulative impact assessment results in no change to the previous conclusion of no significant adverse cumulative effects on ecological receptors.

8. Ornithology

8.1 Background

Chapter 8 of the 2022 EIA Report provides an assessment of potential effects of the Proposed Development on ornithological receptors. Taking account of committed mitigation measures, the assessment concluded that there would be no significant adverse effects on ornithological receptors. Additional information and clarification was provided in the April 2023 SEI Report and the December 2023 SEI Report, including details of further bird survey results and associated updates to the impact assessment, additional analysis of the potential impact of indirect loss of foraging habitat on hen harrier and short-eared owl from the nearby Orkney Mainland Moors Special Protection Area (SPA), and additional detail of the committed Habitat Management Plan (HMP) including defined areas of habitat management and enhancement.

The cumulative assessment presented in the 2022 EIA Report included consideration of potential cumulative effects from the Proposed Development in combination with relevant wind energy developments in the Orkney area of Natural Heritage Zone 2 (NHZ2) as detailed in Table 8.11 in the 2022 EIA Report.

The cumulative assessment considered the potential for cumulative collision risk impacts, and the potential for cumulative disturbance and displacement effects.

8.1.1 Cumulative Collision Risk

As given in Paragraph 8.11.4 of the 2022 EIA Report, "*There are seven single turbines in close proximity of the site, one within the site* [the operational Ludenhill turbine] *and a further six within 1 km of the site. There is no collision risk data for these small scale developments and the small size of the turbines mean the impacts on displacement of waders is considered to be significantly less than larger turbines and the cumulative impacts on waders is considered to be negligible. There are approximately 500 single domestic scale turbines on Orkney and in NHZ2 which generally have no collision risk data and given the large number of those out of immediate vicinity of the site are not considered within this assessment*."

The cumulative assessment concluded that cumulative collision risks would be not significant. Based on the observed flights at the Proposed Development site and the available information on collision risk for other nearby developments, it was considered that red-throated diver was the only species for which a cumulative collision risk assessment was required. The assessment concluded no significant cumulative collision risk for red-throated diver.

The April 2023 SEI Report and December 2023 SEI Report provided updated cumulative assessments of collision risk, including consideration of short-eared owl, taking account of additional survey data and

ongoing engagement with NatureScot. The reports confirm no change to the previous assessment of no significant cumulative effects arising from collision risk.

8.1.2 Cumulative Disturbance and Displacement Effects

The potential for cumulative disturbance and displacement effects on curlew and lapwing were considered within the 2022 EIA Report, given that these species were recorded as breeding within the Proposed Development site. It was concluded that a small number of breeding pairs may be affected, although in some cases, the committed habitat management measures have been created in part to offset this effect. The residual cumulative effect on the local curlew and lapwing populations was considered to be negligible and not significant.

The April 2023 SEI Report and December 2023 SEI Reports both confirm that the additional bird survey data, gathered after publication of the 2022 EIA Report, did not have any impact on the assessment of cumulative disturbance/ displacement effects on curlew and lapwing, which remained negligible and not significant.

8.1.3 Consideration of the Ludenhill Repowering Project

With planning permission now having been granted for the repowering of the Ludenhill turbine, within the Proposed Development site boundary, consideration has been given to whether there could be any resultant change to the assessment of cumulative ornithological effects.

8.2 Information from the Ludenhill Repowering EIA Report

As noted in Section 7.2 above, the Ludenhill repowering proposals include for replacing the existing turbine with a larger turbine model, at the same location as the existing turbine. The proposed hardstanding area is to be slightly extended, by an area estimated to be approximately 350 m^2, and a section of temporary new access track is to be laid (described as “suitable overlain matting) for the construction phase only.

As reported in the Ludenhill repowering EIA Report, the ornithological survey data from the Proposed Development was used to assess potential effects from repowering the Ludenhill turbine. No new survey data was gathered specifically for that development.

The conclusions drawn were generally that the repowered turbine would have no greater impact on bird species than the existing baseline (operational turbine). For example, in respect of red-throated divers, flight data suggests that birds avoid the existing turbine, therefore the same would be expected of the repowered turbine. No significant effects on any bird species were predicted to arise as a result of construction or operation of the repowered Ludenhill turbine.

Chapter 6 of the Ludenhill repowering EIA Report provides a cumulative assessment of collision risk on short-eared owl, red-throated diver, and great skua. This assessment considers the Proposed Development as part of the cumulative risk, together with other proposed and operational wind energy developments in the vicinity. The assessment concludes no significant cumulative collision risks to the above-noted species. The assessment also notes that the proportion of collision risk contributed by the repowered Ludenhill turbine would be very low (for example, less than 1% of the cumulative risk for red-throated diver).

Chapter 6 of the Ludenhill repowering EIA Report also provides an assessment of effects on Orkney Mainland Moors SPA qualifying features, for the proposed Ludenhill repowering project in combination with other relevant developments, including the Proposed Development. As given in Tables 6.11, 6.12 and 6.13 of the Ludenhill repowering EIA Report, no or negligible impacts on nesting or roosting SPA hen harrier, short-eared owl and red-throated diver were predicted from that development itself, and negligible impacts on foraging were predicted. The assessment of in-combination effects with other developments concluded that such effects would be negligible.

8.3 Updated Cumulative Assessment

8.3.1 Collision Risk

As given in the Ludenhill repowering EIA Report, the repowered turbine will not likely result in any discernibly greater impact on bird species than the existing, operational turbine. Considering also that the repowered Ludenhill turbine would be sited within the spatial area of the Proposed Development array, the "at risk" flights relevant to the Proposed Development have already been considered in the calculation of collision risk from the Proposed Development on its own. The impact of replacing the existing, operational Ludenhill turbine with a larger model at the same location, is not expected to have any material effect on the cumulative collision risk. This is the conclusion reached in the Ludenhill repowering EIA Report, which does not appear to have been questioned by any regulatory authorities.

8.3.2 Disturbance and Displacement

Given that the repowered Ludenhill turbine would be sited within the Proposed Development array area, there would be no difference to resultant disturbance and displacement effects on wader species breeding within the Proposed Development site. There is therefore no change to the assessment of cumulative disturbance and displacement effects being negligible and not significant for curlew and lapwing.

8.4 Indirect Effects on SPA Species – Hen Harrier and Short-Eared Owl

As reported in the December 2023 SEI Report, NatureScot had requested additional analysis of potential effects on hen harrier and short-eared owl from the Orkney Mainland Moors SPA, as a result of indirect loss of foraging habitat/ displacement of birds from suitable foraging habitat in the area around the proposed turbines.

Assessment of this potential indirect effect was undertaken based on an assumption of potential indirect loss of foraging habitat for an area comprising a 500 m buffer around each turbine.

The December 2023 SEI Report provided detailed analysis of the potential magnitude of indirect loss of suitable foraging habitat, applicable to identified nest sites. Due to the potential for significant indirect loss of foraging habitat for hen harrier and short-eared owl, when considering the above-noted buffer area, the HMP was updated and extended, to provide mitigation and enhancement in the form of managing and restoring defined areas of suitable foraging habitat.

Because the repowered Ludenhill turbine would be located within the Proposed Development turbine array area, a 500m buffer from the Ludenhall turbine falls entirely within the 500m buffer from the Proposed Development and therefore it has no impact on the potential for indirect loss of foraging habitat. The area across which potential indirect habitat loss was calculated, due to proximity to the Proposed Development turbines, would be no different.

Therefore, the recent granting of planning permission for the repowering of the Ludenhill turbine, within the Proposed Development site area, results in no change to the assessment of effects from indirect loss of foraging habitat, nor the updated and extended HMP commitments, as presented in the December 2023 SEI Report.

8.5 Conclusion

It is therefore concluded that the inclusion of the Ludenhill repowering project in an updated cumulative impact assessment results in no change to the previous assessments and mitigation commitments, presented in the 2022 EIA Report and updated in the April 2023 and December 2023 SEI Reports.

9. Cultural Heritage

9.1 Introduction

The predicted cumulative effects of the Proposed Development were considered in Section 9.12 of the 2022 EIA Report. The assessment of cumulative effects was based on a list of operational, consented and submitted developments and although all were considered, only those which contribute to, or have the possibility to contribute to, cumulative effects on specific heritage assets were discussed in detail in the 2022 EIA Report. Additionally, given the emphasis in relevant EIA guidance on significant effects, cumulative effects were only given detailed consideration in those instances where the assets were either components of the Heart of Neolithic Orkney World Heritage Site (HONO WHS) or were assessed as possessing a medium or high relative sensitivity to changes to their setting, and lie within 5 km of the nearest Proposed Development turbine and, crucially for which the effect on setting from the Proposed Development, alone, was judged to be minor or greater. These parameters were set in order to scope out assets where it was considered that the cumulative level of effect upon their setting was unlikely to reach the threshold of significance as defined in Table 9.5 of the 2022 EIA Report. In cultural heritage terms cumulative effects are for the most part limited to impacts upon the settings of assets and although in some rare cases cumulative direct effects are possible, the assessment as reported in the 2022 EIA Report did not identify this to be the case for the Proposed Development. The 2022 EIA Report therefore addressed the potential for significant cumulative effects upon the settings of heritage assets during the operation phase of the Proposed Development.

The existing operational Ludenhill turbine stands within the Proposed Development site area and has a blade tip height of 46.5m. It was not considered in the 2022 EIA Report as it falls below the 50m threshold that was used to identify cumulative developments. However, its operators have recently obtained planning permission to repower the development with a 76m blade tip successor, although as was noted in Section 1.1 above it is not anticipated that either the existing or the consented Ludenhill turbine would operate concurrently with the Proposed Development and therefore in practice there is no scope for any additional cumulative effect to occur.

It should also be noted that the Ludenhill applicants' cultural heritage EIA Report chapter, prepared by a separate consultant independently of the Proposed Development, included the Proposed Development as part of a cumulative baseline that included the existing Burgar Hill and the consented Costa Head wind farms. The Ludenhill repowering EIA Report concluded that, when set within that baseline, the 76m Ludenhill development '*would represent only a small increase in the number of large-scale turbines within the setting of the heritage assets in this northern part of Orkney Mainland*' (AXIS 2023, 41)[3]. With respect to the theoretical cumulative visual relationship between the consented Ludenhill and the Proposed Development, the Ludenhill repowering EIA Report considered that:

"*As the proposed replacement turbine would be 76 m to tip, compared to the proposed 180 m to tip of the Nisthill turbines, there would be a clear difference in scale between the two which would exacerbate the visual impact on the settings of heritage assets of the two schemes in combination. The impact on the settings of the heritage assets assessed for this Proposed Development, as well as on numerous others around Hundland Hill, would be mostly derived from the proposed Nisthill turbines. In this scenario, the cumulative effect from the addition of the Proposed Development would be one of no more than low magnitude and minor significance (not significant in EIA terms)*" (AXIS 2023, 41).

Neither Historic Environment Scotland (HES) or the Orkney Islands Archaeologist objected to the Ludenhill repowering application although both expressed a preference for its height to be reduced below 76m and both opinions were specific to the Ludenhill repowering. It should also be noted that HES considered that the effects of the Ludenhill turbine upon the settings of the three closest Scheduled Monuments; the Hundland Hill Enclosure (Asset 65) and the Park Holm and Stoney Holm crannogs (Assets 72 & 83) would be

[3] Axis 2023, *Ludenhill Turbine Repowering Environmental Impact Assessment Report Chapter 07: Cultural Heritage Report*

significant although ultimately, they concluded that these effects would fall below the threshold at which they would object.

In recommending the Ludenhill repowering application for approval, OIC planning officers noted that:

"*The proposed development is considered compliant with all relevant national and local policies, noting support for repowering of wind energy development in National Planning Framework 4 (NPF4). In terms of material planning considerations, no unacceptable impacts are anticipated and, where subject to embedded mitigation, matters could be controlled by planning conditions*" (OIC 2024, 1).[4]

Although it is recognised that the Ludenhill repowering and the Proposed Development are intrinsically different, and in practice would not stand together, given that the Ludenhill repowering EIA Report considered the Proposed Development within its cumulative baseline it is reasonable to conclude that the visual relationships between the 76m Ludenhill turbine and the Proposed Development's four 180m turbines, including those that relate to cumulative effects upon the settings of heritage assets, have been considered by OIC and deemed to be acceptable in planning terms.

This SEI assessment will consider potential changes to the cumulative effects from those reported on in the 2022 EIA Report, based upon the now consented 76m high turbine at Ludenhill.

9.2 Scope

There have been no notable changes to the baseline conditions of the Study Area since the 2022 EIA Report was submitted. However, there has been one notable change to the cumulative context, with the recent consent of a 76m high turbine to replace the existing operational 46.5m high Ludenhill turbine within the Proposed Development site area. This change to the cumulative context is considered further in the revised assessment below.

As there are no changes to either the baseline conditions or the Proposed Development, the main assessment presented in Chapter 9 of the 2022 EIA Report remains unchanged. It is only the cumulative assessment that is updated here.

9.3 Method

The cultural heritage methodology remains unchanged from that set out in Chapter 9 of the 2022 EIA Report however, this SEI has drawn upon two subsequent sets of visualisations.

- Figures 7.4 – 7.13 of the Ludenhill repowering EIA Report (AXIS 2023) which illustrate the predicted visibility of the consented 76m turbine from a range of designated heritage assets.
- Figures 6.19b, 6.20c, 6.21c, 6.22c, 6.23b, 6.24b, 6.25b, 6.26c, 6.27b, 6.28c, 6.29b, 6.30c, 6.31b, 6.32c, 6.33b, 6.34c, 6.35c, 6.36c and 6.37c of this SEI (June 2024), that were prepared in support of the updated LVIA assessment (Section 6) and illustrate the predicted cumulative visibility, including the 76m Ludenhill turbine from the LVIA viewpoints. These LVIA viewpoints include both the Ring of Brodgar (Asset 146) and the Brough of Birsay (Asset 124).

9.4 Findings

The assets that have been considered within the updated cumulative effects assessment are set out in Table 9.1 below, which also sets out the cumulative levels of effect. The cumulative baseline used is illustrated in 2022 EIA Report Figure 6.12 and described in 2022 EIA Report Chapter 6. Schemes which appear or would appear more distant on the horizon are not considered to have the potential to elevate setting effects that have been predicted for the Proposed Development alone and have consequently been scoped out of further assessment.

[4] Orkney Island Council 2024, *Planning Committee 20 March 2024 (Item 5) Report by Corporate Director for Neighbourhood Services and Infrastructure*.

*Table 9.1: Summary of Revised Cumulative Effects (Predicted significant effects highlighted in **bold**)*

Asset No	Receptor	Principal Cumulative Scheme(s)	Relative Sensitivity	Magnitude of Impact/ Level of Effect (Proposed Development Alone)	Magnitude of Impact/ Cumulative Level of Effect
15	Black Knowe, burial mound, 245m NNW of Westside: Scheduled Monument	Costa Head, Burgar Hill	High	Low/ Minor	Low/ Minor
	Summary: Black Knowe sits in relatively close proximity to Greene Knowe burnt mound which lies to its northwest (Asset 27, SM1270) in slightly boggy ground. Black Knowe could be associated with Green Knowe and is situated on a natural knoll in an otherwise relatively flat landscape. This affords Black Knowe good clear views across the surrounding local landscape; to the northwest this view is principally towards the Loch of Boardhouse and along an axis of view between Ravie Hill to the northwest and Kirbister Hill to the north. ZTV analysis suggests that four turbines would be visible from Black Knowe. However, as Black Knowe's principal setting is northwest towards the Loch of Boardhouse, views to the Proposed Development are to the east of this primary setting. Although the Proposed Development would be visible to the northeast it would not impede Black Knowe's principal setting views which lie to the northwest over the Loch of Boardhouse, nor would the consented Costa Head turbines; which would appear to the northeast to the rear of the Proposed Development when viewed from this vantage point. The existing Burgar Hill turbines stand further to the east and are similarly outwith this viewshed. **Revised Assessment:** Given that the consented 76m Ludenhill turbine would occupy the same site as the Proposed Development, it follows that the conclusions drawn above would apply to it as well and that consequently the consented insertion of the Ludenhill development into this baseline would not elevate the predicted level of cumulative effect upon the setting of Black Knowe.				
19	Durka Dale, burnt mound 230m NNW of S of Loch Hundland: Scheduled Monument	Costa Head, Burgar Hill, Holodykes	Medium	Low/ Minor	Low/ Minor
	Summary: Durka Dale is a burnt mound standing up to 1m high. ZTV analysis suggests that four Nisthill turbines could potentially be visible. As it is a burnt mound the primary setting of the monument is considered to be the adjacent Burn of Hillside which, on its present alignment, passes to the south of the asset. Any wider setting relationship would relate to the Loch of Hundland to the north into which the burn flows. The Proposed Development would appear to the north the loch on the Hill of Hundland whilst any visibility with the consented Costa Head turbines would be to the rear of the Proposed Development, the Burgar Hill Wind Farm being offset to the east. Although the Proposed Development would be visible on the Hill of Hundland it would not affect the assets key setting relationship with the burn, nor would it directly intervene in views towards the loch. Neither will the consented Costa Head turbines which will				

Asset No	Receptor	Principal Cumulative Scheme(s)	Relative Sensitivity	Magnitude of Impact/ Level of Effect (Proposed Development Alone)	Magnitude of Impact/ Cumulative Level of Effect
	appear to the rear of the Proposed Development when viewed from this vantage point, or the existing Burgar Hill turbines which stand to the east. **Revised Assessment:** Given that the consented 76m Ludenhill turbine would occupy the same site as the Proposed Development, it follows that the conclusions drawn above would apply to it as well and that consequently the consented insertion of the Ludenhill development into this baseline would not elevate the predicted level of cumulative effect upon the setting of the Durka Dale burnt mound beyond that assessed in the 2022 EIA Report.				
27	Greene Knowe, burnt mound, 230m SW of Braeside: Scheduled Monument	Costa Head, Burgar Hill, Holodykes	Medium	Low/ Minor	Low/ Minor
	Summary: Green Knowe sits on low lying, rough pasture on a northwest facing slope in close proximity to a watercourse that has been culverted. As a burnt mound Green Knowe probably utilised this water source and this can be considered to be its primary setting. It is possible that the authentic contextual settings of Green Knowe was comparatively limited and did not extent significantly beyond the boggy ground in its immediate vicinity. As a burnt mound Green Knowe can be considered to have a medium sensitivity to changes in its settings within the local landscape in which it is situated. The Proposed Development would not impede either the immediate setting of the burnt mound which relates to the watercourses which lie in its close proximity or its wider setting which relates to views to the northwest over the Loch of Boardhouse. Although the Proposed Development would be visible to the northeast it would not impede views to the northwest over the Loch of Boardhouse, nor will the consented Costa Head turbines which will appear to the rear of the Proposed Development when viewed from this vantage point, or the existing Burgar Hill turbines which stand to the east. **Revised Assessment:** Given that the consented 76m Ludenhill turbine would occupy the same site as the Proposed Development, it follows that the conclusions drawn above would apply to it as well and that consequently the consented insertion of the Ludenhill development into this baseline would not elevate the predicted level of cumulative effect upon the setting of Greene Knowe beyond that previously assessed in the 2022 EIA Report.				
30	Howana Gruna, cairn 270m SE of Whitehouse: Scheduled Monument (2022 EIA Report Figure 9.10)	Burgar Hill, Costa Head	High	Low/ Minor	Low/ Minor
	Summary: Howana Gruna lies immediately adjacent to the operational Burgar Hill development, and the sound of the turbines is clearly audible from the cairn. Whilst the Proposed Development would be visible when viewed from the cairn it would appear in the opposing view to Burgar Hill				

Asset No	Receptor	Principal Cumulative Scheme(s)	Relative Sensitivity	Magnitude of Impact/ Level of Effect (Proposed Development Alone)	Magnitude of Impact/ Cumulative Level of Effect
	and there would therefore be no linked visual effect between the two developments. Although, as the visualisation provided in 2022 EIA Report Figure 9.10 shows, the Costa Head turbines will appear to the east of the Proposed Development when viewed from Howana Gruna they will be both set apart from it and located at a greater distance. **Revised Assessment:** Given that the consented 76m Ludenhill turbine would occupy the same site as the Proposed Development, it follows that the conclusions drawn above would apply to it as well and that consequently the consented insertion of the Ludenhill development into this baseline would not elevate the predicted level of cumulative effect upon the setting of Howana Gruna beyond that previously assessed in the 2022 EIA Report.				
32	Hundland, settlement mound 270m SW of: Scheduled Monument (2022 EIA Report Figure 9.11)	Burgar Hill, Costa Head	High	Low/ Minor	Low/ Minor
	Summary: The asset comprises a steep sided, stony settlement mound standing up to 2 m high, probably of Iron Age date. Wireline evidence (EIAR Figure 9.11) indicates that three of the Nisthill turbines would be visible from below hub height and the fourth from hub height itself. It also suggests that neither the Burgar Hill nor the Costa Head turbines will appear in the same field of view. **Revised Assessment:** Given that the consented 76m Ludenhill turbine would occupy the same site as the Proposed Development, it follows that the conclusions drawn in the cumulative section of the 2022 EIA Report would apply to it as well and that consequently the consented insertion of the Ludenhill development into this baseline would not elevate the predicted level of cumulative effect upon the setting of the Hundland Settlement beyond that previously assessed in the 2022 EIA Report.				
33	Kirbister Hill, barrow cemetery 410m ENE of Heatherlea: Scheduled Monument	Burgar Hill, Costa Head	Medium	Low/ Minor	Low/ Minor
	Summary: At least 10 low lying (up to 0.5 m high) burial barrows are present probably dating to the Bronze Age. During AOC Archaeology Group's setting assessment site visit only one mound was identifiable against a modern fence line as a low mound roughly 0.3 m high. The remaining barrows were probably represented by undulations within the field. Located on a slightly southeast facing slope, the asset overlooks the Loch of Hundland with clear views towards Hundland Hill across the Loch. Prehistoric burial barrows would usually be considered to have a high sensitivity to changes in their settings. However, these burial mounds have been reduced by ploughing to the extent that they are level with the rest of the field. Due to the degraded				

Asset No	Receptor	Principal Cumulative Scheme(s)	Relative Sensitivity	Magnitude of Impact/ Level of Effect (Proposed Development Alone)	Magnitude of Impact/ Cumulative Level of Effect
	nature of the barrows, Kirbuster Hill can be said to have a medium sensitivity to changes in its setting. The Hub and blades of the existing 46.5m Ludenhill wind turbine are visible behind the ridgeline of Hundland Hill and the Proposed Development would add to the wind turbines in the view towards Hundland Hill. The consented Costa Head Turbines will appear to the rear of and to the north of the Proposed Development in this view, whilst the existing Burgar Hill turbines stand to the east. **Revised Assessment:** Given the condition of the monument and the fact that the consented 76m Ludenhill turbine will occupy the same site as the Proposed Development, it follows that the conclusions drawn in the cumulative section of the 2022 EIA Report will apply to it as well and that consequently the consented insertion of the Ludenhill development into this baseline would not elevate the predicted level of cumulative effect, beyond that previously assessed in the 2022 EIA Report, upon the setting of the Kirbister barrows.				
34	Knowe of Brenda, burnt mound 260m WNW of Downatown: Scheduled Monument	Burgar Hill, Costa Head	Medium	Low/ Minor	Low/ Minor
	Summary: As a burnt mound the Knowe of Brenda can be considered to have a medium sensitivity to changes in its setting within the local landscape in which it is situated. The Proposed Development would not impede either the immediate setting of the burnt mound which relates to the watercourses which lie in its close proximity, which in any case appear to have been diverted when the adjacent aerodrome RNAS Twatt, was constructed. Visibility with both the Proposed Development and the cumulative schemes; Burgar Hill and Costa Head would be both distant and to the northeast. **Revised Assessment:** Given the changes to the immediate topography that were affected by the construction of RNAS Twatt and the fact that the consented 76m Ludenhill turbine would occupy the same site as the Proposed Development, it follows that the conclusions drawn in the cumulative section of the 2022 EIA Report would apply to it as well and that consequently the consented insertion of the Ludenhill development into this baseline would not elevate the predicted level of cumulative effect upon the setting of the Knowe of Brenda.				
36	Knowe of Crustan, mound, Crustan: Scheduled Monument	Costa Head	High	Low/ Minor	Low/ Minor
	Summary: Turf covered mound described as much broken up with a 19th century excavation trench running east to west. It was formerly surmounted by a standing stone. Height was recorded at 0.3 m in 1993. ZTV analysis suggests that four Nisthill turbines could potentially be visible. The Knowe of Crustan is roughly equidistant between the Proposed Development and the consented Costa Head turbines. It is therefore likely that the effects of each development, when considered individually, will be comparable and that neither would intervene with the				

Asset No	Receptor	Principal Cumulative Scheme(s)	Relative Sensitivity	Magnitude of Impact/ Level of Effect (Proposed Development Alone)	Magnitude of Impact/ Cumulative Level of Effect
	monument's most striking setting relationship which relates to the adjacent coastline to the north. **Revised Assessment:** Given the fact that the monument's visual relationship with the coast would not be effected and the fact that the consented 76m Ludenhill turbine would occupy the same site as the Proposed Development, it follows that the conclusions drawn in the cumulative section of the EIA Report would apply to it as well and that consequently the consented insertion of the Ludenhill development into this baseline would not elevate the predicted level of cumulative effect upon the setting of the Knowe of Brenda.				
48	Runa, mound, Twatt: Scheduled Monument	Burgar Hill, Costa Head (ZTV suggests limited visibility)	Medium	Low/ Minor	Low/ Minor
	Summary: The asset is a Bronze Age burial mound. A second mound stood to the east but has now been destroyed. The Scheduling description gives a height of 1.5m. However, a field visit by the Orkney Barrow Project on 1 April 1994 (NRHE No. HY22SE 41) gives a height of only 0.7m and AOC Archaeology Group's setting assessment survey confirmed that the mound; although noticeable, is now slight. Runa is situated on a slope overlooking the Loch of Isbister to its southwest and the northern Hills of Hoy to the south. Prehistoric burial mounds would usually be considered to have a high sensitivity to changes in their settings. Due to Runa's degraded nature, it can be said to have a medium sensitivity to changes in its setting. Although the Proposed Development, the consented Costa Head turbines and the existing Burgar Hill wind farm either do or would appear to the east, any visibility to the east would be distant and would not intervene in the monument's key southward views. **Revised Assessment:** Given the fact that the monument's key southward views would not be effected and the fact that the consented 76m Ludenhill turbine would occupy the same site as the Proposed Development, it follows that the conclusions drawn in the cumulative section of the 2022 EIA Report would apply to it as well and that consequently the consented insertion of the Ludenhill development into this baseline would not elevate the predicted level of cumulative effect upon the setting of the Runa Mound.				
49	Knowe of Nesthouse, settlement: Scheduled Monument	Burgar Hill	Medium	Low/ Minor	Low/ Minor
	Summary: The asset comprises a large settlement mound which occupies the whole of a D-shaped promontory on the east shore of the Loch of Boardhouse. Iron Age finds have been recorded from the Knowe of Nesthouse. It is not thought to be a broch; it is either a single multi-chambered drystone building or several contiguous single celled buildings. The Knowe of Nesthouse is associated with the Loch of Boardhouse to its west and the agricultural land within its immediate environs. The location of the Knowe of Nesthouse would have had a setting relationship with the agricultural lands in its vicinity and therefore can be considered to have a				

Asset No	Receptor	Principal Cumulative Scheme(s)	Relative Sensitivity	Magnitude of Impact/ Level of Effect (Proposed Development Alone)	Magnitude of Impact/ Cumulative Level of Effect
	medium sensitivity to changes in its setting. Although the existing Burgar Hill turbines are visible to the east and the Proposed Development would be visible to the northeast, the monument's crucial setting relationship with the Loch of Boardhouse to its immediate east, into which it protrudes, would not be affected. **Revised Assessment:** Given the fact that the monument's key setting relationship with the adjacent loch would not be effected and the fact that the consented 76m Ludenhill turbine would occupy the same site as the Proposed Development, it follows that the conclusions drawn in the cumulative section of the 2022 EIA Report would apply to it as well and that consequently the consented insertion of the Ludenhill development into this baseline would not elevate the predicted level of cumulative effect upon the setting of the Knowe of Nesthouse.				
56	Knowes of Cuean, mounds 225m N of Sunnybrae: Scheduled Monument	Burgar Hill (ZTV suggests limited visibility), Holodykes	Medium	Low/ Minor	Low/ Minor
	Summary: The asset comprises the remains of up to four barrows probably dating to the Bronze Age. These mounds, situated within improved agricultural land, have been reduced in height; the largest of the four mounds stands to a height of 0.6m. These barrows sit on a low-rise overlooking land that slopes down in a southwest direction with clear views to the hills of Hoy. Prehistoric burial barrows would usually be considered to have a high sensitivity to changes in their settings. However, due to their degraded state the Knowes of Cuean can be said to have a medium sensitivity to changes in its setting. A site visit established that views extend southward from the Knowes towards the distinctive hills of Hoy, which are considered to be the key element of their visual setting. By contrast the Proposed Development and the consented Costa Head Wind Farm site lie to the north whilst the existing Burgar Hill turbines stand to the northeast and consequently none would impede the monument's key southward views. **Revised Assessment:** Given that the monument's key southward setting relationship with the hills of Hoy would not be effected and the fact that the consented 76m Ludenhill turbine would occupy the same site as the Proposed Development, it follows that the conclusions drawn in the cumulative section of the 2022 EIA Report would apply to it as well and that consequently the consented insertion of the Ludenhill development into this baseline would not elevate the predicted level of cumulative effect upon the setting of the Knowes of Cuean.				
57	Knowes of Lingro, burial mounds 110m WNW of Waverley: Scheduled Monument	Costa Head	High	Low/ Minor	Low/ Minor
	Summary: The asset comprises the remains of three low lying, earthen covered barrows probably dating to the Bronze Age and standing up to 1m high. The Located within pasture lands, the Knowes have clear views east to Costa Hill and to the landscape to the south including Hundland				

Asset No	Receptor	Principal Cumulative Scheme(s)	Relative Sensitivity	Magnitude of Impact/ Level of Effect (Proposed Development Alone)	Magnitude of Impact/ Cumulative Level of Effect
	Hill and the current wind turbine that is located within the Site. There are also clear views out to the north coast of Orkney and the sea. The Knowes of Lingro can still be understood, appreciated and experienced as Bronze Age burial barrows. For this reason, it is considered to retain a high relative sensitivity to changes to its setting, particularly to the north. The Knowes of Lingro are roughly equidistant between the Proposed Development and the consented Costa Head turbines and both would be visible although given that they would stand at similar distance to the turbines it is likely that the effects of each development, when considered individually, would be comparable. **Revised Assessment:** Given that the consented 76m Ludenhill turbine would occupy the same site as the Proposed Development, it follows that the conclusions drawn in the cumulative section of the 2022 EIA Report would apply to it as well and that consequently the consented insertion of the Ludenhill development into this baseline would not elevate the predicted level of cumulative effect upon the setting of the Knowes of Lingro.				
61	Nisthouse, burial mound 270m ENE of: Scheduled Monument (2022 EIA Report Figure 9.13)	Costa Head	High	**Medium/ Moderate**	**Medium/ Moderate**
	Summary: The asset comprises a burial mound or barrow dating to the Bronze Age and standing to a height of 1.1m. within the Site boundary on the western slope of Hundland Hill. Although a site visit established that all four turbines are likely to be visible, wireline evidence shows that the intervening presence of the summit of Hundland Hill would limit visibility of the eastern pair of turbines to their blade tips only. It should also be noted that all four of the turbines would stand beyond the asset's key setting which can be defined as the immediate southwest facing hillslope upon which it stands and the view to the southwest across the lochs towards Hoy. The EIAR concluded that the cumulative level of effect upon the settings of the enclosure and the mound would not be increased from the moderate and significant effect that has been predicted for the Proposed Development alone. This is because the consented Costa Head turbines will appear to the rear of the proposed Nisthill turbines, set back at a distance of 2.9km and consequently the principal effects upon the setting on the monument would be from the Proposed Development itself and consequently the cumulative level of effect upon the setting of the monument would not increase from the **moderate** and significant effect that was predicted for the Proposed Development alone. **Revised Assessment:** ZTV analysis submitted as part of the Ludenhill repowering application (AXIS 2023)[5] shows that the visibility of the existing 46.5m turbine from the Nisthill mound is restricted to blade-tips only, although the predicted visibility of the 76m turbine will be greater with both the hub and the blades being visible. Given the open nature of the hilltop terrain it is				

[5] AXIS 2023, Figures 5.3a-b and 5.4a-b

Asset No	Receptor	Principal Cumulative Scheme(s)	Relative Sensitivity	Magnitude of Impact/ Level of Effect (Proposed Development Alone)	Magnitude of Impact/ Cumulative Level of Effect
	predicted that this theoretical visibility will translate into actual visibility. The consented level of effect upon the Nisthill mound is therefore greater than the existing effect although it should be acknowledged that by virtue of its increased height the predicted level of effect of the Proposed Development upon the setting of the monument would exceed that of the consented 76m turbine. Therefore, the cumulative level of effect upon the setting of the monument would not increase from the moderate and significant effect that was predicted in the 2022 EIA Report.				
65	Hundland Hill, enclosure 500m NE of Nisthouse: Scheduled Monument (2022 EIA Report Figure 9.14)	Costa Head, Burgar Hill	High	**Medium/ Moderate**	**Medium/ Moderate**
	Summary: The monument comprises a Prehistoric enclosure which lies at the highest point of the Site on the summit of Hundland Hill and as the accompanying photomontage and wireline (EIAR Figure 9.14) show two turbines would stand to the east of the enclosure and two to the west and all would be visible from the monument. As the visualisations show, the operational Burgar Hill Wind Farm appears in views to the southeast from the monument, along with the existing 46.5m Ludenhill turbine which stands on the southern slopes of Hundland Hill. The consented Costa Head turbines will also appear in views to the north from the monument when they are built. However, the operational and consented schemes will all appear to the rear of the Proposed Development and, with the exception of the operational Hundland Hill turbine, either stand or will stand on separate topographical landforms. It is therefore clear that the principal effects upon the setting on the monument would be from the Proposed Development itself and consequently the cumulative level of effect upon the settings of the enclosure would not be increased from the **moderate** and significant effect that was predicted for the Proposed Development alone. **Revised Assessment:** Although the consented level of effect upon the Hundland Hill enclosure is now greater than it was when the 2022 EIA Report was prepared it should be acknowledged that by virtue of its increased height the predicted effect of the Proposed Development upon the setting of the monument would exceed that of the consented 76m turbine. Therefore, the cumulative level of effect upon the setting of the monument would not increase from the **moderate** and significant effect that was predicted in the 2022 EIA Report.				
67	Mittens, two mounds 110m NE of, Swannay: Scheduled Monument (2022 EIA Report Figure 9.15)	Costa Head, Burgar Hill	High	**Medium/ Moderate**	**Medium/ Moderate**
	Summary: The two Mittens mounds lie to the north of the Site and whilst both are Scheduled, one has been severely truncated by ploughing and survives only to a height of 0.20m. As the				

Asset No	Receptor	Principal Cumulative Scheme(s)	Relative Sensitivity	Magnitude of Impact/ Level of Effect (Proposed Development Alone)	Magnitude of Impact/ Cumulative Level of Effect
	photomontage and wirelines (Visualisation Figure 9.15) show, the operational Burgar Hill turbines appear considerably to the south of the Proposed Development in southward facing views from the monument, whilst the consented Costa Head turbines will appear in the opposing northward view which would not include the Proposed Development. Both schemes will be set at a greater distance to the monument than the Proposed Development. Neither the consented turbines nor the proposed ones encroach upon the monument's key setting relationship, namely the axis of view over the Loch of Hundland towards Hoy. Consequently, the cumulative level of effect upon the settings of the Mittens mounds would not be increased from the **moderate** and significant effect that has been predicted for the Proposed Development alone. **Revised Assessment:** A site visit by AOC in March 2022 confirmed that the existing 46m turbine is clearly visible from the road which runs adjacent to the Mitten mounds, the now consented increase in height means that the consented level of effect upon the setting of the mounds has increased, although by virtue of the further increase in scale that it would represent the Proposed Development would elevate this level of effect further. However, this needs to be considered against the fact that the monument's crucial setting relationship with the axis of view over the Loch of Hundland towards Hoy would remain unchanged. Therefore, the cumulative level of effect upon the setting of the monument would not increase from the **moderate** and significant effect that was predicted in the 2022 EIA Report.				
69	Bigbreck Cottage, burial mounds N of: Scheduled Monument	Costa Head (ZTV suggests limited visibility), Burgar Hill	High	Low/ Minor	Low/ Minor
	Summary: The asset comprises ten or more burial mounds that form part of a barrow cemetery that probably dates to the Bronze Age. Varying between 0.3m and 1.25m in height the barrows overlook the Loch of Boardhouse to the north and east and this can be considered to be their primary setting relationship. A site visit established that the Burgar Hill turbines can be seen to the east of the mounds whilst the Proposed Development would be visible to the northeast. However, both lie to the rear of the mounds key setting relationship, the adjacent Loch of Boardhouse. **Revised Assessment:** Given that the consented 76m Ludenhill turbine would occupy the same site as the Proposed Development, it follows that the conclusions drawn in the cumulative section of the 2022 EIA Report would apply to it as well and that consequently the consented insertion of the Ludenhill development into this baseline would not elevate the predicted level of cumulative effect upon the setting of the Bigbreck burial mounds beyond that previously assessed in the 2022 EIA Report.				
72	Park Holm, artificial island and causeway, Loch of Swannay: Scheduled Monument	Costa Head, Burgar Hill	High	**Medium/ Moderate**	**Medium/ Moderate**

Asset No	Receptor	Principal Cumulative Scheme(s)	Relative Sensitivity	Magnitude of Impact/ Level of Effect (Proposed Development Alone)	Magnitude of Impact/ Cumulative Level of Effect
	(2022 EIA Report Figure 9.16)				
	Summary: The asset comprises an artificial island just off the southwestern shore of the Loch of Swannay. It is considered to be of late prehistoric date, although as it has not been excavated this remains unconfirmed. The EIAR considered that the monument's key setting characteristics relate to the waters of the loch and its immediate southwestern foreshore, and it is therefore less sensitive to changes that are located at a greater distance. A site visit established that the operational Burgar Hill turbines are clearly visible when the monuments are viewed from the loch's adjacent southwest shore and that the consented Costa Head turbines will also be visible when the monuments are viewed from this vantage point. However, as the accompanying wireline EIAR Figure 9.16 shows, the Proposed Development would stand to the rear of the monuments when they are viewed from this vantage point, and therefore whilst it would stand closer to Park Holm than the cumulative schemes it would not appear in views from this location that include the cumulative developments. Consequently, the cumulative level of effect upon the setting of Park Holm would not be increased from the **moderate** and significant effect that has been predicted for the Proposed Development alone. **Revised Assessment:** Although the consented level of effect upon Park Holm is now greater than it was when the 2022 EIA Report was prepared it should be acknowledged that by virtue of its increased height the predicted effect of the Proposed Development upon the setting of the monument would exceed that of the consented 76m turbine. Therefore, the cumulative level of effect upon the setting of the monument would not increase from the moderate and significant effect that was predicted in the 2022 EIA Report.				
81	Stanerandy, mound and two standing stones 100m SSE of Little Favel: Scheduled Monument	Burgar Hill (ZTV suggests either limited or no visibility)	High	Low/ Minor	Low/ Minor
	Summary: The asset comprises a grass covered earthen mound standing up to 0.9m high with two standing stones embedded into the mound. Stanerandy is probably a burial mound dating to the Bronze Age. A shoulder of higher ground inhibits but does not totally block views east towards the Site and the key settings characteristics of this monument are views to the Loch of Boardhouse to the southwest and the Brough of Birsay to the west with clear views out to sea. ZTV analysis suggests that two Nisthill turbines could potentially be visible. **Revised Assessment:** ZTV analysis submitted as part of the Ludenhill repowering application (AXIS 2023)[6] shows that there is no potential for the recently consented 76m Ludenhill turbine				

[6] AXIS 2023, Figures 5.3a-b and 5.4a-b

Asset No	Receptor	Principal Cumulative Scheme(s)	Relative Sensitivity	Magnitude of Impact/ Level of Effect (Proposed Development Alone)	Magnitude of Impact/ Cumulative Level of Effect
	to be visible from the Stanerandy monument and consequently no additional cumulative effect upon its setting is predicted.				
83	Stoney Holm, crannog, Loch of Swannay; Scheduled (2022 EIA Report Figure 9.17)	Costa Head, Burgar Hill	High	**Medium/ Moderate**	**Medium/ Moderate**
	Summary: The asset comprises an artificial island just off its southwestern shore of the Loch of Swannay. It is considered to be of late prehistoric date, although as it has not been excavated this remains unconfirmed. The 2022 EIA Report considered that the monument's key characteristics of setting relate to the waters of the loch and its immediate southwestern foreshore, and it is therefore less sensitive to changes that are located at a greater distance. A site visit established that the operational Burgar Hill turbines are clearly visible when the monuments are viewed from the loch's adjacent southwest shore and that the consented Costa Head turbines will also be visible when the monuments are viewed from this vantage point. However, as the accompanying wireline given in 2022 EIA Report Figure 9.17 shows the Proposed Development would stand to the rear of the monuments when they are viewed from this vantage point, and therefore whilst it would stand closer to Stoney Holm than the cumulative schemes it would not appear in views from this location that include the cumulative developments. Consequently, the cumulative level of effect upon the setting of Park Holm would not be increased from the **moderate** and significant effect that have been predicted for the Proposed Development alone. **Revised Assessment:** Although the consented level of effect upon Stoney Holm is now greater than it was when the 2022 EIA Report was prepared it should be acknowledged that by virtue of its increased height the predicted effect of the Proposed Development upon the setting of the monument would exceed that of the consented 76m turbine. Therefore, the cumulative level of effect upon the setting of the monument would not increase from the **moderate** and significant effect that was predicted in the 2022 EIA Report**.**				
84	Hillhead, three burial mounds 430m ENE of: Scheduled Monument	Costa Head, Burgar Hill	Medium	Low/ Minor	Low/ Minor
	Summary: The asset comprises three burial mounds or barrows probably dating to the Bronze Age; the highest of the low-lying turf covered mounds stands to a height of 0.6m. A site visit established that, as with the Queena Mounds (Asset 88) to the east the principal views from the monument extend southwards terminating with the landmark cliffs of Hoy. The existing Burgar Hill turbines can be seen on a ridgeline to the southeast whilst ZTV analysis suggests that four Nisthill turbines could potentially be visible to the east and any visibility with the Costa Head				

Asset No	Receptor	Principal Cumulative Scheme(s)	Relative Sensitivity	Magnitude of Impact/ Level of Effect (Proposed Development Alone)	Magnitude of Impact/ Cumulative Level of Effect
	turbines would be to the northeast. However, all three wind farms sites lie clearly outwith and beyond the assets key southward setting relationships. **Revised Assessment:** Given that the consented 76m Ludenhill turbine would occupy the same site as the Proposed Development, it follows that the conclusions drawn in the cumulative section of the 2022 EIA Report would apply to it as well and that consequently the consented insertion of the Ludenhill development into this baseline would not elevate the predicted level of cumulative effect upon the setting of the Hillhead burial mounds.				
85	Summerfield, three mounds 470m WNW of, Greeny: Scheduled Monument	Costa Head, Burgar Hill	Medium	Low/ Minor	Low/ Minor
	Summary: The asset comprises three prehistoric burial mounds; the highest mound stands to a hight of 0.8m. ZTV analysis suggests that four Nisthill turbines could potentially be visible. **Revised Assessment:** ZTV analysis submitted as part of the Ludenhill repowering application (AXIS 2023)[7] shows that the Scheduled area lies either at the very limit of the blade tip consented 76m turbine or more likely just outwith it. Consequently, any visibility is likely to be at worst extremely limited and no additional cumulative effect upon its setting is predicted.				
87	Quoyhorrie, three mounds 200m ESE of: Scheduled Monument	Costa Head, Burgar Hill	Medium	Low/ Minor	Low/ Minor
	Summary: A site visit by AOC in March 2022 established that due to ploughing these burial mounds no longer survive as upstanding remains. The monument lies on the eastern slope of the hill that rises west from the Loch of Hundland and a site visit established that both the existing Burgar Hill wind farm and the blade and hub of the current 46.5m Ludenhill turbine can be seen from this vantage point. Prehistoric burial barrows would usually be considered to have a high sensitivity to changes in their settings. However, due to degradation by ploughing Quoyhorrie, can be said to have a medium sensitivity to changes in its setting. **Revised Assessment:** Given that the consented 76m Ludenhill turbine would occupy the same site as the Proposed Development, it follows that the conclusions drawn in the cumulative section of the 2022 EIA Report would apply to it as well and that consequently the consented insertion of the Ludenhill development into this baseline would not elevate the predicted level of cumulative effect upon the setting of the monument.				

[7] AXIS 2023, Figures 5.3a-b and 5.4a-b

Asset No	Receptor	Principal Cumulative Scheme(s)	Relative Sensitivity	Magnitude of Impact/ Level of Effect (Proposed Development Alone)	Magnitude of Impact/ Cumulative Level of Effect
88	Queena, two mounds SSW of, Abune-the-Hill: Scheduled Monuments	Costa Head, Burgar Hill	High	Low/ Minor	Low/ Minor
	Summary: The asset comprises the remains of two possible prehistoric burial mounds. Although in poor condition, one mound remains upstanding on the northeast boundary of a ploughed field. Queena has views across to the Site; the existing 46.5m Ludenhill wind turbine is visible and from the observer's point of view partially merges into the array of Burgar Hill Wind Farm. The two prehistoric burial mounds of Queena have a high sensitivity to changes in their setting. Views to the north from Queena are curtailed, views southeast and southwest are open and extensive, to the southwest they extend as far as the cliffs of Hoy, whilst to the southeast they reach over the Loch of Hundland to the ridgelines to its rear. Views directly south and south-southeast are however curtailed by the continuation of the ridge onto the summit of Kirbuster Hill, with the considerably higher summit of Greeny Hill visible behind. Rousay can also be glimpsed as a horizontal landform over the cliffs to the east. However, views in the southern arc from the Queena mounds are extensive and the positioning of the mounds allows for a number of key views and glimpses to be appreciated. Therefore, the critical views within the setting of the Queena mounds lie largely to the south and their wider setting extends in arc from east to southwest. **Revised Assessment:** Given that the consented 76m Ludenhill turbine would occupy the same site as the Proposed Development, it follows that the conclusions drawn above would apply to it as well and that consequently the consented insertion of the Ludenhill development into this baseline would not elevate the predicted level of cumulative effect upon the setting of the monument from that previously assessed in the 2022 EIA Report.				
91	Wheebin standing stone: Scheduled Monument	Costa Head, Burgar Hill	High	Low/ Minor	Low/ Minor
	Summary: Prehistoric standing stone standing 3.5m high. ZTV analysis suggests that four Nisthill turbines could potentially be visible. A site visit established that in setting terms its key visual relationships relate to views east over the Loch of Boardhouse and northwest towards the Brough of Birsay. **Revised Assessment:** ZTV analysis submitted as part of the Ludenhill repowering application (AXIS 2023) [8] confirms that the standing stone lies outwith, the ZTV of the existing 46.5m turbine although the blade tips of its consented 76m replacement may be visible. However, given that the consented 76m Ludenhill turbine would occupy the same site as the Proposed Development, it follows that the conclusions drawn in the cumulative section of the 2022 EIA Report would				

[8] AXIS 2023, Figures 5.3a-b and 5.4a-b

Asset No	Receptor	Principal Cumulative Scheme(s)	Relative Sensitivity	Magnitude of Impact/ Level of Effect (Proposed Development Alone)	Magnitude of Impact/ Cumulative Level of Effect
	apply to it as well and that consequently the consented insertion of the Ludenhill development into this baseline would not elevate the predicted level of cumulative effect upon the setting of the monument beyond that previously assessed in the 2022 EIA Report.				
98	Oxtro or Oxtra, broch, Boardhouse: Scheduled Monument	Costa Head, Burgar Hill (ZTV suggests that there may be only limited visibility from either scheme)	High	Low/ Minor	Low/ Minor
	Summary: The asset comprises a substantial Iron Age Broch mound associated with prime agricultural land on the west side of the Loch of Boardhouse. ZTV analysis suggests that four Nisthill turbines could potentially be visible. **Revised Assessment:** ZTV analysis submitted as part of the Ludenhill repowering application (AXIS 2023)[9] confirms that the standing stone lies outwith, the ZTV of the existing 46.5m turbine although the blade tips and potentially the hub of its consented 76m replacement may be visible. However, given that the consented 76m Ludenhill turbine would occupy the same site as the Proposed Development, it follows that the conclusions drawn in the cumulative section of the 2022 EIA Report would apply to it as well and that consequently the consented insertion of the Ludenhill development into this baseline would not elevate the predicted level of cumulative effect upon the setting of the monument beyond that previously assessed in the 2022 EIA Report.				
114	Vinquin, broch, 145m SSW of Upper Arsdale: Scheduled Monument (2022 EIA Report Figure 9.18)	Costa Head, Burgar Hill	High	Low/ Minor	Low/ Minor
	Summary: Vinquin Broch stands on a pinnacle in the ridgeline to the northeast of the Site and the operational Burgar Hill turbines to the south can be clearly seen from it. Although the Proposed Development would be clearly visible from Vinquin, along with the consented Costa Head turbines to the north, the three schemes would be broadly spaced within a wide landscape and the underlying topography of the landscape would remain clearly legible. **Revised Assessment:** As Figure 6.19b of this SEI (June 2024) shows the consented 76m Ludenhill turbine would occupy the same site as the Proposed Development, it follows that the conclusions drawn in the cumulative section of the EIAR would apply to it as well and that consequently the consented insertion of the Ludenhill development into this baseline would not elevate the predicted level of cumulative effect upon the setting of the monument beyond that previously assessed in the 2022 EIA Report.				

[9] AXIS 2023, Figures 5.3a-b and 5.4a-b

Asset No	Receptor	Principal Cumulative Scheme(s)	Relative Sensitivity	Magnitude of Impact/ Level of Effect (Proposed Development Alone)	Magnitude of Impact/ Cumulative Level of Effect
123	Earl's Palace, Birsay: Scheduled Monument & HES PiC (2022 EIA Report Figure 9.19)	Costa Head, Burgar Hill	High	Low/ Minor	Low/ Minor
	Summary: ZTV analysis indicates that four turbines would be visible from the Earl's Palace However, wireline evidence suggests that only one of these turbines would be visible from just below hub height, along with the blade of another and the extreme blade tips of the other two. (2022 EIA Report Figure 9.19). The Palace's internal courtyard was by its very nature an enclosed space and whilst it is now severely ruined, and the surrounding land to the east can be seen through it, that sense of enclosure is retained. Historically, any views east to the Site from the north range would have been restricted by the projecting defensive tower on the northeast corner of Earl's Palace, whilst the placement of the long gallery at first floor level within the west range suggests that importance was attached to views west and northwest over Birsay Bay and towards the Brough of Birsay. These views would be unaffected by either the Proposed Development or any of the cumulative schemes. **Revised Assessment:** ZTV analysis submitted as part of the Ludenhill repowering application (AXIS 2023)[10] shows that there is no potential for the recently consented 76m Ludenhill turbine to be visible from the Earl's Palace monument and consequently no additional cumulative effect upon its setting is predicted.				
124	Brough of Birsay: Scheduled Monument & HES PiC (2022 EIA Report Figure 9.20 & SEI (June 2024) Figure 6.24b)	Costa Head, Burgar Hill	High	Low/ Minor	Low/ Minor
	Summary: ZTV analysis indicates that four turbines would be visible from the Scheduled area on the Brough of Birsay, whilst a photomontage (2022 EIA Report Figure 9.20) shows that all four turbines would be visible from the Brough; one from below hub height, one from hub height itself and two at blade level. Whilst the Proposed Development would be visible, given that it would stand beyond the key elements of Brough's setting it would not affect the ability to understand, appreciate or experience this asset.				

[10] AXIS 2023, Figures 5.3a-b and 5.4a-b

Asset No	Receptor	Principal Cumulative Scheme(s)	Relative Sensitivity	Magnitude of Impact/ Level of Effect (Proposed Development Alone)	Magnitude of Impact/ Cumulative Level of Effect
	Revised Assessment: ZTV analysis submitted as part of the Ludenhill repowering application (AXIS 2023)[11] suggests that the Scheduled area on the Brough lies either just within or slightly outwith, the blade tip ZTV for the consented 76m Ludenhill turbine. Whilst a photomontage prepared for this SEI (Figure 6.24b) found that there will be no visibility. Consequently, no additional cumulative effect upon the setting of the Scheduled Monument is predicted.				
126 & 145	Eynhallow Church and Settlement, Scheduled Monument (Asset 126) and Eynhallow Conservation Area (Asset 145) (2022 EIA Report Figure 9.21)	Costa Head, Burgar Hill, Hammars Hill, Hammars Hill Extension.	High	Low/ Minor	Low/ Minor
	Summary: The Scheduled Monument and Conservation Area are assessed together here. Wireline evidence presented in 2022 EIA Report Figure 9.21 indicates that when viewed from Eynhallow the operational Burgar Hill turbines, the Proposed Development and the consented Costa Head turbines would appear, spaced out but in a row either on or behind the ridgeline that extends along the northeastern edge of West Mainland. The Burgar Hill turbines stand closest at 2.9km and by virtue of their placement on the ridge itself are visible at either their full extent or close to it. The Proposed Development would appear at a distance of 5.2km and due to the position of Hundland Hill to the rear of the ridge, none would appear at full height; two would be seen from below hub height and one from hub height, whilst only the blade tip of the fourth turbine would be visible. Although at 5.3km the Costa Head turbines will be set at a similar distance to the Proposed Development, the intervening presence of the Costa Head landmass means that although one turbine will appear from just below hub height only the extreme tips of the blades of the other three will be visible. **Revised Assessment:** ZTV analysis submitted as part of the Ludenhill repowering application (AXIS 2023)[12] confirms that Eynhallow lies outwith, the ZTV of the existing 46.5m turbine although the blade tip and potentially the hub of its consented 76m replacement may be visible. However, given that the consented 76m Ludenhill turbine would occupy the same site as the Proposed Development, it follows that the conclusions drawn in the cumulative section of the 2022 EIA Report would apply to it as well and that consequently the consented insertion of the Ludenhill development into this baseline would not elevate the predicted level of cumulative effect upon the setting of Eynhallow beyond that previously assessed in the 2022 EIA Report.				

[11] AXIS 2023, Figures 5.3a-b and 5.4a-b
[12] AXIS 2023, Figures 5.3a-b and 5.4a-b

Asset No	Receptor	Principal Cumulative Scheme(s)	Relative Sensitivity	Magnitude of Impact/ Level of Effect (Proposed Development Alone)	Magnitude of Impact/ Cumulative Level of Effect
147-149	Heart of Neolithic Orkney World Heritage Site (HONO). Includes: The Ring of Brodgar (Asset 146, 2022 EIA Report Figure 9.25 & SEI (June 2024) Figure6.29b) Maes Howe (Asset 147, 2022 EIA Report Figure 9.26 & 2023 SEI (June 2024) VP2 & VP3) The Stones of Stenness (Asset 148, 2022 EIA Report Figure 9.27 & 2023 SEI (June 2024) VP1) Skara Brae (Asset 149, 2022 EIA Report Figure 9.28 & SEI (June 2024) 6.32c)	Hoy, Costa Head, Holodykes, Burgar Hill	Very High/ High	Low/ Minor	Low/ Minor
	Summary: The Heart of Neolithic Orkney World Heritage Site (HONO WHS) encompasses four core Scheduled Monuments; the Stones of Stenness (Asset 148), the Ring of Brodgar (Asset 146) and Maes Howe (Asset 147) which can be grouped together as the 'Stenness assets' and the geographically separate Skara Brae Neolithic settlement (Asset 149). The 2022 EIA Report included either wirelines or photomontages for all four monuments (2022 EIA Report Figures 9.25 – 9.28), whilst additional visualisations were subsequently prepared for the Stones of Stenness and Maes Howe at the behest of HES. The WHS monuments lie between 10.89km (Skara Brae) and 14.38km (Stones of Stenness) from the Site and this distance of separation needs to be balanced with their sensitivity; the three Stenness assets are all significant, internationally important ceremonial monuments and have a very high sensitivity to changes to their settings, although both the Proposed Development and the cumulative schemes lie beyond that the key elements of their settings. As 2022 EIA Report Figure 9.25 shows, the operational Holodykes and Burgar Hill turbines can currently be seen from the Ring of Brodgar at distances of 8.7km and 13.2km respectively. It is				

Asset No	Receptor	Principal Cumulative Scheme(s)	Relative Sensitivity	Magnitude of Impact/ Level of Effect (Proposed Development Alone)	Magnitude of Impact/ Cumulative Level of Effect
	noted that this visibility can vary according to cloud and haze conditions, although they are usually detectable as a distant presence within an evolved landscape. The wirelines also suggest that, when built, two consented schemes may also be visible from the Ring of Brodgar: Costa Head 16.5km and Hoy 18.9km to the south, although neither will have the degree of visibility that the operational Burgar Hill Turbines currently have. Whilst the distance of separation between Burgar Hill and the monument is broadly similar, 13.2km as opposed to 13.6km, the Proposed Development would appear slightly larger, due to the size of the turbines proposed relative to those that are currently installed at Burgar Hill. However, whilst all the cumulative schemes are located either along or in proximity to the ridges of the topographical bowl that encircles the Stenness assets, they do not dominate them either individually or collectively. Two wirelines (2022 EIA Report Figures 9.26 and 9.27) suggest that visibility from the summit of Maes Howe and the Stones of Stenness would be broadly similar to the visibility from Brodgar. However, due to changes in the topography the operational Burgar Hill turbines cannot be seen from Maes Howe, whilst the consented Hoy turbines will not be visible from either asset. Photomontages were subsequently prepared showing the view from the Stones of Stenness (SEI (December 2023) VP 1), the ground to the immediate north of Maes Howe (SEI (December 2023) VP 3) and the path to it (SEI (December 2023) VP 2) at the behest of HES. The Stenness photomontage confirmed that visibility from the stones would be as predicted by the wireline (EIAR (June 2024) Figure 9.27) whilst the Maes Howe photomontages established that there would be no visibility of the Proposed Development from ground level either around Maes Howe or on the approach to it from the road. Skara Brae lies northwest of the Stenness assets, on the northwest coast of West Mainland. The cumulative schemes, along with the Proposed Development, are located on the eastern side of West Mainland and there is consequently a much lower potential for significant cumulative effects to occur. As 2022 EIA Report Figure 9.28 shows, the operational Burgar Hill turbines can be seen from Skara Brae; however, as the accompanying photographs show, in certain light conditions that visibility is less than the wirelines would suggest. The Proposed Development would also appear in this view to the left of Burgar Hill; although, as the photomontage indicates, only the blades of three turbines of the Proposed Development would appear. **Revised Assessment:** Analysis by AOC of ZTV mapping submitted as part of the Ludenhill repowering application (AXIS 2023)[13] confirms that: • Skara Brae lies outwith the ZTV of the consented 76m Ludenhill turbine and consequently no additional cumulative effect upon its setting is predicted. • There will be no visibility of the 76m Ludenhill turbine from Maes Howe at ground level, although the hub and blade may be visible from the top of mound itself.				

[13] AXIS 2023, Figures 5.3a & 5.4a

Asset No	Receptor	Principal Cumulative Scheme(s)	Relative Sensitivity	Magnitude of Impact/ Level of Effect (Proposed Development Alone)	Magnitude of Impact/ Cumulative Level of Effect
	• The Ring of Brodgar lies within the ZTV of the consented Ludenhill turbine at both hub and blade tip heights, although at hub height this visibility will be limited to the eastern part of the monument. Although a cumulative visualisation prepared in support of this SEI (June 2024) indicates that in practice this visibility will be limited. Overall, given the limitations of the predicted visibility of the consented 76m Ludenhill turbine from the HONO WHS assets it is not considered that it has the potential to elevate the predicted cumulative effects beyond those assessed in the 2022 EIA Report. This applies to both the settings of the individual monuments and the Outstanding Universal Value (OUV) of the WHS.				

9.5 Summary

This SEI has identified no additional cumulative effects resulting from the consented 76m Ludenhill turbine and therefore the conclusions of the cumulative assessment remain unchanged from those that were set out in Chapter 9 of the 2022 EIA Report.

10. Noise

10.1 Introduction

The ability of the Proposed Development to meet appropriate operational noise limits, considering existing cumulative turbines, was considered in the 2022 EIA Report undertaken as part of the planning application for the Proposed Development.

Following the consented application for the repowering of the Ludenhill turbine, the future baseline cumulative scenario has changed, and further assessment is required to determine whether the derived residual noise limits applicable to the Proposed Development require updating.

This section considers the change in the cumulative noise scenario following the repowering of the Ludenhill turbine, compared to that evaluated in the 2022 EIA.

10.2 Scope of the Noise Assessment

This assessment has comprised the following:

- Review of noise assessment provided in support of the application for repowering of the Ludenhill turbine;
- Review of planning conditions specified for repowered Ludenhill turbine;
- Update to the cumulative noise model to include the repowered Ludenhill turbine;
- Review of derived residual noise limits applicable to the Proposed Development; and
- Review of ability of Proposed Development to meet updated residual noise limits.

10.3 Method

10.3.1 Overall Method and Assumptions

The prediction and evaluation methods used in this study follow the same approach as set out in the noise chapter of the 2022 EIA Report. The study area and Noise Sensitive Receptors (NSRs) considered in this assessment are the same as in the 2022 EIA Report and are provided in Table 10.1.

Table 10.1 – Representative NSRs

NSR name	NSR ID	Easting	Northing
Veltan (FI)	NSR1	330276	1027681
Dale (FI)	NSR2	330314	1027784
Belmont (FI)	NSR3	330118	1027887
Lochside Cottage (FI)	NSR4	330334	1028205
Stoneymilders (FI)	NSR5	329898	1028130
Newhouse (FI)	NSR6	329564	1028114
Myres*	NSR7	329430	1027816
Nisthouse (FI)	NSR8	329691	1026842
Mucklehouse (FI)	NSR9	330077	1026616
Hundland (FI)	NSR10	330092	1026550
Skesquoy	NSR11	330260	1025820
Dale Costa	NSR12	331928	1027666
Lochview	NSR13	331928	1027174
Bokieha	NSR14	329495	1028364
Kelowna	NSR15	329444	1028379
Viewforth	NSR16	329372	1028419
Finties	NSR17	329273	1028322
Slinghorn	NSR18	329178	1028366
Whitemire	NSR19	332491	1026789
Hewin	NSR20	333609	1027478
Castlehill	NSR21	334777	1026539
Mannobreck	NSR22	329588	1029290
Swannay House	NSR23	329597	1029253
Surtidale	NSR24	330140	1028985
Crismo Farm	NSR25	331507	1028835

Note – properties marked (FI) are considered to be financially involved with the Proposed Development.

Property marked with an asterisk (*) was unoccupied at the time of the baseline noise survey.

This assessment assumes that all other cumulative developments considered in the 2022 EIA remain unchanged.

10.3.2 Details of the Consented Ludenhill Turbine

The details of the proposed repowered Ludenhill turbine provided in the consented planning application are provided below and in Table 10.2 and Table 10.3:

- Hub height 50 m (increase of 20 m compared to the existing 30 m hub height);
- Candidate turbine model Vestas V52; and
- Proposed grid coordinates 330415,1027040.

Table 10.2 – Applied Sound Power Level

Item / 10 m standardised wind speed, m/s	6	7	8	9	10
Apparent sound power level, $L_{WA,k}$ (dB)	100.3	102.2	102.7	102.7	102.7
Effective sound power level applied, including uncertainty corrections	101.6	103.5	104.0	104.0	104.0

Table 10.3 – Spectral Data Applied

Octave band centre frequency, Hz	31.5	63	125	250	500	1000	2000	4000	8000
Sound power level, dB(A)	74.6	84.2	90.6	96.3	98.4	98.3	96.6	91.1	77.5

For consistency with the consented Ludenhill repowering application, our assessment has used the source data presented in its supporting noise assessment.

We have kept the same prediction locations for NSRs as the 2022 EIA Report; these vary slightly from the locations adopted in the Ludenhill repowering application noise assessment, however this is expected to result in a negligible difference when comparing the two assessments. We note that the NSR Ludenhill Farm considered in the Ludenhill repowering application noise assessment is non-residential and comprises only agricultural buildings. We have therefore excluded this location from our assessment.

No sound power level is reported for the consented Ludenhill turbine at standardised wind speeds below 6 m/s or above 10 m/s. ITPEnergised has therefore applied the 6 m/s sound power level at 4 m/s and 5 m/s wind speeds and the 10 m/s sound power level at 11 m/s and 12 m/s wind speeds.

10.3.3 Update to Derived Residual Noise Limits

The process for deriving residual noise limits (RNLs) from the overall noise limits (ONLs) is shown in the 2022 EIA Report. The same process has been followed in this assessment, accounting for the change in the predicted cumulative contribution of the Ludenhill turbine.

We note that the consented noise limit for the repowered Ludenhill turbine is the simplified ETSU limit of 35 $dBL_{A90,10min}$ at all NSRs, both during the daytime and the night-time period.

10.3.4 Assumed Mitigation

The 2022 EIA Report confirmed that agreements will be in place with the owners/operators of the Nisthouse, Hundland and Newhouse turbines that these turbines will be switched off at wind speeds of 9 m/s and above to preserve headroom for operation of the Proposed Development.

This assessment assumes that the same mitigation will remain. Additional mitigation has been specified within this assessment, comprising curtailment (switching off) the Nisthouse and Hundland turbines at 7 m/s and 8 m/s. The exact wind speeds and directions requirements under which the existing small turbines will be curtailed will be confirmed following determination of the turbine model for the Proposed Development, seeking to minimise any required curtailment.

10.4 Findings

The predicted noise level from the consented repowered Ludenhill turbine operating in isolation is shown and compared with the predicted noise level from the 2022 EIA Report in Appendix 10.1 Table 1.

At standardised wind speeds of 4 m/s to 6 m/s the predicted noise levels due to the Ludenhill turbine show a slight decrease. The marginal (0.1 – 0.8) dB increases at some NSRs are attributed to the slightly different coordinates to the existing turbine, which will bring it closer to some NSRs and further from others.

The predicted noise levels show increase at all NSRs at standardised wind speeds of 7 m/s and above, by up to 3.7 dB.

The updated RNLs, derived using the method provided in the 2022 EIA, are provided in Appendix 10.1 Table 2, both for the daytime and the night-time period. These include the effect of the assumed mitigation discussed in Section 10.3.4, whereby small turbines at Hundland, Nisthouse and Newhouse may be switched off to preserve headroom in the noise limits for theses NSRs, such that the Proposed Development may operate without curtailment.

The predicted noise level due to the Proposed Development is no different to that reported in the 2022 EIA Report, however, the operational noise levels are provided for each NSR in Appendix 10.1 Table 3 for completeness.

The predicted operational noise levels are evaluated against the updated derived RNLs in Appendix 10.1 Table 4.

During the daytime period the predicted noise level due to the Proposed Development meets the derived RNLs at all NSRs at all wind speeds, with the exception of NSR22 and NSR23 at 5 m/s and 6 m/s, where exceedances of up to 0.3 dB and 0.5 dB have been identified, respectively.

During the night-time period the predicted noise level due to the Proposed Development meets the derived RNLs at all NSRs at all wind speeds. Noise effects at all NSRs across the range of wind speeds during the night-time period are therefore not significant.

At NSR22 and NSR23 at 5 m/s and 6 m/s the predicted noise levels exceed the daytime RNL by up to 0.5 dB and therefore appear to be significant (adverse). Given very small margin by which the predicted level exceeds the RNL and the robust nature of the prediction method, actual overall noise levels are likely to be lower than the predicted levels, and no mitigation will be required. The Proposed Development will therefore meet the RNLs across the full range of wind speeds. This assessment therefore considers that noise levels at NSR22 and NSR23 at 5 m/s and 6 m/s will meet the daytime noise limits and operational wind turbine noise is not significant.

The Applicant commits to compliance with appropriate noise limits, therefore should the actual noise levels at NSR22 and NSR23 be above the noise limit, then appropriate mitigation will be put in place such that noise limits are met.

10.5 Summary

This assessment has considered the ability of the Proposed Development to meet appropriate noise limits, following the consenting of the repowering of the Ludenhill turbine. The assessment has comprised updating the derived residual noise limits at NSRs within the study area to account for the change in the noise level, hub height and micrositing of the Ludenhill turbine and evaluation of the ability of the Proposed Development to meet the updated RNLs.

The predicted noise level due to the Proposed Development meets the updated RNLs at all wind speeds, both during the daytime and the night-time period, with marginal exceptions (up to 0.5 dB) at NSR22 and NSR23 at 5 m/s and 6 m/s during the daytime.

Additional mitigation measures have been specified, beyond those proposed in the 2022 EIA Report, requiring that the small turbines at financially involved NSRs Hundland, Nisthouse and Newhouse be curtailed (switched off) at 7 m/s and 8 m/s to preserve headroom for the Proposed Development to operate. The actual requirements for curtailment of the small turbines would be determined subject to consent of the Proposed Development and the cumulative situation prevailing at the time of its construction.

11. Transport and Access

Chapter 11 of the 2022 EIA Report provides an assessment of potential effects of the Proposed Development on the local transportation network, including consideration of abnormal load deliveries and general construction traffic.

The assessment concluded that there were no significant capacity issues expected on any of the roads within the relevant study area, due to additional construction traffic movements associated with the Proposed Development. Operational traffic, following completion of construction, was anticipated to be minimal (approximately two vehicle movements every fortnight).

Taking account of committed mitigation and management measures, no significant residual effects were anticipated.

The cumulative assessment undertaken as part of the 2022 EIA considered potential traffic flows from additional developments in the vicinity. At that time, the repowering of the Ludenhill turbine was not considered because it was not a consented development. Now that planning permission has been granted to repower the Ludenhill turbine, consideration is required as to the potential for cumulative traffic and transport effects to arise, when taking account of the Ludenhill repowering together with the Proposed Development.

As noted in Section 1.1 above, the scenario whereby both the Ludenhill turbine (existing or repowered) operates concurrently with the Proposed Development, is not anticipated in practice. A commercial arrangement between the Applicant and the operator of the Ludenhill turbine is ongoing. It is therefore not anticipated that there is any potential for the construction of the Proposed Development to overlap with construction works for the Ludenhill turbine repowering.

However, in considering the theoretical possibility of this occurring, information from the Ludenhill repowering EIA Report has been reviewed, in respect of traffic and transport.

The Ludenhill repowering EIA Report provides an indicative 8-week construction period, anticipated to commence in Quarter 1 of 2024. Clearly this has not been the case, but it can be taken from this that construction would be proposed fairly quickly following granting of planning permission. The Proposed Development construction period, as set out in Chapter 3 of the 2022 EIA Report, is not anticipated to commence until 2025. It is therefore unlikely that, even in the unlikely event of both developments being constructed, that construction programmes would overlap.

Taking account of the very remote possibility of both developments being constructed, and construction periods overlapping, the Ludenhill repowering EIA Report indicates that the total number of expected two-way HGV movements to construct that development would be seven. The peak month of predicted

construction traffic for the Proposed Development is month 7 of the construction programme, during which 83 daily two-way trips are predicted (refer to Table 11.11 of the 2022 EIA Report). If the seven predicted HGV movements associated with the Ludenhill repowering construction were all to occur within month seven of the Proposed Development construction programme, this would represent a negligible increase (approximately 0.3%) to the predicted Proposed Development construction traffic.

Operational traffic for the Ludenhill repowered turbine is anticipated to be very limited, in the order of four maintenance visits per year based on information from the Ludenhill repowering EIA Report.

There is therefore considered to be no change to the previous assessment, i.e. no potential for significant cumulative traffic and transport effects to arise, for either the construction or operational phases of the Proposed Development together with other relevant developments in the vicinity, including the Ludenhill repowered turbine.

12. Geology, Peat, Hydrology & Hydrogeology

12.1 Background

Chapter 12 of the 2022 EIA Report provides an assessment of effects of the Proposed Development on geology, hydrology, hydrogeology and peat. The assessment concluded no significant residual effects on identified receptors. Additional information was provided in the April 2023 and December 2023 SEI Reports, in response to consultee queries, predominantly from the Scottish Environment Protection Agency (SEPA) relating to Groundwater Dependent Terrestrial Ecosystems (GWDTE). The conclusions as presented in the April 2023 and December 2023 SEI Reports reaffirmed the assessment of no significant residual effects.

The cumulative assessment as reported in the 2022 EIA Report identified no significant cumulative effects. At that time, the only development considered as part of the cumulative assessment was Costa Head Wind Farm, approximately 1.1 km north of the site. No further updates or consideration of cumulative effects were undertaken or required as part of the April 2023 or December 2023 SEI Reports.

As discussed in Section 1.1 of this SEI Report (June 2024), an application to repower the operational Ludenhill wind turbine, within the Proposed Development site boundary, was approved by OIC in March 2024. This consented development is therefore now considered as part of an updated cumulative assessment.

12.2 Relevant Information from the Ludenhill Repowering Proposals

As noted in Section 7.2 above, the Ludenhill repowering proposals include for replacing the existing turbine with a larger turbine model, at the same location as the existing turbine. The proposed hardstanding area is to be slightly extended, by an area estimated to be approximately 350 m^2, and a section of temporary new access track is to be laid (described as “suitable overlain matting) for the construction phase only.

12.3 Updated Cumulative Assessment – Geology, Peat, Hydrology and Hydrogeology

With no or very little new permanent land-take proposed for the Ludenhill repowering project, and no highly sensitive geological, hydrological or hydrogeological receptors (including, for example, deep peat) identified at or in close proximity to the proposed temporary track and hardstanding extension, there is not considered to be any potential for significant cumulative effects to arise as a result of construction or operation of the Proposed Development together with the Ludenhill repowering project. No additional or amended mitigation measures are therefore considered to be warranted.

13. Aviation

Chapter 13 of the 2022 EIA Report provides an assessment of potential effects of the Proposed Development on aviation and radar. The assessment concluded no aviation impacts, subject to an Instrument Flight Procedure impact assessment demonstrating no impacts on Kirkwall Airport. The Safeguarding Officer at Highlands and Islands Airports Limited subsequently provided a consultation response to the planning application, confirming no objection.

The recent granting of planning permission to repower the Ludenhill wind turbine, within the Proposed Development site boundary, has no impact on the assessment of aviation and radar effects. With no effects assessed as a result of either the Proposed Development or the repowered Ludenhill turbine, there is no potential for significant cumulative effects to arise.

14. Socioeconomics, Recreation and Tourism

Chapter 14 of the 2022 EIA Report presents an assessment of the potential effects of the Proposed Development on socioeconomic, recreation and tourism receptors. It was determined that, during the development and construction phase, the Proposed Development could generate up to £2.2 million GVA and 28 years of employment in Orkney (£7.2 million GVA and 106 years of employment in Scotland), and during each year of the operational phase, the Proposed Development could generate up to £0.2 million GVA and two jobs in Orkney (£0.6 million GVA and seven jobs in Scotland). The Proposed Development's importance in contributing generation capacity to the needs case for a new interconnector between Orkney and the Scottish mainland was also noted.

While the beneficial construction and operation socio-economic effects were assessed as being not significant in EIA terms, they would be important to the local and national economy, contributing to sustainable economic growth. The cumulative effect of supporting the needs case for an interconnector between Orkney and the Scottish mainland was assessed as significant in EIA terms. Although it is recognised that the needs case has now been confirmed, it remains important that committed renewable energy generation in Orkney is maximised, to ensure that the interconnector is in fact constructed and its use optimised, for the benefit of the local and national economy.

As set out in the 2022 EIA Report, no significant adverse effects on recreation or tourism receptors were predicted, either for the Proposed Development on its own, or cumulatively.

The recent granting of planning permission to repower the Ludenhill wind turbine, within the Proposed Development site boundary, has no impact on the cumulative assessment of socioeconomic, recreation and tourism effects. In the unlikely event that the repowered Ludenhill turbine was to be constructed as well as the Proposed Development, there would be some additional construction activity in the site area, and therefore some additional economic activity and generation of employment. However, given the small scale of the Ludenhill repowering proposals and the short duration of construction, this would not change the significance of cumulative socioeconomic effects as previously presented. No change to the significance of cumulative effects on recreation or tourism receptors is anticipated.

15. Other Issues

15.1 Telecommunications

Chapter 15 (Section 15.2) of the 2022 EIA Report provides an assessment of the potential effects of the Proposed Development on telecommunications links. Subject to implementation of a suitable micro-siting buffer for Turbine 3 (T3) to avoid potential infringement on an identified EE link, no significant residual effects were predicted.

An updated search for any potential new telecommunications links at or near the site has been undertaken, via a review of information on the online Spectrum Information Portal (providing data on licensed Ofcom links). The data available from the Spectrum portal shows only the previously identified EE link crossing the site, with no new ore previously unidentified links in the close proximity.

The recent granting of planning permission to repower the Ludenhill wind turbine, within the Proposed Development site boundary, has no impact on the assessment of effects on telecommunications links. The Ludenhill turbine is not located within an area that could cause infringement on the identified EE link. With no residual effects assessed as a result of either the Proposed Development or the repowered Ludenhill turbine, there is no potential for significant cumulative effects to arise.

15.2 Shadow Flicker

Chapter 15 (Section 15.3) of the 2022 EIA Report provides an assessment of the potential shadow flicker effects arising from the Proposed Development. Subject to provision and implementation of a Shadow Flicker Mitigation Protocol (a committed mitigation measure), the assessment identified no significant residual effects on local residential receptors.

The cumulative assessment presented in the 2022 EIA Report involved identifying other wind developments within 3 km of the Proposed Development turbines, and generating study areas for those other developments which extended to 10 rotor diameters (Scottish Government, 2014a) from turbine locations.

No receptors were identified within the overlap between the Proposed Development shadow flicker study area and the relevant study areas identified for other wind farm developments in the vicinity. It was therefore assessed that there was no potential for cumulative shadow flicker effects.

As planning permission has now been granted to replace the Ludenhill turbine, within the Proposed Development site area, with a larger turbine model, the relevant study area for the Ludenhill turbine needs to be reconsidered.

Information from the Ludenhill EIA Report indicates that the proposed rotor diameter of the repowered turbine is 52 m. Therefore, it is appropriate to consider a shadow flicker study area for the repowered Ludenhill turbine, extending to 520 m from the turbine location.

Figure 15.4 (figure numbering retained from the 2022 EIA Report) has been updated to show this extended study area for the Ludenhill turbine. It can be seen from **Figure 15.4** that there are still no receptors within the overlap between the Proposed Development shadow flicker study area and the relevant study areas identified for other wind farm developments in the vicinity, including the (now consented) larger Ludenhill turbine.

There is therefore no change to the conclusion from the 2022 EIA Report, that there is no potential for cumulative shadow flicker effects.

No additional or amened mitigation measures are considered to be warranted.

15.3 Carbon Savings

Chapter 15 (Section 15.4) of the 2022 EIA Report provides information on the anticipated carbon savings arising from the Proposed Development.

The recent granting of planning permission to repower the Ludenhill wind turbine has no impact on the assessment of carbon savings associated with the Proposed Development.

16. Schedule of Mitigation

The granting of planning permission to repower the Ludenhill turbine has resulted in no change to the committed mitigation measures for the Proposed Development, with the exception of a slight change to operational noise mitigation to ensure relevant cumulative noise limits can be met at all identified receptors, across the full range of wind speeds.

Because there have also been some amendments to committed mitigation measures as presented in the April 2023 and December 2023 SEI Reports, a full and updated Schedule of Mitigation is presented in Table 16.1 below, for ease of reference.

Table 16.1 – Schedule of Mitigation

Environmental Subject Area	Mitigation	Timing
Project Design		
Micrositing	A micrositing allowance of up to 50 m in all directions is being sought in respect of T1, T2 and associated infrastructure. An increased micrositing allowance of up to 125 m in all directions is being sought for T3 and associated infrastructure, to ensure that potential conflict with an identified telecommunications link can be avoided. An increased mircositing allowance of up to 100m in all directions is being sought for T4 and associated infrastructure to allow the National Vegetation Classification (NVC) M27 mire community in this area to be avoided. During construction the need for any micrositing would be assessed and agreed with the onsite Environmental Clerk of Works (ECoW).	Construction
Turbine foundations	A detailed ground investigation will be completed prior to construction to inform the final foundation and hardstanding design.	Pre-construction
	Detailed construction drawings with final dimensions will be provided prior to commencement once the final turbine model has been selected.	
	Turbines will be painted an off-white or light grey colour with low reflectivity semi-matt finish, or similar, as agreed with the Local Planning Authority.	
Access Tracks	Existing onsite access tracks and wayleaves, where possible, will be retained, re-used and upgraded (where necessary).	Pre-construction
	New access tracks will be made of locally sourced material, potentially from on-site borrow pits (if suitable).	
	Prior to construction, any required improvements to public roads will be undertaken and appropriate highway safety measures will be agreed with Orkney Islands Council (OIC) and Transport Scotland, with necessary signage or traffic control measures implemented throughout the construction phase on the agreed basis.	
Construction Compounds	The detailed location, size and engineering properties of the construction compounds and temporary turbine laydown area will be confirmed prior to the start of construction, after the turbine supplier and model have been confirmed.	Pre-construction
	On completion of construction works, it is proposed that all temporary structures be removed and the compound areas be restored.	Post-construction

Environmental Subject Area	Mitigation	Timing
Substation	The design of the components of the substation compound is proposed to be secured by an appropriately worded condition.	Construction
Borrow Pits	Detailed site investigations prior to construction will be carried out to further confirm the rock type, rock characteristics and suitability, as well potential volumes to be extracted from the search area. The final borrow pit(s) identified during the geotechnical evaluation will be defined within the Construction Environmental Management Plan (CEMP).	Pre-construction
Construction Hours	Normal construction hours will be between 07:00 and 19:00 Monday to Friday and 09:00 and 13:00 on Saturdays. These times have been chosen to minimise disturbance to local residents. It must, however, be noted that out of necessity due to weather conditions and health and safety requirements, some generally quiet activities, for example abnormal load deliveries (which are controlled by Police Scotland) and the lifting of the turbine components, may occur outside the specified hours stated.	Construction
Construction traffic	The Applicant will ensure that the vehicles will be routed as agreed with OIC, Transport Scotland and Police Scotland.	Construction
Construction Environmental Management Plan (CEMP)	The Contractor shall produce and adhere to a CEMP. This shall be developed in consultation with the Orkney Islands Council, NatureScot, SEPA and Historic Environment Scotland (HES). The Contractor shall amend and improve the CEMP as required throughout the construction and decommissioning period.	Pre-construction
	The CEMP shall describe how the Contractor will ensure suitable management of, but not limited to, the below aspects during construction of the Proposed Development. A draft CEMP was included as Appendix 3.1 to the 2022 EIA Report: ▪ noise and vibration; ▪ dust and air pollution; ▪ surface and groundwater; ▪ ecology and ornithology (including protection of habitats and species); ▪ agriculture (including protection of livestock and land); ▪ cultural heritage; ▪ waste (construction and domestic); ▪ details of the size, location and volumes to be extracted from borrow pits; ▪ pollution incidence response (for both land and water); and	Pre-construction

Environmental Subject Area	Mitigation	Timing
	▪ site operations (including maintenance of the construction compound, working hours, monitoring of construction procedures and safety of the public).	
	Prior to commencement of construction activities, a pollution prevention strategy, contained within a CEMP, will be agreed with SEPA.	Pre-construction
Landscape and Visual		
The primary mitigation adopted in relation to the Proposed Development is embedded within the design of the Proposed Development and relates to the consideration that was given to avoiding and minimising landscape and visual effects during site selection and the evolution of the Proposed Development layout.		
Ecology		
Habitat Protection Plan	A Habitat Protection Plan will be developed that will include demarcation of no-go areas in sensitive habitats.	Construction
CEMP	Full details of construction mitigation measures will be provided in a CEMP to be agreed with OIC, in consultation with NatureScot, HES and SEPA, post-consent but prior to development commencing.	Construction
Habitats	Identification of appropriate exclusion zones around sensitive features (e.g. waterbodies, wet heath, blanket bog etc) to prevent construction vehicles tracking through these areas.	Construction
	Exclusion of livestock from any restored areas to permit habitat recovery free from grazing pressure (which otherwise has the potential to degrade the surface).	Operation
	A detailed Habitat Management Plan/Grazing Management Plan will be prepared and implemented to increase the quality of habitats and as a result improve the biodiversity of the site. Details of the proposed habitat management areas are provided in Appendix 8.4 of the December 2023 SEI Report.	Operation
Otters	Pre-construction otter survey to establish if there has been any significant change in the status of otter on site and within 250 m since the original survey. If the presence of otter is considered a possibility an otter-specific protection plan will be developed inclusive of: ▪ Cap any exposed pipe systems when not being worked and provide exit ramps for any exposed trenches or excavations (to prevent otters entering and becoming trapped).	Pre-construction

Environmental Subject Area	Mitigation	Timing
	▪ Driver awareness and 10 mph speed controls within the Proposed Development site to limit the risk of road traffic accident mortality. ▪ Implementation of an exclusion zone of at least 30 m to be implemented around any new holt or resting place.	
Fish	Site run-off will be intercepted and treated according to SEPA pollution prevention guidelines. The CEMP will include measures to prevent sedimentation of watercourses and reduce potential for pollution incidents and provision of spill kits.	Construction
Ornithology		
CEMP	All ornithological mitigation will be incorporated into a CEMP. This CEMP, to be confirmed, will outline all required mitigation and provide details on timelines for undertaking mitigation for each identified ornithological receptor. A Site Restoration Plan will be implemented as part of the CEMP to ensure the regeneration of those areas of habitat that have been temporarily lost through development.	Construction
Pre-construction ornithology surveys	Not more than 12 months prior to construction of the Proposed Development, the Applicant will engage a Suitably Qualified Ecologist (SQE) to undertake a series of pre-construction ornithological surveys to update the baseline information in order to finalise the mitigation proposals.	Pre-construction
Protection of Breeding Birds and Habitats	To ensure the protection of breeding bird nests from damage and/or destruction during the breeding season will need to be ensured. Wherever possible, all vegetation clearance will occur outside the breeding season (i.e. clearance to be undertaken between October and February inclusive, inclusive), to ensure that no active nests are damaged or destroyed by the proposed works. This would include any areas of shrub clearance and vegetation removal for access tracks, compounds or turbine bases due to the populations of ground nesting birds on and around the site.	Construction
	Removing vegetation from working areas outside the breeding season, wherever possible between October and February inclusive but preferably between November and January, would also reduce the attractiveness of those areas to breeding birds the following season.	Construction
	Avoidance of unnecessary disturbance to habitats by minimising the extent of ground clearance and other construction practices as far as practicable.	Construction

Environmental Subject Area	Mitigation	Timing
	An ecological toolbox talk will be given to all construction personnel as part of site induction on the potential presence of ornithological species and any measures that need to be undertaken should such species be discovered during construction activities. The toolbox talk will also include the requirement to report and log any bird casualties at the Proposed Development during construction and operation of the site.	Construction
	Disturbed ground will be restored as soon as practicably possible using materials removed during the construction of access tracks, excavation of cable trenches and turbine foundations. To achieve this, any excavated soil will need to be stored in such a manner that is suitable to facilitate retention of the seed bank.	Construction
Habitat Management Plan / Grazing Management Plan	A Habitat Management Plan and Grazing Management Plan will be developed to improve habitats for breeding waders throughout the Proposed Development site by providing suitable grassland habitat, and to mitigate indirect losses of hen harrier and short-eared owl foraging and nesting habitat by managing and restoring suitable habitat across defined areas. Details of the proposed habitat management areas are provided in Appendix 8.4 of the December 2023 SEI Report.	Construction and Operation
Orkney Native Wildlife Project	The site will be included in the Orkney wide project which involves the trapping of stoat (*Mustela erminea*) for the lifetime of the Proposed Development (or the lifetime of the project should the project end sooner).	Construction
Ecological Clerk of Works (ECoW)	The ECoW will undertake construction phase surveys of birds within the Proposed Development and will record information of breeding success as far as is possible (avoiding disturbance, and following relevant NatureScot survey guidance (SNH, 2017). The data will be used with pre-construction baseline survey data and future data obtained during monitoring work to provide population information across each phase of the Development.	Construction
Cultural Heritage		
Archaeological Watching Briefs	A watching brief will be undertaken during all groundworks that are located either within or adjacent to two non-designated assets (Assets 164 and 167). All known heritage assets within 50 m of the Proposed Development (working areas) will be fenced off with a visible buffer under archaeological supervision prior to the start of the construction phase in order to avoid accidental damage by heavy plant movement.	Construction
	A watching brief will also be maintained on a proportion of all other ground breaking works to assess the potential for hitherto unrecorded buried archaeological remains to survive within the Proposed Development Area. The aim of the watching brief will be to identify any archaeological remains threatened by the Proposed Development, to assess their	Construction

Environmental Subject Area	Mitigation	Timing
	significance and to mitigate any impact upon them either through avoidance or, if preservation in situ is not warranted, through preservation by record. If significant archaeological remains are identified during the batching brief there is the potential that further works, such as excavation and post-excavation analyses, could be required. Details of mitigation will be agreed with OIC in consultation with the Orkney County Archaeologist through a Written Scheme of Investigation (WSI).	
Geophysical survey	A geophysical survey of the Hundland Hill enclosure be undertaken in order to inform understanding of this designated asset and assess the extent to which burnt material, an indication of cremation activity, may be present. A Metal and Mineral Detecting Consent (MMDC) will need to be obtained from HES prior to the work being undertaken.	Pre-construction
Community Engagement Programme	A Community Engagement Programme will be developed and implemented by the Applicant, to increase public awareness of the Scheduled Monuments within and near the Proposed Development site boundary. The details of this programme will be agreed with HES and OIC prior to implementation.	Construction and Operation
Noise		
Construction Noise	Good practice measures will be implemented during construction to limit unnecessary noise including but not limited to the following: ▪ avoid unnecessary revving of engines and switching off plant when not required (i.e. no idling); ▪ haul routes to be kept well maintained; ▪ minimising the drop height of materials during delivery to, and movement around, site; ▪ starting up plant and vehicles sequentially, rather than all together; ▪ specification of plant with white-noise or directional reversing alarms, rather than beeper type alarms; ▪ where possible, selection of quiet / noise reduced plant; ▪ vehicles accessing the site will have regard to the normal operating hours of the site and the location of nearby NSR.; and ▪ use and siting of equipment will be considered such that noise is minimised.	Construction
Non-turbine fixed plant noise	Noise from the final type and location of the substation will be attenuated by acoustic enclosure (if required), such that it meets the derived non-turbine noise limits. A total sound power level of 100 dB(A), equivalent to a sound pressure level of 72 dB(A) at 10 m, would enable the noise limit to be met. The installed plant will meet these criteria.	Operation

Environmental Subject Area	Mitigation	Timing
Wind turbine noise	Agreements will be in place with the owners/operators of the Nisthouse, Hundland and Newhouse turbines that these turbines will be switched off at wind speeds of 9 m/s and above, to preserve headroom for operation of the Proposed Development. In the unlikely event that the now-consented repowered Ludenhill turbine was to be operated alongside the Proposed Development, additional mitigation, comprising curtailment of the Nisthouse and Hundland turbines at 7 m/s and 8 m/s wind speeds, will be implemented if required. The actual requirements for curtailment of the small turbines would be determined subject to consent of the Proposed Development and the cumulative situation prevailing at the time of its construction.	Operation
Traffic and Transport		
Construction Traffic Management Plan (CTMP)	The Applicant will prepare a Construction Traffic Management Plan (CTMP) for agreement with OIC prior to construction works commencing. The CTMP will detail the management of traffic to and from site. It shall also include mitigation for impacts to public transport, local private access and public footpaths/rights of way, cycleways and bridleways. The Contractor and/or Applicant shall amend and improve the CTMP as required throughout the construction and decommissioning period.	Construction
Abnormal wear and tear on roads	The Applicant will cover the cost of abnormal wear and tear on roads not designed for that purpose and propose that this imposed by a planning condition. Any necessary repairs will be coordinated with OIC. Any damage caused by traffic associated with the Proposed Development, during the construction period that would be hazardous to road users, will be repaired immediately	Construction
Operational/ Maintenance traffic	Site entrance roads will be well maintained and monitored during the operational life of the development. Regular maintenance will be undertaken to keep the site access track drainage systems fully operational and the road surface in good condition and to ensure there are no adverse issues affecting the public road network.	Operational
Abnormal Load Transport Management Plan	An AIL Traffic Management Plan (TMP) will also be developed to ensure road safety for all road users during transit of development loads. The TMP will outline measures for managing the convoy and set out procedures for liaising with the emergency services to ensure that police, fire and ambulance vehicles are not impeded by the loads. This is normally undertaken by informing the emergency services of delivery times and dates and agreeing communication protocols and lay-over areas to allow overtaking.	Construction
Staff Travel Plan	A Staff Travel Plan will be deployed where necessary, to manage the arrival and departure profile of staff and to encourage sustainable modes of transport.	Construction

Environmental Subject Area	Mitigation	Timing
Port Management Plan	To ensure that there are no detrimental issues at Hatston Pier, the Applicant will produce a Port Management Plan secured by planning condition that will be agreed prior to the delivery of the first turbine component.	Construction
Hydrology, Geology, Hydrogeology and Peat		
Watercourses	No proposed infrastructure is sited within 50 m of a major watercourse or water body, nor within 50 m of the nearby West Mainland Moors SSSI. The detailed design of watercourse (drainage ditch) crossings will take account of the guidance contained within engineering in the Water Environment Good Practice Guide: River Crossings (SEPA, 2010). All crossings will be designed to accommodate 1 in 200-year storm event (including climate change allowance) to reduce the risk of flooding.	Construction
Avoidance of M27 Mire Community	The final position of T3, T4 and associated infrastructure will avoid the M27 mire communities identified in these areas. The micrositing allowances as set out in the Project Design section above will ensure this can be achieved.	Construction
Protection of Groundwater	Based on a precautionary approach and given the potential for habitats at the T1 hardstanding and substation locations to be groundwater dependent (refer to Figure 2.1 of the April 2023 SEI Report), the following measures will be implemented to minimise potential adverse effects on the quality and quantity of groundwater at this location: ▪ Pre-construction site investigations will include targeted groundwater monitoring at this location, to establish the presence and level of groundwater and any discrete seepage locations. The findings from pre-construction investigations and groundwater monitoring will inform micrositing, to be overseen by the ECoW, seeking to ensure that the T1 turbine base is sited away from localised seepages or locations where groundwater is at or near the surface and may require substantial dewatering during excavation. ▪ The excavation formed for the T1 turbine base will be completed as quickly as possible to ensure that any dewatering required, and associated localised groundwater level drawdown, is limited in duration. ▪ Depending on findings from the pre-construction site investigations, if it is considered appropriate to minimise potential of concrete leaching into local groundwater, the Principal Contractor will give consideration to protective measures such as inclusion of an impermeable lining at the base of the excavation prior to pouring concrete. Ongoing advice will be provided by the ECoW.	Construction

Environmental Subject Area	Mitigation	Timing
	▪ Groundwater monitoring will carry on through construction and for an agreed period post-construction. A water monitoring plan, to include groundwater, will be prepared and agreed with the local planning authority, in consultation with SEPA, prior to commencement of construction. The above measures will be captured in the CEMP (see below).	
CEMP	A CEMP will be developed, agreed with SEPA and OIC prior to commencement of construction, and implemented by the lead contractor. and will cover aspects such as: timing and phasing of construction works; delineating working areas; control of surface runoff; storage of oils and chemicals; protection of watercourse banks during construction; appropriate methods for stockpiling soils; dewatering of excavations; concrete delivery and washing out of vehicles; contingency planning; emergency procedures; and monitoring of construction procedures to ensure risks are minimised.	Construction
ECoW	All construction activities will be supervised by a suitably qualified Environmental Clerk of Works (ECoW).	
Pre-construction site investigations	Pre-construction intrusive site investigation works will be undertaken, to confirm ground and groundwater conditions at the proposed turbine and infrastructure locations, and to aid in detailed design and micro-siting. The investigations will include targeted monitoring and assessment of groundwater levels and flows beneath the site. The requirement for any additional specific mitigation resulting from the findings of these investigations will be agreed with SEPA in advance of construction.	Pre-construction
Peat Management Plan (PMP)	A PMP will be produced in consultation with SEPA, OIC and NatureScot. This will set out details of how any peat excavated will be stored, re-used and managed. Appendix 12.2 of the 2022 EIA Report provides an outline of the proposed PMP.	Construction
Peat Landslide during Construction	A 'Peat Hazard Emergency Plan' to instruct Contractors of response procedures in the event of a peat slide, and the further refinement of layout design through detailed pre-construction ground investigations will be prepared. The construction process will be undertaken using a detailed Geotechnical Risk Register and under the supervision of a resident Geotechnical Engineer.	Construction
Soils, peat and groundwater	At all construction work areas, clean runoff (i.e., non-silty surface water flow) will be kept separate from potentially contaminated water from construction areas as far as possible. Where required, interceptor ditches and other drainage diversion measures will be installed immediately in advance of any excavation works in order to collect and divert clean runoff away from construction disturbed areas.	Construction

Environmental Subject Area	Mitigation	Timing
	The borrow pit will feature a perimeter surface drain, which will aim to prevent water in-flow into the borrow pit. The water collected within the surface drains will be discharged either into the surrounding vegetation, or into a suitably located sediment lagoon.	Construction
	Discharge of diverted clean runoff will be into an area of vegetation for dispersion or infiltration and will occur as close as possible to the location of interception in order to ensure that there is no effect on soil moisture regimes downstream of the works.	Construction
Surface water	The use of SuDS, petrol interceptors and spill kits will be utilised where chemical spillage, for example as a result of refuelling, is a possibility. Site personnel will be trained in river and stream protection measures to ensure a quick response to any accidental spillages or contamination.	Construction
Aviation		
Aviation obstruction lighting	Aviation lighting will be installed on each turbine in accordance with the requirements of the Air Navigation Order 2016 and approved by the Civil Aviation Authority (CAA) and Ministry of Defence (MoD).	Operation
Socio-economics, Recreation and Tourism		
No significant adverse effects associated with the Proposed Development have been identified, therefore no mitigation measures were considered necessary.		
Telecoms		
Micrositing	Additional micrositing has been incorporated into the design to ensure Turbine 3 can be sited so it does not cause unacceptable interference associated with the telecommunications link operated by EE. The Applicant will undertake further consultation with EE as necessary.	Pre-construction
Shadow Flicker		
Shadow Flicker Protocol	Prior to the erection of the first turbine a written scheme (a Wind Farm Shadow Flicker Protocol) shall be submitted to and approved in writing by OIC. The protocol would come into effect if a complaint is made of unacceptable shadow flicker at either of the receptors where significant effect may occur. This would set out mitigation measures to alleviate shadow flicker attributable to the Proposed Development, for example shut down periods for certain	Pre-construction

Environmental Subject Area	Mitigation	Timing
	turbines during certain meteorological conditions when shadow flicker is predicted, as well as a protocol for addressing any complaints received from a receptor within the study area.	

17. Summary of Residual Effects

The additional information provided in this SEI Report (June 2024), namely consideration of the recent planning permission granted for repowering the Ludenhill wind turbine located within the boundary of the Proposed Development in updated cumulative impact assessment, confirms no change to the assessed significance of cumulative effects as presented in the 2022 EIA Report. Also as confirmed in both the April 2023 and December 2023 SEI Reports, no change to the assessed residual effects or cumulative effects resulted from the additional information and analysis presented in those reports.

A summary of residual effects and cumulative effects was provided in Chapter 17 of the 2022 EIA Report and this is unchanged.

FIGURES

APPENDICES