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## Introduction

### Background

9.1 This Chapter of the Environmental Impact Assessment Report (EIAR) addresses potential climate effects of a proposed extension to the sand and gravel pit located at Kilmore, Brinny, Co. Cork.

9.2 The proposed development will consist of:

- An extension to the existing sand & gravel pit with extraction area of c. 9.8 hectares worked on a phased basis.
- Continued use of development granted planning permission under P. Ref. 24/6269 comprising the existing processing plant and related water management system; the existing concrete plant; ancillary buildings (site office (63 sq.m), 3 no. welfare portacabins (32 sq.m, 23.5 sq.m & 22.0 sqm), 4 no. storage buildings / containers (15 sq.m, 10 sq.m, 6 sq.m & 5 sq.m), 2 no. garages (76 sqm & 76 sq.m), ESB Substation (26 sq.m)); covered vehicle storage (220 sq.m); site access and all related ancillary facilities (wheelwash, fuel storage tank, weighbridge); and recycling of c. 15,000 tonnes of concrete per year for use in concrete production.
- Phased and final restoration to agricultural use.

All within an application area of c. 18.3 hectares.

Permission is sought for fifteen years plus two years for final restoration (total duration 17 years).

9.3 Further information on the proposed development, site activities, environmental management system and controls are provided in the Chapter 2 of this EIAR – Project Description.

### Scope of Work

9.4 The following sections of this Chapter describe the potential climate change impacts associated with the proposed sand and gravel development. The following issues are addressed separately:

- climate change legislative framework / policy context;
- analysis of evolving environmental baseline trends;
- identifying climate change concerns in relation to proposed development;
- assessing effects (cumulative effects and uncertainty);
- identifying alternatives and mitigation measures;
- identifying monitoring and adaptive management.

### Consultations / Consultees

9.5 No specific consultations have been undertaken in relation to this EIAR chapter.

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## Contributors / Author(s)

- 9.6 The climate impact assessment presented in this Chapter was prepared by SLR Consulting Ireland. The lead consultant for the study was Tim Paul MSc CEng MIEI MRICS MIQ – Chartered Engineer & Chartered Mineral Surveyor.

## Limitations / Difficulties Encountered

- 9.7 There are currently no published guidelines and established methodology providing specifically for assessment of climate impacts from quarrying activities in Ireland. This Chapter of the EIAR has therefore been prepared based on general cross-sectoral guidance.

## Legislative Framework / Policy Context

- 9.8 In recent years, there has been increasing public awareness about the implications of past, ongoing, and continued future emissions of greenhouse gases on the earth's climate. The implications of such change will potentially have significant impact on local communities and national populations across the world. The ever-increasing awareness and acceptance of this reality has, in recent years, prompted significant public policy development around emissions and climate change.
- 9.9 An overview of the legislative framework and policy context which informs this assessment of potential climate impacts of the proposed development at Brinny is presented in Appendix 9-A. This provides background detail in respect of the following:
- National Policy on Adaption to Climate Change
    - o Sectoral Adaption Plans
    - o Local Level Adaption
    - o The Climate Change Action Plan 2021 (CAP 2021)
  - Regulation / Control of Greenhouse Gas Emissions
    - o Paris Agreement (2015)
    - o Kyoto Protocol (2008-2012)
    - o EU 2021-2030 Targets for non-ETS sector emissions- Effort Sharing Regulations
    - o Energy White Paper (2015)
  - Future Management of Flood Risk
  - EIA Directive 2014/52/EU
  - Published Guidelines
    - o Guidance on Integrating Climate Change and Biodiversity into EIA
    - o Assessing Greenhouse Gas Emissions and Evaluating their Significance
    - o Climate Change and Major Projects
    - o Sector Planning Guidelines for Climate Change Adaption
    - o Local Authority Strategy Development Guidelines.

## National Adaptation Framework 2024 Planning for a Climate Resilient Ireland.

- 9.10 The Irish Government, through the Climate & Low Carbon Development (Amendment) Act 2021, commits to achieving 'net-zero' emissions by 2050. Undertakings to achieve this include a national adaptation framework to be provided at least every 5 years, Climate Action Plans to be updated annually, the preparation of a long-term climate action strategy, the provision of a carbon budget programme, and a roadmap of actions and other measures.
- 9.11 Ireland's second statutory National Adaptation Framework (NAF) was published in June 2024 to update the first one published in 2018. The NAF sets out the national strategy to reduce the vulnerability of the country to the negative effects of climate change and to avail of positive impacts. The NAF identifies 13 priority sectors under 7 lead departments that are required to prepare sectoral adaptation plans under the Climate Act. The deadline for the submission of sectoral plans to Government for approval is Q3 2025. The NAF identifies the role of the private sector in investing in renewable energy, sustainable agriculture, and efficient water management systems.
- 9.12 The Government launched the national Climate Action Plan 2025 on 15th April 2025, an ambitious plan to protect us from the devastating consequences of climate change. It targets the delivery and acceleration of actions to reduce emissions and provide for a just transition away from carbon intensive industries. It states that emissions have reduced by 9.5% in the industry sector from 2018-2023, but that this trend in reductions will have to accelerate significantly in order to stay within the sector's emissions ceiling. Actions in 2025 will focus on cement and construction decarbonisation, carbon-neutral heating in Industry, and encouraging more efficient use of energy.
- 9.13 CAP25 sets out the nature of the challenge which Ireland faces over the coming years. The CAP notes that 2023 was the warmest year on record globally and for Ireland, 2023 was the warmest and wettest year on record. Warming has continued in 2024 with the average global temperature for the 12-month period July 2023 – June 2024 the highest on record at 1.64°C above the pre-industrial average. It states that as agreed at COP28, limiting global warming to 1.5°C requires deep, rapid and sustained reductions in global GHG emissions of 43% by 2030 and 60% by 2035 compared to 2019 levels and reaching net zero CO<sub>2</sub> emissions globally by 2050.

## Cork County Council Climate Action Plan 2024 - 2029

- 9.14 In February 2024 Cork County Council adopted its Climate Action Plan 2024-2029, which aligns with the Government's national climate objectives and targets seeking to transition to a climate resilient, biodiversity rich, environmentally sustainable and climate neutral economy by 2050.
- 9.15 Cork County Council will use its Climate Action Plan (CAP) in planning how it will reduce greenhouse gas emissions from across its own assets and infrastructure, whilst also taking on a broader role to influence, facilitate and co-ordinate the climate actions of communities and other stakeholders and what it will do to advocate for climate action in County Cork.

- 9.16 As well as setting out Cork County Council's own potential to reduce carbon emissions through activities in its direct control, the Cork County CAP aims to identify opportunities for the Council to indirectly influence operations in the County. For example, it aims to use its key strategic and regulatory powers and instruments to influence and facilitate the reduction of emissions from infrastructure, buildings, and social housing and to adapt and build resilience to the impacts of a changing climate.
- 9.17 The Applicant commits to work within the framework of national and local policy to identify opportunities to lower its carbon footprint.

## Receiving Environment

### Climate Environmental Baseline

#### Regional Context

- 9.18 Observations of increases in global average air and ocean temperatures, widespread melting of snow and ice, and rising sea level are unequivocal evidence of warming of the climate system globally. Global mean temperature has increased by 0.8°C compared with pre-industrial times for land and oceans, and by 1.0°C for land alone. Most of the observed increase in global average temperatures is very likely due to increases in anthropogenic greenhouse gas concentrations.
- 9.19 In future years, landmasses are expected to warm more than the oceans at northern middle and high latitudes. Despite possible reductions in average summer precipitation over much of Europe, precipitation amounts exceeding the 95th percentile are very likely in many areas; thus episodes of severe flooding may become more frequent despite the general trend towards drier summer conditions. In an ensemble-based approach using outputs from 20 global climate models (GCMs), the Mediterranean, north-east and north-west Europe are identified as warming hot spots but with regional and seasonal variations in the pattern and amplitude of warming. Regional climate models (RCMs) also project rising temperatures for Europe until the end of the 21st century, with an accelerated increase in the second half of the century.
- 9.20 For precipitation, the larger-scale summer pattern shows a gradient from increases in Northern Scandinavia to decreases in the Mediterranean region. By contrast, increases in wintertime precipitation primarily north of 45°N are a consistent feature of RCM projections over Europe, with decreases over the Mediterranean. Overall, then, there are consistent projections of change for northern and north-west Europe, including Ireland.
- 9.21 Ireland has a typical maritime climate, with relatively mild and moist winters and cool, cloudy summers. The prevailing winds are south-westerly in direction. The climate is influenced by warm maritime air associated with the Gulf Stream which has the effect of moderating the climate, and results in high average annual humidity across the country. The area of least precipitation is along the eastern seaboard of the country, in the rain shadow of the Leinster uplands.
- 9.22 Mean seasonal temperature will change across Ireland. A number of studies have applied selected IPCC Special Reports on Emissions Scenarios (SRESs) to model climatic changes across Ireland at a regional scale. Despite the different methods and scenario combinations used, there is agreement in projected changes in temperature for Ireland. However, there are more disparities in the magnitude and sign (i.e. +/- ) for the precipitation changes projected for the island.

9.23 Table 9-1 summarises climate impact projections for Ireland, estimates of projections confidence are derived from published projection data from the Local Authority Adaptation Strategy Development Guidelines<sup>1</sup>.

**Table 9-1: Climate Impacts Projections : 30-Year Overview<sup>1</sup>**

| Variable           | Summary                          | Confidence | Projected Changes                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
|--------------------|----------------------------------|------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Sea Levels Rise    | Strong increase                  | High       | Projections of sea level rise to 2100 suggest a global increase in the range of 0.09-0.88m with a mean value of 0.48m. For 2050, it is reasonable to assume a sea level rise in the region of 25cm above present levels. It should be noted that due to a limited understanding of some important effects that contribute to rates of increase, these estimates of sea level rise may prove optimistic, and estimates of up to 4-6 m have been projected by some models.                                                                               |
| Storm Surge        | Strong increase                  | Medium     | An increase in the number of intense cyclones and associated strong winds are expected over the north - east Atlantic. By the 2050s, storm surge heights in the range of 50-100cm are expected to increase in frequency for all coastal areas with exception of the southern coast.                                                                                                                                                                                                                                                                    |
| Coastal Erosion    | Moderate increase                | Low        | Currently approximately 20% of Ireland's coastline is at risk of coastal erosion, particularly areas of the south and east coast and also in isolated areas on the west coast. Rates of increase will be determined by local circumstances; however, it is expected that areas of the south-west are likely to experience the largest increase.                                                                                                                                                                                                        |
| Cold Snaps / Frost | Moderate decrease (winter/night) | High       | By mid-century, minimum temperatures during winter are projected to increase by ~20C in the southeast and ~2.90C in the north. This change will result in fewer frost days and milder night-time temperatures.                                                                                                                                                                                                                                                                                                                                         |
| Heatwaves          | Strong increase (summer)         | High       | Seven significant heatwaves (defined as 5+ days@>250C) have been recorded in Ireland over the past 30 years, resulting in approximately 300 excess deaths. By mid-century, a projected increase in summer maximum daily temperature of approximately 20C will likely intensify heatwaves, with maximum temperatures increasing and heatwave duration lengthening.                                                                                                                                                                                      |
| Dry Spells         | Strong increase (summer)         | Medium     | There have been eight periods of insignificant rainfall in Ireland in the past 40 years. Of these, the events of 1976, 1995 and 2018 were the most severe, averaging 52, 40 and 54 days in duration respectively across Irish rainfall stations. An approximate 20% decrease in summer precipitation in many areas is strongly indicated under a high emissions scenario. This decrease is likely to result in progressively longer periods without significant rainfall, posing potentially severe challenges to water sensitive sectors and regions. |
| Extreme Rainfall   | Strong increase (winter)         | Low        | Heavy precipitation days (in which more than 20mm of rain falls) are likely to increase in frequency in winter. By the 2050s an increase in the number of heavy precipitation days of around 20% above the level of 1981-2000 is projected under both low-                                                                                                                                                                                                                                                                                             |

<sup>1</sup> Local Authority Adaptation Strategy Development Guideline, EPA 2016

| Variable   | Summary                    | Confidence | Projected Changes                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
|------------|----------------------------|------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|            |                            |            | medium and high emissions scenarios. This may have serious consequences for flood risk in sensitive catchments.                                                                                                                                                                                                                                                                                                                                                      |
| Flooding   | Moderate increase (winter) | Low        | An Irish Reference Network of hydrometric stations has been established to assess signals of climate change in Irish hydrology. This network has detected an increasing trend in high river flows since 2000. Projections of future flows are beset by uncertainty at the catchment scale, but a broad signal of wetter winters and drier summers is evident across a number of independent studies.                                                                 |
| Wind Speed | Minor increase (winter)    | Medium     | Observed wind speed over Ireland has not changed significantly in recent times, but it is anticipated that the distribution of wind will alter slightly in future, with winters marginally windier and summers marginally less so. Though the average wind speed is anticipated to change in only a minor way over the coming decades, the frequency of extreme windstorms is expected to increase due to alternations in the origin and track of tropical cyclones. |

## Local Context

- 9.24 The weather station at Cork Airport which is located approximately 15km to the north-east of the application site is considered representative of conditions experienced at the application site.

## Temperature

- 9.25 The moderating influence of the Atlantic Ocean is felt throughout Ireland. The annual mean temperature for different areas in Ireland varies between mountainous regions, lowlands and the coast. Mean daily maximum temperatures are typically between 8.2 to 18.7°C and mean daily minimum temperatures are typically between 3.0 to 11.8°C.
- 9.26 The mean daily duration recording of sunshine for the area around Cork Airport is 3.9 hours. December is the dullest month, with 1.7 hours for Cork Airport of mean daily duration. May is the sunniest month, with 6.2 hours for Cork Airport and of mean daily duration, explained largely by its long days and finer weather.

**Table 9-2: Cork Airport 1981-2010 Temperature Averages**

|                  | Temperature (degrees Celsius) |     |     |      |      |      |      |      |      |      |      |     |      |
|------------------|-------------------------------|-----|-----|------|------|------|------|------|------|------|------|-----|------|
|                  | Jan                           | Feb | Mar | Apr  | May  | Jun  | Jul  | Aug  | Sep  | Oct  | Nov  | Dec | Year |
| Mean Daily Max   | 8.2                           | 8.3 | 9.9 | 11.8 | 14.4 | 17   | 18.7 | 18.5 | 16.5 | 13.2 | 10.3 | 8.5 | 12.9 |
| Mean Daily Min   | 3.0                           | 3.1 | 4.0 | 4.9  | 7.4  | 10.0 | 11.8 | 11.8 | 10.2 | 7.7  | 5.2  | 3.7 | 6.9  |
| Mean Temperature | 5.6                           | 5.7 | 6.9 | 8.4  | 10.9 | 13.5 | 15.3 | 15.2 | 13.3 | 10.5 | 7.8  | 6.1 | 9.9  |

## Wind

- 9.27 Results from the synoptic meteorological station at Cork Airport, located approx. 30km north-east of the application site over the period 1990-2007, indicate that the main wind direction is from a west and south-westerly direction, with an annual incidence of 37.9%

for winds between 200° and 280°; and 30% for winds between 290° and 0° refer Figure 9-1. The lowest frequency is for winds blowing from the east and northeast direction.

- 9.28 The mean yearly wind speed at Cork Airport over the period 1981 to 2010 is 10.5 knots, or 5.4 m/s, with maximum gusts of 65.9 knots or 33.9 m/s. The average number of gale days per year is 10.8; indicating that the area is “windy”, without experiencing the extreme gusts that occur on the west coast (Table 9-3).

**Table 9-3: Cork Airport Wind**

| WIND (knots)              | Jan  | Feb  | Mar  | Apr  | May  | Jun  | July | Aug  | Sep  | Oct  | Nov  | Dec  | Year |
|---------------------------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| Mean monthly speed        | 12.1 | 12.0 | 11.6 | 10.3 | 10.1 | 9.4  | 9.0  | 9.0  | 9.4  | 10.7 | 10.9 | 11.6 | 10.5 |
| Max. gust                 | 78.0 | 83.0 | 70.0 | 62.0 | 59.0 | 49.0 | 57.0 | 54.0 | 58.0 | 75.0 | 66.0 | 80.0 | 65.9 |
| Max. mean 10-minute speed | 52.0 | 54.0 | 43.0 | 40.0 | 40.0 | 33.0 | 40.0 | 38.0 | 39.0 | 48.0 | 46.0 | 56.0 | 44.1 |
| Avg days with gales       | 2.3  | 1.8  | 1.3  | 0.3  | 0.3  | 0.0  | 0.1  | 0.2  | 0.3  | 1.0  | 1.2  | 1.9  | 10.8 |

### Rainfall / Precipitation

- 9.29 During the period 1981-2010, long-term monthly rates of precipitation were between 76.5mm and 133.1mm at the Cork Airport station, with winter months receiving the heaviest amounts. The mean of the Met Eireann records indicates that average annual rainfall around Cork Airport is approximately 1227.9mm / year; refer to Table 9-4. The average rainfall data indicates that the greatest daily total (73.2mm) falls in the month of July.

**Table 9-4: Average Precipitation Cork Airport (mm) 1981-2010**

| Rainfall (mm)                  |       |      |      |      |      |      |      |      |      |       |       |       |        |
|--------------------------------|-------|------|------|------|------|------|------|------|------|-------|-------|-------|--------|
|                                | Jan   | Feb  | Mar  | Apr  | May  | Jun  | Jul  | Aug  | Sep  | Oct   | Nov   | Dec   | Year   |
| Mean Monthly Total             | 131.4 | 97.8 | 97.6 | 76.5 | 82.3 | 80.9 | 78.8 | 96.8 | 94.6 | 138.2 | 120.0 | 133.1 | 1227.9 |
| Greatest Daily Total           | 45.7  | 49.9 | 55.2 | 34.2 | 34.9 | 59.7 | 73.2 | 60.9 | 58.9 | 52.1  | 47.9  | 41.9  | 73.2   |
| Mean num. of days with ≥ 0.2mm | 20    | 17   | 19   | 16   | 15   | 14   | 15   | 15   | 16   | 19    | 19    | 19    | 204    |

- 9.30 Rainfall is an important climatological parameter in the generation or control of dust; sufficient amounts of rainfall can suppress dust at the source and eliminate the pathway to the receptor. According to Arup Consulting Engineers (1995)<sup>2</sup>, rainfall greater than 0.2mm per day is sufficient to suppress dust emissions – refer to EIAR Chapter 8 (Air Quality). For the 30-year period (1981-2010) Cork Airport has recorded an average of 204 days per year (55%) where rainfall is equal to or above 0.2mm.

<sup>2</sup> Arup Environmental. Environment Effects of Surface Mineral Workings. UK DoE, October 1995

## Impact Assessment

### Methodology

- 9.31 In Ireland some sectors have independently begun the process of identifying key vulnerabilities for their activities. The report by the Irish Academy of Engineering, Ireland at Risk Critical Infrastructure – Adaptation for Climate Change (The Irish Academy of Engineering, 2009) and the report by the Heritage Council and Fáilte Ireland (the National Tourism Development Authority), Climate Change, Heritage and Tourism, Implications for Ireland's Coast and Inland Waterways (ed. Kelly and Stack, 2009) are examples of initiatives of this kind.
- 9.32 Other research work on adaptation in specific sectors has been carried out or commissioned by other Government Departments/bodies such as the OPW, CoFoRD (programme of competitive forest research for development research programme, etc. (e.g. CLIMADAPT).
- 9.33 A National Climate Change Vulnerability Scoping Study (Sweeney and Coll, 2012) was undertaken to identify first generation vulnerabilities for Ireland based on a sensitivity analysis across key sectors. The analysis identified a clustering of impacts and their importance in relation to an assessment of likely resilience by sector. The assessment methodology used was an impacts-first, science-first classical approach. The priority sectors identified are biodiversity and fisheries; water resources and the built coastal environment; forestry and agriculture.
- 9.34 As each sector develops its sectoral adaptation plan (under the Climate Action and Low Carbon Development Act 2015), detailed vulnerability and risk analysis will be required. Some preliminary work has been undertaken on costing the impacts of climate change in Ireland. This is now being supported by more detailed analysis of the current and future costs of flood risk management.
- 9.35 The implementation of adaptation is being supported by the development of a suite of guidelines, tools and approaches. These include the Local Authority Adaptation Strategy Development Guideline; and the Irish climate information platform "Climate Ireland", which includes data, information, tools and approaches for local level adaptation decision making. Work is ongoing to develop sectoral decision-making tools and supports.
- 9.36 There are no specific tools developed for assessing climate change for extraction industry. The Climate Change and Major Project guidelines on how to make investments resilient to climate change provides a methodology for undertaking a vulnerability and risk assessment.
- 9.37 Climate change adaptation and mitigation are to be increasingly integrated in the preparation and approval of proposed development. Adaptation seeks to ensure adequate resilience of proposed development to the adverse impacts of climate change based on Vulnerability. Mitigation seeks to reduce the emissions of greenhouse gases.

### Development Vulnerability

- 9.38 The aim of the vulnerability assessment is to identify the relevant climate hazards foreseen at the development location. Main steps include identifying and combining the sensitivity and exposure of the project which will describe the vulnerability, while the risk will be determined by likelihood and impact. Adaptation through project options, appraisal, and planning will depend on the assessed project vulnerability and risk.

- 9.39 Timescale for the project vulnerability and risk assessment shall correspond to the lifespan of the project. During the lifespan, there could be significant changes in frequency and intensity of weather events due to climate change, which should be taken into account. Detailed methodology charts for development vulnerability assessment are presented in Appendix 9-B.

### Greenhouse Gases Emissions

- 9.40 All projects have the potential to emit greenhouse gas (GHG) emissions to atmosphere during the construction, operational and decommissioning phase of the development. Direct GHG emissions may be caused by operational activities and project commissioning / decommissioning. Indirect GHG emissions may be due to increased demand for energy and indirect GHG generating activities. Indirect GHG activities linked to the development projects may include transport, space heating of buildings / offices or loss of habitats that provide carbon sequestration, (e.g. through land-use change).
- 9.41 The significance of a project's GHG emissions should be based on its net impact, which may be positive or negative. Where GHG emissions cannot be avoided, the significance of a project's emissions shall be reduced by mitigation or project design. Where GHG emissions remain significant but cannot be reduced further approaches to compensate project emissions should be considered.
- 9.42 Currently in Ireland, there is no set methodology to evaluate significance criteria or a defined threshold for GHG emissions for the mineral extraction industry. Due to the inconsistencies between the different methods and their assumptions for assessment, there is no single agreed method by which to assess a project carbon budget. The method of assessment varies according to the type and scale of the development.
- 9.43 Due to a lack of guidelines and an established methodology, the assessment of significance of the GHG emissions is based on whether the development's GHG emissions cumulatively represent a considerable contribution to the global atmosphere and whether the development as continued or extended will replace existing development that would have a higher GHG profile.
- 9.44 Where the GHG emissions cannot be avoided, the mitigation should aim to reduce the development emissions at all stages.

### Development Vulnerability Assessment

- 9.45 The aim of the vulnerability assessment is to identify the relevant climate hazards for the project at the foreseen location. A development vulnerability assessment for the proposed development is presented in Appendix 9-C.
- 9.46 Based on the development vulnerability assessment, measures to improve the resilience of the project to extreme rainfall, flood, flash flood, storms, and winds are required.

### Greenhouse Gas Emissions Assessment

- 9.47 For the purpose of this assessment, GHG emissions have been calculated for the proposed development based on annual energy use at Brinny in future years.
- 9.48 Planning permission ref. 24/06269 provides for recycling of 15,000 tonnes of concrete per year for use in concrete production; importation of 25,000 tonnes of sand & gravel for processing; and importation of up to 20,000 tonnes of inert soil & stone per year (under Article 27) for phased restoration. This equates to a total of up to 60,000 tonnes per year.

- 9.49 The proposed maximum annual output from the pit extension will be 60,000 tonnes of sand & gravel per year.
- 9.50 The maximum number of HGV movements generated will be one to two HGV trips per hour based on a maximum annual total output / import of 120,000 tonnes per year, 50 week year, 5.5 day week, 11 hour full day and 28 tonne (aggregates / inert soil) or 8 cu. metre (concrete) HGV loads.
- 9.51 For the purposes of this climate assessment, the projected traffic movements associated with the development will generate a maximum of 16 HGV two-way trips per day for 50 weeks per year (5.5 days a week), based on section 9.50 above. For the purposes of this assessment, it has also been assumed that the average distance travelled for each delivery will be 25km each way (or 50km in total).
- 9.52 It is estimated that c. 1,000 litres of diesel will be consumed each week (for 50 weeks per year) to power processing plant and on-site loading plant and equipment. It is also assumed that the weighbridge, wheelwash, concrete plant, lighting and heating for site offices, welfare facilities and other buildings will collectively consume 10,000kWh of electrical power per week.
- 9.53 Total estimated annual GHG emissions associated with the proposed site activities are presented in Table 9-5.

**Table 9-5: GHG Emissions Calculations**

| Type                                        | Annual Value  | Distance Travelled (km) | Conversion factor | Calculated (CO <sub>2e</sub> kg) | Total annual CO <sub>2e</sub> kg |
|---------------------------------------------|---------------|-------------------------|-------------------|----------------------------------|----------------------------------|
| Traffic (trips)                             | 4,400 No.     | 50                      | 0.71266           | 150,830                          | -                                |
| Energy (Diesel)                             | 50,000 litres |                         | 2.60016a          | 130,008                          | -                                |
| Electrical Power (Offices / Concrete Plant) | 500,000 kWh   |                         | 0.35b             | 175,000                          |                                  |
| TOTAL                                       |               |                         |                   |                                  | 455,838                          |

a Conversion factor for 2017 for Scope 1 Protocol for fuels: diesel.

Conversion factor for Irish power grid 0.35kg CO<sub>2</sub> / kWh ([www.smartgriddashboard.eirgrid.com](http://www.smartgriddashboard.eirgrid.com))

- 9.54 Based on the calculated total of 455,838 CO<sub>2e</sub> kg (456 CO<sub>2e</sub> tonnes) and a comparison to Ireland's 2024 emissions value of 53.75 million tonnes of CO<sub>2e</sub>, it is assessed that proposed operations would represent less than c. 0.001% of Ireland's annual CO<sub>2e</sub> emissions for the duration of the development.
- 9.55 Based on the scale and extent of proposed activities, GHG emissions generated by the proposed development are assessed as not making a significant contribution to the global atmosphere.

## Mitigation

- 9.56 Mitigation is designed to increase the resilience of the development, or wider environmental receptors, to climate change and focuses on increasing capacity to absorb climate related shocks.

## Project Adaptation against Expected Climate Change Effects

- 9.57 In the context of climate change, measures to increase the adaptive capacity of the proposed development and disaster risk reduction strategies can be developed with a view to reducing vulnerability and increasing its resilience. Significant incidents related to the climate change that affect operation of the proposed development should be recorded for future analysis.
- 9.58 Based on a development vulnerability assessment (refer to Appendix 9-C), measures to improve the resilience of the project to extreme rainfall, flash flood, storms, and winds are required. Table 9-6 details specific mitigation measures for the proposed development relating to climate change adaptation.

**Table 9-6: Mitigation Measures Related to Climate Change Adaptation**

| Main Concerns Related to:            | Proposed Alternatives or Mitigation Measures                                                              |
|--------------------------------------|-----------------------------------------------------------------------------------------------------------|
| Extreme Rainfall, Flood, Flash Flood | Development scheme layout avoids mapped flood hazard areas.                                               |
| Storms and Winds                     | Implement procedures to facilitate operational shutdown where required during extreme weather conditions. |
|                                      | Ensure the selection, design, operation, and maintenance of plant and equipment meets required standards. |
| Risk Reduction Mechanism             | Secure and maintain insurance for site assets and operations.                                             |

## Proposed Reduction of GHG Emissions

- 9.59 The Applicant will implement a GHG monitoring programme at Brinny. Based on the GHG monitoring results, the company will establish short, medium, and long-term objectives and targets for a GHG reduction programme and energy management plan.
- 9.60 Table 9-7 details specific mitigation measures for the Brinny in respect of the GHG reduction programme.

**Table 9-7: Mitigation Measures Related to GHG Reduction Programme**

| Main Concerns Related to: | Proposed Alternatives or Mitigation Measures                                                |
|---------------------------|---------------------------------------------------------------------------------------------|
| Energy supply             | Consider using renewable energy sources / suppliers.                                        |
| Direct GHG emissions      | Use energy efficient machinery / energy, consider use of electric machinery where possible. |

- 9.61 GHG emissions related to unnecessary equipment use / transport journeys should be avoided by management of transport and travel demands. Equipment should not be left in un-necessary idling mode.

## Accidents, Malfunctions and Unplanned Events

- 9.62 Accidents, malfunctions and unplanned events refer to events or upset conditions that are not part of any activity or normal operation of the proposed development planned by the Applicant. Even with the best planning and the implementation of preventative measures,

the potential exists for accidents, malfunctions or unplanned events to occur during the proposed extraction.

- 9.63 Many accidents, malfunctions and unplanned events are, however, preventable and can be readily addressed or prevented by good planning, design, emergency response planning, and mitigation. In terms of climate change impact, the following unplanned events could have an effect on the local area:

- equipment malfunction;
- vehicle collision;
- accidental material spillages during transport;

- 9.64 In relation to climate change, the impacts of any unplanned events are considered to be negligible.

## Monitoring

### Project Adaptation against Expected Climate Change Effects

- 9.65 A framework will be developed to assess project preparedness for adaptation against climate change. Provision shall be made for a periodic review of plans and the allocation of reporting responsibilities for a regime to measure and evaluate progress on adaptation. This will be documented in the Environmental Management System (EMS).

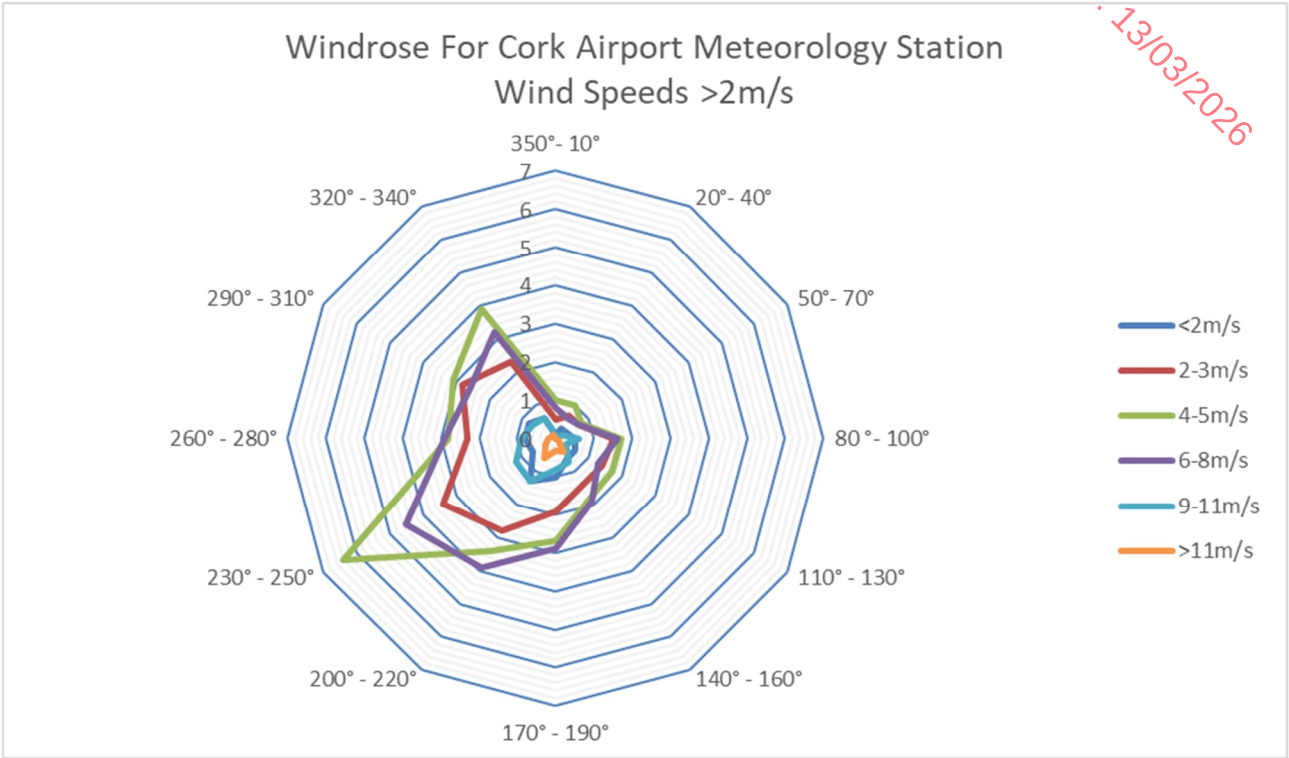
## GHG Emissions

- 9.66 Monitor, report and review progress in achieving GHG reductions within the Environmental Management System.

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## Figures

Figure 9-1: Windrose for Cork Airport Meteorology Station



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## **Appendix 9-A      Climate Change: Legislative Framework / Policy Context**

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## Introduction

In recent years, there has been increasing public awareness about the implications of past, ongoing and continued future emissions of greenhouse gases on the earth's climate. The implications of such change will potentially have significant impact on local communities and national populations across the world. The ever increasing awareness and acceptance of this reality has, in recent years, prompted significant public policy development around emissions and climate change.

An overview of the legislative framework and policy context which informs this assessment of the potential climate impacts of the proposed development at Brinny sand and gravel pit is presented herein below.

## National Adaptation to Climate Change

The Irish National Policy Position establishes the fundamental national objective of achieving transition to a competitive, low carbon, climate-resilient and environmentally sustainable economy by 2050. It sets out the context for the objective; clarifies the level of GHG mitigation ambition envisaged; and establishes the process to pursue and achieve the overall objective. Specifically, the National Policy Position envisages that policy development will be guided by a long-term vision based on:

- an aggregate reduction in carbon dioxide (CO<sub>2</sub>) emissions of at least 80% (compared to 1990 levels) by 2050 across the electricity generation, built environment and transport sectors;
- in parallel, an approach to carbon neutrality in the agriculture and land-use sector, including forestry, which does not compromise capacity for sustainable food production.

The evolution of climate policy in Ireland will be an iterative process based on the adoption by Government of a series of national plans over the period to 2050. Greenhouse gas mitigation and adaptation to the impacts of climate change are to be addressed in parallel national plans – respectively through National Mitigation Plans and National Climate Change Adaptation Frameworks. The plans will be continually updated, as well as being reviewed on a structured basis at appropriate intervals, and at a minimum, every five years. This will include early identification and ongoing updating of possible transition pathways to 2050 to inform sectoral strategic choices.

The Climate Action and Low Carbon Development Act 2015<sup>3</sup> was enacted in December 2015. The Act identified and provided for the development and submission to Government of national mitigation and adaptation plans. It also established the institutional and governance framework within which these plans can be developed and implemented on a cyclical basis.

The Department of Communications, Climate Action and Environment (DCCAE) published a National Adaptation Framework (NAF) in January 2018<sup>4</sup>. The NAF sets out the national strategy to

<sup>3</sup> <https://www.dccae.gov.ie/en-ie/climate-action/legislation/Pages/Climate-Action-and-Low-Carbon-Development-Act-2015.aspx>

<sup>4</sup> <https://www.dccae.gov.ie/en-ie/climate-action/topics/adapting-to-climate-change/national-adaptation-framework/Pages/default.aspx>

reduce the vulnerability of the country to the negative effects of climate change and to avail of positive impacts.

The NAF builds on the work already carried out under the National Climate Change Adaptation Network (NCCAF, 2012). Under the NAF a number of Government Departments will be required to prepare sectoral adaptation plans in relation to a priority area that they are responsible for. Local authorities are required to prepare local adaptation strategies. NAF also aims to improve the enabling environment for adaptation through ongoing engagement with civil society, the private sector and the research community.

The Climate Action and Low Carbon Development (Amendment) Act 2021 was signed into law by the President of Ireland on the 23rd of July 2021 enacting the pursuit of a higher level of climate action targets and ambition over the next decades including for the local government sector. The Act provides for approval of plans, by the government, towards achieving the National Climate Objective. The National Climate Objective refers to the transitioning of the country to a climate resilient, biodiversity rich, environmentally sustainable, and climate neutral economy by no later than 2050. The Act introduces the development of carbon budgets and sectoral emission ceilings covering successive five-year periods up to 2050. The Act states that carbon budgets for the purpose of achieving the National Climate Objective shall be proposed by the Climate Change Advisory Council and approved by government for a five-year period with new budgets introduced for each subsequent 5-year period thereafter. The first two carbon budget cycles will be aimed towards achieving a 51% reduction in greenhouse gas emissions by the end of 2030, using 2018 as the baseline year.

The Act also tasks the government with the development of a National Long-Term Climate Action Strategy, covering a minimum period of 30 years, and a National Adaptation Framework. The Long Term Climate Action Strategy will be updated every 5 years taking account of how the country is progressing towards the National Climate Objective. Additionally, the government is required to update the Climate Action Plan 2019: To Tackle Climate Breakdown on an annual basis.

Within 12 months of the enactment of the Act, local authorities will be requested by the Minister to prepare and make Local Authority Climate Action Plans. These Plans are to highlight the mitigation and adaptation measures that will be adopted during the next 5-year period. Local Authority Climate Action Plans are to be consistent with the most recently approved Climate Action Plan and National Adaptation Framework and have regard for the most recently approved Long-Term Climate Action Strategy, the most recently approved Sectoral Adaptation Plans, the National Planning Framework and any current Climate Change Policies. Local authorities are to cooperate with adjoining local authorities in the development of their Climate Action Plans. A further provision of the Bill provides that the Minister may issue guidelines in respect of the content and preparation of the local authority climate action plans and that local authorities shall comply with these guidelines.

The Climate Action and Low Carbon Development (Amendment) Act 2021 also included an amendment of Section 10(2) (n) of the Planning and Development Act 2000 whereby, to reduce anthropogenic greenhouse gas emissions as well as addressing adaptation requirements, County Development Plans will need to take account of Local Authority Climate Action Plans.

## Sectoral Adaptation Plans

Under the National Adaptation Framework (NAF), Government Departments have to prepare Sectoral Adaptation Plans. Twelve sectors under 7 Government Departments will prepare plans. The deadline for submitting plans to Government is 30 September 2019. The sectors are :

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- Seafood - Department of Agriculture, Food and the Marine;
- Agriculture - Department of Agriculture, Food and the Marine;
- Forestry - Department of Agriculture, Food and the Marine;
- Biodiversity - Department of Culture, Heritage and the Gaeltacht;
- Built and Archaeological Heritage - Department of Culture, Heritage and the Gaeltacht;
- Transport infrastructure - Department of Transport, Tourism and Sport;
- Electricity and Gas Networks - Department of Communications, Climate Action and Environment;
- Communications networks - Department of Communications, Climate Action and Environment;
- Flood Risk Management - Office of Public Works;
- Water Quality - Department of Housing, Planning and Local Government;
- Water Services Infrastructure - Department of Housing, Planning and Local Government;
- Health - Department of Health.

The aggregate and extractive industries were not specifically required under the National Adaptation Framework (NAF) to prepare sectoral adaptation plans in line with the requirements of the Climate Action and Low Carbon Development Act.

Under the non-statutory 2012 Framework, four Government Departments prepared draft sectoral plans covering 5 sectors. These plans are :

- Sectoral Adaptation Plan for Flood Risk Management (OPW, 2015);
- Adaptation Planning - Developing Resilience to Climate Change in the Irish Agriculture and Forest Sector (DAFM, 2017);
- Adaptation Planning - Developing Resilience to Climate Change in the Irish Transport Sector (DTTAS, 2017);
- Adaptation Plan for the Electricity and Gas Networks Sector (DCCAE, 2017).

Government Departments must develop statutory sectoral adaptation plans in accordance with the NAF and with a six-step adaptation planning process described in Sectoral Planning Guidelines for Climate Change Adaptation. This Department published the guidelines for the use of the sectors required to prepare statutory sectoral adaptation plans under the Framework. The guidelines aim to ensure that a coherent and consistent approach to adaptation planning will be adopted by the key sectors in Ireland. Completed plans could include actions that :

- Integrate adaptation into key sectoral plans and policies;
- identify and understand the key vulnerabilities, risks, and opportunities facing their sectors. This should include major cross cutting risks;
- ensure that plans related to emergencies assigned to a sectoral department as lead Government department under the Strategic Emergency Planning Guidelines are climate proofed;

- identify and collect information on the costs and benefits of adaptation within their sectors;
- build capacity within their sectors to cope with climate change;
- identify and address key research gaps within their sectors;
- improve co-ordination with the local government sector;
- develop appropriate monitoring and verification systems within their sectors.

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### Local Level Adaptation

The National Adaptation Framework identifies the critical role to be played by local authorities in addressing climate change adaptation. This will effectively build on their existing expertise and experience as first responders in emergency planning scenarios. Under the NAF each local authority will also be developing their own adaptation strategies in line with guidelines developed for the sector. Local authorities had been set a deadline for the completion of local adaptation strategies of 30 September 2019.

The NAF explores how local authorities might adopt a joint or regional approach to adaptation planning. In January 2018 the DCCAE entered into a five-year financial commitment of €10m to establish four Climate Action Regional Offices (CAROs). Building on a business case prepared by the local government sector itself, this commitment recognises the significant obligation which has been placed on local government to develop and implement its own climate action measures, as well as the need to build capacity within the sector to engage effectively with climate change – both in terms of mitigation and adaptation.

The Climate Action Regional Offices are being operated by a lead local authority in four different regions that have been grouped together based on a climate risk assessment with a focus on the predominant risk(s) in each geographical area. The establishment of these offices will enable a more coordinated engagement across the whole of government and will help build on the experience and expertise which exists across the sector.

### The Climate Change Action Plan 2021 (CAP 2021)

Published in November 2021 in line with the requirements of the Climate Action and Low Carbon Development (Amendment) Act 2021. This plan sets a roadmap for taking decisive action to halve Ireland's emissions by 2030 and reach net zero no later than 2050.

The Plan sets out indicative ranges of emissions reductions targets for each sector of the economy and actions to achieve these. In relation to local authorities, the Plan states:

The Climate Action Regional Offices will continue to play a central role in supporting and coordinating climate action by local authorities including developing capacity through training; supporting behavioural change initiatives; identifying and sourcing funding opportunities; and measuring and recording performance.

- Each local authority will prepare a Climate Action Plan at least once every five years, containing both mitigation and adaptation measures.
- Each local authority will develop a decarbonisation zone within its administrative area that will become the focus for a range of climate mitigation, adaptation and biodiversity measures.

- This process will include the identification of projects and their associated outcomes that will contribute to achieving our national climate target.

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Table 9-A-1 summarises the adaptation actions to climate change in Ireland.

**Table 9-A-1: Summary of Adaptation to Climate Change Actions in Ireland<sup>5</sup>**

| Item                                              | Status                                                                             | Programs                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
|---------------------------------------------------|------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| National Climate Adaptation Strategy              | Legislation enacted.<br>Statutory Framework adopted                                | Climate Action and Low Carbon Development Act 2015<br>National Adaptation Framework<br>Climate Action and Low Carbon Development (Amendment) Act 2021                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| Action Plans                                      | Sectoral Adaptation Plans in development.<br>Local authority plans in development. | Local Authority Adaptation Strategy Development Guidelines (2016)<br>Sectoral Planning Guidelines for Climate Change Adaptation<br>Local Authority Adaptation Support Tool<br>The Climate Change Action Plan 2021                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| Impacts, Vulnerability and Adaptation Assessments | National Vulnerability Assessment                                                  | 2012 National Climate Change Vulnerability Scoping Study<br>Climate Change Impacts on Biodiversity in Ireland (2013)<br>Climate change Impacts on Phenology in Ireland(2013)<br>COCOADAPT (2013)<br>2013 HydroDetect Project<br>Robust Adaptation to Climate Change in the Water Sector in Ireland (2013)<br>Ensemble of Regional Climate Projections for Ireland(2015)<br>Urb-ADAPT<br>Sectoral Adaptation Plan for Flood Risk Management (OPW, 2015)<br>Adaptation Planning - Developing Resilience to Climate Change in the Irish Agriculture and Forest Sector (DAFM, 2017)<br>Adaptation Planning - Developing Resilience to Climate Change in the Irish Transport Sector (DTTAS, 2017)<br>Adaptation Plan for the Electricity and Gas Networks Sector (DCCAIE, 2017) |
| Research Programs                                 | EPA Research Programme (Climate Pillar)                                            | <a href="http://www.epa.ie">http://www.epa.ie</a>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |

<sup>5</sup> <http://climate-adapt.eea.europa.eu/countries-regions/countries/ireland>

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| Item                                  | Status                   | Programs                                                                |
|---------------------------------------|--------------------------|-------------------------------------------------------------------------|
| Climate services / Met Office         | Established              | <a href="http://www.met.ie">http://www.met.ie</a>                       |
| Web Portal                            | Established              | <a href="http://www.climateireland.ie">http://www.climateireland.ie</a> |
| Monitoring, Indicators, Methodologies | In development           |                                                                         |
| Training, Education                   | Ongoing / in development | <a href="http://www.climateireland.ie">http://www.climateireland.ie</a> |

## Regulation / Control of Greenhouse Gas Emissions

Ireland is a party to both the United Nations Framework Convention on Climate Change (UNFCCC) and the Kyoto Protocol, which together provide an international legal framework for addressing climate change.

In December 2015, an ambitious new legally binding, global agreement on climate change was agreed in Paris. The Paris Agreement aims to restrict global temperature rise to well below 2°C above pre-industrial levels, and to pursue efforts to limit the temperature increase to 1.5°C. It aims to increase global ability to adapt to the adverse impacts of climate change and to foster climate resilience and low greenhouse gas emissions development, in a manner that does not threaten sustainable food production. It also seeks to achieve a balance between anthropogenic emissions by sources, and removals by sinks, of greenhouse gases in the second half of this century.

The first Irish National Mitigation Plan<sup>6</sup> represents an initial step to set us on a pathway to achieve the level of decarbonisation required. It is a whole-of-Government Plan, reflecting in particular the central roles of the key Ministers responsible for the sectors covered by the Plan – Electricity Generation, the Built Environment, Transport and Agriculture, as well as drawing on the perspectives and responsibilities of a range of other Government Departments.

The measures that will be implemented through the plan will lay foundations for transitioning Ireland to a low carbon, climate resilient and environmentally sustainable economy by 2050. To support this ongoing work, the Plan also includes over 100 individual actions for various Ministers and public bodies to take forward.

Emissions reduction measures and actions set out in this National Mitigation Plan are aligned with and build upon commitments made in the 2015 Energy White Paper. This paper will be guided by the following strategic objectives :

- policy will contribute to reductions in Ireland's greenhouse gas emissions and enhancement of sinks in a manner that achieves the optimum benefits at least cost;
- a stable and predictable policy and regulatory framework will be underpinned by rigorous analysis and appraisal, supported by strong research and analytical capacity;
- the Government will pursue investment, innovation and enterprise opportunities towards building a competitive, low carbon, climate-resilient and environmentally sustainable economy; and

<sup>6</sup> <https://www.dccae.gov.ie/en-ie/climate-action/topics/national-mitigation-plan/Pages/default.aspx>

- the citizen and communities will be at the centre of the transition.

## COP 26

The Glasgow Climate Pact (The Pact), the final agreement document of COP26 that was negotiated by nearly 200 countries. For the first time in a UN climate agreement, there is an explicit reference to coal and fossil fuel subsidies and a promise to increase aid to developing countries, who are bearing the brunt of climate change. The main outcome of COP26 was the agreement of the Glasgow Climate Pact, which includes the following:

- Agreement that the current NDCs, are inadequate to limit temperature rises to 1.5C, and a roadmap for more frequent revisions of NDC's starting at COP27 next year in Egypt,
- Commitment to "phase down" coal-fired power generation. Unfortunately, this text was watered down from "phase-out", at the last minute. Nevertheless agreement on this was important.
- Commitment to significantly increase funding for developing countries hardest hit by the effects of climate change.

## Paris Agreement

The Paris Agreement which entered into force on 4 November 2016 aims to tackle 95% of global emissions through 188 Nationally Determined Contributions (NDCs) which will increase in ambition over time. Ireland's contribution to the Paris Agreement will be via the NDC tabled by the EU on behalf of its Member States. This is a binding target for an overall reduction of at least 40% in greenhouse gas emissions by 2030 (relative to 1990 levels). The target will be delivered by the EU by 2030 through reductions in the Emissions Trading Scheme (ETS) and non-ETS sectors of 43% and 30% respectively (relative to 2005).

## Kyoto Protocol (2008 – 2012)

The EPA has overall responsibility for the national greenhouse gas inventory in Ireland's national system, which was established in 2007 under Article 5 of the Kyoto Protocol<sup>7</sup>. The EPA's OCLR<sup>8</sup> performs the role of inventory agency in Ireland and undertakes all aspects of inventory preparation and management as well as the reporting of Ireland's submissions annually in accordance with the requirements of Decision 280/2004/EC and the UNFCCC.

Ireland currently accounts for GHG emissions under the Kyoto Protocol. The Kyoto Protocol required Ireland to limit total national greenhouse gas emissions to 314.2 Mtonnes of CO<sub>2eq</sub> over the five-year period 2008 – 2012 which is equivalent to 62.8 Mtonnes of CO<sub>2eq</sub> per annum. The Kyoto Protocol limit is calculated as 13% above Ireland's 1990 baseline value which was established and fixed at 55.61Mtonnes of CO<sub>2eq</sub> following an in-depth review of Ireland's 2006 greenhouse gas inventory submission to the UNFCCC<sup>9</sup>.

<sup>7</sup> [http://unfccc.int/kyoto\\_protocol/items/2830.php](http://unfccc.int/kyoto_protocol/items/2830.php)

<sup>8</sup> <http://www.epa.ie/mobile/about/org/oclr/>

<sup>9</sup> [http://unfccc.int/files/national\\_reports/annex\\_i\\_natcom/submitted\\_natcom/application/pdf/nc6\\_br1\\_ire.pdf](http://unfccc.int/files/national_reports/annex_i_natcom/submitted_natcom/application/pdf/nc6_br1_ire.pdf)

## EU 2021-2030 Targets for non-ETS sector emissions- Effort Sharing Regulations<sup>10</sup>

Under the EU Commission's Climate and Energy Package, sectors of the economy not covered by the EU ETS must reduce emissions by 30% by 2030 compared to 2005 as their contribution to the overall target.

The non-ETS sectors cover those sectors that are outside the EU Emissions Trading Scheme and includes agriculture, transport, built environment (residential, commercial/institutional), waste and non-energy intensive industry.

## 2015 Energy White Paper

The White Paper on Energy Policy, Ireland's Transition to a Low Carbon Energy Future 2015-2030, published in 2015, sets out a framework to guide energy policy in the period to 2030. The White Paper recognises that a radical transformation of our energy system is required to meet our national, EU and international climate objectives and sets a course for an energy sector where the State will provide the supports that enable consumers to become active energy citizens. It posits a policy approach where our energy system will change from one that is almost exclusively led by Government and utilities to one where individuals and communities are agents of change in the way Ireland generates, transmits, stores, conserves and uses energy. It sets out a vision, a framework and over 90 actions for Irish energy policy up to 2030 as we transition to a low carbon society and economy by 2050.

## Future Management of Flood Risk

The Catchment Flood Risk Assessment and Management (CFRAM) Programme<sup>11</sup> (see [www.cfram.ie](http://www.cfram.ie)) is the mechanism established to facilitate future adaptation to climate change. It provides for long-term flood risk management in Ireland and the embedment of flood risk assessment in the future development of capital projects. The future scenario flood maps produced under the CFRAM Programme will facilitate this approach, inform other industrial sectors, and provide a valuable resource for local adaptation planning and sustainable land use management and planning.

## EIA Directive 2014/52/EU

Directive 2014/52/EU<sup>12</sup> of the European parliament and of the Council of 16 April 2014, amending Directive 2011/92/EU on the assessment of the effects of certain public and private projects on the environment had to be transposed into national law by 16 May 2017, necessitating changes in laws, regulations, and administrative provisions across a number of legislative codes.

Key changes introduced in the 2014 Directive (in Annex IV - Information referred to in Article 5(1) – Information for the Environmental Impact Assessment Report) and the national transposing regulations (the European Union (Planning and Development)(Environmental Impact Assessment) Regulations, S.I. No. 296 of 2018) include a requirement for information on the impact of a project on climate (for example the nature and magnitude of greenhouse gas emissions) and the

<sup>10</sup> <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=celex:32018R0842>

<sup>11</sup> <https://www.cfram.ie/>

<sup>12</sup> <http://eur-lex.europa.eu/legal-content/EN/TXT/?uri=celex%3A32014L0052>

vulnerability of the project to climate change to be provided in the Environmental Impact Assessment Report.

## Published Guidelines

### Guidance on Integrating Climate Change and Biodiversity into EIA (EC, 2012)<sup>13</sup>

EU Guidelines provide recommendations on how to integrate climate change and biodiversity in Environmental Impact Assessment (EIA). The need for action on climate change and biodiversity loss is recognised across Europe and around the world. The guidelines include an explanation as to why climate change and biodiversity are so important in EIA, present the relevant EU-level policy background, provide advice on how to integrate climate change and biodiversity into selected stages of the EIA process. The annexes provide sources of further reading and links to other relevant information, data, and tools.

### Assessing Greenhouse Gas Emissions and Evaluating their Significance (IEMA, 2017)<sup>14</sup>

IEMA Guidance provides information to assist practitioners with addressing greenhouse gas (GHG) emissions assessment and mitigation in statutory and non-statutory Environmental Impact Assessment (EIA). It complements IEMA's earlier guide on Climate Change Resilience and Adaptation and builds on the Climate Change Mitigation and EIA overarching principles. The requirement to consider this topic has resulted from the 2014 amendment to the EIA Directive.

### Climate Change and Major Projects (EC, 2016)<sup>15</sup>

This publication provides guidance for assessing vulnerability and risk from Climate Change for major projects funded by the European Regional Development Fund (ERDF) and the Cohesion Fund and listed in the concerned operational programmes.

### Sectoral Planning Guidelines for Climate Change Adaptation<sup>16</sup>

The guidelines aim to ensure that a coherent and consistent approach to adaptation planning is adopted by the key sectors in Ireland. Sectors preparing sectoral adaptation plans under the NAF are required to prepare their plans in line with the process described in these guidelines while also being aware of the overall requirements regarding the development of sectoral adaptation plans.

### Local Authority Adaptation Strategy Development Guidelines<sup>17</sup>

Guidance was produced to provide a consistent and coherent process for local authorities in helping them develop local adaptation strategies and contain information on the process of developing an adaptation strategy :

<sup>13</sup> <http://ec.europa.eu/environment/eia/pdf/EIA%20Guidance.pdf>

<sup>14</sup> <https://www.iema.net/policy/ghg-in-eia-2017.pdf>

<sup>15</sup> [https://ec.europa.eu/clima/sites/clima/files/docs/major\\_projects\\_en.pdf](https://ec.europa.eu/clima/sites/clima/files/docs/major_projects_en.pdf)

<sup>16</sup> <https://www.dccae.gov.ie/en-ie/climate-action/topics/adapting-to-climate-change/national-adaptation-framework/Pages/Sectoral.aspx>

<sup>17</sup> <https://www.dccae.gov.ie/en-ie/climate-action/topics/adapting-to-climate-change/national-adaptation-framework/Pages/Localadaptation.aspx>

- provide background information on what adaptation entails and provides the rationale behind implementing a local scale adaptation strategy;
- outline the initial steps required in launching a strategy development process, describing key roles and who can fulfil them, and setting out important factors to consider in the early stages of strategy development;
- explains how to assess the role that weather extremes and periods of climate variability currently play within the local jurisdiction, and it describes why doing so is a fundamental element of working towards a more climate-resilient future;
- moves from the present to the identification of future climate risks, describing a staged risk assessment process and positioning the adaptation strategy within more detailed risk assessments undertaken during shorter term decision-making processes such as statutory plan-making;
- on the basis of the risk assessment process undertaken determination of adaptation goals and objectives and the types of adaptation actions that are available and outlines how each might be identified, assessed, prioritised and implemented is described;
- outlines the steps required to move from a phase of planning to one of implementation, and it explains the importance of monitoring and evaluation in ensuring that the strategy is achieving its anticipated adaptation objectives.

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# **Appendix 9-B      Development Vulnerability Assessment Methodology**

## Development Vulnerability Assessment Methodology

The scale for assessing the likelihood of a climate hazard is presented in Table 9-B-1. The output of the likelihood analysis is an estimation of the likelihood for each of the essential climate variables and hazards.

**Table 9-B-1: Scale of Likelihood of Climate Hazard**

| Term           | Qualitative              | Quantitative |
|----------------|--------------------------|--------------|
| Rare           | Highly unlikely to occur | 5%           |
| Unlikely       | Unlikely to occur        | 20%          |
| Moderate       | As likely to Occur       | 50%          |
| Likely         | Likely to Occur          | 80%          |
| Almost certain | Very likely to occur     | 95%          |

The scale for assessing the potential impact of a climate hazard is presented in Table 9-B-2. The impact analysis provides an assessment of the potential impact of each of the essential climate variables and hazards.

**Table 9-B-2: Example Table for Climate Hazard Impact Analysis**

| Risk areas                             | Insignificant | Minor | Moderate | Major | Catastrophic |
|----------------------------------------|---------------|-------|----------|-------|--------------|
| Asset damage, engineering, operational |               |       |          |       |              |
| Safety and Health                      |               |       |          |       |              |
| Environment                            |               |       |          |       |              |
| Social                                 |               |       |          |       |              |
| Financial                              |               |       |          |       |              |
| Reputation                             |               |       |          |       |              |

The matrix for assessing the sensitivity of project to climate hazards is presented in Table 9-B-3. The sensitivity is summarised, along with the ranking of the relevant climate variables and hazards relating to the project.

**Table 9-B-3: Example Table for Sensitivity of Project to Climate Hazards**

|                 | Extreme rainfall, flood, flash flood | Heath | Drought | Wildlife Fires | Storms and winds | Landslides | Cold Spells and snow | Freeze –thaw damage | Rising sea levels |
|-----------------|--------------------------------------|-------|---------|----------------|------------------|------------|----------------------|---------------------|-------------------|
| On site assets  |                                      |       |         |                |                  |            |                      |                     |                   |
| Inputs – Water  |                                      |       |         |                |                  |            |                      |                     |                   |
| Inputs - Energy |                                      |       |         |                |                  |            |                      |                     |                   |

|                   | Extreme rainfall,<br>flood , flash flood | Heath | Drought | Wildlife Fires | Storms and winds | Landslides | Cold Spells and<br>snow | Freeze –thaw<br>damage | Rising sea levels |
|-------------------|------------------------------------------|-------|---------|----------------|------------------|------------|-------------------------|------------------------|-------------------|
| Outputs - product |                                          |       |         |                |                  |            |                         |                        |                   |
| Transport links   |                                          |       |         |                |                  |            |                         |                        |                   |

The matrix for assessing exposure of a project to climate hazards is presented in Table 9-B-4. The exposure analysis ranks climate variables and hazards as low, medium or high based on current and future climate.

**Table 9-B-4: Example Table of Exposure of the Project to Climate Hazards**

|                 | Extreme rainfall,<br>flood , flash flood | Heath | Drought | Wildlife Fires | Storms and winds | Landslides | Cold Spells and<br>snow | Freeze –thaw<br>damage | Rising sea levels |
|-----------------|------------------------------------------|-------|---------|----------------|------------------|------------|-------------------------|------------------------|-------------------|
| Current Climate |                                          |       |         |                |                  |            |                         |                        |                   |
| Future Climate  |                                          |       |         |                |                  |            |                         |                        |                   |

An example of the vulnerability of a project to climate hazards is presented in Table 9-B-5. The vulnerability combines the sensitivity and the exposure analysis.

**Table 9-B-5: Example Table for Vulnerability Analysis of Project to Climate Hazards**

| Sensitivity | Exposure (current & future climate) |        |      |
|-------------|-------------------------------------|--------|------|
|             | Low                                 | Medium | High |
| Low         |                                     |        |      |
| Medium      |                                     |        |      |
| High        |                                     |        |      |

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# Appendix 9-C      Development Vulnerability Assessment

## Development Vulnerability Assessment

The likelihood analysis of the proposed development to climate hazards is presented in Table 9-C-1.

The proposed development has been assessed to be moderate affected by extreme rainfall, flash (pluvial) flood, storms and winds. The proposed development would be unlikely affected to cold spells, landslides and snow. The proposed development would not be affected by heat, drought, wildlife fires and freeze –thaw damage. The proposed development will not be affected by rising sea level.

**Table 9-C-1: Analysis of Likelihood of Climate Hazards**

|                | Extreme rainfall, flash flood | Flood | Heat | Drought | Wildlife Fires | Storms and winds | Landslides | Cold Spells and snow | Freeze –thaw damage | Rising sea levels |
|----------------|-------------------------------|-------|------|---------|----------------|------------------|------------|----------------------|---------------------|-------------------|
| Rare           |                               |       | ✓    | ✓       | ✓              |                  |            |                      | ✓                   | ✓                 |
| Unlikely       |                               | ✓     |      |         |                |                  |            | ✓                    |                     |                   |
| Moderate       | ✓                             |       |      |         |                | ✓                |            |                      |                     |                   |
| Likely         |                               |       |      |         |                |                  |            |                      |                     |                   |
| Almost certain |                               |       |      |         |                |                  |            |                      |                     |                   |

Table 9-C-2 shows the climate hazard impact analysis of the proposed development. It was assessed that climate hazards will have major impacts on health and safety, the environment and financial areas, moderate impacts on asset damage and engineering, operational, social and reputation areas.

**Table 9-C-2: Climate Hazard Impact Analysis**

| Risk areas                             | Insignificant | Minor | Moderate | Major | Catastrophic |
|----------------------------------------|---------------|-------|----------|-------|--------------|
| Asset damage, engineering, operational |               |       | ✓        |       |              |
| Safety and Health                      |               |       |          | ✓     |              |
| Environment                            |               |       |          | ✓     |              |
| Social                                 |               |       | ✓        |       |              |
| Financial                              |               |       |          | ✓     |              |
| Reputation                             |               |       | ✓        |       |              |

Table 9-C-3 below assesses the sensitivity of the project to climate hazard. It was assessed that site assets, energy inputs and transport links are of high sensitivity to extreme rainfall, flood, flash floods, storms and winds; water inputs will be highly sensitive to droughts. On site assets will be medium sensitive to cold spells and snow and freeze – thaw damage. Transport links will be medium sensitive to cold spells and snow.

**Table 9-C-3: Sensitivity of Project to Climate Hazards**

|                    | Extreme rainfall,<br>flash flood | Flood | Heat | Drought | Wildlife Fires | Storms and winds | Landslides | Cold Spells and<br>snow | Freeze –thaw<br>damage | Rising sea levels |
|--------------------|----------------------------------|-------|------|---------|----------------|------------------|------------|-------------------------|------------------------|-------------------|
| On site<br>Assets  | High                             | Low   | Low  | Low     | Low            | High             | Low        | Med                     | Med                    | Low               |
| Inputs -<br>Water  | Low                              | Low   | Low  | High    | Low            | Low              | Low        | Low                     | Low                    | Low               |
| Inputs -<br>Energy | High                             | Low   | Low  | Low     | Low            | High             | Low        | Low                     | Low                    | Low               |
| Transport<br>Links | High                             | Low   | Low  | Low     | Low            | High             | Low        | Med                     | Low                    | Low               |

In Table 9-C-4, the exposure of the planned development to climate hazards was assessed. In the current climate, the exposure of the development to extreme rainfall, flood, flash flood, storms and winds has been assessed to be medium. In the future, the development was assessed to have high exposure to rainfall, flash flood, storms, and winds.

**Table 9-C-4: Exposure of the Development to Climate Hazards without Mitigation**

|                    | Extreme rainfall,<br>flash flood | Flood | Heat | Drought | Wildlife Fires | Storms and winds | Landslides | Cold Spells and<br>snow | Freeze –thaw<br>damage | Rising sea levels |
|--------------------|----------------------------------|-------|------|---------|----------------|------------------|------------|-------------------------|------------------------|-------------------|
| Current<br>Climate | Med                              | Low   | Low  | Low     | Low            | Med              | Low        | Low                     | Low                    | Low               |
| Future<br>Climate  | High                             | Low   | Low  | Low     | Low            | High             | Low        | Low                     | Low                    | Low               |

Table 9-C-5 shows the vulnerability analysis of the project to climate hazards; it combines the sensitivity and the exposure analysis. The project was assessed to be most sensitive to extreme rainfall, flash flood, storms, and winds.

Table 9-C-5: Vulnerability Analysis of Project to Climate Hazards

| Sensitivity | Exposure (current & future climate)                                                      |                      |                                                 |
|-------------|------------------------------------------------------------------------------------------|----------------------|-------------------------------------------------|
|             | Low                                                                                      | Medium               | High                                            |
| Low         | Rising sea levels, Flood, Landslides, Freeze –thaw damage, Drought, Heat, Wildlife Fires |                      |                                                 |
| Medium      |                                                                                          | Cold Spells and Snow |                                                 |
| High        |                                                                                          |                      | Extreme Rainfall, Flash Flood, Storms and Winds |