17 Summary of Cumulative Effects

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17.1 Introduction

17.1.1 Schedule 4(5) of *The Electricity Works (Environmental Impact Assessment) (Scotland) Regulations 2017* states the need for cumulative impacts to be considered at a project level. Cumulative impacts are those new impacts, or enhancements of existing impacts, that occur only because of the interaction of the construction and operation of the Proposed Development with other developments, in particular wind energy developments, or from the interaction of different aspects of the Proposed Development.

17.1.2 Consideration has been given to the potential for cumulative effects to arise from the interaction of the Proposed Development with other wind energy developments within up to 35 km of the site that were either operational, consented and/or under construction, or were in planning either with an application that was not yet determined or subject to an appeal, as at 01 January 2019. Table 3.1 in Chapter 3 lists the wind energy developments within 5 km of the Proposed Development site which are also shown on Figure 3.2. These are the principal projects which were considered to have the potential to give rise to cumulative effects.

17.1.3 The following sections provide a summary of the potential cumulative effects already described in detail within each of the technical chapters (Chapters 6 to 16).

17.2 Cumulative Effects

Landscape and Visual

17.2.1 The methodology adopted within the main LVIA provides the baseline against which the effects of the addition of the Proposed Development to the landscape has been assessed, and includes all operational/built wind farms, but excludes the consented schemes in the vicinity of the site (Douglas West, Consented Dalquhandy, Consented Cumberhead and Poniel turbines) and any other consented or 'in planning' schemes (Revised Cumberhead, Revised Dalquhandy and Repowered Hagshaw Hill). An assessment of the effects of developing the Proposed Development in combination with other operational wind farms has already therefore been presented in the main section of the LVIA.

17.2.2 The cumulative impact assessment in the LVIA therefore considers the additional effects that might arise as a result of the Proposed Development if other consented and in planning (awaiting determination) schemes were also operational. Two scenarios are considered which reflect the different degrees of certainty that these schemes will be constructed:

- scenario 1 - assumes that other consented (but as yet unbuilt) wind farms are operational;
- scenario 2 - extends this further to assume that all schemes in planning are also operational; and

17.2.3 In this first cumulative scenario the character of the landscape context within which the Proposed Development is located would be markedly different. With reference to the typologies referred to in the *South Lanarkshire Landscape Capacity Study for Wind Energy* (2016), these schemes collectively create a 'wind turbine landscape' which would extend over the character type within which the Proposed Development is located and others in the locality of the site. In this context, the introduction of the Proposed Development would not alter the defining characteristics of the

character types in the local area but would instead reinforce the existing characteristics of the baseline landscape.

17.2.4 It is acknowledged that wherever more than one wind farm is present in the landscape there will be a greater overall or combined effect on landscape character than if just one wind farm was visible in the landscape. Likewise, it is acknowledged that the more wind turbines that are constructed in any given landscape, the greater will be the magnitude of overall (or combined) change to the landscape character that prevailed prior to the introduction of the first turbines. However, it is also noted that in any given landscape where turbines are already present the additional effect on landscape character of introducing further turbines may not be as significant as the initial introduction of turbines. Furthermore, in general, the greater the number of turbines in the baseline landscape the less significant the addition of further turbines may be in landscape character terms as the landscape will be more heavily characterised by turbines in the baseline situation.

17.2.5 Taking this into account it is considered that in the first cumulative scenario, the effect of introducing the Proposed Development on the landscape character of a local area in which the Douglas West Wind Farm, Consented Dalquhandy Wind Farm, Poniel turbines, and Consented Cumberhead Wind Farm were already present would be less significant than previously assessed in the main LVIA. The combined effect on the local landscape would be significant but this level of significance would occur in any event in the absence of the Proposed Development.

17.2.6 Similar observations can be made about most of the surrounding landscape character types (LCTs), however in some cases the addition of the additional consented schemes to the baseline would serve to reduce the level of effect to such a degree that it would become non-significant. This would be the case for the section of LCT 8 up to 5 km from the site; the area of LCT 5 up to 5 km to the north of the site; and areas of LCT 7 up to 6 km to the south of the site. In each of the LCTs considered (LCT 5, 7 & 8), whilst the overall combined effect would be greater and significant, this level of significance would generally occur in any event in the absence of the Proposed Development.

17.2.7 Within the lower lying land of the Douglas Valley SLA, the Proposed Development would be visible alongside the Existing Hagshaw Hill, Hagshaw Hill Extension, and Hazelside Farm turbines and the consented Douglas West Wind Farm and Poniel turbines. However, wind energy development beyond the lower sections of the valley would not become the single most dominant characteristic of the landscape. The valley topography, mature vegetation and the Douglas Water would prevail as the defining characteristics of this landscape. The introduction of the Proposed Development would be significant, as would the combined effect, but there would already be a significant effect on the character of this area as a result of the already consented developments. The introduction of the Proposed Development would not increase the level of cumulative effect of wind farm development such that the combined effect crosses the threshold of the whole SLA becoming part of the wind farm landscape.

17.2.8 In terms of cumulative visual effects in cumulative scenario 1, it is noted that the Proposed Development turbines would, from the vast majority of locations, be visible in combination with, and appear as, an extension to the consented Douglas West Wind Farm, and would also be seen in the immediate context of the Consented Dalquhandy Wind Farm and Consented Cumberhead Wind Farms, in addition to the existing operational wind farms of Hagshaw Hill, Hagshaw Hill Extension, Hazelside Farm, Galawhistle, and Nutberry Wind Farms. Together these schemes would form a concentration of turbines extending from the rolling moorland down into the foothills bordering the farmland to the east. From most locations the proposed turbines would also be visible either in combination with or in succession with the consented Poniel turbines and, also to the north of the Proposed Development, either in combination with or in succession with the scattered existing and

consented medium to large scale individual turbines in the farmland along the M74 corridor (including Auchren Farm, Broken Cross Small, JJ Farm, M74 Eco-Park, Nether Fauldhouse, Letham Farm, Low Whiteside Farm and Yonderton Farm).

17.2.9 In general, where visible, the Proposed Development would reinforce the presence of turbines in views rather than introduce turbines into any views which are currently unaffected by turbines.

17.2.10 Measured against this baseline in cumulative scenario 1, whilst the overall combined impact might be greater, the additional effects arising as a result of introducing the Proposed Development would typically be less significant than reported earlier in the main LVIA. Indeed, the significant effects identified in the main assessment for the areas around Coalburn and Braehead; the eastern part of Douglas; the farmsteads and dwellings scattered along the eastern side of Bellfield Road; and properties in and around Rigside and Lesmahagow; would reduce to a non-significant level.

17.2.11 With regard to viewpoints in the wider landscape, the identified significant effect on visual receptors at viewpoints 4 (B7078 south of Lesmahagow) and 5 (A70 Rigside) would also reduce to a non-significant level once the revised baseline including the consented schemes is considered.

17.2.12 It is recognised that there would be a significant cumulative effect in relation to a small number of properties as a result of the Douglas West Wind Farm and the Proposed Development being constructed in conjunction, however the overall effect would not be overbearing such as to render the properties an unattractive place to live.

17.2.13 It is recognised that there would be some sequential cumulative effects along the M74, A70, B7078 and NCN 74. However, in the context of the already consented and operational wind farms in this landscape, the additional effect of introducing the Proposed Development would not be significant. The overall effect on these routes is likely to be significant but this effect would occur in any case in the absence of the proposed turbines.

17.2.14 It is noted that whilst the effects are considered to be long term, they are not ultimately permanent and upon decommissioning the Proposed Development the effects are almost entirely reversible. Therefore, there would be no permanent or irreversible effects on landscape character or visual amenity and these residual effects would not be significant.

17.2.15 Given the relatively high number of operational and consented schemes considered in cumulative scenario 1, the change to the baseline brought about by the other schemes in planning in scenario 2 would be minimal. Therefore, it is not considered that the cumulative effects would be discernibly greater in cumulative scenario 2 than in scenario 1 and no additional significant cumulative effects are predicted.

17.2.16 Wind turbines give rise to a wide spectrum of opinions, ranging from strongly adverse to strongly positive, with a wide range of opinions lying somewhere between these two positions. In considering the effects of the Proposed Development, a precautionary approach has been adopted and it is therefore assumed that the effects identified will be adverse in nature even though it is recognised that for some people the impacts could be perceived to be beneficial.

17.2.17 The recent consents for other commercial scale wind farms, such as, Douglas West Wind Farm, Consented Dalquhandy Wind Farm, Consented Cumberhead Wind Farm and Poniel turbines, are particularly relevant as once built they will serve to create a wind farm landscape across the locality of the site. In the context of these consented turbines the Proposed Development will sit within an area already surrounded by large scale wind turbines and in this regard, would constitute an obvious infill to complete the pattern and distribution of wind turbines in this area.

Ecology

17.2.18 It is considered unlikely that any significant cumulative effects on blanket bog at a regional level would arise as a consequence of the Proposed Development adding to habitat loss associated with other projects. The Proposed Development and other wind farm projects within 10 km have been located on similar lower quality habitats common to the area. Therefore, cumulative effects on blanket bog and wet modified bog are assessed as negligible and not significant.

17.2.19 No bat roosts were confirmed in locations that may be affected by construction activities, therefore construction related cumulative effects are considered to be negligible and not significant.

17.2.20 A cumulative collision risk during operation may exist for bats, however, in general the activity rates at most sites within 10 km were very low and the risk of levels of collisions reaching regional significance are unlikely. A potential significant collision risk may exist for *Nyctalus* bats in a worst-case scenario if all projects are operational and if the Scottish population is as low as estimated, however this situation is considered unlikely.

17.2.21 Any impacts of collision risk on bats will be offset by mitigation measures (if required) which will improve foraging conditions away from turbines. Therefore, a minor adverse and not significant cumulative effect is predicted.

Ornithology

17.2.22 A detailed qualitative assessment of the cumulative effects of local wind farm projects considered the impact on disturbance-displacement and on collision risk on Important Ornithological Features (IOFs). The only impact considered to be potentially significant was that of disturbance-displacement on black grouse which is predicted to be a moderate adverse effect. Local populations of black grouse have in recent years declined, however it is unclear whether this is due to the presence of operational wind farms or based on wider species' population trends. The proposed mitigation of native woodland planting has the potential to offer suitable habitat for black grouse and therefore is predicted to reduce the disturbance-displacement risk to a not significant level.

17.2.23 The cumulative impacts on other species considered were assessed to be not significant, therefore all cumulative effects on ornithology are not significant and no further mitigation is proposed.

Noise

17.2.24 A broad-brush approach to the recommendations of the *IOA Good Practice Guide* was undertaken which considered all operational and consented wind farms within approximately 5 km of the Proposed Development, regarding them together with the Proposed Development as a single development. Every turbine was treated as if it were directly upwind of each receptor at a single point in time, and no allowance was made for directivity. In keeping with the IOA Guidance, to take into consideration screening by the landform, 2 dB overall was deducted from the contribution of any turbine that is not visible from the receiver location.

17.2.25 This approach exaggerates the cumulative noise effects, because there are no receptor locations that can ever simultaneously fall downwind of every wind farm in the locality. Nevertheless, the proposed noise limits for the Proposed Development can be met under these circumstances at all but one of the receptor locations used in the present study, with the sole exception being the consented (but unbuilt) housing development at Gunsgreen.

17.2.26 The predicted exceedance at Gunsgreen using this approach was slight. The layout of proposed dwellings at Gunsgreen is not yet known, but acoustical screening within the housing estate will tend to reduce the levels and, as noted above, the broad-brush approach used exaggerates the

cumulative effects as there are no receptor locations (including Gunsgreen) that can ever simultaneously fall downwind of every wind farm in the locality. It is therefore concluded that in reality, should this housing development ever be built in the future, that the noise limits set out in Chapter 9 would be met by the Proposed Development, alone and cumulatively.

17.2.27 The cumulative noise effects on local receptors are therefore considered to be not significant.

Cultural Heritage

17.2.28 Collectively the cumulative schemes in the local area constitute a cluster of 100 turbines in the hills to the northwest of Douglas. The Proposed Development would be an addition to the centre of the cluster, and the cumulative assessment addresses the effect of adding the Proposed Development to a baseline that includes consented and in planning developments, in the context of a baseline of operational developments.

17.2.29 For most of the heritage assets within the Outer Study Area the addition of the Proposed Development to a baseline including the operational and consented schemes within the Hagshaw cluster will be of no more than negligible magnitude. The Proposed Development would sit within the cluster and would not add appreciably to the visual impact from the operational and consented developments.

17.2.30 For the assets within Douglas and for Douglas Castle, the cumulative effect will be of negligible magnitude and of minor significance. The Proposed Development would sit within the cluster and would add very little to the visual impact from the existing operational and consented developments.

Hydrology, Hydrogeology and Geology

17.2.31 The assessment concluded that there will be no significant effects on geological resources associated with the Proposed Development. As such, no significant cumulative effects on geological resources associated with the Proposed Development, in combination with other similar local developments currently operational, consented or in planning, are predicted.

17.2.32 In terms of hydrology and hydrogeology, a number of operational and proposed wind energy projects in the vicinity lie partially within the catchment of the Poniel Water. A proportion of the drainage from these wind farms are likely to drain into the Poniel Water, although flows are also likely to be distributed to other watercourses as well. All of these wind farms either have, or will be required to prepare their own drainage strategies to protect all receiving watercourses from pollution and increased run-off. Therefore, with no or negligible predicted residual effects on the Poniel Water from the Proposed Development, it is considered that the combined effect on hydrological resources will be negligible and no additional mitigation measures over and above those committed to are considered necessary to address potential cumulative effects on hydrology or hydrogeology.

Traffic and Transport

17.2.33 A number of wind farm developments are proposed in the area surrounding the Proposed Development site. Construction traffic routeing to and from several of these is expected to use the same part of the road network as the Proposed Development (the M74 motorway and a very short strecth of the B7078 at junction 11 of the M74). The construction programmes for these potential cumulative developments are not yet known and so it cannot be said with any certainty whether any of them would be constructed at the same time as the Proposed Development. Any additional traffic from other consented wind farms on the relevant sections of the road network, at the same time as traffic from the Proposed Development, is likely to cause only negligible increases in traffic.

17.2.34 Several industrial and residential developments are also planned in the area and could affect volumes of traffic on the roads within the study area. The traffic estimated to be generated by the Proposed Development is relatively small compared to that estimated to be generated by these other developments.

17.2.35 Furthermore, the Proposed Development construction traffic is of a relatively short duration and therefore when considered in combination with traffic from other consented developments, any potential cumulative effects would be temporary and relatively short in duration.

17.2.36 The cumulative effects arising from the Proposed Development and the other consented developments in the locality is considered to be negligible.

Socio-Economics, Tourism and Recreation

17.2.37 There are three main ways in which the Proposed Development could contribute to cumulative socio-economic effects. Two of these could result in beneficial cumulative effects and the other could result in an adverse cumulative effects.

17.2.38 Adverse cumulative effects on tourism, recreation and socio-economics could occur if the Proposed Development was expected to have a significant cumulative visual impact on important tourism receptors. It is however, important to note that even if such effects were to occur, they would not necessarily be significant. This is because landscape is likely to be a somewhat less important driver of tourism in South Lanarkshire than it is for other parts of Scotland.

17.2.39 The Proposed Development also has the potential to generate beneficial cumulative impacts if it were to help encourage the development of a significant local renewable energy supply chain. Initial investigations undertaken by the Applicant have identified a number of potential suppliers in the local area so there is some evidence that this effect may already be occurring.

17.2.40 The development of a strong local supply chain would help to increase the economic benefits of the Proposed Development and similar projects in the local area, which could help to increase the magnitude of the long-term beneficial economic effects considered in Chapter 13. The Applicant's Responsible Contracting Policy and stated preference for securing supplies locally where possible should help to support this.

17.2.41 Furthermore, if additional community benefit and shared ownership income was secured from other similar developments in the area this would enable the local community to leverage more funding and investment into the area. Physical infrastructure such as roads could also become part of the network of access paths around Junction 11 off the M74, attracting more people to the area.

Aviation, Radar and Telecommunications

17.2.42 It is considered that as none of the consented wind farm developments have significant residual effects on aviation, radar or telecommunication interests, the potential for cumulative effects is negligible.

17.2.43 Therefore, it is considered that there will be no significant cumulative effects on aviation, radar or telecommunication interests.

Shadow Flicker

17.2.44 In order to assess the potential for cumulative impact from other wind farm developments in the surrounding area or from turbines within the Proposed Development, any turbine within 3 km of the Proposed Development site were reviewed.

17.2.45 There are two developments (Consented Dalquhandy Wind Farm and Douglas West Wind Farm) located within 3 km of the proposed turbine locations, which have a shadow flicker study area overlapping with the Proposed Development study area. Three shadow flicker receptors were identified within the areas of overlap.

17.2.46 A cumulative shadow flicker assessment was undertaken at three receptor locations within the study area overlap (Receptors 1, 2 and 3 - Station House, Blackwood Cottage and Gunsgreen). The total number of shadow hours per year remain within the recommended limit of 30 hours per year. This is likely to be a conservative total as the final orientation of the proposed houses at Gunsgreen is unknown as is any proposed landscaping and planting.

17.2.47 In conclusion, the predicted cumulative shadow flicker residual effect across the Proposed Development study area would not be significant.

Forestry

17.2.48 In order to assess cumulative forestry impacts on Cumberhead Forest, woodland removal has been used as the principle indicator. The Proposed Development seeks to install 13 six megawatt turbines into Cumberhead Forest, with an associated impact of 0.42 ha of woodland removal per megawatt, which is the lowest impact of any of the operational, consented or proposed wind farm developments within Cumberhead Forest.

17.2.49 The Proposed Development has adopted a similar approach to the other wind farms in relation to minimising woodland removal, however, the use of 200 m tip heights results in greater clearance between the rotor swept edge of the rotor and tree canopy heights, significantly reducing the need for woodland removal.

17.2.50 From a cumulative impact assessment perspective, the Proposed Development, Revised Cumberhead Wind Farm and the operational Nutberry Wind Farm would see a total of 33 turbines, generating 143 MW of renewable energy located across Cumberhead Forest. This would comprise a loss of 109.06 ha of Sitka spruce dominated woodland within the forest, representing 5.4 % of the total forest area.

17.2.51 The cumulative loss of 5.4 % of Cumberhead Forest is considered a minor effect in the context of the property, especially when the losses come from generally lower yield class crops in the higher altitude locations, reducing the impact of loss of production. The Wind Farm Forest Plan demonstrates that Cumberhead Forest will remain a largescale, productive commercial forest, capable of longer-term sustainable production of good quality commercial timber. The positive renewable energy and carbon reduction benefits that would accrue from the wind farms within the forest are also noteworthy in this regard.

17.2.52 It is important to note, both the Revised Cumberhead Wind Farm and the Proposed Development will deliver compensatory planting to mitigate the loss of productive conifers and as such the actual loss of woodland related benefit is limited to the areas previously removed for Nutberry Wind Farm.

17.3 Conclusions

17.3.1 All the technical assessments, with the exception of ecology and landscape and visual, conclude no significant cumulative effects as a result of the Proposed Development.

17.3.2 The ecological impact assessment concluded a potential significant collision risk may exist for *Nyctalus sp.* bats however it is considered unlikely and required all projects to be operational and for the Scottish population to be as low as estimated. Mitigation measures are proposed if required.

17.3.3 The landscape and visual cumulative assessment concluded that, in general, where visible, the proposed turbines would reinforce the presence of turbines in views rather than introduce turbines into any views which are currently unaffected by turbines. For the most part, the additional effect of introducing the Proposed Development would not be significant. Where combined effects would be significant, this level of significance would in most cases occur in any event in the absence of the Proposed Development.