

## 5.0 POPULATION & HUMAN HEALTH

### 5.1 INTRODUCTION

This chapter assesses the existing environment in addition to the potential effects on population and human health arising from the proposed development. Reasonable alternative options are considered in Chapter 3 of the EIAR (Reasonable Alternatives).

Section 5.2 of this chapter will focus on Population including population, employment, tourism and amenities, infrastructure, community gain and health and safety. Land use is addressed in Chapter 9 (Material Assets). The second part of this chapter (Section 5.3) will specifically deal with the effects on human health associated with the proposed development. Mitigation measures will be proposed for the proposed development where appropriate.

#### *5.1.1 Proposed Development*

The proposed development is described in full in Chapter 2 of this EIAR (Description of the Proposed Development).

#### *5.1.2 Statement of Authority*

This Population assessment has been carried out by Dr John Staunton, Senior Project Manager and Environmental Scientist in TOBIN. John has more than 14 years' postgraduate experience in both research and environmental consultancy. John holds a BSc and PhD in Environmental Science and has considerable experience in project managing large scale developments and carrying out associated impact assessments including in preparing assessments in relation to Population and Human Health (Human Beings).

The Human Health aspect of this chapter was written by Dr. Martin Hogan FRCPI FFOM, Consultant Occupational and Environmental Physician. He holds his primary degree from University College Cork. He initially trained in general practice and holds a MRC GP and MICGP qualification. He subsequently trained in occupational medicine in the UK and has been in practice in Ireland since 1993. He is a registered specialist in occupational medicine. He is a past Dean of the Faculty of Occupational Medicine of the Royal College of Physicians of Ireland. He has over 20 years of experience in assessing human health impacts of projects and has given evidence to oral hearings on many occasions.

## 5.2 POPULATION, SOCIO-ECONOMICS & TOURISM

### *5.2.1 Methodology*

A desktop study and site visit were carried out in order to examine relevant information pertaining to this population impact assessment. The site visit was used to verify descriptions and information of the local area, and thus inform the impact assessment. Maps from Ordnance Survey Ireland (OSI) were used to identify relevant amenity facilities surrounding the proposed development site and within the main settlement areas around the proposed project.

Information on population statistics, employment and social data for the areas surrounding the proposed project have been obtained from the Central Statistics Office (CSO) and predominantly from the 2016 and 2011 Census records; full 2022 census data was not available at the time of writing this report. The first official 2022 Census summary report is expected to be published by the CSO in April 2023; where relevant preliminary 2022 census data is available

at the time of writing, this has been reviewed. Data has been captured on an ED basis as this is the most appropriate scale for collated census data and is commonly used for defining the existing population profile. The ED's within which the proposed project is located comprise the study area for this assessment.

As part of the EIAR scoping process, a consultation letter on the proposed development project was sent to a number of consultees as described in Chapter 1 (Introduction) including Fáilte Ireland who sent on their EIAR guidelines which should be consulted. The Department of Tourism Culture Arts Gaeltacht, Sports and Media were also consulted, but they did not provide any significant feedback (they provided contact details for other departments which they said might be more appropriate). Waterways Ireland responded to say they have no issues with the proposed development. Other relevant bodies scoped (with no response) were Irish Trails/Sport Ireland, the Health Service Executive and The Arts Council.

The Community Benefit Proposal is set out in Chapter 1 of this EIAR. The provisions of the Community Benefit Proposal which will have an effect on the local population are discussed in Section 5.2.3.

The following guidance documents were used:

- EPA Guidelines – 'Information to be contained in Environmental Impact Statements', 2002;
- Advice Notes on Current Practice in the Preparation of Environmental Impact Statements (September 2003);
- EPA Guidelines on the information to be contained in Environmental Impact Assessment Reports (May 2022)

In addition to this, other information sources and references were used, including:

- Fáilte Ireland Information in relation to tourism amenity in conjunction with websites of relevant tourism sites and amenities for the area;
- Central Statistics Office (CSO) information;
- Kildare County Development Plan 2023-2029;
- Guidelines on the treatment of tourism in an EIS, provided by Fáilte Ireland as part of their submission to the Scoping request issued to them;
- OSI mapping, online interactive maps and Aerial Photography (Google and Bing) to identify land use and possible amenity sites; and
- Environmental Impact Statements for previous developments pertaining to the Drehid WMF facility (within the Bord na Móna landholding) (2004, 2008, 2012 and 2017);

### ***5.2.2 Receiving Environment/Baseline Description***

The extent of the Bord na Móna landholding, which comprises 2,544 hectares (ha), is outlined in blue in Chapter 1, on EIAR Figure 1.1. The Bord na Móna landholding, outlined in blue on EIAR Figure 1.1, is located within the County Kildare townlands of Drehid, Ballynamullagh, Kilmurry, Mulgeeth, Mucklon, Timahoe East, Timahoe West, Coolcarrigan, Corduff, Coolearagh West, Allenwood North, Killinagh Upper, Killinagh Lower, Ballynakill Upper, Ballynakill Lower, Drummond, Kilkeaskin, Loughnacush, and Parsonstown.

As described in Chapter 1 of the EIAR, the application area is outlined in red as shown on the planning drawings. The proposed development will occur within this boundary, within an area of 262 ha. The proposed development is confined to the townlands of Timahoe West, Coolcarrigan, Killinagh Upper, Killinagh Lower, Drummond, Kilkeaskin, Loughnacush, and Parsonstown.

The village of Derrinturn is located approximately 2.6 km to the west of the proposed application boundary and Timahoe crossroads is located approximately 1.7 km to the east of the closest edge of the site activity boundary. Carbury is located approximately 6 km to the north-west of the proposed development and Prosperous is approximately 8.3 km to the south-east.

The land within the proposed development consists of the flat lying and gently undulating topography typical of cutover and cutaway peatland.

Figure 1.1 of this EIAR (Chapter 1) shows the site location relative to a number of adjacent villages including Derrinturn, Timahoe, Coill Dubh and Allenwood. The location of the site relative to the regional roads R402 and R403 is also shown on the drawing.

### **5.2.2.1 Population**

This section provides an overview of the population change over the period 2006-2016 (2016 census is the most recent for which localised data is available. In order to gain an understanding of the socioeconomic activity in the area. The Bord na Móna landholding is located in the Electoral Divisions (EDs) of Timahoe North, Timahoe South, Drehid, Dunfierth, Kilpatrick, Windmill Cross and Kilmeague North. The proposed development is located within the ED of Timahoe South. According to S.I. No. 620/2018 - County of Kildare Local Electoral Areas and Municipal Districts Order 2018, these EDs are located within the Maynooth Municipal District and Clane Local Electoral Area.

The objectives for settlement strategy in County Kildare are outlined in Chapter 2 of the Kildare County Development Plan 2023-2029. Table 2.8 of the plan lists Allenwood and Coill Dubh/Coolearagh are described as Villages, Prosperous and Derrinturn as Towns, while Carbury and Timahoe are categorised as Rural Nodes (in Table 2.6 of the plan), and provides information on the settlement strategies for each.

As the proposed development remains outside the development boundary of Derrinturn and Allenwood, specific planning objectives relating to these settlements do not apply to the proposed development.

Housing in the immediate area of the proposed site comprises predominantly single dwellings with adjacent farmyards and new bungalows. A ground truthing of buildings and planning applications within a buffer of 1 km proximity to the planning application boundary was undertaken. Figure 5.1 shows the outline of the proposed development footprint, and a 500 m and a 1,000 m buffer from the planning application boundary. The largest concentration of houses close to the proposed facility is to the north west of the site in the village of Derrinturn.

As noted in Chapter 1, the nearest sensitive receptor (house) will be a distance of approximately 1 km to the northeast of the proposed non-hazardous Landfill footprint, while the nearest property to the proposed development site boundary is approximately 170 m to the west, although no works are proposed in that part of the site. There are also sensitive receptors along the R403 near the Drehid WMF site entrance.

All of the existing settlements in the vicinity are at a considerable distance (i.e. unlikely to be significantly affected by noise, dust, or visual impact by the proposed development as discussed throughout the EIAR) from the subject site, the nearest being Timahoe, at approximately 1.7 km from the proposed development. Derrinturn is approximately 2.6 km from the proposed development, while both Allenwood and Coill Dubh are 4.9 km and 5.2 km, respectively.

Table 5-1 illustrates the population change between 2006-2016 (the latest census data which is available) in the State, Leinster, County Kildare, and the ED of Timahoe South.

*Table 5-1: Population Change 2006-2016*

| Location       | 2006      | 2011      | 2016      | % Change 2006-2016 |
|----------------|-----------|-----------|-----------|--------------------|
| State          | 4,239,848 | 4,588,252 | 4,757,976 | 12.2%              |
| Leinster       | 2,295,123 | 2,504,814 | 2,634,403 | 13.8%              |
| County Kildare | 186,335   | 210,312   | 222,504   | 17.7%              |
| Timahoe South  | 772       | 772       | 845       | 9.5%               |

Source: Central Statistics Office (CSO)

Table 5-1 above shows that the population has increased in the state as a whole and in Leinster over the period 2006-2016 by 12.2% and 13.8% respectively. Population during this period has increased significantly in County Kildare, by 17.7%. Population also increased within the ED of Timahoe South (9.5%). Preliminary data for the 2022 census<sup>1</sup> shows that the population of Kildare increased by 11% (the joint third highest county growth) while nationally the population increased by 8%.

The national rate of unemployment for Ireland (i.e. those listed as “Looking for their first regular job” or “Unemployed having lost or given up previous job” in the census) was 14.8% in 2016. For County Kildare, that rate was 12.8%, while in Timahoe South ED, it was 13.0%. According to the Central Statistics Office<sup>2</sup>, the latest unemployment data for January 2023 at a national level has reduced to 4.4%, although there are no similar recent county or local scale data available.

The Kildare County Development Plan 2023-2029 (Chapter 3) notes that:

*“Census 2016 recorded an average household size of 3.0 persons for County Kildare, up from 2.94 in 2011, but down from 3.19 in 2002 and 3.01 in 2006. Notwithstanding the modest increase in household size between 2011 and 2016, it is likely that household size will start to fall again. The National Planning Framework indicates that the average household size is expected to decline nationally to 2.5 persons by 2040. By the end of the HNDA period, 2031, it is forecast that the average household size for County Kildare will fall to 2.77.”*

It also notes:

*“Kildare has a rapidly increasing ‘65 and over’ age cohort. According to Census 2016, there were 22,104 people over 65 living in Kildare in 2016, representing 10% of the county’s population, a figure which represents a 32.2% increase in that cohort of the*

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[https://www.cso.ie/en/media/csoie/newsevents/presentations/2022/Census\\_Preliminary\\_Results\\_2022\\_-\\_23\\_June\\_2022\\_-\\_PDF.pdf](https://www.cso.ie/en/media/csoie/newsevents/presentations/2022/Census_Preliminary_Results_2022_-_23_June_2022_-_PDF.pdf)

<sup>2</sup> [Monthly Unemployment - CSO - Central Statistics Office](#)

*population from the 2011 census. The Kildare Age Friendly Strategy 2019-2021, reports that the ageing of the population from this point onwards will represent one of the most significant demographic and societal developments and challenges that Ireland has encountered. It is projected that by 2031, 16% of the population of County Kildare will be over the age of 65 years, with this rate increasing to 21% by 2040.”*

### 5.2.2.2 Socioeconomic Profile

Statistics in relation to the occupational group are provided in the 2016 Census for the ED of Timahoe South in which the proposed development is located. These occupational groups are outlined in Table 5-2 below.

*Table 5-2: Occupational Groups in Timahoe South ED*

| Occupational Group                | No. Males  | No. Females |
|-----------------------------------|------------|-------------|
| Agriculture, forestry and fishing | 7          | 0           |
| Building and construction workers | 30         | 4           |
| Manufacturing industries          | 25         | 15          |
| Commerce and trade                | 56         | 49          |
| Transport and communication       | 30         | 9           |
| Public administration             | 8          | 5           |
| Professional services             | 18         | 42          |
| Other                             | 21         | 19          |
| <b>Total</b>                      | <b>195</b> | <b>143</b>  |

Source: CSO, 2016.

Commerce and trade workers are the largest occupational group for males in Timahoe South ED (56), commerce and trade is also the largest occupational group for females (49).

The aim of economic development as set out in the Kildare County Development Plan 2023-2029 is to ‘*provide for the future well-being of the residents of the county by creating a strong and resilient economic base, providing expanded opportunities for employment and facilitating a good quality of life within vibrant and attractive places to live, work, visit and invest.*’

### 5.2.2.3 Community Gain

The proposed development has been designed and will be constructed and operated to Best Available Techniques (BAT) as described in Chapter 2 of this EIAR (Description of the Proposed Development). All information will be available to interested parties and a complaints register will be maintained at the facility. The EPA will also undertake regular environmental audits, which will record licence compliance.

#### **Community Liaison Committee**

Consistent with previous proposals and permissions, a community liaison committee has previously been established under the auspices of Kildare County Council in respect of the existing Drehid Waste Management Facility.

The already established committee comprises eight members, as follows:

- two local community representatives;
- two local area elected representatives; Maynooth Municipal District / Clane Electoral Area;
- two personnel from Bord na Móna; and
- two personnel from the Planning Authority (Kildare County Council).

With regard to the proposed development, it is proposed that the same or a similar committee (for agreement with Kildare County Council) will identify environmental works and community facilities to be funded by the Drehid Waste Management Facility (WMF) Community Development Fund, outlined below.

### **Drehid Waste Management Facility Community Development Fund**

Consistent with previous proposals and permissions, Bord na Móna will agree the establishment of a community development fund with Kildare County Council in respect of the proposed development. This fund will contribute to the provision of environmental improvement and recreational or community amenities in the locality. The identification of such projects will be decided by the planning authority in consultation with the Community Liaison Committee. This type of community fund has previously been established for the existing Drehid Waste Management Facility.

### **Public Education**

The educational room in the Administration Building will be used for the provision of a public education area for environmental education needs. Poster presentations and literature on waste management and on the workings of the proposed facility will be available in this meeting room. Provision will also be made for the inspection of the EPA waste licence and Annual Environmental Reports (AERs) in this room.

#### ***5.2.2.4 Tourism and Amenities***

The Kildare County Development Plan 2023-2029 states that tourism

*“...prior to Covid 19 had grown substantially over the previous number of years. Because of its proximity to the Dublin tourism hub, the tourism sector requires a particular strategic approach for success. This includes an emphasis on boutique and special character hotels offering an ‘accommodation plus’ product (e.g. leisure, recreation, outdoor pursuits, heritage and selected sports).”*

County Kildare is located in the East and Midlands tourist region. Statistics from Fáilte Ireland<sup>3</sup> for the year ending December 2019 (the latest report available at the time of writing this document) indicate that approximately 9.7 million overseas visitors arrived in Ireland in 2019. These (along with tourists from Northern Ireland) generated total revenue of €5.6 billion. Domestic tourism expenditure amounted to €2.1 billion making tourism in total a €9.5 billion industry in 2019.

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<sup>3</sup> <https://www.failteireland.ie/Research-Insights/Current-Tourism-Performance.aspx>



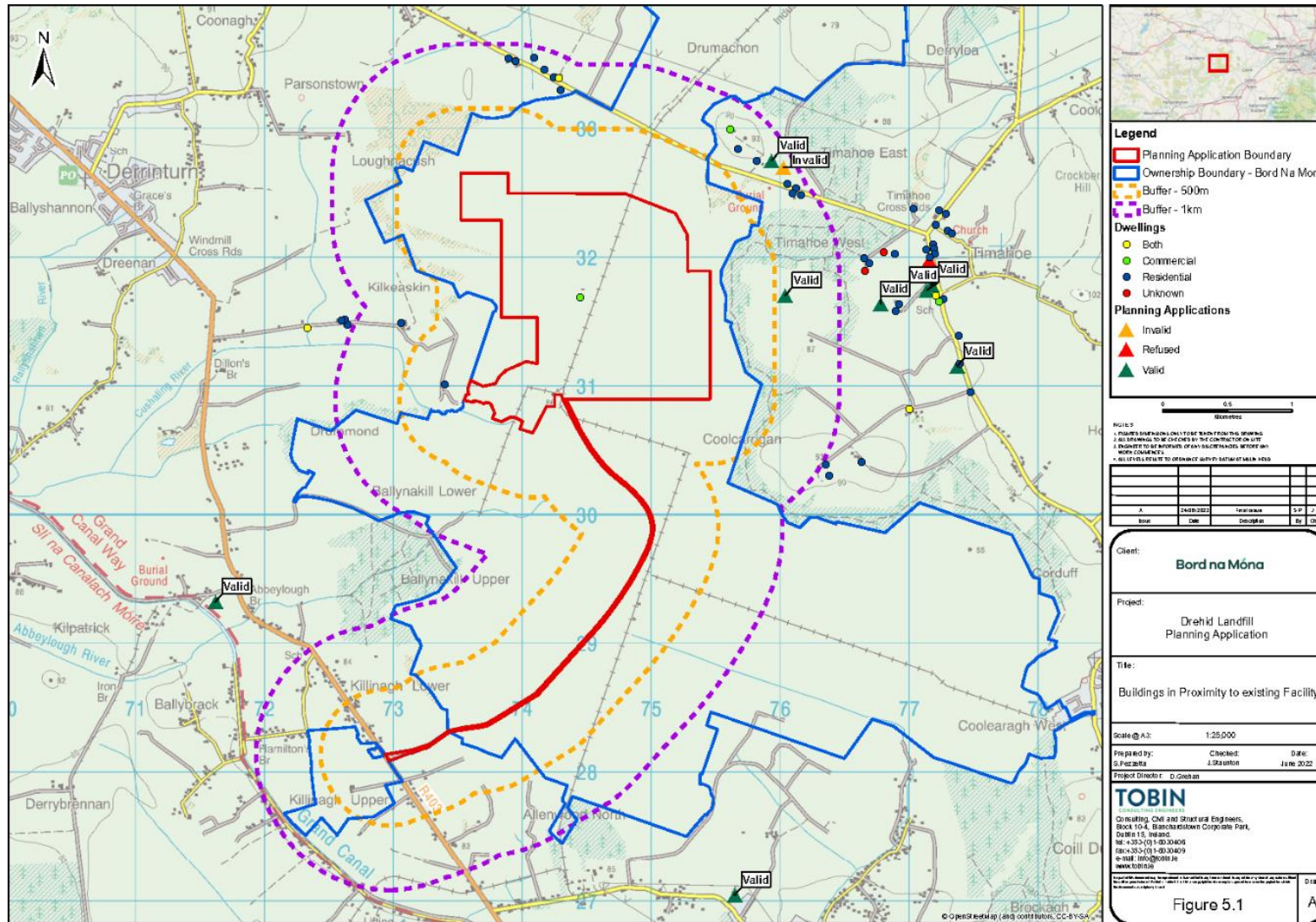


Figure 5.1: Sensitive Receptors in Proximity to Drehid Waste Management Facility

Table 5-3 illustrates that there were approximately 954,000 overseas visitors to the East and Midlands region in 2019 and this generated revenue of €348 million.

*Table 5-3: 2019 Numbers of Overseas Visitors (thousands of visitors)*

|                     | Britain<br>(000s) | Mainland<br>Europe<br>(000s) | N. America<br>(000s) | Other<br>(000s) | Total<br>(000s) | Revenue<br>(€million) |
|---------------------|-------------------|------------------------------|----------------------|-----------------|-----------------|-----------------------|
| Visitors to Ireland | 3,487             | 3,609                        | 1,902                | 676             | 9,674           | 5,174 m               |
| East & Midlands     | 117               | 136                          | 153                  | 55              | 954             | 348 m                 |

Source: Fáilte Ireland, 2022

The top visitor attractions identified by Fáilte Ireland for County Kildare for 2019 are listed below, with associated visitor numbers:

- Castletown House & Parklands (965,632);
- Irish National Stud & Japanese Gardens (138,310);
- Lullymore Heritage and Discovery Park (55,000);
- Castletown House (26,204);
- Maynooth Castle (21,937);
- Burtown House (20,000);
- Athy Heritage Centre (14,000);
- Kildare Town Heritage Centre (12,400);
- Larchill Arcadian Gardens (3,500).

In addition to top visitor attractions identified above, additional visitor attractions were identified as part of the Tourism assessment and these include:

- Newbridge Silverware Museum of Style Icons;
- The Steam Museum, Straffan;
- Coolcarrigan House and Gardens;
- The Irish Pewtermill & Moone High Cross Centre;
- Ballitore Library & Quaker Museum;
- Leixlip Castle;
- Harristown House; and
- A number of golf courses in the wider vicinity.

There are very few accommodation providers in proximity to the site, with one B&B located not far from the site entrance.

The Kildare County Development Plan 2023-2029 aims to ‘*protect, conserve and sensitively manage the built and cultural heritage of County Kildare and to encourage sensitive sustainable development so as to ensure its survival and maintenance for future generations*’ (Chapter 11 of CDP). This includes Carbury Castle, Newbury Hall and Demense that has Trinity Well located therein, and Ardkill House. Coolcarrigan House, which is also listed, has extensive gardens and a 19th century Hiberno-Romanesque church that is also formally preserved, both of which are open to visitors. The garden of the dwelling (Coolcarrigan House) is located approximately 1.3 km from the nearest element of the proposed development and is visually screened from the proposed development by an extensive coniferous forestry plantation to the west of the house. In addition, traffic generated by the proposed development will enter the Bord na Móna landholding directly from the R403 by way of the existing entrance and will therefore not adversely impact on visitors travelling to Coolcarrigan House.



## Walking and Cycling Routes

The Kildare County Development Plan 2023-2029 states the following in relation to walking routes:

*“The long-distance Royal Canal Greenway has been recently completed. This trail begins in Maynooth and ends in County Longford and goes through Kilcock. The development of the Grand Canal Towpath to the Greenway standard<sup>4</sup> is ongoing, with sections of the Grand Canal at various stages of development. Once completed the Grand Canal Greenway will start in County Dublin and end in County Offaly, traversing County Kildare and the towns and villages of Ardclough, Sallins, Robertstown and Allenwood.” (Ref Section 13.6.4 of the plan)*

Sections of the Grand Canal Way and the Barrow Way pedestrian walks coincide adjacent to the 19th Lock to the southeast of Allenwood, though both are approximately >5 kilometres from the proposed development.

There is also a walk at Donadea Demense, which has a lake that is home to a variety of wildfowl which is located approximately >8 kilometres from the proposed development.

The Kildare County Development Plan 2023-2029 also states in relation to walking and cycle trails:

*“Kildare has a wealth of trails; along the Royal Canal (as part of the Dublin to Galway Greenway), Heritage Trails (Arthur’s Way), Slí na Sláinte routes and Historic Walking trails, all of which need to be supported and enhanced around a coherent active tourism strategy.”*

## Forest Parks/Woodlands & Boglands

The Kildare County Development Plan 2023-2029 states the following in relation to Forest Parks/Woodlands & Boglands:

*“Approximately 9,200 ha of land in Kildare is under forest cover. Forests and woodlands provide benefits over and above the revenue yielded from timber and other woodbased products. These include recreational and tourism amenities for local communities... County Kildare is favoured with extensive peatlands which are no longer used for peat extraction. These peatlands provide an opportunity for nature-based solutions on a grand scale to our twin crises of biodiversity loss and climate change mitigation. Peatlands, including restored peatlands and recently rewilded peatlands can be enjoyed as a special new amenity of unique and enduring value for the local people and economy.” (Ref Section 13.6.2).*

The Bog of Allen Nature Centre (Lullymore) is located southwest of Allenwood. This centre focuses on Irish Peatland Heritage and all aspects of its history, folklore, nature & wildlife.

Ardkill Bog/Ardkill Farm offers visitors a chance to see a raised bog in a controlled setting. These are located approximately 7 km and 5.5 km respectively from the site of the proposed development.

In terms of statutory protection, Carbury and Hodgestown Bogs are designated Natural Heritage Areas (NHAs) and are located approximately 6 km to the northwest and 4 km to the east of the proposed development site respectively. Ballynafagh Lake and Bog are designated

Special Areas of Conservation (SACs) and cited as proposed NHAs. These are located approximately 5.8 km and 6.4 km to the southeast of the proposed development. The Long Derries, Edenderry is also an SAC and proposed NHA site and is over 7.2 km to the west.

### **Other Activities**

Allenwood Celtic AFC's football pitch is located to the south of the existing entrance on the R403 at Killinagh Upper. A wide belt of mixed deciduous and evergreen trees and shrubs has been planted by the developer along the entire boundary of the Bord na Móna landholding with the grounds of Allenwood Celtic AFC in the interest of visual amenity.

Within the general area of the proposed development site, there is a golf course at Ballygibbon East and Kilshawanny Lower (near Carbury) approximately 10 km west of the site.

Coarse fishing can be undertaken at both Ballynafagh Lake, near Prosperous (5.8 km to the east of the proposed development) and the Grand Canal.

### ***5.2.3 Potential Effects***

As the construction phase, operational phase and decommissioning phase of the proposed project will be so heavily intertwined due to the phasing of the proposed landfill, the impact assessment for these will not be separated out. Any effects in relation to Noise and Vibration (Chapter 10), Air Quality & Climate (Chapter 12), Water (Chapter 8), Material Assets including land use (Chapter 9), Traffic and Transportation (Chapter 14) and Landscape and Visual (Chapter 11) are dealt with in those relevant chapters of this EIAR.

#### ***5.2.3.1 Do-Nothing Effects***

In the Do-Nothing Scenario, the existing operational Drehid WMF activities will continue until the existing landfill is full and the site has been closed. Outside of this, within the footprint of the proposed non-hazardous landfill, the existing lands will remain as peatlands with scrub encroachment, with little or no changes in the baseline at the site. Activities associated with the operation of the existing Drehid WMF will continue with the movement of vehicles and personnel associated with same. Existing effects associated with noise, dust, odour and roads will continue while the site remains operational.

The opportunities for local employment and additional economical spend from the proposed development will not be realised.

In the Do-Nothing Scenario, there will be no emissions generated from construction works and no potential for effects associated with the waste infrastructure or activities at this site.

The benefits to the national waste infrastructure associated with the creation of additional non-hazardous landfill capacity and waste processing facilities from the proposed development will be lost and alternative candidate sites will need to be identified, to ensure the required future capacity for Ireland is met within the state.

#### ***5.2.3.2 Population***

The proposed development is unlikely to have any significant negative effects on the local or broader population numbers. There is likely to be a slight positive effect on the local population as some of those employed at the proposed development may move into or continue to reside in the locality. This would have a long-term slight positive impact on the local population.

### ***5.2.3.3 Residential Amenity***

The development site is located within a large Bord na Móna landholding and is not in close proximity to dwellings as mentioned above. The proposed development will utilise existing internal road infrastructure and public road entrance. Any vehicles that are associated with the proposed development that are queueing for the weighbridge will do so on the internal site roads approximately 1 km from the nearest house, and there will be no requirement to carry out any works at the site entrance, so effects on the local population in that regard will be avoided. There will be no significant change to the existing traffic movements associated with the existing Drehid WMF, and there will therefore be no significant effect on the social travel patterns of those residing adjacent to the development site. Traffic is discussed in detail in Chapter 14 (Traffic and Transportation) of the EIAR.

Air emissions (dust and odour) from the proposed development will not cause a nuisance at sensitive receptors; refer to Chapter 12 (Air Quality & Climate) of the EIAR. The proposed increased composting capacity will ensure that waste is adequately treated prior to being deposited in landfill, reducing any odour emissions. There will be an appropriately designed larger odour abatement system installed in the new composting and MSW processing facility.

Based on the above, the proposed development is anticipated to have a slight long term negative effect on residential amenity (including roads, noise, dust and odour).

### ***5.2.3.4 Employment***

The proposed development has the potential to retain and create several new jobs in the area with the resultant off-shoot benefits. During construction, it is envisaged that the proposed development will employ up to an additional 20 construction staff in addition to approximately 5 people currently employed in continual construction / landfill capping works at the site for the existing MSW landfill and ancillary development (based on experience of Bord na Móna). Phased construction of the proposed development is expected to extend over a 25 year period, with up to 30 construction staff employed at the Bord na Móna Drehid site during peak construction (based on Bord na Móna experience), between the construction works for the proposed landfill, buildings and associated infrastructure.

When operational, it is envisaged that the proposed development will provide full time employment for approximately 8 additional people (based on Bord na Móna experience). This will include administrative (1) / weighbridge operator (1), maintenance staff (1), drivers (2) and general operatives (3).

Overall, there will be a long term, slight positive impact on employment in the area as a result of the proposed development during construction and operational phase.

### ***5.2.3.5 Tourism and Amenities***

There are no tourism attractions or amenity sites within the site of the proposed development.

The large majority of the tourist attractions described in Section 5.2.2.4 are located a significant distance from the proposed facility and will therefore not be impacted by the proposed development. Traffic generated by the proposed development will enter the Bord na Móna landholding directly from the R403 by way of the existing entrance and will therefore not adversely impact on visitors travelling to Coolcarrigan House. It will also be visually screened from the proposed development by mature forestry. Other tourism attractions/businesses that are located in close proximity to the proposed development site (such as B&Bs), will be at a

significant distance (over 1 km) from the proposed landfill and processing facilities so no significant effects are anticipated.

There will be no visual effect on any of the surrounding attractions or facilities of tourist potential due to the screening which exists on and around the site from vegetation. The amenity and tourist potential therefore, especially of the waterways, will only be compromised if those seeking to travel to such might consider the effect of the traffic movements along the surrounding regional routes, as an intrusion. The Grand Canal is at such a distance from the proposed development, that along with the existing and proposed vegetation cover, there will be no views from the Grand Canal of the proposed development.

Allenwood Celtic AFC's football pitch is located to the south of the existing entrance on the R403 at Killinagh Upper. As the access road does not require any additional works, the potential effects on this amenity are not considered significant. A wide belt of mixed deciduous and evergreen trees and shrubs has been planted by the developer along the entire boundary of the Bord na Móna landholding with the grounds of Allenwood Celtic AFC in the interest of visual amenity.

Any potential visual effects are dealt with in Chapter 11 (Landscape and Visual Impact) of this EIAR, while traffic related effects are discussed in Chapter 14 (Traffic and Transportation).

#### ***5.2.3.6 Health and Safety***

Details relating to health and safety for the proposed development are provided in the CEMP (see Appendix 2-5 of this EIAR). This includes information of safety and security, welfare facilities, traffic and parking, signage, fire safety, an Emergency Response Plan and incidents/complaints procedures. The following relevant Health and Safety Legislation will be adhered to for the proposed development:

- Safety, Health and Welfare at Work Act 2005 (No. 10 of 2005);
- Safety, Health and Welfare at Work (General Application) Regulations 2007 (S.I. No. 299 of 2007), as amended;
- Safety, Health and Welfare at Work (Construction) Regulations 2013 (S.I. 291 of 2013), as amended

Assuming that the proper health and safety guidelines are adhered to throughout all project phases, the potential effects here are anticipated to be long term and slight.

#### ***5.2.4 Mitigation Measures***

Mitigation by design has been utilised in the design of this project to assure minimal effects to Population and Human Health. Where required, mitigation measures for Landscape & Visual (Chapter 11) Noise & Vibration (Chapter 10), Water (Chapter 8), Material Assets (Chapter 9), Traffic & Transportation (Chapter 14) and Air Quality and Climate (Chapter 12) are dealt with in the respective chapters in this EIAR. A cross reference of environmental factors is also presented in Chapter 17 (Interactions of the Foregoing).

The proposed project is not anticipated to have a significant effect on the local or regional population, therefore no mitigation measures in respect of population trend impacts are required.

From an economic perspective, the proposed project will provide employment opportunities to the local community and wider region during construction, operations and decommissioning. The project, primarily at construction stage, is also likely to increase spend in local businesses as

persons involved in the project stay locally or purchase goods. Overall, there will be a positive effect on the local economy and no mitigation measures are required.

The project will employ all of the latest and relevant guidelines and legislation (See CEMP in Appendix 2-5 in terms of health and safety for works at the proposed development. The required levels of safety will be maintained for all site visitors and staff. The proposed development site itself will not be open to the public for the duration of the project. Appropriate health and safety measures as described in the CEMP (Appendix 2-5) will be taken for all works areas in the interest of worker safety also. Should any public health advice be in place during the construction phase (such as the recent Covid-19 public restrictions) these will be implemented on site.

The community benefit fund will provide benefits for the local community through the provision of environmental improvement and recreational or community amenities in the locality.

There are no significant negative effects anticipated on tourism in the area, however, the mitigation designed to minimise potential effects on the local sensitive receptors (as described in the above referenced chapters) will also mitigate local tourism attractions and businesses, and the community benefit fund will improve local facilities and attractions, thereby making the area more appealing to tourists. Therefore, no further tourism-specific mitigation measures are required.

### ***5.2.5 Residual Effects***

The proposed development will have a slight positive long term residual effect on the local population through incoming construction and operations workers. These workers are likely to cause an imperceptible increase in local population particularly during the regular construction phases for the infrastructure and landfill, resulting in a boost to the local economy through accommodation and spend in local shops and restaurants. There will be a slight negative effect on residential amenity as a result of the construction phase traffic and associated noise, however this is anticipated to be in line with the current situation on site.

The establishment of a Community Benefit Fund is considered to be a long-term positive effect on the local community in general. This in turn would have a positive effect on the individuals living in this community, incoming tourists and have a positive effect on their individual psychological health through the development of community led projects and maximising the level of local involvement in terms of influencing how the funds are spent.

## **5.3 HUMAN HEALTH**

### ***5.3.1 Introduction***

A human health risk assessment is the process to estimate the nature and probability of adverse health effects in humans as a result of the proposed development, which is described in full in Chapter 2 of this EIAR.

The assessment has had regard to the findings of other chapters of this EIAR, and in particular to:

- Chapter 8 Water;
- Chapter 12 Air Quality & Climate; and
- Chapter 10 Noise and Vibration.



Drehid is an existing long-established Waste Management Facility (WMF) operated by Bord na Móna. A description of the baseline local population, including its demographics, is provided in Section 5.2 above. The proposed development is located within a large Bord na Móna landholding and is not in close proximity to dwellings. The nearest sensitive receptor (house) will be a distance of approximately 1 km to the northeast of the proposed new landfill footprint, while the nearest property to the proposed development site boundary is approximately 170 m to the west, although no works are proposed in that part of the site.

This assessment is focused on potential human health effects related to potential emissions, either during the construction phase or the operational phase. However, it is acknowledged that people may experience annoyance or other disturbance e.g. from temporary effects of the construction phase. Annoyance or other similar disturbance is not in itself a health effect, and it is also noted that the proposed development is not a greenfield development but is set within the context of an existing Landfill facility with long-established operations. Local residents are therefore accustomed to living in the general environment of an operational landfill and the changes proposed are unlikely to be perceptible in terms of noise or other disturbances during the operational phase.

### ***5.3.2 Relevant Guidelines, Policy and Legislation***

This assessment has been prepared having regard to the following guidelines:

- Addressing Human Health in Environmental Impact Assessment As per EU Directive 2011/92/EU amended by 2014/52/EU CONSULTATION DRAFT November 2019(IAIA, 2019);
- Guidelines on the Information to be Contained in Environmental Impact Assessment Reports (EPA, May 2022);
- Air Quality Standards Regulations 2011 (SI No. 180 of 2011);
- British Standard (BS) 5228-1:2009+A1:2014 – Code of Practice for Noise and Vibration Control on Construction and Open Sites Part 1: Noise;
- Department of Housing, Planning and Local Government (2018) Guidelines for Planning Authorities and an Bord Pleanála on carrying out Environmental Impact Assessment, (Government of Ireland, August 2018);
- European Public Health Association (EUPHA) (2019) Addressing Human Health in Environmental Impact Assessment (EUPHA, 2019);
- Guidance Note for Noise: Licence Applications, Surveys and Assessments in Relation to Scheduled Activities (NG4) (EPA, 2017c);
- Guidelines for treatment of tourism in an Environmental Impact Statement (Fáilte Ireland, 2011);
- Environmental Impact Assessment of Projects Guidance on the preparation of the Environmental Impact Assessment Report (EU Commission 2017);
- DIRECTIVE 2008/50/EC OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 21 May 2008;
- Health Impact Assessment (Institute of Public Health Ireland, 2009);
- Health Impact Assessment Resource and Tool Compilation (US EPA, 2016);
- Health in Environmental Impact Assessment - A Primer for a Proportionate Approach (IEMA, 2017);
- Institute of Environmental Management and Assessment (IEMA) Guide to Effective Scoping of Human Health in Environmental impact Assessment, November 2022;
- Institute of Environmental Management and Assessment (IEMA) Guide to Determining Significance for Human Health in Environmental Impact Assessment, November 2022;
- Impact Assessment Outlook Journal (Volume 8: October 2020)- Health Impact Assessment in Planning (IEMA, 2020);

- Institute of Public Health (IPH) (2021) Health Impact Assessment Guidance (IPH, 2021);
- International Association for Impact Assessment (IAIA) 2020 Human Health Ensuring a High Level of Protection;
- World Health Organisation (WHO) Night-time Noise Guidelines for Europe (WHO, 2009);
- WHO Environmental Noise Guidelines for the European Region 2018; (WHO, 2018);
- World Health Organisation (WHO) Air Quality Guidelines (WHO, 2006);
- World Health Organisation (WHO) Air Quality Guidelines (WHO 2021); and
- World Health Organisation Guidelines for Community Noise (WHO,1999).

### 5.3.3 Methodology

Health Impact Assessment (HIA) is defined by the Institute of Public Health in Ireland, as a combination of procedures, methods and tools that systematically judges the potential, and sometimes unintended, effects of a policy, plan, programme or project on both the health of a population and the distribution of those effects within the population. A Health Assessment in the context of EIA focuses the attention of the assessment on likely significant effects, i.e. on effects that are deemed likely to occur and, if they were to occur, would be expected to be significant (as per the requirements of EIA Directive).

The Institute of Environmental Management and Assessment (IEMA) Health in Environmental Impact Assessment – A Primer for a Proportionate Approach (IEMA, 2017) (hereafter referred to as the IEMA discussion document) notes that HIA and EIA are separate processes and that, whilst a HIA can inform EIA practice in relation to human health, a HIA alone will not necessarily meet the EIA human health requirement. HIAs are not routinely carried out for major infrastructure schemes in Ireland nor are they required to be.

The recitals to the 1985 and 2011 EIA Directives refer to ‘human health’ and the operative texts refers to ‘human beings’ as the corresponding environmental factor. The most recent amendment of the EIA Directive in 2014 changed this factor to ‘Population and Human Health’.

The new 2022 EPA guidelines on the information to be contained in Environmental Impact Assessment were issued in May 2022.

The EPA Guidelines on the Information to be Contained in Environmental Impact Assessment Reports (EPA, 2022) note that this health assessment approach is consistent with the approach set out previously in the 2002 EPA Guidelines, where health was considered through assessment of the environmental pathways through which it could be affected, such as air, water or soil. The current Guidelines state:

*‘The evaluation of effects on these pathways is carried out by reference to accepted standards (usually international) of safety in dose, exposure or risk. These standards are in turn based upon medical and scientific investigation of the direct effects on health of the individual substance, effect or risk. This practice of reliance upon limits, doses and thresholds for environmental pathways, such as air, water or soil, provides robust and reliable health protectors [protection criteria] for analysis relating to the environment’.*

In terms of human health protection, emissions during the Construction or Operational Phase of the Proposed Project will need to be identified and compared against reliable Health Based Standards. Reliable sources of the standards may be regulatory such as the EU, such as Air Quality Standards, or based on expert opinion such as is provided by the WHO as is the case with noise guidelines.

The EPA Guidelines on the Information to be Contained in Environmental Impact Assessment Reports (EPA, 2022) also note that in an EIAR:

*‘the assessment of impacts on population & human health should refer to the assessments of those factors under which human health effects might occur, as addressed elsewhere in the EIAR e.g. under the environmental factors of air, water, soil etc.’, and that,*

*‘assessment of other health & safety issues are carried out under other EU Directives, as relevant. These may include reports prepared under the Integrated Pollution Prevention and Control, Industrial Emissions, Waste Framework, Landfill, Strategic Environmental Assessment [SEA], Seveso III, Floods or Nuclear Safety Directives. In keeping with the requirement of the amended Directive, an EIAR should take account of the results of such assessments without duplicating them’.*

The IEMA 2017 discussion document was a primer for what a proportionate assessment of the impacts on health should be in EIA and is a useful document when considering what can and should be assessed. Regard has been given to the general approach advocated in this document when compiling this chapter.

The IEMA discussion document states that there should be a greater emphasis on health outcomes, as opposed simply to the health determinants or the agents or emissions (e.g. dust) which could have the potential to have health effects, which has previously been the focus of EIA. This change in emphasis does not mean a complete change in practice. The IEMA discussion document recommendations are entirely consistent with the EPA guidelines (EPA, 2022) on what should be contained in an EIAR.

This was further emphasised by the Institute of Environmental Management and Assessment (IEMA) Guide to Effective Scoping of Human Health in Environmental Impact Assessment, November 2022 and the Institute of Environmental Management and Assessment (IEMA) Guide to Determining Significance for Human Health in Environmental Impact Assessment, November 2022. The 2017 Primer and the 2022 documents on Scoping and Significance will be henceforth collectively referred to as the IEMA documents.

The IEMA documents note that public health has three domains of practice that should be considered in the assessment of health in EIA:

Health protection (including chemical and radiation exposure, health hazards, emergency response and infectious diseases);  
Health improvement (including lifestyle, inequalities, housing, community and employment);  
and  
Improving services (including service planning, equity and efficiencies).

The WHO defined health in its broader sense in its 1948 constitution (WHO, 1948) as:

*“a state of complete physical, mental, and social well-being and not merely the absence of disease or infirmity.”*

Therefore, whilst the EPA guidance is useful in terms of health protection, for a more holistic assessment as per the IEMA document, it is also worthwhile to look at broader health effects in terms of opportunities for improvement of health and for improvement of access to services. While it is important to do this, it is also important not to attribute every conceivable event as

being a health effect. To further rely on the WHO definition, a health effect would be something that would have a material impact on somebody's physical mental and social well-being be that positive or negative. As outlined in the International Association on Impact Assessment IAIA Document of 2020 human health within EIA (IAIA, 2019), the Public Health perspective is underpinned by five principles:

- A comprehensive approach to health: Physical, psychological and social wellbeing is determined by a wide range of factors across society and consideration of these wider determinants and their interrelationships will inform the assessment of human health. Inter-sectoral collaboration, between public health and other sectors, should be a feature of coherent coverage of health in EIA;
- Equity: The distribution of health impacts across the population must be considered, paying specific attention to vulnerable groups. Where impacts that are unfair and avoidable are identified, appropriate measures must be included to avoid or reduce adverse health outcomes, or to improve health outcomes for affected groups;
- Transparency: A transparent EIA process facilitates cooperation and communication, external to the organisation conducting the EIA. It enhances the process and improves effectiveness. The reporting of the EIA must demonstrate a clear and consistent method and reasoned conclusions;
- Proportionality: The scoping of human health issues into EIA will focus on whether the potential impacts are likely to be significant. Effort is then focused on identifying and gaining commitment to avoiding or reducing adverse effects and to enhancing beneficial effects. The assessment findings should be presented clearly and aim to be concise and precise and to give appropriate weight to health as a material consideration; and
- Consistency: The assessment should be based on evidence and on sound judgment. The assessment process should follow an acceptable, explicit logic path and retain common sense in applying relevant guidance. Divergence from accepted practice should be explained. The assessment, its process and conclusions, should be in accordance with up-to-date policy, guidance and scientific consensus. This acknowledges the potential for conflict between policy and emerging evidence.

The assessment of potential impacts resulting in health effects on the population is undertaken by way of the following assessments as detailed further below:

- Risk Assessment: to identify the potential risk to human health in response to identified hazards;
- Socioeconomic impacts on human health;
- Impacts on amenity resources and subsequent effects on human health; and
- Potential for psychological effects

In performing the actual assessment in terms of human health protection, emissions during the Construction or Operational Phase of the Proposed Project will need to be identified and compared against reliable Health Based Standards. Reliable sources of the standards may be regulatory such as the EU, such as Air Quality Standards, or based on expert opinion such as is provided by the WHO as is the case with the noise guidelines.

The 2022 EPA Guidelines on the Information to be Contained in Environmental Impact Assessment Reports also note that, in an EIAR:

*'the assessment of impacts on population & human health should refer to the assessments of those factors under which human health effects might occur, as addressed elsewhere in the EIAR e.g. under the environmental factors of air, water, soil etc.', and that*

*'assessment of other health & safety issues are carried out under other EU Directives, as relevant. These may include reports prepared under the Integrated Pollution Prevention and Control, Industrial Emissions, Waste Framework, Landfill, Strategic Environmental Assessment [SEA], Seveso III, Floods or Nuclear Safety Directives. In keeping with the requirement of the amended Directive, an EIAR should take account of the results of such assessments without duplicating them'.*

The IEMA documents help to detail on what a proportionate assessment of the impacts on health should be in EIA and is a useful document when considering what can and should be assessed in the context of EIA. Regard has been given to the general approach advocated in this document when compiling this chapter.

One of the messages in the IEMA documents, in terms of assessing health in EIA, is that there should be a greater emphasis on health outcomes or the potential effects on human health. This is opposed simply to the health determinants or the agents or emissions which could have the potential to have health effects. The IEMA documents noted that, in EIA, there has previously been a strong focus on just the agents or emission levels (e.g. dust) rather than focussing on the effects of these agents/emission levels on human health. This change in emphasis does not mean a complete change in practice. The IEMA recommendations therefore are entirely consistent with the EPA guidelines (EPA, 2022) on what should be contained in an EIAR.

The IEMA document notes that public health has three domains of practice:

- Health protection;
- Health improvement; and
- Improving services.

It suggests that these three domains should be considered in the assessment of health in EIA. Examples of health protection issues to be considered could include issues such as chemicals, radiation, health hazards, emergency response and infectious diseases whilst health improvement issues could include lifestyles, inequalities, housing, community and employment. Examples of improving services issues could include service planning, equity and efficiencies.

WHO defined health in its broader sense in its 1948 constitution (WHO, 1948) as:

*"a state of complete physical, mental, and social well-being and not merely the absence of disease or infirmity."*

Therefore, whilst the EPA guidance is useful in terms of health protection, for a more holistic assessment as per the IEMA document, it is also worthwhile to look at broader health effects in terms of opportunities for improvement of health and for improvement of access to services. While it is important to do this, it is also important not to attribute every conceivable event as being a health effect. To further rely on the WHO definition, a health effect would be something that would have a material impact on somebody's physical mental and social well-being be that positive or negative.

Therefore, health protection, health improvement and improving services are all considered in this chapter of the EIAR.

### ***5.3.4 Data Collection and Collation***

There are difficulties in performing a human health assessment for EIA as outlined by the Institute of Public Health. Not least of these is the difficulty in getting baseline health data. It is quite difficult due to patient confidentiality and other reasons to accurately determine levels of



even relatively common medical conditions in a relatively defined population that might be affected by such a project. Qualitative and quantitative baseline health data are a vitally important part of the appraisal section of the HIA (Health Impact Assessment). In the absence of an accurate baseline, it is very difficult to assess qualitative and quantitative changes that might occur. Generalised data that might exist for larger areas such as a city or county, but these would be at most an estimate of the local baseline and not accurate enough to allow for meaningful interpretation.

The IEMA Health in Environmental Impact Assessment – A Primer for a Proportionate Approach (IEMA, 2017) discussion document notes that the WHO provides an overview of health in different types of impact assessment (Fehr et al. 2014) and presents the WHO’s perspective on the relationship of HIA to other types of impact assessment as follows:

*“The health sector, by crafting and promoting HIA, can be regarded as contributing to fragmentation among impact assessments. Given the value of impact assessments from a societal perspective, this is a risk not to be taken lightly ... The need ... and justification for separate HIA cannot automatically be derived from the universally accepted significance of health; rather, it should be demonstrated whether and how HIA offers a comparative advantage in terms of societal benefits...”*

Health issues can, and need to, be included [in impact assessment] irrespective of levels of integration. At the same time, from a civic society perspective, it would be unacceptable for HIA to weaken other impact assessments. A prudent attitude suggests optimising the coverage of health along all three avenues:

- Better consideration of health in existing impact assessments other than HIA;
- Dedicated HIA; and
- Integrated forms of impact assessment”.

It is clear therefore that the WHO does not support a stand-alone HIA unless it could be demonstrated to be of advantage over an EIAR. Therefore, it is appropriate that this health assessment is part of the EIAR and there is no stand-alone HIA undertaken.

#### **5.3.4.1** Definition of Terms

The following terms are used in the assessment.

**Agent** - A chemicals or factors in the environment to which humans are exposed that may cause adverse health effects

**Vulnerable /Vulnerable Groups** - An individual or group of individuals who, by nature of their age, health status or other factor is more prone to developing adverse health effects

**Robust** - Strong and Healthy

**Health based Standard** - The dosage of an agent scientifically determined to protect against human health effects

**Threshold** - The dosage of an agent below which there is no adverse health effect

**PM10** - Particulate matter of diameter less than 10 µm

**PM2.5** - Particulate matter of diameter less than 2.5 µm

#### 5.3.4.2 Health Based Standards

Health based standards and Guidelines are by their nature are set to protect against human health effects. The level at which the standard is set is chosen to protect the vulnerable, not the robust. They have an in-built measure of significance in that they are set at levels where there will be no significant health effects.

An example of Standards are the Air Quality Standards as set by the EU Commission and detailed in the CAFE (Clean Air for Europe) Directive and transposed into Irish legislation by the Air Quality Standards Regulations 2011 (S.I. No. 180 of 2011). They do not necessarily exclude each and every health effect. An individual might notice a transient slight irritation in the throat slightly below some Air Quality Standards but fundamental health status of the population would not change.

Another example would be WHO (World Health Organisation) Guidelines for Air Quality and Environmental Noise. The choice of the relevant standard and the reasons for this choice are explained in the relevant sections below.

This standards-based approach is also consistent with the Irish EPA Revised Guidelines on the Information to be contained in Environmental Impact Assessment Reports. (May 2022):

*‘The evaluation of effects on these pathways is carried out by reference to accepted standards (usually international) of safety in dose, exposure or risk. These standards are in turn based upon medical and scientific investigation of the direct effects on health of the individual substance, effect or risk. This practice of reliance upon limits, doses and thresholds for environmental pathways, such as air, water or soil, provides robust and reliable health protectors [protection criteria] for analysis relating to the environment.’* EPA Guidelines 2022

#### 5.3.4.3 Identification of Vulnerable Groups (Sensitivity)

The 2022 IEMA EIA Guide to Effective Scoping in Human Health it states;

*“For health in EIA, population groups are the sensitive receptors, the health outcomes of which are considered. The IEMA Guide Determining Significance for Human Health in EIA (November 2022) explains populations in more detail. Other EIA chapters may identify receptors as community assets such as schools or hospitals. Population health refers to the health outcomes of a group of individuals, including the distribution of such outcomes within the group”.*

It goes on: *Scoping should therefore have regard to population level effects on health and differences between groups in the population. Relevant population groups for each scoped in wider determinant of health should consider both geographic populations and vulnerable subpopulations. This allows a discussion of inequalities at the assessment stage.*

The following populations and sub-populations are typically considered as potentially vulnerable:

- Young age
- Older age
- Income or unemployment
- Health status

- Social disadvantage
- Access or geographic factors.

#### **5.3.4.4 Significance of Health Effects**

The 2022 IEMA EIA Guide to determining Significance for Human Health states:

*EIA significance is defined as “informed expert judgement of the importance, desirability or acceptability of a change. For human health, this relates to whether the change is important, desirable or acceptable for public health”*

The Guide further states:

*The guidance confirms that a population health approach should be taken when determining significance.*

This is an important statement and means that when performing the health assessment, we should concentrate on health effects in the human population rather than trying to anticipate or consider each and every possible effect on an individual, good or bad.

The Guide also states that:

*The EIA Report shall include: ‘the information that may reasonably be required for reaching a reasoned conclusion on the significant effects of the project on the environment, taking into account current knowledge and methods of assessment’*

*EIA health significance therefore needs to reflect what it means for a change triggered by the project to be ‘important’ or ‘acceptable’ for public health. The professional judgement must reflect the context and cite relevant evidence to support the position reached.*

#### **5.3.5 Receiving Environment**

The overall Bord na Móna landholding is located within the Timahoe bog near Allenwood, County Kildare. Within the landholding, Bord na Móna operates the permitted Drehid Waste Management Facility, accessed from the regional R403 road, at Killinagh Upper, by a 4.8 km long internal access road, which is dedicated to the waste management facility.

The Drehid WMF is licensed by the EPA (IED Licence number W0201-03). This existing facility comprises an engineered landfill, composting facility and associated infrastructure including administration buildings, gas utilisation plant, settlement lagoons, leachate management infrastructure, weighbridge and access roads. The hours of operation of the existing facility are limited to operation between the hours of 08:00 and 19:00 Monday to Saturday. The waste acceptance hours are between 08:00 and 18:30 Monday to Saturday.

The surrounding environment is rural in nature with residential properties located around all boundaries at varying distances from the landholding boundary. The proposed development footprint is positioned within the central part of the landholding and hence is significantly set back from noise sensitive properties.

The nearest sensitive receptors will be approximately 1 km from the nearest element of the infrastructure to be used within the proposed development, and more from the proposed Landfill footprint.

### ***5.3.6 Step 1 – Hazard Identification***

An essential element of the “Step 1- Hazard Identification” of the assessment methodology advised by the US EPA is the undertaking of a literature review outlining the findings of relevant medical findings/publications related to the proposed development and its potential effects. This literature review will be detailed in the following sections.

The term “landfill” is extremely broad and complex with the potential for a wide variety of exposures and exposure scenarios involving a multiplicity of agents with different toxicological properties.

The site factors affecting the likelihood or otherwise that a landfill leads to potentially harmful population exposure include: engineering and containment, hydrogeology and topography, the type and quantity of waste contained, the mixing of contents, the presence and depth of leachate and the management practices.

The main concerns on health consequences derive from possible emissions of chemical mixtures or infectious agents.

Some, mainly historical, epidemiological studies on the health effects of waste landfills can exist, (these are assessed in the Literature Review below) but many share the important weakness of the lack of direct exposure measurement.

In performing this assessment, it is necessary to assess the potential population health effects of this landfill.

It is against this background that we reviewed the medical literature specifically in relation to the proposal to apply for permission to develop waste management facilities adjacent to an existing EPA-licensed landfill providing for the acceptance of inert construction & demolition waste and other wastes.

The review consisted of:

- PubMed An online resource which comprises over 26 million citations for peer-reviewed biomedical literature from MEDLINE (the U.S. National Library of Medicine® (NLM)), life science journals, and online books.
- Review of health-related literature

#### ***5.3.6.1 Summary of Literature***

In Ireland, a report was commissioned by the Health Research Board at the request of the Department the Environment and Local Government. This was published in 2003 and was entitled Health and Environmental, Effects of Landfilling and Incineration of Waste – A Literature Review<sup>4</sup>. This will be referred from here as the HRB Report.

In the UK, The University of Birmingham/Enviros study 2004 published Review of Environmental and Health Effects of Waste Management: Municipal Solid Waste and Similar

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<sup>4</sup> <https://arrow.tudublin.ie/schfsehrep/3/>

Wastes<sup>5</sup> also looked at this area. This report was commissioned by the Department of the Environment Food and Rural Affairs (DEFRA). This will be referred to as the DEFRA report. The UK report was well resourced and comprehensive. As stated, it is largely a literature review and most of what it contains had already been reported in the HRB report. It did however conclude that the *“health effects of handling Municipal Solid Waste by methods including, but not exclusively landfilling had at most a minor effect on human health”*.

The author of this section on Human Health relied heavily on these publications and the following studies which predate their publication and where quoted these are taken directly from either or both documents.

Since then, there have been a number of useful reviews. The World Health Organisation (WHO) published Population health and waste management: scientific data and policy options. Report of a WHO workshop. Rome, Italy, in March 2007<sup>6</sup>.

There was also a review entitled Systematic review of epidemiological studies on health effects associated with management of municipal solid waste, by Porta et al. which was released in December 2009 by the journal Environmental Health 2009, 8:60<sup>7</sup>. Both reviews will be referred to.

Finally, a review of health effects associated with the disposal of solid waste in landfills and incinerators in populations living in surrounding areas: a systematic review, by Mattiello et al. was published in 2011<sup>8</sup>. This will be termed the Mattiello review. This is detailed below in section 5.3.6.2.

Regarding composting, a review was published in 2015. Exposures and health outcomes in relation to bioaerosol emissions from composting facilities: a systematic review of occupational and community studies<sup>9</sup>. By Pearson et al. This concluded that whilst there were some respiratory effects, that these were limited to within 250 metres of the actual composting site. The nearest sensitive receptor or domestic dwelling is a distance > 1 km from the compost plant.

In addition, the author performed electronic searches for more recent publications including a “Pubmed” search using terms “landfill” and “health” which is the data base reviewing nearly all significant peer reviewed medical literature. A significant number of articles, many referred to in the reviews above, were found in relation to landfills in general Municipal Solid Waste (MSW).

The other major disadvantage in interpreting the literature is that they are by their nature historical. Many of the studies date back some years but also many of the health conditions have a long latent period that is the time between exposure and the development of symptoms which for some effects such as cancer may be many years. They reflect practices which bear little relationship to modern controls such as the limitations on materials entering the facility and

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<sup>5</sup>

[https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\\_data/file/69391/pb9052a-health-report-040325.pdf](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/69391/pb9052a-health-report-040325.pdf)

<sup>6</sup> [https://www.euro.who.int/\\_\\_data/assets/pdf\\_file/0012/91101/E91021.pdf](https://www.euro.who.int/__data/assets/pdf_file/0012/91101/E91021.pdf)

<sup>7</sup> <https://ehjournal.biomedcentral.com/articles/10.1186/1476-069X-8-60>

<sup>8</sup> <https://pubmed.ncbi.nlm.nih.gov/23887611/>

<sup>9</sup> <https://pubmed.ncbi.nlm.nih.gov/25825807/>



perhaps as importantly, the engineering controls in a modern engineered landfill. These controls have now been in place in most counties including Ireland for several decades, possibly excluding illegal sites, where highly effective controls on emissions are not in place.

What can be said with certainty is that highly effective controls have been in place for the lifetime of the Drehid landfill and will continue to be.

### **5.3.6.2 Important Landfill Health Reviews**

Redfearn and Roberts (2002) presented a detailed review of the available epidemiological literature on landfill and health. They separated the available epidemiological studies into four categories as follows:

- Single site studies of waste sites including hazardous waste sites, illegal landfills;
- Multi-site studies of sites including hazardous waste sites, illegal landfills or “inhouse” of industry;
- Single site epidemiological studies of potential health effects associated with landfill including some sites accepting hazardous waste;
- Multi-site epidemiological studies of potential health effects associated with waste disposal sites, some accepting hazardous waste.

They discounted the first two groups of studies as they concerned sites which did not in any way parallel current UK landfill practice, and which they felt were therefore not useful in interpretation of effects. The papers in the latter two categories are summarized. The DEFRA report largely used this summary in their review some two years later.

They categorised studies according to health outcome and whether the study indicated an excess risk for those residing in the vicinity of a landfill for that health outcome and those indicating no excess risk. Those reported as demonstrating excess risk showed a significant positive association between a health outcome and proximity to a landfill site. Those indicated as showing no excess risk, did not show a statistically significant association, although the reason could be lack of statistical power to demonstrate such an association. The majority of the adverse health outcomes studied come under the categories of birth defects and other pregnancy outcomes, and cancers. The balance between studies with and without a positive finding appears more strongly in favour of outcomes with an excess risk in the case of birth defects as opposed to cancer. They cautioned about use of their study to infer that the adverse effects were caused by landfill. This is because there were other potential explanations. In epidemiological terms, they could not exclude confounding. An example of this might be simultaneous exposure to other pollutant such as those from industrial sources or for example, social class difference between those who live close to landfills and those who do not. These types of confounders appear repeatedly in all studies and reviews of landfills.

### **WHO Report**

This was quite a wide review published in 2007 about a wide range of Waste Management options. The review gave an interesting summary of its conclusions in relation to Landfill in particular. It said:

*“With regards to waste landfills, a wide variety of exposures, exposure pathways and exposure scenarios are involved, entailing a large complexity and difficulty in estimating the health risks possibly involved. Only few epidemiological studies have evaluated sites with respect to the types of chemicals they contain and release; most studies on the health effects of waste landfills in fact lack direct exposure measurement and rely on residential distance from the site or sometimes on*

*exposure modelling. Many health endpoints have been considered in epidemiological studies, including cancer incidence and mortality and reproductive outcomes such as birth defects and low birth weight. Despite the methodological limitations, the scientific literature on the health effects of landfills provides some indication of the association between residing near a landfill site and adverse health effects. The evidence, somewhat stronger for reproductive outcomes than for cancer, is not sufficient to establish the causality of the association. However, in consideration of the large proportion of population potentially exposed to landfills in many European countries and of the low power of the studies to find a real risk, the potential health implications cannot be dismissed.”*

The report commented on another review by Linzalone and Bianchi (2005):

It concluded that there were no consistent results in studies on cancer incidence, mortality and congenital malformations were reported. Increases in low birth weight and different types of symptoms were consistently found. They stated that the availability of environmental data and individual measurements of exposure was very poor in most of the studies.

The WHO report, which was itself the product of an expert group workshop also noted that concurrently with the workshop, three multi-site studies were published, two of them dealing with United States hazardous sites.

In the first one (Kuehn et al., 2007) a series of significant risks for congenital malformations, decreasing with distance from the sites, have been found; in the second one (Mueller et al., 2007), foetal deaths for women residing near the sites were not associated with the distance but an association was observed among women residing less than one mile from pesticide-containing sites. The third study (Jarup et al., 2007) analysed the risk of giving birth to a child with Down syndrome, associated with residence near 6,289 landfill sites (processing special, non-special and unknown waste type) in England and Wales. Postcodes within the two kilometres zone were classified as exposed and people living beyond two kilometres comprised the reference population. No excess risks of Down Syndrome related to landfill sites were found and adjustment for socioeconomic status did not influence the estimates. Interestingly, no differences in risk between hazardous waste sites and other landfill sites were found.

### **The Porta review 2009**

As stated above, whilst this report did concentrate on MSW sites, and it did include other studies as well.

It reported:

*In most cases the overall evidence was inadequate to establish a relationship between a specific waste process and health effects; the evidence from occupational studies was not sufficient to make an overall assessment. For community studies, at least for some processes, there was limited evidence of a causal relationship, and a few studies were selected for a quantitative evaluation. In particular, for populations living within two kilometres of landfills there was limited evidence of congenital anomalies and low birth weight with excess risk of 2 percent and 6 percent, respectively. The excess risk tended to be higher when sites dealing with toxic wastes were considered, though the proposed development will not contain any such waste. For populations living within three kilometres of old incinerators, there was limited evidence of an increased risk of cancer, with an estimated excess risk of 3.5 percent. The confidence in the evaluation and in the estimated excess risk tended*

*to be higher for specific cancer forms such as non-Hodgkin's lymphoma and soft tissue sarcoma than for other cancers.*

### **The Vinti review 2021**

This looked at evidence on health effects of Landfills and Incinerators for the handling of MSW (Municipal Solid Waste) They reported:

*There was some evidence of an increased risk of adverse birth and neonatal outcomes for residents near each type of MSW site. There was also some evidence of an increased risk of mortality, respiratory diseases, and negative mental health effects associated with residing near landfills. Additionally, there was some evidence of increased risk of mortality associated with residing near incinerators. However, in many cases, the evidence was inadequate to establish a strong relationship between a specific exposure and outcomes, and the studies rarely assessed new generation technologies.*

Some other publications have occurred in the last 2 years including that by Siddiqua et al. in 2022 and Ozbay et al. in 2021 but conclusions were similar.

Essentially this found similar findings to the other reviews that there was no evidence of deleterious effects in relation to modern well managed landfill sites. It is important to note that while the review was new the evidence on which it was based included many of the studies reviewed in previous publications.

#### **5.3.6.3 Specific Health Effects**

##### **Congenital malformations / reproductive problems**

The HRB report stated that several studies have shown an apparent increase in the incidence of low birth weight, birth defects. Problems were reported around some hazardous waste landfills falling significantly below current operating standards, such as Love Canal in the U.S. It is important to note here that the proposed development will not include any hazardous waste.

The report also said studies such as Geschwind et al. (1992), Budnick et al. (1984), Croenet et al. (1997), Roberts et al. (2000) and more recently Goldberg (2005) reported similar findings but also shared common limitations. It is however fair to say that low birth weight is one of the most consistent findings. However, it is also one of the factors most vulnerable to confounders. For example, two factors very closely linked to low birth weight are lower social class and maternal smoking. It has been repeatedly found that deprivation scores are consistently higher around landfills.

A Danish study (Kloppenborg 2005) found no association between waste landfill location and congenital anomalies combined or of the nervous system. However, they found small excess risk for congenital anomalies of the cardiovascular system. No causal mechanisms are available to explain these findings, but the authors offered possible alternative explanations including approximated birth rates and residual confounding.

A Welsh study (Palmer 2005) reported an apparent increase in the rate of congenital abnormalities in the vicinity of 24 Welsh landfills after opening from 1983 to 1997. Many of these were "Special waste", that is hazardous sites. They concluded that a causal relationship

could not be established. It is of note that when the study looked at enhanced data from 1998 to 2000 it did not show a significant increase. In addition, the landfills studied were also examined in the earlier but much larger Elliot study. The latter is considered by many, the most complete and its findings are dealt with separately herein.

A British study (Jarup 2007) studied the risk of Down's syndrome in the population living near 6,829 landfills in England and Wales. It studied those who lived in a 2 km zone around each site, people beyond this zone were the reference group. A two year lag period between potential exposure of the mother and her giving birth to a Down's syndrome child was allowed. The analysis was adjusted for maternal age, urban-rural status and deprivation index. No statistically significant excess risk was found in the exposed populations, regardless of waste type.

Of note is a January 2004 study published in the Irish Medical Journal by Boyle et al. The occurrence of congenital anomalies in proximity to municipal landfill sites in the Eastern Region (counties Dublin, Kildare, Wicklow) was examined by small area (district electoral division), distance and clustering tendencies in relation to 83 landfills, five of which were major sites. For the more populous areas of the region 50% of the population lived within 2-3 km of a landfill and within 4-5 km for more rural areas. They concluded that congenital anomalies were not found to occur more commonly in proximity to municipal landfills.

There has been very little published in the medical literature on this over the past 20 years. This is likely to represent the absence of effects with modern landfills. This is because of study and publication bias. In other words, health effects are more likely to be studied and subsequently published if there is evidence of a health effect. The absence of health effects because of controls though important is less likely to be published although entirely what is expected from the available evidence.

## **Cancers**

The HRB report pointed out that Pukkala and Ponka (2001) studied the risk of cancer in people living in houses built on top of an old municipal dump in Finland. They identified a small increase in cancers on the basis of cancer incidence rates in Helsinki. The numbers studied were quite small. The incidence of cancer was also studied around Love Canal, Janerich et al. (1981) showed rates were no higher than those calculated for the entire state outside of New York City.

Goldberg et al. (1995.) evaluated whether cancer incidence among persons who lived near the Miron Quarry was higher than expected. Some cancers appeared increased but these increases in risk were weak and for most conditions were not statistically significant. Again, the evidence was not strong or consistent enough for conclusions to be drawn.

Jarup et al. (2002) examined cancer risks in populations living within 2 km of 9,565 (from a total of 19,196) landfill sites that were operational at some time from 1982 to 1997 in Great Britain. No excess risks of cancers of the bladder and brain, hepato-biliary cancer or leukaemia were found, after adjusting for age, sex, calendar year and deprivation. The study was very large and had high statistical power, so the absence of findings is very reassuring.

It is worth noting that there have been few if any well designed studies on this matter over the last several years. This may well be further evidence of the study and publication bias referred to above. The evidence linking landfill to cancer is weak, perhaps even surprisingly so because a number of the areas studied were hazardous waste sites with known problems. Certainly, it is reasonable to extrapolate that the human risk of cancer from living adjacent to a well-run non-hazardous waste landfill are absolutely minimal.

## Symptoms of illness

Many studies of symptoms conducted in communities living near landfill sites rely on self-reported symptoms. In essence, no statistically significant reproducible health effects have been demonstrated.

## Studies of landfills workers

Gelberg et al. (1997) conducted a cross-sectional study to examine acute health effects among employees working for the New York City Department of Sanitation, focusing on Fresh Kills Landfill employees. Telephone interviews conducted with 238 on-site and 262 off-site male employees asked about potential exposures both at home and work, health symptoms for the previous six months, and other information (social and recreational habits, socio-economic status). Landfill workers reported a significantly higher prevalence of work-related respiratory, dermatological, neurologic and hearing problems than controls. Respiratory and dermatologic symptoms were not associated with any specific occupational title or task, other than working at the landfill, and the association remained, even after controlling for smoking status.

## Elliot Studies

The largest study carried out on the health effects of landfill sites was that by Elliot et al. for the Dept. of Health in the UK published in August 2001. This appeared to show small excess risk, in the region of 1% for overall congenital abnormalities to those living within 2 km radius of a landfill site.

To put this into context, the background rate of congenital abnormalities is about 2% of all births. A 1% increase even if true would give a rate of 2.02%. In an area of low population, one might have to wait several hundred years or even more for an effect.

Interestingly the study showed that approximately 80% of the British population live within 2 km of a landfill site though not all are operational. Though the study is generally well designed, there are a number of limitations in this study, some of which it shares with some of the other studies quoted. By the nature of this type of study, it studies “the good, the bad and the ugly”, that is, covering landfill sites in all states of use, age and type of landfill, hazardous or non-hazardous. It will therefore include the well designed and operated but also those which are not. It would be possible for one or two “bad eggs” in terms of poorly managed landfill sites to skew a study particularly given the very small level of reported excess.

There are also anomalies in the data, for example when they studied landfill sites recently opened there was an excess risk of congenital abnormalities predating the opening of the landfill site suggesting demographic or other environmental factors were primarily responsible.

While the study did attempt to allow for confounders such as deprivation etc., in effect it is impossible to allow for all possible confounders and they did not even attempt to control for some potentially relevant factors such as smoking and occupation. Therefore, while noteworthy the findings cannot be relied upon and need to be considered in the light of the other available literature.

Elliot et al. updated the previous study (2009) in order to evaluate whether geographical density of landfill sites was related to congenital anomalies. The analysis was restricted to 8,804 sites operational at some time between 1982 and 1997. There were 607 sites handling special (hazardous) waste and 8,197 handling non-special or unknown waste type. The exposure assessment took into account the overlap of the 2 km buffers around each site, to define an



index of exposure with four levels of increasing landfill density. Several anomalies (hypospadias and epispadias, cardiovascular defects, neural tube defects and abdominal wall defects) were evaluated. The analysis was carried out separately for special and non-special waste sites and was adjusted for deprivation, presence or absence of a local congenital anomalies register and maternal age. The study found a weak association between intensity of hazardous sites and some congenital anomalies (all, cardiovascular, hypospadias and epispadias).

While this study has been included in the reviews of the health effects of landfills outlined at the start of the literature review it is included here as it is by far the largest study in these islands.

#### ***5.3.6.4 Summary Of Literature On Health Effects Of Landfilling***

One of the main difficulties about reviews of epidemiological evidence is that they are by their nature, historical. While they may accurately reflect the situation as it was; with far more engineering controls and much higher level of supervision of what enters landfills and management of potential emissions, it is certain that potential health effects are less than in the past. In other words, we can look at a worst-case scenario, but modern landfills are far better than what was there in the past. When the term “modern” is used, by and large in Western countries it is referring to post 1980’s. The Drehid landfill opened in 2008 and always has met the highest engineering standards.

At present, there is little or no evidence to demonstrate a link between cancer and exposure to these modern landfills.

A few studies have reported putative links between landfill sites and congenital abnormalities but again these studies are somewhat inconsistent and are related to hazardous waste sites, which is not proposed for Drehid. Again, these are primarily related to historical poorly designed and managed and sometimes illegal landfills.

Reports of increased risk of respiratory, skin and gastrointestinal illnesses are based mainly on self-reported symptoms. Although this evidence must not be dismissed, consideration should be given to the strong possibility of bias and the influence of fears and worry related to the waste.

#### ***5.3.7 Exposure Assessment***

Health based standards therefore rely on the dose response concept and try to identify by scientific means the threshold below which no significant health effects would occur. When standards are scientifically set by reliable and recognised or statutory agencies, they are a useful method in assessing the effect of any proposed change.

Health standards are set based on the threshold to protect the robust, who may be more resilient but are primarily there to protect the vulnerable. They are to protect the elderly, the very young, and the ill and by extension thereby, the robust are not affected.

An example of such health standards are the EU Air Quality Standards. These are explained by the Irish EPA (<http://www.epa.ie/air/quality/standards/>) as follows:

*In order to protect our health, vegetation and ecosystems, EU directives set down air quality standards in Ireland and the other member states for a wide variety of pollutants. These rules include how we should monitor, assess and manage ambient air quality.*

*The European Commission set down the principles to this approach in 1996 with its Air Quality Framework Directive. Four "daughter" directives lay down limits for specific pollutants:*

- 1st Daughter Directive: Sulphur dioxide, nitrogen dioxide and oxides of nitrogen, particulate matter and lead
- 2nd Daughter Directive: Carbon monoxide and benzene
- 3rd Daughter Directive: Ozone
- 4th Daughter Directive: Polyaromatic hydrocarbons, arsenic, nickel, cadmium and mercury in ambient air

With regards to particulate matter, for example, the standards relate to relatively smaller particles that is, for example, PM<sub>10</sub>, which is particulate matter with a diameter of less than 10µm. The reason for this is that this size of dust can be inhaled into the lungs and travel all the way to the alveoli, for which we use the term respirable. Larger particles which are greater than 10µm but less than 30µm are potentially inhaled, that is enter the nose or mouth but do not enter the alveoli and are not respired. These are usually swallowed and do not have effects on the respiratory system.

Dust particles which are greater than 30µm are not inhalable so do not have an effect on human health and typically fall to the ground. The smaller particles can remain airborne. Therefore, dust on cars does not correlate with a health risk. It is only if the smaller particles are increased that human health issues may arise. In human health, it is the dust which cannot be seen that has potential for health effects, while visible dust, while being a nuisance, and may require more frequent car washing, does not affect human health. Therefore, when we are assessing the effect of practical matter on health it is PM<sub>10</sub> and smaller that is relevant.

For completeness it is worth considering other guidelines. During the 68th World Health Assembly in 2015, the WHO adopted a landmark resolution on air quality and health, recognizing air pollution as a risk factor for noncommunicable diseases such as ischaemic heart disease, stroke, chronic obstructive pulmonary disease, asthma and cancer, and the economic toll they take.

In it's 2021 Guidelines the WHO states:

*The global nature of the challenge calls for an enhanced global response. These guidelines, taking into account the latest body of evidence on the health impacts of different air pollutants, are a key step in that global response. The next step is for policy-makers around the world to use these guidelines to inform evidence-based legislation and policies to improve air quality and reduce the unacceptable health burden that results from air pollution.*

This was the WHO's first adjustment of its recommendations on particulate matter (PM), ozone (O<sub>3</sub>), nitrogen dioxide (NO<sub>2</sub>), sulphur dioxide (SO<sub>2</sub>), and carbon monoxide (CO) since 2005.

According to the WHO, the new recommendations reflect the recent evidence of the significantly higher-than-thought impact of even lower concentrations of air pollution on human health and wellbeing. A recent study estimated the death toll of air pollution at 8.7 million per year. The vast majority of these deaths are recognized to occur in developing countries. The guidelines recognize significant improvement in air quality in high income countries such as Western Europe and North America.

While almost 9,000,000 deaths annually is obviously significant, it is in the context of a global population of around 8 billion. In addition, very few of these deaths were in robust good health but rather elderly or otherwise vulnerable to changes in air quality.

The guidelines identify the three main groups of users as targets for the Guidelines:

- policy-makers, lawmakers and technical experts operating at the local, national and international levels who are responsible for developing and implementing regulations and standards for air quality, air pollution control, urban planning and other policy areas;
- national and local authorities and nongovernmental organizations, civil society organizations and advocacy groups, such as patients, citizen groups, industrial stakeholders and environmental organizations; and
- academics, health and environmental impact assessment practitioners, and researchers in the broad field of air pollution

The WHO recognize that these levels are essentially unachievable in most countries and indeed also provides interim targets in the years when the full guideline aim to be achieved. It is important that these figures are intended for populations rather than for individual receptors. Indeed, the Guidelines state:

*Currently, the accumulated evidence is sufficient to justify actions to reduce population exposure to key air pollutants, not only in particular countries or regions but on a global scale.*

To follow on from this, while WHO guidance is helpful, it is also unachievable and clearly not viable to consider it a standard, which it is not anyway.

It is therefore clear that the appropriate Health Based Standards for air quality are the Air Quality Standards.

### ***5.3.8 Appropriate Health Based Standard***

As outlined in the EPA 2022 Guidelines for the assessment of health effect it is appropriate to use health based standards to aid these assessments. As outlined above and in Chapter 12. The appropriate standards are the Air Quality Standards.

#### ***5.3.8.1 Assessment of Effects of Proposed Development from Emissions to Air***

A detailed air quality assessment is provided in Chapter 12 (Air Quality & Climate) of the EIAR. The standards used in the air quality assessment include the Air Quality Standards Regulations 2011, which incorporate European Commission Directive 2008/50/EC, which has set limit values for the pollutants SO<sub>2</sub>, NO<sub>2</sub>, PM<sub>10</sub>, benzene and The European Parliament and Council Directive 2008/50/EC combines the previous Air Quality Framework Directive (96/62/EC) and its subsequent daughter directives (including 1999/30/EC and 2000/69/EC). Provisions were also made for the inclusion of new ambient limit values relating to PM<sub>2.5</sub>. These are appropriate and robust standards. The air quality assessment provides detailed information on existing and proposed emission sources and the use of AERMOD modelling.

Odour, air quality and construction dust are all separately considered.

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The conclusions can be summarised as follows:

### **Odour**

The scenarios modelled lead to odour concentrations which are in compliance with the relevant odour criterion at the worst-case receptor.

### **Air Quality**

Regarding NO<sub>2</sub>, the modelled scenario will lead to ambient NO<sub>2</sub> concentrations (including background) which are in compliance with the relevant limit values at the worst-case off-site location.

With regard to PM<sub>10</sub> / PM<sub>2.5</sub>, emissions from the facility will lead to ambient PM<sub>10</sub> / PM<sub>2.5</sub> levels (including background) which are in compliance with the relevant limit values at the worst-case off-site location.

The results of the traffic air dispersion modelling study indicate that the residual effects of the proposed development on air quality and climate are predicted to be negligible with respect to the operational phase local air quality assessment for the long and short term.

### **Construction Dust**

When the dust minimisation measures are implemented, fugitive emissions of dust from the site will be insignificant and pose no nuisance at nearby receptors.

In summary, all emissions from the facility under the proposed development at Drehid Waste Management Facility will be in compliance with the ambient air quality standards and will not lead to a substantive risk of non-compliance or odour nuisance. There is a negligible effect predicted due to increased vehicle emissions during the operational phase.

### **Assessment of Effect**

The human health effect for all receptors arising from potential emissions to air are assessed as being Imperceptible.

#### ***5.3.8.2 Assessment of Effects of Proposed Development from Noise Emissions***

By comparing the predicted noise emissions as detailed in Chapter 10 (Noise & Vibration) of this EIAR, with reliable noise standards, we can determine if any health effect is likely as a result. For the construction phase the standard is BS5228. For the operational phase there are existing noise criteria for the site. It is appropriate to use these as the standard.

### **Construction Phase**

The conclusions of that chapter were that, allowing for mitigation, during the construction phase, given the distances to the nearest residences, the temporary and short-term nature of the construction phase and the calculated noise levels, the overall noise effect will occur on an intermittent basis, affecting the closest noise sensitive properties in the surrounding environment. The effect is determined to result in a neutral effect and will be of a short term and slight effect at the majority of noise sensitive locations. Vibration effects during this phase are determined to be short term and imperceptible.

## Operational Phase

The conclusions of Chapter 12 were that predicted noise levels at the nearest sensitive locations are well below the operational noise criteria in all instances. There are no vibration effects associated with the operational phase of the proposed development.

In terms of traffic, for the majority of road links, due to the existing volume of traffic and that projected for the future baseline years, the addition of traffic volumes associated with the proposed development are negligible. The increase in traffic noise levels along most link roads is less than 3 dB(A) which is defined as being of negligible effect. For a small number of routes, a minor effect is calculated, assuming even distribution of traffic over the course of a typical day. During peak periods, there will be instances where noise level increases are up to 4 dB along the closest access roads to the site. The overall traffic noise is minor to moderate, perceptible effect during peak periods.

## Assessment of Effect

The human health effect for all receptors arising from noise are assessed as being Imperceptible.

### *5.3.8.3 Assessment of Effects of Proposed Development from Emissions to Water*

The potential effects on water have been assessed in Chapter 8 of the EIA Report. These concluded that due to the low magnitude of effect and low sensitivity of the surrounding environment, the residual effects on the surrounding geological and hydrogeological regime at the site are considered to be minor and mainly long term in nature.

## Assessment of Effect

Given that there will be no effect on water quality standards, the effects on human health from water are assessed as Imperceptible.

## Mitigation Measures

No mitigation measures other than those detailed elsewhere in this EIA Report and associated appendices, or as required under the IE Licence, are required.

## Residual Effects

Given no residual effects are predicted on water quality from that the proposed development, either during construction or operation, no effects on human health are predicted.

## Health Improvement

As mentioned above, an assessment of health improvement is a component of a health assessment. While we take for granted that our waste will be safely and efficiently collected and disposed of this would and could not happen without appropriate facilities for dealing with this waste. Having adequate facilities including landfill facilities to deal with MSW is an essential part of health improvement. The alternative would be unsafe handling of waste material which could only have deleterious health effects.

Therefore, we can say that for regional and even a national level, the proposed facility, by being part of the solution for municipal solid waste management, will allow for health improvement or to look at it another way would prevent health deterioration that might arise with the lack of such facilities.

#### ***5.3.8.4 Potential for psychological effects***

In the EIA process, potential adverse effects on psychological health are often mentioned, for example, anxiety and stress experienced by people worried that they will experience a change in the environment in which they live.

Human receptors may experience annoyance from the temporary effects of the Construction Phase, such as noise or dust. Annoyance is not in itself a health effect, although it is recognised that there can be potential influences on a person's overall psychological well-being. If someone develops a psychological illness such as anxiety or depression this becomes a medical impact.

There are various degrees of psychological impact, and these can be both positive and negative. Although identifying the potential impacts is possible, quantifying them is difficult as there are no direct measurements available and the same impacts may have different effects on different people.

An example of this is how people differ in reactions to the same events, such as in relation to the Covid pandemic. Many had very significant concerns about contracting Covid, with increased levels of anxiety and even leading to increased psychological ill health, whereas others were anxious because of movement restrictions or requirements to wear masks in public. While some impacts on health are very predictable, such as the impacts of increasing noise or decreasing air quality, the impacts on psychological health from the same situation can differ very significantly between people depending on their perspectives.

An example of a positive impact could be those looking forward to increasing employment opportunities; both directly, in the potential for employment in construction and operation of the proposed project, and indirectly by improved continued waste management services during the Operational Phase.

In terms of assessing the psychological impact, an impact is assessed as either positive or negative, if it is likely that the overwhelming majority of people will experience that effect. Where different psychological impacts are anticipated from the same scenario the assessed psychological impact is neutral.

An existing landfill and waste management site has been present on this site since 2008. In all likelihood, the psychological impacts of the proposed additional facilities would be relatively small. One could argue with that in a do-nothing scenario that there will be inadequate landfill facilities going forward. This would extend far beyond the site itself and could have impacts on regional and national economic growth. In such a scenario, adverse psychological impacts from increased unemployment or potential difficulties dealing with waste could have adverse effects.

Overall though it is believed that the most appropriate assessment on the potential psychological impacts of the facilities are neutral.

#### **Access To Services**

Again, one service that is expected in a modern society is the collection and safe disposal of waste. We all aspire to a society where there is no waste, but the reality is this does not exist, and cannot exist for the foreseeable future. In this situation we all do need our bins to be collected and dealt with in an efficient and safe manner. Having the landfill facilities and capacity to help manage some waste is a central part of the waste management cycle. The additional facility proposed here will assist in providing that needed capacity and will ensure that peoples' bins continue to be collected and handled safely and thus protect health and wellbeing.



## Mitigation Measures

No additional measures other than those already described in other chapters are proposed for the protection of human health.

### *5.3.9 Residual Health Effect by the Proposed Development*

Based on the assessment above the effect on human health is assessed as imperceptible and has benefits to society as it facilitates access to services.

## 5.4 MAJOR ACCIDENTS/DISASTERS

The vulnerability of the project to risk of major accidents and/or disasters, such as extreme flooding or peat/soil instability, is discussed primarily in Chapter 7 (Land, Soils and Geology) and Chapter 8 (Water ) which found that the project is not at significant risk in this regard. The potential for climate change to impact future flood events is considered as part of the site-specific Flood Risk Assessment (FRA) in Chapter 8 (Water ), which found that the proposed infrastructure will not be significantly affected by climate change.

In the context of potential human health risk from major accidents/disasters, potential risks are presented by facility fires or gas explosions. There are no dwellings located within 1 km of the proposed landfill and infrastructure locations, therefore the risk to residential receptors from fires or explosions is not considered significant.

The risk of fire or explosion is very low on the basis of the proposed design considerations, safety checks throughout the construction and operational process and the site operators many years of experience in safely operating a landfill at this location. The landfill will include a fire ring main that will be available for use in emergency to minimise the potential risk of fires.

The proposed project will not come under the *Control of Major Accident Hazards (COMAH) Regulations*, as such, there is no potential for the proposed project or any associated activities to cause a risk to human health in this regard. Additionally, there are no Upper or Lower Tier COMAH establishments located in proximity of the proposed development site, therefore there is no risk posed to the Drehid WMF site from such an establishment and associated activities<sup>10</sup>.

It is therefore considered that the potential for a significant effect on the local population and human health from a major accident or disaster is low.

## 5.5 CUMULATIVE EFFECTS

In the assessment of cumulative effects, any other existing, permitted or proposed developments in the surrounding area have been considered where they have the potential to generate in-combination or cumulative effects with the proposed project. The potential for cumulative effects on the local population and human health, in particular noise, traffic and visual effects are discussed in the relevant chapters.

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<sup>10</sup> No COMAH Establishments (Upper or Lower Tier) were identified near the proposed development site - [https://www.hsa.ie/eng/your\\_industry/chemicals/legislation\\_enforcement/comah/list\\_of\\_establishments/](https://www.hsa.ie/eng/your_industry/chemicals/legislation_enforcement/comah/list_of_establishments/) (Accessed 15 February 2023)

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There is potential for a cumulative effect for population and human health (primarily related to noise, traffic, dust, odour and visual effects) associated with large scale existing, permitted and proposed projects near the proposed development. These are listed in Chapter 4 (Planning, Policy and Development Context) of the EIAR but include the Ballydermot Wind Farm, Timahoe North Solar Farm, Monaghan Mushrooms facility and a proposed solar farm at Coolcorrigan.

Other developments proposed in the area around the proposed development site are relatively small, comprising mostly residential one-off houses and agricultural sheds/activity. All of these developments/activities are not anticipated to have a significant cumulative effect on population and human health due to their small scales.

Overall, it is considered that there are no significant cumulative effects from the proposed project on population, human health, socio-economics, employment, tourism, residential amenity and health and safety.

## **5.6 STATEMENT OF SIGNIFICANCE OF EFFECTS**

There are no significant effects anticipated.

## **5.7 CONCLUSION**

Having considered the residual effects described above, and assuming that the proposed design, mitigation and best practice is adhered to as described in this EIAR, it is not anticipated that there will be any significant effects on Population and Human Health (population, residential amenity, socio-economics, tourism and amenity, human health and safety) associated with the proposed development.