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Volume 7F Intertidal and Combined Assessment Appendices

Appendix 3-2 In-combination Climate Change Impacts

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Acronyms and Abbreviations

EIAR	Environmental Impact Assessment Report
HDD	Horizontal Directional Drilling
ICCI	In-combination Climate Change Impacts
IEMA	Institute of Environmental Management and Assessment
OnTI	Onshore Transmission Infrastructure
RLB	Red Line Boundary
SSSI	Site of Special Scientific Interest

1 Introduction

1.1.1.1 This appendix shows the results of the In-combination Climate Change Impacts (ICCI) assessment. This appendix should be read in conjunction with Volume 6, Chapter 3: Climate Change Resilience and Volume 7F, Appendix 3-1: Climate Change Resilience Assessment.

1.1.1.2 The ICCI assessment determines the extent to which climate change exacerbates a potential effect of the Proposed Development on any environmental receptors. The ICCI assessment methodology was developed in line with the IEMA guidance (IEMA, 2020[1]). The ICCI assessment followed the same approach to assessing impacts, identifying receptors, and determining significance as for each of the individual Environmental Impact Assessment Report (EIAR) topics, but with the added consideration of future climate change projections. Please refer to the methodology sections within the EIAR for each topic assessment for further information. For the purposes of the ICCI assessment the study boundary and assessment period will align with those defined for each topic chapter.

1.1.1.3 The initial assessment of significant environmental receptors was conducted by each environmental discipline as per each relevant topic chapter. Once all other environmental disciplines had completed their assessments, reviews took place between the climate resilience team and the relevant environmental expert. The assessment of significance was completed by the climate change specialist and environmental specialists from the relevant topics working together to provide a qualitative assessment of significance.

1.1.1.4 Different EIAR topics use different criteria for determining significance, and as such there is no single approach to determining the significance of an ICCI. Considering the potential climate change impacts, professional judgement was used by both the climate change professionals and the environmental discipline experts to produce high level, qualitative statements about how the identified climate hazards might impact upon receptors within each topic chapter and alter sensitivity. How climate change may exacerbate, and possible impacts previously identified within each topic chapter was also considered.

1.1.1.5 The potential significance of in-combination climate change impacts was then assessed qualitatively, based on the professional judgement of relevant environment and climate change specialists. An ICCI was considered as significant if evidence suggested that climate change would either significantly exacerbate existing "significant" impacts already identified by each EIAR chapter topic lead, or if "non-significant" impacts would be exacerbated enough to become significant.

1.1.1.6 Table 1-1 provides a summary of discussions undertaken with EIAR topic leads for the ICCI, and documents assessment conclusions.

Table 1-1: Summary of discussions and conclusions of the ICCI assessment.

Volume and Chapter number	Chapter	Climate Changes impact on receptors	How climate change might exacerbate identified effects or impacts of the Proposed Development	Summary of ICCI conclusions	ICCI Effect Result
Volume 2, Chapter 2	Marine and Coastal Processes	Climate change will have some impact on receptors through both sea level rise impacting cliffs around the location of the Landfall Site and changes to sea temperatures.	The Proposed Development is likely to have some effects on this receptor. During construction, there will likely be changes to the shoreline caused by the Landfall Site. Horizontal Directional Drilling (HDD) will mitigate this and therefore changes will be minimal. In addition to disturbances caused by the Proposed Development, climate change will likely increase volumes of suspended sediment, which in turn may result in seabed changes. Climate change is not expected to exacerbate any of these effects.	No ICCIs identified.	No significant ICCI
Volume 2, Chapter 3	Marine Water and Sediment Quality	Climate change has the potential to change the dissolved oxygen concentration because of changes in water temperature.	Based on the current evidence it is unlikely that climate change will exacerbate any current impacts the Proposed Development has on these receptors. Therefore, it is likely that there are no significant ICCIs for this topic.	No ICCIs identified.	No significant ICCI
Volume 2, Chapter 4	Benthic Subtidal and Intertidal Ecology	Many climate change impacts could have a negative impact on benthic subtidal and intertidal ecology. Changes to seawater temperature, sea level rise, increased storm surge and increased temperatures could all exacerbate the loss of subtidal / intertidal habitat and negative pressure on native species composition or local extinction. However, no particularly sensitive species are found within the assessment study area.	No significant impacts were found from the Proposed Development. Some impacts are likely to be exacerbated by climate change pressures on the receptors. Those impacts and potential ICCIs include temporary habitat disturbance from jack-up vessels and cable installation during construction and cable maintenance works during operation. With possible exacerbation from habitat loss and negative pressures from changes to seawater temperature, sea level rise, increased storm surge and changes to weather (hotter temperatures). However, as these impacts from the Proposed Development are not significant and climate change will not significantly alter that finding, it is unlikely that climate change will exacerbate any current impacts the Proposed Development has on these receptors. Therefore, it is likely that there are no significant ICCIs for this topic.	Though generic climate change pressure could exacerbate impacts from the Proposed Development. No impacts were found to be significant with or without the additional pressure of climate change.	No significant ICCI
Volume 2, Chapter 5	Fish and Shellfish Ecology	It is recognised that climate change may impact the fish and shellfish receptors in various ways, including exacerbating pressures on habitat and spawning grounds. Climate change factors such as sea temperature and acidification are likely to have some influence. However, the current understanding is that climate change projections are not likely to significantly impact the identified receptors within this topic chapter within the appraisal period.	The Proposed Developments key impact on the receptors is a result of increased underwater noise from piling. This is not currently considered to be a significant impact. Moreover, climate change is not likely to significantly interact and exacerbate this impact. Therefore, it is likely that no significant ICCI impacts will occur.	Climate change is not expected to exacerbate impacts from the Proposed Development, and no impacts are currently considered significant.	No significant ICCI
Volume 2, Chapter 6	Offshore Ornithology	Understanding specific impacts of climate change on the receptors in this chapter is difficult due to a lack of research and evidence. However, several impacts may occur, some examples include: - In the latter part of operation, when temperatures are expected to significantly increase, there is the potential for some negative heat impacts on south facing cliffs for	Main impact pathways assessed in this chapter are the Proposed Developments impact on collision risk and distributional responses. If climate change were to alter the population of receptors significantly this may exacerbate the impact of collision risk. It is difficult to know within the Proposed Development's appraisal period whether significant changes to population distributions due to climate change will occur.	Overall, though climate change may impact the receptors in multiple ways there is uncertainty on specifically how and the extent of the impact. Moreover, climate change will only exacerbate the impact of	No significant ICCI

Volume and Chapter number	Chapter	Climate Changes impact on receptors	How climate change might exacerbate identified effects or impacts of the Proposed Development	Summary of ICCI conclusions	ICCI Effect Result
		egg hatching and chick survival. Though the anticipated temperature increases in this location are far less than other parts of the UK. - Increased in temperature could have a subsequent impact on the prevalence of diseases impacting birds such as bird flu. - Increase in storms may also negatively impact upon the receptors within this chapter. - Climate change could also have negative impacts on prey availability, resulting in cascading impacts upon ornithological receptors.	On the current evidence it is unlikely that climate change will exacerbate any current impacts the Proposed Development has on these receptors. Therefore, it is likely that there are no significant ICCIs for this topic.	collision risks if it causes is significant decreases in population. There is currently not enough evidence to conclude that this will happen.	
Volume 2, Chapter 7	Marine Mammals	Climate change is likely to have impacts upon marine mammals in many ways (e.g. change in home-range or distribution, increased risk of disease, loss of habitat, increase biotoxin exposure etc). However, little is known specifically about the effects on individual species and so it is difficult to make conclusions on the overall impact. As well as direct impacts, climate change is also likely to impact prey species in terms of both quality and availability. However, uncertainty remains about the extent of this impact in the study area.	On the current evidence it is unlikely that climate change will exacerbate any current impacts the Proposed Development has on these receptors. Therefore, it is likely that there are no significant ICCIs for this topic.	No ICCIs identified.	No significant ICCI
Volume 2, Chapter 8	Commercial Fisheries	For the Nephrops fisheries most shellfish are sedentary but have a high tolerance to changes in temperature. Some warming in this part of the North Sea is unlikely to significantly impact these receptors. The evidence around Scallops and how changes to temperature will impact upon them is varied and not conclusive. For white fish fisheries, such as haddock or cod, climate change could have a large impact via warming sea and in turn reducing the area within the North Sea that is suitable for these fish species. This could cause fish to migrate to the Northern North Sea and the Moray firth. Making these areas (where Caledonia South is located) more important as a fishery.	The Proposed Development may have a significant impact on fishery access during the construction phase, particularly around cable laying. However, this will be temporary with access reinstated at operation. Significant impacts from climate change are unlikely to coincide with construction due to this being closer to present day and so the climate changing to a lesser extent. During the operation phase of the Proposed Development there is likely to be a significant impact from Caledonia South (floating WTG section) on commercial fisheries access to fish in this area of Caledonia South. This could cause an ICCI effect for white fish fisheries (notably cod and haddock) as it is unknown where these fish might move too after the impacts of climate change (warming sea temperature). If fish are to move to this area and fisheries were inaccessible this would cause a possible significant ICCI.	Possibly significant ICCI but highly dependent on white fish migration (due to climate change) to the area of the Caledonia South Array Area where fishing will be restricted during operation. Due to uncertainty of fish resource distribution trends as a result of future climate change effects, and timelines of if or when these may occur potential ICCI impacts are scored as not significant for the Proposed Development (Offshore).	No significant ICCI
Volume 2, Chapter 9	Shipping and Navigation	There likely will be some effects on shipping and navigation from climate change, both positive (e.g., rising sea levels leading to larger vessels being able to access ports) and negative (e.g., increased storm activity meaning vessels spend more time sheltering/in port).	It has been noted that the Proposed Development may impact Serco NorthLink ferries during adverse weather through the need to re-route vessels. This may mean that under certain conditions sailings are cancelled / delayed as a result of the Proposed Development. These impacts may be exacerbated as climate change increases storm activity in future.	Identified potential ICCI impacts are unlikely to be significant.	No significant ICCI

Volume and Chapter number	Chapter	Climate Changes impact on receptors	How climate change might exacerbate identified effects or impacts of the Proposed Development	Summary of ICCI conclusions	ICCI Effect Result
Volume 2, Chapter 10	Marine Archaeology and Cultural Heritage	The current understanding is that climate change projections are not likely to significantly impact the identified receptors within this topic chapter within the appraisal period.	Based on the current evidence it is unlikely that climate change will exacerbate any current impacts the Proposed Development has on these receptors. Therefore, it is likely that there are no significant ICCIs for this topic.	No ICCIs identified.	No significant ICCI
Volume 2, Chapter 11	Military and Civil Aviation	The current understanding is that climate change projections are not likely to significantly impact the identified receptors within this topic chapter within the appraisal period.	Based on the current evidence it is unlikely that climate change will exacerbate any current impacts the Proposed Development has on these receptors. Therefore, it is likely that there are no significant ICCIs for this topic.	No ICCIs identified.	No significant ICCI
Volume 2, Chapter 12	Seascape, Landscape and Visual Impact Assessment	The current understanding is that climate change projections are not likely to significantly impact the identified receptors within this topic chapter within the appraisal period.	Based on the current evidence it is unlikely that climate change will exacerbate any current impacts the Proposed Development has on these receptors. Therefore, it is likely that there are no significant ICCIs for this topic.	No ICCIs identified.	No significant ICCI
Volume 2, Chapter 13	Other Human Activities	The current understanding is that climate change projections are not likely to significantly impact the identified receptors within this topic chapter within the appraisal period.	Based on the current evidence it is unlikely that climate change will exacerbate any current impacts the Proposed Development has on these receptors. Therefore, it is likely that there are no significant ICCIs for this topic.	No ICCIs identified.	No significant ICCI
Volume 5, Chapter 2	Land use	Climate change is likely to have some impact on agricultural land with more seasonal distribution of rainfall and projected more frequent heavy rainfall events.	One impact being assessed is that of construction on agricultural land (this may be significant). Hotter drier weather could result in increased soil repellence to water, with a knock on impact of soils being damaged during storage in the construction period. However, during the construction period climate change is not likely to have a significant exacerbating impact on this identified effect. Based on the current evidence it is unlikely that climate change will exacerbate any current impacts the Proposed Development has on these receptors. Therefore, it is likely that there are no significant ICCIs for this topic.	No ICCIs identified.	No significant ICCI
Volume 5, Chapter 3	Terrestrial Ecology and Biodiversity	Anticipated changes to climate are likely to impact several receptors in this chapter to differing extents. For example: • Due to their mobility breeding birds should not be significantly impacted by climate change. Though some pressures me occur from increased disease or pressure on prey. • Water voles might be impacted by climate change due to heavy rain resulting in faster flowing watercourses as this will reduce the water courses suitability. • Wintering birds may also be indirectly impacted by climate change causing possible land use change. Reducing the suitability of foraging areas. In contrast • Badgers are not expected to be significantly impacted by climate change within the OnTI RLB and wider Aberdeenshire area.	Although bat survey results and reports were not available at the time of writing the Onshore Substation Site could have some significant impacts on bats. However, embedded mitigation will be included in design to minimise these impacts. Watercourses are also likely to be impacted by the Proposed Development where the Onshore Export Cable Route crosses them, due to trenching during the construction period only. This could be exacerbated by anticipated changes to rainfall (drier summers could mean drying out, and wetter winters could result in faster flows). Based on the current evidence it is unlikely that climate change will exacerbate any current impacts the Proposed Development has on these receptors. Therefore, it is likely that there are no significant ICCIs for this topic.	Though some impacts have the potential to be exacerbated by climate change it is anticipated that these exacerbations will not be significant and so there are no significant ICCI impacts.	No significant ICCI

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		• Bats could become more prevalent in the OnTI RLB and wider Aberdeenshire area due to a warmer and more favourable climate. Though storms could negatively impact upon them, especially extreme winds.			
Volume 5, Chapter 4	Landscape and Visual	The current understanding is that climate change projections are not likely to significantly impact the identified receptors within this topic chapter within the appraisal period.	Based on the current evidence it is unlikely that climate change will exacerbate any current impacts the Proposed Development has on these receptors. Therefore, it is likely that there are no significant ICCIs for this topic.	No ICCIs identified.	No significant ICCI
Volume 5, Chapter 5	Terrestrial Archaeology and Cultural Heritage	The current understanding is that climate change projections are not likely to significantly impact the identified receptors within this topic chapter within the appraisal period.	Based on the current evidence it is unlikely that climate change will exacerbate any current impacts the Proposed Development has on these receptors. Therefore, it is likely that there are no significant ICCIs for this topic.	No ICCIs identified.	No significant ICCI
Volume 5, Chapter 6	Hydrology and Hydrogeology	Anticipated increases in drought and changes to precipitation levels as a result of climate change will have an impact on the soils and water repellence. In addition, groundwater and water courses are likely to be impacted by the change in precipitation levels and recharge rates. Sea level rise may impact the potential for increased flood risk in coastal areas.	While the impacts of climate change are likely to affect the water environment, embedded mitigation within the Proposed Development design, such as climate change allowances in the drainage design and use of SEPA Future Flood Maps in determining floodplains, will result in no significant ICCI effects.	No ICCIs identified.	No significant ICCI
Volume 5, Chapter 7	Geology, Soils and Contaminated Land	Climate change could negatively impact the following receptors by: Sea level rise and increased coastal erosions might impact on the protected Site of Special Scientific Interest (SSSI). However, the cliffs are hard wearing and should be relatively resilient to erosion. Peat may be negatively impacted by both hotter and drier summers causing the drying out of peat deposits. Increased air temperature could impact upon the behaviour of contaminants; however, this is highly unlikely with the projected temperatures at the location of the Proposed Development.	Some minor loss of peatland could occur if peat is removed for cable trenching and replaced with another soil type. However, this alone and in combination with the additional stresses climate change is not likely to be significant. Therefore, based on the current evidence it is unlikely that climate change will exacerbate any current impacts the Proposed Development has on these receptors. Therefore, it is likely that there are no significant ICCIs for this topic.	There are likely to be no significant impacts from the Proposed Development both alone and when considering the impacts of climate change upon the receptors in this chapter.	No significant ICCI
Volume 5, Chapter 8	Airborne Noise and Vibration	Current understanding is that climate change projections will not likely impact the identified receptors within this topic chapter. However, climate change may cause an overall increase in the baseline noise level due to increased wind speeds.	Due to the impacts of climate change on noise being minimal in regards increasing baseline noise, it is anticipated that there will be no significant ICCI effects. As noted, changes to wind due to climate change might result in an overall increase in baseline noise levels. As a result, noise impacts from the Proposed Development would remain the same or become marginally lessened.	Due to the impacts of climate change on noise being minimal or increasing baseline noise, it is anticipated that there will be no significant ICCI effects.	No significant ICCI
Volume 5, Chapter 9	Traffic and Transport	The current understanding is that climate change projections are not likely to significantly impact the	Based on the current evidence it is unlikely that climate change will exacerbate any current impacts the Proposed Development	Due to the purpose of the traffic and transport assessment and the location of the transport-specific receptors (which are all	No significant ICCI

Volume and Chapter number	Chapter	Climate Changes impact on receptors	How climate change might exacerbate identified effects or impacts of the Proposed Development	Summary of ICCI conclusions	ICCI Effect Result
		identified receptors within this topic chapter within the appraisal period.	has on these receptors. Therefore, it is likely that there are no significant ICCIs for this topic.	focused on the volume of traffic passing along the associated links) Climate change is unlikely to impact on the Traffic and Transport assessment conclusions.	
Volume 6, Chapter 2	Socioeconomics, Tourism and Recreation	Climate change may have some impact on both tourism and agriculture, though the extent of impact and whether the impact is negative or positive is unknown. There are some potential risks to agriculture as the study area has a higher than-average dependence on the sector.	Based on the current evidence it is unlikely that climate change will exacerbate any current impacts the Proposed Development has on these receptors. Therefore, it is likely that there are no significant ICCIs for this topic.	No ICCIs identified.	No significant ICCI

2 References

[1] Institute of Environmental Management and Assessment (IEMA) (2020) 'Environmental Impact Assessment Guide to: Climate Change Resilience & Adaptation'. Available at: https://www.iema.net/resources/reading-room/2020/06/26/iema-eia-guide-to-climate-change-resilience-and-adaptation-2020 (Accessed 01/10/2024).

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