

EIAR FOR POWERSTOWN BIOENERGY

Volume 2 - MAIN body of the EIAR

Chapter 7 – Population and Human Health

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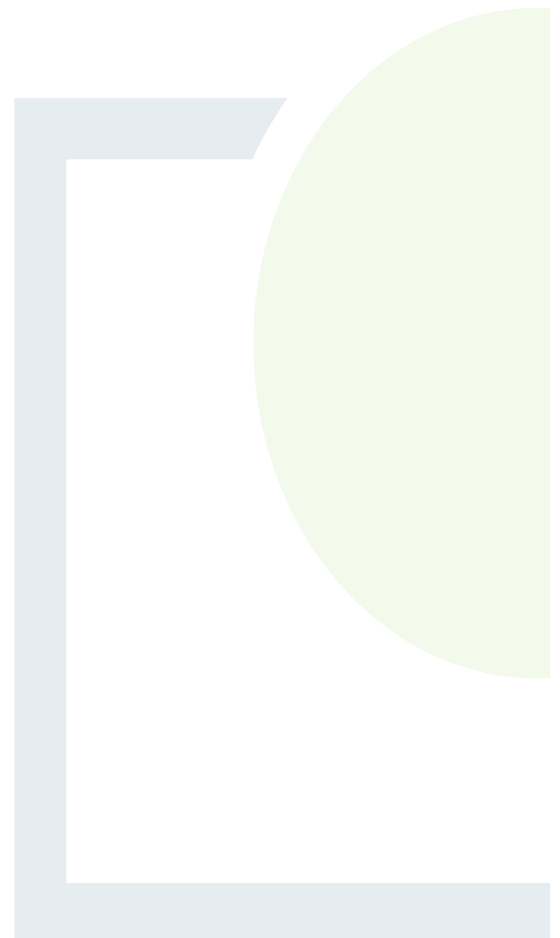


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GLOSSARY AND ACRONYMS

Please refer to Chapter 1 Introduction, in Volume 2 of this EIAR, for the exhaustive acronyms and glossary lists.



7. POPULATION AND HUMAN HEALTH

7.1 Introduction

This chapter assesses the likely population and human health impacts associated with the proposed development. The assessment of impacts has been undertaken in the context of current relevant standards and guidance and identifies any requirements or possibilities for mitigation. The proposed development is defined in Chapter 1 Introduction, in Volume 2 of this Environmental Impact Assessment Report (EIAR), and a detailed description of the proposed development is set out in Chapter 3, Description of the Existing and Proposed Development, in Volume 2 of this EIAR.

Directive 2014/52/EU (European Union, 2014) requires the assessment of the potential impact of the proposed development on population and human health. Human beings comprise a significant element of the overall environment. In carrying out a new development, one of the principal concerns are that people should experience no reduction in the quality of life because of the construction, operational, and decommissioning phases of a development.

Ultimately, the effects of a potential development on the environment may impinge upon human beings, directly and indirectly, positively and negatively. The key issues examined in this section of the EIAR include population and human health but also economic activity and employment, safety, wellbeing, recreation, amenity and tourism (including landscape and visual impacts).

7.1.1 Guidance

This chapter has been prepared in accordance with the following guidelines:

- Guidelines on the Information to be Contained in Environmental Impact Assessment Reports (EPA, 2022)
- Environmental Impact Assessment of Projects: Guidance on the preparation of the Environmental Impact Assessment Report (European Commission, 2017)
- Guidelines for Planning Authorities and An Bord Pleanála on carrying out Environmental Impact Assessment (Department of Housing, Planning and Local Government, 2018)
- Health Impact Assessment Guidance: A Manual (Institute of Public Health, 2021)
- Human Health: Ensuring a High Level of Protection. A reference paper on addressing Human Health in Environmental Impact Assessment (European Public Health Association, 2020)
- Environmental Noise Guidelines for the European Region (World Health Organisation, 2019)
- Environmental Impact Assessment of Projects. Guidance on the Preparation of the Environmental Impact Assessment Report (European Commission, 2017)
- Health in Environmental Impact Assessment – A Primer for a Proportionate Approach (Institute of Environmental Management and Assessment, 2022)
- Institute of Environmental Management and Assessment (IEMA) Guide: Determining Significance For Human Health in Environmental Impact Assessment (Institute of Environmental Management and, 2022)
- IEMA Guide: Effective Scoping of Human Health in Environmental Impact Assessment (Institute of Environmental Management and, 2022)



7.2 Statement of Authority

This chapter was written by Eibhlín Vaughan and reviewed by Janette Bligh of Fehily Timoney and Company (FT).

Eibhlín is a Project Environmental Scientist in the Circular Economy and Environment Department at Fehily Timoney and Company. She holds a First Class Honours Bachelor's Degree in Environmental Science from Trinity College Dublin and a Master of Engineering Science Degree from University College Dublin. She has three years of experience supporting with Environmental Impact Assessment Reports (EIARs) for infrastructure projects. Eibhlín provides technical support to the EIAR teams for a variety of projects.

Janette Bligh is a Senior Environmental Scientist with a MSc in Environmental Engineering from Queen's University, Belfast and a BSc in Environmental Geoscience from the University of Birmingham. Janette has 14 years of experience working on various infrastructure projects during screening, scoping and preparing Human Health and Population chapters of EIARs. She works for Fehily Timoney and Company.

7.3 Assessment Methodology

7.3.1 Study Area

The proposed development is situated in Carlow County Council's jurisdiction and includes the lands at Powerstown, County Carlow, and the Electoral District of Nurney, County Carlow.

A detailed description of the proposed development is provided in Chapter 3, Description of the Existing and proposed development, in Volume 2 of this EIAR.

7.3.2 Desktop Study

No specific guidance on the meaning of the term Human Health has been issued in the context of Directive 2014/52/EU (European Union, 2014). The European Commission's Guidance on the preparation of the Environmental Impact Assessment Report (European Commission, 2017) references the requirement to describe and, where appropriate, quantify the primary and secondary effects on human health and welfare. The European Commission guidance states the following in relation to the assessment of Human Health:

"Human health is a very broad factor that would be highly Project dependent. The notion of human health should be considered in the context of the other factors in Article 3(1) of the EIA Directive and thus environmentally related health issues (such as health effects caused by the release of toxic substances to the environment, health risks arising from major hazards associated with the Project, effects caused by changes in disease vectors caused by the Project, changes in living conditions, effects on vulnerable groups, exposure to traffic noise or air pollutants) are obvious aspects to study. In addition, these would concern the commissioning, operation, and decommissioning of a Project in relation to workers on the Project and surrounding population".

In accordance with this statement in the European Commission's Guidance document, this chapter addresses Human Health in the context of factors addressed elsewhere in this EIAR, such as air quality, noise, and water.

Regarding study area selection for the assessment of human health impact, the IEMA Guide to Scoping of Human Health in EIA (Institute of Environmental Management and Assessment (IEMA), 2022) states the following:



“Using a single geographically defined neighbouring community (site-specific population) to cover a range of effects across different wider determinants of health can provide appropriate flexibility and is proportionate. If there are clearly distinct localities from which a project’s activities occur (e.g. communities along a linear development), it would be appropriate to present multiple separate site-specific geographic populations.

Reporting should have regard to the geographic audiences most relevant to the health effects of the project. The populations of relevant geographic areas should be defined to aid understanding of the individual and combined health effects due to the project. For projects of a linear nature (e.g. cable, pipeline, road or rail infrastructure), reporting structure should allow the localised conclusions for relevant geographic areas to be understood separately. This does not require that every community has a separate reporting section, but that relevant localised effects should be discussed as appropriate”.

The Guidelines for Planning Authorities and An Bord Pleanála on carrying out Environmental Impact Assessment (Department of Housing, Planning and Local Government, 2018), and the Guidelines on the Information to be Contained in Environmental Impact Assessment Reports (EPA, 2022) state that there is a close interrelationship between the SEA Directive and Directive 2014/52/EU. The Guidelines state that as the term ‘Human Health’ is contained within both of these directives, a common interpretation of this term should therefore be applied.

A comprehensive desk study was undertaken to assess the potential effects of the proposed development on Population and Human Health. This study involved the collation and assessment of data from the following sources:

- Carlow County Development Plan (Carlow County Council, 2022)
- Central Statistics Office (CSO) Census Data (Central Statistics Office, 2026)
- Pobal data (Pobal, 2026) for socio-economic and demographic data
- Fáilte Ireland data (Fáilte Ireland, 2024) for tourism data
- Corine Landcover data through Tailte Éireann (Tailte Éireann, 2018) for land use data

7.3.3 Impact Assessment Methodology

7.3.3.1 *Population*

In accordance with best practice, demographic data has been sourced from the CSO Census of Ireland (2011 to 2022) records. A desktop review of online data relating to the demographic information relating to the State, County Carlow, and the ‘Study Area’ has been assessed to establish the existing demographic trends.

For the purpose of this aspect of the assessment, the demographic analysis of the Study Area is defined in terms of Electoral Divisions (EDs) within which the proposed development is contained. Therefore, for the purpose of this aspect of the assessment, there is one area contained within the ‘Study Area’: the ED of Nurney, County Carlow.

Eircode data (2026), Geodirectory data, data from the Central Statistics Office (CSO) and Pobal data have been assessed to identify any commercial or residential receptors in proximity to the proposed development.

Topographical maps and Google maps, along with the information contained within Volume 2 of this EIAR have also been used to inform the baseline description of the area.



The data gathered have informed the consideration of impacts on the existing population within the immediate environs of the proposed development and allows for a comprehensive assessment of the potential effects on population trends which may occur during the construction, operational, and decommissioning phase of the proposed development.

7.3.3.2 Employment

A socio-economic profile of the existing environment was established using Census (2022) data to outline an employment profile of the area containing the proposed development.

7.3.3.3 Land Use

Land use in the area was examined to determine likely indirect and direct significant effects on existing land use patterns which may arise because of the proposed development. Corine Landcover data were studied to determine land uses in the Study Area (Tailte Éireann, 2018). The likely significant effect of the proposed development was then considered regarding these land uses.

7.3.3.4 Recreation, Amenity and Tourism

EIAR Guidelines for the Consideration of Tourism and Tourism Related Projects (Fáilte Ireland, 2023) informed the methodology used in assessing potential impacts on Recreation, Amenity and Tourism. A profile of tourism in the region was established through examination of Fáilte Ireland Statistics in order to indicate the strength of Recreation, Amenity and Tourism in the surrounding region. Likely significant effects as a result of the proposed development were then considered in relation to the tourism profile, amenity and recreation facilities and attractions of the area around Powerstown and the wider area within County Carlow.

7.3.3.5 Human Health

The Human Health and Safety aspect of this chapter has regard to the Health Impact Assessment Guidance (Institute of Public Health, 2021) which provides a health sensitivity conceptual model. The conceptual model, shown in Figure 7-1, provides different components of sensitivity. It uses criteria (segments) and indicative classifications (levels) to explore, and explain, a finding of sensitivity. The conclusion may be summarised as a high, medium, low or negligible sensitivity to change as a result of a proposed development. This conceptual model was used for the assessment of potential impacts by the proposed development on population.

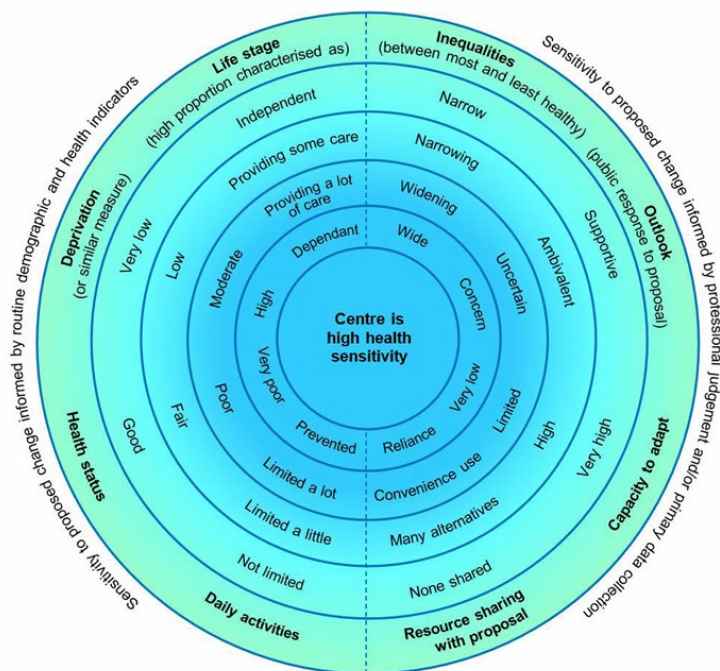


Figure 7-1: Health sensitivity conceptual model (Institute of Public Health, 2021)

The Health Impact Assessment Guidance (Institute of Public Health, 2021) also provides a conceptual model of the different components of sensitivity, shown in Figure 7-7-2. This conceptual model uses criteria (segments) and indicative classifications (levels) to explore, and explain, a finding of magnitude. The conclusion may be summarised as a high, medium, low or negligible magnitude of change.

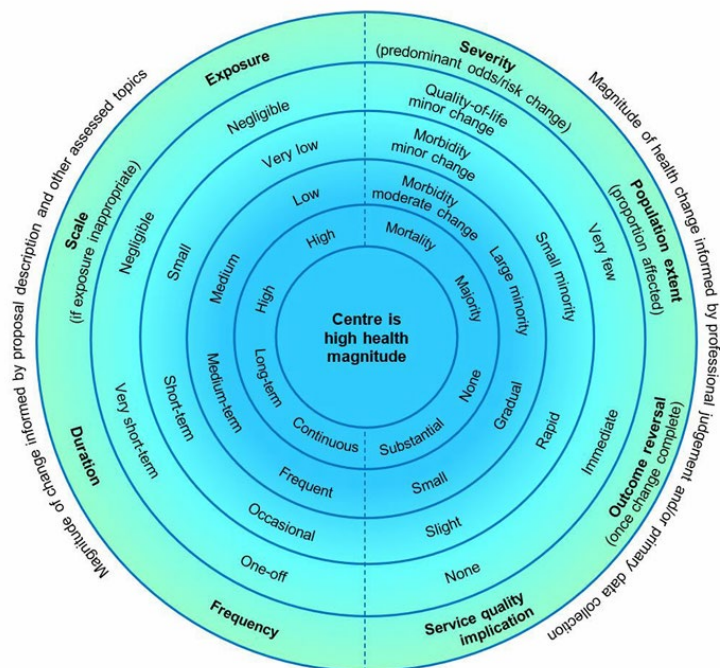


Figure 7-2 : Health magnitude: conceptual model (Institute of Public Health, 2021)



The risk assessment for the proposed development includes a review of published literature on the effects of bioenergy developments and construction activities on human health. CSO data (Central Statistics Office, 2026) and Health in Ireland – Key Trends 2024 (Department of Health, 2025), were examined to establish a baseline health profile of the Study Area.

A desktop examination of Tailte Éireann resources to identify potential hazardous land uses in the Study Area was carried out and vulnerability of the project to natural disaster was assessed through a desktop geographical study and literature review (Tailte Éireann, 2018) . Potential impacts to human health as described throughout this EIAR are detailed in this Chapter, including potential impacts on air quality, noise and traffic and potential impacts on human safety including potential for flood risk.

7.4 Baseline Environment

7.4.1 Population

The proposed development is situated towards the centre of the Nurney ED which sits within the administrative boundary of Carlow County Council, approximately 2.5 km northeast of Leighlinbridge. Carlow County and Nurney ED are presented in Figure 7-3.

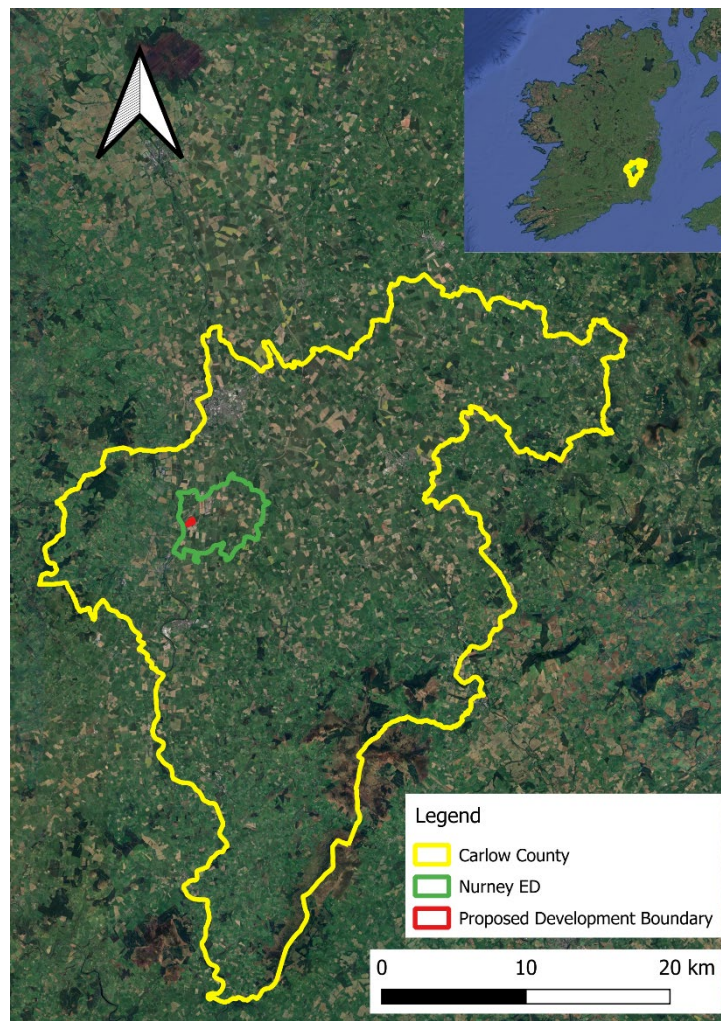


Figure 7-3: Carlow County and Nurney ED



Table 7-1 presents population statistics for the State, County Carlow, and Nurney ED.

Table 7-1: Population Trends for the State, County Carlow, and Nurney ED 2011-2022

Area	2011	2016	2022	% Change 2011 to 2016	% Change 2016 to 2022
State	4,588,252	4,761,865	5,149,139	+3.78%	+8.13%
Carlow	54,612	56,932	61,968	+4.25%	+8.85%
Nurney ED	867	855	893	-1.38%	+4.44%

The data presented in Table 7-1 demonstrate that between the 2016 Census and the 2022 Census the state population has seen a national increase of 8.13%. This is an upward continuation of the trend in national population which has been observed since the previous census in 2011, which showed 4,588,252 persons, an overall increase of 12.22%.

Nurney ED has seen an increase in population of 4.44% between the 2016 Census and the 2022 Census. While there was a decrease in population of 1.38% between the 2011 Census and the 2016 Census at this ED, the overall population increased by approximately 3% between 2011 and 2022. The rate of population growth for this ED is below the national average. As it is a rural area, with relatively low population density (37 persons per square kilometre in 2022, compared to the national population density of 73.3 persons per square kilometre), it is more prone to slower population growth and occasional declines.

7.4.1.1 Age Profile

Age profile information of the population provides a good insight into the potential labour force, the demand for schools, amenities, other facilities, and the future housing demand.

Table 7-2 presents the age profiles for the State, County Carlow, and Nurney ED for 2022.

Table 7-2: Age profile for the State, County Carlow, and Nurney ED (2022)

Area	0-19	20-29	30-49	50-64	65+	Total
State	1,349,915 (26.22%)	602,951 (11.71%)	1,500,120 (29.13%)	919,838 (17.86%)	776,315 (15.08%)	5,149,139
Carlow	16,635 (26.84%)	7,073 (11.41%)	17,703 (28.57%)	11,253 (18.16%)	9,304 (15.01%)	61,968
Nurney ED	183* (20.49%)	148* (16.57%)	203 (22.73%)	220 (24.64%)	139 (15.57%)	893

* Data for EDs are banded by ages 0-17 and ages 17-29

Table 7-2 shows that for the local area within which the proposed development is located, the dominant age grouping is 50-64 years. This is older than the State and County Carlow dominant age groupings for 2022, which are both 30-49 years. The Nurney ED has a lower percentage of population under 20 years (20.49%) than County Carlow and the State (both approximately 26%). The dependency ratio within the study area is outlined in further detail in Section 7.4.1.2.



7.4.1.2 Life Stage (Age Dependency)

Age dependency provides an indicator of how resilient or vulnerable a community might be to potential environmental and health impacts. Areas with higher proportions of children and older adults can be more vulnerable to disruptions associated with construction and operation, particularly in relation to traffic, noise, and access to services. In rural communities (such as those around the proposed development) an ageing population or a higher dependency ratio can also reflect reduced resilience, as these groups may rely more heavily on local services and may have greater health sensitivities.

For this chapter, dependents are defined as people outside the normal working-age range of 15–64 years. Dependency rates are used to describe the age structure of the population, showing the proportions of young (0–14 years) and older (65+ years) residents as percentages of the total population. A low dependency rate indicates that a larger share of the population is of working age, with relatively fewer children and older adults. Conversely, a high dependency rate reflects a greater proportion of dependent age groups within the population. Higher dependency can also suggest that more residents are likely to be at home during daytime hours, which may increase their potential exposure to impacts arising from local development.

Age dependency data can be sourced through the Pobal Online Geo-Profiling tool, which draws on national Census information (Pobal, 2026). Table 7-3 presents age dependency data for the State, County Carlow, and Nurney ED.

Table 7-3: 2022 age dependency rate for State, County Carlow, and Nurney ED

Area	Rate 2022
State	36.19
Carlow	34.88
Nurney ED	32.20

From Table 7-3, it is evident that the study area has a lower dependency rate than both the State and County Carlow. This indicates that the area has a relatively higher proportion of working-age residents (15–64 years) and fewer dependents (children and older adults), suggesting that the population has greater labour-force capacity and potentially higher resilience to change. It may also indicate that fewer residents are at home during daytime hours, which can reduce overall sensitivity to certain types of impacts when compared with areas that have more young or older dependents.

7.4.1.3 Deprivation

The Health Impact Assessment Guidance (Institute of Public Health, 2021) states:

“... deprivation reflects an increased sensitivity due to lack of ownership of or access to assets, including those that support good health. Deprivation differences between areas are indicative of social gradients, which are central to the consideration of health inequalities. The potential for localised high deprivation within wider areas showing average or low deprivation should always be considered. Consider if the population is already stressed by limited resources or high burdens as well as if groups are affected that have reduced access to financial, social and political resources”.



The Pobal HP Deprivation Index is Ireland's primary tool for measuring relative affluence and disadvantage across the country, using detailed Census data (Pobal, 2026). The Index uses Census data to assess ten indicators across three dimensions: demographic profile, social class composition, and labour market situation. Pobal HP Deprivation Index data are available from the Pobal website (Pobal, 2026). Table 7-4 outlines the available Pobal HP Deprivation Index data for 2016 and 2022 for County Carlow and Nurney ED.

Table 7-4: Pobal HP deprivation index data for 2016 and 2022 for County Carlow and Nurney ED (Pobal, 2026)

Area	Index 2016	Index 2022
Carlow	-3.66 (Marginally Below Average)	-2.76 (Marginally Below Average)
Nurney ED	-1.86 (Marginally Below Average)	-1.19 (Marginally Below Average)

As outlined in Table 7-4, both County Carlow and Nurney ED are described as 'Marginally Below Average' under the Pobal HP Deprivation Index. This indicates that the population is of 'moderate' sensitivity (deprivation) within the study area. No deprivation scores for the state are available at the time of writing.

7.4.2 Employment

This section provides a comprehensive overview of the socio-economic, employment and economic activity associated with the Study Area, which provides an understanding of the overall socio-economic profile of the receiving environment

7.4.2.1 *Employment and Economic Status*

Live Register Data provides information relating to the number of people registering for Jobseekers Benefit, Jobseekers Allowance, or for various other statutory entitlements. The figure is useful to gauge unemployment estimations for an area. However, it is noted that the Live Register Data includes part-time workers (working up to three days per week), seasonal workers and casual workers who are entitled to Jobseekers Benefit or Jobseekers Allowance and therefore, it cannot be relied upon entirely for conclusive employment data. Furthermore, there was a significant increase in unemployment throughout the country due to the COVID-19 pandemic, however, the impacts of this have largely receded.

No 2022 data are available for employment status within the electoral divisions.

Table 7-5 presents the total population aged over 15 years in Nurney ED, County Carlow, and the State in 2022, and Table 7-6 presents employment status data for County Carlow and the State for the same year. No 2022 data are available for employment status within the electoral divisions.

Table 7-5: Total Population aged 15+ in Nurney ED, County Carlow, and the State (2022)

	Total Population Aged 15+ 2022
State	3,065,070
Carlow	49,656
Nurney ED	746



Table 7-6: Employment status of population aged 15+ within County Carlow and the State (2022)

Status of % of Population aged 15+	County Carlow	State
At Work	54.0%	56.1%
First time job seeker	0.9%	0.8%
Unemployed	4.8%	4.3%
Student	11.2%	11.1%
Home duties	7.7%	6.6%
Retired	15.2%	15.9%
Unable to work	5.8%	4.6%
Other	0.4%	0.7%

<https://census.geohive.ie/>

As shown in Table 7-6, the principal employment status in 2022 across the State, County is 'at work', and the percentage of the population spread across the employment categories (status) generally align across the State and County.

Table 7-7 presents live register (unemployment) data for County Carlow and the State.

Table 7-7: Live register data for County Carlow, and the State between Jan. 2022 and Jan. 2026

	Jan. 2026	Jan. 2025	Jan. 2024	Jan. 2023	Jan. 2022
State	170,674	165,235	177,264	184,180	162,578
Carlow	2,691	2,624	2,857	3,092	2,671

Between January 2022 and January 2026, unemployment trends in County Carlow experienced fluctuation, where numbers recorded on the live register for Carlow increased by approximately 16% between 2022 and 2023. By 2026, these values have returned to the level recorded in 2022. This increase was also seen across the state, with 2026 unemployment levels being approximately 5% higher than those stated in January 2022.

7.4.3 Land Use

The proposed development is located in the jurisdiction of Carlow County Council. Land use within the site of the proposed development is dominated by historical and current quarry activities, with areas of agricultural activities located outside of the site boundary. There are other quarries in the area.

The site has been quarried by Kilcarrig Quarries and has been partially restored. Sand and gravel extraction continues and material is imported for restoration. A detailed description of the existing development is presented in Chapter 3, Description of the proposed development, in Volume 2 of this EIAR. The planning history is described in Chapter 1 of Volume 2 of this EIAR.



The Corine Land Cover database for Ireland (based on interpretation of satellite imagery and national vector mapping data) identifies the surrounding lands as mines, dumps and construction sites, pastures, non-irrigated arable lands, and road and rail networks associated with land (i.e. the M9 motorway). Corine Landcover mapping of the immediate area surrounding the proposed development is presented in Figure 7-4.

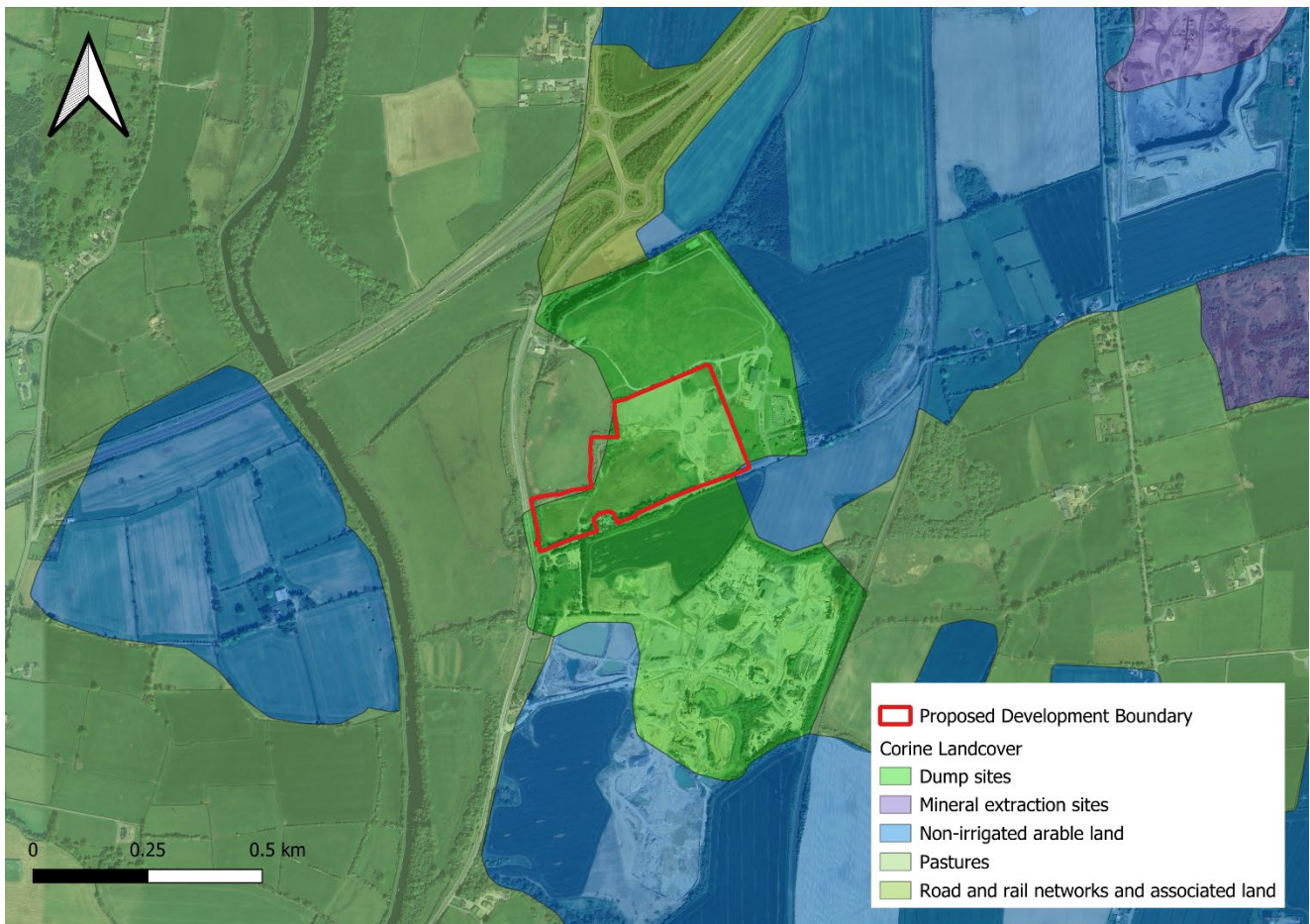


Figure 7-4: Corine Landcover Map of Proposed Development Immediate Area

In addition, a gas pipeline is proposed to be installed within the verge of the public road. The local road network includes typical linear infrastructure within roadside verges, such as underground utilities.

7.4.3.1 Settlement Patterns

The settlement patterns in the area consists of one-off rural housing fronting onto the road network in a rural settlement pattern. There are approximately 193 no. residential and commercial properties within 2 km of the red line boundary. Leighlinbridge is the most proximate settlement located approximately 2.5 km to the south of the proposed development.



7.4.4 Recreation, Amenity and Tourism

7.4.4.1 *Tourism*

Tourism is one of the major contributors to the national economy and is a significant source of full-time and seasonal employment. The preparation of this section complies with guidelines (Fáilte Ireland, 2023) which was provided by Fáilte Ireland during the scoping and consultation phase of the proposed development's EIAR (see Chapter 5, Scoping and Consultation, in Volume 2 of this EIAR).

Consultation has taken place with local stakeholders, as detailed in Chapter 5, Scoping and Consultation, in Volume 2 of this EIAR, to identify any potential effects regarding recreation activity in the area around Powerstown and the wider hinterland of the site within County Carlow.

The latest tourism statistics available from Fáilte Ireland relate to 2024 (Fáilte Ireland, 2025). The 2024 figures state that overseas and Northern Ireland tourist expenditure in the Republic was an estimated €6.6 billion, with a further €1.5 billion spent by overseas visitors on fares to Irish carriers. Domestic tourism expenditure amounted to €3.6 billion, making tourism a €12 billion industry for 2024. Additionally, the tourism statistics state that for every €1 m of tourist expenditure, 20 employees in tourism industries are supported and that for every €1 spent, approximately 29 cents generated in tax. Fáilte Ireland estimate that €3 billion was accrued by the Government through taxation of tourism in 2024.

Recreation and tourism amenities within 15 km of the site located in Carlow and Kilkenny have been reviewed and are summarised in Table 7-8 with their approximate distance to site noted (Fáilte Ireland, 2024). Further details on natural, cultural, archaeological and residential/commercial assets within the Zone of Influence (ZOI) of the proposed development are described within Chapter 16, Landscape and Visual Impact, in Volume 2 of this EIAR.

Table 7-8: Tourism and Amenities by distance from Proposed Development (Fáilte Ireland, 2024)

Tourism and Amenities within 15 km of the proposed development	Approximate Distance from the proposed development
River Barrow (Carlow to Leighlinbrdige) footpath	300 m
Milford Mill	1 km
Arboretum Inspirational Gardens	3 km
The Lord Bagenal Inn Restaurant	3 km
Black Castle	4 km
Clogrennan Woods	4 km
Leighlinbridge - Garden Village	4 km
Superbowl Sports Complex, Leighlingbridge	4 km
The Plum Tree Bistro at the Woodford Dolmen Hotel	6 km
Community Centre and Basketball, Old Leighlin	5 km
St Laserian's Cathedral	6 km
Matty's Pub & Accommodation	7 km
SETU Sports Grounds	7 km
Quinagh House Par 3 Golf Course and Driving Range	7 km



Tourism and Amenities within 15 km of the proposed development	Approximate Distance from the proposed development
Bagenalstown Swimming Pool	8 km
Royal Oak Distillery, Bagenalstown	8 km
Carlow Brewing Company	8 km
Ballymoon Castle	8 km
Graiguecullen Swimming Pool	8 km
Liberty Tree	8 km
Carlow Castle	8 km
Carlow Farmers Market	8 km
Carlow Tours	8 km
Carlow County Museum	8 km
Carlow Genealogy	8 km
Carlow Food Trail	8 km
Saint Marys Church Of Ireland	8 km
St. Patrick's Trail - Driving Route	8 km
St Laserian's Trail - Driving Route	8 km
Carlow Cathedral	8 km
Croppies Grave	8 km
VISUAL Centre for Contemporary Art and George Bernard Shaw Theatre	8 km
Carlow Courthouse	8 km
GAA Centre of Excellence, Fenagh	9 km
County Carlow Military Museum	9 km
Carlow International English Language School (CIELS)	9 km
Delta Sensory Gardens	9 km
Corcoran Mobility Scooter Rentals	9 km
Brownshill Dolmen	9 km
Killeshin Romanesque Doorway	10 km
Shankill Castle and Gardens	10 km
Gowran Racecourse	10 km
Carlow Golf Club	11 km
Oak Park Forest Park	12 km
Garryhill House	12 km
Herb Garden at Kilgraney House	12 km
Southern County Fishing Resort & Activities Resort	13 km



Tourism and Amenities within 15 km of the proposed development	Approximate Distance from the proposed development
The Garden at Hardymount House	13 km
Glenn Lucas Woodturning	13 km
Cloch an Phoill	14 km
Ducketts Grove Walled Gardens and Pleasure Grounds	14 km
Malone's Fruit Farm	14 km
The Lace Gallery	15 km
Adelaide Memorial Church	15 km
Tullow Museum	15 km
Goresbridge Horse Sales	15 km

As shown in Figure 7-5, there is one tourist attraction along the proposed gas pipeline route: the Arboretum Inspirational Gardens. This attraction features a visitor garden, a home and garden shop, and a café. The proposed gas pipeline route passes this feature when travelling west on the R448 regional road. The proposed pipeline route does not pass the entrance to the attraction, instead turning north onto the L3038 local road.

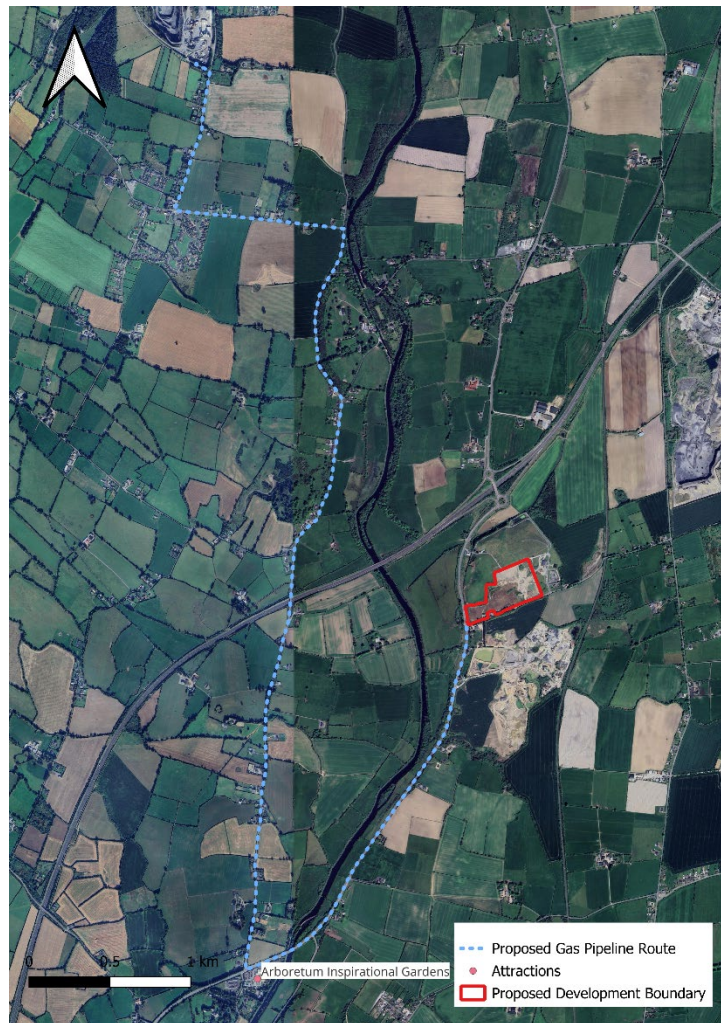


Figure 7-5: Tourist Attractions Along Route of the Proposed Gas Pipeline

7.4.4.2 Community Facilities and Services

Community facilities and service in proximity to the proposed development are centred on town and villages in the area. The closest settlement is Leighlinbridge which is located 2.5 km to the south of the site, refer to Figure 7-6. Facilities and services within the town include several shops and bars, a post office and DHL drop-off service, a church and graveyard, a national school, a health centre, a hotel, and a lifestyle and garden centre. There are several sports facilities in the town for soccer and GAA and scenic walking routes along the River Barrow. The town also benefits from good transports links, including the 887 bus route which connects New Ross and Carlow Town, as well as the nearby M9 motorway. The nearest secondary schools are in Bagenalstown (7 km) and Carlow Town (6km). The nearest medical centres are local General Practice in Leighlinbridge. St Dymphna's day Hospital is in Carlow Town and the Sacred Heart Hospital for Older Persons. The nearest nursing homes are located in Leighlinbridge (Beechwood), Bagenalstown (St. Lazerians) and Carlow Town (St. Flaccs and Hillview).

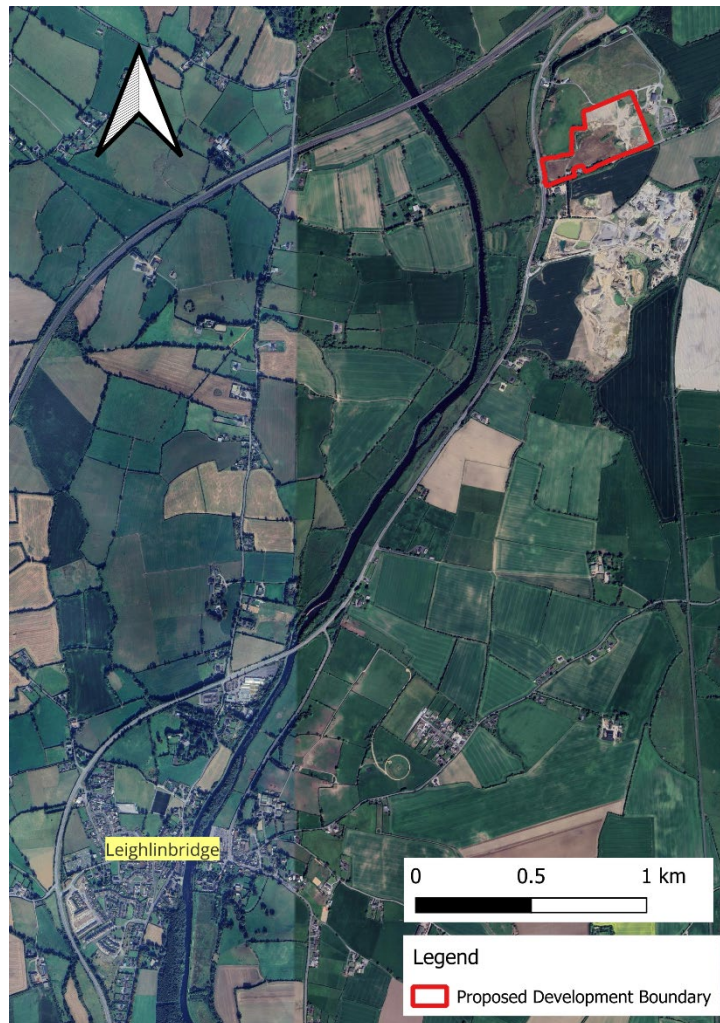


Figure 7-6: Closest settlement to the proposed development

Mitigation is set out in Chapter 6, Traffic and Transportation, in Volume 2 of this EIAR, in order to avoid indirect effect as far as possible on town and village centre facilities and services during the construction and operation of the proposed development.

In terms of energy resources, the local population is not dependent on the proposed development for gas supply. While the proposed development will contribute positively to renewable energy generation and could produce a volume of biomethane equivalent to County Carlow's annual domestic gas demand, households and businesses remain served by the national energy network, which sources gas from a diversified mix of domestic production, imports, and renewable alternatives. As a result, the proposed development does not have the potential to negatively alter the community's energy security or create any reliance on the proposed development, but provides a supplementary, low-carbon and 'clean' contribution to the wider energy system.

7.4.5 Human Health

Human health, in relation to this assessment, refers to the nature and possibility for adverse health effects on humans. Areas with a poor health status are typically considered to be of a higher sensitivity and more susceptible to change in environmental conditions. As part of census 2022, the CSO conducted a self-reported measure of population health within the State. Generally speaking, Ireland's population has a high level of good health as demonstrated in self-evaluation statistics included in Census 2022.



Table 7-9 shows the self-reported measure of population health for the State, County Carlow, and Nurney ED (Central Statistics Office, 2026).

Table 7-9: Self-reported measure of population health for the State, County Carlow, and Nurney ED (2022)

Area	Not Stated	Very Bad	Bad	Fair	Good	Very Good
State	346,824 (6.74%)	16,843 (0.33%)	72,556 (1.41%)	444,895 (8.64%)	1,527,027 (29.66%)	2,740,994 (53.23%)
Carlow*	3,966 (6.40%)	248 (0.40%)	991 (1.60%)	6,135 (9.90%)	18,838 (30.40%)	31,790 (51.30%)
Nurney ED	32 (3.58%)	1 (0.11%)	8 (0.90%)	72 (8.06%)	258 (28.89%)	522 (58.45%)

* Calculated using 2022 total population figure (61,968) and percentage values available on CSO

As outlined in Table 7-9, 87% of respondents in Nurney ED classified their health as 'good' or 'very good', a value that is slightly higher than the County and the State (81% and 83% respectively). The percentage of respondents in the Nurney ED local area who classified their health as 'bad' or 'very bad' was lower than the County and State values, at 1%.

Overall, the census data suggests that the general health condition in the Site ED is slightly above that of the State and County. These insights are valuable for understanding community wellbeing and informing future planning and development in the region.

With reference to the Health Impact Assessment Guidance (Institute of Public Health, 2021) Health Sensitivity Conceptual Model shown in Figure 7-1, the health sensitivity of the local population is considered to be of low health sensitivity to change in the context of the proposed development. This is based on the data considered throughout the baseline assessment. A summary of these results is available in Table 7-10.

Table 7-10: IPH Health Sensitivity Conceptual Model results

Indicator	Result	Reference
Outlook (public response to proposal)	Ambivalent	Section 5.3.6 of Chapter 5, Scoping and Consultation, Volume 2 of this EIAR.
Capacity to adapt	High	Section 7.4.1
Resource sharing with the proposed development	Many alternatives	Section 7.4.4.2
Daily activities	Not limited	Section 7.4.4
Health status	Good	Section 7.4.5
Deprivation	Low	Section 7.4.1.3
Life stage (high proportion characterised as)	Independent	Section 7.4.1.2



7.5 Potential Impacts

7.5.1 'Do Nothing' Impacts

Under the 'Do Nothing' scenario, no commercial-scale anaerobic digestion (AD) facility is developed. The existing use of land as a quarry and the surrounding lands for agriculture will remain unchanged. It is likely that the landowner would commence the latest planning consent for the existing site (planning ref: PL01.320180 2025, refer Section 1.4.4 of Chapter 1, Introduction, in Volume 2 of this EIAR).

Factors considered within this EIAR of relevance to this chapter include air quality, climate, noise and vibration, surface water and hydrology, archaeology, and landscape and visual impact. The 'Do Nothing' scenario impacts for these chapters are summarised in Table 7-11. The full chapters are available in Volume 2 of this EIAR.

Table 7-11: 'Do Nothing' scenario impact summaries for the proposed development

Chapter	'Do Nothing' Scenario Impact Summary
Chapter 6, Traffic and Transport	It is expected that the traffic environment will generally remain as per the baseline. Traffic flows on the public road network are assumed to grow in accordance with the latest growth factors. Since the site of the proposed development would not progress, there would be no direct increase in traffic on the receiving roads and therefore no significant effect on local traffic conditions, on capacity, on queues, on delays or on the level of service of the receiving road network in the study area.
Chapter 8, Air Quality	No process emissions from the proposed development and no changes in traffic emissions associated with the development which could impact local air quality. Ambient air quality at the whole project site will remain as per the baseline and will change in accordance with trends within the wider area (including influences from potential new developments in the surrounding area, changes in road traffic, etc).
Chapter 9, Climate	Under the 'Do Nothing' Scenario, the proposed development will not be constructed, no construction works associated with the proposed development will take place and any previously identified or recorded effects of the climate will remain as predicted or recorded.
Chapter 10, Noise and Vibration	The existing noise sources and future baseline noise environment would remain unchanged.
Chapter 13, Surface Water and Hydrology	The impact on the hydrological regime and surface water quality within the proposed development and the wider study area would remain largely unaltered.
Chapter 15, Archaeology and Cultural Heritage	No negative effects to any of the known cultural heritage constraints within the reviewed study areas detailed in Chapter 15, in Volume 2 of this EIAR
Chapter 16, Landscape and Visual Impact	The primary effect of this would be that the impacts and effects identified would not directly occur, and the existing development would continue to operate under its current planning permission and likely invoke its latest planning consent to restore the quarry to agricultural land. Perimeter vegetation around this area would continue to mature, and the wider landscape context would likely continue to be managed for agriculture. The proposed gas pipeline route, which is contained along existing roads, would likely be managed as roadside verge. The existing vegetation contained within these verges would continue to change over time.



7.5.2 Construction Phase Impacts

7.5.2.1 *Population*

The construction phase of the proposed development and proposed gas pipeline is not anticipated to have any likely long-term significant effect on the local population. As such projects often require skilled workers who may not reside locally, contractors may aim to provide accommodation near the site to ensure the necessary workforce is available without disrupting project timelines. It is therefore possible that there may be a slight, short-term increase in local population over the duration of the construction phase for the proposed scheme (24 months). The existing local housing and community infrastructure will remain unaffected.

Activities associated with the construction phase are anticipated to have **slight, positive, short-term** effects on the local population.

7.5.2.2 *Employment*

The construction phase of the proposed development and proposed gas pipeline is anticipated to create short-term employment opportunities within the study area, with the potential to positively affect local unemployment rates. Employment during the construction phase will be approximately 500 staff.

It is also anticipated that this phase will have secondary effects on employment within the study area, supporting local retail services, building supply services, and technical professions. However, it is understood that these beneficial effects will be temporary, due to the temporary nature of the construction phase. It is anticipated that, whilst temporary, the future viability of the affected services will benefit in the long-term.

Activities associated with the construction phase are anticipated to have **positive, moderate, temporary** effects on the local employment.

7.5.2.3 *Land Use*

Land use outside of the red line boundary (as shown in Figure 7-5) is not anticipated to be affected during the construction phase. It is considered that the activities carried out on the surrounding agricultural lands will proceed as normal.

Activities associated with the construction phase are anticipated to have **neutral** effects on the local land use outside of the red line boundary.

The only permanent change in land use relates to the site itself, where the current quarry lands will be converted to a renewable-energy use through the development of the proposed development. This represents a long-term change from extractive and land restoration to energy-production land use, but it is contained entirely within the project's boundary and does not influence land-use patterns beyond the site boundary.

Additionally, the proposed development's associated proposed gas pipeline will be installed within the existing road verge to connect the proposed development to the wider gas network. This infrastructure will be located entirely within the footprint of the public road corridor and will be installed below ground. As such, it will not alter the existing land use, which will remain as transport infrastructure, nor will it affect the functioning or management of adjacent lands. The use of the road verge for underground utilities is typical and does not constitute a change in land use character or pattern.

Activities associated with the construction phase are anticipated to have **positive, significant, and long-term** effects on land use within the redline boundary.



7.5.2.4 Recreation, Amenity and Tourism

Temporary effects on local amenity are possible as a result of increased construction activity, vehicle movements, and short-term visual and noise disturbance.

As the effects are expected to be limited in duration and confined to the immediate vicinity of the site, and the closest tourism amenity is approximately 7 km (as the crow flies) from the site (see Section 7.4.4.1), tourism is not anticipated to be affected by the construction phase of the proposed development. Furthermore, and as outlined in Chapter 15, Archaeological, Architectural, and Cultural Heritage, in Volume 2 of this EIAR, no significant effects on the known cultural heritage resource are predicted to arise during the construction phase of the proposed development.

Community facilities and local services will continue to operate as normal, with construction traffic managed through defined haul routes (refer to Chapter 6, Traffic and Transportation, in Volume 2 of this EIAR) and standard traffic-management plans to avoid disruption to access or service provision.

The sensitivity of visual receptors in the study area is considered to be Medium. Potential construction stage visual effects as a result of the proposed development and as a result of the proposed gas pipeline are considered **Not Significant**.

During the construction phase, there is potential for temporary, localised impacts on the Arboretum Inspirational Gardens, Leighlinbridge, due to works associated with the installation of the proposed gas pipeline along the R448. These may include short-term disruptions such as increased traffic, minor delays, noise, vibration, and dust generation associated with excavation and reinstatement works within the road corridor.

However, given that the pipeline does not pass the entrance to the attraction and remains confined to the public road verge before turning onto the L3038, direct access to the facility will be maintained at all times. Any impacts on visitor experience are therefore expected to be **temporary, slight, and reversible** in nature.

Activities associated with the construction phase are anticipated to have **negative, slight, temporary** effects on amenity.

7.5.2.5 Human Health

During the construction phase of the proposed development and proposed gas pipeline route, there is likely to be increased noise and traffic in the study area (see Chapter 10, Noise and Vibration, and Chapter 6, Traffic and Transportation, both in Volume 2 of this EIAR). Populations with higher age dependency rate are more sensitive to these disturbances.

As outlined in Section 7.4.1.2, the study area surrounding the proposed development has a lower dependency rate than both the State and County Carlow, indicating that the area has a relatively higher proportion of working-age residents (15–64 years) and fewer dependents (children and older adults). The lower age dependency rate indicates that the local population are relatively more resilient to potential disturbances caused by traffic and construction. It is therefore considered that the construction phase will not have significant human health effects.

As stated in Chapter 8 Air Quality, in Volume 2 of this EIAR, best practice dust mitigation measures associated with medium risk works will be implemented to ensure there are no significant air quality impacts at nearby sensitive receptors. In the absence of mitigation, the likely effect of the dust impacts within the zone of influence are predicted to be **direct, short-term, negative** and **slight**.



The works associated with the general construction are expected to have a **slight, negative** noise effect at nearby receptors and will be **short-term** in duration. Without mitigation, the linear gas connection works are predicted to have a **moderate to significant, negative** effect at these properties. However, given the nature of the gas connection works, construction activities will not occur over an extended period at any one location. It is proposed that works will be conducted in 100 m segments and typically the maximum time outside any one property will be 1-2 days and therefore the effects will be temporary. At 50 m distance from the works and greater, the effects are expected to be **slight, negative** and **temporary**. Details on the noise surveys conducted are available in Chapter 10, Noise and Vibration, in Volume 2 of this EIAR.

As presented in Chapter 9, Climate, in Volume 2 of this EIAR, the impact of the proposed development on the climate in the absence of mitigation during the construction stage is considered to be **direct, negative and significant**.

Activities associated with the construction phase are anticipated to have **negative, slight, temporary** effects on human health.

7.5.3 Operational Phase Impacts

7.5.3.1 *Population*

The operational phase of the proposed development and proposed gas pipeline is not anticipated to have any likely significant effect on the local population. As there is no residential element proposed as part of the proposed development, no effect will occur on the local population. Some future employees may move into the area.

Activities associated with the operational phase are anticipated to have **neutral** effects on local population.

7.5.3.2 *Employment*

Once constructed, there will be direct and indirect employment associated with the operational phase of the proposed development. Direct jobs will arise from the day-to-day operation and maintenance of the proposed development, while indirect employment will be supported through associated activities such as operational services, maintenance, other contracted services and local services like shops and restaurants.

The proposed development will support the agricultural sector with mutually beneficial supply return contracts for feedstock and digestate. Farmers will provide raw manures, and receive a fertiliser for land application, cutting down on their carbon emissions and artificial fertiliser costs.

The proposed development therefore supports the following objectives of the Carlow Local Economic and Community Plan 2023-2029 (Carlow County Council, 2022):

- HLG1-1: Ensure the County Carlow Business Community continues to develop in the areas of sustainability, climate and biodiversity.
- HLG5-3: Enhance the capacity of communities to develop the economic potential of their areas.
- HLG6-1: Build a resilient, sustainable business base and support new and existing businesses to grow, be enterprising and take advantage of new opportunities.
- HLG6-2: Ensure our local economy contributes proportionately to, and integrates with, the growth of the region and maximises its international reach by improving the attractiveness of County Carlow as a place to do business.



The proposed development also supports the Carlow County Development Plan (CDP) 2022-2028 (Carlow County Council, 2022) economic development policies and objectives which are outlined in Chapter 4 of the CDP. Specifically, objectives ED P3 and ED O2 seek to drive economic growth and facilitate innovation in rural economic development and enterprise (refer to Chapter 2, Planning, Policy and Need, in Volume 2 of this EIAR for further details).

Activities associated with the operational phase are anticipated to have **positive, slight, long-term** effects on employment.

7.5.3.3 *Land Use*

The proposed development and proposed gas pipeline will not give rise to any impacts on surrounding land uses, as adjacent agricultural, residential, and commercial activities will continue to function as normal. The proposed development will operate within a defined footprint and will not restrict or displace existing land uses in the wider area. The proposed gas pipeline will be located underground and mainly in the road network.

Activities associated with the operational phase are anticipated to have **neutral** effects on land use surrounding the proposed development.

7.5.3.4 *Recreation, Amenity and Tourism*

The operational phase of the proposed development and proposed gas pipeline is not anticipated to have any likely significant effect on the local amenities. The proposed development will operate within a defined footprint and will not impede access to community facilities, recreational spaces, or tourism assets in the surrounding area. Normal patterns of movement, land use, and amenity enjoyment will continue unchanged, and no new restrictions or reductions in public access are expected.

The potential visual impacts of the proposed development are Not Significant due to the site's location in a quarry and the benefit of good screening.

Activities associated with the operational phase are anticipated to have **neutral** effects on local amenities.

7.5.3.5 *Human Health*

The 'Guidelines for Anaerobic Digestion in Ireland' (Cré, 2018) provide guidelines on anaerobic digestion health risks. The hazards include exposure to hazardous substances, electrical hazards, mechanical hazards and explosion and fire hazards. The main hazards however are prolonged low-level exposure to gases and faulty equipment, such as electrical or mechanical equipment.

With regard to hazardous substances, the hazards that could occur include:

- Risk of asphyxiation and/or poisoning from fermentation gases and/or biogas in the feedstock receiving areas.
- Release of highly toxic gases such as hydrogen sulphide into the receiving area especially during mixing.
- The use of additives and auxiliary materials with hazardous properties (e.g. carcinogenic properties)

Electrical and mechanical hazards are inherently present at anaerobic digestion facilities as electrical equipment and heavy machinery are necessary for day-to-day activities.



The explosive atmospheres in anaerobic digestion facilities are capable of igniting and causing extensive damage and serious or fatal injuries. Flammable substances include gases, vapours, mists and dusts.

Chapter 8, Air, in Volume 2 of this EIAR, provides details on potential impacts on air quality arising from the operation and maintenance of the proposed development. Factors considered are Nitrogen Dioxide (NO₂), Particulate Matter (PM₁₀) and Particulate Matter (PM_{2.5}), Ammonia (NH₃), and Odour. These results are summarised in Table 7-12.

Table 7-12: Operational air quality effects

Air Quality Factor	Operational Effects
Nitrogen Dioxide (NO ₂)	Direct, long-term, negative and slight
Particulate Matter (PM ₁₀)	Direct, long-term, negative and slight
Particulate Matter (PM _{2.5})	Direct, long-term, negative and slight
Ammonia (NH ₃)	Direct, long-term, negative and slight
Odour	Direct, long-term, negative and slight

As shown in Table 7-12, air quality impacts during the operational phase are assessed as direct, long-term, negative and slight, arising from emissions associated with site activities and traffic movements. This is considered **not significant** in EIA terms. The development will also deliver positive effects on air quality at a broader scale through the displacement of fossil fuels, as the biomethane produced will offset conventional natural gas use and contribute to lower carbon and pollutant emissions within the energy system.

As presented in Chapter 9, Climate, in Volume 2 of this EIAR, the impact of the proposed development on the climate in the absence of mitigation during the operational stage is considered to be **direct, long-term, and beneficial**.

Chapter 10, Noise and Vibration, in Volume 2 of this EIAR provides details on potential noise and vibration impacts arising from the operation and maintenance of the proposed development. It concludes that it is likely that existing road traffic noise will mask the noise from the proposed development during the operational phase. However, the proposed development will introduce a new noise source in the soundscape which may be audible and give rise to increased ambient noise levels at certain locations during certain conditions (e.g. at locations close to the site during periods of low traffic and during night-time).

The operational phase of the proposed development is therefore expected to have a **slight, negative** effect and will be **long-term** in duration.

In terms of the additional noise and vibration impacts from traffic on local roads that will be generated as a result of the operational phase of the proposed development, the resultant effect is expected to be **negative, moderate** and **long-term** at one road link (road link 8, please see Chapter 10, Noise and Vibration, in Volume 2 of this EIAR). The Average Annual Daily Traffic (AADT) increases at all remaining road links are lower (and significantly below 25%), with the effects on all remaining road links expected to be **neutral, imperceptible** and **long-term**.

In the absence of mitigation, the activities associated with the operational phase are anticipated to have **negative, slight, long-term** effects on the local human health.



7.5.4 Decommissioning Phase Impacts

The expected lifetime of the proposed development is 30 years. Upon cessation of anaerobic digestion activities at the site, the proposed development will be decommissioned in accordance with a Closure Plan for the facility.

The proposed gas pipeline will remain in-situ. Therefore, there will be no impacts on population and human health arising during this phase of the proposed development.

7.5.4.1 *Population*

The decommissioning phase of the proposed development and proposed gas pipeline is not anticipated to have any likely significant effect on the local population. As there is no residential element proposed as part of the proposed development, no effect will occur on the local population as a result of the decommissioning of the proposed development and proposed gas pipeline.

Activities associated with the decommissioning phase are anticipated to have **neutral** effects on local population.

7.5.4.2 *Employment*

During the decommissioning phase, the proposed development is expected to generate only limited, short-term employment. These works will typically involve a small number of specialised contractors responsible for dismantling infrastructure, removing equipment and restoring the site, resulting in a temporary increase in local employment activity.

However, once decommissioning is completed, all operational roles associated with the proposed development will cease, leading to a permanent reduction in employment relative to the operational phase. As this workforce is expected to be small and largely contracted, the overall effect on county-wide or local employment levels will be negligible, and no significant socio-economic impacts are anticipated.

If the proposed development was decommissioned in 30 years with no replacement facility, farmers would lose a source of fertiliser.

Activities associated with the decommissioning phase are anticipated to have **neutral** effects on employment, compared to the baseline.

7.5.4.3 *Land Use*

As the proposed development land has already undergone a permanent change in use from former quarry lands to renewable-energy infrastructure during the operational phase, the decommissioning process will not give rise to additional land-use impacts on the surrounding area. Once decommissioned, the site will no longer function as an AD facility, and the future land use will be determined in consultation with the planning authority and in accordance with the Closure Plan, ensuring the site does not pose ongoing environmental or amenity constraints.

Activities associated with the decommissioning phase are anticipated to have **neutral** effects on land use.

7.5.4.4 *Human Health*

Potential short-term risks to human health during the decommissioning phase for the proposed development include dust, noise, traffic movements or handling of residual materials.



Noise and vibration impacts during the decommissioning phase are expected to be **slight, negative and temporary**, similar to or lower in magnitude than those experienced during construction. Noise and vibration levels are predicted to remain within the required limits, resulting in only temporary and minor disturbance for nearby receptors.

The greatest potential impact on air quality during the decommissioning phase is from dust emissions from the demolition and removal of buildings and materials and road traffic emissions. These are expected to be of a similar or lesser magnitude to those identified during the construction phase (but generally of a shorter duration). It can therefore be determined that the decommissioning phase will have a **short-term, direct, negative** and **not significant** effect on air quality for human health.

During the decommissioning phase works will be carried out in accordance with the proposed development's IE licence Closure Plan, ensuring that all decommissioning activities follow established health and safety regulations, environmental controls and best-practice standards during the decommissioning and handling of residual materials.

7.5.4.5 *Recreation, Amenity and Tourism*

The effects of the decommissioning phase on recreation, local amenity and tourism are anticipated to be similar to that of the construction phase effects.

Temporary effects on local amenity are possible as a result of increased decommissioning activity, vehicle movements, and short-term visual and noise disturbance.

As the effects are expected to be limited in duration and confined to the immediate vicinity of the site, and the closest tourism amenity is approximately 7 km (as the crow flies) from the site (see Section 7.4.4.1), tourism is not anticipated to be affected by the decommissioning phase of the proposed development. Furthermore, and as outlined in Chapter 15, Archaeological, Architectural, and Cultural Heritage, in Volume 2 of this EIAR, no significant effects on the known cultural heritage resource are predicted to arise during the construction phase of the proposed development.

Community facilities and local services will continue to operate as normal, with decommissioning traffic managed through defined haul routes and standard traffic-management plans prepared for IE closure plan to avoid disruption to access or service provision.

Activities associated with the decommissioning phase are anticipated to have **neutral, slight, temporary** effects on amenity.

7.6 Mitigation Measures

7.6.1 Construction Phase Mitigation

7.6.1.1 *Population*

The construction phase of the proposed development and proposed gas pipeline is not anticipated to have any likely significant effect on the local population. Activities associated with the construction phase are anticipated to have a slight, positive, short-term impact on the local population. The existing local housing and community infrastructure will remain unaffected. Therefore, no mitigation measures for potential effects on population are required during the construction phase of the proposed development.



7.6.1.2 *Employment*

Activities associated with the construction phase of the proposed development and proposed gas pipeline are anticipated to have positive effects on the local employment. Therefore, no mitigation measures for potential effects on employment are required during the construction phase of the proposed development.

7.6.1.3 *Land Use*

The construction phase of the proposed development and proposed gas pipeline is not anticipated to have any likely significant effect on land use outside of the red line boundary. Activities associated with the construction phase are anticipated to have positive effects on land use within the redline boundary as the current quarry lands will be converted to a renewable-energy use. Therefore, no mitigation measures for potential effects on land use are required during the construction phase of the proposed development.

7.6.1.4 *Recreation, Amenity and Tourism*

To minimise temporary amenity impacts during construction of the proposed development and proposed gas pipeline, a range of standard mitigation measures will be implemented. Construction traffic will be managed through designated haul routes and a detailed Traffic Management Plan (Refer to CEMP in Appendix 3.1 of Volume 3 of this EIAR) to avoid disruption to local access and community services. Visual and noise disturbance will be reduced through adherence to defined working hours, good-practice construction methods, and the noise- and dust-control measures outlined in Section 7.6.1.5. Site activities will be confined within the project boundary, with appropriate signage and communication provided to the local community through the appointed Community Liaison Officer. The proposed gas pipeline works will be managed by GNIs Community Liaison Officer to ensure adequate notice of works and traffic management. These measures will ensure that temporary disturbance is kept to a minimum and that no significant effects on tourism assets or community facilities arise during the construction phase.

Given the short-term nature of the construction works, adherence to best-practice construction methods, and the implementation of mitigation measures such as controlled working hours, dust and noise suppression, and clear signage, no significant construction-phase effects on tourism assets, community facilities, or local service availability are anticipated.

7.6.1.5 *Human Health*

During the construction phase, potential impacts on human health are expected to be limited, temporary, and well controlled through standard industry practices. Construction methods will follow established best practice to minimise emissions, noise, dust, and vibration, while all works will be undertaken strictly within designated working hours to avoid undue disturbance to nearby residents. The project will be executed in full compliance with relevant health and safety regulations, ensuring safe working conditions on site and preventing risks to the public. A CEMP has been prepared and is included in Appendix 3-1, in Volume 3 of this EIAR. It specifies environmental controls that the Contractor will be required to undertake during the construction phase.

In addition, mitigation-by-design measures such as defined construction access routes and layout choices that minimise interface with sensitive receptors will further reduce the potential for any adverse health effects. With these controls in place, no significant construction-phase impacts on human health are anticipated.



Regarding air quality, the proposed development has been assessed as having a medium risk of dust soiling impacts and a low risk of dust related human health impacts. Best practice construction dust management measures have been compiled for the proposed development and are detailed in Section 8.9.1 in Chapter 8, Air Quality, in Volume 2 of this EIAR. The best practice mitigation measures will focus on the control of dust and other air pollutants, to minimise generation of emissions at source. The mitigation measures that will be put in place during construction will ensure that the impact complies with all EU ambient air quality legislative limit values (set out in Directive 2008/50/EC), which are based on the protection of human health. Therefore, the predicted residual, dust-related, human health impact of the construction phase of the proposed development is **short-term, direct, negative and not significant**.

While predicted noise levels from on-site activity from the general construction works associated with the proposed project are below the project noise criteria, and the predicted construction vibration levels are below the criteria for cosmetic or structural damage and are not expected to result in significant negative effects, mitigation measures are put in place as good practice.

Mitigation during the construction phase for climate impacts involves a change in the use of materials as detailed in Section 9 of Chapter 9, Climate, in Volume 2 of this EIAR. It has been calculated that the total construction phase embodied carbon for the proposed development will be 18,389 tCO₂e.

Noise and vibration impacts during construction traffic and on-site works will be effectively minimised through adherence to defined working hours, advance community consultation for any out-of-hours activities, and ongoing communication via the Community Liaison Officer. All construction activities will follow best-practice guidance set out in BS 5228-1:2009+A1:2014 (British Standards Institution, 2014) and BS 5228-2:2009+A1:2014 (British Standards) and the noise and vibration control measures detailed in the CEMP (Appendix 3.1, Volume 3). Good practice measures will be implemented throughout the works, including proper plant maintenance, minimising drop heights, limiting on-site speeds, orienting noisy equipment away from sensitive receptors, and ensuring operators are trained to reduce unnecessary noise. Contractors will also comply with all relevant noise legislation and regulations. Further information on construction noise, vibration, and associated mitigation is provided in Chapter 10, Noise and Vibration, in Volume 2 of this EIAR.

7.6.2 Operational Phase Mitigation

7.6.2.1 *Population*

The operational phase of the proposed development and proposed gas pipeline is not anticipated to have any likely significant effect on the local population. Activities associated with the operational phase are anticipated to have neutral effects on the local population. Therefore, no mitigation measures for potential effects on population are required during the operational phase of the proposed development.

7.6.2.2 *Employment*

As the activities associated with the operational phase of the proposed development and proposed gas pipeline are anticipated to have positive, slight, long-term effects on employment, no mitigation measures are required.

7.6.2.3 *Land Use*

The proposed development and proposed gas pipeline will not give rise to any impacts on surrounding land uses, as adjacent agricultural, residential, and commercial activities will continue to function as normal. Therefore, no mitigation measures are required for land use during the operational phase of the proposed development.



7.6.2.4 Recreation, Amenity and Tourism

Operational activities will be contained on site, with traffic, noise, and odour controlled through established mitigation measures and regulatory compliance, ensuring that the ongoing functioning of nearby recreational and tourist amenities remains unaffected. As a result, the development is not expected to alter the character, quality, or availability of local amenities during operation.

7.6.2.5 Human Health

A proper safety management system and regular repair and maintenance on the plant as well as suitable plant design will be implemented to reduce the potential for human health impacts (Cré, 2018). Confined space training and portable gas detection will be mandatory for all operators within the proposed development. Equipment lockout procedures will be strictly enforced to avoid unnecessary accidents. Proper training on processes and equipment will be mandatory for all biogas plant operators. Health and safety equipment will be routinely checked for precision and calibration. Proper hygienic procedures (showers, hands cleaning, etc.) will be enforced to avoid pathogen-linked disease contamination and spread. The staff of a biogas plant will be trained in basic firefighting skills. A Firewater Risk Assessment report is available in Appendix 3.2 of Volume 3 of this EIAR. It outlines the procedures for fire prevention, detection, response, etc.

It is the obligation of the employers to evaluate the risks to the safety and health of workers (European Union, 1989, updated 2008). However, a permit-to-work system (a formal recorded process used to control work which is identified as potentially hazardous) will be used for high-risk tasks relating to hazardous substances.

All workers coming into contact with electrical networks will have up-to-date electrical safety training.

A risk-reduction strategy will be developed to limit the risk of mechanical hazards on human health.

Explosion mitigation measures will also be enforced, through the use of primary, secondary, and tertiary explosive protection. These measures will aim to prevent the formation of an explosive atmosphere, prevent ignition, and reduce explosion consequences respectively.

As outlined in Chapter 1, Introduction, in Volume 2 of this EIAR, in accordance with the Chemicals Act (Control of Major Accidents Involving Dangerous Substances) Regulations 2015 (COMAH), which implement the Seveso III Directive, a Seveso lower tier site registration will be required from the Health Safety Authority (HSA). The facility will be designed and operated in full compliance with COMAH requirements, including the implementation of appropriate safety management systems and measures to prevent major accidents and limit their consequences for human health and the environment. A Land Use Assessment has been prepared and is submitted with the application for development consent. It concludes that the individual location-based risk contours corresponding to tolerable levels for new COMAH establishments do not extend to an off-site work location or to an indoor area where the public are present. Therefore, it is concluded that the criteria in Table 1 of the Guidance on Technical Land Use Planning Advice (HSA, 2023) are met, and level of off-site risk at the proposed development is acceptable.

As the effects of air quality resulting from the operation of the proposed development are not considered significant (slight, negative, long-term), no site-specific air quality mitigation measures are proposed for this phase. Air quality mitigation is embedded in the site design through the use of enclosed process areas, sealed digestate and feedstock handling systems, odour-controlled storage, and high-efficiency gas management and combustion systems, all of which inherently minimise emissions during normal operation.



Regarding operational noise mitigation, embedded noise mitigation measures have also been incorporated into the proposed development design. The site layout and orientation ensure that noise from external sources such as HGVs and the plant will be screened from the closest receptors to the south and maximum distance between noise sources and receptors is achieved. The proposed development will be constructed using insulated wall and roof panels, which will provide a high degree of sound insulation performance and will allow for reduced noise breakout from the proposed development operations. The proposed development will also utilise fast-acting roller shutter doors, which will ensure that doors will not be left open during operations. HGVs on site will use auto idle shut off technology to avoid engines idling for long periods.

As stated in Chapter 9, Climate, in Volume 2 of this EIAR, during operation, emissions are direct and long-term but overall beneficial, as the project reduces fossil fuel use through biogas production and supports Ireland's transition to net zero.

The noise modelling results (see Chapter 10, Noise and Vibration, in Volume 2 of this EIAR) for the daytime, evening and night-time scenarios demonstrate that the predicted noise levels are below the noise limits at all noise sensitive locations. No significant noise impacts are anticipated during the operational phase of the proposed development and as such, no mitigation measures are deemed necessary. However, best practicable means to minimise operational noise will be employed as outlined in Section 10.10.3 in Chapter 10, Noise and Vibration, in Volume 2 of this EIAR.

7.6.3 Decommissioning Phase Mitigation

7.6.3.1 *Population*

The decommissioning phase of the proposed development and proposed gas pipeline is anticipated to have a neutral effect on the local population. Therefore, no mitigation measures are proposed for the potential effects on population during the decommissioning phase of the proposed development.

7.6.3.2 *Employment*

Given that employment effects during decommissioning are short-term, and not significant, no specific mitigation measures are required. Nevertheless, the contractor will be encouraged to source labour locally where feasible, ensuring that any short-term employment benefits are retained within the surrounding area. The decommissioning works will be carried out in accordance with an approved Closure Plan and all relevant regulatory requirements, which will ensure that the process is well-managed, phased and clearly communicated, thereby avoiding any undue uncertainty regarding employment changes. As the workforce involved will be small and primarily composed of specialist contractors, no additional socio-economic mitigation is considered necessary.

7.6.3.3 *Land Use*

As the activities associated with the decommissioning phase are anticipated to have neutral effects on land use, no mitigation measures are proposed.

7.6.3.4 *Recreation, Amenity and Tourism*

Given the short-term nature of the decommissioning works, adherence to best-practice methods, and the implementation of mitigation measures such as controlled working hours, dust and noise suppression, and clear signage, no significant construction-phase effects on tourism assets, community facilities, or local service availability are anticipated.



7.6.3.5 Human Health

General decommissioning activities will be managed through appropriate mitigation measures, including controlled work practices, emissions management, and traffic management plans. As these activities are temporary, carefully regulated and confined within the site boundary, the decommissioning phase is not expected to give rise to any notable impacts on the health or wellbeing of the local population.

For air quality, dust is considered the only emission with potential to affect human health during the decommissioning stage. As the dust emissions during the decommissioning phase are expected to be of a similar or lesser magnitude to those identified during the construction phase, the mitigation measures applicable to construction phase dust emissions are also considered suitable for those during the decommissioning phase. Dust emissions will also be comparable to, or less than, those anticipated during construction and will be effectively managed through the same mitigation measures, including dust suppression and controlled work practices.

As outlined in Chapter 10, Noise and Vibration, in Volume 2 of this EIAR, no significant noise and vibration impacts are anticipated during the decommissioning phase of the proposed development and as such, no mitigation measures are required. As good practice, the noise control measures outlined in the Appendix 3.1 Construction Environmental Management Plan, in Volume 3 of this EIAR, and in Section 10.10.2 will be implemented, in addition to any measures in best practice guidance available at the time of decommissioning.

7.7 Residual Impacts

7.7.1 Summary of Residual Impacts

A summary of the residual impacts is outline in Table 7-13.



Table 7-13: Summary of Residual Impacts

Activity/Source of Impact	Potential Impact	Description of Effects (Pre-Mitigation)	Description of Effects (Post-Mitigation)
Construction	Employment	- Approx. 500 construction jobs created, providing short-term employment. - Positive secondary effects for local services (retail, suppliers, technical sectors). - Benefits are temporary but may support longer-term service viability. - Overall impact: Positive, moderate, temporary.	Activities associated with the construction phase of the proposed development and proposed gas pipeline are anticipated to have positive effects on the local employment.
	Land use within red line boundary	- Permanent land use change confined to site: quarry to renewable energy use (long-term). - Overall impact: Positive, significant, long-term.	Activities associated with the construction phase are anticipated to have positive effects on land use within the redline boundary as the current quarry lands will be converted to a renewable energy use.
	Land use outside red line boundary	- No effect on surrounding land use patterns. - Proposed gas pipeline installed underground within existing road verge; no change to land use or function of adjacent lands. - Use of road corridor for utilities is standard and does not alter land use character. - Overall neutral effects on the local land use outside of the red line boundary.	No anticipated likely significant effect on land use outside of the red line boundary.



Activity/Source of Impact	Potential Impact	Description of Effects (Pre-Mitigation)	Description of Effects (Post-Mitigation)
	Human health	- Increased noise, traffic, and dust likely during construction. - Local population has a lower age dependency rate, indicating greater resilience to disturbance. - Dust impacts: Slight, negative, short-term without mitigation; no significant effects with mitigation. - Noise impacts: General construction: slight, negative, short-term. Proposed gas pipeline works: moderate to significant locally, but very short duration. - Climate impact: the construction phase, greenhouse gas emissions could initially have a moderate negative impact on human health - Overall human health effect: Slight, negative, temporary; not significant.	Not significant with mitigation; slight, negative, short-term residual effects.
	Amenity	- Temporary impacts from construction activity (traffic, noise, visual disturbance). - Effects are short-term and localised; no impact on tourism. - No significant effects on cultural heritage. - Community facilities and services remain operational; traffic managed via haul routes. - Visual effects: Not significant (medium sensitivity receptors). - Minor, temporary impacts possible at Arboretum Inspirational Gardens; access maintained and effects slight and reversible. - Overall impact: Negative, slight, temporary.	Overall residual impact: Not significant; temporary, slight disturbance only.



Activity/Source of Impact	Potential Impact	Description of Effects (Pre-Mitigation)	Description of Effects (Post-Mitigation)
Operation	Employment	- Ongoing direct and indirect employment from operations, maintenance, and local services. - Supports local economy through supply chains and service demand. - Positive link with agriculture: feedstock supply and digestate return, reducing fertiliser costs and emissions. - Overall impact: Positive, slight, long-term.	Overall residual impact: positive, slight, long-term effects on employment.
	Human health	- Air quality: Slight, negative, long-term effects from emissions (NO₂, PM₁₀, PM_{2.5}, NH₃, odour); not significant. - Wider benefit: Positive impact through displacement of fossil fuels and reduced system-wide emissions. - Noise: Slight, negative, long-term; generally masked by existing traffic but may be audible in low-noise conditions. - Traffic noise: Moderate, negative, long-term effect on one road link; all others neutral/imperceptible. - Climate: During the operational phase, the development is beneficial to human health both before and after mitigation. - Overall impact on human health: Negative, slight, long-term (not significant).	Overall residual impact: Not significant; slight, negative, long-term effects.
Decommissioning	Employment	- Short-term, limited employment from specialised decommissioning activities. - Permanent loss of operational jobs following site closure. - Effects on local and county employment levels expected to be negligible. - Potential indirect impact on agriculture due to loss of digestate supply. - Overall impact: Neutral, temporary during works.	Overall residual impact: Neutral, not significant.



Activity/Source of Impact	Potential Impact	Description of Effects (Pre-Mitigation)	Description of Effects (Post-Mitigation)
	Human health	- Potential short-term impacts from dust, noise, traffic, and material handling. - Noise and vibration: Slight, negative, temporary; within limits and lower/similar to construction. - Air quality: Dust and traffic emissions; slight, negative, short-term; not significant. - Works undertaken under IE Licence Closure Plan with appropriate controls and best practice. - Overall impact: slight, negative and temporary	Overall residual impact on human health: Not significant; negligible to slight, temporary.
	Amenity	- Temporary, localised disturbance; no impact on tourism; access maintained and services unaffected. - No significant effects on cultural heritage. - Overall impact: Neutral to slight, temporary (not significant).	Overall residual impact: Not significant; slight, temporary.



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