16 Population and Human Health

16.1 Introduction

This chapter addresses potential impacts of the Proposed Project on population and human health.

The purpose of this assessment is to identify and assess the potential health and wellbeing effects of the Proposed Project on the surrounding population, and to deliver evidence based recommendations that maximise health benefits and reduce or remove potentially negative impacts.

The requirement to carry out an assessment of potential impacts on Population and Human Health is set out in the new EIA Directive (2014/52/EU). The recitals to the 1985 and 2011 Directives refer to 'Human Health' and include 'Human Beings' as the corresponding environmental factor. The 2014 Directive changes the title of this factor to 'Population and Human Health'.

According to the Draft Guidelines on the Information to be Contained in Environmental Impact Assessment Reports (EPA, 2017) "*in an EIAR, the assessment of impacts on population and human health should refer to the assessments of those factors under which human health effects might occur, as addressed elsewhere in this EIAR e.g. under the environmental factors of air, water, soil etc*."

The Draft Guidelines also note that:

"The legislation does not generally require assessment of land-use planning, demographic issues or detailed socio-economic analysis. Coverage of these can be provided in a separate Planning Application Report to accompany an application for planning permission"

An independent 'Socio-Economic Impact Assessment Report' has therefore been prepared as part of the planning application.

Potential impacts of the Proposed College Green Project on population and human health arise from traffic and transportation, air quality and climate, noise and vibration, townscape and visual, material assets: utilities and the risk of major accidents and/or disasters. These aspects are dealt with in the specific chapters in this EIAR dedicated to those topics.

In addition, issues such as health and safety and risk of major accident and/or disaster are dealt with in Chapter 17.

This Chapter refers to the findings of those assessments included elsewhere in this EIAR which human health effects might occur.

16.2 Assessment Methodology

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

- Draft Guidelines on the Information to be Contained in Environmental Impact Assessment Reports (Environmental Protection Agency, Draft August 2017);

- Advice Notes for Preparing Environmental Impact Statements, Draft September 2017;
- Guidelines on the Information to be contained in Environmental Impact Statements (EPA, 2002); and
- Advice Notes on Current Practice in the Preparation of Environmental Impact Statements (EPA, 2002).

16.3 Baseline Environment

This section provides an overview of the existing health status of the study area.

It should be noted that the description of the baseline environment of those factors under which human health effects might occur has been addressed elsewhere in this EIAR, under the environmental factors of traffic and transportation, air quality and climate, noise and vibration, townscape and visual and material assets: utilities.

16.3.1 Existing Population at Study Area

According to the Census 2016 results, there are 50,573 people living within the study area, with a projected growth in population by 22% before 2026 to 64,000.

Table 16.1 below identifies population changes within the study area (CSO 2006, 2011, 2016) and population projections.

Table 16.1: Population changes within study area (CSO 2006, 2011, 2016) and population projections

CSO Electoral District	Population 2006	Population 2011	Population 2016
Inns Quay C	2,672	2,709	2,757
Mansion House A	4,462	4,347	4,665
Mansion House B	869	1,069	1,311
Merchants Quay A	2,062	2,275	2,513
Merchants Quay B	3,901	3,822	3,966
Mountjoy A	3,760	5,326	5,389
North City	3,867	5,345	5,654
North Dock C	4,179	4,345	4,214
Rotunda A	4,672	4,698	5,965
Royal Exchange A	3,602	4,481	4,329
Royal Exchange B	2,020	1,914	2,082
St. Kevin's	5,206	4,910	5,122
Wood Quay A	2,743	2,669	2,606
	44,015	47,910	50,573

16.3.2 Existing Health Status of Ireland

The Department of Health's report '*Health in Ireland, Key Trends 2016*' (Department of Health, 2016) provides summary statistics on health and health care in Ireland over the past ten years.

According to the key trends, life expectancy in Ireland has increased by 2.4 years since 2005 and is now above the average for the EU (See **Figure 16.1**).

The greatest gains in life expectancy have been achieved in the older age groups reflecting decreasing mortality rates from major diseases. The proportion of life expectancy at age 65 to be lived in good health is higher for both men and women in Ireland compared with the EU-28 average.

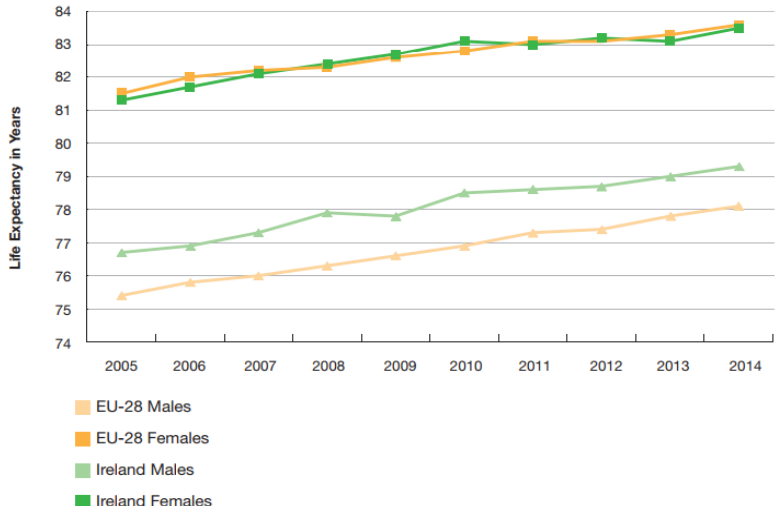

Figure 16.1: Life Expectancy at Birth, Ireland and EU-28 by Gender, 2005-2014[1]

In recent decades, Ireland has consistently recorded high rates of self-evaluated good health. Population health at the national level presents a clear picture of rapid decreases in mortality rates accompanied by a rapid rise in life expectancy during the past ten years.

In the areas of self-reported chronic illness and limitations in activities, Ireland continues to compare favourably with the EU average.

Mortality rates from circulatory system diseases fell by 28% between 2006 and 2015 and cancer death rates decreased by 13% over the same period. When cancer of the trachea, bronchus and lung are included, respiratory diseases accounted for 19% of all registered deaths in 2015.

Transport accident mortality rates have fallen by 51% in the past decade, infant mortality rates by 19%, and suicide rates by 6%.

For diseases of the circulatory system, mortality in Ireland was 9% below the EU average. For non-respiratory cancers, Ireland was 8% above average EU mortality.

[1] Source: Health in Ireland, Key Trends 2016 (Department of Health, 2016)

Rates of mortality from respiratory diseases were 40% higher in Ireland than the EU-28 average. Overall improvements in mortality rates and relatively high levels of self-rated health can mask variations between regions, age groups and other population subgroups.

As expected, causes of death are very different for those 65 years of age and over and those who die at age 64 or under. In the former case, 60% of all mortality is attributable to circulatory system diseases and cancer. For those under the age of 65 deaths from injury and poisoning are much more prominent than for the older age groups, accounting for 18% of all deaths, compared with around 2% of deaths for those over the age of 65.

Refer to Figure **16.2** for cause of death and death rates in Ireland.

TABLE 2.5
AGE-STANDARDISED DEATH RATES PER 100,000 POPULATION BY PRINCIPAL CAUSES OF DEATH, IRELAND AND EU-28, 2013

Cause	Ireland	EU-28	% difference Ireland -EU
All causes	1030.8	1,020.9	1.0
Circulatory system diseases	348.9	383.4	-9.0
Non-respiratory cancers	227.8	210.0	8.5
Respiratory system diseases (incl. cancer of trachea, bronchus and lung)	193.1	137.7	40.3
External causes of injury and poisoning	38.1	46.0	-17.1

Source: Central Statistics Office, Public Health Information System (PHIS) - Department of Health, Eurostat.

FIGURE 2.5
AGE-STANDARDISED DEATH RATES FOR SELECTED CAUSES, IRELAND, 1999 TO 2015

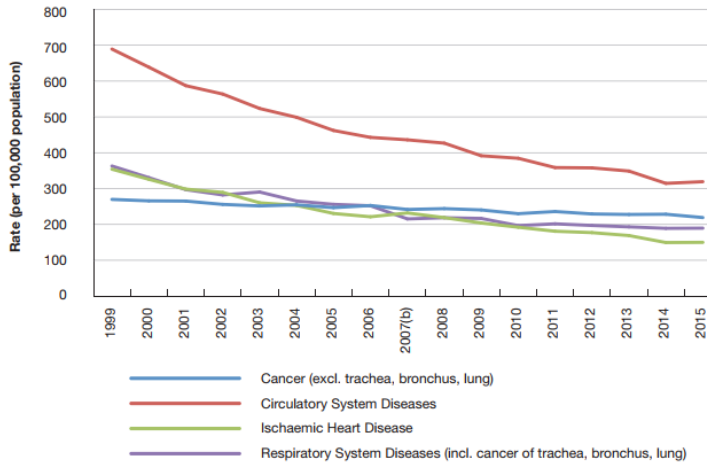

Figure 16.2: Death Rates in Ireland [2]

The results of the Census in 2011 include information on self-reported health. The vast majority of people in Dublin City (89%) reported that their health was good or very good, nine per cent stated that their health was fair and just two per cent reported bad or very bad health.

In relation to disabilities, the Dublin City Local Economic and Community Plan 2016-2022 (Dublin City Council, 2016) states that '*with 15 per cent of the Dublin City population reporting a disability in 2011, accessibility of the public realm and all the facilities, amenities and activities the city has to offer is a crucial issue.*'

Figure 16.3 shows the geographical spread of people with a disability in Dublin City in 2011. It is useful to examine the proportion of people with a disability in different age categories, 7 per cent of 0 – 14 year olds had a disability while the same was true for 13 per cent of 25 – 64 year olds and 43 per cent of those aged 65 years and over.

[2] Source: Health in Ireland, Key Trends 2016 (Department of Health, 2016)

This explains the variation in the map, with areas with older populations likely to have higher proportions of people with a disability than parts of the city where there is a predominately younger population.

As illustrated in **Figure 16.3**, some 10.1- 15% of the population of the proposed study area were recorded as having a disability in 2011.

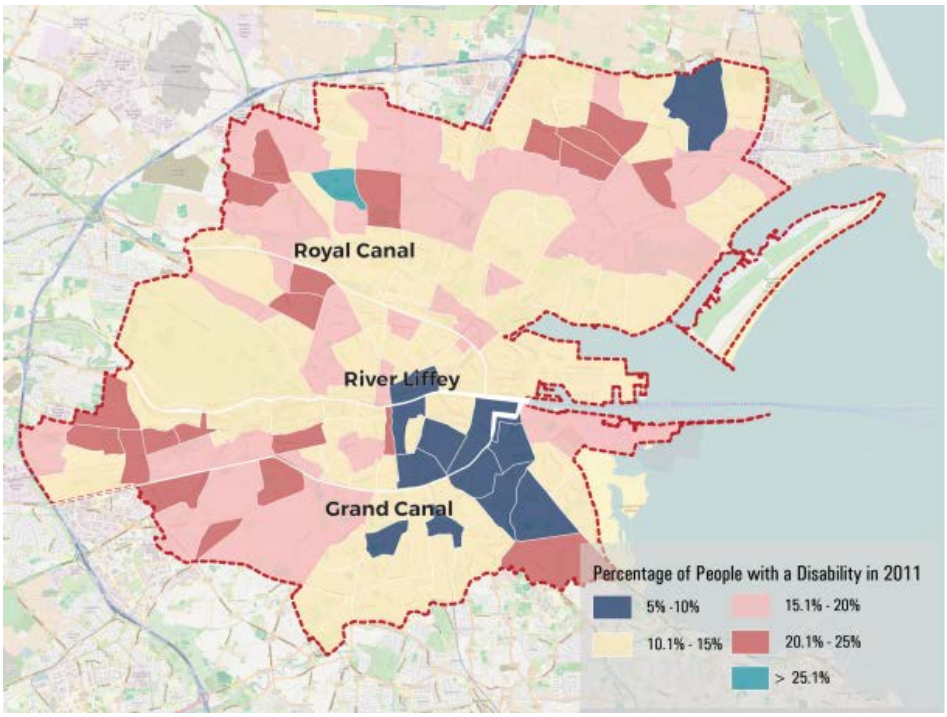

Figure 16.3: Geographical spread of people with a disability in Dublin City in 2011[3]

16.4 Predicted Impacts

This section provides an assessment of all of the potential and predicted impacts of the Proposed Project on population and human health. As outlined in Section 16.1, in accordance with the draft EPA guidelines, the assessment of impacts on population and human health refer to the assessments of those factors under which human health effects might occur, as addressed elsewhere in this EIAR e.g. under the environmental factors of air, water, soil etc.

16.4.1 Population

The Proposed Project will have an operational residual significant positive impact on business, retail and tourism, by improving the public realm in a city centre site, increasing the space available to people and activity, improving the quality of the experience of visiting Dublin and improving convenient walking access to economic, commercial, tourism, educational and social facilities in the area. The residual impact of the Proposed Project is considered to be significant and positive in the long-term.

[3] Source: CSO.ie

The transportation measures considered in Chapter 6 will support the increase in journeys into the city core through more redistribution of road space for more efficient public transport use and a significant improvement in the quality of public realm. Access to the city centre car parks will be maintained to support car-based shopping. While the re-routing of bus routes and bus stops from College Green will require some adjustment in the short term, the changes are within an acceptable threshold of change.

Taxi ranks in College Green will be re-positioned, but taxi access will remain crucial with ranks relocated close by and taxis maintaining access to all bus lanes. Furthermore, there will be improved access to College Green by Luas.

The implementation of the Proposed Project will improve the permeability of the city centre areas, and support the improved growth and integration of the city core.

16.4.2 Traffic and Transportation

16.4.2.1 Traffic and Transportation and Population/ Human Health

According to the World Health Organisation report '*Health Effects and Risks of Transport Systems: the HEARTS Project'* (World Health Organisation, 2006), road traffic is a major cause of adverse health effects – ranking with smoking and diet as one of the most important determinants of health in Europe.

Traffic-related air pollution, noise, crashes and social effects combine to generate a wide range of negative health consequences, including increased mortality, cardiovascular, respiratory and stress-related diseases, cancer and physical injury. These affect not only transport users but also the population at large, with particular impact on vulnerable groups such as children and elderly people, cyclists and pedestrians.

16.4.2.2 Predicted Impacts

Potential health pathways associated with changes in road traffic movements include increased risk of road traffic accident and injury, community severance and exposure to vehicle exhaust and noise emissions. All of which are addressed in this EIAR.

The Proposed Project will have an operational residual significant positive impact on business, retail and tourism, by improving the public realm in a city centre site, increasing the space available to people and activity, improving the quality of the experience of visiting Dublin and improving convenient walking access to economic, commercial, tourism, educational and social facilities in the area.

16.4.3 Air Quality and Climate Factors

16.4.3.1 Air Quality and Climate Factors and Population/Human Health

According to the EPA report 'Air Quality in Ireland 2015' (EPA, 2016), air pollution is the single largest environmental health risk in Europe. Cardiovascular complications like heart disease and stroke are the main causes of premature death attributed to air pollution, and air pollution is responsible for 80% of cases of premature death in Europe. This negative impact on human health also has considerable negative impact on European member state economies, with working days lost, reduced productivity and increased medical costs.

16.4.3.2 Predicted Impacts

As outlined in Chapter 7 'Air Quality and Climate Factors', when mitigation measures are implemented during the construction phase of the Proposed Project, fugitive emissions of dust from the construction site will be insignificant and pose no nuisance at nearby receptors.

During operation, the air quality assessment has found that the Proposed Project will be overall beneficial to air quality in the study area.

16.4.4 Noise and Vibration

16.4.4.1 Noise and Vibration and Population/Human Health

Exposure to excessive noise is becoming recognised as a large environmental health concern. According to the 2015 European Commission report 'Noise Impacts on Health' (European Commission, 2015), the most common effects of noise on the vulnerable identified include:

1. **Annoyance.** Several studies found that schoolchildren (aged between eight and 14) are less annoyed by aircraft and road traffic noise then adults. One paper, reviewing multiple studies, found that both the youngest and people over 60 are the least likely to be highly annoyed by air and road traffic noise, irrespective of the level of noise or how sensitive to noise they were.

2. **Sleep disturbance.** Results from several studies indicate that children are less likely than adults to be woken by noise, but they tend to experience more physical reactions, including raised blood pressure. Studies have not found evidence of the long-term health effects of sleep disturbance for vulnerable groups, including people sensitive to noise.

3. **Heart and circulation problems.** Research on the impact of aircraft and road traffic noise on the cardiovascular health of schoolchildren shows that the main effect appears to be short-term raised blood pressure, although the strength of the association between noise exposure and cardiovascular effects is inconsistent between studies because of differences in the methods used.

4. **Quality of life.** Several studies have linked noise exposure at school to children having more headaches, being more tired and having raised stress hormone levels in the blood.

One study associated deterioration in physical and mental quality of life in people over 60 with exposure to road traffic noise.

5. **Cognitive processes.** Several studies suggest that schoolchildren exposed to noise from aircraft and road traffic experience learning and comprehension difficulties. One study found that noise at work affected the job performance of teenage boys.
6. **Hearing.** Little is known about the impact of noise on the hearing of children, although it is likely any effects will be cumulative over the long term.

16.4.4.2 Predicted Impacts

As outlined in Chapter 8 'Noise and Vibration', the modelling outputs for the daytime 2018 DS scenario predict an increase of 5% in residential addresses points in the undesirable daytime category and a decrease of 2% in residential locations in the desirable category.

The study concludes that when comparing the DM and DS 2018 scenarios for nighttime, a 5% increase in residential locations in the undesirable band and a slight decrease of approximately 1% in the desirable band is predicted.

The modelling outputs for the day time 2035 DS scenario predict an increase of 9% in residential addresses points in the undesirable day time category and a decrease of 3% in residential locations in the desirable category.

The study concludes that when comparing the DM and DS 2035 scenarios for night time, a 1% increase in residential locations in the undesirable band and a slight decrease of approximately 2% in the desirable band is predicted.

16.4.5 Townscape and Visual

16.4.5.1 Townscape and Visual and Population/Human Health

According to the World Health Organisation (WHO), urban environments that are aesthetically pleasing and landscaped have been shown to encourage people to explore and access their local community by foot or bicycle when compared to the same urban space prior to renovations. Urban environments that lack public gathering places have also been found to encourage sedentary living habits.

A report titled 'Health Impacts of the Built Environment: A Review' (The Institute of Public Health in Ireland, 2006) found that deteriorating physical features of urban environments can harm health. Studies have highlighted how such environments can impact on both mental and physical health through reduction in physical activity, increased anxiety among residents and increased social disorder. For example, people are more likely to exercise if sidewalks are present, attractive, unobstructed and maintained and if the scenery is enjoyable.

16.4.5.2 Predicted Impacts

As outlined in Chapter 11 'Townscape and Visual, it is acknowledged that there will be moderately negative townscape impacts during the construction stages of the proposed plaza, but that these will be short-term.

Once operational, the shared surface plaza is deemed to contribute positively to the form and function of College Green and will strengthen it as a key node in the central city.

In relation to visual impacts, it is again considered that there will be negative effects on the visual context of College Green during the construction stage of the proposed plaza. However, following completion of the plaza the visual effects at all six of the representative viewpoints are considered to be positive and the visual setting enhanced. This is principally due to the transformation of this space from a cluttered and traffic-dominated junction into a simply organised social and civic space. Improved townscape and visual settings will result in a positive impact on population and human health in that the proposed pedestrianized plaza should encourage more people to access the area by foot or by bicycle which will subsequently result in increased physical activity of the local population and visitors alike.

16.4.6 Material Assets: Utilities

16.4.6.1 Material Assets: Utilities and Population/Human Health

The lack of electricity, gas, telecommunications, clean water supply and drainage have the potential to impact on the physical and mental health of a population.

16.4.6.2 Predicted Impacts

Some minor infrastructure works will be required as part of the Proposed Project- including some local electricity diversions, the installation of a new Sustainable Urban Drainage System (SuDS), and some new telecommunications ducting. As outlined in Chapter 14, the Contractor assigned to the Proposed Project will be obliged to put in place measures to ensure that there are no interruptions to existing services and utilities are maintained unless this has been agreed in advance with the relevant service provider and local authority.

It can therefore be determined that the impact on human health resulting from Material Assets: Utilities will be imperceptible.

16.4.7 Major Accidents and Disasters

16.4.7.1 Major Accidents and Disasters and Population/Human Health

Major accidents and/or disasters can result in illness, injury or loss of life to a population, either directly, or indirectly.

16.4.7.2 Predicted Impacts

As outlined in Chapter 17, a number of potential accidents and/or disasters were considered with regards the Proposed Project. These included Luas accidents, road traffic accidents, fire/explosions, unpermitted vehicles on the pedestrian plaza, seepage of pollutants into the water course, contamination of the groundwater table, extreme weather, collapse/damage to structures and crime.

The worst case scenario with regards to a major accident and/or disaster was identified as unpermitted vehicles on the pedestrian plaza.

While it was considered that should either of these events occur, the consequence could be 'very serious', resulting in mass injury or loss of life, the likelihood was not considered to be high.

The risk of unpermitted vehicles on the pedestrian plaza is therefore not considered to be significant.

16.5 Mitigation Measures

It should be noted that mitigation measures relating to those factors under which human health effects might occur have been addressed elsewhere in this EIAR, under the environmental factors of traffic and transportation, air quality and climate, noise and vibration, townscape and visual, and material assets: utilities.

Section 4.4.3 of this EIAR provides information on the universal design of the proposed civic plaza. The plaza has been designed to be an exemplar of best practice in applying the principals of 'universal access to ensure that the proposed College Green plaza is usable by people of all ages and all abilities, including the visually impaired.

16.6 Residual Impacts

Following implementation of the mitigation measures outlined in relevant sections of this EIAR, the residual impact on population and human health is considered to be positive.

This positive residual impact on population and human health relates to enhanced form and function of College Green, enriched visual setting, improved public realm and increased space.

16.7 Difficulties Encountered

No difficulties were encountered during the preparation of the population and human health assessment.

16.8 References

Environmental Protection Agency (EPA) (2017) *Draft Guidelines on the Information to be Contained in Environmental Impact Assessment Reports*

EPA (2017) *Advice Notes for Preparing Environmental Impact Statements,*

EPA (2002) *Guidelines on the Information to be contained in Environmental Impact Statements*

EPA (2002) *Advice Notes on Current Practice in the Preparation of Environmental Impact Statements*

Department of Health (2016), *Health in Ireland, Key Trends*

Dublin City Council (2016) *Dublin City Local Economic and Community Plan 2016-2022*

World Health Organisation (2006), *Health Effects and Risks of Transport Systems: the HEARTS Project*

EPA (2016), *Air Quality in Ireland 2015*

European Commission (2015), *Noise Impacts on Health*

The Institute of Public Health in Ireland (2006), *Health Impacts of the Built Environment: A Review*

ISOCARP (2010), *Urban Planning and Human Health in the European City-Report to the World Health Organisation*