9. AIR & CLIMATE

9.1 Introduction

MKO prepared the Air & Climate chapter of this Environmental Impact Assessment Report (EIAR) for the Proposed Development at Lomaunaghbaun, Tuam, Co. Galway.

This Chapter examines the effect of the Proposed Development on air and climate. Where required, appropriate mitigation measures to limit any identified significant impacts to air and climate are recommended.

9.1.1 Statement of Authority

This chapter of the EIAR has been prepared by Tom Madden and reviewed by Eoin O'Sullivan, both of MKO. Tom Madden joined MKO in 2022, prior to which he worked as a consultant with Panther Environmental. He holds a BSc in Environmental Science from the University of Limerick and has over four years' experience working in the environmental consultancy sector. Eoin is an experienced geo-environmental scientist and has over fourteen years' experience in the design, implementation and interpretation of all phases of geo-environmental and geotechnical site investigations. Eoin has also got extensive experience in the preparation of air and climate assessments and reports for EIAs, particularly relating to wind energy. Eoin is also proficient in undertaking detailed quantitative risk assessments for the protection of controlled waters and human health. Eoin holds an MSc in Environmental Engineering and is a Chartered Member of the Chartered Institute of Water and Environmental Management (CWEM) and Chartered Environmentalist (CEnv) with the Society of Environment. .

9.2 Air

9.2.1 Background

The Proposed Development site is located within the townland of Lomaunaghbaun in north-east county Galway. There are nineteen houses located within 1km of the Proposed Development site. The town of Tuam is located approximately 8.6km to the south-west and the village of Clonberne is located approximately 4.7km to the east. ITM coordinates for the centre of the site are X 552253, Y 756481.

The site is bounded by agricultural land to the north, west and south. The local L2232 road bounds the site to the east and agricultural land lies beyond. The landscape around the Proposed Development site is characterised by low-density, one-off housing and agriculture. Land use in the area is primarily agricultural with some areas of forestry and quarrying operations.

The R328 regional road is located approximately 3.92km to the north and is connected to the site via the L2232 local road. The N83 national road is located approximately 8.07km to the north-west via the R328 and L2232. Access to the R328 is also available to the south at an approximate distance of 6.5km via the L2223.

9.2.2 Methodology

The assessment has been undertaken with reference to the following sources of information:

- EPA (2021). Air Quality in Ireland 2021.
- EPA Guideline Document entitled Environmental Management in the Extractive Industries (2006).

- Department of Environment, Quarries and Ancillary Activities, Guidelines for Planning Authorities (2004).

9.2.3 Air Quality Standards

In 1996, the Air Quality Framework Directive (96/62/EC) was published. This Directive was transposed into Irish law by the Environmental Protection Agency Act 1992 (Ambient Air Quality Assessment and Management) Regulations 1999. The Directive was followed by four Daughter Directives, which set out limit values for specific pollutants:

- The first Daughter Directive (1999/30/EC) deals with sulphur dioxide, oxides of nitrogen, particulate matter and lead.
- The second Daughter Directive (2000/69/EC) addresses carbon monoxide and benzene. The first two Daughter Directives were transposed into Irish law by the Air Quality Standards Regulations 2002 (SI No. 271 of 2002).
- A third Daughter Directive, Council Directive (2002/3/EC) relating to ozone was published in 2002 and was transposed into Irish law by the Ozone in Ambient Air Regulations 2004 (SI No. 53 of 2004).
- The fourth Daughter Directive, published in 2007, deals with polyaromatic hydrocarbons (PAHs), arsenic, nickel, cadmium and mercury in ambient air.

The Air Quality Framework Directive and the first three Daughter Directives have been replaced by the Clean Air for Europe (CAFE) Directive (Directive 2008/50/EC on ambient air quality), which encompasses the following elements:

- The merging of most of the existing legislation into a single Directive (except for the Fourth Daughter Directive) with no change to existing air quality objectives.
- New air quality objectives for $PM_{2.5}$ (fine particles) including the limit value and exposure concentration reduction target.
- The possibility to discount natural sources of pollution when assessing compliance against limit values.
- The possibility for time extensions of three years (for particulate matter PM_{10}) or up to five years (nitrogen dioxide, benzene) for complying with limit values, based on conditions and the assessment by the European Commission.

Table 9-1 Limit values of Directive 2008/50/EC, 1999/30/EC and 2000/69/EC (Source: EPA)below sets out the limit values of the CAFE Directive, as derived from the Air Quality Framework Daughter Directives. Limit values are presented in micrograms per cubic metre ($\mu g/m^3$) and parts per billion (ppb). The notation PM_{10} is used to describe particulate matter or particles of ten micrometres or less in aerodynamic diameter. $PM_{2.5}$ represents particles measuring less than 2.5 micrometres in aerodynamic diameter.

The CAFE Directive was transposed into Irish legislation by the Air Quality Standards Regulations 2011 (S.I. No. 180 of 2011) as amended by the Air Quality Standards (Amendments) and Arsenic, Cadmium, Mercury, Nickel and Polycyclic Aromatic Hydrocarbons in Ambient Air Regulations, 2016 (S.I. 659 2016). These Regulations supersede the Air Quality Standards Regulations 2002 (S.I. No. 271 of 2002), the Ozone in Ambient Air Regulations 2004 (S.I. No. 53 of 2004) and the Ambient Air Quality Assessment and Management Regulations 1999 (S.I. No. 33 of 1999).

Table 9-1 Limit values of Directive 2008/50/EC, 1999/30/EC and 2000/69/EC (Source: EPA)

Pollutant	Limit Value Objective	Averaging Period	Limit Value (µg/m3)	Limit Value (ppb)	Basis of Application of Limit Value	Attainment Date
Sulphur dioxide (SO_2)	Protection of Human Health	1 hour	350	132	Not to be exceeded more than 24 times in a calendar year	1st Jan 2005
Sulphur dioxide (SO_2)	Protection of human health	24 hours	125	47	Not to be exceeded more than 3 times in a calendar year	1st Jan 2005
Sulphur dioxide (SO_2)	Upper assessment threshold for the protection of Human Health	24 hours	75	28	Not to be exceeded more than 3 times in a calendar year	1st Jan 2005
Sulphur dioxide (SO_2)	Lower assessment threshold for the protection of human health	24 hours	50	19	Not to be exceeded more than 3 times in a calendar year	1st Jan 2005
Sulphur dioxide (SO_2)	Protection of vegetation	Calendar year	20	7.5	Annual mean	19th Jul 2001
Sulphur dioxide (SO_2)	Protection of vegetation	1st Oct to 31st Mar	20	7.5	Winter mean	19th Jul 2001
Nitrogen dioxide (NO_2)	Protection of human health	1 hour	200	105	Not to be exceeded more than 18 times in a calendar year	1st Jan 2010

Pollutant	Limit Value Objective	Averaging Period	Limit Value (µg/m3)	Limit Value (ppb)	Basis of Application of Limit Value	Attainment Date
Nitrogen dioxide (NO_2)	Protection of human health	Calendar year	40	21	Annual mean	1st Jan 2010
Nitrogen dioxide (NO_2)	Upper assessment threshold for the protection of human health	1 hour	140	73	Not to be exceeded more than 18 times in a calendar year	1st Jan 2010
Nitrogen dioxide (NO_2)	Lower assessment threshold for the protection of human health	1 hour	100	52	Not to be exceeded more than 18 times in a calendar year	1st Jan 2010
Nitrogen monoxide (NO) and nitrogen dioxide (NO_2)	Protection of ecosystems	Calendar year	30	16	Annual mean	19th Jul 2001
Particulate matter 10 (PM_{10})	Protection of human health	24 hours	50	-	Not to be exceeded more than 35 times in a calendar year	1st Jan 2005
Particulate matter 10 (PM_{10})	Upper assessment threshold for the protection of human health	24 hours	30	-	Not to be exceeded more than 7 times in a calendar year	Based on the indicative limit values for 1 January 2010
Particulate matter 10 (PM_{10})	Lower assessment threshold for the protection of human health	24 hours	20	-	Not to be exceeded more than 7 times in a calendar year	Based on the indicative limit values for 1 January 2010

Pollutant	Limit Value Objective	Averaging Period	Limit Value (µg/m3)	Limit Value (ppb)	Basis of Application of Limit Value	Attainment Date
Particulate matter 2.5 ($PM_{2.5}$)	Protection of human health	Calendar year	40	-	Annual mean	1st Jan 2005
Particulate matter 2.5 ($PM_{2.5}$) Stage 1	Protection of human health	Calendar year	25	-	Annual mean	1st Jan 2015
Particulate matter 2.5 ($PM_{2.5}$) Stage 2	Protection of human health	Calendar year	20	-	Annual mean	1st Jan 2020
Lead (Pb)	Protection of human health	Calendar year	0.5	-	Annual mean	1st Jan 2005
Carbon Monoxide (CO)	Protection of human health	8 hours	10,000	8,620	-	1st Jan 2005
Benzene (C_6H_6)	Protection of human health	Calendar Year	5	1.5	-	1st Jan 2010

The Ozone Daughter Directive 2002/3/EC is different from the other Daughter Directives in that it sets target values and long-term objectives for ozone rather than limit values. Table 9-2 Target values for Ozone Defined in Directive 2008/50/ECpresents the limit and target values for ozone.

Table 9-2 Target values for Ozone Defined in Directive 2008/50/EC

Objective	Parameter	Target Value for 2010	Target Value for 2020
Protection of human health	Maximum daily 8 hour mean	120 mg/m^3 not to be exceeded more than 25 days per calendar year averaged over 3 years	120 mg/m^3
Protection of vegetation	AOT40 calculated from 1 hour values from May to July	18,000 $mg/m^3.h$ averaged over 5 years	6,000 $mg/m^3.h$
Information Threshold	1 hour average	180 mg/m^3	-
Alert Threshold	1 hour average	240 mg/m^3	-

AOT_{40} is a measure of the overall exposure of plants to ozone. It is the sum of the excess hourly concentrations greater than 80 g/m^3 and is expressed as g/m^3 hours.

9.2.3.1 Air Quality and Health

The Environmental Protection Agency (EPA) report '*Air Quality in Ireland 2021'* noted that in Ireland, the premature deaths attributable to poor air quality are estimated at 1,300 people per annum. A more recent European Environmental Agency (EEA) Report, '*Air Quality in Europe – 2021 Report'* highlights the negative effects of air pollution on human health. The report assessed that poor air quality accounted for premature deaths of approximately 307,000 people in the 27 EU Member States in 2019, with regards to deaths relating to $PM_{2.5}$. The estimated impacts on the population in Europe of exposure to NO_2 and O_3 concentrations in 2019 were around 40,400 and 16,800 premature deaths per year, respectively. From this, 1,300 Irish deaths were attributable to fine particulate matter ($PM_{2.5}$), 30 Irish deaths were attributable to nitrogen oxides (NO_2) and 50 Irish deaths were attributable to Ozone (O_3) (Source: *Air Quality in Europe – 2021 Report',* EEA, 2021).

These emissions, along with others including sulphur oxides (SOx) are produced during fossil fuel-based electricity generation and traffic in various amounts, depending on the fuel and technology used. Whilst there is the potential of such emissions to be generated from the Proposed Development, a number of mitigation measures will be implemented at this site to reduce the impact from dust and vehicle emissions, which are discussed in Sections 9.4 below.

9.2.4 Air Quality Zones

The Environmental Protection Agency (EPA) has designated four Air Quality Zones for Ireland:

- Zone A: Dublin City and environs.
- Zone B: Cork City and environs.
- Zone C: 16 Urban areas with population greater than 15,000.
- Zone D: Remainder of the country.

These zones were defined to meet the criteria for air quality monitoring, assessment and management described in the Framework Directive and Daughter Directives. The site of the Proposed Development lies within Zone D, which represents rural areas located away from large population centres.

9.2.5 Existing Air Quality

The air quality in the vicinity of the Proposed Development site is typical of that of rural areas in the west of Ireland, i.e. Zone D. Prevailing south-westerly winds carry clean, unpolluted air from the Atlantic Ocean onto the Irish mainland. The EPA publishes Air Monitoring Station Reports for monitoring locations in all four Air Quality Zones. The most recent report on air quality in Ireland, 'Air Quality in Ireland 2021' was published by the EPA in September 2022. The EPA reports provide SO_2, PM_{10}, NO_2 and O_3 concentrations for areas in Zone D. Values for each of these elements recorded within the Zone D monitoring stations listed in the report, have been averaged to give representative values for Zone D. Similar measurement values for all air quality parameters would be expected for the Proposed Development site as it lies in a rural location, within Zone D.

9.2.5.1 Sulphur Dioxide (SO2)

Sulphur dioxide data for Kilkitt, Letterkenny, Cork Harbour, Edenderry and Askeaton in 2021 is presented in Table 9-3.

Table 9-3 Average Sulphur Dioxide Data for Zone D Sites in 2021

Parameter	Measurement (ug/m^3)
Annual Mean	4.16
Hourly values > 350	0
Hourly max	94.80
Daily values > 125	0
Daily max	25.54

During the monitoring period there were no exceedances of the hourly and daily limit values for the protection of human health. As can be observed from Table 9-3 the average maximum hourly value recorded during the assessment period was 94.80 µg/m^3. In addition, there were no exceedances of the annual mean limit for the protection of ecosystems. It would be expected that SO_2 values at the Proposed Development site would be similar or lower than those recorded for the Zone D sites above.

9.2.5.2 Particulate Matter (PM10)

Sources of particulate matter include vehicle exhaust emissions, soil and road surfaces, construction works and industrial emissions. The EPA report[1] provide annual mean PM_{10} concentration for sixteen Zone D towns, Castlebar, Kilkitt, Claremorris, Enniscorthy, Roscommon Town, Cobh Carrignafoy, Macroom, Carrick-on-Shannon, Birr, Askeaton, Cavan, Edenderry, Mallow, Longford, Cobh Cork Harbour and Tipperary Town. Particulate matter (PM_{10}) data for 2021 is presented in Table 9-4.

Table 9-4 Average Particulate Matter (PM_{10}) Data for Zone D Sites in 2021

Parameter	Measurement (ug/m^3)
Annual Mean	11.94
% Data Capture	91
Values > 50 ug/m^3	Max 4
Daily Max	60.57

Notes: [1-] PM_{10} daily limit for the protection of human health: No more than 35 days >50 µg/m^3

The daily limit of 50 µg/m^3 for the protection of human health was not exceeded more than 35 times during the monitoring period. It would be expected that PM_{10} values at the Proposed Development site would be similar or lower than those recorded for the Zone D towns above.

[1] *EPA (2021). Air Quality in Ireland 2021.*

9.2.5.3 Nitrogen Dioxide (N02)

Nitrogen dioxide data for Emo Court, Birr, Castlebar, Carrick-on-Shannon, Edenderry and Kilkitt in 2021 is presented in Table 9-5.

Table 9-5 Nitrogen Dioxide Data for Zine D Sites in 2021

Parameter	Measurement (µg/m^3)
Annual Mean	7.52
NO_2 Values >200	0
Values > 140 (UAT)	0
Values >100 (LAT)	0
Hourly Max.	63

The annual NO_2 value was below the annual mean limit value for the protection of human health of 40 µg/m^3. Furthermore, the lower and upper assessment thresholds of 100 and 140 µg/m^3 was not exceeded during the monitoring period. The average hourly max. NO_2 value of 63 µg/m^3 measured during the monitoring period was below the hourly max threshold of 200 µg/m^3. It would be expected that NO_2 values at the Proposed Development site would be similar lower than those recorded for the Zone D sites above.

9.2.5.4 Carbon Monoxide

The EPA Report[2] provides rolling 8-hour carbon monoxide concentrations for Birr, a Zone D site. Carbon Monoxide data for 2021 is presented in Table 9-6 below.

Table 9-6 Carbon Monoxide Data for Birr – Zone D Site in 2021

Parameter	Measurement
Annual Mean	0.3 mg/m^3
Median	0.3 mg/m^3
% Data Capture	98.2%
Values > 10	0
Max	1.2 mg/m^3

The average concentration of carbon monoxide was 0.3 mg/m^3. The carbon monoxide limit value for the protection of human health is 10,000 µg/m^3 (or 10 mg/m^3). On no occasions were values in excess of the 10 mg limit value set out in Directives 2000/69/EC or 2008/69/EC. It would be expected that CO values at the Proposed Development site would be similar or lower than those recorded for the Zone D site above

9.2.5.5 Ozone (O3)

The EPA report[1]provides rolling 8-hour ozone concentrations for seven Zone D sites, Emo Court, Kilkitt, Carnsore Point, Mace Head, Castlebar, Valentia and Malin Head. Ozone (O_3) data for 2021 is

presented in Table 9-7. As can be observed from Table 9-7 there were eleven exceedances of the maximum daily eight-hour mean limit of 120 µg/m^3. The legislation stipulates that this limit should not be exceeded on more than 25 days.

Table 9-7 Average Ozone Data for Zone D Sites in 2021

Parameter	Measurement
Annual Mean	60 µg/m^3
Median	62 µg/m^3
% Data Capture	89.5%
No. of days > 1800	11 days

9.3 Dust

There are no statutory limits for dust deposition in Ireland. The German TA-Luft standard for dust deposition sets a maximum permissible emission level for dust deposition of 350 mg/m^2/day. Recommendations EPA Guideline Document entitled *Environmental Management in the Extractive Industries* (April 2006) and Department of Environment, *Quarries and Ancillary Activities, Guidelines for Planning Authorities* 2004 apply the Bergerhoff limit of 350 mg/m^2/day to the site boundary of quarries.

The extent of dust generation at any site depends on the type of activity undertaken, the location, the nature of the dust, i.e. soil, sand, etc., and the weather. In addition, dust dispersion is influenced by external factors such as wind speed and direction and/or, periods of dry weather. Construction traffic movements also have the potential to generate dust as they travel along the haul route.

The potential dust-related effects on local air quality and the relevant associated mitigation measures are presented in Section 9.4 below.

9.4 Likely and Significant Effects and Associated Mitigation Measures

9.4.1 Characteristics of the Proposed Development

The Proposed Development being applied for under this current planning application includes for the extraction of sand over an area of approximately 6.2 ha, washing plant and all other related infrastructure.

Initial construction works for the proposed works at the site will be minimal and will primarily be site enabling works. It is estimated that the construction phase of the proposed works required will take approximately 1-3 months.

The construction phase will include:

- Preparation of site for construction.
- Pouring of concrete for refuelling area foundation and foundation for processing plant and associated components;
- Construction of new drainage network and fuel/oil interceptor at refuelling area;

- Road reprofiling/improvements; and
- Installation of a weighbridge and wheelwash.

Minor excavations will be required for the installation drainage pipework. It is proposed that excavated soil material will be reused onsite for the installation of berms.

The operational phase of the Proposed Development will comprise of the excavation, washing and distribution of sand.

It is also proposed to install a new entrance on to the L2232 road which runs in a north-south direction adjacent to the proposed sites eastern boundary. It is proposed to reprofile this section of road to allow for appropriate visibility. The existing level of the road will be lowered by 0.6m at this location.

9.4.2 "Do-Nothing" Scenario

If the proposed quarry development were not to proceed, there would be no change to the existing environment. The site would remain largely unaltered as a result of the Do-Nothing Scenario.

9.4.3 Likely Effects and Mitigation Measures – Construction Phase

9.4.3.1 General Air Quality

The overburden/stockpile removal and sand extraction will require the operation of vehicles and plant on site. Exhaust emissions associated with vehicles and plant will arise as a result of site enabling works activities. This potential effect will not be significant and will be restricted to the duration of the site enabling works phase and localised to works locations. Therefore, this is considered a temporary-term slight negative effect. Mitigation measures to reduce this effect are presented below.

Mitigation

- All vehicles and plant will be maintained in good operational order while onsite, thereby minimising any emissions that arise.
- If necessary, sporadic wetting of loose stone, sand and soil surface will be carried out during to minimise movement of dust particles to the air.
- All plant and materials vehicles shall be stored in dedicated areas (on site).
- Overburden will be progressively removed from the working area in advance of extraction.
- The internal access roads which will be installed during the site enabling works within the confines of site will be regularly inspected for cleanliness and cleaned as necessary.
- The adjacent public road will be inspected on a regular basis throughout the site enabling works phase of the project. If required, road sweeping or water misting will be carried out.

Residual Effect

Temporary-term Imperceptible Negative Effect

Significance of Effects

Based on the assessment above there will be no significant effects.

9.4.3.2 Dust Emissions

The installation of the concrete slab for refuelling, wheelwash/weighbridge and drainage network installation may give rise to dust emissions during the site enabling works. This potential effect will not be significant and will be restricted to the duration of the site enabling works. Therefore, this is a Temporary Slight Negative Effect. Dust suppression mitigation measures to reduce this effect are presented below.

Dust can be generated from many on-site activities. The extent of dust generation will depend on the type of activity being undertaken, the location, the nature of the dust, i.e. soil, overburden, etc and the weather. In addition, dust dispersion is influenced by external factors such as wind speed and direction and/or, periods of dry weather. Traffic movements associated with the site enabling works also have the potential to generate dust. These effects will not be significant and will be relatively Temporary term in duration.

The following mitigation measures will however be implemented at the site:

Mitigation

- When necessary, sections of the site will be dampened down with water.
- Where the transport of any fine materials has the potential to generate it dust, will be undertaken in tarpaulin-covered vehicles where necessary.
- The roads adjacent to the site will be regularly inspected by the Site Manager for cleanliness and cleaned as necessary.
- Water bowser movements will be carefully monitored to avoid, insofar as reasonably possible, increased runoff.

Residual Effect

Following implementation of mitigation measures as outlined above, residual impacts from potential sources of dust will have a Temporary Imperceptible Negative Effect.

Significance of Effects

Based on the assessment above there will be no significant effects.

9.4.4 Likely Effects and Mitigation Measures – Operational Phase

9.4.4.1 General Air Quality

The sand material will be removed from the site by road going vehicles that have the potential to generate exhaust emissions. The excavation and processing of sand along with decommissioning and restoration will also require the use of machinery and plant that has the potential to generate exhaust emissions. This is likely to have a Medium-term Slight Negative Effect, which will be reduced through the use of the best practices mitigation measures as presented below.

The following mitigation measures will be implemented at the site:

- All on-site plant and vehicles will be maintained in good operational order, thereby minimising any emissions that arise.
- When stationary, delivery and on-site vehicles will be required to turn off engines.

- Users of the site will be required to ensure that all plant and vehicles are suitably maintained to ensure that emissions of engine generated pollutants is kept to a minimum.

Residual Effect

The number of plant items to be used on site is relatively small in the context of the general air quality of the site and surrounds.

Medium-term Imperceptible Negative Effect

Significance of Effects

Based on the assessment above there will be no significant effects.

9.4.4.2 Dust Emissions

Dust can be generated from many on-site activities such as traffic movements and excavation works. The extent of dust generation will depend on the type of activity undertaken, the location, the nature of the dust and the weather. In addition, dust dispersion is influenced by external factors such as wind speed and direction and/or, periods of dry weather.

Site restoration will involve the levelling of soil, which in terms of the potential for dust generation is not dissimilar to the operational phase extraction activities. However, it should be noted that once all soil materials are levelled, reseeding with an appropriate seed mix will occur thus reducing the potential for dust emissions to occur. Pre-mitigation, the potential dust emission effects during the operational phase could have a Medium-term Moderate Negative Effect.

The following mitigation measures will however be implemented at the site:

Mitigation

- The hardstanding/roads adjacent the site will continue to be regularly inspected by the Site Manager for cleanliness, and cleaned as necessary.
- The site access roads will be checked weekly for damage/potholes and repaired as necessary.
- Any hardstanding areas/site roads with the potential to give rise to dust will be regularly watered, as appropriate, during dry and/or windy conditions. Water bowser movements will be carefully monitored, as the application of too much water may lead to increased runoff.
- The transport of material, which has significant potential to cause dust, will be undertaken in tarpaulin-covered vehicles.
- All vehicles required to pass through the wheel wash on exiting the site.
- Following reinstatement, the area will be reseeded to facilitate immediate revegetation of the site and prevent dust generation.
- All plant and machinery will be maintained in good operational order while onsite.
- All plant and shall be stored in the dedicated compound area.

Residual Effect

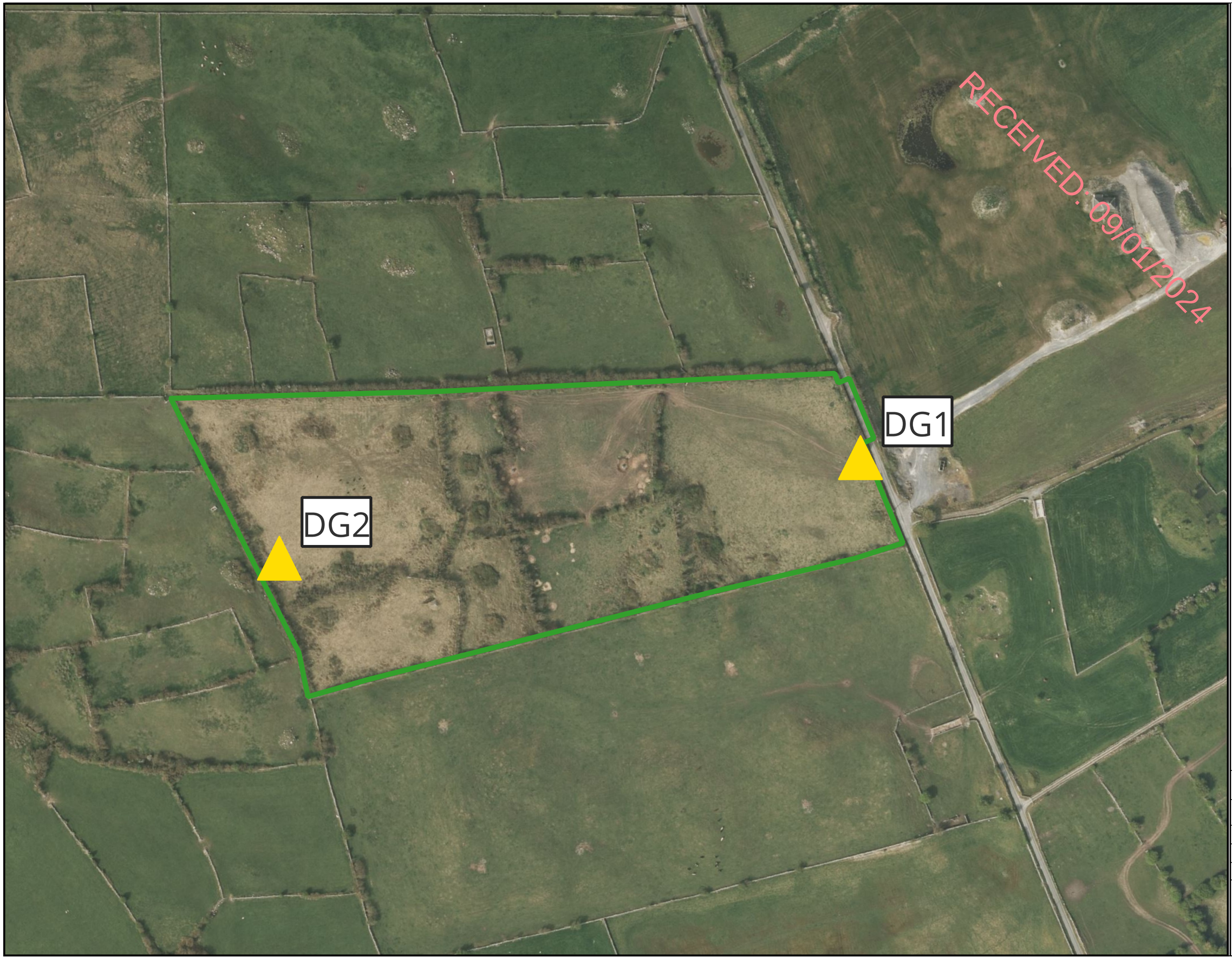
Following implementation of mitigation measures as outlined above, residual impacts of dust generation from the operational phase will have a Medium-term Imperceptible Negative Effect.

Significance of Effects

Based on the assessment above there will be no significant effects.

9.4.4.3 Dust Monitoring

Dust monitoring will be conducted using Bergerhoff Gauges. It is proposed to install a total of two dust gauges within the confines of the site boundary. One of these dust gauges will be installed at the western end of the site and the other will be installed near the eastern boundary, adjacent to the L2232 road. See Figure 9-1 below which shows the locations where the dust gauges will be installed. At the end of each month, the collection container shall be taken for analysis by an appropriately certified laboratory in order to determine the rate of dust deposition.



Map Legend

Dust Monitoring Locati

EIAR site Boundary

Drawing Title

Dust Monitoring Locations

Project Title

Lomaunaghbaun Quarry

Drawn By	Checked By
EC	TM
Project No.	Drawing No.
211034	Figure 9-1
Scale	Date
1:1600	2023-11-30

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9.4.5 Likely Effects & Mitigation Measures - Decommissioning/Reinstatement Phase

9.4.5.1 General Air Quality

The decommissioning and restoration phase will require the use of machinery and plant that has the potential to generate exhaust emissions. This is likely to have a Temporary-term Slight Negative Effect, which will be reduced through the use of the best practices mitigation measures as presented below.

The following mitigation measures will be implemented at the site:

- All on-site plant and vehicles will be maintained in good operational order, thereby minimising any emissions that arise.
- When stationary, delivery and on-site vehicles will be required to turn off engines.
- Users of the site will be required to ensure that all plant and vehicles are suitably maintained to ensure that emissions of engine generated pollutants is kept to a minimum.

Residual Effect

The number of plant items to be used on site during the reinstatement is relatively small in the context of the general air quality of the site and surrounds.

Temporary-term Imperceptible Negative Effect

Significance of Effects

Based on the assessment above there will be no significant effects.

9.4.6 Health Effects

Whilst the site enabling works and operational phase of the Proposed Development is likely to lead to the generation of dust and vehicle emissions, the implementation of the mitigation measures discussed above and as outlined in the Environmental Management Plan (EMP attached in Appendix 4-2) and good management practices can prevent or minimise potential effects off-site. Good management practice consists of good site design and layout, adopting appropriate working methods, choosing the right equipment and ensuring that the workforce understands the company's responsibilities and is familiar with good working practice and dust suppression techniques. The potential for health effects are considered negligible as the potential for both exhaust and dust emissions will be limited and controlled through site layout design and mitigation measures.

9.4.7 Cumulative Effect

Potential cumulative effects on air quality between the Proposed Development and other developments in the vicinity were also considered as part of this assessment. It is noted that the other land use activities in the area are predominantly associated with agriculture related activities with some areas of forestry and quarrying operations.

9.4.7.1 General Air Quality

The existing land use activities noted above, and the Proposed Development will require plant items and vehicles which consume fossil fuels and therefore will lead to a minor level of air emissions

cumulatively. However, given the implementation of the mitigation measures discussed in Section 9.4 above and outlined in the EMP, there is unlikely to be cumulative effects arising from the Proposed Development and other local existing developments, projects and plans.

9.4.7.2 Dust Emissions

As previously mentioned in Section 9.3, the Proposed Development has the potential to generate dust. However, as noted above, with the implementation of the identified mitigation measures in Section 9.3 and the EMP which is attached in Appendix 4-2, the potential for dust emissions will be imperceptible. It is therefore considered that there is unlikely to be cumulative effects arising from the Proposed Development and other local existing developments, projects and plans.

9.5 Climate

9.5.1 Climate Change and Greenhouse Gases

Climate change is one of the most challenging global issues facing us today and is primarily the result of increased levels of greenhouse gases in the atmosphere. These greenhouse gases come primarily from the combustion of fossil fuels in energy use. Changing climate patterns are thought to increase the frequency of extreme weather conditions such as storms, floods and droughts. In addition, warmer weather trends can place pressure on animals and plants that cannot adapt to a rapidly changing environment. Moving away from our reliance on coal, oil and other fossil fuel-driven power plants is essential to reduce emissions of greenhouse gases and combat climate change.

9.5.1.1 International Greenhouse Gas Emission and Climate Targets

Globally, governance relating to climate change has changed significantly since the 1994 when the United Nations Framework Convention on Climate Change (UNFCCC) entered into force. Greenhouse Gas emissions have been a primary focus of climate related international agreements for almost two decades.

International greenhouse gas emission and climate targets play an important role in stimulating and enabling action for developed and developing nations. The following sections provide an overview of the international agreements that have played key roles in establishing climate governance.

9.5.1.1.1 *Kyoto Protocol*

The Kyoto Protocol was adopted on 11 December 1997; this Protocol operationalised the UNFCCC and was the first international agreement that committed countries to reduce their greenhouse gas emissions (GHGs). It set limitations and reduction targets for greenhouse gases for developed countries. The Kyoto Protocol came into effect in 2005, as a result of which, emission reduction targets agreed by developed countries, including Ireland, became binding for the first time.

Under the Kyoto Protocol, the EU agreed to achieve a significant reduction in total greenhouse gas emissions in the period 2008 to 2012. These EU emission targets are legally binding in Ireland. Ireland's contribution to the EU commitment for the period 2008 – 2012 (the first commitment period) was to limit its greenhouse gas emissions to no more than 13% above 1990 levels. Ireland achieved its Kyoto Protocol targets under the EU burden-sharing agreement.

Doha Amendment to the Kyoto Protocol

In Doha, Qatar, on 8th December 2012, the "Doha Amendment to the Kyoto Protocol" was adopted. The amendment includes:

- New commitments for Annex I Parties to the Kyoto Protocol who agreed to take on commitments in a second commitment period starting in 2013 and lasting until 2020
    - The amendment entered into force on 31 December 2020
- A revised list of greenhouse gases (GHG) to be reported on by Parties in the second commitment period; and
- Amendments to several articles of the Kyoto Protocol which specifically referenced issues pertaining to the first commitment period and which needed to be updated for the second commitment period.

During the first commitment period, 37 industrialised countries and the European Community committed to reduce GHG emissions to an average of 5% below 1990 levels. During the second commitment period, Parties committed to reduce GHG emissions by at least 18% below 1990 levels in the eight-year period from 2013 to 2020. The composition of Parties in the second commitment period is different from the first; however, Ireland and the EU signed up to both the first and second commitment periods. Under the protocol, countries must meet their targets primarily through national measures, although market-based mechanisms (such as international emissions trading) can also be utilised.

Although the 1997 Kyoto Protocol and 2012 Doha Amendment were in force in 2020, the 2015 Paris Agreement superseded the Kyoto Protocol as the principle regulatory instrument governing the global response to climate change.

9.5.1.1.2 COP21 Paris Agreement

COP21 was the 21st session of the Conference of the Parties (COP) to the United Nations Convention. Every year since 1995, the COP has gathered the 196 Parties (195 countries and the European Union) that have ratified the Convention in a different country, to evaluate its implementation and negotiate new commitments. COP21 was organised by the United Nations in Paris and held from 30th November to 12th December 2015.

COP21 closed on 12th December 2015 with the adoption of the first international climate agreement (concluded by 195 countries and applicable to all). The twelve-page text, made up of a preamble and 29 articles, provides for a limitation of the temperature rise to below 2°C above pre-industrial levels and even to tend towards 1.5°C. It is flexible and takes into account the needs and capacities of each country. It is balanced as regards adaptation and mitigation, and durable, with a periodical ratcheting-up of ambitions.

9.5.1.1.3 COP25 Climate Change Conference- Madrid

The 25th United Nations Climate Change conference COP25 was held in Madrid and ran from December 2nd to December 13th, 2019. While largely regarded as an unsuccessful conference, the main outcome from the conference was the launch by the European Union (EU) of the '*The European Green New Deal'.* The deal sets out the EUs commitments to tackle climate and environmental related challenges and includes proposals to reduce emissions from the transport, agriculture and energy sectors. Measures such as fines and pay-outs by member states who rely on coal power will be in place to encourage the switch to renewable clean energies such as wind. On the 4th of March 2020, the European Commission put forward the proposal for a European climate law. This aims to establish the framework for achieving EU climate neutrality. It aims to provide a direction by setting a pathway to climate neutrality and to this end, aims to set in legislation the EU's 2050 climate-neutrality objective. If accepted, this climate law will likely be implemented in 2021. Decisions regarding the global carbon market were postponed until the next Climate Conference (COP26) which will be held in Glasgow in November 2021.

9.5.1.1.4 COP27 Climate Change Conference - Sharm El-Sheikh

COP27 took place in Sharm el-Sheikh from the 6th of November 2022 to the 20th of November 2022. The Conference of the Parties (COP) is a supreme decision-making body of the United Nations Framework Convention on Climate Change (UNFCCC).

The three major topics of COP27 were:

- Closing the emissions gap to keep 1.5°C alive
- Loss and damage
- Climate finance

The summit took place a year after its precedent COP26 summit in Glasgow, Scotland. In Glasgow, the final agreement was delayed due to the stance of China and India, among others, who were not comfortable with the 'phase out' of coal wording in the draft text. This led to the watering down of this commitment to a 'phase down' of coal use. The hope was that COP27 would work to include further language on coal and fossil fuel reduction efforts and be matched by increased ambition and action to meet agreed pledges. Initial texts represented more serious language than used at COP26 in Glasgow, however, the published final text retains the language of Glasgow, phase down, which does not use any binding language to reduce use and is still only applicable to coal, not oil and gas.

There has been the setting of a workplan for 2023 to help articulate the nature and components of a global collective goal on adaptation and resilience, however in order to achieve this, more work needs to be done by countries, cities and organisations as currently, the numbers on the NDCs don't add up. Currently, no country has an NDC in place that is able to meet Paris Agreement goals, making net zero by 2050 difficult to envision and 2030 commitments near impossible.

9.5.1.1.5 United Nations Sustainable Development Goals Report 2022

Transforming our World: the 2030 Agenda for Sustainable Development which includes 17 Sustainable Development Goals (SDGs), and 169 targets was adopted by all UN Member States at a UN summit held in New York in 2015. The agenda is universally applicable with all countries having a shared responsibility to achieve the goals and targets which came into effect on January 1st, 2016. The goals and targets are to be actions over the 15-year period, are integrated and indivisible i.e., all must be implemented together by each Member State. On 10th July 2023, the United Nations published '*The Sustainable Development Goals Report 2023*[2]*,* highlighting that the lasting impacts of the COVID-19 pandemic, the war in Ukraine and subsequent refugee crisis, and the increasing consequences of the climate crisis have hindered the achievement of the SDGs. The report stipulates that due to these unprecedented events, the world is falling short of meeting most of the SDGs by 2030, especially in terms of climate action. An assessment of the around 140 targets for which trend data is available shows that about half of these targets are moderately or severely off track; and over 30% have either seen no movement or regressed below the 2015 baseline.

The Sustainable Development Goals National Implementation Plan 2022-2024 was published by the Department of Communications, Climate Action & Environment in partnerships with all Government Departments, key stakeholders, and based on input from two public consultation processes. The Plan identifies that, overall, the world is not on track to achieve the global Goals by 2030. The Plan sets out how Ireland will work to achieve the goals and targets of the Agenda for Sustainable Development both domestically and internationally. Irelands first National Implementation Plan provided a framework for Ireland to work towards the implementation of the SDGs; the new Implementation Plan aims to build on the structures and mechanisms from the first Plan and to develop and integrate additional approaches in areas identified as requiring further action.

[2] https://unstats.un.org/sdgs/report/2023/The-Sustainable-Development-Goals-Report-2023.pdf

In September 2023, the UN Summit on the SDGs took place in New York and was co-facilitated by Ireland and Qatar. Representing the halfway mark to achieving the SDGs by 2030, it marked the beginning of a new phase of accelerated progress towards the SDGs with high-level political guidance on transformative and accelerated actions. The Global Sustainable Development Report 2023[3] was published in September 2023. The previous Global Sustainable Development Report (2019) found that for some targets the global community was on track, but for many others the world would need to quicken the pace. In 2023, the situation is much more worrisome owing to slow implementation and a confluence of crises. The 2023 Report goes on to highlight the current standing of each SDG and its relevant indicators. A 2023 UN Special Report[4] found that over 30% of the SDGs have seen either no improvement or reverse trends in progress. The push for transformation to achieve the SDGs will come by through shifts in six key entry points:

1. *Human Well Being and Capabilities*
2. *Sustainable and Just Economies*
3. *Food Systems and Healthy Nutrition*
4. *Energy Decarbonisation with Universal Access*
5. *Urban and Peri-Urban Development*
6. *Global Environmental Commons*

The Proposed Development will contribute to Entry Point 4 due to the clean and renewable energy it will provide over its operational life. The phase out of fossil fuels in a manner that is globally and domestically just, while strengthening the transition to renewables by increasing energy efficiency and encouraging behavioural change will be key to achieving the relevant SDGs to the Proposed Development.

Relevant SDGs to the Proposed Development and how they are implemented into Irish National plans and policies can be found in Table 9-8.

[3] *Global Sustainable Development Report 2023* <https://sdgs.un.org/sites/default/files/2023-09/FINAL%20GSDR%202023-Digital%20-110923_1.pdf>
[4] *The Sustainable Development Goals Report 2023: Special Edition* <https://unstats.un.org/sdgs/report/2023/The-Sustainable-Development-Goals-Report-2023.pdf>

Table 9-8 United Nations Sustainable Development Goals adopted in 2015. https://sustainabledevelopment.un.org/sdgs

SDG	Targets	International Progress/Downfalls to Date (2023)	National Relevant Policy
SDG 6 Clean Water and Sanitation: *Ensure availability and sustainable management of water and sanitation for all.*	• By 2030, improve water quality by reducing pollution, eliminating dumping and minimising release of hazardous chemicals and materials, halving the proportion of untreated wastewater and substantially increasing recycling and safe reuse globally • By 2020, protect and restore water-related ecosystems, including mountains, forests, wetlands, rivers, aquifers and lakes • Support and strengthen the participation of local communities in improving water and sanitation management	Water scarcity is a growing problem in many parts of the world, and conflicts and climate change are exacerbating the issue. In addition, water pollution is a significant challenge which affects both human health and the environment in many countries. Achieving universal coverage by 2030 will require a 6-fold increase in current global rates of progress on drinking water, a 5-fold increase for sanitation, and an 8-fold increase for hygiene. Boosting infrastructure investment, improving cross-sectoral coordination, and addressing climate change is key to getting SDG6 back on track The extent of surface water bodies, including lakes, rivers, and reservoirs, is rapidly changing across the entire planet, with one in five river basins experiencing high (i.e. above natural) fluctuations in surface water during the last 5 years.	*The Water Framework Directive;* *Climate Action Plan 2023;* *Water Services Policy Statement 2018;* *National Implementation Plan on Persistent Organic Pollutants;* *Waste Action Plan for a Circular Economy;* *National Waste Prevention Programme (EPA);*
SDG 8: Decent Work and Economic Growth *Promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all*	• Sustain per capita economic growth in accordance with national circumstances and, in particular, at least 7 per cent gross domestic product growth per annum in the least developed countries • Achieve higher levels of economic productivity through diversification, technological upgrading and innovation, including through a focus on high value added and labour-intensive sectors • Improve progressively, through 2030, global resource efficiency in consumption and production and endeavour to decouple economic growth from environmental degradation, in accordance with the 10-Year Framework of Programmes on Sustainable	The lingering effects of COVID-19, cost-of-living crises, trade tensions, uncertain monetary policy paths, rising debts in developing countries, and the war in Ukraine can each significantly set back global economic growth. Combined, these crises are placing the global economy under a serious threat. Following a sharp decline of 4.1% in 2020, global real GDP per capita increased by 5.0% in 2021. However, growth in global real GDP per capita is forecast to slow down to 2.1% in 2022 and further to 1.0% in 2023, before recovering somewhat to a growth rate of 1.8% in 2024. After a sharp decline in 2020 due to the COVID-19 pandemic, labour productivity rebounded in 2021 by 2.4%. Productivity growth slowed in	*Annual National Budgets;* *A Better World;* *National Economic Recovery Plan;* *National Social Enterprise Policy for Ireland 2019-2022;* *Food Vision 2030* *National Implementation Plan on Persistent Organic Pollutants;*

SDG	Targets	International Progress/Downfalls to Date (2023)	National Relevant Policy
	Consumption and Production, with developed countries taking the lead	2022, increasing by only 0.5%. However, even before the onset of the COVID-19 pandemic, productivity growth had been slowing around the world. The latest estimates extend the downward growth trend, from an average annual rate of 1.8% between 2000-14 to 1.4% between 2015-22	*Waste Action Plan for a Circular Economy; National Waste Prevention Programme*
SDG 9: Industry, Innovation, and Infrastructure *Build resilient infrastructure, promote inclusive and sustainable industrialisation and foster innovation*	• Develop quality, reliable, sustainable and resilient infrastructure, including regional and transborder infrastructure, to support economic development and human well-being, with a focus on affordable and equitable access for all. • Promote inclusive and sustainable industrialization and, by 2030, significantly raise industry's share of employment and gross domestic product, in line with national circumstances, and double its share in least developed countries • Support domestic technology development, research and innovation in developing countries, including by ensuring a conducive policy environment for, inter alia, industrial diversification and value addition to commodities	The manufacturing industry's recovery from COVID-19 remains incomplete and uneven: some high-income regions achieved record-high manufacturing value added per capita in 2022 but levels in LDCs were not much higher than the 2015 baseline Global carbon dioxide (CO2) emissions from energy combustion and industrial processes grew by 0.9% in 2022 to a new all-time high of 36.8 billion tonnes. Emissions shrank by more than 5% in 2020, but rebounded past pre - pandemic levels in 2021, growing more than 6% in tandem with economic stimulus and a surge in coal demand even as renewables capacity additions scaled record heights. CO2 growth in 2022 was well below GDP growth of 3.2%.	*National Development Plan 2021-2030; National Economic Recovery Plan; Climate Action Plan 2023; National Implementation Plan on Persistent Organic Pollutants; Waste Action Plan for a Circular Economy; National Waste Prevention Programme; A Better World*
SDG 12 Responsible Consumption and production: *Ensure sustainable consumption and production patterns.*	• By 2030, achieve the sustainable management and efficient use of natural resources. • By 2020, achieve the environmentally sound management of chemicals and all wastes throughout their life cycle, in accordance with agreed international frameworks, and significantly reduce their release to air, water and soil in order to	Unsustainable patterns of consumption and production are the root cause of the triple planetary crisis: 7. *Climate Change* 8. *Biodiversity Loss* 9. *Pollution* The world is seriously off track in its effort to halve per-capita food waste and losses by 2030.The COVID-19 pandemic has had significant	*National Implementation Plan on Persistent Organic Pollutants; Waste Action Plan for a Circular Economy; National Waste Prevention Programme;*

SDG	Targets	International Progress/Downfalls to Date (2023)	National Relevant Policy
	minimize their adverse impacts on human health and the environment • Encourage companies, especially large and transnational companies, to adopt sustainable practices and to integrate sustainability information into their reporting cycle • Promote public procurement practices that are sustainable, in accordance with national policies and priorities. • Develop and implement tools to monitor sustainable development impacts for sustainable tourism that creates jobs and promotes local culture and products	impacts on consumption and production patterns, with disruptions to global supply chains and changes in consumer behaviour. Responsible consumption and production must be an integral part of the recovery from the pandemic. But the global economy also needs to speed up the decoupling of economic growth from resource use by maximizing the socio-economic benefits of resources while minimizing their negative impacts. Reporting on corporate sustainability has tripled since the beginning of the SDG period, but the private sector will need to significantly improve reporting on activities that contribute to the SDGs. Global data showed a rise in fossil fuel subsidies in 2021, after a brief fall in 2020 which was largely caused by a drop in energy prices. In 2021, Governments spent an estimated $732 billion on subsidies to coal, oil, and gas, against $375 billion in 2020. This brings the subsidies back to pre-2015 levels. High oil and gas prices in 2022 will likely bring a new increase, as subsidies are often linked to the price of energy.	*Climate Action Plan 2023;* *Tourism Action Plan;* *National Clean Air Strategy;* *Towards Responsible Business: Ireland's Second national Plan on Corporate Social Responsibility (CSR) 2017-2020;* *Sustainable, Inclusive and Empowered Communities 2019-2024;* *Climate Action Plan 2023*
SDG 13 Climate Action: *Take urgent action to combat climate change and its impacts** **Acknowledging that the United Nations Framework Convention on Climate Change*	• Strengthen resilience and adaptive capacity to climate-related hazards and natural disasters in all countries • Integrate climate change measures into national policies, strategies and planning • Improve education, awareness-raising and human and institutional capacity on climate change mitigation, adaptation, impact reduction and early warning	The world is on the brink of a climate catastrophe and current actions and plans to address the crisis are insufficient. Without transformative action starting now and within this decade to reduce greenhouse gas emissions deeply and rapidly in all sectors, the 1.5°C target will be at risk and with it the lives of more than 3 billion people. Failure to act leads to intensifying heatwaves, droughts, flooding, wildfires, sea-level rise, and famines. Emissions should already be decreasing now and will need to be cut almost by half by 2030 - a mere seven years from now. Global temperatures have already hit 1.1°C, rising due to increasing global greenhouse gas emissions, which reached record highs in 2021. Real-time data from 2022 show emissions continuing an upward	*National Adaptation Framework;* *Building on Recovery: Infrastructure and Capital Investment 2016-2021;* *National Mitigation Plan;* *National Biodiversity Action Plan 2017-2021;* *National Policy Position on Climate*

SDG	Targets	International Progress/Downfalls to Date (2023)	National Relevant Policy
is the primary international, intergovernmental forum for negotiating the global response to climate change.		trajectory. Instead of decreasing emissions as required by the target to limit warming, carbon dioxide levels increased from 2020 to 2021 at a rate higher than the average annual growth rate of the last decade and is already 149% higher than pre-industrial levels. Projected cumulative future CO2 emissions over the lifetime of existing and currently planned fossil fuel infrastructure exceed the total cumulative net CO2 emissions in pathways that limit warming to 1.5°C (>50%) with no or limited overshoot.	*Action and Low Carbon Development; Project 2040: National Development Plan 2021-2030; Climate Action Plan 2023; National Dialogue on Climate Action; Agriculture, Forest, and Seafood Climate Change sectoral Adaptation Plan; The National Strategy on Education for Sustainable Development in Ireland 2014-2020*
SDG15 Life on Land: *Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and*	• Take urgent and significant action to reduce the degradation of natural habitats, halt the loss of biodiversity and, by 2020, protect and prevent the extinction of threatened species • By 2020, integrate ecosystem and biodiversity values into national and local planning, development processes, poverty reduction strategies and accounts. • By 2030, combat desertification, restore degraded land and soil, including land affected by	The trend in forest loss, land degradation and the extinction of species is becoming worse, posing a severe threat to the health of the planet and people. The world's forest area continues to decline, from 31.9% in 2000 to 31.2% in 2020, representing a net loss of 100 million hectares. Agricultural expansion is the direct driver for almost 90% of global deforestation. However, globally, there has been progress in sustainable forest management with both certified forest area and the	*Climate Action Plan 2023* *Enhanced Decommissioning, Rehabilitation and Restoration Scheme (2020)* *National Biodiversity Action Plan*

SDG	Targets	International Progress/Downfalls to Date (2023)	National Relevant Policy
reverse land degradation and halt biodiversity loss.	desertification, drought and floods, and strive to achieve a land degradation-neutral world • Take urgent and significant action to reduce the degradation of natural habitats, halt the loss of biodiversity and, by 2020, protect and prevent the extinction of threatened species	proportion of forests under management plans and within protected areas increasing. Between 2015 and 2019, the world lost at least 100 million hectares of healthy and productive land every year, affecting food and water security globally. Human activities, intensified by climate change, are the main drivers of land degradation, directly affecting 1.3 billion people. If land degradation continues at a similar rate, this would result in an additional 1.5 billion hectares of degraded land by 2030.	

9.5.1.1.6 *Climate Change Performance Index*

Established in 2005, the Climate Change Performance Index (CCPI) is an independent monitoring tool which tracks countries climate protection performance. It assesses individual countries based on climate policies, energy usage per capita, renewable energy implementation and Greenhouse Gas Emissions (GHG) and ranks their performance in each category and overall. The 2023 CCPI was published in November 2022. While the CCPI 2023 indicated signs of potential reductions in global emissions, no country achieved its Paris Climate targets and therefore the first three places of the ranking system remain unoccupied.

Ireland, ranked 46th in 2022, has climbed 9 places to 37th for 2023, however still remains as a "low" performer in international performance. Ireland still remains at "very low" on the Greenhouse Gas Emissions ratings at 47th in the world and is one of the only two EU countries, along with Poland, to receive a "very low" performance rating.

9.5.1.2 National Greenhouse Gas Emission and Climate Targets

9.5.1.2.1 *Programme for Government*

The Programme for Government was published in October 2020 and last updated April 2021. In relation to climate change the programme recognises that the next ten years are a critical period in addressing the climate crisis. It is an ambition of the programme to more than halve carbon emissions over the course of the decade (2020-2030). The programme notes that the government are committed to reducing greenhouse gas emissions by an average 7% per annum over the next decade in a push to achieve a net zero emissions by the year 2050. The programme also recognises the severity of the climate challenge as it clarifies that:

> *"Climate change is the single greatest threat facing humanity"*

9.5.1.2.2 *Climate Action and Low Carbon Development (Amendment) Act 2021*

The Climate Action and Low Carbon (Amendment) Act 2021 is a piece of legislation which commits the country to move to a climate resilient and climate neutral economy by 2050. This was passed into law in July 2021.

The Programme for Government has committed to a 7% average yearly reduction in overall greenhouse gas emissions over the next decade, and to achieve net zero emissions by 2050. This Act will manage the implementation of a suite of policies to assist in achieving this target.

The Act includes the following key elements, among others:

- Places on a statutory basis a 'national climate objective', which commits to pursue and achieve no later than 2050, the transition to a climate resilient, biodiversity-rich, environmentally sustainable and climate-neutral economy.
- Embeds the process of carbon budgeting into law, Government are required to adopt a series of economy-wide five-year carbon budgets, including sectoral targets for each relevant sector, on a rolling 15-year basis, starting in 2021.
- Actions for each sector will be detailed in the Climate Action Plan, updated annually.
- A National Long Term Climate Action Strategy will be prepared every five years.
- Government Ministers will be responsible for achieving the legally-binding targets for their own sectoral area with each Minister accounting for their performance towards sectoral targets and actions before an Oireachtas Committee each year.
- Strengthens the role of the Climate Change Advisory Council, tasking it with proposing carbon budgets to the Minister.

Provides that the first two five-year carbon budgets proposed by the Climate Change Advisory Council should equate to a total reduction of 51% emissions over the period to 2030, in line with the Programme for Government commitment.

9.5.1.2.3 Climate Change Advisory Council 2023

The Climate Change Advisory Council (CCAC) was established on 18th January 2016 under the Climate Action and Low Carbon Development Act 2015. The CCAC aims to provide independent evidence-based advice and recommendations on policy to support Ireland's Just Transition to a biodiversity-rich, environmentally sustainable, climate-neutral, and resilient society.

The Annual Review 2023[5] is the seventh annual review carried out by CCAC and details the CCAC concerns that the necessary national actions are not taking place or being enabled at the required speed, going on to state that 'at the current rate of policy implementation, Ireland will not meet the targets set in the first and second carbon budget periods unless urgent action is taken immediately, and emissions begin to fall much more rapidly.'

The electricity sector is the third largest emitting sector in Ireland and the successful decarbonisation of this sector could lead to decarbonisation in other sectors, such as the electrification of transport and heating. The Annual 2023 Review states that the electricity sector has been set one of the smallest sectoral emission ceilings and the steepest decline in emissions of all sectors with emission ceilings of 40MtCO_2eq for the first carbon budget period (2021–2025) and 20MtCO_2eq for the second carbon budget period (2026–2030). This equates to a headline target of a 75% reduction in emissions in the sector from 2018 levels by 2030, which will be achieved by increasing the share of renewable electricity to 80%, encompassing 9GW of onshore wind capacity, at least 5GW of offshore wind capacity and 8GW of solar photovoltaic capacity, supported by a range of actions set out in the Climate Action Plan 2023.[6]

9.5.1.2.4 Carbon Budgets

The first national carbon budget programme proposed by the Climate Change Advisory Council, approved by Government and adopted by both Houses of the Oireachtas in April 2022 comprises three successive 5-year carbon budgets. The total emissions allowed under each budget are shown in Table 9-9.

Table 9-9 Proposed Carbon Budgets of the Climate Change Advisory Council

	2021 – 2025 Carbon Budget 1	2026 – 2030 Carbon Budget 2	2031 – 2035 Provisional Carbon Budget 3
	All Gases		
Carbon Budget (Mt CO_2eq)	295	200	151
Annual Average Percentage Change in Emissions	-4.8%	-8.3%	-3.5%
The figures are consistent with emissions in 2018 of 68.3 Mt CO_2eq reducing to 33.5 Mt CO_2eq in 2030 thus allowing compliance with the 51% emissions reduction target by 2030			

[5] *Climate Change Advisory Council 2023 Review* <https://www.climatecouncil.ie/councilpublications/annualreviewandreport/CCAC-AR-2023-FINAL%20Compressed%20web.pdf>
[6] *Climate Action Plan 2023* <https://www.gov.ie/en/publication/7bd8c-climate-action-plan-2023/>

9.5.1.2.5 Sectoral Emissions Ceilings

The Sectoral Emissions Ceilings were launched in September 2022. The objective of the initiative is to inform on the total amount of permitted greenhouse gas emissions that each sector of the Irish economy can produce during a specific time period. The Sectoral Emissions Ceilings alongside the annual published Climate Action Plan provide a detailed plan for taking decisive action to achieve a 51% reduction in overall greenhouse gas emissions by 2030.

Section C of the Climate Action and Low Carbon Development (Amendment) Act 2021 provides the minister with a method of preparing the Sectoral Emissions Ceiling within the bounds of the carbon budget. The Sectoral Emission Ceilings for each 5-year carbon budget period was approved by the government on the 28th of July 2022 and are shown in Table 9-10 below.

Table 9-10 Sectoral Emission Ceilings 2022

	Sectoral Emission Ceilings for each 5-year carbon budget period (MtCO2eq.)	
Sector	2021 – 2025 Carbon Budget 1	2026 – 2030 Carbon Budget 2
Electricity	40	20
Transport	54	37
Built Environment-Residential	29	23
Built Environment-Commercial	7	5
Industry	30	24
Agriculture	106	96
LULUCF[1]	Yet to be determined	Yet to be determined
Other (F-Gases, Waste & Petroleum refining)	9	8
Unallocated Savings		*-26*
Total[2]	Yet to be determined	Yet to be determined
Legally binding Carbon budgets and 2030 Emission Reduction Targets	295	200

[1] Finalising the Sectoral Emissions Ceiling for the land-use, Land-use Change and Forestry (LULUCF) sector has been deferred for up to 18 months to allow for the completion of the Land-use Strategy
[2] Once LULUCF sector figures are finalised, total figures will be available.

9.5.1.2.6 Climate Action Plan 2023

The Climate Action Plan 2023 (CAP 2023) was launched in December 2022. Following on from Climate Action Plans 2019 and 2021, CAP 2023 sets out the roadmap to deliver on Ireland's climate ambition. It aligns with the legally binding economy-wide carbon budgets and sectoral ceilings that were agreed by Government in July 2022 following the Climate Action and Low Carbon Development (Amendment) Act 2021, which commits Ireland to a *legally binding target of net-zero greenhouse gas*

emissions no later than 2050, and a reduction of 51% by 2030. CAP 2023 sets out indicative ranges of emissions reductions for each sector of the economy.

There have been Six Vital High Impact Sectors identified within CAP 2023 and these are as follows:

Powering Renewables – 75% Reduction in emissions by 2030

We will facilitate a large-scale deployment of renewables that will be critical to decarbonising the power sector as well as enabling the electrification of other technologies.

- *Accelerate the delivery of onshore wind, offshore wind, and solar.*
- *Dial up to 9 GW onshore wind, 8 GW solar, and at least 7 GW of offshore wind by 2030 (with 2 GW earmarked for green hydrogen production).*
- *Support at least 500 MW of local community-based renewable energy projects and increased levels of new micro-generation and small-scale generation.*
- *Phase out and end the use of coal and peat in electricity generation.*
- *New, dynamic Green Electricity Tariff will be developed by 2025 to incentivise people to use lower cost renewable electricity at times of high wind and solar generation.*

Building Better – 45% (Commercial/Public) and 40% (Residential) Reduction in Emissions by 2030

We will increase the energy efficiency of existing buildings, put in place policies to deliver zero-emissions new builds and continue to ramp up our retrofitting programme.

- *Ramp up retrofitting to 120,000 dwellings to BER B2 by 2025, jumping to 500,000 by 2030.*
- *Put heat pumps into 45,000 existing and 170,000 new dwellings by 2025, up to 400,000 existing and 280,000 new dwellings by 2030.*
- *Generation up to 0.8 TWh of district heating by 2025 and up to 2.5 TWh by 2030.*

Turning Transport Around – 50% Reduction in Emissions by 2030

We will drive policies to reduce transport emissions by improving our town, cities and rural planning, and by adopting the Avoid-Shift-Improve approach: reducing or avoiding the need for travel, shifting to public transport, walking and cycling and improving the energy efficiency of vehicles.

- *Change the way we use our road space.*
- *Reduce the total distance driven across all car journeys by 20%.*
- *Walking, cycling and public transport to account for 50% of our journeys.*
- *Nearly 1 in 3 private cars will be an Electric Vehicle.*
- *Increase walking and cycling networks.*
- *70% of people in rural Ireland will have buses that provide at least 3 trips to the nearby town daily by 2030.*

Making Family Farms More Sustainable – 25% Reduction in Emissions by 2030

We will support farmers to continue to produce world class, safe and nutritious food while also seeking to diversify income through tillage, energy generation and forestry.

- *Significantly reduce our use of chemical nitrogen as a fertilizer.*
- *Increase uptake of protected urea on grassland farms to 90-100%.*

- *Increase organic farming to up to 450,000 hectares, the area of tillage to up to 400,000 ha.*
- *Expand the indigenous biomethane sector through anaerobic digestion, reaching up to 5.7TWh of biomethane.*
- *Contribute to delivery of the land use targets for afforestation and reduced management intensity of organic soils.*

Greening Business and Enterprise – 35% Reduction in Emissions by 2030

We're changing how we produce, consume, and design our goods and services by breaking the link between fossil fuels and economic progress. Decarbonising industry and enterprise is key to Ireland's economy and future competitiveness.

- *Reduce clinker content in cement and substitute products with lower carbon content for construction materials, ensuring 35% reduction in emissions by 2030 (against 2018).*
- *Reduce fossil fuel use from 64% of final consumption (2021) to 45% by 2025 and further by 2030.*
- *Increase total share of heating to carbon neutral to 50-55% by 2025, up to 70-75% by 2030.*
- *Significantly grow the circular economy and bioeconomy.*

Changing Our Land-Use - Exact reduction target for this sector is yet to be determined.

The first phase of the land use review will tell us how we are using our land now. Then, we can map, with evidence, how it can be used most effectively to capture and store carbon and to produce better, greener food and energy.

- *Increase our annual afforestation rates to 8,000 hectares per annum from 2023 onwards.*
- *Rethink our Forestry Programme and Vision.*
- *Promote forest management initiatives in both public and private forests to increase carbon sinks and stores.*
- *Improve carbon sequestration of 450,000 ha of grasslands on mineral soils and reduce the management intensity of grasslands on 80,000 ha of drained organic soils.*
- *Rehabilitate 77,600 hectares of peatlands.*

9.5.1.2.7 Emissions Projections

In its approach to decarbonising, the EU has split greenhouse gas (GHG) emissions into two categories, the Emissions Trading System (ETS) and the non-ETS. Emissions from electricity generation and large industry in the ETS are subject to EU-wide targets which require that emissions from these sectors be reduced by 43% by 2030, relative to 2005 levels. Within the ETS, participants are required to purchase allowances for every tonne of emissions, with the amount of these allowances declining over time to ensure the required reduction of 43% in GHG emissions is achieved at EU-level[7].

Emissions from all other sectors, including agriculture, transport, buildings, and light industry are covered by the EU Effort Sharing Regulation (ERS[8]). This established binding annual GHG emission targets for Member States for the period 2021–2030. Ireland is required to reduce its emissions from

[7] *Government of Ireland (2023) - Climate Action Plan 2023 https://www.gov.ie/en/publication/7bd8c-climate-action-plan-2023/*
[8] *Regulation (EU) 2018/842 of the European Parliament and of the Council of 30 May 2018 on binding annual greenhouse gas emission reductions by Member States from 2021 to 2030 contributing to climate action to meet commitments under the Paris Agreement and amending Regulation (EU) No 525/2013 (Text with EEA relevance)*

these sectors by 30% by 2030, relative to 2005 levels. Under the EU Green Deal, the targets for the ETS and non-ETS sectors will be revised upwards in order to achieve the commitment, at EU level, to reach an economy-wide 2030 reduction in emissions of at least 55%, compared to 1990 levels.

The Environmental Protection Agency (EPA) publish Ireland's Greenhouse Gas Emission Projections and at the time of writing, the most recent report, *'Ireland's Greenhouse Gas Emissions Projections 2022–2040'* was published in June 2023. The report includes an assessment of Ireland's progress towards achieving its emission reduction targets out to 2030 set under the Effort Sharing Regulation (ESR).

The EPA has produced two scenarios in preparing these greenhouse gas emissions projections: a "With Existing Measures" (WEM) scenario and a "With Additional Measures" (WAM) scenario. These scenarios forecast Irelands greenhouse gas emissions in different ways. The WEM scenario assumes that no additional policies and measures, beyond those already in place by the end of 2020. This is the cut off point for which the latest national greenhouse gas emission inventory data is available, known as the 'base year' for projections. The WAM scenario has a higher level of ambition and includes government policies and measures to reduce emissions such as those in Ireland's Climate Action Plan 2021.

The EPA Emission Projections Update notes the following key trends:

- Ireland is not on track to meet the 51% emissions reduction target by 2030 (as compared to 2018 levels) – expected to achieve a total reduction of 29% under a WAM scenario
    - Will only achieve an 11% reduction under a WEM scenario
- Almost all sectors are projected to breach their sectoral emission ceiling (SEC) for 2025 and 2023 in both WAM and WEM scenarios
    - Only the residential sector will achieve their SEC
- Projected that Ireland could meet the original EU Effort Sharing Regulation target of 30% emissions reductions by 2030 (compared to 2005) – this goal has since been updated to a 42% reduction which will require full and rapid implementation of CAP 2023 measures and further measures to be implemented
- Energy sector emissions are projected to decrease by 50-60% between 2021-2030
    - Achievement of the 80% renewable energy target is expected
- Transport emissions are expected to decrease between 1-35% between 2021-2030
- Emissions from LULUCF are projected to increase over the period 2021-2030 as forestry reaches harvesting age
    - Planned policies for the sector are expected to reduce the extent of emissions increase

9.5.2 Receiving Environment

County Galway has a temperate oceanic climate, resulting in mild winters and cool summers. The Met Éireann weather station at Claremorris is the nearest weather and climate monitoring station to the Proposed Development site, located approximately 25.4km to the north-west of the Proposed Development site.

Meteorological data recorded at Claremorris is over the 30-year period from 1971-2000 is shown in Table 9-11 below. The wettest months are October and December, and April is usually the driest. July is the warmest month with an average temperature of 15.0° Celsius. The mean annual temperature recorded at Claremorris Station was 9.3° Celsius.

More recent monthly meteorological data recorded at Athenry, Co. Galway, located approximately 46.8 kilometres south of the site, from January 2020 to January 2023 is available at: https://www.met.ie/climate/available-data/monthly-data. February 2020 was the wettest month in this time

period, with 248.5mm of rainfall recorded, while April 2021 was the driest month with 23.9mm of rainfall. July 2021 was the warmest month in this time period, with a mean monthly temperature of 17.3° Celsius. December 2022 was the coldest month with a mean monthly temperature of 3.4° Celsius.

9.5.2.1 Wind

The wind field characteristics of the area are important climatological elements in examining the potential for the generation of fugitive dust emissions from the site. Fugitive dust emissions from a surface occur if the winds are sufficiently strong and turbulent and the surface is dry and loose, together causing re-suspension of particulate matter from the ground. A wind speed at ground level in excess of about five metres per second is considered to be the threshold above which re-suspension of fine sized material from an exposed surface may occur. The surface needs to have a relatively low moisture content for this type of dust emission to take place and any wetting either by rainfall or sprayers, will greatly reduce the potential of fugitive dust emissions. The mean annual wind speed at Claremorris Station is 8.7 knots.

9.5.2.2 Rainfall

Long term rainfall data was also obtained from the monitoring station at Claremorris Station. The annual average rainfall for Claremorris Station is 1,173.6 mm/yr. This percentage rainfall is considered to be high. Such a percentage rainfall is attributed to Galway's oceanic position in the North Atlantic Ocean.

Table 9-11 Data from Met Éireann Weather Station at Claremorris, 1971 to 2000 - – Monthly and Annual Mean and Extreme Values

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year
TEMPERATURE (degrees Celsius)													
Mean daily max	7.5	8.1	9.8	12.1	14.9	17.0	18.9	18.7	16.4	13.1	9.9	8.1	12.9
Mean daily min	1.7	1.8	2.9	3.9	6.1	8.8	11.0	10.6	8.6	6.4	3.5	2.5	5.7
Mean temperature	4.6	4.9	6.3	8.0	10.5	12.9	15.0	14.7	12.5	9.8	6.7	5.3	9.3
Absolute max.	13.3	13.6	16.2	22.3	25.4	29.8	30.5	28.0	25.1	19.9	15.9	14.3	30.5
Absolute Min.	-11.7	-9.1	-8.0	-5.5	-3.1	0.7	0.6	2.6	-1.2	-4.3	-5.3	-12.9	-12.9
Mean No. of Days with Air Frost	8.7	7.3	5.2	3.3	0.8	0.0	0.0	0.0	0.1	1.2	5.3	7.6	39.5
Mean No. of Days with Ground Frost	15	14	12	10	5	0	0	0	2	5	12	14	89
RELATIVE HUMIDITY (%)													
Mean at 0900UTC	90.7	90.3	88.7	82.5	79.3	80.4	83.6	86.2	88.1	91.6	91.2	91.0	87.0
Mean at 1500UTC	85.6	79.8	75.7	67.9	68.0	71.1	73.2	73.4	74.7	80.2	84.4	88.1	76.8
SUNSHINE (Hours)													
Mean daily duration	1.3	1.9	2.6	4.3	5.0	4.4	3.7	3.8	3.2	2.4	1.7	0.9	2.9
Greatest daily duration	7.9	9.3	10.8	13.4	15.1	15.8	14.8	13.7	11.4	9.3	8.6	6.7	15.8
Mean no. of days with no sun	9.5	7.3	5.7	2.8	2.0	2.2	2.2	2.1	3.4	5.0	8.1	10.8	61.1
RAINFALL (mm)													
Mean monthly total	127.9	102.1	101.6	63.7	68.1	64.5	70.1	95.7	94.3	128.2	127.7	129.6	1173.6
Greatest daily total	31.5	107.0	26.8	34.0	51.3	38.0	42.2	49.7	41.0	46.7	54.9	41.2	107.0
Mean num. of days with >= 0.2mm	21	18	21	16	16	15	17	18	18	21	21	22	224
Mean num. of days with >= 1.0mm	18	15	17	12	12	11	12	13	14	17	18	17	176
Mean num. of days with >= 5.0mm	9	7	7	4	4	4	4	6	5	8	8	9	75
WIND (knots)													
Mean monthly speed	10.2	10.3	10.2	8.7	8.1	7.7	7.2	6.8	7.7	8.7	8.9	9.7	8.7
Max. gust	96	85	74	74	62	51	66	78	58	70	67	81	96
Max. mean 10-minute speed	59	48	45	41	41	34	39	32	37	46	40	52	59
Mean num. of days with gales	1.4	0.9	0.7	0.1	0.1	0.0	0.0	0.0	0.1	0.3	0.4	0.8	4.8

WEATHER (Mean No. of Days With:)													
Snow or sleet	5.7	4.4	3.8	1.6	0.2	0.0	0.0	0.0	0.0	0.1	1.2	3.1	20.0
Snow lying at 0900UTC	2.3	0.7	0.7	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.7	4.6
Hail	4.4	3.2	5.4	3.2	1.6	0.4	0.1	0.0	0.7	0.8	2.6	2.7	25.2
Thunder	0.3	0.1	0.2	0.2	0.4	0.7	0.7	0.2	0.2	0.2	0.3	0.5	4.0
Fog	3.4	2.3	1.6	1.8	1.2	1.4	2.0	3.2	3.3	3.2	2.6	3.4	29.5

9.5.3 Carbon Losses from the Proposed Development

Quarrying is an essential component to the Irish economy and a vital element in a recovering construction sector. However, in Ireland, the construction sector is responsible for 37% of Ireland's emissions with 14% of this being from embodied carbon within construction materials.[9] The 2023 Climate Action Plan (CAP 2023) has set a 2030 target of reducing embodied carbon emissions by at least 30% for all materials produced and used in Ireland and to reduce fossil fuel demand through energy efficient measures by 10%. CAP 2023 Key Performance Indicators (KPIs) for 2025 and 2030 call for a decrease of embodied carbon in construction materials produced and used in Ireland by 10% and 30% respectively. This will equate to a 0.2MtCO2eq and 0.4MtCO2eq emissions abatement as compared to 2018 levels. As quarry activities have a critical role in the further development of Ireland moving this industry forward under sustainable and low carbon methods will be fundamental to reducing emissions and getting back on track to achieve the industry sectoral emission ceiling and the first carbon budgeting period.

9.5.4 Potential Climate Effects and Associated Mitigation Measures

9.5.4.1 Do Nothing Phase

If the Proposed Development were not to proceed, there would be no change to existing climate conditions in the area.

9.5.4.2 Site Enabling Works Phase

9.5.4.2.1 *Greenhouse Gas Emissions from Machinery*

Construction activities require the use of plant and machinery on the Proposed Development site, this will result in exhaust emissions; this type of emission is an inevitable consequence of construction works. This potential impact will be short-term and slight only, given the quantity of greenhouse gases associated with the generation and management of these waste streams that will be emitted to the atmosphere, and will be restricted to the duration of the site enabling works and operational phase.

Emissions associated with the site enabling works, particularly the cement hardstands are considered as part of the emissions associated with energy consumption and chemical processes during the extraction, transport and/or manufacture of establishment materials or products. Typical embodied carbon datasets are 'cradle-to-gate' (i.e., all emissions to the point of delivery from the factory gate). Embodied carbon refers to the emissions associated with all the activities of procuring, mining, harvesting raw materials, transforming these materials into construction products, transporting them to site and incorporating them into a project and subsequently maintaining, replacing and removing at the end of life. Embodied carbon within the materials used during site enabling works will result in a long-term imperceptible negative impact due to the nature of these emissions.

The transport of material away from the site, as well as equipment/materials to the site, will also give rise to greenhouse gas emissions associated with the transport vehicles and exhaust emissions. The potential impact will be short-term and slight only, given the quantity of greenhouse gases that will be emitted.

Waste will arise from the Proposed Development during the site enabling phase, mainly from excavation and unavoidable waste including material surpluses, damaged materials, traffic and

[9] *Building a Zero Carbon Ireland – A roadmap to decarbonise Irelands Built Environment across it's Whole Life Cycle (2022)* <https://www.igbc.ie/wp-content/uploads/2022/10/Building-Zero-Carbon-Ireland.pdf>

transport emissions, and packaging waste. This potential impact will be short-term and slight only, given the quantity of greenhouse gases associated with the generation and management of these waste streams that will be emitted to the atmosphere, and will be restricted to the duration of the construction phase. Waste management will be carried out in accordance with *Best Practice Guidelines on the Preparation of Resource and Waste Management Plans for Construction & Demolition Projects* (2021) produced by the EPA.

9.5.4.3 Site Operational Phase

9.5.4.3.1 *Greenhouse Gas Emissions from Machinery*

Due to the nature of the Proposed Development, the effects that occur during the site enabling works will largely be maintained during the operational phase. Some potential long-term slight negative impacts that will occur during the operational phase of the Proposed Development are the release of carbon dioxide to the atmosphere due to quarry activities and vehicle exhaust emissions, embodied carbon, and waste disposal.

Operational activities will consist of the extraction, processing and washing of sand. This will lead to exhaust emissions. Emissions of this type are inevitable consequence of the production of quarry product due to the nature of the work and the historical lack of availability of more energy efficient technologies and infrastructure appropriate for this sector.

Waste will arise from the Proposed Development during the operational phase, mainly from excavation and unavoidable waste including canteen wastes. This potential impact will be medium-term and moderate, given the quantity of greenhouse gases associated with the generation and management of these waste streams that will be emitted to the atmosphere. Waste management will be carried out in accordance with *Best Practice Guidelines on the Preparation of Resource and Waste Management Plans for Construction & Demolition Projects* (2021) produced by the EPA. Waste management at the site is further outlined in the accompanying Environmental Management Plan (EMP) which is appended in Appendix 4-2.

9.5.4.4 Restoration Phase

Upon the completion of the operational phase at the site, restoration will occur. This will involve levelling the site using material in the berms and replanting of hedgerows. This is outlined in further detail in Chapter 4 and 11 of the EIAR and in the Site Restoration Drawings included in the Planning Drawings Pack in Appendix 4-1 and Appendix 11-1. This will result in a permanent moderate positive effect.

9.5.4.5 Mitigation Measures

As the Proposed Development will have no significant negative effects on climate, mitigation measures are not proposed other than all machinery and plant will be maintained in good operational order while on-site, minimising any emissions that are likely to arise. These measures will minimise any effect that the development might have on climate in the long-term.

9.5.4.6 Residual Effect

Once emitted to the atmosphere, the greenhouse gas emissions that will arise from quarry activities will have a permanent, therefore, following implementation of the mitigation measures above, residual impacts of greenhouse gas emissions arising from the Proposed Development will have a permanent imperceptible negative effect on Climate.

9.5.4.7 Significance of Effects

Based on the assessment above there will be imperceptible significant effects.

9.5.4.8 Cumulative Effect

The site restoration and other quarry operations in the area will require plant items which consume fossil fuels and therefore will lead to a minor emission of greenhouse gases cumulatively. However, given the facilities surrounding the site will be managed to control emissions to air and with the implementation of the mitigation measures discussed, the cumulative effects are likely to be imperceptible.