Frodsham Solar

Environmental Statement: Volume 2

Appendix 5-4: In-combination Climate Change Impacts Assessment

May 2025

Cubico SUSTAINABLE INVESTMENTS

PINS Ref: EN010153
Document Ref: EN010153/DR/6.2
Planning Act 2008; and Infrastructure Planning (Applications: Prescribed Forms and Procedure) Regulations Regulation 5(2)(a)

Revision P01

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Appendix 5-4: In-combination Climate Change Impacts Assessment

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Document revision record

Revision no	Date	Details of revisions	Prepared by	Checked by
00	08/05/2025	ES Appendix draft to client	JS1	RSF
01	22/05/2025	Final issue	JS1	RSF

Contents

1 Introduction

The In-combination Climate Change Impacts (ICCI) Assessment for the Proposed Development is presented in Table 1. The assessment considers the extent to which climate change exacerbates or ameliorates the potential effects identified within each of the technical assessments presented in each of the following technical chapters:

- **ES Vol 1 Chapter 6: Landscape and Visual Amenity [EN010153/DR/6.1]**;
- **ES Vol 1 Chapter 7: Terrestrial Ecology [EN010153/DR/6.1]**;
- **ES Vol 1 Chapter 8: Ornithology [EN010153/DR/6.1]**;
- **ES Vol 1 Chapter 9: Flood Risk, Drainage and Surface Water [EN010153/DR/6.1]**;
- **ES Vol 1 Chapter 10: Ground Conditions [EN010153/DR/6.1]**;
- **ES Vol 1 Chapter 11: Cultural Heritage [EN010153/DR/6.1]**; and
- **ES Vol 1 Chapter 12: Tourism and Recreation [EN010153/DR/6.1]**.

ICCIs are unlikely to impact upon the construction phase of the Proposed Development given that, if consented, construction would occur in the near future when the climatic conditions are well understood and would be accounted for in the construction practices. The ICCI Assessment presented has been informed by the projected change in climate identified in **ES Vol 2 Appendix 5-2: Climate Baseline Report [EN010153/DR/6.2]** which includes:

- Increased winter precipitation;
- Decreased summer precipitation;
- Increase in temperatures;
- Increased frequency and magnitude of storms;
- Changes in cloud cover; and
- Sea level rise.

The ICCI Assessment has been produced using the principles as set out in IEMA guidelines titled: *"Environmental Impact Assessment Guide to: Climate Change Resilience & Adaptation"*[1] (hereafter referred to as the 'IEMA Climate Change Resilience Guidance'). Professional judgement has been used to assess how potential effects presented within the technical assessments will be affected by climate change.

[1] IEMA. (2020). *Environmental Impact Assessment Guide to: Climate Change Resilience & Adaptation*. Available at: https://www.iema.net/media/mabhqino/iema-eia-climate-change-resilience-june-2020.pdf [Last Accessed 23 April 2025].

2 ICCI Assessment

Table 1: ICCI Assessment

Technical Chapter	Change in Climate	Hazard resulting from climate change	Potential Impacts of Climate Change	Additional mitigation requirement
ES Vol 1 Chapter 6: Landscape and Visual Amenity [EN010153/DR/6.1]	• Increased winter precipitation; • Decreased summer precipitation; • Increase in temperatures; and • Increased frequency and magnitude of storms.	• Drought; • Heatwaves; • changes in annual average temperature; • increased frequency and magnitude of wind surges; and • Surface water and fluvial flooding.	• The creation of permissive paths; the planting scheme; and the retention of existing habitats would mitigate the landscape impacts of the Proposed Development and could potentially be impacted by climate change. • The impacts of climate change on the permissive paths have been assessed in the Tourism and Recreation section of this table. • The impacts of climate change on the planting scheme and retention of existing habitats have been assessed in the Terrestrial Ecology section of this table.	The proposed habitat planting and retention of existing habitats (**ES Vol 1 Chapter 7: Terrestrial Ecology [EN010153/DR/6.1]**) and the creation of permissive paths (**ES Vol 1 Chapter 12: Tourism and Recreation [EN010153/DR/6.1]**) would mitigate the landscape impacts of the Proposed Development. No additional mitigation is required beyond those measures set out in **ES Vol 1 Chapter 6: Landscape and Visual Amenity [EN010153/DR/6.1]**, **ES Vol 1 Chapter 7: Terrestrial Ecology [EN010153/DR/6.1]**, and **ES Vol 1 Chapter 12: Tourism and Recreation [EN010153/DR/6.1]** as these remain effective in the context of anticipated climate change scenarios.
ES Vol 1 Chapter 7: Terrestrial Ecology [EN010153/DR/6.1]	• Increased winter precipitation; • Decreased summer precipitation; • Increase in temperatures; and • Increased frequency and magnitude of storms.	• Drought; • Heatwaves; • changes in annual average temperature; • increased frequency and magnitude of wind surges; and	• Potential damage to or loss of the planting scheme and/or retained habitats due to drought causing plants to not be able to perform essential processes like photosynthesis, nutrient transport, and cell hydration. • Potential damage to or loss of the planting scheme and/or retained habitats due heatwaves causing	The proposed habitat planting, as set out in **ES Vol 1 Chapter 7: Terrestrial Ecology [EN010153/DR/6.1],** considers species selection, mixes and avoidance of single species used in mitigation planting, and ensuring species are suitable for local conditions, resilient to threats, pests, climate change and diseases. Additionally, the **Outline Landscape and Ecological Management Plan (oLEMP) [EN010153/DR/7.13]**, includes include specific details for the

Technical Chapter	Change in Climate	Hazard resulting from climate change	Potential Impacts of Climate Change	Additional mitigation requirement
		• Surface water and fluvial flooding.	scorching and destabilisation of soil structure. • Potential longer growing season, more vigorous vegetation growth in spring and autumn because of changes in annual average temperatures. • Potential damage to or loss of the planting scheme and/or retained habitats due to high winds causing soil erosion and destabilisation. • Potential damage to or loss of the planting scheme and/or retained habitats due to flooding causing soil erosion, destabilisation, and inundation.	management throughout the lifetime of the Proposed Development. No additional mitigation is required beyond those measures set out in **ES Vol 1 Chapter 7: Terrestrial Ecology [EN010153/DR/6.1]** and the **Outline Landscape and Ecological Management Plan (oLEMP) [EN010153/DR/7.13]** as these remain effective in the context of anticipated climate change scenarios.
ES Vol 1 Chapter 8: Ornithology [EN010153/DR/6.1]	• Increased winter precipitation; • Decreased summer precipitation; • Increase in temperatures; and • Increased frequency and magnitude of storms.	• Drought; • Heatwaves; • changes in annual average temperature; • increased frequency and magnitude of wind surges; and • Surface water and fluvial flooding.	• Changes in climate could lead to habitat loss and changes in food availability for birds. • The creation of the planting scheme and the retention of existing habitats within the Non-Breeding Bird Mitigation Area (NBBMA) would mitigate the ornithological impacts at the Proposed Development and could potentially be impacted by climate change. • The impacts of climate change on the planting scheme and retention of existing habitats have been assessed in	The proposed habitat planting and retention of existing habitats in the NBBMA (**Outline Landscape and Ecological Management Plan Appendix B - Outline Non Breeding Bird Mitigation Strategy (oNBBMS) [EN010153/DR/7.13]**) would mitigate the ornithological impacts of the Proposed Development. Additionally, the **Outline Landscape and Ecological Management Plan Appendix B - Outline Non Breeding Bird Mitigation Strategy (oNBBMS) [EN010153/DR/7.13]**, includes include specific details for the management throughout the lifetime of the Proposed Development. No additional mitigation is required beyond those measures set out in **ES Vol 1 Chapter 8:**

Technical Chapter	Change in Climate	Hazard resulting from climate change	Potential Impacts of Climate Change	Additional mitigation requirement
			the Terrestrial Ecology section of this table.	**Ornithology [EN010153/DR/6.1]**, **ES Vol 1 Chapter 7: Terrestrial Ecology [EN010153/DR/6.1]** and the **Outline Landscape and Ecological Management Plan (oLEMP) [EN010153/DR/7.13]** as these remain effective in the context of anticipated climate change scenarios.
ES Vol 1 Chapter 9: Flood Risk, Drainage and Surface Water [EN010153/DR/6.1]	• Increased winter precipitation; • Increased frequency and magnitude of storms; and • Sea level rise.	• Surface water and fluvial flooding.	Part of the Proposed Development is located within a Flood Zone 3 designated area. Increased winter precipitation and increased frequency and magnitude of storms could potentially increase the risk of fluvial and surface water flooding to the Proposed Development. Additionally, sea level rise could increase the risk of a breach of the River Mersey flood defences. This may increase the frequency of flooding and increase the extent of the Site within Flood Zone 3.	**ES Vol 2 Appendix 9-1: Flood Risk Assessment and Drainage Strategy [EN010153/DR/6.2]** has considered the future water levels at the Site, taking account of climate change scenarios, which has informed the design of the Proposed Development including the height of the solar PV modules, the location of critical electrical equipment and the use of permeable materials. No additional mitigation is required beyond those measures set out in ES **Vol 1 Chapter 9: Flood Risk, Drainage and Surface Water [EN010153/DR/6.1]** as these remain effective in the context of anticipated climate change scenarios and ensure that there are no unacceptable flood risk impacts from the Proposed Development.
ES Vol 1 Chapter 10: Ground Conditions [EN010153/DR/6.1]	• Increased winter precipitation; and • Decreased summer precipitation.	• Drought; and • Surface water and fluvial flooding.	• Drought could lead to a soil moisture deficit and reduced groundwater storage levels. • Potential future increases or decreases in precipitation leading to flooding or drought respectively could affect groundwater quality underlying the Site as potential contaminants	**ES Vol 1 Chapter 10: Ground Conditions [EN010153/DR/6.1]** has included mitigation measures including the use of appropriate materials, safe storage of chemicals and effluent discharge. No additional mitigation is required beyond those measures set out in **ES Vol 1 Chapter 10: Ground Conditions [EN010153/DR/6.1]** as these remain

Technical Chapter	Change in Climate	Hazard resulting from climate change	Potential Impacts of Climate Change	Additional mitigation requirement
			currently above the groundwater table could be mobilised.	effective in the context of anticipated climate change scenarios.
ES Vol 1 Chapter 11: Cultural Heritage [EN010153/DR/6.1]	• Increased winter precipitation; • Decreased summer precipitation; and • Increase in temperatures.	• Surface water and fluvial flooding; and • Drought.	• Surface water and fluvial flooding could lead to erosion which poses a risk to buried archaeology. • Drought could lead to ground shrinkage which poses a risk to buried archaeology. • Both of the above could lead to a loss of heritage significance.	The only archaeology that has been identified is the sluice and the medieval flood defence . These are below ground but are understood to lie behind the modern day River Weaver flood defence. The Proposed Development would not exacerbate any erosion risks to these assets. **ES Vol 1 Chapter 11: Cultural Heritage [EN010153/DR/6.1]** has included the following mitigation measures: • The features relating to the interface of the Site and the River Boundary has been retained; and • the solar PV modules would have a maximum pile depth of 5 m bgl as to not impact peat deposits. No additional mitigation is required beyond those measures set out in **ES Vol 1 Chapter 11: Cultural Heritage [EN010153/DR/6.1]** as these remain effective in the context of anticipated climate change scenarios.
ES Vol 1 Chapter 12: Tourism and Recreation [EN010153/DR/6.1]	• Increased winter precipitation; • Decreased summer precipitation; • Increase in temperatures;	• Heatwaves; • Increased frequency and magnitude of wind gusts; and • surface water and fluvial flooding.	Increased frequency and intensity of wind gusts; heatwaves; and fluvial and surface water flooding could reduce the opportunities for the general population to access the permissive paths.	**ES Vol 1 Chapter 12: Tourism and Recreation [EN010153/DR/6.1]** has outlined mitigation measures including improved surfacing of the permissive paths, landscape screening, educational displays, improved bird viewing opportunities, and better maintenance of existing footpaths. **ES Vol 2 Appendix 5-3 Climate Resilience Assessment [EN010153/DR/6.2]** considers the

Technical Chapter	Change in Climate	Hazard resulting from climate change	Potential Impacts of Climate Change	Additional mitigation requirement
	• Increased frequency and magnitude of storms.			climate resilience of the permissive paths (and users of them) and concludes that no likely significant impacts are likely to arise. No additional mitigation is required beyond those measures set out in **ES Vol 1 Chapter 12: Tourism and Recreation [EN010153/DR/6.1]** as these remain effective in the context of anticipated climate change scenarios.

3 Conclusion

Climate change has the potential to exacerbate and/or ameliorate the potential effects identified within the technical chapters. However, the mitigation measures outlined in the technical chapters remain effective in the context of anticipated climate change scenarios.

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