

Luas Finglas

Environmental Impact Assessment Report 2024

Chapter 7: Human Health

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GLOSSARY OF FREQUENTLY USED TERMS

Term	Definition
ASD	Autism Spectrum Disorder
AQS	Air Quality Standards
CAMHS	Child and Adolescent Mental Health Services
CHO	Community Healthcare Organisation
CNVMP	Construction Noise and Vibration Management Plan
CSO	Central Statistics Office
DCC	Dublin City Council
DCDP	Dublin City Development Plan
DMRB	Design Manual of Roads and Bridges
EIAR	Environmental Impact Assessment Report
EMF	Electromagnetic Fields
EMRA	The Eastern and Midland Regional Assembly
EPA	Environmental Protection Agency
EUPHA	European Public Health Association
FCC	Fingal County Council
GDA	Greater Dublin Area
GDPR	General Data Protection Regulation
HIA	Health Impact Assessment
HSE	Health Services Executive
IAIA	International Association for Impact Assessment
IEMA	Institute of Environmental Management and Assessment
LHO	Local Health Office
LRT	Light Rail Transit
LRV	Light Rail Vehicle
NRA	National Roads Authority
SEA	Strategic Environmental Assessment
TII	Transport Infrastructure Ireland
WHO	World Health Organisation

SECTION 7: HUMAN HEALTH

7.1 Introduction

7.1.1 Purpose of this Report

This chapter presents the findings of an impact assessment of the proposed Luas Finglas (hereafter referred to as the proposed Scheme) on Human Health as a result of the Construction and Operational Phases.

This chapter describes and assesses the likely direct and indirect significant effects of the proposed Scheme on Human Health, in accordance with the requirements of Directive 2014/52/EU of the European Parliament and of the Council of 16 April 2014 amending Directive 2011/92/EU on the assessment of the effects of certain public and private projects on the environment (i.e. the EIA Directive) (European Union, 2014).

Some of the potential impacts on human health are considered to be indirect effects resulting from the impacts on material assets and resources outlined in this EIAR. For this reason, this chapter should be read in conjunction with the technical chapters (Chapters 8 to 22) and their appendices, which present related impacts arising from the proposed Scheme and proposed mitigation measures to ameliorate the predicted impacts.

7.1.2 Outline Scheme Description

The proposed Scheme comprises a high-capacity, high-frequency light rail running from Broombridge to Charlestown, connecting Finglas and the surrounding areas with Dublin's wider public transport network by providing a reliable and efficient public transport service to the city centre via Broombridge.

As shown in Volume 4 - Map Figure 1-1, starting from Broombridge, the proposed Scheme travels northwards, crossing the Royal Canal and the Maynooth railway line adjacent to Broome Bridge. It then runs adjacent to the east of Broombridge Road and the Dublin Industrial Estate. It then crosses the Tolka Valley Park before reaching the proposed St Helena's Stop and then proceeds northwards towards the proposed Luas Finglas Village Stop. From here, the route passes through a new corridor created within the Finglas Garda Station car park, making its eastern turn onto Mellowes Road. The route then proceeds through Mellowes Park, crossing Finglas Road, towards the proposed St Margaret's Road Stop. Thereafter, the proposed line continues along St Margaret's Road before reaching the terminus Stop proposed at Charlestown.

The proposed Scheme has been designed to integrate with the existing and future transport network, providing connections with bus services at all new Stops, mainline rail services at Broombridge, and a Park and Ride facility to intercept traffic on the N/M2. In addition, the proposed Scheme through the inclusion of integrated cycle lanes and cycling infrastructure sets out to facilitate multimodal "cycle- light rail transit (LRT) trips" as a key aspect of the Luas Finglas scheme.

The proposed Scheme will comprise a number of principal elements as outlined in Table 7-1 and Table 7-2. A full description of the proposed Scheme is provided in the following chapters of this EIAR:

- Chapter 1 (Introduction);
- Chapter 5 (Description of the proposed Scheme); and
- Chapter 6 (Construction Activities).

Table 7-1: Overview of the Key Features of the proposed Scheme

Scheme Key Features	Outline Description
Permanent Scheme Elements	
Light Rail track	3.9km extension to the Luas Green Line track from Broombridge to Finglas (2.8km of grass track, 700m of embedded track and 360m of structure track)
Depot Stabling facility	A new stabling facility (with stabling for eight additional LRVs) will be located just south of the existing Broombridge terminus, as an extension of the Hamilton depot area.
Luas Stops	Four Stops located at: St Helena's, Finglas Village, St Margaret's Road and Charlestown to maximise access from the catchment area including the recently re-zoned Jamestown Industrial Estate.
Main structures	Two new Light Rail Transit (LRT) bridges will be constructed as part of the proposed Scheme: a bridge over the River Tolka within the Tolka Valley Park and a bridge over the Royal Canal and the Iarnród Éireann (IÉ) railway line at Broombridge. A number of existing non-residential buildings shall be demolished to facilitate the proposed Scheme. In addition, the existing overbridge at Mellows Park will be demolished.
At grade signalised junctions	10 at grade signalised junctions will be created at: Lagan Road, Ballyboggan Road, Tolka Valley Road, St. Helena's Road, Wellmount Road, Cappagh Road, Mellows Road, North Road (N2), McKee Avenue, Jamestown Business Park entrance. Note: The junction at Charlestown will be reconfigured but does not have a LRT crossing.
Uncontrolled crossings	13 at grade uncontrolled crossings (11 pedestrian / cycle crossings and two local accesses located at: Tolka Valley Park, St Helena's, Farnham pitches, Patrickswell Place, Cardiff Castle Road, Mellows Park, St Margarets Road, and ESB Networks.
Cycle facilities	Cycle lanes are a core part of the proposed Scheme in order to facilitate multimodal "cycle-LRT trips". Approximately 3km of segregated cycle lanes and 100m of non-segregated cycle lanes along the route. Covered cycle storage facilities will be provided at Broombridge Terminus, Finglas Village Stop and St Margaret's Road Stop and within the Park & Ride facility. "Sheffield" type cycle stands will be provided at all stop locations.
Power substations	Two new traction power substations for the proposed Scheme will be located near Finglas Village Stop behind the existing Fire Station, and near the N2 junction before St Margaret's Road Stop where the current spiral access ramp to the pedestrian overbridge is located. A third substation is required for the Park & Ride facility.
Park & Ride facility	A new Park & Ride facility, with e-charging substation, located just off the M50 at St Margaret's Road Stop will be provided with provision for 350 parking spaces and secure cycle storage to facilitate multimodal "cycle-LRT trips". The building will feature photovoltaic (PV) panel roofing and is the location for an additional radio antenna. This strategic Park and Ride facility will intercept traffic on the N/M2, before congestion begins to form.
Temporary Scheme Elements	
Construction compounds	There will be three principal construction compounds, two located west of Broombridge Road and one located at the northern extents of Mellows Park. In addition, there are other secondary site compound locations for small works/storage. Details can be found in Chapter 6 (Construction Activities) of this EIAR.

Table 7-2: Summary of New Bridges of the proposed Scheme

Identity	Location	Description
Royal Canal and Rail Bridge	Approximately 10m east of the existing Broome Bridge and then continuing north, parallel with Broombridge Road on its east side	The proposed bridge is an eight-span structure consisting of two main parts: a variable depth weathering steel composite box girder followed by a constant depth solid concrete slab. The bridge has the following span arrangement: 35 + 47.5 + 30 + 17 + 3x22 + 17m. Steel superstructure extends over the first three spans. The bridge deck is continuous over the full length of 212.5m and has solid approach ramps at both ends.
Tolka Valley Park Bridge	Approximately 30m west of the existing Finglaswood Bridge	A three-span structure with buried end spans, thus appearing as a single span bridge. End spans as well as part of the main span consist of post-tensioned concrete variable depth girder, the central section of the main span is a suspended weathering steel composite box girder. The overall length of the bridge is 65m with spans 10m, 45m, 10m.

7.2 Methodology

7.2.1 Study Area

The population which has the highest potential to experience effects arising from the construction and operation of the proposed Scheme will be those living primarily within a relatively short distance of the proposed Scheme infrastructure. Those individuals have the potential to be exposed to various emissions such as noise and vibration and emissions to air, which are predicted to occur in both the Construction and Operational Phases. It is important to note that not everybody within the study area would be equally affected by the same level of emissions, from a human health perspective.

Individuals living within 500m from the proposed Scheme will be potentially most affected, given the way noise and vibration and air emissions attenuate with distance. Therefore, the study area for the human health assessment will be predominantly within 500m of the proposed Scheme, although it is recognised that some potential effects will extend beyond this, including impacts on human health from traffic and waste disposal, and these are considered where relevant to this assessment.

Similarly, those at the outer limit of the study area, outside 250 metres, will have imperceptible effects from some emissions such as airborne and noise and will be scoped out if the evidence is of no effect.

During the Operational Phase there will still be potential impacts within this study area but the population using the proposed Scheme on completion also need to be considered, which will extend well beyond 500m from the alignment.

7.2.2 Relevant Guidelines, Policy and Legislation

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

- Addressing Human Health in Environmental Impact Assessment per EU Directive 2011/92/EU amended by 2014/52/EU Consultation Draft November 2019 (IAIA, 2019);
- Air Quality Standards Regulations 2022 (S.I. No. 739/2022);
- British Standard (BS) 5228-1:2009+A1:2014 – Code of Practice for Noise and Vibration Control on Construction and Open Sites Part 1: Noise;
- Human responses to lighting based on LED lighting solutions (CIBSE, 2016);
- Guidelines for Planning Authorities and An Bord Pleanála on carrying out Environmental Impact Assessment, (DoHLGH, 2018);
- Determining Significance for Human Health in Environmental Impact Assessment (IEMA, 2022);
- Directive 2008/50/EC of the European Parliament and of the Council of 21 May 2008 on ambient air quality and cleaner air for Europe (EU, 2015);
- Effective Scoping of Human Health in Environmental Impact Assessment (IEMA, 2022);

- Environmental Impact Assessment of Projects - Guidance on the preparation of the Environmental Impact Assessment Report (European Union, 2017);
- Addressing Human Health in Environmental Impact Assessment (EUPHA, 2019);
- Guidelines on the Information to be Contained in Environmental Impact Assessment Reports (EPA, 2022);
- Guidance Note for Noise: Licence Applications, Surveys and Assessments in Relation to Scheduled Activities (NG4) (EPA, 2017);
- Guidelines for treatment of tourism in an Environmental Impact Statement (Fáilte Ireland, 2011);
- Health Impact Assessment Resource and Tool Compilation (US EPA, 2016);
- Health in Environmental Impact Assessment - A Primer for a Proportionate Approach (IEMA, 2017);
- Impact Assessment Outlook Journal (Volume 8: October 2020) - Health Impact Assessment in Planning (IEMA, 2020);
- Health Impact Assessment Guidance (IPH, 2021);
- Human Health Ensuring a High Level of Protection (IAIA, 2020);
- World Health Organisation (WHO) Night-time Noise Guidelines for Europe (WHO, 2009);
- WHO Environmental Noise Guidelines for the European Region 2018 (WHO, 2018);
- WHO Air Quality Guidelines (WHO, 2021); and
- WHO Guidelines for Community Noise (WHO, 1999).

Transport Infrastructure Ireland (TII) has commissioned guidance on the assessment of human health impacts within EIAR, specifically for infrastructure projects. This guidance is outlined in document PE-ENV-01108, Population and Human Health Assessment of Proposed National Roads – Standard. While this document has not yet been published at the time of writing¹, it is expected to be available in the coming weeks. The documents referenced above have been used in the development of this guidance and it seems unlikely that the guidance will deviate significantly from the existing sources, but rather integrate these sources with an emphasis of the Irish context. Therefore, the methodology described will be compatible with the forthcoming guidance.

Transport Infrastructure Ireland (TII) has developed specific guidance on assessing human health effects within Environmental Impact Assessment Reports (EIAR), with a focus on infrastructure projects. General Approach

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 (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'.

¹ As of 15th September 2024.

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 is 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 Scheme will need to be identified and compared against reliable health-based standards. Reliable sources of the standards are regulatory such as the EU, such as Air Quality Standards, or based on expert opinion, such as is provided by the WHO (as in 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,

‘the assessment of other health & safety issues are carried out under other EU Directives, as relevant. These may include reports prepared under the Industrial Emissions, Waste Framework, Landfill, Strategic Environmental Assessment (SEA), Seveso III, Water Framework Directive, 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 Institute of Environmental Management and Assessment (IEMA) 2022 documents, Guide to Effective Scoping of Human Health in Environmental Impact Assessment (Pyper et al., 2022) and Guide to Determining Significance for Human Health in Environmental Impact Assessment (Pyper et al., 2022), which are identified to be relevant in the UK and in Ireland, describe what is required for a proportionate assessment of the impacts on health. This guidance is useful 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 documents 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 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 on what should be contained in an EIAR.

The IEMA notes 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 per the IEMA discussion 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 a person’s physical mental and social wellbeing be that positive or negative. As outlined in the International Association on Impact Assessment (IAIA) Document of 2020 human health within EIA (IAIA, 2020), 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;
- Socio-economic impacts on human health;
- Impacts on amenity resources and subsequent effects on human health; and
- Potential for psychological effects.

The EIAR Chapter topics have been reviewed for their potential to create effects that would impact human health. Table 7-3 lists the EIAR Chapters and states whether they are included in the human health assessment and the rationale for this.

Table 7-3: EIAR Chapters included in the Human Health Assessment

Chapter	Input into Human Health (Yes / No)	Rationale
Chapter 8 (Population)	Yes	This Chapter refers to Human impacts although there is relatively little overlap.
Chapter 9 (Biodiversity)	No	No relevant overlap with this Chapter.
Chapter 10 (Water)	Yes	Covered in terms of assessing human health risk associated with contamination of waterbodies
Chapter 11 (Land and Soils: Soils, Geology & Hydrogeology)	Yes	Covered in terms of assessing human health risk associated with contamination of groundwater
Chapter 12 (Land Take)	No	No relevant overlap with this Chapter.

Chapter	Input into Human Health (Yes / No)	Rationale
Chapter 13 (Air Quality)	Yes	Covered in terms of human health risk arising from air quality and dust emissions, including from traffic.
Chapter 14 (Climate)	Yes	Covered in terms of the proposed Schemes vulnerability to extreme weather events.
Chapter 15 (Noise and Vibration)	Yes	Covered in terms of human health risk arising from noise and vibration emissions.
Chapter 16 (Electromagnetic Compatibility & Interference)	Yes	Covered in terms of the potential magnitude of stray current.
Chapter 17 (Material Assets: Infrastructure & Utilities)	No	No relevant overlap with this Chapter.
Chapter 18 (Material Assets: Traffic & Transport)	Yes	Covered in terms of traffic congestion and its relation to 'annoyance', and the positive impacts of traffic relief from the Operational Phase.
Chapter 19 (Material Assets: Resource & Waste Management)	Yes	The health effects referred to in this chapter include dust arising from waste handling which are covered under Chapter 13 (Air Quality) Impacts and the health effects associated with contaminated soils which are dealt with under Chapter 11 (Land and Soils: Soils, Geology & Hydrogeology)
Chapter 20 (Cultural Heritage)	No	No relevant overlap with this Chapter.
Chapter 21 (Landscape & Visual Amenity)	Yes	Covered in terms of impacts on Amenity Resources and Subsequent Effects on Human Health.
Chapter 22 (Risk of Major Accidents & Disasters)	No	No relevant overlap with this Chapter.

7.2.2.1 Sensitivity of Receptors

In practice, some human beings are more sensitive than others, by reason of their age, health status or other reasons. However, no attempt has been made to try to identify specific individual sensitivities or vulnerabilities as this would not be feasible, nor necessarily worthwhile. Patient confidentiality and General Data Protection Regulations (GDPR) would prevent doctors and healthcare practitioners from divulging information about their patients. Even if it were possible, it still would not aid the assessment of human health impacts. The humans that are vulnerable today, will not necessarily be those who are vulnerable during the Construction and/or Operational Phases. In order to be conservative, and in keeping with the reasonably foreseeable worst-case approach, it has been assumed that there are vulnerable individuals at every receptor. In addition, the assessment is aided because health-based standards are derived to protect the vulnerable and not the robust. This is the reason that, in this Chapter no attempt has been made to identify individual sensitive or vulnerable receptors, but rather to assume that all receptors are vulnerable.

For reasons of consistency, sensitive or vulnerable receptors, are looked at in terms of their importance, sensitivity and functional value. In terms of human health however there is considerable overlap between all of these. This section will outline the general principles for assessing impacts on Human Health in an Environmental Impact Assessment. The health impact assessment will be carried out for all.

The sensitivity of an area or building in this context refers to the vulnerability of the population. Reasons for this include inherent vulnerability such as is the case for the very young or old. Locations where there are higher numbers of vulnerable individuals such as hospitals and nursing homes are considered to be 'very highly sensitive' and require special consideration where potential effects are possible. Where it is clear, however, that very highly sensitive receptors have negligible effects, perhaps because of their distance from Luas Finglas, these are scoped out.

Residences, schools, workplaces, commercial areas and places of worship are considered ‘highly sensitive’. This is because these areas will include populations of elderly, young people and people with health conditions. However, the majority of the population in these locations are likely to be less vulnerable than those in the very highly sensitive locations.

Areas where recreational activities are carried out are considered to be ‘sensitive’ as these locations are typically only occupied during the day, and not necessarily continually. They will be used by children and the elderly but usually only for limited periods of time.

Sensitivity is also considered to increase with increased duration of exposure to emissions. For example, it is true that those indoors are less sensitive to emissions than those outdoors, as potential exposures are less. However, this is balanced by the fact that people tend to spend much more time indoors. Therefore, no major distinction has been made between indoors and outdoors.

7.2.2.2 Importance

In the context of Human Health, all individuals are regarded as equally important, and as such, there is only one level of importance. For consistency with other chapters in this EIAR, this term is used accordingly.

The use of the term ‘importance’ in this context refers to areas or buildings occupied by people. Their importance is considered to increase as the number of people increases and the duration of time spent there increases.

The EPA ‘Advice Notes for Preparing Environmental Impact Statements’ (EPA, 2003) indicates that neighbouring occupied premises and land uses that should be considered include the following:

- Homes;
- Hospitals;
- Healthcare facilities;
- Hotels and hotel accommodation;
- Schools and rehabilitation workshops;
- Tourism and recreational facilities; and
- Visitor attractions.

Residential areas, public and private health facilities, workplaces, commercial areas and educational facilities are considered to be ‘very important’ areas because a number of persons usually spend significant time at these locations. Places of worship and recreational areas are considered to be ‘important’ areas of the baseline environment because they are used in a more transient way and people usually spend less time in these places. The intermittent but significant use of these spaces by various segments of the population warrants their classification as ‘important’.

The classification of ‘medium importance’ in human health terms is based on the level of human presence and the amount of time typically spent in these areas. Areas designated as ‘medium importance’ usually have fewer people present and those who are there tend to spend less time compared to areas deemed ‘very important’ or ‘important.’

For instance, these areas might include industrial zones or certain types of infrastructure facilities. While these locations do see human activity, it is generally more sporadic and less concentrated compared to residential, healthcare, commercial, or educational settings. The limited human presence and shorter duration of stay reduce the potential health impact on the population, thereby categorizing these areas as of ‘medium importance.’

7.2.2.3 Functional Value

In Human Health terms, there is some overlap when one considers sensitivity and Functional Value. The Functional Value of the baseline environment is evaluated to take into account the importance and sensitivity of different features of the environment, and the greater the Functional Value, increased attention is required

for the assessment. The Functional Value assigned is a product of the importance and sensitivity and a ‘Very high’ Functional Value is assigned when either or both the sensitivity or importance of a location is considered to be very high as shown in Table 7-4 below.

Table 7-4: Criteria for Baseline Categorisation

Criteria	Functional Value
Residential areas Health facilities Educational facilities Workplaces Commercial / retail facilities	Very high (V)
Recreational areas Places of worship	High (IV)
Agricultural areas Open green spaces Brownfield sites	Medium (III)
Not applicable	Low (II)
Not applicable	Very low (I)

Of the ‘Very high’ Functional value locations, health facilities and educational facilities merit special attention given the numbers of people there, for significant periods of time, and their potential vulnerability. This is reflected in this Chapter.

7.2.2.4 Data Sources

There are difficulties in performing a quantitative health assessment for EIA as outlined by the Institute of Public Health. Not least of these is the difficulty in getting baseline health data (due to patient confidentiality, GDPR (General Data Protection Regulation) and other reasons), to accurately determine levels of even relatively common medical conditions in a 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 and in the absence of an accurate baseline, it is very difficult to assess qualitative and quantitative changes that might occur. Generalised data may exist for larger areas such as a city or county, but this would at most, provide an estimate of the local baseline and not be accurate enough to allow for meaningful interpretation.

Such data collection would only be necessary if it was proposed to perform a HIA and it is appropriate to consider if a HIA is necessary or event appropriate. It is still entirely possible to perform an appropriate and in-depth assessment of human health impacts in the absence of a HIA, using the methodology in the EPA guidelines 2022 as outlined above and used for this assessment.

7.2.2.5 Magnitude of Impacts

The main tool used to assess the potential impacts on human health is the risk assessment process. This process identifies a hazard and assesses the potential effects on human health. A hazard is something that has the potential to cause harm and the risk is the likelihood that harm will occur. A risk assessment therefore determines the likelihood of harm occurring. The likelihood of harm occurring is, in most instances, related to the amount or dose to which a human being is exposed.

Dose Response Risk Assessment

A dose response relationship indicates that the higher the dose the more likely a response is to occur, and in many instances the more severe a response. Even psychological risks show this dose response relationship as the more stress and annoyance people experience, the more likely there is to be an actual impact on psychological health.

This knowledge that the risk to health is usually associated with the magnitude of the exposure to the hazard allows an assessment of likely effects on human health to be determined given the likely exposure. That is, the risk can be assessed if the likely exposure is predicted.

The first step is therefore to identify the hazards, then the magnitude of exposure and then to assess the likely health effects. Within this EIAR, the potential impacts which affect human health have been identified (Hazard Identification). The scale of these potential impacts (Dose-Response Assessment) and their duration (Exposure Assessment) is assessed and the significance of the potential effect on human health determined (Risk Characterization). The Health Impact Assessment Resource and Tool Compilation (US EPA 2016) presents this four-step approach graphically and this is shown in Figure 7-1. It should be noted that this is precisely the same approach, albeit somewhat expanded, as outlined by the Irish EPA.

When using a recognised Health-Based Standard for a particular hazard, the dose response assessment is included in the standard. This means that the authorities or expert committees which recommended the level of the standard will have taken into account the health problems at the different exposure levels and set the level within the standard to prevent these problems from occurring (Refer to Figure 7-1).

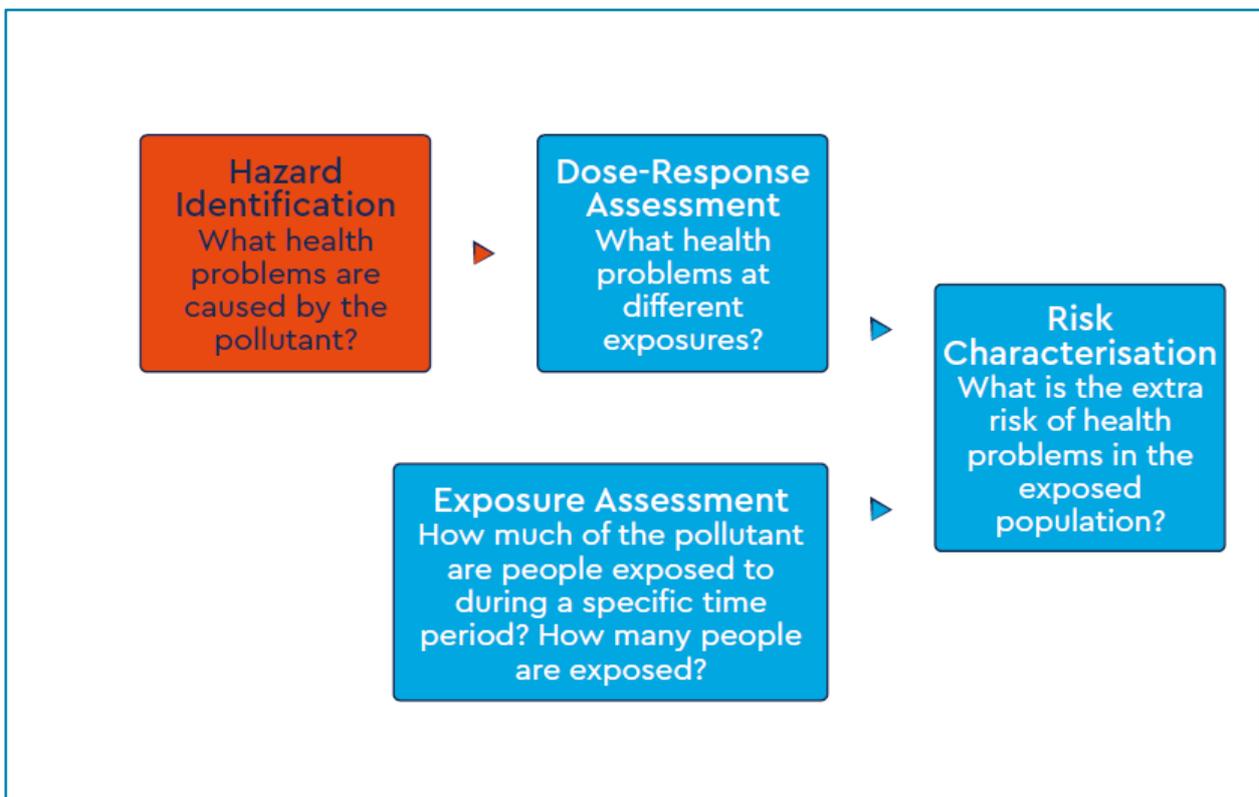


Figure 7-1: Four-Step Human Risk Assessment Process (US EPA, 2017)

Socio-economic Impacts on Human Health

Improved socio-economic status is associated with improved health measures such as longevity. People who work live longer and enjoy better health than the unemployed, who generally suffer poorer physical and psychological health outcomes. Indeed, providing and encouraging employment, and with it, improved financial means, is one of the most important contributors to public health. Whilst socio-economic gains are worthwhile in themselves, it is important to realise that they are also associated with an improvement in health status.

Projects that provide environmental benefits, protect the population from public health dangers, support regeneration, reduce unemployment and improve socio-economic circumstance can contribute to improving the health and wellbeing of communities. Some of the ways these goals can be achieved is that they can make an area more attractive for investment, increase tourism and facilitate sustainable travel. Although negative effects on socio-economic development are possible, the link between socio-economic conditions and positive health outcomes is so strong that improving socio-economic situations can be used as a surrogate for human health effects. In other words, by predicting an improving socio-economic situation, one can anticipate an improvement in health outcomes.

This was reinforced by the 2019 publication by the HSE, ‘Population Health and Demographics’; the following observations were made:

‘There is a strong link between poverty, socio-economic status and health’.

The assessment of human health for the proposed Scheme, in terms of health improvement, includes an assessment on how the proposed Scheme would impact on the socio-economics of the community (in addition to the assessment undertaken in Chapter 8 (Population) of this EIAR. This chapter focuses on how the proposed Scheme would impact on health inequalities as a result of socio-economic impacts.

7.2.2.6 Areas of Assessment

Impacts on Amenity Resources and Subsequent Effects on Human Health

Amenity can be described as a desirable or useful feature of a place. It is something that helps provide comfort, convenience or enjoyment for people. In human health terms amenity can relate to factors such as the ability to exercise using sporting facilities, parks, footpaths, cycle lanes and roads. Amenity also extends to the ability for individuals to relax, which has definite human health benefits.

The human health assessment of impacts on amenity primarily relate to opportunities for exercise for all including able bodied and disabled individuals. The assessment covers potential loss and gains of amenity.

The key criterion in relation to general amenity is community wellbeing. Direct effects on communities due to loss of facilities, amenity space and natural areas can impact on community wellbeing and interaction. Indirect effects will result from changes in environmental quality, for instance, from noise or visual intrusion and are cross-referenced where applicable with relevant chapters of the EIAR. Impact levels are defined in Table 7-5.

Table 7-5: Criteria used in the Assessment of Amenity impacts

Impact Level	Significance Criteria
Imperceptible	No noticeable change in the character of the environment
Not Significant	An effect which can cause noticeable changes in the character of the environment, but without significant consequences for the community’s wellbeing, amenity or health
Slight	A small impact on community wellbeing can be attributed to the proposed Scheme
Moderate	A moderate impact on the community wellbeing can be attributed to the proposed Scheme
Significant	An effect which has the potential to impact on community wellbeing such as to affect people’s behaviour and quality of life
Very Significant	An effect which has the potential to substantially impact on community wellbeing such as to affect most people’s behaviour and quality of life
Profound	Effects of a scale to significantly impact on community wellbeing to an extent that people’s behaviour or quality of life is substantially changed, for example where significant health issues arise or where people wish to relocate

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 are expected to 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 impacts on a person's overall psychological wellbeing. 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 have different effects on different people. For example, for some individuals, demolishing an old building is viewed as removing an eyesore or making way for something better but alternatively for others, it can be seen as a loss of heritage or in some instances, their homes.

Another example of this is how people reacted to the COVID-19 pandemic. Many had very significant concerns about contracting COVID-19, with increased levels of anxiety, 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 is those looking forward to increasing employment opportunities: both directly, in the potential for employment during the Construction and Operational Phases of the proposed Scheme, and indirectly by improved public transport during the Operational Phase.

There will also be negative effects of varying degrees. These can be minimised by construction and operational mitigation measures and also by communication and provision of regular factual information.

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.

7.3 Baseline Environment

The receiving environment is a standard urban and a sub-urban environment. There are residential, commercial, and industrial land uses, along with educational facilities, buried utilities and telecommunication equipment. Outside of the urban environment, the proposed Scheme passes mostly through green areas.

7.3.1 Health Profile

From a human health perspective, the assessment considers primarily those that are considered the most likely to be affected and includes people who live or work within 500m of the proposed Scheme. However, impacts beyond this area were also reviewed to ensure more distant effects were also taken in account.

'Health in Ireland Key Trends' (2022) is the most recent health statistics report published by the Department of Health. It provides a summary of health and healthcare statistics for the country over the past ten years. In Ireland, there has been an increase in life expectancy and a decrease in mortality rates. Mortality rates in Ireland have declined 15.8% since 2012. In 2022, 81% of people in Dublin stated that their health was good or very good compared with 86% in 2016. Nationally, 83% of people stated that their health was good/very good, compared with 87% in 2016. It should be noted that the apparent drop is considered reflective of the time of the sample as it was done as the country emerged from the pandemic.

The Healthy Fingal Strategic Plan 2021 to 2025 states that *'the majority of the indicators showed that Fingal was in line with or positively exceeding the national average. The areas where Fingal/ Dublin had a two to three negative percentage difference from the national average included:*

- A lower percentage of people who have attempted to quit smoking in the past 12 months (Dublin based);
- A higher proportion of residents that have drunk alcohol in the past year and of drinkers who drink at least once a week (Dublin based);
- A higher proportion of young person (18 – 34 years) prevalence of usage of any illegal drug in the last year and in their lifetime (Dublin based);
- A higher percentage of children aged 15–17 who reported having ever had sex (Dublin based);
- A higher percentage of women who would describe at least one of their pregnancies as a crisis pregnancy (Dublin based);
- A lower percentage of people who have had sex education who said it was helpful or very helpful in terms of preparing them for adult relationships (Dublin based);
- A more diverse range of responses to the question ‘what time of the month do you think a woman is most likely to become pregnant?’ between its male and female population (Dublin based);
- A higher number and rate of HIV diagnoses by HSE area (HSE Area East - Dublin, Kildare, Wicklow);
- A higher proportion of HIV positive and new HIV positive cases found through the HIV antenatal screening programme by HSE (HSE Dublin North East region);
- A lower proportion of accepted referrals offered first appointment and seen within 12 weeks by CAMHS (CHO Area 9);
- A higher proportion of young people with a probable mental health problem (Dublin based);
- A higher percentage of children who are absent from school for 20 days or more in the school year and a higher proportion of student days lost for primary schools (non-attendance) (Dublin based);
- The highest number of people accessing local authority managed emergency accommodation out of eight regions. (Dublin based);
- A higher proportion of children living in lone-parent households (Dublin based);
- A higher proportion of households private renting (Fingal based); and
- LHO Dublin North has one of the lowest immunisation rates in the country.’

In 2015, County Health Profiles were published on the HSE website under the Healthy Ireland Strategy which is a national framework to improve the health and wellbeing of the people of Ireland. A group comprising the Health Services Executive and Lenus, the Irish Health Repository, have published these health profiles for all local authorities in Ireland. These reports have been used to establish a community health profile for the proposed Scheme.

From a human health perspective, the assessment considers primarily those that are most likely to be affected and includes people who live or work within 500m of the proposed Scheme. However, impacts beyond this area were also reviewed to ensure more distant effects were also taken in account.

The County Health Profile (HSE Public Health Profile Working Group, 2015) notes the following key facts for Fingal:

- Is the second most affluent Local Authority in Ireland, 85% of its population are either above average or affluent;
- Has a low dependency ratio of 46.0% (i.e. Those aged 0-14 and 65 years and over as a proportion of those aged 15-64)-national rate 49.3%;
- Is the most diverse population nationally with 24.5% of its population being of ethnicity other than white Irish;
- Has the lowest percentage nationally of those who report their health being bad or very bad at 1.1%, or persons with disability at 10.2% (national 1.5% and 13.0% respectively);
- Has the highest birth rate population nationally at 20.2/100,000 population and the second highest rate for breast feeding of 53.7% (national 46.6%);
- Cancer incidence rates are higher than average for female malignant melanoma, male colorectal cancer and male and female lung cancers (County data); and
- Has the lowest suicide rate nationally of 5.6/100,000 population.

The County Health Profile for Dublin City (HSE Public Health Profile Working Group, 2015) highlights the following key facts:

- Has a dependency ratio of 38.4% (i.e. those aged 0-14 and 65 years and over, as a proportion of those aged 15-64) – the national rate is 49.3%;
- Has a high level of households which are local authority rented at 11.5% (the national rate is 7.8%)
- Has a diverse population with 21.3% of the population who are not white Irish;
- Has a higher-than-average number of persons who report their health as being bad or very bad 2% (nationally, 1.5%) or who have a disability 14.9% (nationally, 13.0%);
- Has a greater than average birth per 1,000 rate for those aged under 20, of 19.0 (the national rate is 12.3);
- Cancer incidence rates are higher than average for female malignant melanoma, male colorectal cancer and male and female lung cancers (County level data); and
- Mortality rates are above the national average for heart disease and stroke in those aged under 65 years (County level data).

In terms of deprivation, Table 7-6 shows the area of the proposed Scheme and includes some of the most affluent and least affluent / most deprived areas in the state.

Table 7-6: Social Class of the population (CSO, 2022)

	Fingal	Dublin	EMRA	State
Professional workers	8.94%	10.08%	8.9%	8.12%
Managerial and technical	32.88%	30.44%	29.75%	28.08%
Non-manual	18.46%	17.36%	17.58%	17.58%
Skilled manual	12.87%	11.82%	13.23%	14.11%
Semi-skilled	8.52%	8.33%	9.31%	10.52%
Unskilled	2.8%	3.07%	3.34%	3.58%
All Others Gainfully				
Occupied and unknown	15.55%	18.92%	17.89%	18.01%

7.3.1.1 Effects of Emissions

The two single major influences on potential human health impacts are changes in noise and vibration and air quality. This is not to say that other aspects cannot have significant human health effects as well but rather these are generally the most important.

The reader is referred to section 15.3 of Chapter 15 (Noise and Vibration) of this EIAR which outlines in great detail the baseline environment which is potentially impacted by the construction and operational phase of the scheme.

Chapter 13 (Air Quality) of this EIAR similarly includes much of this but also considers potential impacts from traffic which can extend beyond the study area.

7.3.2 Sensitive Receptors

Receptors have been identified within each of the specialist EIAR chapters and assessed in line with the study area requirements, guidance and methodologies relevant and specific to these chapters. All receptors which are occupied by human beings are being considered as sensitive.

While residential dwellings will be considered from a human health perspective, the two specific receptor types which merit special attention are healthcare and educational facilities. The sensitive receptors identified in these categories are named in the following sections.

7.3.2.1 Healthcare Facilities

Healthcare facilities are very important but vary in their sensitivity. For example, hospitals and nursing home facilities care for the sick and vulnerable members of the community and are very highly sensitive (24-hour care). Facilities such as health centres are also highly sensitive, despite treating only patients over a short period of time. However, due to the exposure, greater emphasis should be given to facilities such as hospitals and nursing homes within the Study Area. It is noted that there are no hospitals identified within the Study Area.

Healthcare facilities and Nursing Homes are identified in Table 7-7 and Table 7-8 respectively.

Table 7-7: Health Centres Within the Study Area

Name	Name
Cabra Health Centre	Dr James Kirrane GP
Finglas Family Practice	Charlestown Medical Centre (GP Surgery)
Finglas Medical, Centric Health	Melville Medical Centre
The Village Medical Centre	Dr Desmond Day, Family Practice Physician
Clune Road Medical Centre	Ballygall Health Centre

Table 7-8: Nursing Home Facilities Within the Study Area

Name	Name
St Helena's Drive Assisted Living	The Ardmore by CareChoice – Finglas Nursing Home
Santa Sabina House Nursing Home	

7.3.2.2 Educational Facilities

Educational facilities are considered to be of high sensitivity. Also considered are facilities either dedicated to or who provide educational services to persons with special needs and/or disabilities. This assessment is aided by the fact that health based standards are there to protect the vulnerable rather than the robust. If the standards are observed, then it is reasonable to predict no significant adverse effects no matter how vulnerable individuals are.

Educational facilities have been broadly divided into primary, secondary and third level in Table 7-9, Table 7-10 and Table 7-11 below.

Table 7-9: Primary Schools in the Study Area

Name	Name
St Oliver Plunkett's NS	Gaelscoil Uí Earcáin
St Malachy's NS	St Kevin's NS
St Finian's National School	St Brigid's Senior NS
St Finbarr's Boys NS	St Brigid's Infant NS
St Fergal's Boy NS	St Joseph's Girls NS

Name	Name
Finglas Parochial NS	Holy Family School for the Deaf ²
St Canice's Primary School	St Catherine's School
St Joseph's School for Deaf Boys	Broombridge Educate Together School

Table 7-10: Secondary Schools in the Study Area

Name	Name
St Michael's Holy Faith Secondary School	Cabra Community College
Coláiste Eoin	Coláiste Mhuire
Holy Family School for the Deaf ²	St Declan's College
St Dominic's College	Youthreach Cabra

Table 7-11: Third-level Education Establishments in the Study Area

Name	Name
Coláiste Íde College of Further Education	City of Dublin Adult Education Centre

7.4 Potential Impacts

As outlined above in the Methodology section, in terms of human health protection, emissions during the Construction or Operational Phases of the proposed Scheme were identified and compared against reliable health based standards. Reliable sources of the standards are 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.

7.4.1 Do Nothing Scenario

In the Do-nothing scenario, there is likely to be a continued growth in private transport including private cars, as there are limitations on alternatives. The Do-Nothing scenario has potential for adverse psychological impacts. Progressively longer journey times and uncertainty will be associated with increased annoyance at least, and at worst, will impact on psychological health, if persistent.

7.4.2 Construction Phase

7.4.2.1 Introduction

As outlined in the CTMP (in Volume 5 – Appendix A6.2), some disruption is predicted during the Construction Phase. There will be a direct impact of construction activities such as noise and dust, and indirect, such as from necessary traffic diversions and controls, which have potential to give annoyance in some instances. However significant controls to minimise the direct effects are outlined elsewhere in the EIAR, with these mitigation measures incorporated in the CEMP (in Volume 5 - Appendix A6.1), CTMP and are also referenced in Chapter 25 (Summary of Mitigation Measures, Monitoring and Residual Impacts) of this EIAR.

² The Holy Family School for the Deaf caters for deaf pupils from age 3-18 and is therefore acknowledged under both Primary and Secondary School groupings.

To ensure clarity, a review of the identified adverse impacts in the EIAR chapters relevant to the Construction Phase of the human health assessment has been conducted. The potential health effects are included and presented in Table 7-12 below.

Table 7-12: EIAR Chapter Impacts and the Potential Health Effects (Construction Phase)

EIAR Chapter	Identified Impact	Potential Health Effect
Chapter 10 (Water)	Human health risk associated with contaminated water	Potential for gastrointestinal illnesses caused by viruses, bacteria and parasites associated with contaminated groundwater
Chapter 10 (Water)	Human health risk associated with contamination with leachate from the historical landfill	Potential for health problems such as skin irritation or gastrointestinal illnesses as a result of chemical or pathogen exposure
Chapter 10 (Water)	Human health risk associated with re-exposure of historically settled contaminants within or near the waterbodies	Potential for gastrointestinal illnesses from exposure to harmful contaminants
Chapter 11 (Land and Soils: Soils, Geology & Hydrogeology)	Presence of potentially contaminated soil	Potential for contractors to experience skin irritation or respiratory issues due to exposure to harmful contaminants
Chapter 11 (Land and Soils: Soils, Geology & Hydrogeology)	Contamination of groundwater	Potential for gastrointestinal illnesses caused by viruses, bacteria and parasites associated with contaminated groundwater
Chapter 13 (Air Quality)	Potential for Aspergillus airborne during demolition and earthworks	Potential respiratory infections arising from the spread of Aspergillus spores
Chapter 13 (Air Quality)	Increased dust emissions from Construction	Potential annoyance and respiratory issues for vulnerable people
Chapter 13 (Air Quality)	Traffic Emissions	Potential annoyance for road users
Chapter 13 (Air Quality)	Risk from asbestos-containing materials	Potential asbestosis for contractors from exposure to asbestos containing materials
Chapter 14 (Climate)	Human health risk associated with extreme wind	Potential for physical injury due to damaged or windblown infrastructure
Chapter 14 (Climate)	Human health risk associated with flooding in parts of Finglas village & Tolka Valley Park areas	Potential for physical injury or gastrointestinal illnesses as a result of exposure to pathogens
Chapter 15 (Noise and Vibration)	Construction Working Hours	Potential annoyance, sleep disturbance and interference with communication
Chapter 15 (Noise and Vibration)	Human discomfort from the vibration associated with bored piling	Potential annoyance, sleep disturbance and interference with communication
Chapter 15 (Noise and Vibration)	Noise and Vibration Impacts on Stakeholders	Potential annoyance, sleep disturbance and interference with communication

EIAR Chapter	Identified Impact	Potential Health Effect
Chapter 15 (Noise and Vibration)	Psychological effects arising from annoyance from construction activities	Potential annoyance, sleep disturbance and interference with communication
Chapter 15 (Noise and Vibration)	Noise and vibration emissions from construction traffic	Potential annoyance, sleep disturbance and interference with communication
Chapter 15 (Noise and Vibration)	Impact of works undertaken in proximity to Ravens Court	Potential annoyance, sleep disturbance, severance and interference with communication
Chapter 18 (Material Assets: Traffic & Transport)	Impacts on Traffic	Potential annoyance for road users
Chapter 19 (Material Assets: Resource & Waste Management)	Potential for impacts on human health of construction workers from exposure to contaminants in the sub-surface during construction	Potential for contractors to experience skin irritation or respiratory issues due to exposure to harmful contaminants

7.4.2.2 Construction Phase Impacts

The key impacts during the Construction Phase are as follows:

Air Quality

Air quality standards are predicted to be exceeded locally and briefly during the Construction Phase. As outlined in Chapter 13 (Air Quality) of this EIAR, using the IAQM methodology for the assessment of air quality impacts from construction activities has indicated that the risk of dust impacts and ecological impacts for demolition, earthworks, construction, and trackout is high, but the impacts on human health are considered to be low risk. For ease of reference, the post-mitigation summary of impact significance table from Chapter 13 (Air Quality) is reproduced below, in Table 7-13.

Table 7-13: Summary of Significance of Impact including Site-specific Mitigation

Potential Impact	Significance			
	Demolition	Earthworks	Construction	Trackout
Dust Soiling	Negligible	Negligible	Negligible	Negligible
Human Health	Negligible	Negligible	Negligible	Negligible
Ecological	Negligible	Negligible	Negligible	Negligible

Nevertheless, some noise and dust escape from the construction site is inevitable. However, this will be at levels which would not affect human health in physical terms but could potentially cause annoyance. For example, soiling of surfaces such as windowsills, dust on cars and laundry, and noise affecting sleep quality - particularly for those who are trying to sleep during working hours such as shift workers - and annoyance as a result of the above. This could also happen due to traffic delays arising from controls being put in place and which are necessary to allow for construction.

An extensive dust mitigation plan is outlined in Chapter 13 (Air Quality). These measures, when correctly implemented according to the management plan, will significantly reduce dust levels outside the immediate construction area and protect construction workers within the construction area. The relevant Standards are the Ambient Air Quality Standards Regulations 2022 (S.I. No. 739/2022). Detailed mitigation measures have been defined in a form suitable for implementation by way of a planning condition and will be included in a Construction Environmental Management Plan.

When the dust mitigation measures detailed in Chapter 13 are implemented, the potential for fugitive dust emission effects at the nearest sensitive receptors will be controlled to ensure impacts are of negligible

significance. Taken together with the mitigation measures recommended, the existing low background particulate (PM₁₀ & PM_{2.5}) concentrations, and the determination of mitigation measures suitable for a high risk during the construction activities, the significance of dust impacts at the nearest receptor locations will be negligible. The assessment of Construction Phase traffic has found that as the construction of the proposed Scheme will include less than 200 additional HDV traffic flows per day on the existing road network, there will be no significant construction traffic impact on local air quality. The Construction Phase of the assessment identifies a generally negligible impact on air quality in the vicinity of the proposed Scheme. Therefore, it is considered that the residual effects with the EPA Guidelines (EPA, 2022) and considering the likely effects of emissions from the proposed Scheme construction, the likely effects on Human Health are considered overall Neutral, Not Significant, and Medium-Term.

Aspergillus

The assessment in Chapter 13 (Air Quality) also considered potential health impacts from Aspergillus. Aspergillus is ubiquitous in the environment and can become airborne through everyday activities like composting, gardening, and DIY projects, however, it is only a concern during large-scale activities. The majority of people are immune, but invasive aspergillosis can harm those with suppressed immune systems such as hospital inpatients, although no such sensitive receptors were identified within the proposed Scheme study area.

The National Guidelines (Health Protection Surveillance Centre 2018) note that the fundamental requirements in preventing Aspergillus infection arising from construction works are, first, to minimise the dust generated during construction and, second, to prevent dust infiltration into patient care areas. A competent contractor will prepare an Aspergillus Prevention Plan in line with the National Guidelines for the Prevention of Nosocomial Aspergillosis (HSE, 2018), which includes risk assessment and dust mitigation measures.

The assessment in Chapter 13 (Air Quality) considered potential health impacts from Aspergillus. With the proposed mitigation measures, the risk of invasive aspergillosis is assessed as Negative, Not Significant, and Short-term.

Noise and Vibration

Noise and Vibration are assessed in Chapter 15 (Noise and Vibration) in Volume 2 of this EIAR. The Construction Phase is relatively short-term in any one location and therefore any elevated levels of noise will be of limited duration. A large number of noise-sensitive locations, including residential, commercial, educational, and amenity areas, are identified with predicted noise effects at each location.

In human health terms there will be sensitive individuals in some of these locations. Examples of especially sensitive individuals in relation to noise include people, and perhaps especially children, with autism spectrum disorder (ASD). These can be particularly susceptible to noise. It is important to point out that while some people with ASD suffer from hyperacusis or particular vulnerability to sounds, this does not mean all do. Even if it was possible to identify all persons with ASD, this would over represent those who are particularly vulnerable. It would not be possible in advance to identify where all of these individuals would be and indeed even if it was, their locations are subject to change. Therefore, in human health terms There is no attempt to identify each location, but to consider each and every location as a sensitive receptor.

Emissions from construction activity, including noise and vibration from construction traffic, will occur and are likely to cause some degree of annoyance, particularly close to the construction activity.

The mitigation measures presented in Chapter 15 (Noise and Vibration) of this EIAR include construction methods compatible with BS 5228. These measures are designed to protect the most vulnerable individuals, including people with ASD and other sensitivities. An extensive mitigation plan is outlined to ensure that the effects of noise and vibration are minimized. The standards and mitigation measures put in place are designed to protect sensitive receptors from significant human health effects.

A summary of the predicted effects at each location is outlined in Table 15-28 in Chapter 15 (Noise & Vibration) of this EIAR. Following the implementation of the mitigation measures, the elevated levels of noise

are not expected to pose any risk to human health. The residual, post-mitigation effects are outlined in section 15.6 in Chapter 15 (Noise and Vibration) of this EIAR, which is not reproduced here but can be referred to in the chapter.

This is not to say that there will not be any impact as outlined in Chapter 15 (Noise and Vibration) of this EIAR. Emissions from the construction activity will occur, as with any construction activity. Some noise and vibration emissions will also occur from construction traffic. Overall, the effects are assessed as Slight, negative, and short-term. While there will be some degree of annoyance, particularly close to the construction activity, the extensive mitigation plan ensures that there will be no significant human health effects.

In summary, the population-level impacts are deemed to be slight, although this does not mean that the impact on every single individual is slight. The effects are assessed as Slight, negative, and short-term.

Electromagnetic Effects & Stray Current

Electromagnetic Effects and Stray Current are assessed in Chapter 16 (Electromagnetic Effects and Stray Current) of this EIAR. The impacts of electromagnetic fields (EMF) during the Construction Phase are considered to be negligible but this will be further assessed for the Operational Phase section where electromagnetic stray current is of greater relevance.

No significant effect is predicted during the Construction Phase.

Vermin

There might be concern that vermin poses a problem, particularly during the Construction Phase of the Proposed Scheme. Any construction activity that involves groundworks can result in the mobilisation of existing vermin. However, any displaced vermin would rapidly move out of sight again. There is no reason why there would be any change in the underlying vermin population as a result of the proposed Scheme and as such an adverse effect on human health from vermin is not predicted.

Psychological Effects

Communities are likely to experience annoyance from the temporary impacts of traffic management and other effects during the construction phase.

Whilst individual annoyance cannot be discounted, annoyance alone does not constitute a health effect. There is no evidence that there are any significant effects on human health from simply transient levels of annoyance. In these circumstances, the negative impacts are assessed as Slight and short term.

While it is possible that certain individuals, particularly those with vulnerabilities such as ASD, experience a heightened psychological response to noise, there is no evidence to suggest a broader population-wide psychological impact. The assessment is therefore limited to evaluating effects at the population level.

Assessment of Potential Impacts on Receptors

While some impacts on human health are outlined above, none of these are assessed as reaching a level of significance. This is particularly so when the controls and mitigations outlined in Chapter 25 (Summary of Mitigation Measures, Monitoring and Residual Impacts) are enforced. Therefore, no significant adverse human health effects are predicted during the Construction Phase.

7.4.3 Operational Phase

7.4.3.1 Introduction

The proposed Scheme, once operational, will provide more regular and reliable public transport to the area in an environmentally efficient manner. From a human health impact assessment perspective, the health effects of an operational scheme are assessed as significantly positive. It provides for a speedy and efficient means of transport which includes a means of getting to work and leisure facilities but also improving access to other services, including health services.

The fact that this is provided in an efficient and environmentally friendly manner and provides people options for getting out of their cars will encourage exercise as outlined in Get Ireland Active (Department of Health, 2016).

The identified adverse impacts in the EIAR chapters pertinent to the Operational Phase of the human health assessment and the associated potential health impacts are detailed in Table 7-14 below.

Table 7-14: EIAR Chapter Impacts and the Potential Health Effects (Operational Phase)

EIAR Chapter	Identified Impact	Potential Health Effect
Chapter 14 (Climate)	Human health risk associated with extreme wind	Potential for physical injury due to damaged or windblown infrastructure
Chapter 14 (Climate)	Human health risk associated with flooding in parts of Finglas village & Tolka Valley Park areas	Potential for physical injury or illness arising from exposure to pathogens
Chapter 15 (Noise and Vibration)	Increased airborne noise generated at St. Helena's Childcare Centre	Potential annoyance and interference with communication
Chapter 15 (Noise and Vibration)	Vibration transfer to buildings in closest proximity to the track at Finglas Village Stop	Potential annoyance and interference with communication
Chapter 15 (Noise and Vibration)	Noise from rail corrugation and squeal	Potential annoyance and interference with communication
Chapter 16 (Electromagnetic Compatibility and Interference)	The magnitude of stray currents is likely to be detectable on structures closest to the alignment (within 10m to 20m)	Potential low-intensity, brief electrical shocks that may cause discomfort but do not result in lasting harm
Chapter 22 (Risk of Major Accidents & Disasters)	Impacts from infectious diseases	Staff and passengers are vulnerable to the risk of virus outbreak

7.4.3.2 Operational Phase Impacts

The key impacts during the Operational Phase are as follows:

Air Quality

This is extensively assessed in Chapter 13 (Air Quality) of this EIAR.

As outlined in Chapter 13, as the proposed Scheme is electrified, there will be no air pollutant emissions from its operation to appraise.

The predicted change in air quality is primarily attributed to the redistribution of road vehicles, which will impact on air quality-sensitive receptors near the extension to Luas Broombridge Hamilton depot, the Park & Ride facility near St Margaret's Road, and along traffic diversion routes within the study area due to the operation of the proposed Scheme.

Potential impacts to local air quality relate to alterations to traffic patterns (e.g. introduction of Park & Ride facility traffic flows or due to redistributed traffic on the surrounding road network), with particular attention focused on areas where the proposed Scheme will result in increased traffic flows in proximity to sensitive air quality receptors.

As stated, there are properties along the existing roads in the study area that will experience a net reduction in road traffic pollution with the proposed Scheme in operation, as a direct result of reducing the number of vehicles that will pass along these roads per day. A reduction of greater than 1,000 vehicles per day will occur along roads in the study area such as Patrickswell Place, Finglaswood Road, St Margarets Road and North Road (south and north of St. Margarets Road). This has the effect of reduced emissions to air from traffic in these areas.

Conversely, there are properties along the existing roads in the study area that will potentially experience a net increase in road traffic pollution with the proposed Scheme in operation as a direct result of the predicted increase in the number of vehicles that will pass along these roads per day. An increase of greater than 1,000 vehicles per day will occur along roads in the study area such as a short section of Finglas Road (R135), Wellmount Road, Glasanaon Road, Jamestown Road (south and north of Melville Road) and Charlestown Place.

However, in those areas that are predicted to have an increase, all predicted air pollutant concentrations at all air quality sensitive receptors in proximity to the extension to Luas Broombridge Hamilton depot, the Park & Ride facility near St Margaret's Road and along diverted traffic routes within the study area due to the operation of the proposed Scheme will remain in compliance with the ambient air quality standards. The proposed Scheme has negligible air quality impacts at all modelled receptors, so no specific Human Health effects are predicted. Refer to further detail in section 13.2.4.3 of Chapter 13 (Air Quality) in Volume 2 of this EIAR.

The overall assessed impacts on human health are assessed as negligible or slightly positive and long term.

Noise and Vibration

For the Operational Phase, no significant noise or vibration impacts associated with the operation of the LRT have been identified in Section 15.6.3 of Chapter 15 (Noise & Vibration) of this EIAR. Noise standards were considered including the World Health Organisation.

In October 2018, the WHO issued updated Environmental Noise Guidelines for the European Region and also issued specific guidelines for railway noise, the principal provisions contents of which are summarised below.

For average noise exposure, they recommend reducing noise levels produced by rail traffic below 54 decibels (dB) L_{den} , as LRT traffic noise above this level is associated with adverse health effects.

For night noise exposure, they recommended reducing noise levels produced by rail traffic during night-time below 44dB L_{night} , as night-time rail traffic noise above this level is associated with adverse effects on sleep.

It is noteworthy that the WHO provides the rationale for these guideline levels. The 54 decibels (dB) L_{den} level is based on annoyance criteria rather than more serious health effects. In fact, there is an overall dearth of evidence of adverse effects of railway noise as compared for example with road noise and aircraft noise. The 44dB L_{night} level is based on sleep disturbance, but it is perhaps surprising how conservative the levels are when one realises that this level represents only 3% of the population self-reporting as highly sleep disturbed. To put this further in context even at levels of 55dB L_{night} , the percentage of people self-reporting sleep disturbance is still only 6%.

The Guidelines specifically state that, *'to reduce health effects, the GDG (Guideline Development Group) strongly recommends that policymakers implement suitable measures to reduce noise exposure from road traffic in the population exposed to levels above the guideline values for average and night noise exposure. For specific interventions, the GDG recommends reducing noise both at the source and on the route between the source and the affected population by changes in infrastructure.'*

While these statements refer to noise exposure from road traffic, their relevance to the proposed Scheme can be understood through the displacement of road traffic that the project will cause. The introduction of the Luas Finglas is expected to reduce the volume of road traffic in the area, which can lead to a decrease in road traffic noise exposure for residents.

The fact is that these guidelines are for populations. The WHO realise that every individual residence will not be below 44dB L_{night} . However, the question in relation to the assessment of the impact on health will be determined by the overall impact on the population. As the population impacts due to environmental noise, particularly in the Operational Phase, the provision of relatively quiet public transport options is very much in keeping with WHO guidelines.

The residual impact assessment results discussed in Chapter 15 (Noise and Vibration) indicate that 38 assessment locations, of which only 13 are residential or educational Noise Sensitive Locations, exceed the WHO recommended rail noise threshold of 54dB L_{den} . For these most sensitive residential receptors the pre-existing baseline levels are such that the rail noise level is not contributing any significant amount to the overall noise environment. As a result, it is concluded that the risk of there being a significant increase in those highly annoyed by noise is low.

Furthermore, only 17 Noise Sensitive Locations were identified with night-time sensitivity which would exceed the WHO night-time recommended rail noise threshold of 44dB L_{night} . The calculated noise levels range between 45 and 52dB L_{night} at these locations. For those above 45dB L_{night} , once added to the prevailing ambient noise environment, the impact is Slight.

Electromagnetic Effects & Stray Current

Electromagnetic Effects and Stray Current was assessed in Chapter 16 (Electromagnetic Effects and Stray Current) of this EIAR.

The assessment concluded that the operation of the electrified line, and support systems will be in-line with current best practices in relation to design and installation. Similar projects such as the existing Luas currently operate well inside the guideline limits on human exposure to EMF.

As stated in Chapter 16, although unlikely, future developments such as extensions and new building at locations including theatres, musical venues, stadiums, domestic or commercial premises that bring unapproved audio equipment within 20m of the lines could potentially experience interference in the audio frequency range. However, no human health impact would be expected from these potential events.

Continued monitoring of the performance of the traction circuit with respect to current returns to the substation will be required. The monitoring proposed is outlined in Chapter 16. This will ensure that in the unlikely event that there is an exceedance that this will be detected and remedied. This will ensure no significant human health impact.

Often there are concerns in relation to implantable electronic devices such as pacemakers and implantable defibrillators. All modern devices are governed by EU standards and regulations and have to be sufficiently shielded against the levels of EMF that may occur in the general environment. The levels predicted in Chapter 16 are well within the safe levels for these devices and no adverse effect is predicted.

No impacts on human health from EMF are envisaged during the Operational Phase of the proposed Scheme.

Psychological Impacts

As outlined in the methodology section, 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.

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.

Many people will utilise the proposed Scheme, when operational, to meet their transport needs. This includes getting to work, accessing services or any other reasons. This means they will not be in cars, and they will not be dealing with issues associated with traffic and traffic jams. This means that there is expected to be positive psychological impact on those people.

There are increased opportunities for exercise because of the easier, more frequent access to public amenity areas, such as Tolka Valley Park, and other areas of physical activity. In turn, this would also have a positive effect on psychological health, as well as physical health.

While some might experience annoyance for a variety of reasons during the Operational Phase there is no reason to believe that this would exceed the positive psychological effects. Overall, the impact on human health is deemed as probably positive, in that the overwhelming majority will experience positive effects, but at worst, neutral.

Physical Activity

Anything that leads to potential increase in physical activity has the potential to lead to improvement in health outcomes, both for physical health and psychological health, as already outlined in Section 7.2.2.5. By facilitating a modal shift from car to rail transport, a resultant increase in physical activity will occur. When people travel by car, they usually travel the entire distance by vehicle. The car is parked as close to their home as possible, and they will typically park as close to their destination as possible. When people travel by public transport the mode of travel from home to station and station to destination would often be by walking or cycling. The provision of such a public transport network therefore facilitates additional physical activity with resultant human health benefits.

As outlined in Chapter 8 (Population) of this EIAR, there are very few existing cycle facilities in the study area. Cycle lanes have been included in the design of the proposed Scheme and will follow the alignment providing for improved connectivity in the same manner but allowing for direct accessibility to destinations between stops including shops, workplaces, community facilities and parks.

Connections will be provided to the proposed GDA Cycle Network which includes proposed cycle lanes on Mellows Road and McKee Avenue. Crossing sequences for cyclists and pedestrians will be incorporated at all signalised crossings providing for relief from existing severance, particular at locations such as Ballyboggan Road, St Helena's Road, Mellows Road, Finglas Road and St Margaret's Road. Given the near absence of a cycle infrastructure in the study area at present, the new infrastructure included in the proposed Scheme will represent a profoundly positive impact.

There will also be a significant positive impact in pedestrian paths within the footprint of the scheme including at locations such as St Helena's Park and Farnham Park, including new smooth surfacing.

By improving access to places of exercise including parks and other areas, and by facilitation of safer cycling and walking in the vicinity of Luas Finglas, the population will be able to exercise more frequently and easily. The impact is assessed as profoundly positive and long term.

Socio-economics Effects on Health

One of the best reviews of the benefits of improved public transport in Ireland was published by PublicPolicy.ie in July 2020 by Hynes and Malone entitled 'The utility of Public transport in Ireland Post Covid 19 Lockdown and Beyond'. The following is an abstract.

'Investment in public transportation has positive direct and indirect induced effects on job creation and retention, business output, GDP and increased tax returns (Weisbrod & Reno, 2009). Social benefits include improved communal cohesion with public transport often serving peripheral, isolated and deprived communities thus reducing the effect on social fragmentation and social exclusion (Li & Deng, 2016; Lucas, 2012). It also offers opportunities for developing and enhancing social capital (Hall, 2010; Mattisson, Håkansson, & Jakobsson, 2015). Public transport can aid public health as it complements the use of active travel modes as walking to and from stops and stations helps physically inactive populations attain some necessary daily physical activity (Le & Dannenberg, 2020; Patterson, Webb, Millett, & Laverty, 2019; van Soest, Tight, & Rogers, 2020). A good public transport system can also help improve air quality and, thus, general health.'

Whilst these comments relate to public transport, in general, rather than specifically to the proposed Scheme, it is reasonable to extrapolate that this important improvement in public transport for one of the most populated areas in the country will bring social economic and health benefits. Some examples include:

- Improved public transport can reduce social isolation by making it easier for residents to visit friends and family, participate in community activities, and engage in social events;

- Access to community centres, libraries, and recreational facilities will be enhanced, promoting social cohesion and a sense of community;
- The extension of the Luas line to Finglas will provide residents with easier access to major employment hubs in Dublin, such as the city centre, the Docklands, and other business districts. For example, a resident living in Finglas will be able to commute to a job in the Dublin Docklands more quickly and reliably using the Luas compared to the longer and less dependable bus journey. This makes it feasible for more residents to consider job opportunities in that area;
- Enhanced public transport connectivity can also attract businesses and investors to the area, fostering economic growth and creating more local jobs; and
- A student from Finglas will be able to travel more easily to Trinity College Dublin or University College Dublin, opening up opportunities for higher education that might have been logistically challenging without the Luas extension.

In summary, the proposed Scheme is expected to bring substantial socio-economic benefits that will enhance the overall quality of life for residents by improving access to essential services and opportunities. The impact is assessed as positive and long term.

Access to Services

An improved public transport system will also assist those who wish to access services, including healthcare. Enhanced connectivity will provide residents with better access to hospitals, clinics, and other health-related providers across Dublin. This can lead to improved health outcomes by removing, or at least decreasing, obstacles to accessing timely medical interventions and regular check-ups.

For example, a patient needing regular visits to St James's Hospital will find it much easier to attend appointments with the proposed Scheme. The Luas Finglas extension will streamline and simplify the journey by enhancing connectivity with the Luas Red Line. It will create a direct link to the existing Green Line, which intersects with the Red Line, reducing the number of transfers needed. This optimisation of travel time is crucial for patients who find multiple transfers cumbersome and tiring, ensuring better continuity of care and health outcomes. Additionally, residents will have easier access to specialised healthcare services that are not available locally, such as mental health services, physiotherapy, and specialist consultations. A positive human health effect is predicted from increased access to services.

While there are significant benefits for the population of the greater Dublin and indeed people visiting the area, from having a rapid and efficient public transport system, the individuals who will have the greatest benefit are those who are living in the vicinity of the proposed Scheme itself. These residents will have greater opportunities to use the LRT, making it a viable option for many of their transport needs.

This convenience is assessed as a Significant Positive and Long-term benefit.

Reduction in Inequalities

The proposed Scheme will help to reduce inequalities by improving access to employment for those dependent on public transport. The groups that would benefit most are the socially disadvantaged and some people with disabilities, noting that there is often an interrelationship between disability and deprivation give that car ownership among disabled people and socially disadvantaged is lower. No aspects of the proposed Scheme that will have a likely significant contribution to a widening of health inequalities have been identified.

The proposed Scheme will upgrade some pedestrian and cycle routes to a better standard. This will likely reduce health inequalities for pedestrians and cyclists. Cycling generally carries a five to 10 times higher risk of injury per kilometre travelled than driving a car.

The proposed Scheme will not only introduce greatly improved active travel infrastructure, but will also reduce traffic along the route, further increasing safety for pedestrians and cyclists. Overall, the assessed impacts on in relation to inequalities will be Positive, Very Significant and Long-term.

Climate

Climate change is a very significant threat to the planet, nature but also to human health. This is readily apparent in many parts of the world but also in Europe. An example of this are the unprecedented heat waves causing many fatalities.

Increased climate events such as flooding effects people both physically and psychologically. People can lose their homes, their property but also sometimes their employment. Businesses that shut because of the flooding event, do not always reopen. Therefore, it is important to consider climate change in relation to potential human health effects. As outlined in Chapter 14 (Climate), it is concluded that the proposed Scheme achieves the project objectives in supporting the delivery of an efficient, low carbon and climate resilient public transport service, which supports the achievement of Ireland’s emission reduction targets.

In the opening year 2035, Luas Finglas will deliver an increase of 1.3 million low carbon public transport trips per annum.

The reductions in general traffic flows in the study area have been assessed and have a positive impact to the environment. The proposed Scheme will reduce CO_{2eq} emissions due to the removal of cars from the road network. This represents a significant contribution towards the national target of 500,000 additional trips by walking, cycling and public transport per day by 2030 as outlined as a target in the latest Climate Action Plan (CAP24). It is concluded that the proposed Scheme will make a significant contribution to reduction in carbon emissions.

7.5 Mitigation and Monitoring Measures

7.5.1 Mitigation

7.5.1.1 Construction Phase

Detail on the mitigation measures that are linked to human health outcomes can be found in the following EIAR chapters: Chapter 10 (Water), Chapter 11 (Land and Soils: Soils, Geology & Hydrogeology), Chapter 13 (Air Quality), Chapter 15 (Noise & Vibration), and Chapter 22 (Risk of Major Accidents & Disasters). These are summarised in Chapter 25 (Summary of Mitigation Measures, Monitoring and Residual Impacts) of this EIAR. Mitigation already outlined in these chapters will effectively mitigate any human health risks without the need for any additional mitigation.

The Contractor will have to implement a Construction Environmental Management Plan and a Health and Safety Plan to protect workers, control environmental pollution, and protect members of local communities from construction activities. The Construction Environmental Management Plan (CEMP) has been prepared for the EIAR and can be found in Volume 5 - Appendix A6.1 of this EIAR.

No additional mitigation, over and above that outlined in the chapters above, is proposed for Human Health.

For the purposes of clarification, the identified mitigation in the above chapters for the impacts relevant to the human health assessment are contained in Table 7-15 below. The residual health effect is also included.

Table 7-15: Mitigation and Residual Health Effects (Construction Phase)

EIAR Chapter	Identified Impact	Identified Mitigation	Residual Health Effect
Chapter 10 (Water)	Human health risk associated with contaminated water	The control and management measures set out in the CEMP and SWMP will be implemented. An Emergency Incident Response Plan has been prepared	No likely significant residual health impact predicted
Chapter 10 (Water)	Human health risk associated with contamination with	The appointed Contractor will implement in full all of the measures set out in the CEMP; and the Contractor will be responsible for regular testing of excavated soils to monitor the suitability of the soil for re-use.	No likely significant residual health impact predicted

EIAR Chapter	Identified Impact	Identified Mitigation	Residual Health Effect
	leachate from the historical landfill	Samples of ground suspected of contamination will be tested for contamination by the Contractor and ground excavated from these areas will be disposed of to a suitably licensed or permitted site, in accordance with the current Irish waste management legislation.	
Chapter 10 (Water)	Human health risk associated with re-exposure of historically settled contaminants within or near the waterbodies	Shallow land drains will not be provided in the vicinity of the historical landfill in Tolka Valley Park to avoid re-exposure of historically settled contaminants. Surface water runoff from haulage roads will be allowed to runoff onto adjacent parklands.	No residual health impact predicted
Chapter 11 (Land and Soils: Soils, Geology & Hydrogeology)	Potentially contaminated soil posing risk to human health	The updated CEMP will identify construction methodologies for the proposed Scheme and standard operating procedures that will be implemented to minimise the impact.	No likely significant residual impacts
Chapter 11 (Land and Soils: Soils, Geology & Hydrogeology)	Human health risk associated with contamination of groundwater	Topsoil stripping / earthworks removal will not be carried out over large areas in advance to limit the time for which groundwater vulnerability in these areas is increased during construction. During piling activities, an appropriate piling method will be selected that will reduce the risk of cross-contamination from made ground into the underlying groundwater. Construction activities will be undertaken in compliance with guidance set out in CIRIA's Control of water pollution from linear construction.	No likely significant residual impacts
Chapter 13 (Air Quality)	Potential for Aspergillus airborne during demolition and earthworks	An Aspergillus Prevention Plan will be completed by a specialist to ensure the prevention of Aspergillus spores spreading	No likely significant residual impacts.
Chapter 13 (Air Quality)	Increased dust emissions from Construction	Implementation of Dust Management Plan	Potential annoyance but no residual health impact predicted
Chapter 13 (Air Quality)	Traffic Emissions	The contractor will produce a Construction Logistics Plan to manage the sustainable delivery of goods and materials	Potential annoyance but no residual health impact predicted
Chapter 13 (Air Quality)	Risk from asbestos-containing materials	A Demolition Survey of all buildings to be demolished will be required prior to commencement of demolition works. Asbestos-containing materials will only be removed from site by a suitably permitted/licensed waste contractor and will be brought to a suitably licensed facility.	No likely significant residual impacts
Chapter 14 (Climate)	Human health risk associated with extreme wind	The lighting masts and elevated signs designed to comply with appropriate guidance.	No likely significant residual impacts
Chapter 14 (Climate)	Human health risk associated with flooding in parts of	The abutment construction will take approx. 8 – 10 weeks, a short enough period to lower the risk of flooding during construction.	No likely significant residual impacts

EIAR Chapter	Identified Impact	Identified Mitigation	Residual Health Effect
	Finglas village & Tolka Valley Park areas		
Chapter 15 (Noise and Vibration)	Construction Working Hours	The proposed construction working hours are mostly limited to daytime hours only from Monday to Friday and to Saturday morning periods.	Potential annoyance but not expected to pose any risk to human health
Chapter 15 (Noise and Vibration)	Human discomfort from the vibration associated with bored piling	A communication programme will be established by TII to inform receptors in advance of any potential intrusive works which give rise to vibration levels likely to result in significant effects. The nature and duration of the works will be clearly set out in all communication circulars as necessary. Activities capable of generating significant vibration effects with respect to human response will be restricted to daytime hours only and appropriate vibration isolation shall be applied to plant, where required and where feasible.	Potential annoyance but no residual health impact predicted
Chapter 15 (Noise and Vibration)	Noise and Vibration Impacts on Stakeholders	A full monitoring and auditing programme will form part of the Construction Noise and Vibration Management Plan (CNVMP) which will be agreed with the Local Authorities prior to the commencement of the Construction Phase.	Potential annoyance but no residual health impact predicted
Chapter 15 (Noise and Vibration)	Psychological effects arising from annoyance from construction activities	The appointed Contractor will select quiet plants and will monitor them to ensure construction noise threshold is not exceeded.	Potential annoyance but no residual health impact predicted
Chapter 15 (Noise and Vibration)	Noise and vibration emissions from construction traffic	Construction traffic noise will be limited by restricting speed limits, maintaining road surfaces and ensuring that all vehicles are properly maintained. In addition, any coverings on construction vehicles will be securely fastened before leaving site to avoid excessive ‘rattling’	Potential annoyance but not expected to pose any risk to human health
Chapter 15 (Noise and Vibration)	Impact of works undertaken in proximity to Ravens Court	Works at the entrance to Ravens Court will be undertaken as quickly as possible to avoid inconvenience for residents.	Potential annoyance but not expected to pose any risk to human health.
Chapter 18 (Material Assets: Traffic & Transport)	Impacts on Traffic	A CTMP will be updated and implemented by the appointed contractor.	Potential annoyance to road users but no residual health effect predicted
Chapter 19 (Material Assets: Resource & Waste Management)	Potential for impacts on human health of construction workers from exposure to contaminants in the sub-surface during construction	The updated CEMP will identify construction methodologies for the proposed Scheme and standard operating procedures that will be implemented to minimise the impact.	Limited potential for exposure to harmful contaminants

7.5.1.2 Operational Phase

No additional human health mitigation measures are proposed, other than those outlined in other chapters of this EIAR. The identified mitigation for the impacts relevant to the human health assessment are contained in Table 7-16 below. The residual health effect is also included.

Table 7-16: Mitigation and Residual Health Effects (Operational Phase)

EIAR Chapter	Identified Impact	Identified Mitigation	Residual Health Effect
Chapter 14 (Climate)	Human health risk associated with extreme wind	The lighting masts and elevated signs designed to comply with appropriate guidance.	No likely significant residual impacts
Chapter 14 (Climate)	Human health risk associated with flooding in parts of Finglas village & Tolka Valley Park areas	For the Tolka Valley Park Bridge, the abutments have been set back 5 meters from the edge of the river to provide adequate space for flood flow. The proposed drainage system through Tolka Valley Park incorporates bioretention areas, infiltration trenches, filter trenches and an attenuation pond. Attenuation has been provided in the form of tanks and nature-based solutions before discharging to the existing drainage network at greenfield runoff rates. The new elements of the drainage systems have been assessed for the critical storm 1 in 100-year flood condition (the critical storm will incorporate a 20% margin for climate change).	No likely significant residual impacts
Chapter 15 (Noise and Vibration)	Increased airborne noise generated at St. Helena's Childcare Centre	A new solid sound boundary treatment is to be installed, with a minimum height of 2.25m and at the western edge of the Childcare Centre from a suitable dense material such as masonry or solid timber fencing, offering suitable sound attenuation.	Potential annoyance but not expected to pose any risk to human health
Chapter 15 (Noise and Vibration)	Vibration transfer to buildings in closest proximity to the track at Finglas Village Stop	A floating slab track detail is being provided in the area approaching the Finglas Village Stop.	The impact of rail noise corrugation, vibration and squeal can cause annoyance but is not predicted to pose a human health risk
Chapter 15 (Noise and Vibration)	Noise from rail corrugation and squeal	Grinding rail surfaces will be carried out. As part of the rail maintenance programme conduct rail lubrication at these locations to minimise the risk and magnitude of any squeal noise generated as provided by on-board lubrication systems aboard all Luas fleet, both existing and proposed.	Potential annoyance but not expected to pose any risk to human health
Chapter 16 (Electromagnetic Compatibility and Interference)	Stray Current	Continued monitoring of the performance of the traction circuit with respect to current returns to the substation will be required.	Potential annoyance but not expected to pose any risk to human health.
Chapter 22 (Risk of Major Accidents & Disasters)	Impacts from infectious diseases	All guidance, standard operating procedures and control measures issued by the Government will be strictly adhered to	Staff and passengers are vulnerable to the

EIAR Chapter	Identified Impact	Identified Mitigation	Residual Health Effect
			risk of virus outbreak.

7.5.2 Monitoring

7.5.2.1 Construction Phase

No additional monitoring, over and above that outlined in the chapters above, is proposed for Human Health. A summary of the monitoring requirements outlined in the EIAR that will safeguard human health is presented below:

- The Dust Management Plan includes monitoring of dust deposition, dust flux, real-time PM₁₀ continuous monitoring, and/or visual inspections;
- A full monitoring and auditing programme will form part of the CNVMP, which will be agreed with the Local Authorities prior to the commencement of the Construction Phase;
- Areas which contained invasive species, where invasives were treated on-site or removed prior to the enabling and construction works, will require an ongoing post-construction monitoring programme to ensure that there is no reestablishment of any invasive species within these areas; and
- The appointed contractor shall carry out visual monitoring of surface water control measures (settlement tanks, silt fences, fuel storage areas etc.) on a daily basis. In addition, weekly visual inspections of the Royal Canal and the River Tolka will be carried out. Furthermore, surface water quality sampling will be undertaken at four locations: at stream outlets of the Finglaswood Stream, St Margaret’s Stream, and at the River Tolka, and Royal Canal. Four rounds of sampling will be undertaken.

7.5.2.2 Operational Phase

No additional human health monitoring measures, over and above that outlined in the chapters above, is proposed for Human Health.

7.6 Residual Impacts

7.6.1 Construction Phase

With the implementation of the mitigation measures proposed in Chapter 25 (Summary of Mitigation and Monitoring Measures) of this EIAR, no significant residual human health effects are predicted during the Construction Phase.

7.6.2 Operational Phase

As outlined previously, the impacts on human health during the Operational Phase are usually positive. The proposed Luas Finglas extension will bring a modern and sustainable means of public transport to the Finglas area, which will be used by both residents and visitors. While Dublin City already has other modern public transport modes in use, the proposed Scheme specifically targets an area that currently lacks direct light rail connectivity. This new LRT will serve as a means to travel to and from work, school, college and recreational activities for residents of Finglas and surrounding neighbourhoods, thereby contributing to overall wellbeing.

Analysis of census data indicates that around a quarter of households within the Finglas area do not have access to a private car. Poor levels of accessibility to employment areas and educational facilities by public transport are a significant barrier to employment for residents who don’t own or have access to a car. The provision of Luas Finglas will support these households without access to a car.

The Luas Finglas extension will enhance access to essential services, including healthcare facilities, by providing a reliable and efficient transport option. No significant residual human health adverse effects are predicted during the Operational Phase.

Through a combination of benefits including socio-economic benefits, access to services, access to exercise and potential psychological benefits, an overall positive impact on human health is predicted.

7.7 Cumulative Impacts

The cumulative assessment of relevant plans and projects has been undertaken separately in Chapter 24 (Cumulative Impacts) of this EIAR.

7.8 Difficulties Encountered in Compiling Information

No significant difficulties were experienced or encountered in undertaking this assessment.

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