HERBATA DATA CENTRE, NAAS

EIAR
VOLUME I MAIN TEXT – CHAPTER 15 HUMAN HEALTH

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15 HUMAN HEALTH

15.1 Introduction

This chapter of the EIAR addresses the potential population health impacts relating to the construction and operation of the Project.

Human Health in Environmental Impact Assessment (EIA) takes a public health approach, meaning it reaches conclusions on the health outcomes to defined populations, rather than the health outcomes of individuals. Guidance explaining that this is the correct approach is set out in Section 15.2.1.

This chapter has been prepared by RPS and meets the EIA requirements in relation to assessing the likely significant, beneficial and adverse effects of the Project on human health. Details and competencies of the specialists who prepared this chapter can be found in Chapter 1 Introduction and Need for EIAR.

The chapter follows guidance and good practice, giving the public health perspective of impacts. In so doing, the chapter:

- Takes a population health approach to assessing physical and mental health outcomes; Population health means '*the health outcomes of a group of individuals, including the distribution of such outcomes within the group*' (Kindig and Stoddart, 2003);
- Considers the wider determinants of health, that may be significantly affected directly or indirectly;
- Assesses the potential for health inequalities to vulnerable groups; and
- Considers opportunities to improve the Project to further benefit population health.

The potential for the Project to change population health outcomes may arise from various health pathways. The effects on physical and mental health link to impacts discussed throughout this EIAR. In particular, the health assessment draws inputs from the following chapters:

- Chapter 4 – Description of the Project and Project Need
- Chapter 6 – Lands and Soils
- Chapter 7 – Water and Hydrology
- Chapter 8 – Air Quality
- Chapter 9 – Noise and Vibration
- Chapter 11 – Landscape and Visual
- Chapter 12 – Traffic and Transportation
- Chapter 14 – Population
- Chapter 16 – Climate Change

The health assessment takes as its input the residual effect conclusions of the EIA Technical Chapters listed above. In this regard the health assessment relies on the mitigation measures set out in those chapters and does not repeat them. This avoids duplication and keeps the assessment proportionate.

Furthermore, the scope of the Human Health chapter has been kept proportionate, considering only those determinants of health with the potential for likely and significant population health effects. The bullet points below summarise the issues covered by this assessment and Table 15.1 summarises issues scoped out of this assessment including justification for scoping out. A watching brief has been kept on other EIAR chapters and it is concluded that they do not require further discussion from a public health perspective. Issues such as land, soils and hydrogeology (Chapter 10: Lands & Soils) include appropriate standard good practice mitigation measures to appropriately break pollution linkage pathways that could pose a risk to population health.

Following guidance on Human Health in EIA (see Table 15.3), the following determinants of health are scoped into the health assessment:

- **Physical Activity**. During the operation and maintenance phase the assessment considers the population health effect of the new operational footpaths and cycleways on physical activity, as well as other opportunities to promote physical activity.
- **Transport modes, access and connections**. During all phases the assessment considers population health implications of changes in road traffic affecting travel times, road safety, accessibility, active travel for local residents (pedestrians and cyclists) and emergency services.
- **Community identity, culture, resilience and influence**. During the operation and maintenance phase the assessment considers the potential effects to community identity from the visual impact of the operational data centre.
- **Education and training**. During the operation and maintenance phase the assessment considers changes to education and training opportunities.
- **Employment and income**. During the operation and maintenance phase the assessment considers the health implications of increased employment and economic opportunities.
- **Climate change and adaptation**. During the operation and maintenance phase the assessment considers climate change health outcomes. These relate to both direct effects of fossil fuel use as a power source, and indirect effects of the data centre supporting carbon emission reductions in other sectors.
- **Air quality**. During all phases the assessment considers the air quality related effects on human health, with a focus on particulate matter (PM) and nitrogen dioxide (NO_2).
- **Water quality or availability**. During the operation and maintenance phase the assessment considers effects to water quality and availability, reflecting the potential for high water use in data centre cooling.
- **Noise and vibration**. During all phases the assessment considers changes in noise, particularly night-time noise, that may be detrimental to population health.
- **Public understanding of electro-magnetic field risk** . Whilst there are unlikely to be actual electromagnetic fields (EMF) exposure risks to public health; during the operation and maintenance phase the assessment considers the potential for a population health effect related to concern about EMF affecting mental health.

Table 15.1 explains issues listed in Human Health in EIA guidance (see Table 15.3), which have been considered, but which are scoped out of the health assessment as not having the potential for likely significant population health effects. This keeps the assessment focused and proportionate in line with EIA requirements.

Table 15.1: Impacts Scoped Out of the Assessment

Potential Impact	Justification
Health related behaviours	
Physical activity	Construction and Decommissioning phases Health promotion within the Project workforces will be considered as a good practice enhancement measure but is otherwise scoped out. There are no existing public rights of way or cycle routes crossing or adjacent to the Project. The nearest cycle route and footpath is located 100 m east of the Project. Construction works are anticipated to occur in a way to avoid disruptions to the use of existing cycle routes/footpaths. As such, it is considered that community physical activity is not affected by construction works.
Risk taking behaviour	All phases The potential for the leisure time activities of the construction and operational workforce to change community behaviours, such as smoking habits or alcohol intake, is considered limited. This reflects the expectation that construction worker accommodation would be relatively dispersed as well as limited as it is expected that construction workers would be mostly recruited from the local and regional area. During operation, numbers are expected to be limited and not sufficient to elicit likely significant effects at the population level. For the same reasons other risk-taking behaviours, including those associated with gambling and sexually transmitted infections, are also scoped out. Although an adverse community effect is unlikely, it would be beneficial for health promotion material to be provided in any community or construction amenities facilities

	on-site, including smoking cessation. Healthy workforce behaviour can be encouraged through a workforce management plan. The Project will operate appropriate measures to safeguard the project workforce and the public in line with Government guidance of the day. Risks are similar to other routine construction activities. There is not considered to be the potential for a likely significant population health effect, this issue is scoped out.
Diet and nutrition	All phases The Project will lead to the reduction in availability or quality of agricultural land as the Project site is located on agricultural land. This is however not considered to be on a scale that could change population diet or food prices and therefore significantly affect population health. This issue is scoped out. Operational and maintenance phase The Project will include a canteen that can be used to store and reheat food and will provide a designated space for meals. Health promotion within the project workforces will be considered as a good practice enhancement measure, including the provision of health promotion material re diet / nutrition, but this topic is otherwise scoped out.
Social environment	
Housing	Construction and Decommissioning phases Housing related issues are scoped out. No new housing is proposed. The workforce will have housing requirements, but it is expected that a high proportion will be resident in the local and regional area, returning to their place of residence when not working. Where temporary accommodation is required, this would be existing B&B/hotel bed spaces, as is typical for the construction industry. It is not expected that use of temporary accommodation would be on a scale to significantly: displace local residents; adversely affect seasonal tourism; or otherwise affect housing availability. There is not expected to be a loss of residential housing or permanent loss of outdoor spaces associated with dwellings. There is not considered to be the potential for a likely significant population health effect associated with changes in the availability of housing during construction. Operational and maintenance phase The same conclusions are reached for the operational workforce. The workforce is expected to be smaller in number and from the local and regional area. The site is located between the existing 'M7 Business Park' and 'Osberstown Business Park' limiting the potential for any widespread adverse effect on housing value or affordability. This issue is scoped out.
Relocation	All phases There are no plans for compulsory land purchases of homes or community facilities. This issue is therefore scoped out.
Open space, leisure and play	Construction and Decommissioning phases Construction activities are not expected to affect access to areas of public open space or result in emissions or disturbance on a scale that could significantly affect use of public open spaces used for leisure and play that could significantly affect population health. Operational and maintenance phase The Project offers the opportunity to incorporate green space with potential to benefit the operational workforce (e.g. outdoor seating areas), however this is not considered to have the potential for significant beneficial health effects at the population level. This impact is scoped out. The potential for Project to affect the use of open spaces near the operational data centre is noted and addressed under physical activity. This issue is therefore scoped out here to avoid duplication.
Community safety	Construction and Decommissioning phases The construction workforce will mainly be local/regional and as such there are not anticipated to be community safety or security issues associated with worker behaviour in local residential areas/towns. The Project would operate appropriate safeguarding and modern slavery policies. The potential for widespread actual or perceived crime that could affect population health is unlikely. This issue is scoped out. Where surface excavations are undertaken these would be within controlled work areas, including use of appropriate fencing and notifications as required. Best practice

	measures would be secured through suitable management plans. The risk to the public from accidental injury, e.g. falls or drowning is scoped out. Electrical risks to the public would be avoided though the design, including fencing of above ground electrical infrastructure. These issues are scoped out. Operational and maintenance phase The operational workforce will be mainly local/regional and as such there are not anticipated to be community safety or security issues associated with worker behaviour in local residential areas/towns. The Project would operate appropriate safeguarding and modern slavery policies. The potential for widespread actual or perceived crime that could affect population health is unlikely. This issue is scoped out.
Community identity, culture, resilience and influence	All phases Due to the nature and size of the construction workforce, demographic changes that could affect community identity are not anticipated, as there would not be a large in-migration or out-migration of workers to local communities. This impact is scoped out. Construction and Decommissioning phases Visual impacts of construction activities, including any temporary lighting, will be limited to the construction phase and are not expected to lead to significant population health effects. Temporary employment opportunities are not expected to have a strong influence on community identity. This impact is scoped out.
Social participation, interaction and support	All phases The Project will not directly affect land used for community interaction (e.g. areas, meeting places, village greens, community centres etc that promote community voluntary, social, cultural or spiritual participation). Any indirect impacts on access to such spaces is addressed under the "Transport modes, access and connection" health determinant. No changes in social participation/increases in social isolation are or associated health outcomes are predicted. This issue is scoped out.
Economic environment	
Education and training	Construction and Decommissioning phases There will be limited direct employment offered during the construction phase. However, the project would support upskilling and career development in relation to its workforces. This may include apprenticeships and adult learning. Given the scale and size of the construction workforce, any benefits to health, including for local and vulnerable groups, are unlikely to be significant at the population level and this impact is scoped out. A large influx of workers, including those bringing families, is not expected, so changes to educational capacity or quality are unlikely and are scoped out.
Employment and income	Construction and Decommissioning phases Construction of the Project provides opportunities for good quality employment; however, given the nature and size of the development this is unlikely to have significant effects on local population health. This issue is scoped out. Any international supply chain would be expected to operate appropriate policies that safeguard against significant population challenges to equality, health and safety, for both workers and, as appropriate, the public. These issues are scoped out. The Project would operate appropriate employment equality policies but is not expected to influence how employment affects family structures and relationships in local populations. Occupational working conditions include particular risks, which are appropriately managed through health and safety policies and practices. Project activities are not expected to differ from industry norms. These issues are scoped out.
Bio-physical environment	
Climate change	Construction and Decommissioning phases Embodied carbon and climate altering pollutant emissions are not of a scale to have the potential for population level effects associated with climate change. This issue is scoped out.
Water quality	All phases Pollutant spills have potential to affect surface and ground waters, which can result in toxin exposures through dermal contact/waters used as drinking water/contamination of food produced in nearby agricultural lands. However, the Project will adopt standard best practice spill avoidance and response measures that will be secured through

	management plans. This issue is scoped out on the basis of the anticipated effectiveness of such measures. Disruption to public drinking water infrastructure are scoped out on the basis that the existing water utilities network would be avoided, including through diversions if appropriate, see discussion under 'built environment'.
Land quality	All phases Ground condition and soil effects are scoped out. Risks of new or historic pollutant mobilisation, including direct exposure and food contamination, are highly likely to be addressed by standard good practice mitigation measures that will be secured through the CEMP. This topic is scoped out.
Radiation	Construction and Decommissioning phases Works would not include using, or making changes to, active major electrical infrastructure producing EMF. Relevant public and occupational safeguards, secured through management plans, would be followed for the temporary electrical equipment used. Electric and magnetic fields strengths reduce rapidly with distance, often requiring only a few meters separation between the source and receptor, to reach background levels. No ionising radiation sources are proposed. These issues are scoped out. Appropriate fencing will be installed so that working areas of the site would not be accessible to the public. Operational and maintenance phase The 'actual EMF' risks are scoped out on the basis that the project would comply with regulatory requirements and international good practice in relation to EMF, namely: the International Commission on Non-ionizing Radiation Protection (ICNIRP) guidelines (ICNIRP, 1998). Such considerations are inherent to the detailed engineering considerations of the Project. These guidelines are long standing and have a high safety margin. The levels of exposure that they require would not pose a risk to public health. Actual risks of EMF are therefore scoped out.
Health and social care services	All phases Effects on health and social care are scoped out. The project workforce is assumed to include a high proportion of people who are resident in the local and regional area. The workforce (expected to be composed of ROI residents) would have HSE entitlement irrespective of place of residence. Workers away from their usual place of residence for a prolonged period would be able to register with local primary health/social care on a temporary basis. The expectation is that the great majority of healthcare needs of the workforce will be met either by occupational provision on-site or by their usual healthcare provider when they return to their usual place of residence. The Project will operate appropriate occupational health services. It is not expected that a high proportion of workers would move to the area with dependants requiring social care. Health protection measures such as screening and immunisations are expected to continue from the workers' usual place of residence. Similarly routine dental appointments are assumed to be with the worker's dental practice close to their usual place of residence. Other health services are not expected to be affected as no largescale in-migration is expected. This topic is scoped out.
Institutional and built environment	
Built environment	Construction and Decommissioning phases The potential for the Project's construction and decommissioning activities to affect existing features of the built environment that are supportive of population health has been considered and scoped out. The project would have a relatively low impact; the position of existing services, such as water and sewer systems will be taken into account in planning the Project. Appropriate diversions would occur to avoid disruption to such services. Operational and maintenance phase The Project will introduce new elements in the built environment that will change the nature of the land use and landscape. This is assessed under the 'community identity' health determinant and scoped out here to avoid duplication. The Project includes on-site battery storage. The Project follows best practice for avoidance of risks and this issue is not assessed separately.

Wider societal infrastructure and resources	All phases The Project will provide energy infrastructure and surplus energy to the grid; however, this is unlikely to be at a scale that may have significant benefits to public health. This issue is scoped out.

15.2 Approach to Assessment

15.2.1 Legislation and Guidance

The following legislation in Table 15.2 is relevant to the assessment of the effects on human health.

Table 15.2: Health legislation

Legislation	Description
The EIA Regulations 2018 (Government of Ireland, 2018a)	Sets the requirement to consider the likely significant effects on human health
The Safety, Health and Welfare at Work etc Act 2005 (as amended) (Government of Ireland, 2005)	Sets out general duties on employers, including ensuring, so far as is reasonably practicable, that employees and individuals at the place of work who are not employees are not exposed to risks to their safety, health or welfare.
The Environmental Protection Agency Act 1992 (as amended) (Government of Ireland, 1992)	Governs environmental exposures, including provisions in relation to nuisance.
The Air Quality Standards Regulations 2011 (Government of Ireland, 2011)	Sets the regulatory thresholds for air quality. These are the standards considered acceptable in terms of public health protection in the Republic of Ireland.
Environmental Noise Regulations 2018 (as amended) (Government of Ireland, 2018)	Sets a common approach to avoid, prevent or reduce on a prioritised basis the harmful effects, including annoyance, due to exposure to environmental noise.

The following guidance in Table 15.3 has informed the assessment.

Table 15.3: Health Guidance

Guidance	Description
Institute of Public Health (IPH), Guidance, Standalone Health Impact Assessment and health in environmental assessment, 2021 (Institute of Public Health, 2021).	Sets current good practice for the assessment of human health in EIA, including assessment methods. This updates the 2009 guidance from the IPH.
Institute of Environmental Management and Assessment (IEMA) 2022 guidance on health in EIA series, effective scoping (Pyper, et al., 2022a) and determining significance (Pyper, et al., 2022b).	EIA practitioner guidance on assessing human health, applicable to Republic of Ireland and Northern Ireland. Guidance sets out principles and methods of assessment.
International Association for Impact Assessment (IAIA) and European Public Health Association. A reference paper on addressing Human Health in EIA (2020), and academic discussion of the same (Cave, et al., 2021).	This international consensus piece informed the IPH 2021 guidance. The publication explains EIA for public health stakeholders and sets out transparent assessment approaches adopted by the IPH.
International Association for Impact Assessment. Health Impact Assessment International Best Practice Principles, 2021 (Winkler, et al., 2021).	Confirms the relationship between HIA and EIA. Confirms the application of HIA principles when undertaking health in EIA.
Environmental Protection Agency. Guidelines on the information to be contained in Environmental Impact Assessment Reports (Environmental Protection Agency, 2022).	The EPA present a health protection position statement on the coverage of health in EIA. The wider public health remit is covered by the IPH 2021 guidance.

In addition, due regard was given, as appropriate, to World Health Organization advisory guidelines, e.g. (World Health Organization, 2021) and World Health Organization (2018). The application of such guidelines for health in EIA is described by IEMA (Pyper et al., 2022b), IPH (Pyper et al., 2021) and Cave *et al*. (2021).

The conceptual models/tools of the IPH guidance informed the health assessment, specifically Figures T09 (sensitivity), T11 (magnitude) and T12 (significance, including importance and acceptability). This is a robust

best practice approach that can be applied consistently and transparently to all determinants of health. Further details are provided in Section 15.3.3.5, Table 15.4, Table 15.5, Table 15.6 and Table 15.7.

15.2.2 Policy Context

The following policies are associated with the Human Health Assessment:

- National Planning Framework (NPF) (Government of Ireland, 2018b)
- Healthy Ireland Framework (HIF) (2019-2025) (Department of Health, 2019)
- Roadmap for Social Inclusion (2020-2025) (Government of Ireland, 2023)
- Local Link Rural Transport Programme Strategic Plan 2018 to 2022 (Transport for Ireland, 2018)
- Local health priority issues, various

15.2.2.1 National Planning Framework

The NPF states that "Good access to a range of quality education and health services, relative to the scale of a region, city, town, neighbourhood or community is a defining characteristic of attractive, successful and competitive places. Compact, smart growth in urban areas and strong and stable rural communities will enable the enhanced and effective provision of a range of accessible services" (p.15).

An overarching aim of the NPF is "*Creating a clean environment for a healthy society*" through three main objectives:

- "*Water Quality Recognising the links and addressing on-going challenges between development activity, water quality and our health.*
- *Promoting Cleaner Air - Addressing air quality problems in urban and rural areas through better planning and design.*
- *Noise Management - Incorporating consistent measures to avoid, mitigate and minimise or promote the pro-active management of noise*" (p.117)

Chapter 6, Healthy Communities states that "*decisions made regarding land use and the built environment, including transportation, affect these health risks in a variety of ways, for example through influencing air and water quality, traffic safety, opportunities for physical activity and social interactions as well as access to workplace, education, healthcare and other facilities and services such as food and alcohol outlets*" (p.82).

15.2.2.2 National Development Plan 2018-2027

The National Development Plan (NDP) states that improving "*energy efficiency will also realise benefits for air quality, health, social inclusion, business competitiveness and better public services, all of which will make a real and positive impact on people's lives*" (p.77).

15.2.2.3 Healthy Ireland Framework (HIF) 2018-2023

HIF states that "*many health and wellbeing indicators are affected by individuals' personal lifestyle choices. … The effects of these risk factors can be minimised if individuals can be motivated and supported to make healthier choices. To be effective, action to control the determinants of health must include developing understanding and skills, and promoting informed health choices*" (p.14) (Department of Health , 2019).

"*Those working in non-health sector disciplines and settings such as educationalists, city planners, housing and transport officials, probation officers and welfare officers, also have a critical role to play in improving health and wellbeing*." (p. 26) (Department of Health , 2019).

This recognises that some of the burden of poor health is due to factors beyond the control of the Project. It also recognises that access to opportunities to be physically active and being able to afford and access health food is paramount to public health. These factors are influenced by the development.

The four goals of Healthy Ireland are relevant and have informed the assessment:

- Goal 1: Increase the proportion of people who are healthy at all stages of life;
- Goal 2: Reduce health inequalities;
- Goal 3: Protect the public from threats to health and wellbeing; and
- Goal 4: Create an environment where every individual and sector of society can play their part in achieving a healthy Ireland.

15.2.2.4 Roadmap for Social Inclusion 2020-2025

The introduction states that "*Education, health, housing, employment and social integration (i.e. a person's sense of "connectedness" with their community) are all factors that contribute to a person's overall sense of well-being or welfare*" (p.10).

15.2.2.5 Draft County Kildare Development Plan 2023-2029

The Regional Spatial and Economic Strategy is underpinned by three key principles: health placemaking, climate action and economic opportunity.

The Growth Strategy for the Region "*supports the transition to low carbon, climate resilient communities and a healthy environment with high quality air and water*".

Chapter 6 Infrastructure and Environmental Services aims to "*create an environment characterised by high quality infrastructure networks and environmental services that complement the overall settlement and economic strategy and ensures the health and wellbeing of those who live and work in the County, also securing the economic future of the County*". This includes appropriate waste management and pollution control.

15.2.3 Local health and wellbeing plans

15.2.3.1 Healthy Kildare Plan 2022-2026

The Healthy Kildare Plan (HKP) (Kildare County Council, undated) sets out a local approach to implement the Healthy Ireland goals in County Kildare and provide a roadmap to help improve health and wellbeing within the county. The HKP states its vision of a "*Healthy Kildare, where everyone can enjoy physical and mental health and wellbeing to their full potential, where wellbeing is valued and supported at every level of society and is everyone's responsibility*".

The HKP states that a number of consistent themes were identified in policy as key priorities for health:

- Increasing participation in physical activity – the HKP references the following goals of the Kildare Local Community and Economic Plan 2016-2021: the health and wellbeing high-level goal to "*strengthen the capacity of Kildare to respond to current and future health needs to support healthy communities across the county*"; the HKP also references the goals of the Kildare Sports Partnership Strategic Plan 2017-2021;
- Supporting children, young people and families;
- Reducing the impact of harmful substances;
- Mental Health; and
- Housing, homelessness and reducing health inequalities for minorities.

15.2.3.2 Kildare Children and Young People's Plan 2019-2021

The plan (Kildare Children and Young People's Services Committee, 2019) aims to "*secure better outcomes for children and young people through more effective co-operation and collaboration by existing services and through interventions at local level*".

The plan works towards five outcomes for children and young people in Ireland:

- Are active and healthy, with positive physical and mental wellbeing;

- Are achieving full potential in all areas of learning and development;
- Are safe and protected from harm;
- Have economic security and opportunity; and
- Are connected, respected and contributing to their world.

15.2.4 Human Health Study Area

The Project is located in the townlands of Halverstown, Jigginstown, Osberstown and Newhall approximately 2.5 km west of Naas town centre, in county Kildare situated in the east of Republic of Ireland. The human health study area has regard to localised health effects and wider health effects. Bio-physical health determinants (such as changes to air quality and noise exposure) are likely to have a localised impact as potential change in hazard exposures are limited by physical dispersion characteristics. Social and behavioural determinants (such as changes to lifestyle and community factors) are likely to have both localised and wider impacts.

The study area for baseline statistics relating to health effects focuses on electoral divisions (EDs), with county Kildare and Ireland averages as comparators. Regard is also given to the study areas of other EIAR chapters and very localised (site-specific) health effects are discussed as appropriate with reference to place names of the GeoHive map viewer, which may extend beyond ED administrative boundaries.

The following geographically defined human health populations are used in the assessment:

- The ‘site specific’ area of Naas Rural and Carragh EDs where the Project works are located. Regard has also been given to Naas Urban ED due to its proximity to the site.
- The ‘local’ area is the local authority area of County Kildare
- The ‘regional’ area is the province of Leinster.
- The ‘national’ area is Republic of Ireland (and beyond for global and transboundary effects).

As study areas do not necessarily define the boundaries of potential health effects, particularly mental health effects, the health chapter uses study areas to broadly define representative population groups, including in relation to sensitivity rather than to set boundaries on the extent of potential effects.

The health assessment has regard to the zones of influence defined by other EIAR chapters that are interrelated technical disciplines for the health assessment. Those chapters provide data inputs to the health assessment. Those zones of influence are relevant and inform the health chapter’s consideration of effect magnitude.

Deprivation statistics have been reviewed and taken into account in considering population sensitivity. For example, the deprivation statistics show that although the site specific ED level has average or low deprivation (marginally above or below average or affluent), there are pockets of greater deprivation at the small area geographic boundary level. Notably small area 087071020 to the east of the project site within Naas Urban ED has marginally below average disadvantage. This small area includes the community of Ploopluck. Higher deprivation in this community has been taken into account by the assessment in determining the level of sensitivity for vulnerable groups. Deprivation in other parts of Naas Urban has also been taken into account.

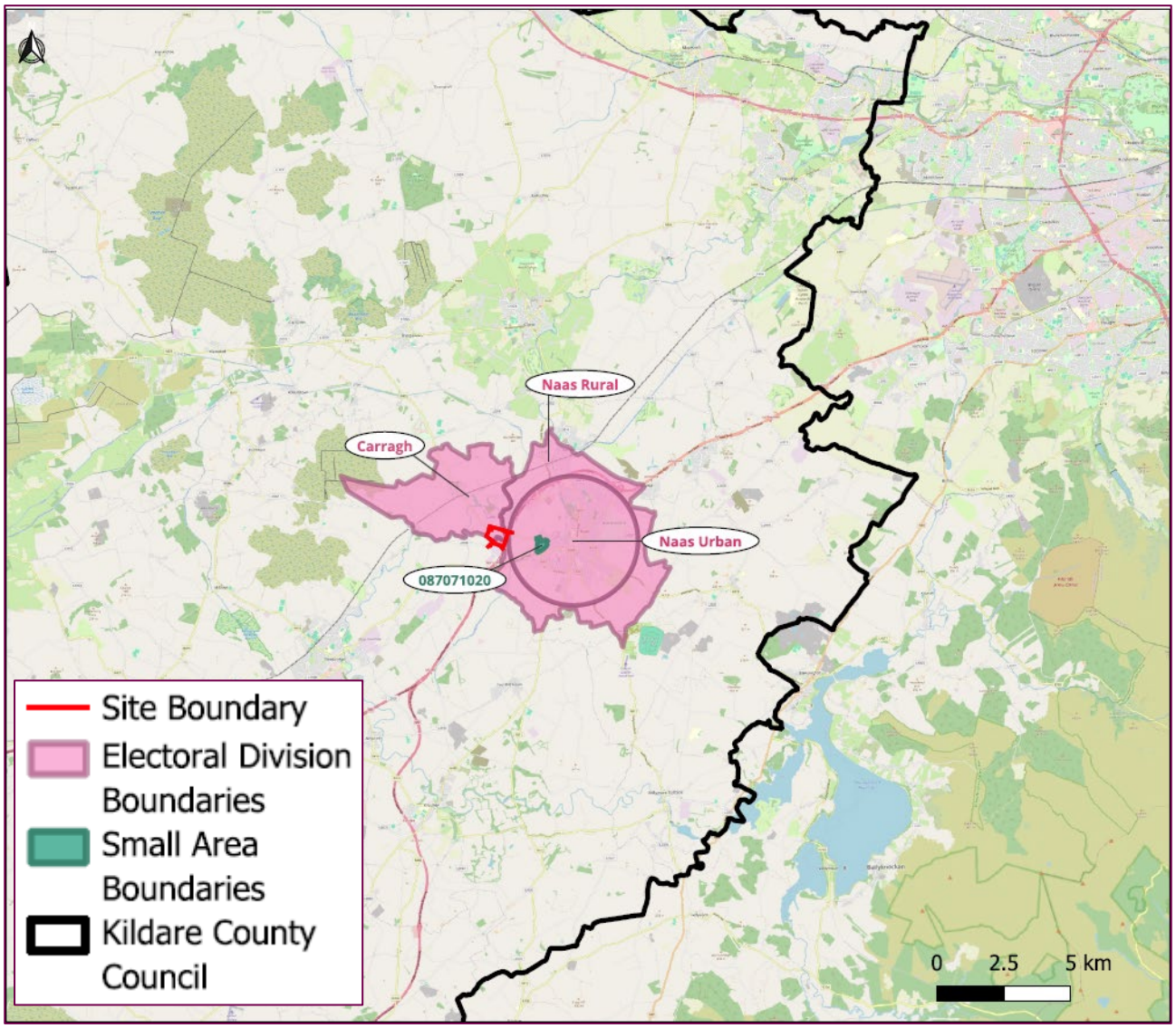


Figure 15.1: Human health study area

15.2.5 Data Sources

Data from the inter-related technical disciplines have been used to inform the health assessment (e.g. Chapter 9 - Noise & Vibration references the GeoDirectory). Data informs the health assessment by identifying potential receptors and community assets for these disciplines, such as schools, residential properties, walking and cycling routes, as well as tourism and recreational amenities. No separate health field surveys have been undertaken. The health analysis is informed by scheme-wide consultation.

The following data sources have informed the health baseline assessment:

- Central Statistics Offcie (CSO) Small Area Population Statistics (SAPS) Interactive Mapping Tool (CSO, 2016)
- CSO StatBank (CSO, n.d.)
- Pobal HP Deprivation Index (Pobal, 2016); and
- Google Earth Pro 2021 aerial and street level photography

Some public health data tools were not available at the time of the assessment. The health baseline (section 15.4.1) was compiled prior to 2022 Census statistics being released as part of the SAPS Interactive Mapping Tool. 2016 statistics therefore remain the more appropriate source and are considered adequate for the assessment's purposes of establishing baseline population vulnerability.

15.2.6 Consultation

The EIA process has been informed by consultation undertaken with KCC and other relevant statutory and non-statutory bodies. Aspects of the Project discussed with KCC included, *inter alia*, landscaping, visual impact, noise monitoring locations and sustainable urban drainage systems. The consultation process and outcomes are summarised in Chapter 3 – Project Scoping and Consultation. No consultation responses were received that pertain specifically to human health.

15.3 Key Parameters for Assessment

15.3.1 Project parameters and design features

Physical Activity

During the operation and maintenance phase the Project would include R409 improvement works, a new footpath, cycleway and new bus stop carriageway. A new 1.8 m width segregated cycleway will be built on the south side of the R409, along the northern boundary of the Project, between the proposed vehicular access junction to the Project and the existing shared pathway located on the western side of the bridge over the M7. It will connect to an existing shared pathway located on the western side of the bridge over the M7. A 2 m shared surface will be provided over the M7.

The proposed new cycle way will extend as far as the existing segregated pedestrian and cyclist infrastructure which currently terminates to the east of the M7 bridge crossing. As such, it will provide jointed cycling and pedestrian infrastructure from the western boundary of the Project site on the R409, to the existing segregated cycleway infrastructure, which currently runs from the R409/R445 roundabout along the R409 to Naas, and in a north-south direction along the R445 to a number of business/industrial parks. Further details are set out in the Appendix 4.2 Planning Engineering Report and Appendix 4.2 L Mobility Management Plan.

As part of the Project, bicycle shelters will be located in the vicinity of each data centre and at the Admin Workshop Area. A total of 104 no. bike parking spaces are provided throughout the site (16 spaces per data centre and 8 for the administration workshop). Further details are set out in the Planning Engineering Report Appendix 4.2 Planning Engineering Report and Appendix 4.2 L Mobility Management Plan.

Transport modes, access and connections

During the construction and decommissioning phases the Project would include ≈ 425 no. vehicles per day during the peak construction period. Further details are set out in Chapter 12 – Traffic and Transportation.

During the operation and maintenance phase the Project would include 56 no. arrivals and 56 no. departures during both the AM and PM peak hour periods and 26 no. total HGV trips per day. Further details are set out in Chapter 12 – Traffic and Transportation.

During the operation and maintenance phase the Project will include a new bus stop located on the north boundary of the site, along the southern side of the R409. It is understood that this will provide an additional bus stop at the Project for the 821 TFI local bus service which currently runs between Newbridge and Sallins train station, thus providing a public transport link to the Project. Further details are set out in Appendix 4.2 L Mobility Management Plan.

Community identity, culture, resilience and influence

During the operation and maintenance phase (50 years duration) the Project would include new visual elements. The Project comprises 6 no. two storey data centre buildings, an administration / management building, car parking, landscaping, energy infrastructure and other associated works. The Project also comprises a grid substation and 110 KVA transmission connection. Further details are set out in Chapter 4: Description of the Project.

Education and training

No measures are included in the Project with regard to training and education opportunities.

Employment and income

During the operation and maintenance phase the Project will generate 225 jobs in the Information, Communications and Technology (ICT) sector directly and support employment in the sector more widely. Further details are set out in Chapter 13 - Population.

Climate change and adaptation

The Project includes a number of design measures to increase the energy efficiency of the buildings and reduce energy demand, including heat pumps, building design, selection of sustainable building materials, goods and services, and orientation to maximise energy efficiency and LED lighting.

Air quality

During the construction and decommissioning phases the Project would elevate dust levels and increase PM and NO_2 emissions due to annual average daily traffic (AADT) changes of 1,000 vehicles or more, and 200 heavy duty vehicles or more. During the busiest construction months there will be an estimated 733 car trips to and from the site per day for construction staff, and 425 car trips per day for site staff Further details are set out in Chapter 8 – Air Quality.

During the operation and maintenance phase the Project will increase PM and NO_2 emissions due to gas power plant emissions and less than 1,000 AADT additional vehicle movements. Further details are set out in Chapter 8 - Air Quality.

Water quality or availability

The Project will comprise a number of design features aimed at managing water supply and water quality, including: surface water drainage; foul water drainage; onsite water treatment plant; implementation of sustainable drainage techniques to treat water prior to discharge; and underground tanked water storage to provide peak day cooling requirements. A minimum of one year water storage will be provided on site for the adiabatic cooling top-up and storage top-up from on-site ponds if required. This water will be obtained from rainfall and/or surface water collection and will not be sourced from the local water supply.

Currently there are no known public surface water connections available to the development. The surface water drainage design aims to collect and attenuate, as far as practically possible, all surface water within a series of swales and ponds, which will discharge into the Bluebell River (subject to regulatory approval) at a rate no greater than greenfield runoff. The foul water design is a gravity-based system which will be collected in two separate foul water pumping stations on site.

Further details are set out in Chapter 4: Description of the Project and Chapter 7: Water Quality and Hydrology.

Noise and vibration

During the construction and decommissioning phases the Project would include noise generating plant, equipment and vehicles within the site boundary and on public highways, including 47 heavy duty vehicle movements per day during peak construction times and 425 car trips on an average day, 175 of which during the traditional peak hours. Further details are set out in Chapter 9 – Noise and Vibration.

During the operation and maintenance phase the Project would include noise generating plant and equipment within the site boundary, including the substation, data hall cooling system and gas power generation elements, and additional vehicle movements on public highways, namely 56 trips during both the AM and PM peak period and 26 daily two-way HGV trips (typically outside peak hours). During the operation and maintenance phase the Project will include measures embedded in the project design to reduce noise, such as selection of plant and equipment, noise control at source, selection of construction materials, building orientation and site layout. Further details are set out in Chapter 9 – Noise and Vibration.

Public understanding of electro-magnetic field risk

During the operation and maintenance phase the Project would include new electrical infrastructure, including the data centre itself, the building design for which would mitigate against external electric field exposures, and a grid substation and 110 KVA transmission connection.

15.3.2 Mitigation measures taken into account

The health assessment is based on the residual effect conclusions of other EIAR assessments. The details of the mitigation measures are set out in those respective assessments, but key features are summarised as follows.

Physical Activity

During operation, the mobility management plan sets out measures and incentives to encourage physical activity and active travel including appointing a mobility manager responsible for the implementation and monitoring of the Mobility Management Plan and for developing measures to encourage a modal shift towards sustainable travel, including: pedestrian and cycling measures such as 'Walk to Work week', 'cycling to work' and other incentives to promote physical activity in the project workforce (see appendix L – Mobility Management Plan).

Transport modes, access and connections

During the construction and decommissioning phases the Project would include an Interim Travel Plan outlining local cycling facilities.

Carach Court Montessori School is situated to the east of the site on the R409. During the construction phase, the following measures are set out in the CTMP to minimise disruption of access to the school and to maximise safety: Regular contact between the Community Engagement Officer and Carach Court Montessori School; and avoidance of HGV movements during school drop off and pick-up. Further details are set out in Chapter 12 – Traffic and Transportation.

Community identity, culture, resilience and influence

During the operation and maintenance phase the Project would include landscaping measures to integrate the Project into the landscape and reduce the visual impact, including earth mounding and native, screen woodland planting. Further details are set out in Chapter 11 – Landscape and Visual.

Education and training

No mitigation measures are proposed with regard to enhancing training and education opportunities.

Employment and income

No mitigation measures are proposed with regard to employment opportunities.

Climate change and adaptation

In addition to the embedded energy efficiency measures stated in section 15.3.1, a number of mitigation measures were considered to reduce operational emissions resultant from the Project, including: gas turbines and associated plant and solar photovoltaic panels. Further details are set out in Chapter 16 – Climate Change.

Air quality

During the pre-construction, construction and decommissioning phases the Project would include a number of measures to mitigate impacts on air quality, including implementation of a Dust Management Plan; implementation of a stakeholders communications plan that includes community engagement; appropriate earthworks and site management measures; and measures to reduce vehicle emissions. Further details are set out in Chapter 8 – Air Quality and Appendix 4.5 Construction Environmental Management Plan (CEMP).

During the operation and maintenance phase the Project would include good design and best practice measures to reduce emissions, including re-use and recycling, use of PV panels LED lighting and tree planting. Further details are set out in Chapter 8 – Air Quality.

Water quality or availability

During construction, measures are set out in the CEMP to mitigate against the risk of surface water pollution, including: on-site groundwater/runoff drainage, storage and treatment, including use mechanism such as silt bag and silt trap fences to intercept bulk silt volumes. A settling pond will be built on site and the water collected within the pond will be disposed of offsite at a licensed facility. All silt and pollution prevention and removal structures will be places at least 10 m from the Bluebell stream. Further details are provided in Appendix 4.5 Construction Environmental Management Plan (CEMP).

Noise and vibration

During the construction and decommissioning phases the Project will include mitigation measures to ensure construction noise and vibration levels are attenuated and reduced, including implementation of best practice measures for management of on-site noise and vibration, temporary noise barriers and communication with residents and local businesses. All mitigation measures will be set out in the CEMP, which will include a noise management plan. Further details are set out in Chapter 9 – Noise and Vibration.

Public understanding of electro-magnetic field risk

During the operation and maintenance phase the Project will include a stakeholder communications plan.

15.3.3 Assessment Criteria and Significance

15.3.3.1 General Approach

This section sets out the methods for assessment of any likely significant population health effects of the Project.

The generic scheme-wide approach to the assessment methodology is set out in Chapter 1: Introduction of the EIAR. This section sets how the generic approach is refined to address the specific needs of the EIA health assessment. Namely criteria for sensitivity, magnitude and significance that inform a professional judgment and reasoned conclusion as to the public health implications of the Project.

Regard has been had to the EPA Guidelines on the Information to be Contained in Environmental Impact Assessment Reports (Environmental Protection Agency, 2022). The guidelines provide generic definitions for significance, but also note that when more specific definitions exist within a specialised factor or topic, these should be used in preference to the generalised definitions. In the case of Human Health, specific definitions are set out by IPH (Pyper et al., 2021) and IEMA (Pyper et al., 2022b).

The methodology outlined in this section follows the IEMA 2022 and IPH 2021 guidance, which sets out best practice for the consideration of health in EIA. The IPH guidance was informed by the international consensus publication between impact assessment and public health practitioners, the IAIA/EUPHA Reference Paper (Cave et al., 2020).

Where significant adverse population health effects are identified, including for vulnerable groups, then mitigation has been proposed to avoid or reduce the effects. Mitigation is secured as part of the Project design or development consent. In line with good practice the Project takes a proportionate approach to identifying opportunities to enhance beneficial population health effects, including for vulnerable groups.

Cumulative effects are considered, including inter-related effects of the Project. This analysis considers how the same geographic or vulnerable group populations may be affected by more than one change in relevant health determinants, for example the combined effects of changes in air quality and noise on population health outcomes.

Where proportionate, the need for monitoring has been considered, including relevant governance.

15.3.3.2 Determinants of Health, Risk Factors and Health Outcomes

The chapter uses the World Health Organization (WHO) definition of health, which states that health is a "*state of complete physical, mental and social wellbeing and not merely the absence of disease or infirmity*" (World Health Organization, 1948)

The chapter also uses the WHO definition for mental health, which is a "*state in which every individual realises his or her own potential, can cope with the normal stresses of life, can work productively and fruitfully, and is able to make a contribution to her or his community*" (World Health Organization, 2022).

Health and wellbeing are influenced by a range of factors, termed the 'wider determinants of health'. Determinants of health span environmental, social, behavioural, economic and institutional factors. Determinants therefore reflect a mix of influences from society and environment on population and individual health.

Impacts of the Project that result in a change in determinants have the potential to cause beneficial or adverse effects on health, either directly or indirectly. The degree to which these determinants influence health varies, given the degree of personal choice, location, mobility and exposure.

A change in a determinant of health does not equate directly to a change in population health. Rather the change in a determinant alters risk factors for certain health outcomes. The assessment considers the degree and distribution of change in these pathways. The analysis of health pathways focuses on the risk factors and health outcomes that are most relevant to the determinants of health affected by the Project. As there are both complex and wide-ranging links between determinants of health, risk factors and health outcomes, it would not be proportionate or informative for an assessment to consider every interaction.

Typically, the change in a risk factor may need to be large, sustained and widespread within a population for there to be a significant influence on public health outcomes.

15.3.3.3 Population Health Approach and Vulnerable Groups

In line with IEMA and IPH guidance, a population health approach has been taken, informed by discussion of receptors within the other technical chapters of the EIAR.

For each determinant of health, the human health chapter identifies relevant inequalities through consideration of the differential effect to the 'general population' of the relevant study area and effects to the 'vulnerable population group' of that study area. The vulnerable population group being comprised of relevant sensitivities for that determinant of health. The following population groups have been considered:

- The 'general population' including residents, visitors, workers, service providers, and service users; and
- The 'vulnerable group population'.

The methods draw on the list of vulnerable population groups set out in the IEMA guide to effective scoping, Table 9.2 (Pyper et al., 2022a). The following six broad population groups are used to inform a consistent narrative on potential health inequalities across the assessment. People falling into more than one group may be especially sensitive:

- **Young age**: Children and young people (including pregnant women and unborn children).
- **Old age**: Older people (particularly frail elderly).
- **Low income**: People on low income, who are economically inactive or unemployed/workless.
- **Poor health**: People with existing poor health; those with existing long-term physical or mental health conditions or disability that substantially affects their ability to carry out normal day-to-day activities.
- **Social disadvantage**: People who suffer discrimination or other social disadvantage, including relevant protected characteristics under the Irish Human Rights and Equality Commission Act 2014[1] or groups who may experience low social status or social isolation for other reasons.
- **Access and geographical factors**: People experiencing barriers in access to services, amenities and facilities and people living in areas known to exhibit high deprivation or poor economic and/or health indicators.

[1] *For example, disadvantage by reference to the following factors: gender; civil status; family status; sexual orientation; religious belief; age; disability; race, including colour, nationality, ethnic or national origin; or membership of the Traveller community.*

The assessment covers these populations within two groups: The general population for the geographic area, notably residents of Naas Rural and Carragh, and the vulnerable sub-population for this area. The latter is comprised of the vulnerabilities listed above. The differentiation of these two groups, allows a discussion of any potentially significant health inequalities and the targeting of any mitigation.

The following general characterisations of how the 'general population' may differ from 'vulnerable group populations' were considered when scoring sensitivity. These statements are not duplicated in each assessment and apply (as relevant) to the issues discussed for both construction and operation.

- In terms of life stage, the general population can be characterised as including a high proportion of people who are independent, as well as those who are providing some care. By contrast, the vulnerable group population can be characterised as including a high proportion of people who are providing a lot of care, as well as those who are dependant.
- The general population can be characterised as experiencing low deprivation. However, the professional judgment is that the vulnerable group population experiences high deprivation (including where this is due to pockets of higher deprivation within low deprivation areas).
- The general population can be characterised as broadly comprised of people with good health status. Vulnerable groups, however, tend to include those parts of the population reporting bad or very bad health status.
- The general population tends to include a large majority of people who characterise their day-to-day activities as not limited. The vulnerable group population tends to represent those who rate their day-to-day activities as limited a little or limited a lot.
- Based on a professional judgement the general population's resilience (capacity to adapt to change) can be characterised as high whilst the vulnerable group population can be characterised as having limited resilience.
- Regarding the usage of affected infrastructure or facilities, the professional judgement is that the general population are more likely to have many alternatives to resources shared with the Project (e.g. shared routes or community assets). For the vulnerable group population, the professional judgement is that they are more likely to have a reliance on shared resources.
- The general population includes the proportion of the community whose outlook on the Project includes support and ambivalence. The vulnerable group population includes the proportion of the community who are uncertain or concerned about the Project.

15.3.3.4 Temporal Scope

The temporal scope of the assessment is consistent with the period over which the Project will be carried out and therefore covers the construction and operational periods. The proposed, indicative construction programme is an estimated 8 years and 9 months. The assessment does not place an end date on the operations of the Project.

With respect to the duration of impacts, the IEMA (Pyper et al., 2022b) terminology has been used as a guide within this assessment. The terms have been defined by this assessment as follows:

- 'Very short term' relates to effects measured in hours, days or weeks;
- 'Short term' relates to effects measured in months;
- 'Medium term' relates to effects measured in years; and
- 'Long term' relates to effects measured in decades (e.g. the long-term effects on health from long-term employment).

15.3.3.5 Determining Effect Significance

The assessment of EIA health significance is an informed expert judgement about what is important, desirable or acceptable for public health with regards to changes triggered by the Project. These judgements are: value-dependant (underpinned by scientific data, but also informed by professional perspectives); and are context-dependent (judgements reflect relevant social, economic and political factors for the population).

The determination of significance has two stages:

- Firstly, the sensitivity of the receptor affected, and the magnitude of the effect upon it are characterised. This establishes whether there is a relevant population and a relevant change to consider; and
- Secondly, a professional judgement is made as to whether the expected change in a population's health outcomes would be significant in public health terms. This judgement is explained using an evidence-based narrative setting out reasoned conclusions.

Table 15.4, Table 15.5, Table 15.6 and Table 15.7 together summarise the assessment methodology that has been adopted. This approach shows how the general EIA methods of using sensitivity and magnitude to inform a judgement of significance, are applied for human health. The approach uses professional judgement, drawing on consistent and transparent criteria for sensitivity and magnitude. It also references relevant contextual evidence to explain what significance means for human health in public health terms.

The EIA human health assessment uses qualitative analysis following the 2022 IEMA guidance approach (Pyper et al., 2022b). This draws on qualitative and quantitative inputs from other EIAR topic chapters. This reflects the consensus position amongst public health and impact assessment practitioners that qualitative analysis is the most appropriate methodology for assessing wider determinants of health proportionately, consistently and transparently.

The EIA health chapter conclusions are both EIA scores, such as major, moderate, minor or negligible; and a narrative explaining this score with reference to evidence, local context and any inequalities.

Terms in bold in Table 15.4, Table 15.5, and Table 15.7 indicate terms that qualitatively describe levels within criteria that are discussed across the scoring options. For example, high, moderate, low or very low levels of deprivation. These are the terms from the guidance that are used within the assessment narrative.

Table 15.4: Health Sensitivity Methodology Criteria

Category/ Score	**Indicative criteria (judgment based on most relevant criteria, it is likely in any given analysis that some criteria will span score categories)** *The narrative explains that the population or sub-population's sensitivity is driven by (select as appropriate):*
High	**High** levels of deprivation (including pockets of deprivation); **reliance** on resources shared (between the population and the project); existing **wide** inequalities between the most and least healthy; a community whose outlook is predominantly anxiety or **concern**; people who are **prevented** from undertaking daily activities; **dependants**; people with **very poor** health status; and/or people with a **very low** capacity to adapt.
Medium	**Moderate** levels of deprivation; **few alternatives** to shared resources; existing **widening** inequalities between the most and least healthy; a community whose outlook is predominantly **uncertainty** with some concern; people who are **highly limited** from undertaking daily activities; people providing or requiring **a lot of care**; people with **poor** health status; and/or people with a **limited** capacity to adapt.
Low	**Low** levels of deprivation; **many alternatives** to shared resources; existing **narrowing** inequalities between the most and least healthy; a community whose outlook is predominantly **ambivalence** with some concern; people who are **slightly limited** from undertaking daily activities; people providing or requiring **some care**; people with **fair** health status; and/or people with a **high** capacity to adapt.
Very low	**Very low** levels of deprivation; **no** shared resources; existing **narrow** inequalities between the most and least healthy; a community whose outlook is predominantly **support** with some concern; people who are **not limited** from undertaking daily activities; people who are independent (not a carer or dependant); people with **good** health status; and/or people with a **very high** capacity to adapt.

Table 15.5: Health Magnitude Methodology Criteria

Category/ Score	**Indicative criteria (judgment based on most relevant criteria, it is likely in any given analysis that some criteria will span score categories)** *The narrative explains that the change due to the project has (select as appropriate):*
High	**High** exposure or scale; **long-term** duration; **continuous** frequency; severity predominantly related to **mortality** or changes in morbidity (physical or mental health) for very severe illness/injury outcomes; **majority** of population affected; **permanent** change; **substantial** service quality implications.
Medium	**Low** exposure or **medium** scale; **medium-term** duration; **frequent** events; severity predominantly related to moderate changes in **morbidity** or major change in quality-of-life; **large minority** of population affected; **gradual** reversal; **small** service quality implications.

Low	**Very low** exposure or **small** scale; **short-term** duration; **occasional** events; severity predominantly related to minor change in **morbidity** or moderate change in quality-of-life; **small minority** of population affected; **rapid** reversal; **slight** service quality implications.
Negligible	**Negligible** exposure or scale; **very short-term** duration; **one-off** frequency; severity predominantly relates to a minor change in **quality-of-life**; very few people affected; immediate reversal once activity complete; no service quality implication.

Table 15.6: Assessment Matrix (Indicative)

Magnitude of Impact	Sensitivity			
	High	**Medium**	**Low**	**Very low**
High	Major	Moderate or major	Moderate or minor	Minor or negligible
Medium	Moderate or major	Moderate	Minor	Minor or negligible
Low	Moderate or minor	Minor	Minor	Negligible
Negligible	Minor or negligible	Minor or negligible	Negligible	Negligible

Where the matrix offers more than one significance option, professional judgement is used to decide which option is most appropriate.

Table 15.7: Health Significance Methodology Criteria

Category/ Score	Indicative criteria (judgment based on most relevant criteria, it is likely in any given analysis that some criteria will span score categories)
Major (significant)	The narrative explains that this is significant for public health because (select as appropriate): ➢ Changes, due to the project, have a **substantial** effect on the ability to deliver current health policy and/or the ability to narrow health inequalities, including as evidenced by referencing relevant policy and effect size (magnitude and sensitivity scores), and as informed by consultation themes among stakeholders, particularly public health stakeholders, that show **consensus** on the importance of the effect. ➢ Change, due to the project, could result in a regulatory threshold or statutory standard being **crossed** (if applicable). ➢ There is likely to be a **substantial** change in the health baseline of the population, including as evidenced by the effect size and scientific literature showing there is a **causal** relationship between changes that would result from the project and changes to health outcomes. ➢ In addition, health priorities for the relevant study area are of **specific** relevance to the determinant of health or population group affected by the project.
Moderate (significant)	The narrative explains that this is significant for public health because (select as appropriate): ➢ Changes, due to the project, have an **influential** effect on the ability to deliver current health policy and/or the ability to narrow health inequalities, including as evidenced by referencing relevant policy and effect size, and as informed by consultation themes among stakeholders, which may show **mixed views**. ➢ Change, due to the project, could result in a regulatory threshold or statutory standard being **approached** (if applicable). ➢ There is likely to be a **small** change in the health baseline of the population, including as evidenced by the effect size and scientific literature showing there is a **clear** relationship between changes that would result from the project and changes to health outcomes. ➢ In addition, health priorities for the relevant study area are of **general** relevance to the determinant of health or population group affected by the project.
Minor (not significant)	The narrative explains that this is not significant for public health because (select as appropriate): ➢ Changes, due to the project, have a **marginal** effect on the ability to deliver current health policy and/or the ability to narrow health inequalities, including as evidenced by effect size of limited policy influence and/or that **no** relevant consultation themes emerge among stakeholders. ➢ Change, due to the project, would be **well within** a regulatory threshold or statutory standard (if applicable); but could result in a guideline being crossed (if applicable). ➢ There is likely to be a **slight** change in the health baseline of the population, including as evidenced by the effect size and/or scientific literature showing there is only a **suggestive** relationship between changes that would result from the project and changes to health outcomes. ➢ In addition, health priorities for the relevant study area are of **low** relevance to the determinant of health or population group affected by the project.

Negligible (not significant)	The narrative explains that this is not significant for public health because (select as appropriate): ➢ Changes, due to the project, are **not related** to the ability to deliver current health policy and/or the ability to narrow health inequalities, including as evidenced by effect size or lack of relevant policy, and as informed by the project having **no responses** on this issue among stakeholders. ➢ Change, due to the project, would **not affect** a regulatory threshold, statutory standard or guideline (if applicable). ➢ There is likely to be a **very limited** change in the health baseline of the population, including as evidenced by the effect size and/or scientific literature showing there is an **unsupported** relationship between changes that would result from the project and changes to health outcomes. ➢ In addition, health priorities for the relevant study area are **not** relevant to the determinant of health or population group affected by the project.

Population health effects that are scored major or moderate are considered significant.

Ultimately a likely significant health effect is one that should be brought to the attention of the determining authority, as the effect of the Project is judged to provide, or be contrary to providing, a high level of protection to population health. This may include reasoned conclusions in relation to health protection, health improvement and/or improving services.

Where significant adverse effects are identified, mitigation is considered to reduce the significance of such effects. Similarly, enhancements are considered where significant and proportionate opportunities to benefit population health are identified.

15.3.3.6 Evidence Assumptions and Limitations

15.3.4 Limitations

This assessment is based on publicly available statistics and evidence sources. No new primary research or bespoke analysis of non-public data was undertaken for the assessment.

Baseline data includes indicators where the available public data is pre-Covid-19, or that have yet to show the full impacts of the pandemic for public health. The baseline is considered sufficient and robust in evidencing that there are vulnerable population groups with high sensitivity in the study area. New data would be unlikely to change that conclusion as a 'high' sensitivity is already assigned to vulnerable groups, and any new data would not change this.

The health assessment partially draws from and builds upon, the technical outputs from the other technical chapters of the EIAR. As a consequence, the assumptions and limitations of those assessments also apply to any information used in this chapter (e.g. for modelling work undertaken). It is, however, considered that the information available provides a suitable basis for assessment.

15.4 Description of the Existing Environment

15.4.1 Current Baseline Environment

Different communities have varying susceptibilities to health impacts and benefits as a result of social and demographic structure, behaviour and relative economic circumstances. The aim of the following information is primarily to put into context the local health circumstances of the communities surrounding the Project site, drawing from available statistics. Where possible, data has been collected for the Naas (rural and urban) and Carragh EDs. Where ED data is not available, data for County Kildare has been used to compare with the national average.

It should be noted that the description of the whole population, and the populations within the local and wider study area, does not exclude the probability that there will be some individuals or groups of people who do not conform to the overall profile.

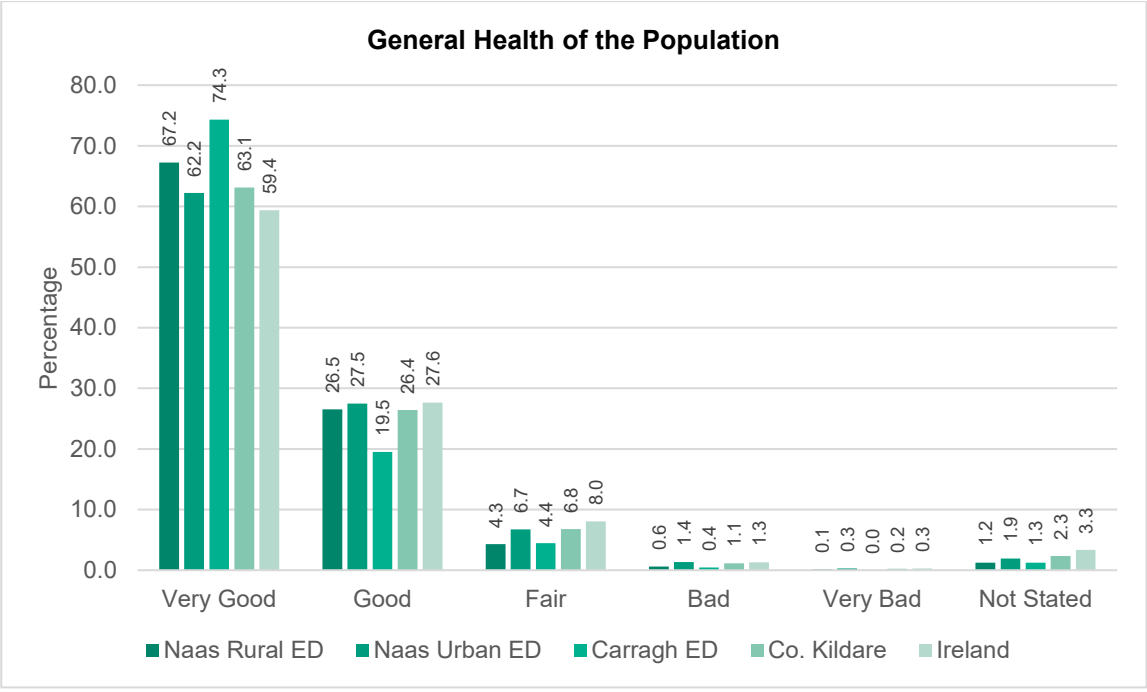


Figure 15.2: General health of the population at ED, county and national level. Census 2016

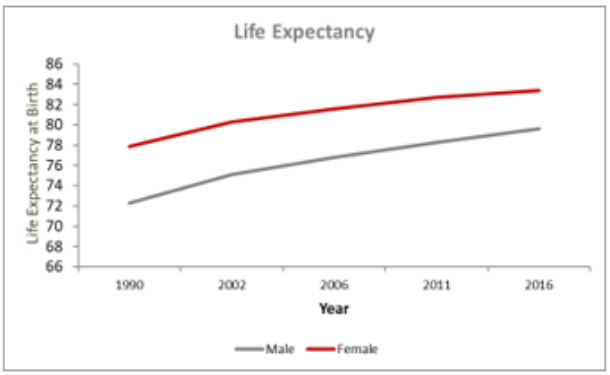
Based on 2016 census statistics (Central Statistics Office, 2016), the general health of the 3 EDs that make up the study area is very good. Consistent with county and national averages, the majority of residents of all 3 EDs report “very good” health: 67% in Naas Rural, 62% in Naas Urban, and 74% in Carragh. Less than 1% of residents in all 3 EDs have reported having “very bad” health, which is consistent with county and national averages.

15.4.2 Human Health Trends

Life Expectancy

Recent (2019) life expectancy statistics are only available at the national (Ireland) level. Life expectancy in Ireland at birth in 2019 was 80.8 years for males and 84.7 years for females (Central Statistics Office, 2019). Life expectancy is increasing with male life expectancy consistently lower than female life expectancy (Figure 15.3).

Healthy life expectancy (HLE) statistics (i.e. the number of years a person is in good health) are only available at the national (Ireland) level. Generally, both male and female HLE are increasing, with male HLE also consistently lower than female HLE (Figure 15.3).



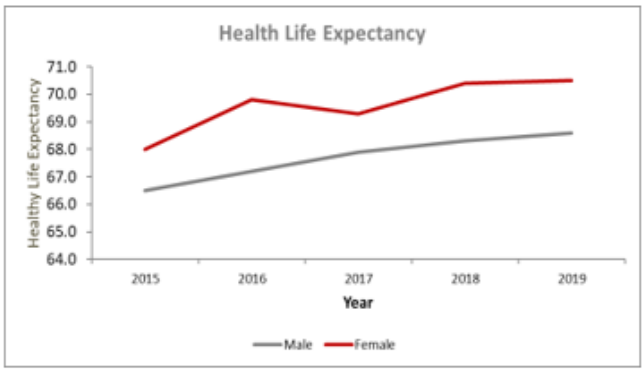


Figure 15.3: Life expectancy and healthy life expectancy in Ireland

Source: (Central Statistics Office, 2020a) (Table VSA30)

Physical Health

Overall, currently available physical health statistics for County Kildare perform better than national averages. There is a slightly higher proportion of people aged 15 years and over reporting good or very good health (89.5%) than the national average (85%) (Central Statistics Office, 2023).

The rate of procedures on the cardiovascular and respiratory systems in County Kildare is illustrated in Figure 15.4 and used a proxy for hospital admissions rates for diseases of the circulatory and cardiovascular system (data for the latter are no longer available). The rate of procedures on the cardiovascular system in County Kildare increased from 89.6 to 93.4 between 2010 and 2020 with a subsequent decrease to 91.8 in 2021. The rate of procedures on the respiratory system has increased from 102.9 to 109.0 between 2010 and 2020, with a decrease to 100.1 in 2021 (Central Statistics Office, 2023).

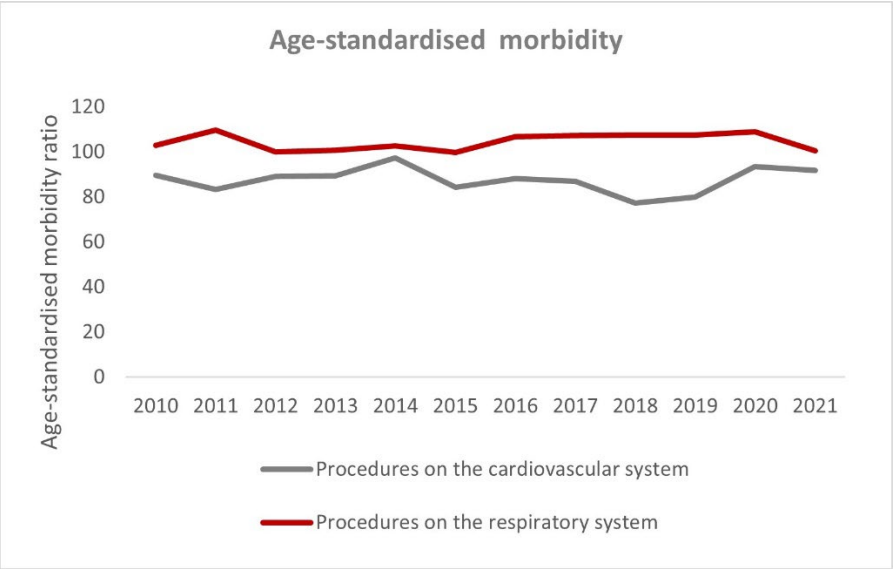


Figure 15.4 Age-standardised morbidity rate for procedures on the cardiovascular and respiratory systems for County Kildare (Statbank – Table DHA60) (Central Statistics Office, 2023)

Overall, the all-age all-cause mortality rate in County Kildare is lower than the national average (654 per 100,000 population).

Mortality from circulatory diseases is consistently lower than national average and is decreasing (Figure 15.6). Mortality from respiratory diseases has fluctuated and is decreasing in most recent figures (see Figure 15.7), showing a similar trend to the national average. Cancer mortality rate has increased in the Human Health Study Area as well as nationally, with most recent available statistics showing a higher rate in the Human Health Study Area (199.7 per 100,000) compared to the national average (191.9 per 100,000) (see Figure 15.8) (Central Statistics Office, 2023).

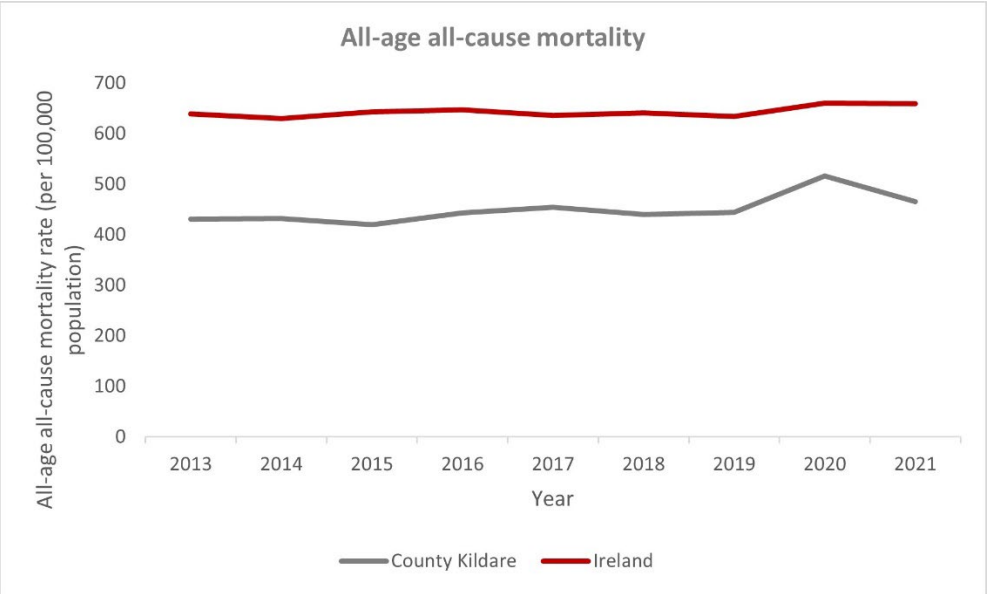


Figure 15.5 All-age all-cause mortality rate (Central Statistics Office, 2021) (Table DHA12)

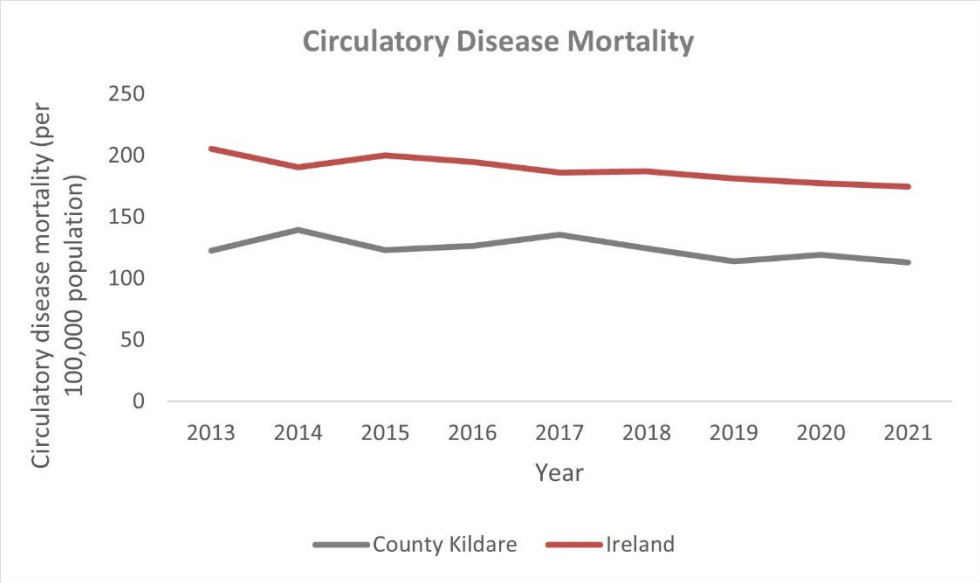


Figure 15.6 Circulatory disease mortality (Central Statistics Office, 2021) (Table DHA12)

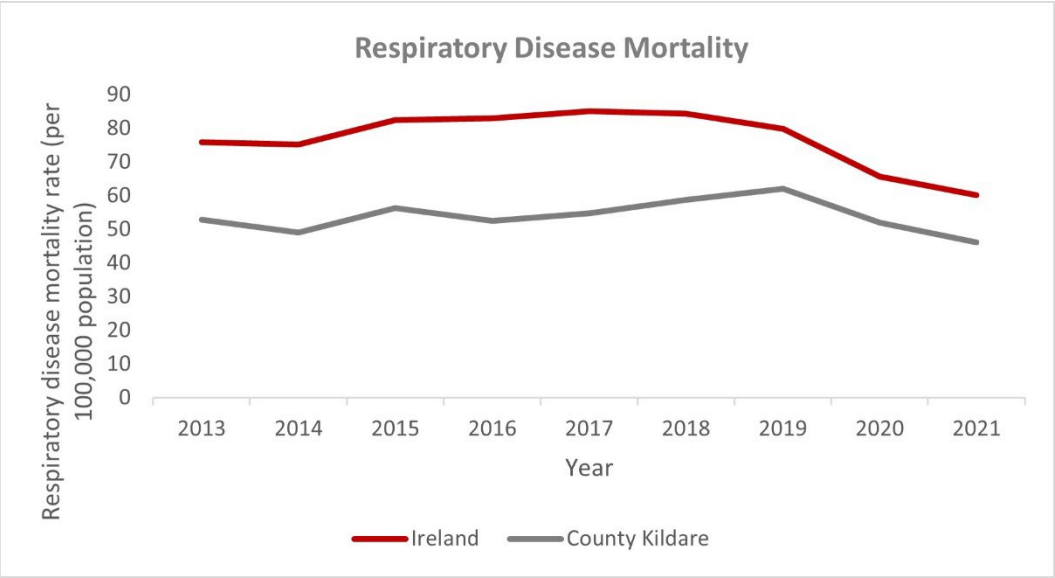


Figure 15.7 Respiratory disease mortality (Central Statistics Office, 2021) (Table DHA12)

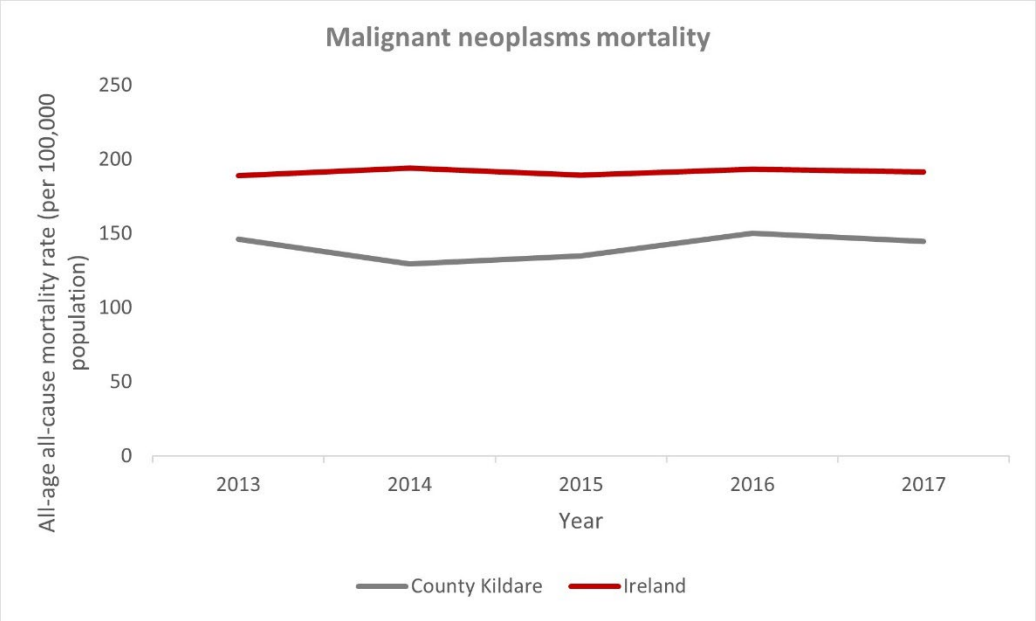


Figure 15.8: Malignant neoplasms mortality (Central Statistics Office, 2021) (Table DHA12)

Mental Health

Self-reported mental health status is only reported at the regional and national levels. Accordingly, the Mid-East region performs similar to the national comparator. In 2019, the percentage of people that reported to have experienced moderately severe to severe depression is 2% in both the Mid-East region and Ireland (Central Statistics Office, 2020b).

Deaths from mental and behavioural disorders is lower in County Kildare (16.8 per 100,000 population) compared to the national rate (35.1 per 100,000). However the suicide rate is slightly higher in County Kildare (10.1 per 100,000 population) compared to Ireland (8 per 100,000) (Central Statistics Office, 2021).

Deprivation

The Project site is located across two Electoral Divisions (ED): ED Naas Rural and ED Carragh, which in the 2022 Pobal Deprivation Index (Pobal, 2023) were classed overall as affluent and marginally above average

(deprivation) respectively. Of the seven small areas that comprise Naas Rural and Carragh EDs, 2022 data show that none were classed as marginally below average, three were classed as marginally above average deprivation, four were classes as affluent, and none were classed as very affluent.

The Human Health Study Area uses the most deprived small area within close proximity to the Project as representative of sensitive populations. Of the abovementioned small areas, the most deprived area is Small Area ID 087070002 (within Naas Rural ED). This area has 457 people (2022 data) with an unemployment rate of 4.65% for males and 9.57% females. The lone parent ratio is 7.55%, 2.74% of the population lives in local authority rented housing, and 2.43% of the population has only primary education.

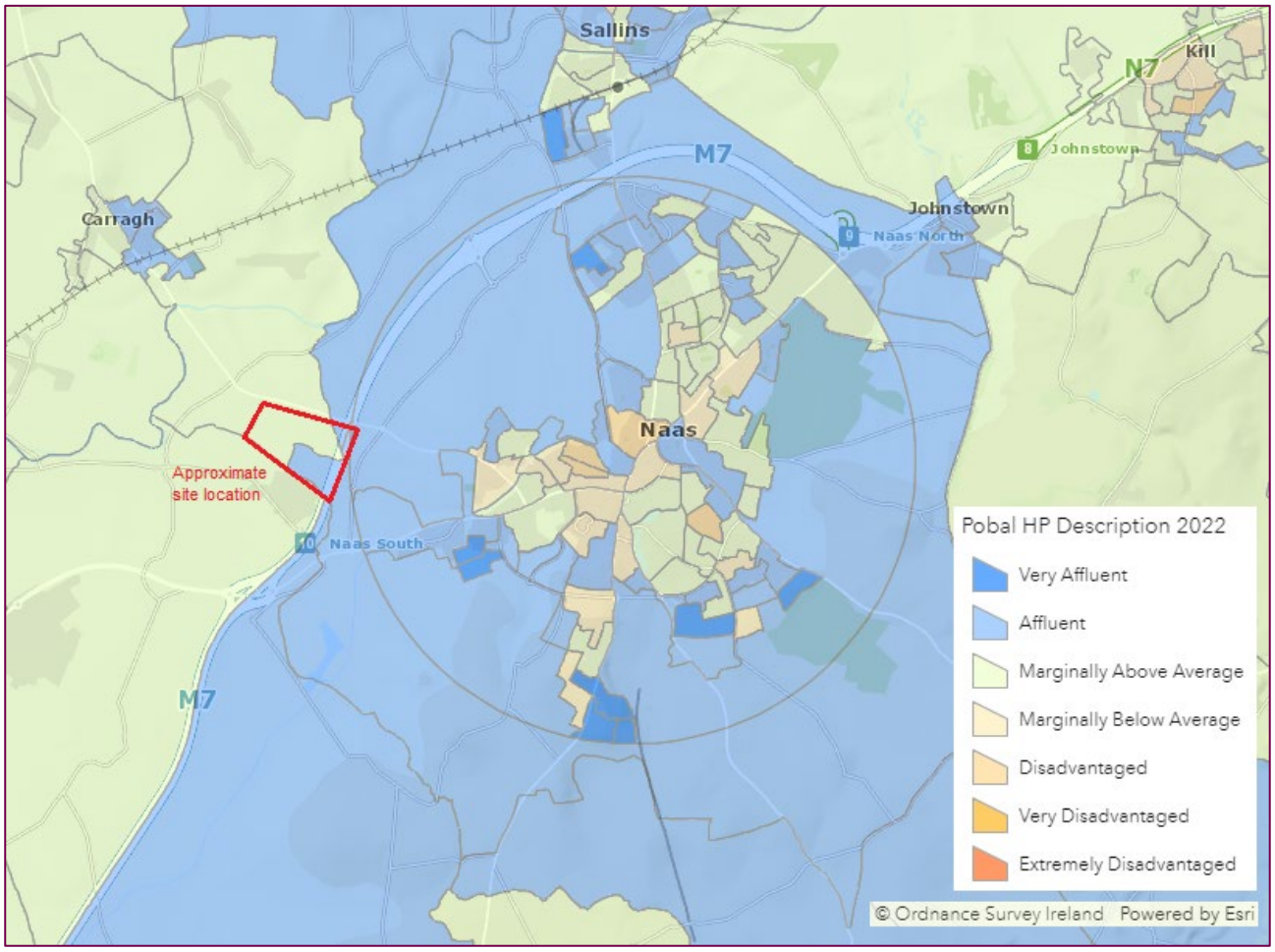


Figure 15.9: Deprivation map for Carragh, Naas Rural and Nass Urban (circular area) Electoral Divisions (Source: Pobal, 2022)

15.4.3 Evolution of the Environment in the Absence of the Proposed Scheme

Longer term trends and interventions in population health may influence the future baseline. Health and social care, public health initiatives and government policies aim to reduce inequalities and improve quality of life. The historic success of such interventions is increasingly challenged by national trends such as an aging population, rising levels of obesity, the COVID-19 pandemic, cost-of-living crisis and climate change. The implications of these pressures for public health will take years to be reflected within statistical data releases, but it is expected that they will exacerbate public health challenges. These factors disproportionately affect vulnerable groups, including due to age and ill-health.

Climate change may exacerbate physical and mental health risk factors, particularly around flooding, extremes of temperature and uncertainty for future generations. The baseline indicates that the population of Naas and Carragh is for the most part relatively affluent and would be expected to therefore be relatively resilient to climate change stresses. Typically, low resource groups, e.g. in areas of high deprivation, are most sensitive to the adverse health effects of climate change.

To reflect these trends the assessment scores all vulnerable groups as having high sensitivity for all determinants of health. This appropriately captures any increase in sensitivity within the future baseline.

It would not be proportionate (or consistent with the qualitative assessment approach taken) to quantitatively model the population's future health. This reflects the complexities of interactions between the wider determinants of health, as well as the potential for macro-economic changes in the next decade that are hard to predict. Any prediction would have such wide error margins that it would greatly limit the value of the exercise.

15.5 Assessment of Effects

15.5.1 Physical Activity

Operations and maintenance

This section considers the population health effect of the new operational footpaths and cycleways on physical activity. Section 15.5.2 assesses transport modes, access and connections and considers how walking and cycling may be affected by the Project's vehicle traffic on the road network. Supporting people to be active is an important determinant of physical and mental health. The Project includes the provision of new footpaths and cycleways connecting the Project to the existing road network, and on-site cycle storage facilities. Active travel health effects may relate to physical health (e.g. cardiovascular health) and mental health conditions (e.g. stress, anxiety or depression) associated with obesity and levels of physical activity.

This section has been informed Chapter 12 – Traffic and Transportation, which sets out relevant assessment findings and mitigation measures that have been considered.

The potential health effect is considered plausible because there is a theoretical source-pathway-receptor relationship:

- The source is new footpaths and cycleways promoting active travel and physical activity near the Project.
- The pathway is changes in amenity for pedestrians and cyclists and behavioural change in levels of physical activity.
- Receptors are residents and commuters in the local communities and businesses near the Project.

Furthermore, the source-pathway-receptor linkage is considered potentially applicable to the context of this development.

The population groups relevant to this assessment are:

- The 'site-specific' geographic population of Naas Rural and Carragh.
- The sub-population vulnerable due to:
  - Low income, specifically people who would benefit from new active travel and improved physical activity opportunities or means of transport.

- Poor health, specifically conditions where physical activity would be beneficial to physical or mental health.
- Access and geographical factors, specifically the population who will have improved access to work / employment locations accessed by the routes provided by the Project.

Sensitivity of receptor

The sensitivity of the general population is **low**. Common factors that differentiate the sensitivity of the general population and the vulnerable group population have been considered and are listed in Section 15.3.3.3 of this report. The general population comprise those members of the community who are unlikely to make regular use of the new public footpaths, cycleways or leisure facilities provided by the Project and would likely have *alternative* routes for active travel or physical activity opportunities.

The sensitivity of the vulnerable group population is **high**. This reflects that the sub-population includes a high representation of those receiving care due to poor health who may benefit from the improved active travel facilities that may facilitate walking/cycling to and from work. The population may be more *reliant* on the improved route, with greater likelihood that any improvement could impact physical activity behaviours.

Magnitude of impact

As reported in Chapter 12: Traffic and Transportation and summarised in section 15.3, the Project will include extension of the existing segregated cycling and walking infrastructure on the southern side of the R409. As a result, the Project site will be connected to Naas and to other business parks in the vicinity by segregated cycling and walking infrastructure, and bicycle parking will be provided at the Project site in the vicinity of each data centre and at the Admin Workshop Area. A total of 104 bike parking spaces are provided throughout the site.

For population health the magnitude of change due to the Project is **low**. The scale of change is considered *small.* The additional infrastructure would be *permanent* and similar or higher in quality as compared to the existing infrastructure. Effects would range from be experienced *occasionally to frequently* over the *long-term* for users of the new routes and facilities. Only *minor changes* in morbidity related to cardiovascular and mental wellbeing outcomes would be expected for a *small minority* of the population.

Significance of effect

The significance of the population health effect for this determinant of health is **minor beneficial** (not significant).

The Project extends an existing active travel route, and this would be beneficial in the promotion of physical activity. Whilst physical activity is a *specific* local public health priority and the scientific literature shows a causal relationship between the benefits of physical activity and beneficial health outcomes; the professional judgement is that there would be only a *slight* beneficial change in the health baseline for the local population. The changes are likely to have a *marginal* influence on the delivery of health-related policy.

15.5.2 Transport modes, access and connections

Construction, Operational and maintenance, and Decommissioning phases

This section considers population health implications of changes in construction and operational road traffic affecting: health-related travel times and accessibility (including emergency services); road safety and; active and sustainable travel for local residents (bus users, pedestrians and cyclists).

- Construction works and constructed-related vehicles and traffic have the potential to disrupt local vehicle traffic (private and public transport) as well as some sustainable travel (bus routes) and active travel (pedestrians and cyclists). This may include health-related journey times, community severance or road safety; and
- There is also potential for increases in vehicle movements during the operational phase, relating to the movement of materials and people to and from the Project site, which may cause delays in local vehicle traffic and health-related journey times and disruptions in active travel.

This section has been informed by Chapter 12 – Traffic and Transportation, which sets out relevant assessment findings and mitigation measures that have been considered.

With regard to health-related travel times and accessibility, health effects may be associated with emergency response times or non-emergency treatment outcomes associated with delays or non-attendance. With regard to active and sustainable travel, health effects may be associated with reductions in levels of active travel, including physical health (e.g. cardiovascular health) and mental wellbeing (e.g. increased stress and anxiety). With regard to road safety, health effects may be associated with the severity or frequency of road traffic incidents.

The potential effect is considered plausible because there is a theoretical source-pathway-receptor relationship:

- The source is the presence of construction and operational vehicles and traffic restrictions on the existing network,
- The pathway is changes in health-related travel times / accessibility, changes to levels of active travel due to increased vehicle traffic, and changes to road safety.
- Receptors are local road users, including those using motor vehicles as well as pedestrians and cyclists, and emergency services using the road network.

Furthermore, the source-pathway-receptor linkage is considered potentially applicable to the context of this development.

The population groups relevant to this assessment are:

- The 'site-specific' geographic population of Naas Rural and Carragh;
- The 'local' population of County Kildare.
- The sub-population vulnerable due to:
  - Young age vulnerability (children and young people as potentially more vulnerable road users).
  - Old age vulnerability (older people as potentially more vulnerable road users)
  - Poor health vulnerability (people with existing poor physical and mental health in relation to health trip journey times)
  - Low-income vulnerability (people living in deprivation, including those on low incomes for who travel costs or alternatives may be limiting)
  - Access and geographical vulnerability (people who experience existing access barriers or who rely on the affected routes, including healthcare and other amenities).

The scientific literature indicates that there is an association between the transport changes, road safety and accessibility. The literature does not identify particular thresholds for effects. The assessment has had regard to the population groups identified in the literature that may be particularly sensitive. For example, children, pregnant women and cyclists (particularly older cyclists) are generally more vulnerable in terms of road safety. People with lower socio-economic status typically face more transportation barriers in accessing health care.

Sensitivity of the population

The sensitivity of the general population is **low**. Common factors that differentiate the sensitivity of the general population and the vulnerable group population have been taken into account and are listed in Section 15.3.3.3 of this report. This reflects that most people in the local area (County Kildare) would only make *occasional* use of the affected section of the road network. It also includes those for whom the road network affords *many alternative* routes. The general population comprise those members of the community with a *high capacity* to adapt to changes in access, including changes in healthcare access, for example due to greater resources and *good* physical and mental health.

The sensitivity of the vulnerable group population is **high**. Vulnerability in this case is linked to mode of travel, including pedestrians and cyclists being more sensitive to road safety changes. It also relates to age (young people and older people) being more vulnerable to accident severity, those *reliant* on services accessed on affected sections of the road network (e.g. traveling to schools), and those in areas of greater deprivation. Deprived populations may already face more access barriers compared to general population and therefore be more sensitive to access changes. Low incomes may compound access barriers by *limiting* adaptive

response. Vulnerability also includes those accessing health services (emergency or non-emergency) at times and locations affected by congestion. Ambulance services (and the recipients of their care) are particularly sensitive to delays in response times (time taken to arrive and stabilise the patient). Ambulances are generally less affected by congestion due to the priority given to them travelling under blue lights, but journey times may benefit from the road improvements. People in poor or very poor health may be more frequent users of healthcare service and therefore be more sensitive to access changes.

Magnitude of impact

Chapter 12 -Traffic and Transportation concludes the impact on the surrounding road network falls within the thresholds as set out in the relevant guidance. Given the percentage impact it is unlikely that the construction phase will result in a significant impact upon the surrounding road network. Operational traffic impacts on the surrounding highway network are assessed as negligible.

For population health the magnitude of change due to the Project is **low**.

- In relation to health-related travel times and accessibility. During construction and decommissioning, the scale of change in delays is expected to be *small*, with the duration of such change medium-*term*. The frequency with which health related journeys may be affected is likely to be *occasional.* During operation and maintenance, the scale of change in delays is expected to be *negligible*, with the duration of such change *long-term*. For all phases, most delays would not affect health outcomes, though for a very few people, severity could relate to a *small change* in risk for morbidity or mortality. Any health service implications are likely to be *slight*.
- In relation to active/sustainable travel. During construction and decommissioning, the scale of change in use of active or public transport due to disruption and additional vehicle movements on the roads is considered *small* and over the *medium-term*. This reflects the temporary nature of construction and decommissioning work and ability of people to adapt to known planned roadworks. During operation and maintenance, the scale of change over the *long-term* is anticipated to be *negligible.* In all phases, any changes relate to those making *frequent or occasional* use of active travel or public transport modes. Any changes, slight incentivising or disincentivising the use of these modes, would be expected to make only a very minor contribution to quality-of-life and morbidity for cardiovascular and mental health outcomes for a *small minority* of the population. Sustained behavioural change due to the Project change is not expected.
- In relation to road safety. During construction and decommissioning, a *small* scale of change in road traffic would have a corresponding very small increase in accident risk (simply as a function of traffic volumes). Such events would remain *occasional* over the *medium-term* for the construction and decommissioning phases. During operation and maintenance, the scale of change is likely to be *negligible,* with *occasional* events over the *long-term.* For all phases, severity relates to a very minor change in risk of injury or mortality (with outcome reversal gradual or permanent). Very few people would be affected, with no or slight implications for healthcare services.

Significance of effect

The significance of the population health effect for this determinant of health is **minor adverse** (not significant). The professional judgment is that there would, at most, be a *slight adverse* change in the population health baseline. This conclusion reflects that road safety and access to health supporting services are *specific* public health priorities and there is *causal* association that is supported by the scientific literature. However, the change due to the Project is appropriately mitigated by standard good practice measures that minimise disruption and disturbance, as described in Chapter 12. The change is unlikely to result in significant differential or disproportionate effects between the general population (low sensitivity) and the vulnerable sub-population (high sensitivity). Consequently, *no widening of health inequalities* would be expected, and no influence is expected on the ability to deliver local or national health policy.

15.5.3 Community identity, culture, resilience and influence

Operational and maintenance phase

This section considers the potential effects to community identity from the visual impact of the operational data centre. Community identity is a determinant of wellbeing and is influenced by aesthetic elements of the

landscape. A range of responses may be expected depending on people's outlook. Some people may experience ambivalent or positive effects while other people may experience negative effects due to a greater degree of built form within their views. To take a conservative approach this section considers the latter response.

This section has been informed by Chapter 11: Landscape and Visual which sets out relevant assessment findings and mitigation measures that have been taken into account.

The potential health effect is considered plausible because there is a theoretical source-pathway-receptor relationship:

- The source is the data centre infrastructure as a new visual element;
- The pathway is visual change triggering psychological responses; and
- Receptors are local communities with frequent near views of the Project.

Furthermore, the source-pathway-receptor linkage is considered potentially applicable to the context of this development.

The population groups relevant to this assessment are:

- The 'site-specific' geographic population of Naas Rural and Carragh
- The sub-population vulnerable due to:
  - low income, specifically people who have fewer resources to adapt to change.
  - poor health, specifically people with existing health conditions or high stress or anxiety levels who feel strongly about the changes associated with the Project.
  - Access and geographical factors, specifically the population with the greatest visual change due to proximity and direct views.

Sensitivity of the receptor

The sensitivity of the general population is **low**. Common factors that differentiate the sensitivity of the general population and the vulnerable group population have been taken into account and are listed in section 15.3.3.3. The general population comprise those members of the community in *good* physical and mental health and with greater resources to respond to change. Given the existing screening including hedgerows, the proposed high mounds to be installed as visual buffers and the distance to the residential area of the Project, the visual impacts would not affect most residents. *Occasional* or passing views of the data centre from roads, footpaths or cycleways are not expected to affect population health.

The sensitivity of the vulnerable group is **high**. This reflects that the sub-population includes those with *existing* poor mental health or who have *high degrees* of concern or *uncertainty* about the Project. This sub-population also includes those who have *less capacity* to adapt to the changes due to near views of the Project from their homes. This vulnerable sub-population may experience disproportionate effects.

Magnitude of impact

During the operation and maintenance phase the Project would include new visual elements, including 6 no. two storey data centre buildings, an administration / management building, car parking, landscaping, energy infrastructure and other associated works. The Project also comprises a grid substation and 110 KVA transmission connection.

Chapter 11: Landscape and Visual concludes that the Project will not be out of character with the surrounding environment. Of the 15 viewpoints assessed, only one will have moderate adverse visual impact at the operational stage: viewpoint 11 (View north from Osberstown Business Park Entrance) is predominantly available to vehicle users and pedestrians. The remaining viewpoints were assessed as no change, negligible or minor adverse. Additionally, the Project's planting scheme will provide further screening. The assessment concluded that the wider landscape and visual resources of the development's surroundings have the capacity to accommodate a development of this type and scale.

For population health the magnitude of the change due to the Project is **low**. Occasional and partial views from vantage points of a transitory nature whilst passing the data centre are not expected to affect population health outcomes. Although this change would be experienced over the *long-term* on a *frequent* basis (albeit not

permanent), there are not widespread changes in near views from dwellings to a degree that would indicate the potential for a population level effect. There is potential, at most, for a *minor* change in quality of life for a *small minority* of the population. A degree of adaptation to views would be expected over time, and *no health service* implications would be expected. For a *very few* people there may be greater changes in setting, for example where there are near views of the Project. Such individual level effects are noted and targeted mitigation may be appropriate, however population level health effects are not expected.

Significance of the effect

The significance of the population health effect for this determinant of health is **minor adverse** (not significant). The professional judgement is that there would be a *very limited* adverse change in the health baseline for the local population, reflecting the level of visual change is limited by the site context. Whilst the scientific literature establishes that there can be an association between visual change and health outcomes, this is not a public health priority issue, and the Project would not result in a scale of changes that would affect the delivery of local or national health policy on this issue. The degree of visual change is not disproportionately greater for more health deprived populations, as such *no change in health inequalities* is expected.

15.5.4 Education and training

Operational and maintenance phase

This section discusses changes to education and training during operation of the Project. The Project provides opportunities for career development and upskilling.

Changes in training opportunities have socio-economic effects that impact upon health and mental well-being.

A potential population health effect is considered plausible because there is a theoretical source-pathway-receptor relationship:

- The source is upskilling and career development opportunity.
- The pathway is good quality education and skills development which is influential for health.
- Receptors are local communities particularly young people and people of working age.

Furthermore, the source-pathway-receptor linkage is considered potentially applicable to the context of this development.

The population groups relevant to this assessment are:

- The local population of County Kildare
- The regional population of Leinster province
- The sub-population vulnerable due to:
  - Young age vulnerability (young people), particularly young adults early in their career.
  - Poor health vulnerability (people with existing poor physical and mental health) who would disproportionally benefit from access to opportunities.
  - Low-income vulnerability (people living in deprivation, including those on low incomes for whom upskilling and career development may be particularly beneficial).

Sensitivity of receptor

The sensitivity of the general population is **low**. Common factors that differentiate the sensitivity of the general population and the vulnerable group population have been taken into account and are listed in section 15.3.3.3. This reflects that most people in the local area would make use of *alternative* educational or training opportunities or have *existing* educational attainment appropriate to their vocation and career progression.

The sensitivity of the vulnerable group population is **high**. Vulnerability in this case relates to young adults, in relation to apprenticeship opportunities, and children or young people, in relation to educational support initiatives. Both these groups, particularly those who are from disadvantaged backgrounds, would be particularly sensitive to educational interventions that provide knowledge, new skills or personal development.

Young people leaving education or early in their careers may have the most to gain from an increase in training opportunities as a pathway into good quality local employment.

Magnitude of Impact

For population health the magnitude of change due to the Project is **low**. The change would be *long term* and *small-scale*. Any upskilling and training opportunities associated with the operational employment opportunities are likely to be associated with *minor* changes in morbidity and quality of life for a *small minority* of the population due to improved socio-economic status.

Significance of effect

The significance of the population health effect for this determinant of health is **minor beneficial** (not significant). The professional judgment is that there would be a *slight* beneficial change in the health baseline for the local population. This conclusion reflects that the scientific literature establishes a clear relationship between career development and factors that promote health or are protective against poor health, particularly mental health. The scale and nature of career development is expected to be *marginal* in narrowing health inequalities locally, and more generally supporting delivery of health policy to improve local population health.

15.5.5 Employment and income

Operational and maintenance phase

This section considers the health implications of increased employment and economic impacts during operation. Employment is an important determinant of health and well-being both directly and indirectly by making health-promoting resources available to an employee and any dependants. The socio-economic benefits associated with employment are improved living conditions and the potential to make healthier choices, e.g. eating a healthier diet and undertaking more physical activity. If members of the community are employed, this can also generate indirect economic activity.

This section has been informed by Chapter 14 – Population, which sets out relevant assessment findings and mitigation measures that have been considered.

The potential health effect is considered plausible because there is a theoretical source-pathway-receptor relationship:

- Source: direct and indirect job creation and economic activity, including access to employment.
- Pathway: level of income and employment linked to spend on health supporting resources.
- Receptor: people of working age (and their dependants).

Furthermore, the source-pathway-receptor linkage is considered potentially applicable to the context of this development.

The population groups relevant to this assessment are:

- The ‘local’ population of County Kildare.
- The ‘regional’ population of the province of Leinster.
- The sub-population vulnerable due to:
  - Young age vulnerability (young adults as employees or apprentices, and children and young people as dependants).
  - Old age vulnerability (older people as dependants).
  - Low-income vulnerability (people living in deprivation, including those on low incomes for whom good quality employment may be particularly beneficial).
  - Poor health vulnerability (people with existing poor physical or mental health, including as dependants).

Sensitivity of the receptor

The sensitivity of the general population is **low**. Common factors that differentiate the sensitivity of the general population and the vulnerable group population have been considered and are listed in section 15.3.3.3. This reflects that most people would already be within stable employment that would be unaffected by the Project (or being a dependant of such a person).

The sensitivity of the vulnerable sub-population is **high**. The health of vulnerable groups is particularly sensitive to employment. Vulnerability in this case relates to people and their dependants who are on low incomes or who are unemployed. Young people, including leaving education or early in their careers may have the most to gain from an increase in good quality job opportunities. Future young or older people may also come to rely on those employed. Improved access to employment opportunities may particularly benefit those on low incomes.

Magnitude of impact

During operation, the Project will generate approximately 225 jobs in the IT sector and will indirectly support the development of other small and medium enterprises. Chapter 14 – Population concludes that the Project will "deliver significant new employment" and "support a key sector of the economy in Kildare".

For population health the magnitude of change due to the Project is **low**. The scale of direct and indirect new employment generated by the Project is considered to be *small* in the local and regional economy context. General employment benefits linked to improved access to job opportunities are predominantly expected to be filled by existing skilled residents extending their commuting range (rather than causing an influx of new residents to communities). The effects are expected to be greatest at the local level, but also extend to the regional level. Overall benefits of the Project to the local economy are considered greater. New good quality *medium-term* roles (in terms of renumeration, working hours, working conditions and job security) are considered particularly likely to contribute to long-term population health benefits. Benefits are likely to relate to *minor* changes in quality of life and morbidity for a *small minority* of the local and regional population (including through indirect benefits to dependants).

Significance of effect

The significance of the population health effect for this determinant of health is **minor beneficial** (not significant). The professional judgment is that there would be a *slight* beneficial change in the health baseline for the local population. This conclusion reflects that the scientific literature establishes a clear relationship between good quality employment and factors that promote health or are protective against poor health, particularly mental health. The scale and nature of employment is *not expected to widen or narrow existing health inequalities.*

15.5.6 Climate change and adaptation

Operational and maintenance phase

The Project utilises natural gas (a fossil fuel) as its primary source of energy. Combustion of natural gas is associated with emission of greenhouse gases, a driving factor of climate change. The Project will also operate on the basis of a minimum of 30% energy from off-site renewables including solar and wind energy and will contain carbon mitigation measures embedded in the project design, including selection of sustainable / low embodied carbon materials and the sourcing of goods, services or works with reduced lifecycle impact. These initiatives have the potential to impact beneficially by enabling the reduction of carbon emissions in ancillary sectors, such as digitisation and dematerialisation (swapping of high carbon products for low carbon alternatives), improved data collection and communication system; system integration and optimisation of processes (Whitehead et al., 2014).

The population health effects associated with climate change include heat-related disorders (e.g. heat stress and lower work capacity), respiratory disorders (e.g. worsened asthma), infectious diseases, migration, food insecurity (e.g., lower crop yields) and injury and mental stress associated with natural disorders (e.g. flooding or fires). This section has been informed by Chapter 16 – Climate which sets out the relevant assessment.

The potential health effect is considered plausible because there is a theoretical source-pathway-receptor relationship:

- Source: non-renewable energy generation and indirect carbon savings in other sectors;
- Pathway: release of climate altering pollutant emissions;
- Receptor: national and global population, particularly deprived populations in low- and middle-income countries.

Furthermore, the source-pathway-receptor linkage is considered potentially applicable to the context of this development.

The population groups relevant to this assessment are:

- The 'national' population of Ireland, and international population for global effects.
- The sub-population vulnerable due to low incomes, including where this overlaps with being a dependant (children, older adults and people with poor health requiring care) and/or other social disadvantage or deprivation.

Sensitivity of the receptor

The sensitivity of the general population is **low**. Common factors that differentiate that sensitivity of the general population and the vulnerable group population have been taken into account and are listed in section 15.3.3.3. The general population comprise those members of the community in good physical and mental health and with greater resources to respond to climate adaptation.

The sensitivity of the vulnerable group population is **high**. This reflects the sub-population on low incomes for whom climate adaptation or the adverse effects of climate change pose a greater risk. This is particularly the case for dependants on issues such as health risks of temperature extremes, including heatwaves and cold weather.

Magnitude of impact

Chapter 16 – Climate discusses the whole life operational GHG emissions relative to Ireland's Carbon budget, concluding a minor adverse effect would be expected following mitigation. Chapter 16 acknowledges there would be a considerable scale of emissions.

The magnitude of change for population health due to the Project is **low**. This reflects the contribution to increasing climate altering pollutant emissions, which is a *small* scale of change in the context of the wider energy and industrial sectors, but with implications for the health outcomes of a global population. Increases in adverse effects of climate change are associated with a *minor change* in risks for population mortality (e.g., increase in excess winter deaths) and morbidity (e.g., exacerbation of respiratory and mental health conditions). Such effects may have a *slight implication* to healthcare services by increasing capacity burdens.

The score also reflects the contribution of the Project to reducing global climate change health effects through the use of facilitating carbon emission reduction in other sectors, which is a *very small scale* of change nationally and internationally, but with implications for a global population. Reducing adverse effects of climate change provides a *minor* reduction in risks for population mortality (e.g., increase in excess winter deaths) and morbidity (e.g., exacerbation of respiratory and mental health conditions). Such effects may bring *slight* benefits to healthcare services by reducing capacity burdens.

Significance of the effect

The significance of the population health effect for this determinant of health is **minor adverse** (not significant). This assessment conclusion reflects that whilst the scientific literature establishes a causal effect relationship between climate change and health outcomes, the changes would result in a *slight effect* on the health baseline of the local population. The Project would not result in a scale of change that would affect the delivery of local or national health policy on this issue. The Projects net contribution to climate change, taking into account emissions directly generated as well as emissions indirectly avoided, suggests that the Project would have, at most, a marginal effect on health inequalities.

15.5.7 Air quality

Construction, Operational and Maintenance, and Decommissioning phases

This section discusses changes to air quality during construction, operation and maintenance, and decommissioning of the Project, and related effects on population health. Construction and decommissioning of the Project has the potential to result in dust effects from demolition and construction activities and construction compounds, as well as vehicle emissions from construction traffic. Operational activities of the Project have the potential to result in emissions from the combustion of natural gas during electricity generation and vehicles operating at the site, as well as operational vehicle traffic movements to and from the Project. Combustion of natural gas is associated with emissions of air pollutants including nitrogen oxides particularly nitrogen dioxide (NO_2) and particulate matter ($PM_{2.5}$ and PM_{10}).

The scientific literature indicates that there is an association between air quality emissions and health and wellbeing effects. Whilst the literature supports there being thresholds set for health protection purposes, it also acknowledges that for PM and NO_2 there are non-threshold health effects (i.e. when there is no known exposure threshold level below which adverse health effects may not occur) (European Environment Agency, 2022). There are population groups that may be particularly sensitive to air quality effects. For example, young children are particularly susceptible to air pollution because of their developing lungs, high breathing rates per bodyweight, and amount of time spent exercising outdoors. Other vulnerable groups include the sick (e.g. people with type 2 diabetes), the elderly, and pregnant women.

This section has been informed by Chapter 8 – Air Quality, which sets out relevant assessment findings and mitigation measures that have been taken into account.

Potential effects on human health are considered plausible because there is a theoretical source-pathway-receptor relationship:

- The source is air pollutants, particularly NO_2, $PM_{2.5}$ and PM_{10} from construction/decommissioning and operation activities, including plant/vehicle emissions and emissions associated with operational electricity generation.
- The pathway is diffusion through the air.
- Receptors are residents and long-term occupiers of nearby properties and community buildings.

Furthermore, the source-pathway-receptor linkage is considered potentially applicable to the context of this development.

The population groups relevant to this assessment are:

- The ‘site-specific’ geographic population of Naas Rural and Carragh.
- The sub-population vulnerable due to:
  - Young age vulnerability (children and young people).
  - Old age vulnerability (older people).
  - Poor health vulnerability (people with existing poor respiratory or cardiovascular health).
  - Access and geographical vulnerability (people for whom close proximity to Project change increases sensitivity).

Construction and operational activities that produce dust relate to the coarser fractions of PM_{10} and potential nuisance from dust deposition on property. The great majority of anthropogenic $PM_{2.5}$ and NO_2 health effects relate to combustion related processes, particularly use of fossil fuels (natural gas) in electricity generation, changes in transport patterns, and solid fuel burning from space heating.

Whilst the focus of discussion in this health chapter differentiates between coarse PM during construction and fine PM during operation, the health outcomes of PM_{10} and $PM_{2.5}$ are not distinguished in this assessment. This reflects that both are typically present (though the relative proportions change) and that the evidence base does not consistently distinguish their effects particularly given that $PM_{2.5}$ is a subset of PM_{10}. However, generally, elevated concentrations of $PM_{2.5}$ are considered of greater concern due to their greater potential to interact within the body.

For dust emissions, the main health outcomes are likely to relate to exacerbation of existing conditions, such as asthma or chronic obstructive pulmonary disease (COPD) (i.e. airway inflammation by coarse PM) and to

reductions in wellbeing associated with annoyance or reduced amenity. Whilst other outcomes (e.g. cardiovascular events) may be relevant in the event of brief high concentrations, such elevated exposures are expected to be avoided though the embedded standard good practice mitigation discussed in Chapter 8 – Air Quality.

Sensitivity of the population

The sensitivity of the general population is **low**. Common factors that differentiate the sensitivity of the general population and the vulnerable group have been taken into account and are listed in Section 15.3.3.3 of this report. The general population comprise those members of the community who live, work and study at a distance where high levels of dispersion and deposition would greatly limit the effects of any change in exposure due to the Project. Furthermore, most people enjoy *good* respiratory health (e.g. are not asthmatic) and are not a life stage (e.g. infant or frail elderly) with particular sensitivity to air quality.

The sensitivity of the vulnerable group population is **high**. This reflects that the sub-population includes a high representation of dependants, both children, elderly and those receiving care due to poor health. For example, *existing* respiratory conditions including asthma and chronic obstructive pulmonary disease (COPD) and type 2 diabetes would increase sensitivity. People likely to be most affected by the Project are those either living or working close to the construction compounds (see receptors listed in Chapter 8 – Air Quality).

Magnitude of impact

This section has been informed by Chapter 8 – Air Quality, which sets out relevant assessment findings for PM_{10}, $PM_{2.5}$ and NO_2 as well as mitigation measures that have been taken into account. During construction, the risk of impact from dust emissions was assessed as low risk to human receptors. Air quality impacts during operation were assessed as negligible. As described in section 15.3.2, a comprehensive set of mitigation and monitoring measures, including a Dust Management Plan, will be implemented to further minimise impacts to air quality.

For population health the magnitude of change due to the Project is **low** for all phases of the Project.

With regard to the construction and decommissioning phases, occasionally, weather conditions may coincide with activities to generate higher levels of dust. This can cause temporary annoyance, and for people with existing poor health, higher levels of coarse dust in the air can exacerbate some conditions (e.g. asthma). Coarse PM is larger and heavier and so it is deposited more quickly. This means that the concentration of coarse PM in the air reduces rapidly as it gets further from the source. The potential for nuisance-type dust effects is therefore expected to be *occasiona*l and *limited* in extent. Deposition rates are slower for finer PM and affect a wider area and thus, potentially, a greater number of people. However, exposure is expected to be *very low* due to the finer PM being typically a relatively small component of dusts and the effects of dispersion, and adequate dust management through the Dust Management Plan would reduce concentrations over distance. At these levels it is unlikely that there would be discernible changes in the risk of developing a new health condition or of exacerbating an existing condition. Such changes would be *medium-term*, with a *minor* influence on quality of life and/or morbidity risk for respiratory and cardiovascular conditions for a *very few people*. Most effects would *rapidly* reverse, with *no discernible* influence for healthcare services.

Any health effect due to operational activities would relate to a *negligible* to *very low* change in exposure to air pollutants, which may occur on a *frequent* basis over the *long-term*. The potential for non-threshold effects of NO_2 and $PM_{2.5}$ (even below WHO advisory guidelines) to population health is noted and has been taken into account in determining the significance of potential air quality effects. Additional exposure due to the Project would represent an incremental addition to the existing baseline conditions resulting in a *very minor* change in morbidity and mortality related population health risk, e.g. associated with respiratory and cardiovascular health outcomes. Any health effect due to a very slight change in risk factors is likely limited to a *small minority* of the study area population and the effect on routine health service planning is likely *negligible*.

Significance of effect

Construction and operational air quality effects are considered **minor adverse** (not significant). The minor adverse (rather than negligible) score represents a conservative assessment finding given scientific uncertainty (and emerging evidence) about non-threshold health effects of NO_2, and $PM_{2.5}$. The score takes into account WHO advisory guidelines, and also reflects that air pollution is a *specific* local public health priority. The level of change in the health baseline due to the Project is likely to be *very limited*, with at most a *marginal* effect on the delivery of health policy and inequalities. This is a public health acknowledgement of the very

small incremental contribution to air pollution that the Project would make, but also recognition that at the Project level this should not be considered a significant effect on population health or health inequalities.

15.5.8 Water quality or availability

Operational and maintenance phase

This section discusses management of water quality during operation of the Project, and related effects on human health. The Project includes management of large volumes of water on-site for cooling purposes stored in underground tanks and a surface pond.

This section has been informed by Chapter 7 – Water and Hydrology, which sets out relevant assessment findings and mitigation measures that have been taken into account.

Potential effects (beneficial and adverse) on human health are considered plausible because there is a theoretical source-pathway-receptor relationship:

- The source is cooling water;
- The pathway is quality or availability of potable water; and,
- Receptors are residents and long-term occupiers of nearby properties and community buildings.

Furthermore, the source-pathway-receptor linkage is considered potentially applicable to the context of this development.

The population groups relevant to this assessment are:

- The 'site-specific' geographic population of Naas Rural and Carragh; and,
- The sub-population vulnerable due to:
  - Young age vulnerability (children and young people);
  - Old age vulnerability (older people);
  - Poor health vulnerability (people with existing poor health); and
  - Access and geographical vulnerability (people for whom close proximity to Project change increases sensitivity).

The scientific literature identifies the following general points relevant to potential exposures and health outcomes. Recreational exposure to natural toxins by skin contact, accidental swallowing of water or inhalation can cause a wide range of acute or chronic illnesses. Climate change is likely to affect the infectious disease burden from exposure to pathogens in water used for drinking and recreation. Drinking water supplies from both surface water and groundwater sources may be contaminated during flooding events. Use of spray irrigation with contaminated water is a risk factor for contamination fruits and vegetation. Avoiding contamination of irrigation water and soil, is effective for the prevention and control of produce contamination.

The safety of water supplies is if paramount health importance. Good hydration is vital to health and wellbeing. There is increasing evidence of the links between water intake and physical disease and cognitive performance. Although microbial contamination is the largest contribution to waterborne disease and mortality at a global scale, chemical contaminants in water supplies also can cause disease, sometimes after long periods of exposure. Water supplies often include mixtures of chemical contaminants at negligible concentrations that vary in time and space. However, drinking-water quality is regulated, and monitoring is conducted routinely. This ensures that drinking water guidelines are not exceeded.

Sensitivity of the population

The sensitivity of the general population is **low**. Common factors that differentiate the sensitivity of the general population and the vulnerable population have been taken into account and are listed in Section 15.3.3.3. This reflects many people would make limited use of areas where exposures to pollutants would potentially occur and do not make regular use of waters that could experience contamination due to the Project. The potential for any effect to public water supplies (surface or ground water sources) is considered *very limited*, with the great majority of people having water supplies that would be unaffected. The general population also includes those who are in *good* health and less likely to be adversely affected by contaminants. This also includes people with *high capacity* to adapt including greater resources to respond to change.

The sensitivity of the vulnerable group population is **high**. Vulnerability in this case relates to people more sensitive due to life stage or health status. For example, children and young people may spend more time outdoors and due to developmental stage or relative body size have increased risks from a given toxin exposure. Increased sensitivity to exposure may also apply to older people and those with existing poor health (e.g. long-term illness). These groups would be more sensitive to accidental *short-term* exposure to any ground or waterborne pollutants or changes in potable water availability.

Magnitude of impact

A minimum of 1 year water storage is provided on site for the adiabatic cooling top-up and storage top-up from on-site ponds if required. In addition, a highly efficient surface water management design mitigates rain run off combined with rain harvesting, to ensure minimal water wastage on site.

This section has been informed by Chapter 7 – Water and Hydrology, which sets out relevant assessment findings and mitigation measures that have been taken into account. Mitigation measures to prevent impacts on water quality during the operational phase include a highly efficient surface water management design to mitigate rain run-off combined with rain harvesting design measures aimed at ensuring adequate drainage and treatment of site/stormwater runoff before discharge to the nearby watercourse. In addition, oil interceptors will be used in the drainage design as appropriate (see section 15.3.1 for details of the design elements pertaining to water management and water quality). Chapter 7 concludes that following implementation of the above design measures, the operation and maintenance of the Project would result in imperceptible impacts on storm water runoff, foul water and hydromorphology.

For population health it is concluded that the magnitude of the change due to the Project is **negligible**. Both ground and water contaminants pose a very low exposure risk to the community, whether by direct contact, waterborne or airborne pathways. As described above, detailed mitigation has been incorporated into the engineering design of the Project to prevent and minimise potential impacts on the water environment. Assuming implementation of all design mitigation and that any discharges would be covered by permits as required, any exposure would be *short-term* and given the design measures to prevent and treat storm water runoff, likely to be *one-off frequency*. Additional population level exposure to water contaminants due to the Project, or demand pressures on potable water availability, if any, would represent a *very minor* change in morbidity related population health risk, e.g. associated with very low dose temporary toxicological exposures. Any health effect from a pollution incident would likely be limited to *very few people* of the study area population, with at most a *slight* effect on routine health service planning.

Significance of effect

The professional judgement is that the significance of the population health effect would be up to **minor adverse** (not significant). The conclusion reflects minimal risk to public drinking water supplies, with water quality expected to be maintained well within regulatory thresholds. Demand pressures on potable water supplies are expected to be avoided through use of direct air cooling, and collection of surface waters for use in the cooling system at peak times. Although the scientific literature establishes causal pathways by which health outcomes could plausibly be affected, in practice the proposed mitigation and best practice design measures mean there are very limited potential pathways by which any contaminants released by the Project could affect population health to a meaningful degree. Any change in the health baseline due to the Project is likely to be *very limited*, with at most a *marginal effect on health inequalities* and delivery of health policy. The minor adverse (rather than negligible) score represents a conservative assessment finding.

15.5.9 Noise and Vibration

Construction, Operational and maintenance, and Decommissioning phases

This section discusses changes in noise exposure during construction and operation of the Project, particularly night-time noise that may be detrimental to population health where sleep is disturbed to a high degree. Changes in the distribution of day-time noise are also considered. The latter may include the potential to change levels of traffic noise near to residential communities.

This section has been informed by Chapter 9 – Noise and Vibration, which sets out relevant assessment findings and mitigation measures that have been taken into account. Chapter 9 – Noise and Vibration concludes that following application of mitigation measures, the noise impact of construction activities is assessed as temporary minor to moderate.

Potential effects on human health are considered plausible because there is a theoretical source-pathway-receptor relationship:

- The source is noise generated by construction activities.
- The pathway is pressure waves through the air.
- Receptors are residents and long-term occupiers of nearby properties and community buildings.

Furthermore, the source-pathway-receptor linkage is considered potentially applicable to the context of this development.

The population groups relevant to this assessment are:

- The 'site-specific' geographic population of Naas Rural and Carragh
- The sub-population vulnerable due to:
  - Young age vulnerability (children and young people).
  - Old age vulnerability (older people).
  - Poor health vulnerability (people with existing poor physical or mental health).
  - Low-income vulnerability (people living in deprivation, including those on low incomes may have fewer resources to adapt, e.g. seek respite or install insulation furthermore, those who are economically inactive may spend more time in affected dwellings).
  - Access and geographical vulnerability (people for whom close proximity to the proposed changes increases sensitivity).

During construction, there is potential for noise to temporarily arise from construction works and movement of construction related vehicles.

The literature highlights cardiovascular effects, annoyance and sleep disturbance (and consequences arising from inadequate rest) as being the main pathways by which population health may be affected. The literature also notes the potential for chronic noise to have a detrimental effect on learning outcomes (e.g. noise distracting and affecting communication within classrooms). Whilst the literature supports there being thresholds at which effects (such as annoyance and sleep disturbance) are likely, it also acknowledges the subjective nature of responses to noise. In this regard noise effects can be considered to have non-threshold effects, with characteristics other than sound levels also determining the influence on health outcomes. The assessment has had regard to the population groups identified in the literature that may be particularly sensitive. For example, children, the elderly, the chronically ill, people with a hearing impairment, neurodiverse people, shift-workers and people with mental illness (e.g., schizophrenia).

Sensitivity of the population

The sensitivity of the general population is **low**. Common factors that differentiate the sensitivity of the general population and the vulnerable group population have been taken into account and are listed in Section 15.3.3.3 of this report. The general population comprise those members of the community in *good* physical and mental health and with resources that enable a high capacity to adapt to change. Additionally, most people live, work or study at a distance from the site boundary and affected parts of the local road network where construction and operational noise and vibration would be unlikely to be a source of concern.

The sensitivity of the vulnerable group population is **high**. This reflects that the sub-population includes a high representation of dependants, both children, elderly and those receiving care due to poor health. This sub-population may experience existing widening inequalities due to living in areas with increasing noise and greater deprivation, with limited capacity to adapt to changes. Vulnerability particularly relates to those living close to the construction activities and construction compounds, including those spending more time in affected dwellings during operation e.g. due to low economic activity, shift work or poor health. People who are concerned or have *high degrees* of uncertainty about construction noise and the unpredictable and distinct tonal character of the data centre noise and its effect on their wellbeing may be more sensitive to changes in noise.

Magnitude of impact

With regard to the construction and decommissioning phases, the noise and vibration impacts from construction activities and construction traffic will be mitigated through the use of appropriate construction hours, noise barriers and best practice measures agreed through the CEMP, which will include a Noise Management Plan. As reported in Chapter 9 – Noise & Vibration, construction of the Project will involve activities at the site that would generate noise and vibration such as demolition works, construction works and vehicle movements. The highest noise levels, where thresholds at nearest receptors would be exceeded, would not occur throughout the entire construction phase but would only be for a very *short term*. Prolonged periods of construction noise at night or daytime disruption of educational activities at schools are not anticipated. Chapter 9 – Noise & Vibration sets out mitigation including noise barriers, and best practice construction noise management measures that reduce the potential for large magnitude effects. The residual effect conclusion is of temporary minor to moderate effects. The noise assessment has included 42 properties in the vicinity of the Project as noise-sensitive receptors. All receptors at a greater distance from the Project are expected to experience a lower noise impact than the 42 receptors included in the noise impact assessment.

For population health the magnitude of change due to the proposed construction works is **low**. This reflects that in terms of population health, the *small scale* of change in noise levels is likely to predominantly relate to a *minor* change in quality of life for a *small minority* of the community, and a *very minor change* in cardiovascular and mental wellbeing morbidity for the very few people of the community closest to construction activities. The changes would be of *short-term* duration and relate to *frequen*t construction related noise exposures.

In relation to the operation and maintenance phase, the noise and vibration impacts from operational activities will be mitigated through the use of appropriate design measures as detailed in Chapter 9 – Noise and Vibration and summarised in section 15.3.1. As reported in Chapter 9 – Noise & Vibration, the operational noise effects of the Project, taking into account the Project's embedded design measures to reduce noise, will be negligible. Operational noise will be generated by plant and equipment, operational road traffic and car parking. Operational plant and equipment noise will occur continuously and long term (day and night). The operational noise-modelling results show that background noise levels at sensitive receptors (residential properties) will not be exceeded during the day or the night-time and effects will be negligible. Similarly, the increase in road traffic noise, and car parking noise as a result of the Project were both assessed as not significant for all receptors. Operational noise is therefore predicted to be within limits set to be protective of health and the environment. The residual effects reported in Chapter 9 – Noise and Vibration are anticipated to only result in negligible to low effect on noise-sensitive receptors.

For population health the magnitude of change due to the Project's operational activities is **low**. In terms of population health, the *small scale* of change in noise levels is likely to predominantly relate to a *minor* change in quality of life for a *small minority* of the community, and a *very minor change* in cardiovascular and mental wellbeing morbidity only for a *very few people*. The changes would be of *long-term* duration and relate to *continuous* operational related noise exposures.

Significance of effect

Construction and operational noise impacts of the Project are considered to result in a **minor adverse** (not significant) effect on population health. Based on the detailed mitigation measures the residual effect is characterised as being adverse in direction, direct, and *short-term* for the construction and decommissioning phases and long term for operation and maintenance effects. Although the scientific literature indicates a clear association between elevated and sustained noise and vibration disturbance and reduced health outcomes, the changes would result in a *very limited* effect in the health baseline of the population. In line with IEMA and IPH guidance, the individual level effects to a very few people are noted, and are appropriately targeted for mitigation, but would not result in a population health effect. The level of effect is not expected to affect the ability to deliver local or national health policy.

15.5.10 Public understanding of electro-magnetic field risk

Operational and maintenance phase

This section presents findings on the potential for a population health effect related to concern about electromagnetic fields (EMF), affecting mental health and wellbeing, rather than the likelihood of an actual risk to public health.

As noted in section 15.2.1 the Project would implement relevant design guidelines of the International Commission on Non-ionizing Radiation Protection (ICNIRP). Such guidelines are deemed sufficient for avoiding actual EMF risk. The focus of this assessment section is therefore not on the actual risk, which is considered appropriately mitigated, but on people's understanding of risks (risk perception). This relates to the potential for community concern about their proximity to the electrical infrastructure, including the data centre infrastructure to affect mental health, even where relevant public EMF exposure guideline limits are met. Further detail on the electrical infrastructure relating to the Project is given in Chapter 4 - Project Description.

Project features and expectations about a project can be understood in different ways by different people. This assessment considers these views, ways that health and well-being might be affected and a course of action. The aim is to find a way to address and allay concerns that people might have, inform communications and consultation elements of the Project, and contribute towards reducing anxiety.

A potential population mental health effect is considered plausible because there is a theoretical source-pathway-receptor relationship:

- Source: public understanding of risks can differ from the actual risks that are derived from scientific studies.
- Pathway: anxiety, stress and a sense of powerlessness can have adverse effects on health and mental well-being while a sense of control is beneficial to health and well-being.
- Receptor: people living and working close to the Project's electrical infrastructure, notably the substation, who may perceive a risk.

Furthermore, the potential mental health effects are probable as no highly unusual conditions are required for the source-pathway-receptor linkage. An effect on the population's physical health associated with the actual exposures or risks is unlikely as mitigation breaks the pathway between sources and receptors.

The population groups relevant to this assessment are:

- The 'site-specific' geographic population of Naas Rural and Carragh:
- The local population of County Kildare.
- The sub-population vulnerable due to:
  - Low-income vulnerability (people with fewer resources may feel less able to adapt to changes that concern them).
  - Poor health vulnerability (people with existing poor mental health may be more sensitive to changes that concern them).
  - Access and geographical vulnerability (people for whom close proximity increases sensitivity).

The scientific literature identifies the following general points relevant to potential effects and health outcomes. The way risks are understood has important influences on health behaviour (Ferrer and Klein, 2015). Awareness of risk can affect mental, physical and emotional wellbeing, and can be worse when it is accompanied by uncertainty (Luria et al., 2009).

The ultimate goal of dialogue between regulators and communities is to produce an informed public (Sinisi, 2004). Trust, credibility, competence, fairness and empathy are of great importance (Sinisi, 2004) and the routine monitoring and clear communication of results can greatly increase trust, empower people and reduce fear (WHO, 2013).

The views that people hold can be associated with low-grade illnesses (e.g., headaches or hypertension) and can be exacerbated when there is uncertainty (Luria et al., 2009).

Sensitivity of receptor

The sensitivity of the general population is **low**. Most people in the study area live, work or travel at a separation distance from the Project's infrastructure and activities, including electrical infrastructure where they would not be concerned about the potential for risks. This group also includes that proportion of the population who are *ambivalent or not concerned* about EMF.

The sensitivity of the vulnerable sub-population is **high**. This reflects that the sub-population includes people who may be *uncertain or concerned* about EMF and this may exacerbate *existing* mental health conditions or be a source of stress and anxiety in itself. This may particularly be the case for people with near views and/or who live in close proximity to the Project's electrical infrastructure. Low incomes or existing deprivation may contribute to a limited sense of control and *reduced capacity* to obtain further information.

Magnitude of Impact

The magnitude of change due to the Project is **low**. The level of actual risk exposure is negligible as stated above, however the scale of change that may contribute to community concern is *medium, continuous* and *long-term*. The severity of the health outcome relates predominantly to a *minor* change in mental health related morbidity for a *very few* people within the population. Such individual level effects are unlikely to have implications for health service capacity. For many people there is likely to be a *rapid* reversal of effects should their concerns be responded to and resolved to their satisfaction.

Significance of effect

The significance of the population health effect is **minor adverse** (not significant). The professional judgment is that there could be a *very limited* adverse change in the health baseline for the surrounding population. This conclusion reflects scientific understanding of the impact of uncertainty or concern about environmental risks on mental health. It also reflects that the actual risks would be *well within* regulatory standards and that most members of the public would expect this to be the case. At most the Project change may have a *marginal* influence on population health inequalities.

15.6 Mitigation, monitoring and residual effects

The following further EIA Human Health mitigation and monitoring measures are proposed. The residual population health effect taking these measures into account is also presented.

15.6.1 Physical Activity

Further mitigation. During the operation and maintenance phase new routes to include access that supports people of all ages, including those with mobility and/or sensory needs. This includes: suitable width and surface to new routes for children's buggies, mobility aids and wheelchairs; appropriate route access points (including to parking); signs in formats that respond to visual impairments; connecting to existing routes and trail networks, including appropriate road crossings. This measure would be secured by a Mobility Management Plan.

Further monitoring. None.

Residual effect. Unchanged.

15.6.2 Transport modes, access and connections

Further mitigation. During construction and decommissioning advertise lane closures in advance so road users are forewarned and can manage commute to work effectively. Ensure that early and ongoing sharing with emergency and healthcare services with regard to any temporary road closures, diversions or lane closures. This measure would be secured by a Construction Travel Management Plan.

Ensure suitable pedestrian access is maintained for diversions of any temporary route closures and provide appropriate wayfinding information for temporary diversions during construction and decommissioning, such as being advertised online and signposting, including approximate journey times on the routes. Wayfinding for circular walks or to destinations should be clearly signposted. This measure would be included in the CTMP.

Further monitoring. None.

Residual effect. Unchanged.

15.6.3 Community identity, culture, resilience and influence

Further mitigation. None.

Further monitoring. None.

Residual effect. Unchanged.

15.6.4 Education and training

Further mitigation. As far as reasonably practicable (e.g. subject to standards and security checks) provide a targeted scheme of access to operation and maintenance training schemes and apprenticeships for young people in the local and regional area for people who are Not in Education, Employment, or Training (NEET). This would be secured through a workforce management plan.

Further monitoring. Monitoring of the proportion of NEETs taking up, and completing, training opportunities with the Project in order to confirm the expected benefit and further tailor the targeting of local vulnerable groups.

Residual effect. Based on the efficacy of such strategies there is the potential for a **moderate beneficial** (significant) population health residual effect for education and training. This reflects the potential to achieve long-term benefits from a targeted training intervention at a critical stage in the life course of this group.

15.6.5 Employment and income

Further mitigation. As far as reasonably practicable (e.g. subject to standards and security checks) provide a targeted scheme of access to operation and maintenance employment opportunities in the local and regional area for people who are Not in Education, Employment, or Training (NEET). This would be secured through a workforce management plan.

Further monitoring. Monitoring of the proportion of local people with long-term unemployment, high job instability or low income who enter good quality stable employment with the Project in order to confirm the expected benefit and further tailor the targeting of local vulnerable groups. This would be secured through a workforce management plan.

Residual effect. If a high proportion of good quality operation and maintenance employment opportunities were targeted to vulnerable groups, notably people who are unemployed, on low incomes, or who have high job instability, including young adults early in their careers, then there is the potential locally for a **moderate beneficial** (significant) population health residual effect. This reflects the potential to achieve long-term benefits though avoiding adverse physical and mental health effects (including to dependants) associated with long-term unemployment, high job instability or low income.

15.6.6 Climate change and adaptation

Further mitigation. None.

Further monitoring. None.

Residual effect. Unchanged.

15.6.7 Air quality

Further mitigation. None.

Further monitoring. None.

Residual effect. Unchanged.

15.6.8 Water quality or availability

Further mitigation. None.

Further monitoring. None.

Residual effect. Unchanged.

15.6.9 Noise and vibration

Further mitigation. None.

Further monitoring. None.

Residual effect. Unchanged.

15.6.10 Public understanding of electro-magnetic field risk

Further mitigation. Continued community consultation and sharing of non-technical information relating to the project (e.g. explaining compliance with public exposure guidelines, actual risks associated with the project), to allow people to express concerns and gain awareness of actual health effects. This will partially be met through the application process, including the EIAR NTS. Non-technical information and a point of contact for community liaison to be provided on the project website.

Further monitoring. None.

Residual effect. Based on the efficacy of such strategies there is the potential for a **negligible** (not significant) population health residual effect associated with public understanding of electro-magnetic field risk.

15.7 Cumulative effects and interactions

15.7.1 Cumulative effects

Cumulative health assessment extends the analysis of potential population health effects. This means a professional judgement is made as to the combined level of effect with other relevant projects and its implications for public health. Following IEMA 2022 guidance for human health, sensitivity of the relevant populations is unchanged from the main assessment in section 15.5. Magnitude is however appraised in light of the combined effect of multiple projects.

As set out in IEMA 2022 guidance, a combined public health effect is most likely where a population is affected by multiple determinants of health and a large proportion of the same individuals within that population experience the combination of effects.

A high degree of spatial proximity is required for there to be the potential for cumulative effects for localised changes in determinants of health, e.g., dust from a construction site. In contrast, where there are more far-reaching effects in a determinant of health, e.g., job creation or noise along shared transport corridors, there is greater opportunity for cumulative interactions between projects.

The assessment is qualitative, following the approach set out in section 15.5, and considers the potential for combined magnitudes of effect to the same populations.

This chapter is informed by cumulative assessment conclusions set out in other chapters. The health assessment does not duplicate detail set out in those chapters. Of the chapters listed in section 15.1 and which inform the human health assessment, Chapter 7: Water and Hydrology; Chapter 12: Traffic and Transportation, Chapter 14: Population and Chapter 16: Climate Change provide an assessment of cumulative effects.

The conclusions from listed chapters on cumulative effects relevant to the health assessment are summarised in the section below.

15.7.1.1 Transport Modes, access and connections

This section has been informed by Chapter 12: Traffic and Transportation which sets out relevant cumulative assessment findings and mitigation measures that have been taken into account. Chapter 12 assesses the cumulative impact of the Gas Networks Ireland (GNI) gas connection to the project. Regard has been given to this for the health assessment.

As stated in Chapter 12: Traffic and Transportation, a considerable portion of the construction period will be working within existing agricultural lands, which will not result in any significant impact upon existing traffic progression.

It is noted that the combined effect is driven by the cumulative effect on transport modes, access and connections. The collective effect is not considered to change the minor adverse effect on population health of the Project in isolation.

The population groups, sensitivity, magnitude and significance conclusions relevant to the cumulative health assessment are therefore not new or materially different to those listed for the project assessment in section 15.5.2. This conclusion applies to all project phases.

15.7.1.2 Education and training

This section has been informed by Chapter 14: Population which sets out relevant cumulative assessment findings and mitigation measures that have been taken into account. Chapter 14 assesses the cumulative impact of the Project gas connection to GNI. Regard has been given to this for the health assessment.

As stated in Chapter 14: Population, it is not anticipated that there will be any impacts on the social or demographic characteristics of the Population.

The population groups, sensitivity, magnitude and significance conclusions relevant to the cumulative health assessment are not new or materially different to those listed for the project assessment in section 15.5.4. This conclusion applies to all project phases.

15.7.1.3 Employment and income

This section has been informed by Chapter 14: Population which sets out relevant cumulative assessment findings and mitigation measures that have been taken into account. Chapter 14 assesses the cumulative impact of the Project gas connection to GNI. Regard has been given to this for the health assessment.

As stated in Chapter 14: Population, it is not anticipated that there will be any impacts on the social or demographic characteristics of the Population.

The population groups, sensitivity, magnitude and significance conclusions relevant to the cumulative health assessment are not new or materially different to those listed for the project assessment in section 15.5.5. This conclusion applies to all project phases.

15.7.1.4 Climate change and adaptation

This section has been informed by Chapter 16 – Climate Change which sets out relevant cumulative assessment findings and mitigation measures that have been taken into account. Section 16.8 within Chapter 16: Climate Change assesses the cumulative impacts of the Project together with the ancillary infrastructure connected with the Project, namely a substation to transfer excess electricity from the Project to the grid, and provision of infrastructure to ensure readiness for connection to a district heat network (should this be proposed in the future). Regard has been given to these for the health assessment.

Chapter 16 – Climate Change concludes that although a quantitative assessment was not possible, the ability of the Project to export to the national grid would likely entail a beneficial effect in that the provision of low / zero carbon heating (from waste heat produced by the Project) to residential or other buildings would reduce the need for fossil fuel-generated heating.

During operation, the Project together with the abovementioned ancillary / export infrastructure may help contribute to national energy security and, through the provision of low/zero carbon heating, contribute to reducing the Project's impacts on global climate change. However, the collective effect is not considered to change the minor adverse effect on population health of the Project in isolation. This reflects that the relative

scale within the context of global climate altering emissions is of a similar order of magnitude whether the projects are considered in isolation or combined.

The cumulative magnitude is therefore predicted to be similar to the individual level magnitude described in section 15.5.6. The magnitude of impact is considered to be low. Sensitivity of the general and vulnerable population groups is unchanged in the cumulative assessment. As described in section 15.5.6, the sensitivity is low for the general population, and high for the vulnerable group population.

The overall cumulative significance of effect remains unchanged at **minor adverse**, which is not significant in EIA terms.

15.7.1.5 Water quality or availability

This section has been informed by Chapter 7: Water and Hydrology which sets out relevant cumulative assessment findings and mitigation measures that have been taken into account. Chapter 7 assesses the cumulative impact of the GNI connection to the project.

As stated in Chapter 7, on the basis of the likely route of the pipeline and the minor nature of the water courses traversed, including the selection of the most appropriate crossing technique in consultation with the relevant statutory authorities and the application on best practice, the cumulative effects of the main Project with the GNI gas transmission line connection will not be significant and will not compromise the environmental objectives of the water bodies affected.

The population groups, sensitivity, magnitude and significance conclusions relevant to the cumulative health assessment are not new or materially different to those listed for the project assessment in section 15.5.8. This conclusion applies to all project phases.

15.8 Interactions

Table 15.8: Interactions by geographic population

Determinant of health	Site-specific	Local	Regional	National	International
Physical Activity	✓ Minor (O)				
Transport modes, access and connections	✓ Minor (COD)	✓ Minor (COD)			
Community identity, culture, resilience and influence	✓ Minor (O)				
Education and training		✓ Moderate (O)	✓ Moderate (O)		
Employment and income		✓ Moderate (O)	✓ Moderate (O)		
Climate change and adaptation				✓ Minor (O)	✓ Minor (O)
Air quality	✓ Minor (COD)				
Water quality or availability	✓ Minor (O)				
Noise and Vibration	✓ Minor (COD)				
Public understanding of electro-magnetic field risk	✓ Negligible (O)	✓ Negligible (O)			

Notes: Ticks indicate effects. Green shading indicates positive effects and orange shading indicates negative effects. C = construction, O = operation and maintenance, D = decommissioning.

The geographic population of the site-specific study area of Naas Rural and Carragh Electoral Divisions would experience effects during construction from changes to: transport modes, access and connections; air quality; and noise. During operation the same population would experience effects from changes to: physical activity; transport modes, access and connections; community identity, culture, resilience and influence; air quality; water quality or availability; and public understanding of electro-magnetic field risk.

The population would include a range of vulnerable sub-populations, including related to age, income, health status, social disadvantage and proximity. The extent to which the various health effects would affect the same individuals within the population would vary. However, there is anticipated to be some overlap, as well as common health outcomes affected, e.g. cardiovascular and mental wellbeing outcomes influenced by different pathways.

Whilst there is some increased adverse influence on health outcomes, the degree of increase is not considered to constitute a significant population health effect. The effect therefore remains minor adverse. The beneficial effect relating to physical activity for the site-specific population is also noted. However, as beneficial and adverse effects do not necessarily cancel out, this effect does not change the cumulative effect conclusion. Similarly, beneficial effects from the training and employment opportunities at the local level of County Kildare may also benefit some people in the site-specific population, but this is not expected to cumulative be a significant population health effect.

Vulnerable groups potentially experiencing combined effects of the Project include children and young people, particularly those from low-income households or who experience social disadvantage. This group may, as dependants, benefit from the Project's contribution to local employment and training/education opportunities. This group may also experience some of the temporary disruptions during construction. Many of the adverse effects are temporary and those that are more long-term are not considered to cumulatively interact to have a significant effect on population health.

The overall position is that the site-specific geographic population of Naas Rural and Carragh Electoral Divisions is expected to experience minor beneficial (not significant) and minor adverse (not significant) population health effects.

At the local level of County Kildare and regional province of Leinster, training and employment benefits may interact, e.g. moving from a training opportunity to a job opportunity. However, the combined residual effect is not considered greater and remains as moderate beneficial (significant).

Overall, no new significant population health effects are expected due to the interaction of individual effects in any study area.

15.9 References

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