Appendix 13-4: In-Combination Climate Change Impact (ICCI) Assessment

Appendix 13-4 In-Combination Climate Change Impact (ICCI) Assessment

1. Introduction

1.1.1 This Appendix (13-4) of the Environmental Impact Assessment Report (EIAR) Climate Chapter (Chapter 13) presents the findings of the In-combination Climate Change Impact (ICCI) Assessment that was carried out on the Proposed Order. The ICCI Assessment was carried out to identify and assess the combined impact of the Proposed Order and future climate change on receptors in the surrounding environment.

1.1.2 The ICCI was undertaken by Joana Cerejeira BSc, MRes, a Principal Sustainability Consultant in AECOM's Carbon and ESG team, with over eight years' experience in the climate change and sustainability space. Joana specialises in climate and carbon in infrastructure and has undertaken numerous CCRAs and associated work across various sectors in Ireland and the UK.

1.1.3 Chapter 13: Climate (EIAR Volume 2) and its appendices were reviewed by Ian Davies BSc (Hons), a Technical Director in AECOM's Carbon and ESG team, with over 20 years' experience in the provision of environmental sustainability assessment, specialising in greenhouse gas (GHG) and ICCIs. These include recent Dublin Airport applications for the proposed Dublin Airport Underpass and for the proposed NRRA, and for the expansion of London Luton Airport.

1.1.4 This ICCI Assessment, although not a requirement of EIARs, was undertaken to meet industry best practice standards established by the Institute of Sustainability and Environmental Professionals (ISEP) previously known as IEMA[1], with regard to the process for undertaking EIARs. The ISEP guidance for carrying out EIAs states that consideration should be given to the following aspects of climate change:

- Lifecycle greenhouse gas (GHG) impact assessment - quantifying the GHG emissions arising from the Proposed Order over its lifetime.
- Climate change risk assessment (CCRA) - the resilience of the Proposed Order to projected climate change impacts.
- In-combination climate change impact (ICCI) assessment - the combined impact of the Proposed Order and future climate change on receptors in the surrounding environment.

1.1.5 The purpose of the ICCI Assessment is to identify any impacts on receptors in the surrounding environment and communities that occur because of the combined impacts of climate change and the operation of the Proposed Order. This ICCI Assessment was carried out by the climate team in collaboration with the wider chapter disciplines involved in this EIAR. Table 13D-6 below presents the findings of the ICCI assessment, which took into account cultural heritage, population and human health, land & soils, surface access, biodiversity, air quality, and the water environment as receptors.

1.1.6 The likelihood of each potential climate change hazard occurring has been assessed. Likelihood is categorised into four levels depending on the probability of the hazard occurring. Table 13D-1-1 presents the likelihood levels and definitions used. This is in line with the definitions presented by the Intergovernmental Panel on Climate Change (IPCC). There is some overlap in the criteria provided to allow for uncertainty and the qualitative approach of the assessment.

1.1.7 A climate hazard is defined as a physical climate-related event, trend, or process that has the potential to cause adverse effects on human health, infrastructure, ecosystems, economic activity, or other receptors.

[1] Institute of Environmental Management and Assessment

Table 13D-1-1:ICCI Assessment - Level of Likelihood of the Climate Hazard Occurring

Level of Likelihood	Definition of Likelihood
Very likely	90-100% probability that the hazard will occur
Likely	66-90% probability that the hazard will occur
Possible, about as likely as not	33-66% probability that the hazard will occur
Unlikely	0-33% probability that the hazard will occur

1.1.8 The likelihood of an impact occurring is then determined. Using their understanding of the receptor sensitivity to the climate hazard, relevant socio-environmental disciplines assigned a likelihood of impact category. In defining the likelihood of an in-combination climate impact occurring, embedded and good practice mitigation measures (primary and tertiary mitigation) are taken into consideration. Definitions of likelihood are set out in Table 13D-1-2.

1.1.9 An impact is defined as the consequence of a climate hazard affecting a receptor, asset, system, or activity, resulting from the interaction of the hazard with the receptor's exposure and vulnerability.

Table 13D-1-2:ICCI Assessment – Level of Likelihood of the Climate Impact Occurring

Level of likelihood of climate impact occurring	Definition of likelihood
Likely	66-100% probability that the impact will occur during the life of the project
Possible, about as likely as not	33-66% probability that the impact will occur during the life of the project
Unlikely	0-33% probability that the impact will occur during the life of the project

1.1.10 Table 13D-1-3 is then used to determine the overall likelihood of the ICCI. Once the likelihood of an in-combination climate impact occurring on a receptor has been identified, the discipline-specific environmental assessment should consider how this will affect the significance of the identified effects.

Table 13D-1-3:Level of Likelihood of the ICCI

		Unlikely	Possible	Likely	Very likely
Likelihood of impact occurring (given embedded mitigation measures, Table 13A-2)	**Unlikely**	Rare	Rare	Unlikely	Unlikely
	Possible	Rare	Unlikely	Unlikely	Unlikely
	Likely	Unlikely	Unlikely	Likely	Likely

1.1.11 The ICCI consequence criteria are defined in Table 13D-1-4 and are based on the change to the significance of the effect already identified by the environmental discipline. To assess the consequence of an ICCI impact, each discipline has assigned a level of consequence to an impact based on the criteria description in Table 13D-1-4 and their discipline assessment methodology.

Table 13D-1-4:ICCI assessment – Consequence Criteria

Consequence	Consequence criteria
High	The climate change parameter in-combination with the impact of the proposed development causes the significance of the effect of the proposed scheme on the resource/ receptor, as defined by the topic, to increase from negligible, minor or moderate to major.
Medium	The climate change parameter in-combination with the impact of the proposed development causes the effect defined by the topic, to increase from negligible or minor to moderate.
Low	The climate change parameter in-combination with the impact of the proposed development, causes the significance of effect defined by the topic, to increase from negligible to minor.
Very low	The climate change parameter in-combination with the impact of the proposed development does not alter the significance of the effect defined by the topic.

1.1.12 The significance of potential effects is determined by the environmental discipline specialists using the matrix in **Table 13D-1-5**. As a general rule, where an effect has been identified as moderate or major, this has been deemed significant. However, professional judgement is also applied where appropriate.

Table 13D-1-5: ICCI Assessment – Significance Criteria

		Likelihood of the ICCI Occurring (Table 13D-1-3)		
		Rare	**Unlikely**	**Likely**
Consequence of ICCI Occurring (Table 13D-1-4)	**Very Low**	Low	Low	Minor
	Low	Low	Minor	Moderate
	Medium	Minor	Moderate	Major
	High	Moderate	Major	Major

1.1.13 The outcomes from the ICCI assessment are presented in Table 13D-6. No significant impacts were identified.

Table 13D-6:ICCI Assessment Outcomes

Discipline / Receptor	Climate Hazard	Likelihood of Climate Hazard Occurring	Likely ICCIs Identified	Description of ICCI Considering Embedded Environmental Measures / Good Practice	Likelihood of ICCI Occurring	Consequence of ICCI	Significance	Possible Mitigation Measures
Population and Human Health – Amenity and local communities	Increased number of hot days, heatwaves and high temperatures in summer months	Very Likely	Potential increase in heat risk for users of Dublin Airport and for local communities in Fingal County.	Dublin Airport will continue to implement relevant climate adaptation and operational management measures, where appropriate, in alignment with applicable local, regional and national adaptation strategies, thereby supporting resilience to increasing temperatures and heatwave events for airport users and surrounding communities.	Unlikely	Low	Low (Not Significant)	Not required
Population and Human Health – Flooding and storms	Risk of extreme events as a result of climate change such as high winds and intense precipitation.	Very Likely	Potential increase in risk for users and employees at Dublin Airport, and for the local communities in Fingal County.	Dublin Airport will continue to implement existing flood risk management, drainage maintenance and emergency response procedures to maintain resilience during extreme rainfall and storm events. Drainage networks, attenuation features and water quality monitoring systems will continue to be regularly inspected and maintained to ensure effective operation during severe weather. Weather forecasts and warnings will be monitored to support operational planning and the implementation of appropriate response measures where required.	Unlikely	Low	Low (Not Significant)	Not required
Population and Human Health – Employment	Increased number of hot days, heatwaves and high temperatures in summer months	Very Likely	Potential increase in heat risk for those employed at Dublin Airport, including heat stress and exhaustion.	Dublin Airport will continue to implement occupational health, safety and wellbeing procedures to manage heat-related risks to employees during periods of elevated temperatures and extreme heat events. This will include monitoring weather forecasts and heat warnings, implementing appropriate operational measures to protect employee welfare, and maintaining operational resilience during extreme weather conditions, thereby supporting the continued provision of airport services for users and surrounding communities.	Unlikely	Low	Low (Not Significant)	Not required

Discipline / Receptor	Climate Hazard	Likelihood of Climate Hazard Occurring	Likely ICCIs Identified	Description of ICCI Considering Embedded Environmental Measures / Good Practice	Likelihood of ICCI Occurring	Consequence of ICCI	Significance	Possible Mitigation Measures
Land and Soils	Temperature related (extreme heat)	Rare	Extreme heat events will increase ambient temperatures in external storage locations. e.g. fuel and chemical storage facilities leading to possible rupture of storage containers.	Dublin Airport will continue to implement established environmental management procedures for the storage and handling of fuels and chemicals, including appropriate containment, inspection and spill response measures. These measures will help maintain resilience to extreme weather events and minimise the potential for pollution incidents that could affect environmental receptors, airport users and surrounding communities.	Unlikely	Low	Low (Not Significant)	Not required
Surface Access Traffic	Extreme Rainfall	Rare	Extreme rainfall events cause flash flooding to occur on the road network, or makes use of public transport less pleasant / reliable.	A decline in public transport mode share can occur, but existing transport management arrangements and passenger communications will continue to support users during periods of disruption caused by extreme rainfall events.	Rare	Very Low	Low (Not Significant)	Not required
Surface Access Traffic	Storm events (wind)	Rare	Storm events (high winds and hail) make driving unsafe / risk of road traffic accidents.	Disruption to public transport by Red Storm Warning; do not travel instruction should reduce risk to / from operational general traffic; car-based passenger traffic may increase if public transport not available.	Rare	Very Low	Low (Not Significant)	Not required
Surface Access Traffic	Temperature (cold)	Rare	Extreme cold causes dangerous driving conditions.	Disruption to general traffic if access is limited due to local roads being icy; planned winter maintenance by the Roads Authority should avoid risk to/from operational general traffic; reduction in public transport mode share, over winter period; appropriate design of facilities should ensure reliable public transport should avoid mode share shift.	Rare	Low	Low (Not Significant)	Not required
Surface Access Traffic	Increased number of hot days, heatwaves and high temperatures in summer months	Very Likely	Potential increase in heat risk for those travelling to and employed at Dublin Airport, including heat stress and exhaustion.	Disruption to general traffic in heatwaves due to increased vehicles breakdown and reduced driver performance (due to heat exhaustion). Early warnings, travel-time adjustments, and advice should be given to people travelling to the Airport to avoid peak-heat travel reduce congestion and incident rates. Appropriate design of facilities should ensure reliable public transport remains in place.	Unlikely	Low	Low (Not Significant)	Not required

Discipline / Receptor	Climate Hazard	Likelihood of Climate Hazard Occurring	Likely ICCIs Identified	Description of ICCI Considering Embedded Environmental Measures / Good Practice	Likelihood of ICCI Occurring	Consequence of ICCI	Significance	Possible Mitigation Measures
Air Quality	Increased number of hot days	Moderate	Sunnier and drier / drought conditions could change concentrations of certain air pollutants such as NOx, PM2.5, PM10 and ozone (O_3).	It is unlikely that sunnier and drier/drought conditions will exacerbate concentrations of NOx, PM2.5 and PM10 because aircraft engines and ground transportation, such as cars, are expected to be cleaner in the future. This is because aircraft engines will comply with emission standards set by the Committee on Aviation Environmental Protection.	Unlikely	Very Low	Low (Not Significant)	Not required
Air Quality	Increased number of hot days	Moderate	Sunnier/hotter conditions could increase aircraft emissions due to the steeper climb angles taken.	It is unlikely that conditions will exacerbate emissions because aircraft engines are expected to be cleaner in the future.	Unlikely	Very Low	Low (Not Significant)	Not required
Air Quality	Changes to Wind Speed	Unlikely	Changes in wind speed and direction could influence local pollutant levels.	There is considerable uncertainty in projections for changes in wind speed and wind direction, and studies show statistically insignificant variation in wind speed. Monitoring measures are already in place. If there is increased channelling due to changes in wind direction this would increase annual average levels at some receptors and decrease them at others.	Unlikely	Very Low	Low (Not Significant)	Not required
Water Environment	Temperature-related (Extreme heat)	Rare/ Unlikely	Reduce water availability and flow in watercourses due to increasing summer air temperatures	Dublin Airport will continue to apply water conservation and environmental management measures, where appropriate, to support the sustainable use of water resources during periods of elevated temperatures and reduced water availability.	Rare	Very Low	Low (Not Significant)	Not required
Water Environment	Temperature-related (Extreme cold)	Rare/ Unlikely	Increase use of de-icing, therefore increased potential to contaminate watercourse.	Dublin Airport will continue to maintain and operate existing drainage and pollution control measures, including continuous water quality monitoring and the diversion of contaminated water to the Central Pollution Control Facility (CPCF), where required, to minimise the risk of pollution to environmental receptors during extreme weather events.	Rare	Low	Low (Not Significant)	Not required

Discipline / Receptor	Climate Hazard	Likelihood of Climate Hazard Occurring	Likely ICCIs Identified	Description of ICCI Considering Embedded Environmental Measures / Good Practice	Likelihood of ICCI Occurring	Consequence of ICCI	Significance	Possible Mitigation Measures
Water Environment	Reduction in Summer rainfall[1]	Moderate	Increased sensitivity of watercourse to pollution	Dublin Airport will continue to maintain and operate existing drainage and pollution control measures, including continuous water quality monitoring and the diversion of contaminated water to the CPCF, where required, to minimise the risk of pollution to environmental receptors during extreme weather events.	Rare	Low	Low (Not Significant)	Not required

1.2 Conclusion

1.2.1 The ICCI Assessment identified a total of 14 impacts, none of which were found to be significant.

1.2.2 The measures listed are existing embedded controls that inform the assessment. No additional project-specific mitigation is required to reduce significant ICCI effects