Chapter 4:

Human Beings

4. HUMAN BEINGS

4.1 Introduction

This section of the Environmental Impact Statement (EIS) describes the potential impacts of the proposed development on human beings and has been completed in accordance with the guidance set out by the Environmental Protection Agency in '*Guidelines on Information to be contained in Environmental Impact Statements*' (EPA, 2000).

One of the principle concerns in the development process is that people, as individuals or communities, should experience no diminution in their quality of life from the direct or indirect impacts arising from the construction and operation of a development. Ultimately, all the impacts of a development impinge on human beings, directly and indirectly, positively and negatively. The key issues examined in this section of the EIS include population, employment and economic activity, land-use, residential amenity, community facilities and services, tourism, and health and safety.

Reference is also made, in this chapter, to nuisance impacts on human beings that are dealt with in other sections of this EIS such as flooding from Chapter 7 - Hydrology and Hydrogeology; dust and noise from Chapter 8 - Air and Climate; and traffic from Chapter 11 - Material Assets.

4.2 Receiving Environment

4.2.1 Methodology

The following sources of information and literature pertinent to the area were used in the preparation of this section:

- Central Statistics Office (CSO),
- Cork City Development Plan 2015 – 2021,
- North Docks Local Area Plan 2005,
- South Docks Local Area Plan 2008,
- Fáilte Ireland
- Local club websites

The study included an examination of the population and employment characteristics of the area. This information was sourced from the most recent census data, the Census of Ireland 2011, the Census of Agriculture 2010 and from the CSO website, www.cso.ie. Census information is divided into State, Provincial, County, Major Town and District Electoral Division (DED) level.

4.3 Human Beings in the Existing Environment

4.3.1 Study Area

Definition of Study Area

The Study Area for the purpose of the Environmental Impact Assessment (EIA) of the proposed Drainage Scheme consists of the area surrounding the Lower River Lee between Innishcarra and Cork City, as shown in Figure 1.1. However, in order to make inferences about the population and other statistics in the vicinity of the proposed development site, the Study Area for the Human Beings section of the EIA was defined in terms of the relevant District Electoral Divisions (DEDs). It has been decided to define the Study Area for the Human Beings Section of this EIS as all those DEDs in which the proposed works areas are located, as shown in Figure 4.1. The site of the proposed development lies within Carrigrohane Beg, Ovens, Ballincollig, St. Marys, Bishopstown, Bishopstown A, Shanakiel, Sundays Well A, Mardyke, Gillabbey C, Gillabbey B, Gillabbey A, Sundays Well B, Shandon B, Shandon A, Centre B, Centre A, South Gate B, South Gate A, City Hall A, City Hall B, St. Patricks A and Knockrea B DEDs, as shown in Figure 4.1, the first five of which are outside the city environs. The total Study Area has a combined population of 23,446 persons, and comprises of a total land area of 100.48 square kilometers. (Source: CSO Census of the Population 2011).

4.3.2 Settlements and Planning Policy

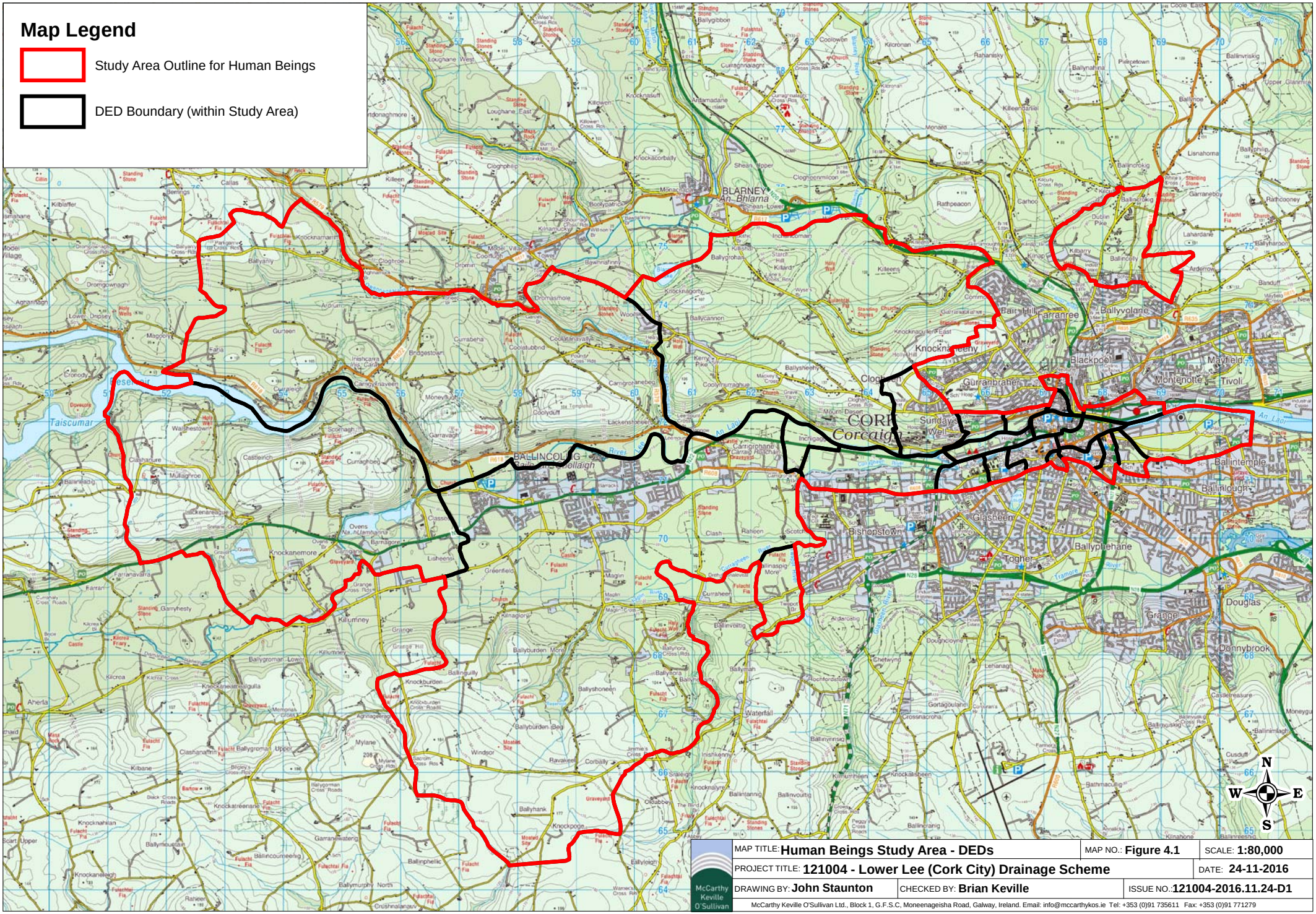
The major settlement within the Study Area is Cork City and its environs, with Ballincollig being the largest settlement outside the city. In addition to the Cork City Development Plan 2015-2021, there are several existing Local Area Plans (LAP) and Area Action Plans (AAP) which relate to the proposed works site and surrounding areas. These include:

- South Docks LAP 2008
- Bishopstown and Wilton AAP 2007
- South Parish AAP 2010
- Coburg Street and St. Patricks Hill AAP 2007
- Cornmarket Street AAP 2005

A Local Area Plan was completed for the South Docks, which is within the study area for the proposed drainage scheme. According to the Local Area Plan for South Docks, the main purpose of the plan for the area is:

> '*the creation of a vibrant, innovative, mixed use, sustainable, socially inclusive, urban quarter, enabling the City to perform both economically and socially at a national and international level.*'

The Bishopstown and Wilton AAP relates to a mature and well-established residential suburb which also makes an important contribution to the employment, educational and healthcare needs of Cork City and the wider region. This part of the city is an area with a declining population due to declining household sizes, and a need for a significant improvement in local commercial and community services to provide for the needs of the area. The Plan aims to provide an integrated planning and development framework for Bishopstown and Wilton that enables the future orderly and sustainable development of the area.



MAP TITLE: **Human Beings Study Area - DEDs**		MAP NO.: **Figure 4.1**	SCALE: **1:80,000**
PROJECT TITLE: **121004 - Lower Lee (Cork City) Drainage Scheme**			DATE: **24-11-2016**
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The South parish AAP represents and area located on the south bank of the River Lee's southern channel as it runs through the city. The boundary extends in the east to Eglinton Street and the South City Link Road. It includes the area around St. Fin Barre's Cathedral and Elizabeth Fort in the west and the southern boundary runs along Tower Street, Evergreen Street and Summerhill South. The area is important given its proximity to the city centre and its residential, commercial and tourist character and potential for tourism development to the city.

The Coburg Street and St. Patricks Hill AAP covers an area of approximately 9.6 hectares with the boundary extending along the River Lee to the south, Bridge Street and St. Patrick's Hill to the east, along Bell's Field and Lady's Well to the north and the North City Link Road to the west. The aim of the plan is as follows:

> '*To promote the regeneration of the Coburg Street and St. Patrick's Hill area through the enhancement of its physical fabric, development of opportunity sites and transformation of its image so that it becomes an attractive place for all those living, working and visiting the area.*'

The Cornmarket Street AAP extends from the River Lee in the north to Castle Street/Paul Street in the south and from North Main Street in the west to Half Moon Street in the east. The aim of the plan is as follows:

> '*This Area Action Plan has been prepared specifically with the aim of promoting the development and improvement of the Cornmarket Street area of the City Centre, maximising the area's potential by building upon its existing special qualities.*'

The Cornmarket Street AAP is also planned to benefit the surrounding areas by improving the retail environment of the city centre and by improving the image of the city centre.

In the period 2006 – 2011 the Cork City Electoral Area population decreased marginally from 119,418 to 119,230; a decrease of 0.2%. In the same period, the study area DEDs, experienced positive population growth of 7.7% (from 47,082 to 50,708 persons).

Overall, the Cork Area Strategic Plan Update (2006 to 2020) proposes an increase in the population of Cork City of 25% (to 150,000 persons) by 2020. The "rest of metropilan Cork" has a proposed increase of population by 41% (to 180,710 persons by 2020), while the ring towns and rural areas around the city have a projected population growth of 14% (to 106,620 persons by 2020).

4.3.3 Population

4.3.3.1 Population Trends

In the four years between the 2006 and the 2011 Censes, the population of Ireland increased by 8.2 per cent. During this time, the population of County Cork grew by 11.4% to 399,802 persons while Cork City decreased 0.2% to 119,230. Other population statistics for the State, Cork and the Study Area have been obtained from the Central Statistics Office (CSO) and are presented in Table 4.1.

Table 4.1 Population 2002 – 2011 (Source: CSO)

Area	Population		% Population Change
	2006	2011	2006-2011
State	4,239,848	4,588,252	8.2%
County Cork	361,877	399,802	10.1%
Cork City	119,418	119,230	-0.2%
Study Area	47,082	50,708	7.7%

The data presented in Table 4.1 shows that the population of the Study Area increased by 7.7% between 2006 and 2011. This rate of population growth is slightly lower than that recorded at State and County level during 2006-2011. When the population data is examined in closer detail, it shows that the rate of population increase within the Study Area has been unevenly spread through the District Electoral Divisions (DEDs). The highest rate of population increase between 2006 and 2011 occurred within Bishopstown DED, which experienced a 108.7% population increase. In comparison, the population of Bishopstown A DED decreased by 21.7% during the same time period.

Of the DEDs that make up the Study Area for the purposes of this assessment, the highest population was recorded in Ballincollig DED, with 17,965 persons recorded during the 2011 Census. The lowest population was recorded in Bishopstown DED, with 217 persons recorded during the 2011 Census. Note, this is a rural DED, whereas the Bishopstown A DED (located adjacent) is within Cork City environs and had a population of 1,326 persons recorded during the 2011 Census.

4.3.3.2 Population Density

The population densities recorded within the State, County Cork and the Study Area during the 2011 Census are shown in Table 4.2.

Table 4.2 Population Density in 2011 (Source: CSO)

Area	Population Density (Persons per square kilometre)
State	67.0
County Cork	53.7
Cork City	3078.5
Study Area	504.66

The population density of the Study Area recorded during the 2011 Census was 504.66 persons per square kilometre. This figure is significantly higher than the national and county population densities of 67 persons per square kilometer and 53.7 persons per square kilometre respectively. It is also significantly lower than the population density of Cork City, which is 3078.5 persons per square kilometre, though this is likely a result of the inclusion of five county DEDs, Bishopstown, Ovens, Ballincollig, Carrigrohane Beg and St. Marys, in the Study Area.

Similar to the trends observed in population, the population density recorded across the Study Area varies between DEDs. Carrigrohane Beg DED has the lowest population density, at 61.66 persons per square kilometre, while South Gate B DED has the highest population density, at 11,426.49 persons per square kilometre.

4.3.3.3 Household Statistics

The number of households and average household size recorded within the State, County Cork and the Study Area during the 2006 and 2011 Censuses are shown in Table 4.3.

Table 4.3 Number of Households and Average Household Size 2006 – 2011 (Source: CSO)

Area	2006		2011	
	No. of House-holds	Avg. Size (persons)	No. of House-holds	Avg. Size (persons)
State	1,469,521	2.8	1,654,208	2.8
County Cork	123,295	2.94	172,042	2.32
Cork City	43,939	2.72	55,633	2.14
Study Area	16,482	2.86	23,446	2.16

In general, the figures in Table 4.3 show that while the number of households at State, County, City and Study Area level has increased, the average number of people per household has decreased slightly, i.e. there are more households but less people per house. Average household size recorded within the Study Area during the 2006 and 2011 Censuses is in line with that observed at State and County level during the same time periods.

4.3.3.4 Age Structure

Table 4.4 presents the percentages of the State, County Cork and Study Area population within different age groups as defined by the Central Statistics Office during the 2011 Census. This data is also displayed in Figure 4.2.

Table 4.4 Population per Age Category in 2011 (Source: CSO)

Area	Age Category				
	0 - 14	15 – 24	25 - 44	45 - 64	65 +
State	21.3%	12.6%	31.6%	22.7%	11.7%
County Cork	23.0%	11.4%	31.3%	23.2%	11.1%
Cork City	14.7%	16.8%	30.6%	22.9%	15.1%
Study Area	16.7%	18.6%	35.2%	20.3%	9.1%

The proportion of the Study Area population within each age category is broadly similar to those recorded at national, County and City level. The most significant difference occurs where only 9.1% of the population within the study area falls into the 65+ age category, while 35.2% of the population is in the 25-44 category. This may indicate the movement of younger age groups into the area for employment. Within the Study Area, the highest population percentage occurs within the 25-44 age category.

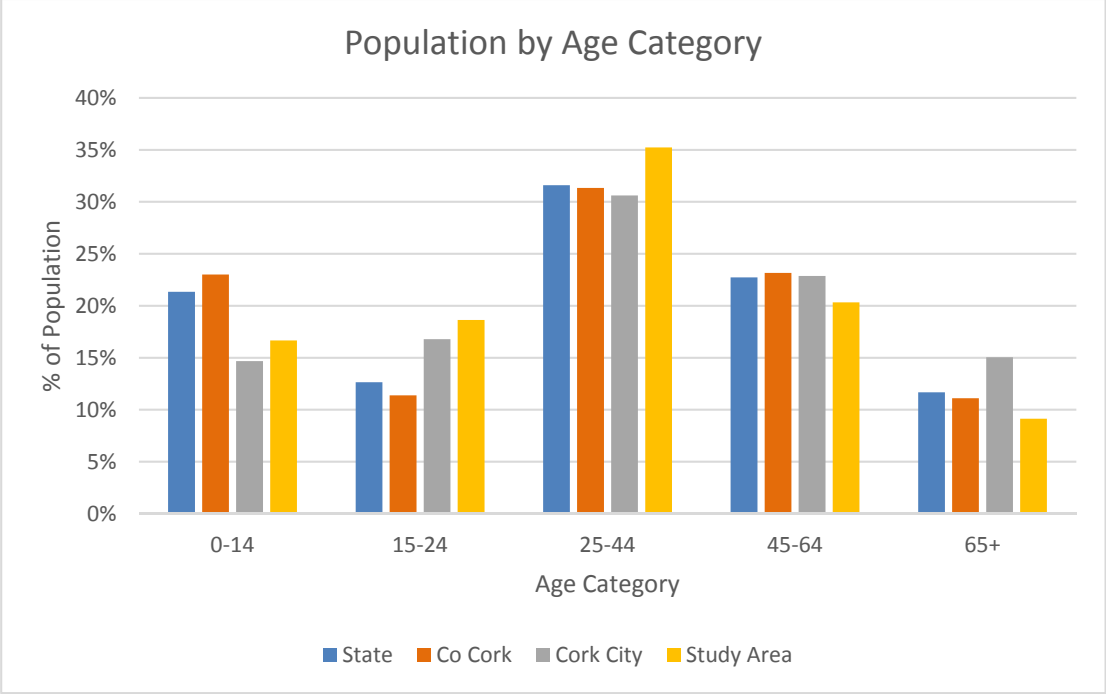

Figure 4.2 Population per Age Category in 2011 (Source: CSO)

4.3.4 Employment and Economic Activity

4.3.4.1 Sources of Employment

Cork City is the second largest city in the state, and is the designated gateway city of the south-west region. The proximity of the study area to an employment centre therefore influences the employment opportunities available to inhabitants surrounding the works areas. The primary types of employment provided in the area are service and office based employment.

The 2011 census also provided information about the journey time to work, school or college where applicable.

Within the 23 ED Study Area, 75.4% of respondents have a journey time of less than 30 minutes to their work or education, which indicates that the majority of employment and educational facilities are located relatively close by. The 2011 Census data for the EDs in the Study Area shows that the industries which employ the greatest percentage of persons are Professional Services (25.7%), Commerce and Trade (22.1%) and 'Other' (19.0%). A greater percentage of females are employed in the professional services and Commerce and Trade industries; with a larger proportion of males employed in the Manufacturing and Building and Construction Industries.

4.3.4.2 Proposed Employment

It is estimated that the proposed Lower Lee (Cork City) drainage scheme will provide employment during the construction phase, which is expected to be approximately 6-7 years in duration. It is likely that the majority of prospective employees will be sourced from the local area, therefore benefitting the local economy and skill base to some extent. There will also be indirect employment during the construction phase of the proposed development such as hauliers and waste contractors among others.

4.3.4.3 Economic Status of the Study Area

The labour force consists of those who are able to work, i.e. those who are aged 15+, out of full-time education and not performing duties that prevent them from working. In 2011, there were 2,232,203 persons in the labor force in Ireland. Table 4.5 shows the percentage of the total population aged 15+ who were in the labor force during the 2011 Census. This figure is further broken down into the percentages that were at work, seeking first time employment or unemployed. It also shows the percentage of the total population aged 15+ who were *not* in the labor force, i.e. those who were students, retired, unable to work or performing home duties.

Table 4.5 Economic Status of the Total Population Aged 15+ in 2011 (Source: CSO)

	Status	State	County Cork	Cork City	Study Area
% of population aged 15+ who are in the labor force		61.9%	62.7%	60.9%	60.4%
% of which are:	At work	81.0%	85.2%	77.8%	83.2%
	First time job seeker	1.5%	1.0%	1.8%	1.5%
	Unemployed	17.5%	13.8%	20.3%	15.3%
% of population aged 15+ who are not in the labour force		38.1%	37.3%	39.1%	39.6%
% of which are:	Student	29.7%	28.4%	32.2%	45.7%
	Home duties	24.7%	27.1%	19.4%	18.0%
	Retired	33.2%	32.8%	32.9%	25.0%
	Unable to work	11.4%	10.8%	14.4%	10.5%
	Other	1.0%	0.9%	1.0%	0.7%

Overall, the principal economic status of those living in the Study Area is similar to that recorded at national, County and City level. The main differences are the 25.0% in the 'Retired' category and the 45.7% in the 'Student' category. The high percentage of retirees is in line with the low population percentage found within the 65+ age group, while the high level of students is most likely as a result of the presence of third level institutons in the EDs.

4.3.4.4 Employment by Socio-Economic Group

Socio-economic grouping divides the population into categories depending on the level of skill or educational attainment required. The 'Higher Professional' category includes scientists, engineers, solicitors, town planners and psychologists. The 'Lower Professional' category includes teachers, lab technicians, nurses, journalists, actors and driving instructors. Skilled occupations are divided into manual skilled, such as bricklayers and building contractors; semi-skilled, e.g. roofers and gardeners; and unskilled, which includes construction labourers, refuse collectors and window cleaners. Figure 4.3 shows the percentages of those employed in each socio-economic group in the State, County Cork, Cork City and the Study Area during 2011.

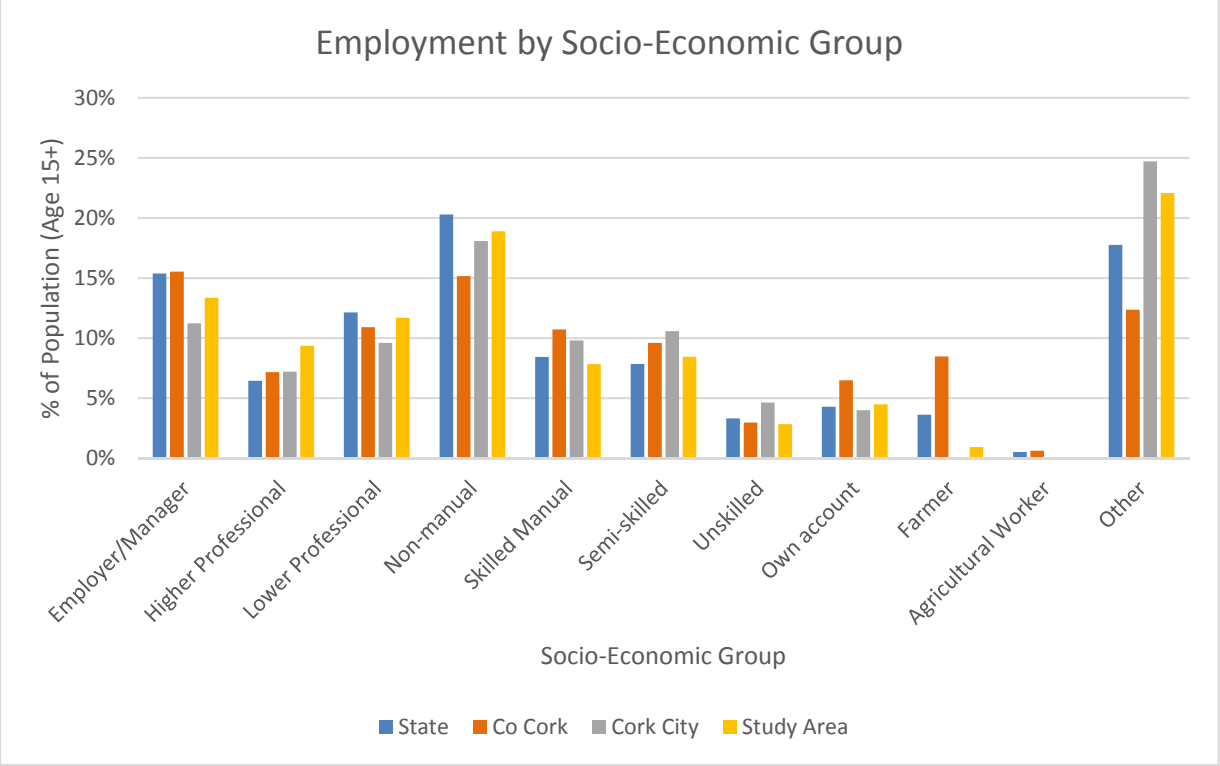

Figure 4.3 Employment by Socio-Economic Group in 2011 (Source: CSO)

The highest level of employment within the Study Area was recorded in the Other category. Approximately 22.1% of those employed within the Study Area form part of this category, in line with the 24.7% of the City population and 17.8% of the national population, though much higher than the 12.4% of the County population. After Other, the next highest levels of employment within the Study Area are in the Non-manual and Employer/Manager categories. The categories in which the lowest percentage of the Study Area population was recorded are Agricultural Worker (0.1% of the Study Area population) and Farmer (0.9% of Study Area population).

The CSO figures for socio-economic grouping have a limitation of including the entire population, rather than just those who are in the labour force. It is likely that this is what gives rise to the high proportion of the population shown to be in the "Other" category in Figure 4.3.

4.3.5 Land-use

4.3.5.1 Agriculture

Results for the agricultural census are only available for the DEDs located in County Cork. Those within the City environs are excluded to retain the anonymity of landowners. Therefore, the following information relates only to Bishopstown DED, Ovens DED, Ballincollig DED, Carrigrohane DED and St. Marys DED, all outside the city. The total area of farmland within the Study Area for the Human Beings assessment measures approximately 7,104 hectares or 78.4% of the DEDs from which the data is taken (or 63.0% of the total Study Area including all 23 DEDs), according to the CSO Census of Agriculture 2010. There are 129 farms located within the Study Area (DEDs from which data is taken), with an average farm size of 55.1 hectares. This is slightly larger than the 40.98 hectare average farm size for County Cork. Within the Study Area (DEDs from which data is taken), farming employs 274 people, and the majority of farms are family-owned

and run. Table 4.6 shows the breakdown of farmed lands within the Study Area. Pasture accounts for the largest proportion of farmland, followed by silage.

Table 4.6 Farm Size and Classification within the Study Area in 2010 (Source: CSO). Note that 'Study Area' here refers to the Bishopstown, Ovens, Ballincollig, Carrigrohane and St. Marys DEDs only, as data was not available for DEDs within the city, or for DEDs without farms (Bishopstown DED).

Characteristic	Value
Size of Study Area	9,057 hectares
Total Area Farmed within Study Area	7,104 hectares
Farmland as % of Study Area	78.4%
Breakdown of Farmed Land	Area (hectares)
Total Pasture	2,905 ha
Total Silage	1,733 ha
Rough Grazing	139 ha
Total Hay	130 ha
Total Potatoes	6 ha
Total Cereals	925 ha
Total Crops	1,266 ha

4.3.5.2 Washlands

The areas designated as "Washlands" are those areas adjacent to the river (and part of the Lee floodplain) which under the Scheme, will be deliberately flooded in advance of a forecasted extreme event, to facilitate pre-emptive lowering of water levels in Carrigadrohid and Innishcarra reservoirs, to create additional storage/attenuation capacity, and subsequently reduce the peak flow during the event.

4.3.6 Services

The proposed development site is predominantly part of the greater Cork City, in areas which tend to focus on commercial, residential and academic activities. Also adjacent to the site is Ballincollig. Both Cork city and Ballincollig are considered the centres for services in the area. Furthermore, the proposed development site and it's surroundings are generally well serviced by water mains, wastewater collection, natural gas, municipal waste collection, electricity, broadband, telecoms, etc.

4.3.6.1 Education

There are numerous National and Secondary Schools located near the proposed development works site including those in Ballincollig, Bishopstown, Sunday's Well, Gurranbraher, Mardyke and the City Centre. University College Cork is located adjacent to the works area of the Lee, and Cork Institute of Technology is located approximately 1.1 kilometres south of the River Lee at Bishopstown.

4.3.6.2 Access and Public Transport

The proposed development site is accessed via National Roads including the N22, N8 and N27, Regional Roads including the R618, R610, R608 and various local roads off these. The N22 runs in an east-west direction alongside (south of) the proposed development site. There are several other national roads within

a ten-kilometre radius of the site, including the N20, N71, N28, N40 and the M8 Motorway. These generally run from the city centre outwards, with all but the N20, N8 and M8 being on the southern side of the city.

The site of the proposed development is served by public transport. The nearest train station to the proposed development site is Kent Station, located in Cork City Centre, located djacent to the easternmost end of the site. Local city bus services operate through the city, including the Ballincollig area. From the main bus station, located adjacent to the eastern end of the site, there are Bus Eireann connections to a significant number of destinations including Dublin, Limerick and Waterford. Cork Airport is located approximately 4.6 kilometres south of the proposed development site.

4.3.6.3 Amenities and Community Facilities

There are numerous amenities and community facilities, including GAA and other sports clubs, parks, youth clubs and recreational areas available in the area surrounding the proposed works and throughout the wider south and west sides of Cork City. Local Gaa clubs which are often focal points for communities include Ballincollig GAA club, Gleann na Laoi GAA club, Lough Rovers GAA club and Redmonds GAA club. Also just south of the Lee in Ballincollig is a regional park at Ballincollig AFC. This park also has walkwaysalongside the river.

There are Foroige youth clubs located in Ballincollig and in Cork City. The Cork County Cricket Club is located in the Mardyke area. Phoenix Kayak Club is located on the north bank of the Lee, just off the Lee Road. University College Cork also has numerous clubs and societies operating within the area, notably the Mardyke Sports Gound. Also nearby are other sporting facilities and groups, including martial arts and soccer clubs.

Retail and personal services within the vicinity are provided in Ballincollig and Cork City, which has several shopping centres near the proposed development site, in addition to nearby retail parks and industrial estates. Ballincollig and Cork City also enjoy some community facilities in the form of community centres, shops, post offices and Churches.

4.4 Tourism

4.4.1 Tourist Numbers and Revenue

Tourism is one of the major contributors to the national economy and is a significant source of full time and seasonal employment. During 2015, total tourism revenue generated in Ireland was €7.7 billion, an increase of approximately 11.2% from the previous year. Overseas tourist visits to Ireland in 2015 grew by 11.9% to 4.2 billion. ('*Tourism Facts 2015*', Fáilte Ireland, September 2016)

Ireland is divided into seven tourism regions. Table 4.7 shows the total revenue and breakdown of overseas and domestic tourist numbers to each region in Ireland during 2015. Figure 4.4 illustrates the total number of tourists per region in 2015. ('*Regional Tourism Performance in 2015*', Fáilte Ireland, October 2016)

Table 4.7 Overseas Tourists Revenue and Numbers 2015 (Source: Fáilte Ireland)

Region	Total Revenue (€m)	Total Number of Overseas Tourists (000s)
Dublin	€1,726 m	4,937

Region	Total Revenue (€m)	Total Number of Overseas Tourists (000s)
East & Midlands	€324 m	922
South-East	€259 m	876
South-West	€792 m	2,104
Shannon	€367 m	1,148
West	€575 m	1,590
North-West	€224 m	694
Total	€4,267 m	12,271

The South-West region, in which the site of the proposed development is located, comprises County Cork and County Kerry. This Region benefited from approximately 17% of the total number of overseas tourists to the country and approximately 19% of the total tourism income generated in Ireland in 2015. Table 4.8 shows the breakdown of overseas tourist numbers to the South West Region during 2015 and the associated revenue generated. The regional data shows that County Cork had the highest tourism revenue and the highest number of overseas tourists within the Region during 2015.

Table 4.8 Overseas Tourism to South-West Region during 2015 (Source: Fáilte Ireland)

County	Revenue Generated by Overseas Tourists (€m)	No. of Overseas Tourists (000s)
Cork	558	1,449
Kerry	234	1,026

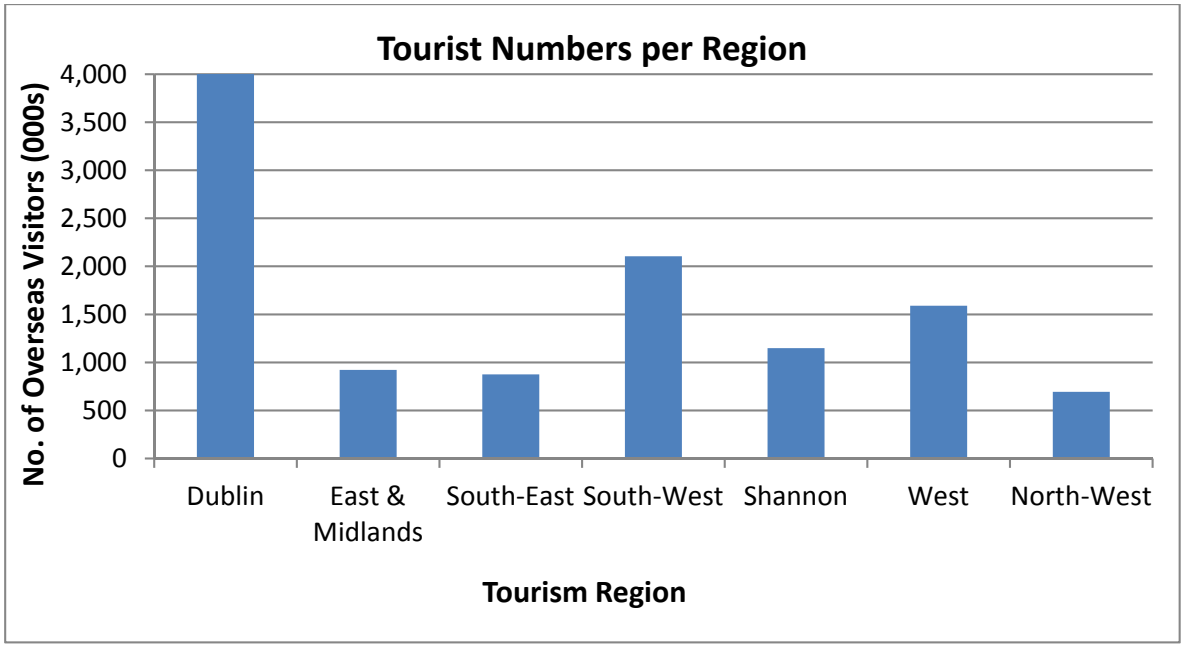

Figure 4.4 Total Overseas Tourists per Region in 2015 (Source: Fáilte Ireland)

Figure 4.5 provides Fáilte Ireland figures showing the type of activities that domestic tourists engaged in during 2015 throughout Ireland. From these figures it can be seen that visting houses/castles visits form the majority of all activities enjoyed followed by hiking/walking. Activities with the least interest include angling, attending horse racing and equestrian pursuits.

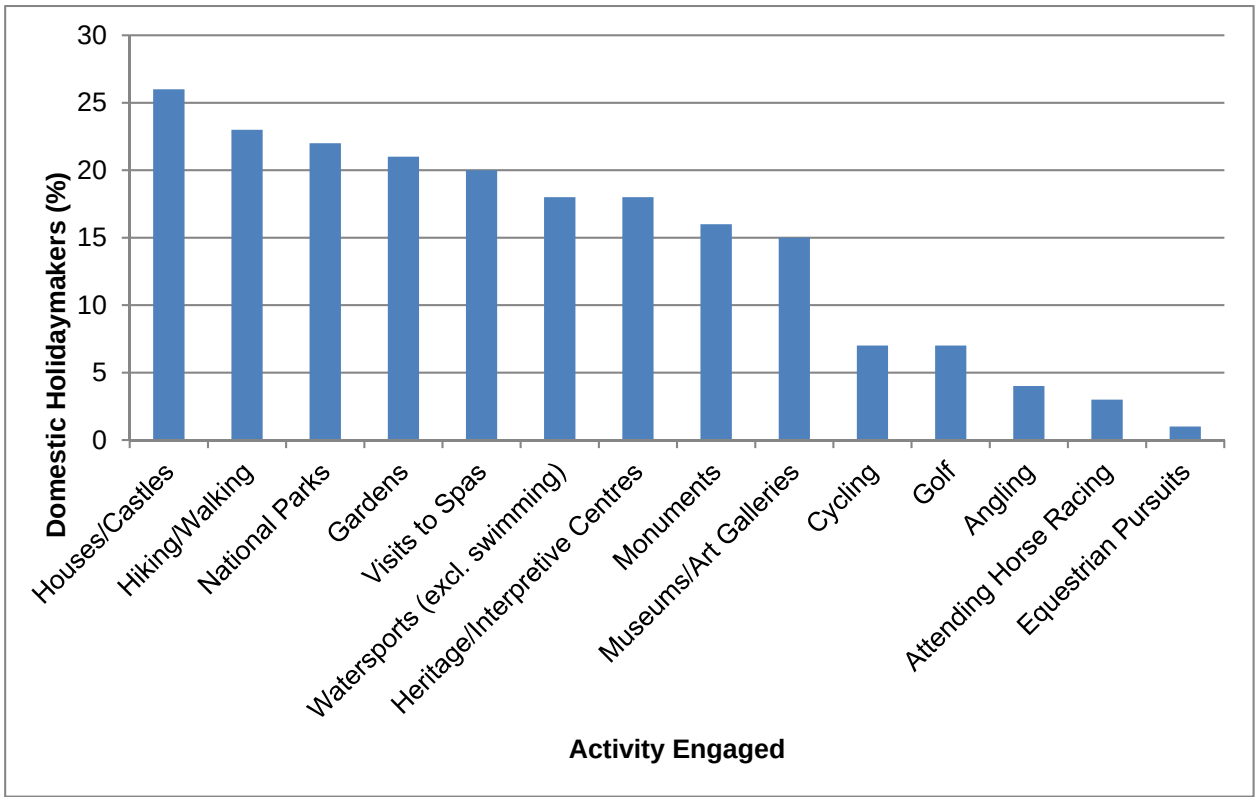

Figure 4.5 Activities undertaken by domestic visitors in Ireland in 2015 (Source: Fáilte Ireland)

4.4.2 Tourist Attractions

The Cork Public Museum is located adjacent to the proposed development area, on the southern bank of the River Lee. This is housed in a two storey Georgian house with large landscaped gardens. Attractions located near the proposed works areas include Fitzgeralds Park, Cork City Hall, Crawford Art Gallery, Tigh Fili Gallery,. St. Peters Church, Cork City Library, St. Fin Barres Cathederal, Lewis Glucksman Gallery and the Old Cork Waterworks. The nearest tourist information centre to the proposed development site is in Cork city centre, located adjacent to the site. Other tourist attractions which can be found within the the greater Cork city area are listed on the Discover Ireland website. Within the greater area of Cork City golf, horse riding, cycling and angling are also available. Outside Cork City towards Ballincollig are Cork County Hall and Ballincollig Regional Park.

A recent report on Angling tourism in Ireland found that €121 million was spent by the 150,000 angling visitors to the country in 2012. Sections of the River Lee further upstream of Cork City are used for angling.

4.5 Health and Safety

Flooding poses a risk to human health and safety. The OPW document 'The Planning System and Flood Risk Management: Guidelines for Planning Authorities' (OPW, 2009) states that flooding can cause physical injury, illness and loss of life. Deep, fast flowing or rapidly rising flood waters can be particularly dangerous, with increased risk if the floodwater is carrying debris. Some of these impacts may be immediate, the most significant being drowning or physical injury due to being swept away by floods. Floodwater contaminated by sewage or other pollutants (e.g. chemicals stored in garages or commercial properties) can potentially cause illness, either directly as a result of contact with the polluted floodwater or indirectly as a result of

sediments left behind. Flood water may also hide other hazards for wading pedestrians, such as manhole openings where the covers have been lifted by flood flows.

The impact on people and communities as a result of the stress and trauma of being flooded, or even of being under the threat of flooding, can be immense. Long-term impacts can arise due to chronic illnesses and the stress associated with being flooded and the lengthy recovery process. The ability of people to respond and recover from a flood can vary. Vulnerable people, such as those who are old, disabled or have a long-term illness, are less able to cope with floods than others. Some people may have difficulty in replacing household items damaged in a flood and may lack the financial means to recover and maintain acceptable living conditions after a flood.

Construction of the proposed development will necessitate the presence of a construction site. Construction sites and the machinery used on them pose a potential health and safety hazard to construction workers if site rules are not properly implemented.

4.6 Likely and Significant Impacts and Associated Mitigation Measures

This section deals with the impacts of the proposed development on the population of the Study Area with regard to population, employment and economic activity, land use, services and tourism. As well as these the health and safety, dust, noise and traffic impacts will be dealt with. Noise and traffic impacts will be dealt with in more detail in Chapters 8 and 12 respectively.

4.6.1 'Do-Nothing' Scenario

If the proposed development were not to proceed, the existing river channel would remain as it is, resulting in many of the same potential impacts on human beings as have occurred previously.

There would also be potential for impacts on:

- Residential and commercial properties
- Potential public health risk
- Pedestrian walkways
- Roads and Transportation Network
- Wastewater Collection Network
- Surface Water Collection Network
- Water Distribution Network
- Bord Gáis Distribution Network
- Electricity Network
- Telecommunications Network

If the proposed development were not to proceed, the opportunity to protect those areas of Cork City surrounding the River Lee from future flooding events would be lost, as would the opportunity to create employment during the construction phase.

4.6.2 Construction Phase

4.6.2.1 Employment, Economic and Investment Impacts

Potential Impacts

The construction cost of the project will be in the region of €80 million. The construction phase of the proposed development will last approximately 6-7 years. Many construction workers and materials will be sourced locally, thereby helping to sustain employment in the construction trade. This will have a **short-term significant positive impact.**

The injection of money in the form of salaries and wages to those employed during the construction phase of the proposed project has the potential to result in an increase in household spending and demand for goods and services in the local area. This would result in local retailers and businesses experiencing a short-term positive impact on their cash flow. This will have a **short-term slight positive indirect impact.**

The proposed development will result in an influx of skilled people into the area, bringing specialist skills for both the construction and operational phases that could result in the transfer of these skills into the local workforce, thereby having a long-term positive impact on the local skills base. Up-skilling and training of local staff in the particular requirements of drainage schemes is likely to lead to additional opportunities for those staff as additional river drainage schemes are implemented in Ireland. This will have a **long-term moderate positive indirect impact.**

There is also the potential for short term disruption to economic activity due to the proposed construction activities. This would predominantly be as a result of traffic and access issues which could have the potential to reduce footfall into local businesses, withnoise and dust from the works adding to this impact on local businesses. This will have a **temporary moderate negative indirect impact** at any one area, as works will be carried out in several phases and be temporary in nature at any one location.

Mitigation Measures

A traffic management plan will be prepared in consultation with the local authorities at the detailed design stage of the project, and will be implemented for the duration of the works in order to ensure that any impacts on traffic mobility are minimised. This will also result in a minimised potential impact on local businesses, as traffic managemet will implement restrictions to local businesses only for the shortest practicable time. In addition, works will be limited to specified working hours, and will account for peak business periods, such as the Christmas shopping period. For this period it is recommended that works would be paused from the beginning of the second week in December until the end of the first week in January. An Environmental Management Plan, based on a compilation of the mitigation measures provided in this EIS, will be implemented during the construction phase to ensure that environmental nuisances relating to the works are minimised. This will include measures to avoid and reduce noise and dust.

Residual Impacts

The residual negative impacts will be temporary and slight. The implementation of a Traffic Management Plan and Environmental Management Plan to reduce traffic and environmental nuisance impacts on the receiving environment during the construction phase will minimise the impact on local businesses. By ensuring

that works account for busy periods for local businesses (e.g. Christmas), the impact on times of peak economic turnover will be greatly minimised.

4.6.2.2 Population

Those working on the construction phase of the proposed development will travel daily to the site from the wider area. The construction phase will have no impact on the population of the Study Area in terms of changes to population trends or density, household size or age structure. There will be **no impact on population.**

4.6.2.3 Tourism

Potential Impacts

The proposed works will have little impact on many sectors of the tourism industry in the study area. Angling does not form a significant part of the industry in the area Angling in areas upstream of Ballincollig, Cork City and elsewhere in the catchment is unlikely to be affected by the proposed works and thus the impact is considered to be **imperceptible**. Potential increases in noise and dust levels, traffic issues and temporary impacts on visual amenity related to the works are likely to deter and/or disturb visitors during the construction phase. There could be a **potential temporary slight negative impact** on tourism at any area, as works will be carried out in several phases and be temporary in nature at any one location.

Mitigation Measures:

Works will be designed to minimise impacts upon the amenity value of the study area during the construction period. Mitigation will include measures to minimise pollution of the river, minimise impacts on fish, limit working hours and prevent un-necessary damage to bankside habitats.

The implementation of a Traffic Management Plan and Environmental Management Plan to reduce traffic and environmental nuisance impacts on the receiving environment during the construction phase will minimise the impact on tourism.

Residual Impacts:

Although upstream stretches of the River Lee will remain unaffected by the works, any impacts on the water quality of the river downstream of the works will be minimised through implementation of mitigation measures. The amenity value of the River Lee within sections of the work area will be diminished for tourists for the duration of the works. Therefore the nature of the impact on tourism overall will remain slight during the construction phase of the scheme.

4.6.2.4 Noise

Potential Impacts

There will be an increase in noise levels in the vicinity of the proposed development site during the construction phase, as a result of machinery and construction work. These impacts will be short-term in duration

on any particular day and temporary (for the duration of the construction phase). The primary noise producing activities associated with the proposed works include:

- Embankment construction works, involving use of 1-2 midsized tracked excavators, and possibly a small number of dumpers or dump trucks.
- Concrete breaking may be required at several locations, involving either hydraulic breakers on tracked excavators, or handheld pneumatic breakers powered by compressors. Concrete saws may also be required.
- Wall and parapet wall repair and construction works, proposed at numerous locations, are likely to involve a number of activities, including blockwork and concrete pours. Plant such as telescopic handlers and mini-excavators may be required. Various activities are likely to require mobile generators to power equipment, lights and pumps. Larger works areas are likely to be surrounded by temporary hoarding to a height of 2.4 m.
- Sheet piling will be required at several works zones. The selection of piling method, will not be determined until site specific investigations are undertaken in due course. Sheet piling may involve use of driven or pressed-in piles, or use of vibro-displacement techniques.
- Removal of excavated material, rubble and spoil, and deliveries of concrete and other materials will require a large number of HGV movements throughout the project. These will be concentrated at specific areas where easements are available.

Construction noise at any given noise sensitive location will be variable throughout the construction project, depending on the activities underway and the distance from the main construction activities to the receiving properties. The potential noise impacts that will occur during the construction phase of the proposed development are further described in Section 8 of this EIS. They will have a **temporary negative slight impact** in most areas, as works will be carried out in several phases and be temporary in nature at each location.

Mitigation

Best practice measures for noise control will be adhered to onsite during the construction phase of the proposed development in order to mitigate the impact associated with this phase of the development. The measures are described in detail in Section 8.4 of this EIS, and include:

- Sensitive location of equipment, taking account of local topography, existing structures (i.e. walls, buildings, etc.) and natural screening.
- Working methods: construction noise will be controlled by prescribing that standard construction work will be restricted to the specified working hours. Any construction work carried out outside of these hours shall be restricted to activities that will not generate noise of a level that may cause a nuisance.
- Plant will be selected taking account of the characteristics of noise emissions from each item. All plant and machinery used on the site shall comply with E.U. and Irish legislation in relation to noise emissions. The timing of on- and off-site movements of plant near occupied properties will be controlled.

- Operation of plant: all construction operations shall comply with guidelines set out in British Standard documents 'BS 5338: Code of Practice for Noise Control on Construction and Demolition Sites' and 'BS5228: Part 1: 1997: Noise & Vibration Control on Construction and Open Sites'. The correct fitting and proper maintenance of silencers and/or enclosures, the avoidance of excessive and unnecessary revving of vehicle engines, and the parking of equipment in locations that avoid possible impacts on noise-sensitive locations will be employed.
- Training and supervision of operatives in proper techniques to reduce site noise, and self-monitoring of noise levels, if appropriate.

Residual Impacts

The residual impacts are expected to be temporary, localised and imperceptible at most locations. Impacts may increase to noticeable negative or substantial negative where piling methods other than pressed-in piles are used. However, it should be noted that these impacts will be entirely short term in nature, lasting several days or weeks locally in most cases. Implementation of mitigation measures described described in Section 8.5 of this EIS will further reduce impacts.

4.6.2.5 Dust

Potential Impacts

Potential dust emission sources during the construction phase of the proposed development include excavation activites, backfilling with aggregate, and resurfacing works. This may cause nuisance to residents and local businesses as well as road users. These impacts will not be significant given the localised nature of the proposed works and will be temporary in duration due to the phasing of works. There is the potential to have a **short-term slight negative impact**.

Mitigation

There will be requirements specified in the Works Requirements to require the contractor(s) to take measures to control dust. These requirements will include wetting surfaces in periods of dry weather to control dust. There will also be requirements for wheel washing facilities in certain circumstances.

Residual Impacts

The residual impacts will be imperceptible.

4.6.2.6 Traffic and Transport Infrastructure

The proposed scheme has the potential to impact the transport infrastructure in the area, most significantly during the construction phase. This impact is likely to occur where works areas are on or directly adjacent to roadways, particularly at bridges and in Cork city centre.

The construction phase will have a temporary impact on traffic volumes in the immediate surrounds of the works areas due to the increase in additional traffic movements associated with the site investigation, construction of new infrastructure including walls, embankments, parapets etc. However, taking into account

the large numbers of vehicles using the road network in Cork city and in the vicinity of the works areas, it is unlikely that traffic generated during the construction phase will have a significant impact on traffic flow in general. It is not anticipated that the construction traffic will significantly affect the flow of traffic through Ballincollig, Cork city and their surrounds. Futher details of the predicted increase in traffic flows can be seen in Section 12.7.1 of this EIS.

It is likely that temporary road closures and diversions will be required during the construction phase of the works at several locations. The most significant impacts in terms of traffic are expected within the city centre area, where the proposed works are more extensive and comprise numerous works elements in isolation or in combination. Works to the west of the city are considered to have a much lesser potential impact on traffic, and include off-line works such as embankments. All of these impacts will be temporary in nature, and will range from slight to significant. For further information, see Section 12.7.2 of this EIS.

Mitigation

A wide range of mitigation measures will be implemented in order to minimise the significance of the potential impacts of the Lower Lee (Cork City) Drainage Scheme on the wider transport network. Site-specific mitigation measures for works sites will be determined and agreed with all relevant stakeholders during the detailed design process.

Although the scheme is divided into 5 principal phases, each individual phase is also likely to be sub-divided further into discrete 'blocks' for the purpose of construction. Each individual works element will require the preparation of a Construction Traffic Management Plan (CTMP), which will be subject to agreement with Cork City Council and An Garda Síochána prior to commencement of construction. The CTMP will set out specific working criteria for each individual works area and the appropriate measures to be implemented. Further information on the proposed CTMPs can be found in Section 12.8.1 of this EIS.

The localised traffic disruptions as a result of other proposed works throughout the scheme will be mitigated through the use of industry standard traffic management measures. These traffic management measures should be designed in accordance with the '*Guidance for the Control and Management of Traffic at Roadworks – Second Edition*'.

Residual Impact

Although the above works elements will for the most part result in a temporary significant negative impact across the scheme extents, the impacts will be temporary only, will occur during construction works, and there will be no residual negative impacts post-completion of the scheme.

4.6.2.7 Services

The majority of proposed works pertaining to the Lower Lee (Cork City) drainage scheme, described in detail in Chapter 3, are located in or in the vicinity of the River Lee. As such there is limited interaction between the scheme and existing services in the area. Section 12.3 gives further details on the predicted impacts on services for drainage networks, water, gas, electricity, broadband and telecommunications distribution networks. Locations where potential impacts are predicted are discussed in section 12.3. Impacts

on each service will vary, but overall the proposed drainage scheme will have a **temporary moderate negative impact** on services.

Mitigation Measures:

The depth of the service networks (e.g. surface water and wastewater collection pipework) close to the proposed works areas will be assessed. Should it be anticipated that any proposed excavations will impact on these networks, this will be taken into consideration at detailed design stage and the utility or service will be replaced, deepened or diverted prior to foundation excavation if necessary.

Prior to excavation, the Contractor will assess record drawings and the results of the Site Investigation in order to determine the exact depth and location of the existing service networks within the works area. The Contractor will carry out additional site investigation to confirm the location of the existing services. This will reduce the risk of striking them and causing interruption to the systems during the construction phase.

Residual Impact:

Taking into account the above mentioned mitigation measures the residual impact of the proposed scheme on the local service networks will be **neutral**.

4.6.2.8 Amenity

Potential Impacts

During the periods of in-stream works, there will be a significant impact on local amenities related to the use of the River Lee. Riverside walks for residents and visitors alike are of importance to the area, with angling having a minor importance. Although in-stream works will be restricted to between May to October inclusive, these months coincide with the period of peak amenity usage of the river. Loss of recreational amenity will be limited to the areas where works are proposed and the area immediately downstream of these works. However, as water quality is likely to be adversely affected in the construction phase of the scheme, diminution of the amenity value of the river will occur downstream of the working area also during the construction phase. In addition, the proposed works have the potential to negatively impact the resident fish stocks and potentially hinder the migration of fish. Indirect impacts may include the smothering of downstream fish gills with suspended solids. This has the potential to impact angling not only in the works areas but also on a wider scale. In-stream works will be temporary and therefore this has the potential to have a **temporary moderate negative impact.**

Mitigation Measures:

Works will be designed to minimise impacts upon the amenity value of the study area during the construction period. Mitigation will include measures to minimise pollution of the river, minimise impacts on fish, limit working hours and prevent un-necessary damage to bankside habitats. Full details of this mitigation is provided in Chapter 5.

Residual Impact:

Although upstream stretches of the River Lee will remain unaffected by the works and impacts on the water quality of the river downstream of the works will be minimised through implementation of mitigation measures, the amenity value of the proposed works areas will be inaccessible to the public within the study area for the duration of the works. Therefore the nature of the impact will remain moderate within and downstream of the works area for residents and visitors during the construction phase of the scheme.

4.6.2.9 Health and Safety Impacts

Potential Impacts

Construction of the proposed development will necessitate the presence of a construction site, however these sites will be temporary in nature as works will be carried out in several phases. Construction sites and the machinery used on them pose a potential health and safety hazard to construction workers if site rules are not properly implemented. This will have a **temporary potential significant negative impact** in each works area.

Mitigation Measures

During construction of the proposed development, all staff will be made aware of and adhere to the 'Safety, Health and Welfare at Work (Construction) Regulations 2013'. This will encompass the use of all necessary Personal Protective Equipment and adherence to the site Health and Safety Plan.

Security fencing will be erected around any excavations to prevent uncontrolled access to this area. Appropriate health and safety signage will also be erected on this fencing and at locations around the site.

Residual Impact:

The implementation of the Health & Safety Plan will ensure any potential risks are minimised.

4.6.3 Operational Phase

4.6.3.1 Health and Safety

Flooding poses a risk to human health and safety. The OPW document 'The Planning System and Flood Risk Management: Guidelines for Planning Authorities' (OPW, 2009) states that flooding can cause physical injury, illness and loss of life. Deep, fast flowing or rapidly rising flood waters can be particularly dangerous, with increased risk if the floodwater is carrying debris. Some of these impacts may be immediate, the most significant being drowning or physical injury due to being swept away by floods. Floodwater contaminated by sewage or other pollutants (e.g. chemicals stored in garages or commercial properties) can potentially cause illness, either directly as a result of contact with the polluted floodwater or indirectly as a result of sediments left behind. Flood water may also hide other hazards for wading pedestrians, such as manhole openings where the covers have been lifted by flood flows. The impact on people and communities as a result of the stress and trauma of being flooded, or even of being under the threat of flooding, can be immense. Long-term impacts can arise due to chronic illnesses and the stress associated with being flooded and the lengthy recovery process. The ability of people to respond and recover from a flood can vary. Vulnerable people, such as those who are old, disabled or have a long-term illness, are less able to cope with floods than others. Some people may have difficulty in replacing household items damaged in a flood

and may lack the financial means to recover and maintain acceptable living conditions after a flood. The construction of the proposed scheme will reduce the risk of flooding from the River Lee and the tide to below the 1 % AEP (Fluvial) or 0.5% (Tidal) levels. Therefore the negative experience of flooding in the areas benefiting from the works (Appendix 2A) will be significantly reduced. **This will have a long-term significant positive impact.**

4.6.3.2 Employment and Investment

The Lower Lee (Cork City) Drainage Scheme will provide increased protection to residential and commercial premises and businesses in Cork city, Ballincollig and surrounding areas. This will be likely to encourage future inward investment in the area, creating further employment and a stronger local ecomony. **This will provide a long-term significant positive impact.**

4.6.3.3 Land-use

During the operational phase of the proposed development, it is expected that the frequency with which the washlands will become flooded is likely to increase as a result of the release of water from the upstream dam. **This will have a long-term slight negaitive impact on land use.**

Mitigation Measures:

Although the frequency of flooding is likely to increase, the development of a flood warning system is likely to ensure that landowners of the washlands are less likely to incur unexpected damage/loss as a result of this flooding. It is forseen that the landowners will be given as much notice as possible (at least several hours) during which they can remove any livestock or machinery from the washland area.

Residual Impact:

Taking into account the above mentioned mitigation measures the proposed scheme will have a long-term slight negative residual impact on land-use.

4.6.3.4 Tourism

The operational phase of the proposed development will have **no negaitive impact** on tourism in the area.

4.6.3.5 Property Values

The Lower Lee (Cork City) Drainage Scheme will provide increased protection to residential and commercial premises in Cork city, Ballincollig and surrounding areas. This will be likely to increase the value of properties in the area. **This will provide a long-term significant positive impact.**

4.6.3.6 Traffic and Transport Infrastructure

The Lower Lee (Cork City) Drainage Scheme will improve the resilience of the city transport network significantly by reducing the risk of flooding events reducing the capacity of the city transport network, which would typically cause it to break down. This improved resilience will be further enhanced by the improvement works to the numerous bridges connecting the north and south channels to the central island,

which have in the past caused extensive significant disruption across the entire city and the wider suburban areas when significant flooding events have occurred.

As has been evidenced by historical flooding events in Cork City, the existing transport network is highly volatile at times and is sensitive to even moderate levels of disruption. This can lead to significant propagation of traffic congestion, queuing and associated delay, which can then rapidly develop outwards from the city centre into the suburban areas.

The Lower Lee (Cork City) Drainage Scheme will therefore have a **permanent significant positive impact** on the city transport network once complete.