

4. POPULATION & HUMAN HEALTH

4.1 INTRODUCTION

This section of the Environmental Impact Assessment Report (EIAR) describes the potential impacts of the proposed Crossmolina Drainage Scheme on population and human health and has been completed in accordance with the guidance set out by the Environmental Protection Agency (EPA) in 'Guidelines on Information to be contained in Environmental Impact Statements' (EPA, 2017) and the European Commission in relation to Environmental Impact Assessment of Projects (Directive 2011/92/EU as amended by 2014/52/EU) including 'Guidance on Screening', 'Guidance on Scoping' and 'Guidance on the preparation of the Environmental Impact Assessment Report'.

One of the principle considerations in the development process is that people, as individuals or communities, should experience no significant 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 EIAR include population & human health, 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 EIAR such as flooding from Chapter 7 - Hydrology and Hydrogeology; dust and noise from Chapter 8 - Air and Climate – Noise & Vibration; 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:

- Census of Ireland,
- Regional Planning Guidelines for the West Region 2010-2022,
- Regional Spatial and Economic Strategy (RSES), published by the Northern and Western Regional Assembly on 23 January 2020,
- Mayo County Development Plan, 2014-2020,
- Mayo County Council Website,
- Fáilte Ireland,
- Local Community Websites: www.crossmolina.ie

Information regarding human beings and general socio-economic data were sourced from the Central Statistics Office (CSO), the County Mayo Development Plan 2009 – 2015, the County Mayo Development Plan 2014 – 2020 Fáilte Ireland and any other literature pertinent to the area. 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 2016, 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 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 Flood Relief Scheme consists of the channel, floodplain and immediate surrounding areas of the River Deel extending along the main channel of the river as shown in Figure 4.1. The major settlement within the Study Area is Crossmolina, which is located on the River Deel and close to the northern shore of Lough Conn in north Co. Mayo. However, in order to make inferences about the population and other statistics in the vicinity of the proposed development, the Study Area for the Human Beings section of the EIA was defined in terms of the relevant District Electoral Divisions (DEDs). The Study Area for the EIAR lies within several DEDs, as shown in Figure 4.1. It has been decided to define the Study Area for the Population and Human Health Section of this EIAR as those DEDs in which the EIAR Study Area is located in or adjacent to. This ensures an analysis for a zone of influence in terms of impact on population and human health from the proposed site for a distance of between 7 – 12 kilometres as defined by the extent of the DEDs. or located close to.

The site of the proposed development lies within the Crossmolina South DED, with the Deel, Crossmolina North, Fortland, Ardagh and Carrowmore DEDs being located adjacent to the site of the proposed development, as shown in Figure 4.1. The total Study Area has a combined population of 4,198 persons and comprises of a total land area of 186.83 square kilometres. (Source: CSO Census of the Population 2016).

4.3.2 Study Area History

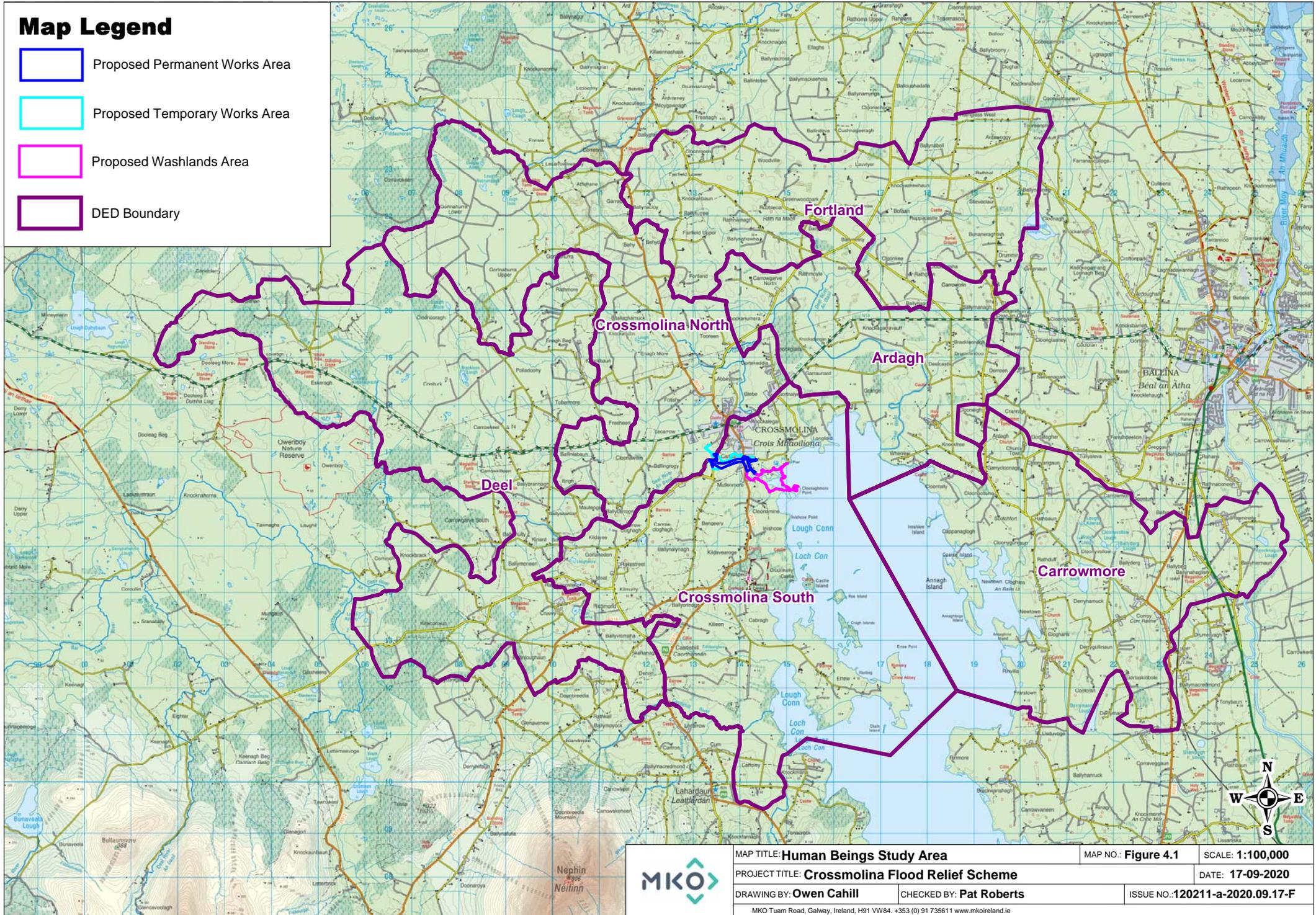
There has been a long history of flooding along the River Deel and in Crossmolina Town. The three most recent flood events were in 1989 and 2006 and 2015 (twice) and resulted in flooding in the three main streets of the town as well as many other areas within the town.

Previous flooding events, specifically that in 2015, caused flooding with a reading of >2.5 metres on the River Deel water level gauge at Ballycarroon (Station 34007), 2.5 km upstream of Crossmolina Town and resulted in a significant impact on human health as detailed below:

- Residential and commercial properties
 - Flooding caused personal damage to both homes and businesses, with many residents at an economical loss. The economic damages or benefits associated with the scheme are estimated to be in the region of €17million
- Potential public health risk
 - Flooding has the capacity to impose a danger to human health, especially with the older members of the population in the 65+ age group as well as people with underlying medical conditions.
- Pedestrian walkways
 - Flooding meant that there was no local access for walking, cycling, recreation, etc. in and around Crossmolina town.
- Roads and Transportation Network
 - Local or commuting traffic as well as public transport, did not have access to local roads.
- Surface Water Collection Network
 - The surface water collection networks were saturated, causing a risk to the local surface water management network.
- Distribution Networks

Map Legend

-  Proposed Permanent Works Area
-  Proposed Temporary Works Area
-  Proposed Washlands Area
-  DED Boundary



	MAP TITLE: Human Beings Study Area	MAP NO: Figure 4.1	SCALE: 1:100,000	
	PROJECT TITLE: Crossmolina Flood Relief Scheme			DATE: 17-09-2020
	DRAWING BY: Owen Cahill	CHECKED BY: Pat Roberts	ISSUE NO.: 120211-a-2020.09.17-F	
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- Local services and networks, particularly that of water and gas services were interrupted, although no water treatment plants are located within the flood zone therefore the impacts to water supply are considered minimal.
- Electricity and Telecommunications Network
 - Services were at risk of being disconnected and being hazardous for the local community.

The above consequences associated with the previous flooding history in Crossmolina are significant and the objective of the proposed development is to protect the human health of Crossmolina and the surrounding vicinity and facilitate the objectives of the Mayo County Development Plan 2014-2020 to ensure economic growth develop a wide range of services and amenities.

4.3.3 Settlements and Planning Policy

The major settlement within the Study Area is Crossmolina. Crossmolina is identified as “other town or village” in the Mayo County Development Plan 2014-2020. It is also considered to be one of the main population centres in the Mayo County Development Plan with a population of 1,044 as reported in the Census of Ireland 2016. Crossmolina is located 12.4km west of Ballina. The area also falls within the Atlantic Economic Corridor as defined in the National Planning Framework and its objectives include contributing to “an improved quality of life for the people who live there”

There is no specific Local Area Plan for the town but, planning and development policies and objectives for the area are included within the Mayo County Development Plan. The most relevant of the overall strategies to the Study Area are:

- P-02

‘it is the policy of the Council to support the sustainable development of the Linked Hub of Castlebar-Ballina to facilitate long term economic growth and a minimum population target of 28,700 persons by 2022 within the context of a high quality environment and to ensure that the towns are centres of economic growth to attract and support a wide range of services and amenities and deliver a high quality of life, thereby making the areas attractive as places to work, live, visit and invest in, which ensuring no significant adverse effects on the environment including the Natura 2000 network.’

- P-05

‘It is the policy of the Council to support the sustainable development and growth of the towns of Foxford, Crossmolina etc. to the population levels set out in the Core Strategy Table and through the implementation of the Housing objectives below, the other strategies and Development Guidance documentation of this Plan’

4.3.4 Population

Population Trends

In the years between the 2006 and the 2011 Censuses, the population of Ireland increased by 8.2 per cent, further increasing by 3.8% between 2011 and 2016. Between 2006 and 2011, the population of County Mayo grew by 5.5% to 130,638 persons. Between 2011 and 2016, the population of County Mayo decreased by 0.1% to 130,507 persons.

The total Study Area for this section of the EIA, as described in Section 4.3.1 above, has a combined population of 4,198 persons and comprises a total land area of 18,682 hectares or 186.82 square kilometres according to the CSO Census of the Population 2016. Population statistics for the State, County

Mayo and the Study Area have been obtained from the Central Statistics Office (CSO) and are presented in Table 4.1.

As described above, Crossmolina is identified in the Mayo Development Plan 2014 – 2020 as a town which will be supported in its growth and sustainable development.

Area	Population			% Population Change	
	2006	2011	2016	2006-2011	2011-2016
State	4,239,848	4,588,252	4,761,865	8.2%	3.8%
County Mayo	123,839	130,638	130,507	5.5%	-0.1%
Study Area	3,945	4,257	4,198	7.9%	-1.4%

Table 4.1 Population 2006 – 2016 (Source: CSO)

The data presented in Table 4.1 shows that the population of the Study Area increased by 7.9% between 2006 and 2011, and then decreased by 1.4% between 2011 and 2016. This rate of population growth is lower than that recorded at State and County level between both 2006-2011 and 2011-2016. 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 2006-2011 occurred in Fortland, where an increase of 14.8% was evident. Increase in population within the entire study area slowed between 2011-2016, with the highest increase of 3.5% being recorded in Ardagh. In comparison, during the same time period, Crossmolina South and Deel showed a reduction in population by 6.2 and 9.6 respectively.

Of the DEDs that make up the Study Area for the purposes of this assessment, the highest population was recorded in Crossmolina North DED, with 1,061 persons recorded during the 2016 Census. The lowest population was recorded in Ardagh DED, with 359 persons recorded during the 2016 Census.

Population Density

The population densities recorded within the State, County Mayo and the Study Area during the 2016 Census are shown in Table 4.2.

Area	Population Density (Persons per square kilometre)
State	69.6
County Mayo	23.4
Study Area	22.5

Table 4.2 Population Density in 2016 (Source: CSO)

The population density of the Study Area recorded during the 2016 Census was 22.5 persons per square kilometre. This figure is significantly lower than state level which has a population density of 69.6 persons per square kilometre but only slightly lower than that for the county, which has a population density of 23.4 persons per square kilometre.

Similar to the trends observed in population, the population density recorded across the Study Area varies between DEDs. Deel DED has the lowest population density, at 11.2 persons per square kilometre, while Crossmolina North DED has the highest population density, at 37.58 persons per square kilometre.

Household Statistics

The number of households and average household size recorded within the State, County Mayo and the Study Area during the 2011 and 2016 Censuses are shown in Table 4.3.

Area	2011		2016	
	No. of House-holds	Avg. Size (persons)	No. of House-holds	Avg. Size (persons)
State	1,654,208	2.8	1,697,665	2.8
County Mayo	48,070	2.7	48,899	2.6
Study Area	1,518	2.8	1,564	2.7

Table 4.3 Number of Households and Average Household Size 2011 - 2016 (Source: CSO)

In general, the figures in Table 4.3 show that while the number of households at State, County and Study Area level has increased, the average number of people per household has remained steady. At state level, average persons per household remained the same, whereas at County and Study Area level, there was a slight decrease in average persons per household because of a small reduction in population between 2011 and 2016, i.e. there are more households but slightly less people per house. Average household size recorded within the Study Area during the 2011 and 2016 Censuses is in line with that observed at State and County level during the same time periods.

Age Structure

Table 4.4 presents the percentages of the State, County Mayo and Study Area population within different age groups as defined by the Central Statistics Office during the 2016 Census. This data is also displayed in Figure 4.2.

Area	Age Category				
	0 - 14	15 - 24	25 - 44	45 - 64	65 +
State	21.1%	12.1%	29.5%	23.8%	13.4%
County Mayo	20.3%	10.8%	24.6%	26.6%	17.6%
Study Area	21.2%	11.3%	22.6%	26.9%	18.0%

Table 4.4 Population per Age Category in 2016 (Source: CSO)

The proportion of the Study Area population within each age category is similar to those recorded at County level, whereas in comparison to State level, larger differences occur within all age categories over 25. The most significant difference occurs where there is a 6.9% difference in population between State and Study Area level within the 25-44 age category, presenting a lower percentage within the study area. These differences are still apparent in both the 45-64 and 65+ age categories but are higher within the Study

Area. This may indicate the movement of younger age groups out of the study area for employment, and then movement back into the area in later life. Within the Study Area, the highest population percentage occurs within the 45-64 age category.

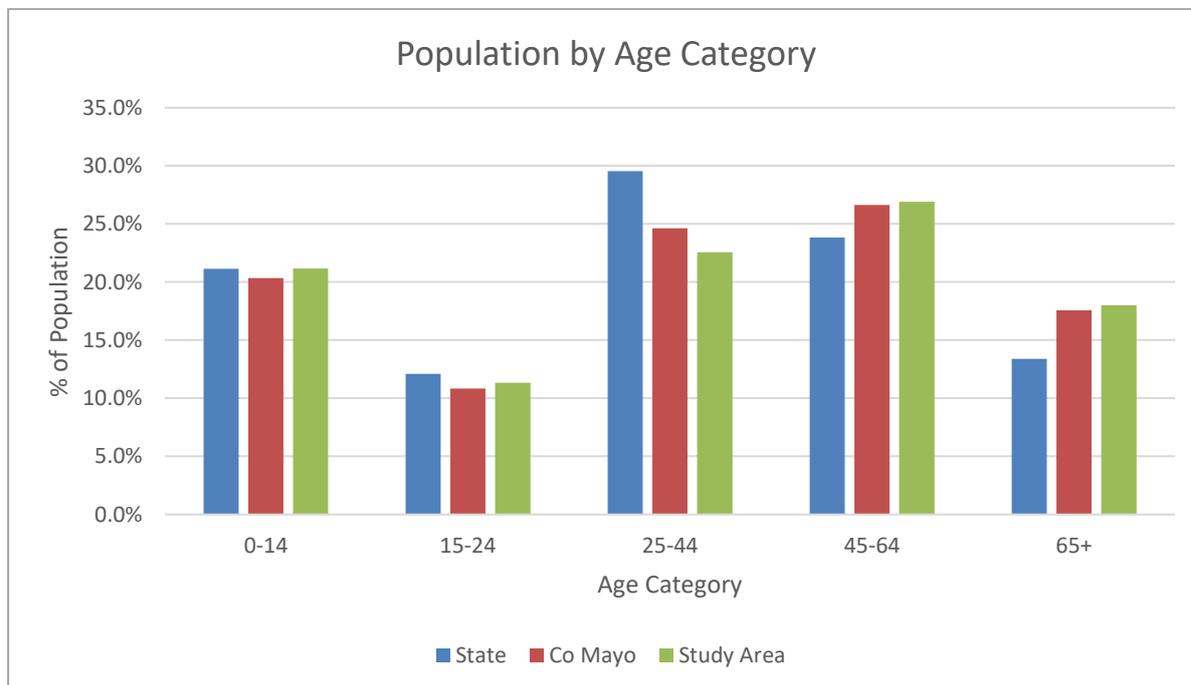


Figure 4.2 Population per Age Category in 2016 (Source: CSO)

4.3.5 Employment and Economic Activity

Sources of Employment

Crossmolina is located 12.4km west of Ballina. This proximity to an employment centre therefore influences the employment opportunities available to inhabitants of Crossmolina and other rural areas surrounding Ballina. The primary type of employment provided in the town of Crossmolina is service based employment, in addition to employment generated by agricultural and tourist industries.

The 2016 Census also provided information about the journey time to work, school or college where applicable.

Within the 6 ED Study Area, 72% 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 2016 Census data for the DEDs in the Study Area shows that the industries which employ the greatest percentage of persons are Professional Services (26%), Agriculture, Forestry and Fishing (19.3%) and Commerce and Trade (17.4%). A greater percentage of females are employed in the professional services and ‘other’ industries; with a larger proportion of males employed in the Agriculture, Forestry and Fishing and Manufacturing Industries.

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 2016, there were 2,304,037 persons in the labour force in Ireland. Table 4.5 shows the percentage of the total population aged 15+ who were in the labour force during the 2016 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 labour force, i.e. those who were students, retired, unable to work or performing home duties.

	Status	State	County Mayo	Study Area
% of population aged 15+ who are in the labour force		61.4%	57.7%	58.5%
% of which are:	At work	87.1%	85.7%	87.5%
	First time job seeker	1.4%	1.3%	1.4%
	Unemployed	11.5%	13.0%	11.1%
% of population aged 15+ who are not in the labour force		38.6%	42.3%	41.5%
% of which are:	Student	29.4%	23.9%	23.7%
	Family	21.1%	18.6%	21.3%
	Retired	37.6%	45.6%	44.3%
	Unable to work	10.9%	10.9%	9.9%
	Other	1.0%	1.0%	0.8%

Table 4.5 Economic Status of the Total Population Aged 15+ in 2016 (Source: CSO)

Overall, the principal economic status of those living in the Study Area is similar to that recorded at national and County level. The main similarities lie with the Study Area and the County, where both ‘Student’ and ‘Retired’ categories are both significantly lower and higher than the state respectively. This is in line with the low population percentage found within the 15-24 age group and the higher population percentage within the 65+ age group. Considering this higher population percentage for the 65+ age group within the Study Area, it is important to emphasise the vulnerability of this age group in terms of potential health risks associated with damage to homes from flooding which is an additional focus towards the need for the project from a human health perspective.

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 Mayo and the Study Area during 2016.

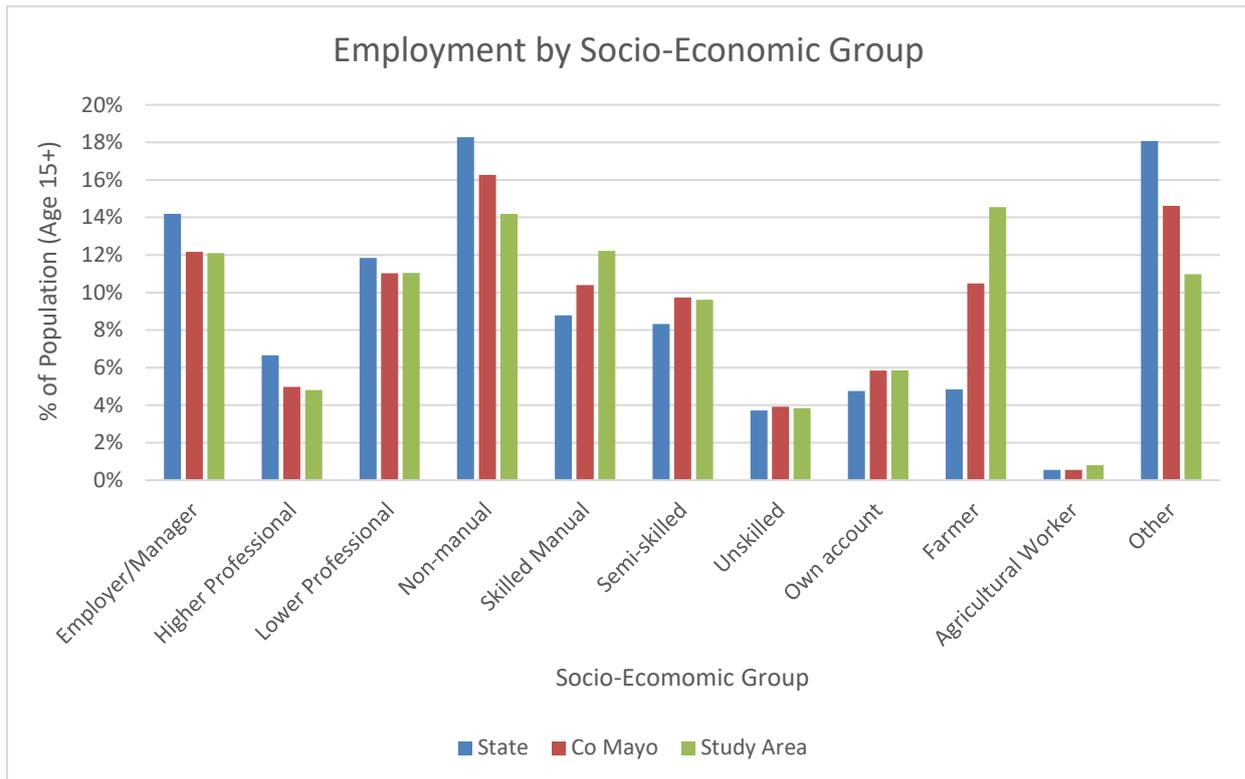


Figure 4.3 Employment by Socio-Economic Group in 2016 (Source: CSO)

The highest level of employment within the Study Area was recorded in the Farmer category. Approximately 14.5% of those employed within the Study Area form part of this category, compared to 10.5% of the County population and 4.8% of the national population. The Study Area and County population also show a higher proportion as working within the Skilled Manual category, compared to the levels recorded at national level. After Farming, the next highest levels of employment within the Study Area was in the Non-Manual sector.

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.

Ballina is the main centre of employment in the area. A large portion of the population of the Study Area may commute to here for work purposes. Castlebar is also approximately 32 kilometres from Crossmolina and it is likely that residents of the Study Area may travel to Castlebar area to work.

4.3.6 Land-use

The total area of farmland within the Study Area measures approximately 12,305 hectares or 80.0% of the Study Area, according to the CSO Census of Agriculture 2010 which are the most recent figures currently available. There are 504 farms located within the Study Area, with an average farm size of 24.4 hectares. This is slightly larger than the 22.4 hectare average farm size for County Mayo. Within the Study Area, farming employs 1010 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 forms the largest proportion of farmland, followed by silage.

Characteristic	Value
Size of Study Area	18,682 hectares
Total Area Farmed within Study Area	12,305 hectares
Farmland as % of Study Area	81.6%
Breakdown of Farmed Land	Area (hectares)
Total Pasture	7,395 ha
Total Silage	3,291 ha
Rough Grazing	1,082 ha
Total Hay	525 ha
Total Potatoes	0 ha
Total Cereals	6 ha
Total Crops	11 ha

Table 4.6 Farm Size and Classification within the Study Area in 2010 (Source: CSO).

4.3.7 Services

The proposed development site is located within as an ‘Other Town and Village’ within the Mayo County Development Plan 2014-2020. It is also referenced as an area within the Ballina and Environs Development Plan 2009 – 2015.

Education

Educational facilities in Crossmolina include the local play school and mixed Crossmolina National School, which has 204 pupils on the roll for 2017/2018 and is located in a relatively recently constructed purpose-built building (opened 2000). The school is located east of the River Deel, adjacent to St Tiernan’s Catholic Church. Richmond National SC (Scoil Naisiunta Cill Mhuire) is located 4.3km southwest of Crossmolina, further along the River Deel. Glenmore National School is also located within 7km of Crossmolina.

Second level students are catered for by St. Tiernan’s College, administered by the VEC and located in Crossmolina with approx. 230 students, in addition, Jesus and Mary Secondary School at Gortnor Abbey, with approximately 560 students, is also located within the study area and caters for students from the vicinity.

Access and Public Transport

The proposed development area is accessed via local roads off the N59 National Secondary Route, which passes through Crossmolina Town in an East West direction. The proposed development site crosses Chapel Street/L1105 which lies adjacent to the River Deel on its eastern bank as well as the R315 which links with the N59 National Route. The N59 commences in Co. Sligo, south of Sligo Town, passing through Ballina, Crossmolina and ending eventually in Galway City. Other national roads within a ten-kilometre radius of the site, include the N26, which connects the N5 road at Swinford with the N58 at Foxford.

The area surrounding the proposed development is served by public transport. The nearest train station to the proposed development site is Ballina Station, located in the nearby town of Ballina, approximately 11.7 kilometres east of the town centre. The 446, 454 and 455 bus services operates within the town, allowing travel to destinations including Ballina, Castlebar and Westport. Ireland West Airport Knock is located approximately 40 kilometres south east of the proposed development site.

Amenities and Community Facilities

There are numerous amenities and community facilities, including local GAA, Deel Rovers who have playing pitches and facilities in the area. Badminton, boxing and basketball are also facilitated by local clubs, in addition to soccer at Kilmurray. Youth of all ages in the area can participate in Ladybirds and Brownies clubs in addition to the local Foróige club.

Retail and personal services within the vicinity are provided mainly on Erris and Bridge Street, which has a variety of local shops. Community facilities in the form of public houses, community centres, shops, post offices and a Church are also available in the surrounding area.

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. As detailed below, tourism is important to the economy of Crossmolina with facilities and local attractions available in the town and surrounding areas. During 2016 (the latest year for which annual Fáilte Ireland figures are available, total tourism revenue generated in Ireland was approximately €8.3 billion, an increase of approximately 8.1% from the previous year. Overseas tourist visits to Ireland in 2016 grew by 8.8% to 8.7 million (*Tourism Facts 2016*, Fáilte Ireland, August 2017).

Ireland is divided into eight tourism regions. Table 4.7 shows the total revenue and breakdown of overseas tourist numbers to each region in Ireland during 2016 (*Tourism Facts 2016*, Fáilte Ireland, August 2017). Figure 4.4 illustrates the total number of tourists per region in 2016.

Region	Total Revenue (€m)	Total Number of Overseas Tourists (000s)
Dublin	€1,975 m	5,687
Mid-East	€251 m	626
Midlands	€72 m	226
South-East	€273 m	946
South-West	€849 m	2,079
Mid-West	€390 m	1,215
West	€543 m	1,675
Border	€286 m	815
Total	€4,639 m	13,269

Table 4.7 Overseas Tourists Revenue and Numbers 2016 (Source: Fáilte Ireland)

The West Region, in which the Study Area is located, comprises Counties Roscommon, Galway and Mayo. This Region benefited from approximately 13% of the total number of overseas tourists to the country and approximately 12% of the total tourism income generated in Ireland in 2016. Table 4.8 shows the breakdown of overseas tourist numbers to the West Region during 2015 (the most recent data available at the time of writing) and the associated revenue generated (*'Regional Tourism Performance in 2015'*, Fáilte Ireland, October 2016). The regional data shows that County Galway had the highest tourism revenue and the highest number of overseas tourists within the Region during 2015.

County	Revenue Generated by Overseas Tourists (€m)	No. of Overseas Tourists (000s)
Roscommon	€20 m	50
Galway	€475 m	1,354
Mayo	€80 m	302

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

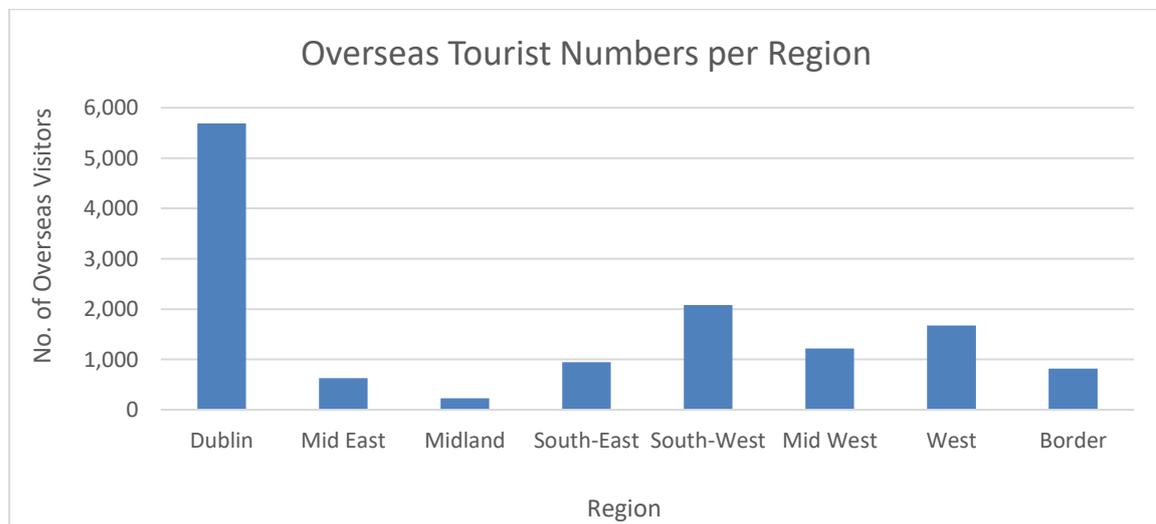


Figure 4.4 Total Overseas Tourists per Region in 2016 (Source: Fáilte Ireland)

Figure 4.5 provides Fáilte Ireland figures showing the type of activities that domestic tourists engaged in during 2016 throughout Ireland. From these figures it can be seen that hiking/walking visits form the majority of all activities enjoyed followed by visits to houses and castles. Activities with the least interest include angling and attending horse racing.

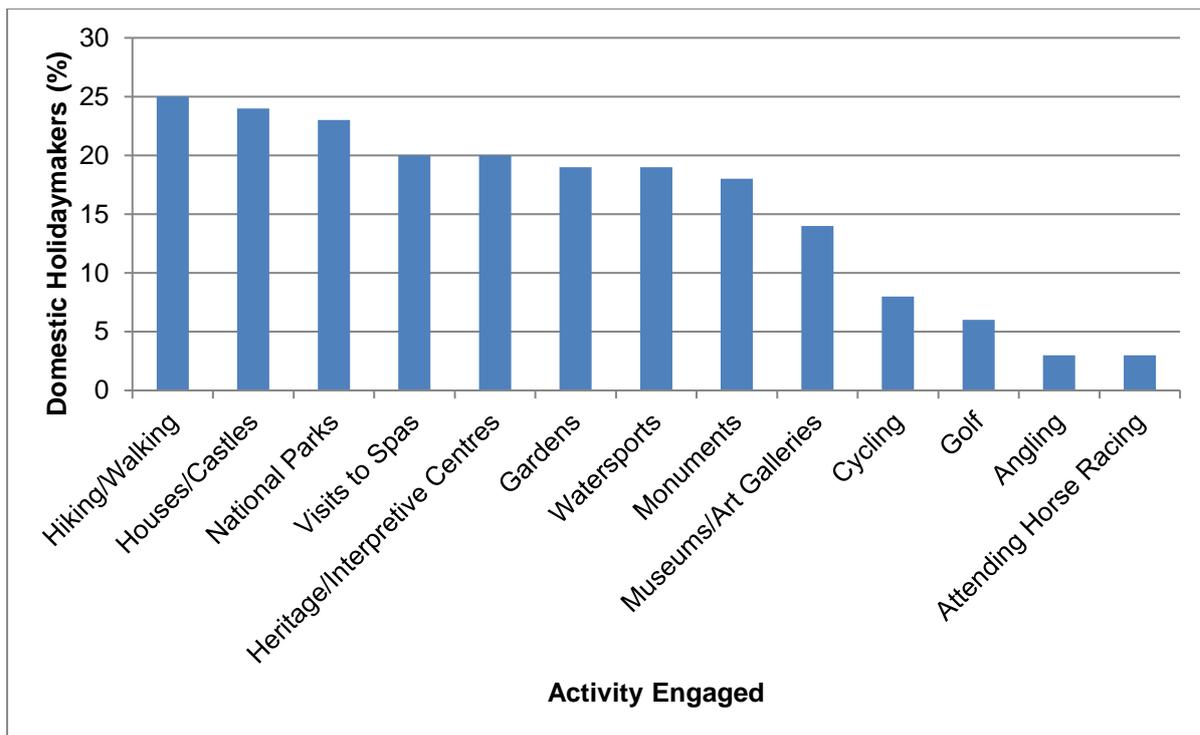


Figure 4.5 Activities undertaken by domestic visitors in Ireland in 2016 (Source: Fáilte Ireland)

Tourist Attractions Tourism is important to the economy of Crossmolina with B&B accommodation and services available in the town and surrounding area to cater for tourists. A number of the tourist attractions that are available in the local area are discussed below. With the exception of the angling resource on the River Deel itself, no identified tourist attractions were recorded within the footprint of the proposed drainage scheme.

Angling Tourism

The most recent report on Angling tourism in Ireland found that €121 million was spent by the 150,000 angling visitors to the country in 2012. Excellent local angling is available on the River Deel, the nearby Lough Conn and the River Moy. The Inland Fisheries Ireland (www.ifi.ie) describe the Deel River as follows:

‘The River Deel rises high in the Nephin Beg mountains and flows for forty-five kilometres through moorland and pastures, and through the town of Crossmolina, before entering the northern end of Lough Conn. It is the largest of the Moy tributaries and offers a wide variety of angling experiences ranging from dry fly fishing for trout together with spring salmon fishing, in the lower reaches, to lively brown trout and grilse fishing in the remote upper reaches. The majority of spring salmon used to be caught downstream of Deel Castle but this area is closed in spring as a conservation measure.’

The Finglasha River, which is a tributary of the River Deel has undergone enhancements works under the OPW funded Environmental River Enhancement Programme (EREP). The programme involved development of pool and riffle systems, tree pruning, scrub removal and berm management and is aimed at improving the river corridor for fisheries and angling.

The River Deel is a river that is regularly used by anglers, who currently have access to the area where the intake weir and flow control structure is proposed.

Other Local Tourist Attractions

Crossmolina and the surrounding area has a number of local attractions as listed below¹:

- Crossmolina looped walks

A series of looped walks were developed, consisting of local town walks, woodland (heritage) walks and mountain walks. The distances vary in length from 3km to 12 km.

- Kayaking on Lough Conn

Kayaking on Lough Conn is available based from Gortnor Abbey Harbour, allowing participants to access the lake and River Deel within a short distance.

- Golf, Hiking and Boating

Boating on Lough Conn and hiking in the general area are also available to locals and visitors to the area. Crossmolina is centrally located for golf enthusiasts with a number of golf courses within a short driving distance, including Ballina, Enniscrone, Castlebar and Belmullet.

- History and Archaeology

Crossmolina and surrounding areas are dotted with a wealth of historical and archaeological sites. The ruin of Abbeytown abbey is 1.5km north of Crossmolina and the ruins of Errew abbey can be seen 10.5km south-east of Crossmolina, while the ruins of the 16th century Deel Castle are to be found at the northern end of Lough Conn.

There are also a number of Visitor Centres within 30 minutes' drive of Crossmolina, including:

- North Mayo Heritage Centre at Enniscrone;
- Céide Fields Visitor and Interpretative Centre;
- Foxford Woollen Mills and
- National Museum of Country Life, Turlough

The annual Crossmolina Community Festival takes place at the end of July each year.

Local Amenities

The Crossmolina Town Trail was developed by the local Tidy Towns Committee, in addition to a LEADER funded Biodiversity Plan which was drawn up in 2011 on behalf of the Crossmolina Community Council. As part of the trail, a brochure is available online, in addition to plaques on the various features around the town, which incorporates historical, archaeological and other local interest information. A riverwalk was also developed in 1990, which includes some signage and ecological interpretative information about rare species using the River Deel.

4.5 HUMAN HEALTH AND SAFETY

There is a long history of flooding in the floodplains of the River Deel and in Crossmolina Town. Between 1963 and 1966, the Moy Catchment Drainage Scheme (CDS) was carried out on the River Deel from Lough Conn to approximately 200m upstream of Jack Garret Bridge. Since the CDS scheme, three significant floods have impacted the town and while a number of lesser events have also occurred, anecdotal information

¹ Local attractions are listed on Crossmolina.ie

suggests that they had minor impact. The three most recent flood events were in 1989 and 2006 and 2015 and resulted in flooding in the three main streets of the town.

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 in the 65+ age group of which 18% of the population of the study area comprise, 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 of people and their safety, and the impacts on their health of dust, noise and traffic will be dealt with. Noise and traffic impacts will be dealt with in more detail in Chapters 8 and 11 respectively.

4.6.1 'Do-Nothing' Scenario

If the proposed development were not to proceed, the existing river channel and regime of reactive maintenance would remain as it is, resulting in many of the same potential impacts on human beings as have occurred previously (most recently in December 2015) and listed above in Section 4.3.2.

If the proposed development were not to proceed, the opportunity to protect Crossmolina and the surrounding vicinity, the population that live, work and travel through that area and to protect against human health risks from future flooding events would be lost. The opportunity to protect current businesses from potential future flood damage and the opportunity to create employment during the construction phase and to enhance future development and economic growth by having appropriate flood protection measures in place would also be lost.

Adopting the do nothing scenario there would be no negative effects on environmental receptors during non-flood conditions. This is the majority of the time and would be considered the 'natural' environmental scenario. However, in flood events, in the do nothing scenario, there is a risk to water quality where pollution may arise from damage to waste or sewerage infrastructure (e.g. septic tanks) or other sources e.g. chemicals or other potential pollutants stored in yards and within basements or buildings which become inundated during

flood conditions and lead to impacts on the population and human health of the local area. Therefore, the do nothing option was not considered.

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 €12.1 million. The construction phase of the proposed development will last approximately 48 months. It is estimated that the proposed Crossmolina Flood Relief Scheme will provide employment for approximately 36 people during the construction phase (with a number of additional short-term positions). It is likely that at least some prospective employees will be sourced from the local area, therefore benefitting the local economy and skill base to some extent. There will also be direct employment opportunities during both the construction where local labour will be sourced where possible and available along indirect employment opportunities for local business and services. The operational phase of the proposed development will also generate employment opportunities in areas such as hauliers and waste contractors among others. **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 and increase the support for local business and services that will be used by the increased workforce in the area, thereby having a long-term positive impact on the local skills base. Up-skilling and training of local staff in the particular requirements of flood relief and 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 traffic into some local rural businesses, with noise and dust from the works adding to this impact on local businesses. These potential impacts are discussed in full in Chapter 8 Air & Climate / Noise & Vibration and Chapter 11 Material Assets **This will have a short-term slight negative indirect impact.**

Mitigation Measures

A traffic management plan (such as rolling traffic management) will be prepared and 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 management will only implement restrictions to local businesses only when necessary and only for the shortest possible time. An Outline Construction Environmental Management Plan (CEMP) prepared and submitted with this application 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. This is fully assessed in Chapter 8 – Air Quality & Climate – Noise & Vibration with the associated mitigation is fully set out in the outline CEMP in Appendix 3C. of this EIAR

Residual Impacts

The residual impacts will be short term 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. There will be no long term or permanent impacts on populations and human health. Based on the assessment above there will be no significant effects.

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

Whilst the proposed works will have little impact on many sectors of the tourism industry in Crossmolina, Angling forms part of the industry in the town and is likely to be affected by the proposed works. However, the proposed works will be restricted to a very small section of the River Deel at the location of the intake weir and flow control structure. Therefore, it is possible that the tourism sector in Crossmolina will experience a **temporary negligible direct adverse impact** during the construction phase through lack of access to this small area. Angling in the catchment areas away from the proposed works is unlikely to be affected by the proposed works given the work practices and mitigation that will be applied and which is fully described in Chapter 5 of this EIAR. Thus the impact is considered to be **Negligible**. Potential increases in noise and dust levels, traffic issues and temporary impacts on visual amenity related to the works may also deter and/or disturb visitors during the construction phase. However, it should be noted that there are no significant tourist attractions pertaining to the site of the proposed development and its immediate surroundings.

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. This mitigation is provided in detail in Chapters 5, 6 & 12 as well as in the Outline Construction Environmental Management Plan that is provided in Appendix 3C.

The implementation of a Traffic Management Plan and Construction and Environmental Management Plan in Appendix 3C 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 Deel 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 outlined in Chapter 7, the amenity value of the River Deel within sections of the work area will be diminished for tourists for the duration of the works. However, amenity use at this location is not significant. Therefore, the nature of the impact on tourism and amenity overall will remain insignificant during the construction phase of the scheme. Based on the assessment above there will be no significant effects.

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. Works associated with the proposed development may contribute to noise impact are as follows:

- Construction of bridge and road infrastructure;
- Construction of new channel and associated infrastructure;
- HGV movements;
- Piling works.

The potential noise impacts that will occur during the construction phase of the proposed development are further described in Chapter 8 of this EIAR. The potential for impact on human health from noise emanating from the works is considered in terms of the nuisance and stress it may cause certain local residents. **These will have a short-term negligible to significant impact** depending on the location of the receptor, and the works being carried out.

Mitigation

In order to sufficiently ameliorate the likely noise and vibration impacts from the proposed works, a schedule of noise control measures has been formulated for the construction phase.

Reference will be made to BS 5228-1: 2009: *Code of Practice for Noise and Vibration Control on Construction and Open Sites: Noise*, which offers detailed guidance on the control of noise & vibration from demolition and construction activities.

If needed, noise monitoring will occur at agreed locations.

Furthermore, a variety of practicable noise control measures will be employed. These include:

- selection of plant with low inherent potential for generation of noise and/ or vibration;
- erection of enclosures as necessary around noisy processes and items such as generators, heavy mechanical plant or high duty compressors;
- placing of noisy / vibratory plant as far away from sensitive properties as permitted by site constraints and the use of vibration isolated support structures where necessary.

In regard to the potential impact on human health to local resident owing to nuisance and stress that noise may cause, the mitigation as outlined above along with open lines of communication with local residents with regards to work schedules, programme and a reassurance of the temporary nature of the works generating noise and nuisance as well as adhering to agreed hours of construction are the appropriate control measures to adopt.

Further mitigation details regarding vibration from construction activities is detailed in Section 8.6.5 of this EIAR.

Residual Impacts

During the construction phase of the project, it is expected expect that nearby residential properties will not be exposed to significant noise emissions from construction works given due to the short-term temporary nature of works and given that they in most cases are over 20m from the works. This is assessed in detail in Chapter 8. Based on the mitigation measures provided in Chapter 8, noise during the construction phase will

be negligible. Based on the assessment above there will be no significant effects on the population and human health associated with noise from the works.

4.6.2.5 Dust

Potential Impacts

Potential dust emission sources during the construction phase of the proposed development include excavation activities, backfilling with aggregate, and resurfacing works. This may cause nuisance to residents and local businesses as well as road users and have the potential to impact the health of people with underlying medical conditions or respiratory issues in the absence of appropriate control measures and mitigation. The concern from a health perspective is focused on particles of dust which are less than 10 microns (PM₁₀). The potential for these impacts to occur will not be significant given the localised and rural nature of the proposed works and will be relatively short-term in duration. This is assessed in detail in Chapter 8 **There is the potential to have a short-term slight negative impact.**

Mitigation

In periods of extended dry weather, dust suppression (localised wetting of surfaces) may be necessary within and around the site to ensure dust does not cause a nuisance.

If needed, environmental monitoring will occur at agreed locations for dust to confirm the effectiveness of the dust suppression measures adopted.

Residual Impacts

The residual impacts will be imperceptible. Based on the assessment above and the mitigation proposed to suppress dust impacts, there will be no significant effects.

4.6.2.6 Exhaust Emissions

Potential Impacts

Exhaust emissions relating to the construction phase of the proposed development will originate from the delivery of materials to the site, the removal of surplus excavated material from the site and the transport of workforce to, from and within the site along the anticipated transport routes presented in Chapter 11 which may lead to an increase nitrogen dioxide, sulphur dioxide, benzene and carbon monoxide. This is assessed in detail in Chapter 8 **There is the potential to have a short-term slight negative impact.**

Mitigation

A number of mitigation measures will be implemented in relation to exhaust emissions and climate during the construction phase switching machinery off when not in use, maintaining all construction vehicles and plant in good operational order and sourcing material which will be required in large volumes such as aggregates locally where possible to reduce potential emissions.

Residual Impacts

The residual impacts will be imperceptible. Based on the assessment above and the mitigation proposed to reduce potential emissions, there will be no significant effects.

4.6.2.7 Traffic and Transport Infrastructure

Potential Impacts

The construction phase of the Crossmolina Flood Relief Scheme will have a temporary impact on traffic volumes in Crossmolina Town and the surrounding vicinity during the construction phase, due to hauling of excavated material, combined with the delivery of materials and work force traffic which will occur.

Construction related traffic will originate from the delivery of materials to site, removal of surplus excavated material from site and transport of employees to, from and throughout the site. The estimated number of round trips is approximately 25,000 spread over the anticipated construction period of 4 years.

Potential impacts are summarised below:

Transport infrastructure in the area will likely be impacted during construction. This will likely affect the L1105, R315, the Lake Road as well as any access roads connecting dwellings and farms to existing junction with the R315.

The proposed construction of two new bridges will have a temporary negative impact during the construction phase and a permanent neutral impact thereafter. Realignment of a section of the Lake Road and creation of a new junction with the R315 and realignment and raising of the existing access track to dwellings and farms to the Lake Road is likely to have a temporary negative impact during the construction phase and a permanent neutral impact thereafter.

It is unlikely that traffic generated during the construction phase of the proposed scheme will have a significant impact on traffic flow in Crossmolina Town. Table 11.3, located in Chapter 11, compares the predicted construction traffic with the existing traffic flows in Crossmolina town.

Localised traffic disruption is also likely to occur at locations of proposed works on, or in the immediate vicinity of the road network. Detailed site investigation works will also be carried in the vicinity of all proposed works. As with noise impacted (discussed above) impacts on road users including delays and inconvenience associated with temporary road closures, stop/go systems and diversions also have the potential for impact on human health in terms of nuisance and stress that these disruptions may cause. Unlike the noise impacts considered, these relate to road users and not considered to be a direct impact on people within their residence.

Temporary road closure details during the construction of the Pollnacross Bridge (L1105) and Mullenmore Bridge (R315), as well as a temporary close of the R315 can be found in Section 11.2.4 of Chapter 11. Overall, this will have a potential temporary slight negative impact on traffic. In Full details of potential effects regarding traffic and transport infrastructure are detailed in Chapter 11.

Mitigation

The construction of the reinforced concrete bridges will be carried out by a suitably qualified and experienced contractor who will be supervised to ensure that the works are carried out correctly. This will ensure that the bridges will be constructed safely and ensure the structural integrity of the structure.

The construction of the roads proposed as part of the scheme will be carried out in consultation with the Local Authority and will also follow the Department of Transport, Tourism and Sport published document entitled 'Guidelines for Managing Openings in Public Roads'. These works will be designed and supervised by a suitably qualified and experience professional to ensure they are carried out correctly.

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'.

Construction works will be sequenced so as to avoid unnecessary interruption to road users insofar as is practicable. The realigned Lake Road will be construction in advance of constructing the two new bridges. Any road and lane closures will be timed to minimise the impact to the flow of traffic, and if possible, work will be carried out at off peak times to reduce the impact, particularly on heavy goods vehicles. All residents and interested parties shall be consulted when planning these road closures to optimise the timing of same. A complete schedule of road closures shall be published in advance of the works commencing to facilitate residents in making alternative arrangements where necessary.

Residual Impact

Taking into account the abovementioned mitigation measures, the residual impact of the proposed scheme on the transport infrastructure and the impact on human health associated with traffic disruption will be neutral.

Traffic: Relatively short, localised delays are likely to be encountered by motorists at the locations of proposed works in the immediate vicinity of the road network. This impact will be a short term impact and there will be no residual impact on completion of the proposed works.

The closure of L1105 and R315 to facilitate the proposed construction of two new bridges is likely to cause a moderate to significant temporary impact to the flow of traffic in the vicinity of the works. However, there will be no residual impact once the proposed scheme is completed. Based on the assessment above there will be no significant effects.

4.6.2.8 Services

Chapter 11, Section 11.3 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 11.3. Impacts on each service will vary, for example, temporary loss of service; but overall the proposed flood relief scheme will have a **potential temporary slight to 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 replaced or deepened prior to foundation excavation if necessary.

Prior to excavation, the Contractor will assess record drawings and the results of the Site Investigation Contract in order to determine the exact depth and location of the existing wastewater collection network within the works area. The Contractor will carry out additional site investigation to confirm the location of the existing pipework. This will reduce the risk of striking the wastewater collection network and causing interruption to the system during the construction phase.

Residual Impact:

Considering the above-mentioned mitigation measures the residual impact of the proposed scheme on the local service networks will be **neutral**. Based on the assessment above there will be no significant effects.

4.6.2.9 Tourism and Amenity (including Visual Amenity)

Potential Impacts

Anglers are the main users of the river amenity, though it is not a widely used section of the river for this. The visual amenity of the river for residents and visitors alike is also of importance to the area. Loss of recreational amenity will be limited to the area of the proposed riverside works, which is outside the town, and has no formal access or amenity uses. This has the potential to have a **short-term negligible negative impact**.

The impact on visual amenity of the construction phase is assessed in full in Chapter 9 (Landscape) of this EIAR. The areas with the most significant works will have the greatest impact. Overall this has the potential to have a **short-term 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 avoid pollution of the river, minimise potential for impacts on fish, limit working hours and prevent un-necessary damage to bankside habitats. Full details of this mitigation is provided in Chapter 5. Other sections of the river will be accessible for amenity use.

The mitigation measures relating to visual amenity impacts are discussed in Chapter 9 (Landscape) of this EIAR.

Residual Impact:

Provided that the mitigation measures discussed in Chapter 9 of this EIAR are implemented correctly, the residual impact on visual amenity will be a **temporary to short term slight negative impact**. Based on the assessment above there will be no significant effects.

4.6.2.10 Human Health and Safety Impacts

Potential Impacts

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. **This will have a short-term potential significant negative impact**.

Mitigation Measures

During construction of the proposed development, all staff will be made aware of and adhere to the Health & Safety Authority's 'Guidelines on the Procurement, Design and Management Requirements of the Safety, Health and Welfare at Work (Construction) Regulations 2006'. This will encompass the use of all necessary Personal Protective Equipment and adherence to the site Health and Safety Plan.

Harris 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.

Temporary lighting of works at or near entrances/exits onto public road will be erected for night and dark winter working.

Residual Impact:

The implementation of the Health & Safety Plan will ensure any potential risks are minimised. Based on the assessment above there will be no significant effects.

4.6.3 Operational Phase

4.6.3.1 Human 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 in the 65+ age group of which 18% of the population of the study area comprise, disabled or have a long-term illness, are less able to cope with floods than others and thus increasing potential for impact on their health. 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 proposed relief scheme will have a long-term significant positive impact.**

4.6.3.2 Population

As detailed above in Section 4.3.4, the population in the study area represented a decrease of 1.4% between 2011 and 2016. Further to this, the Mayo Development Plan 2014 – 2020 identifies Crossmolina as a town which will be supported in its growth and sustainable development.

The proposed relief scheme will be a positive contribution to the area as detailed in Section 4.6.1 and **will provide a long-term significant positive impact** on population.

4.6.3.3 Employment and Investment

The flood relief scheme will provide increased protection to residential and commercial premises and businesses in Crossmolina and the surrounding areas. This may make the town more attractive for future inward investment in the area, creating further employment and a stronger local economy. **The proposed relief scheme will provide a long-term significant positive impact.**

4.6.3.4 Land-use

Potential Impacts

The proposed Crossmolina Flood Relief Scheme described in detail in Chapter 3 will result in a reduced risk of flooding in Crossmolina Town which will have a significant positive impact on residential and commercial properties in the town.

The route of the diversion channel has been chosen with regard to several factors including the goal to minimise impacts on residential properties where possible. The proposed development was designed to avoid the loss of any houses on the chosen diversion channel route, in some cases the scheme will encroach on residential properties, to construct elements of the scheme including the intake structure, diversion channel and realigned Lake Road. In these instances, the development has been designed to minimise encroachment onto residential property.

Chapter 11, Section 11.6 gives further details on the predicted impacts on land-use in relation to residential and commercial properties as well as agricultural land use both in Crossmolina and the surrounding vicinity. Overall the proposed flood relief scheme will have a **potential permanent moderate positive impact** on land-use.

Taking into account the benefit of the scheme to the Crossmolina Town and surrounding area, the residual impact will be **significant permanent positive**.

4.6.3.5 Tourism

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

4.6.3.6 Property Values

The flood relief scheme will provide increased protection to residential and commercial premises in Crossmolina and surrounding areas. The total area of land benefitting from this development will be 107.6 ha. Of this, 23.1 ha is within a residential area and 84.5 ha is located in agricultural lands downstream of the town. This will be likely to increase the value of properties in the area. **The proposed scheme will provide a long-term significant positive impact.**

4.6.4 Decommissioning Phase

It is not anticipated that any situation will arise where decommissioning of the proposed development will be required. The nature of the works is to alleviate flooding in the area and therefore the removal of any infrastructure installed as part of the proposed development for that purpose is not foreseen.

4.6.5 Vulnerability of the Project to Natural Disaster

media and the subsequent potential for impacts on the environment or human health effects.

Should a major accident or natural disaster occur the potential sources of pollution from the proposed development during both the construction and operational phases are limited. The proposed flood relief scheme is not a recognised source of pollution. Sources of pollution with the potential to cause significant environmental pollution and associated negative effects on the environment and health such as bulk storage of hydrocarbons, chemicals, gases, storage of wastes etc. does not arise. The works will also be sequenced, and temporary works areas selected to avoid potential for inundation of the works area by flood water in so far as is practicable during construction stage.

There is limited potential for significant natural disasters to occur at the proposed development. Ireland is a geologically stable country with a mild temperate climate. The potential natural disasters that may occur are therefore limited to flooding and fire. The fundamental objective of the proposed development is to reduce the risk of flooding. Measures will be put in place during the construction stage to mitigate potential effects should flooding occur at this stage in the development. It is considered that the risk of significant fire occurring, affecting the development and causing the flood relief works to have significant environmental effects does not arise. As described earlier, there are no significant sources of pollution in the flood relief with the potential to cause environmental or health effects.

Major industrial accidents involving dangerous substances pose a significant threat to humans and the environment; such accidents can give rise to serious injury to people or serious damage to the environment, both on and off the site of the accident. The flood relief scheme is not regulated or connected to or close to any site regulated under the Control of Major Accident Hazards Involving Dangerous Substances Regulations i.e. SEVESO sites and so there is no potential effects from this source.

4.6.6 Cumulative and In-combination Impact Assessment

4.6.6.1 Cumulative Impact Assessment

The impacts with the potential to have cumulative impacts on human beings, in particular noise, traffic and visual impacts are addressed in the relevant chapters and are summarised as follows.

The construction phase of the project will give rise to road closures and restrictions of traffic movements during the construction of Pollnacross Bridge (L1105) and Mullenmore Bridge and whilst realigning the lake road. This will create some short-term inconvenience for road users. By ensuring that these impacts occur at times and locations provided for in a traffic management plan, this will be mitigated in so far as is possible.

The proposed scheme is intended to mitigate the impacts of flooding on population and human health in locality and beyond. In doing so the design requires that the bypass channel becomes operational at a water level that prevents the flooding of Crossmolina Town. This could potentially result in significant effects on the normal functioning of the river and was overcome by the introduction of a flow control structure, which aids in directing high flows down the bypass channel and means that the intake weir level can be raised so that the lower flows in the river are not affected and the bypass channel is only operational during the very high flows when it is actually required to prevent flooding in Crossmolina Town,

The movement of construction vehicles both within and to and from the site has the potential to give rise to noise and dust nuisance impacts during the construction phase. However, these effects and the measures that are in place to avoid any cumulative or interactive effects are fully described in this EIA.

4.6.6.2 In-combination Impact Assessment

For the assessment of in-combination impacts, any other existing, permitted or proposed developments have been considered where they had the potential to generate a significant in-combination impact with the proposed Crossmolina Flood Relief Scheme. The impacts with the potential to have cumulative impacts on human beings, in particular noise, traffic and visual impacts are addressed in the relevant chapters.

Projects that were included in the In-combination Impact Assessment for Population and Human Health included numerous small scale proposed, permitted and existing operations, plans and developments (e.g. River Deel drainage maintenance, dwelling house, commercial units, school extensions, cemetery ancillary works, agriculture, etc.). These are listed in Section 2.7 of the EIA.

Based on the assessment of the proposed Scheme in combination with all other programmes and projects in the vicinity, no significant in-combination cumulative effects relating to Population and Human are anticipated

4.6.6.3 Employment and Economic Activity

The proposed development will contribute to short term employment during the construction stages and provide the potential for increased long-term employment from existing and future development/activities as a result of the flood protection offered to the area. This results in a **long-term significant positive impact**. The other projects as described above also have the potential to provide employment in the short term.

4.6.6.4 Tourism

As standalone projects or cumulatively, the construction phase of projects will have a short-term slight to moderate negative impact on tourism as nuisance from construction traffic is unavoidable. However, the permanent flood protection offered to the town will have a long-term slight to moderate positive impact, as they will not need to close down for repairs after flood events. Phased development will be employed to allow for construction traffic to be managed and to minimise the volume of construction traffic using the road

network at any one time. There will be a **short-term slight negative** residual impact on tourism. The impacts of Traffic are fully assessed in Chapter 11.

4.6.6.5 Health and Safety

The proposed development will have a **long-term significant positive impact** in terms of health and safety for reasons discussed in Section 4.6.3.1 above.

4.6.6.6 Property Values

The proposed flood relief scheme will provide increased protection to residential and commercial premises in Crossmolina and many other parts of the surrounding area. This will be likely to increase the value of properties in the area. A **long-term significant positive** cumulative impact is anticipated.