Galway Harbour Company

Galway Harbour Extension

Environmental Impact Statement

Chapter 11

Climatic Factors

TABLE OF CONTENTS

TABLES & FIGURES

TABLES

No table of figures entries found.

FIGURES

11 CLIMATIC FACTORS

11.1 INTRODUCTION

This chapter addresses the impact of the proposed development on climate.

While the development is not of a scale to influence global climate, the impact of changes in CO_2 (Carbon Dioxide) and CH_4 (Methane) emissions associated with the development need to be assessed. This chapter will address the greenhouse gas emissions associated with both the construction and operational phases of the development.

11.2 METHODOLOGY & SOURCES OF INFORMATION

The Air Quality chapter of this document (Chapter 9) includes estimates of the greenhouse gas emissions associated with the proposed development. The data sources for this information are outlined in that chapter.

The World Meteorological Organization (WMO) recommends that climate averages are computed over a 30 year period of consecutive records. The period of 30 years is considered long enough to smooth out year to year variations. Met Éireann have decided to use 1981 to 2010 as the baseline period for day-to-day weather and climate comparisons in Ireland. The current WMO global baseline period for use in climate change research is 1961-1990.

The Irish Meteorological Service operates a network of meteorological stations around the country, the nearest of which are located at Mace Head, Carna, Co Galway, Claremorris, Co. Mayo and at Shannon Airport.

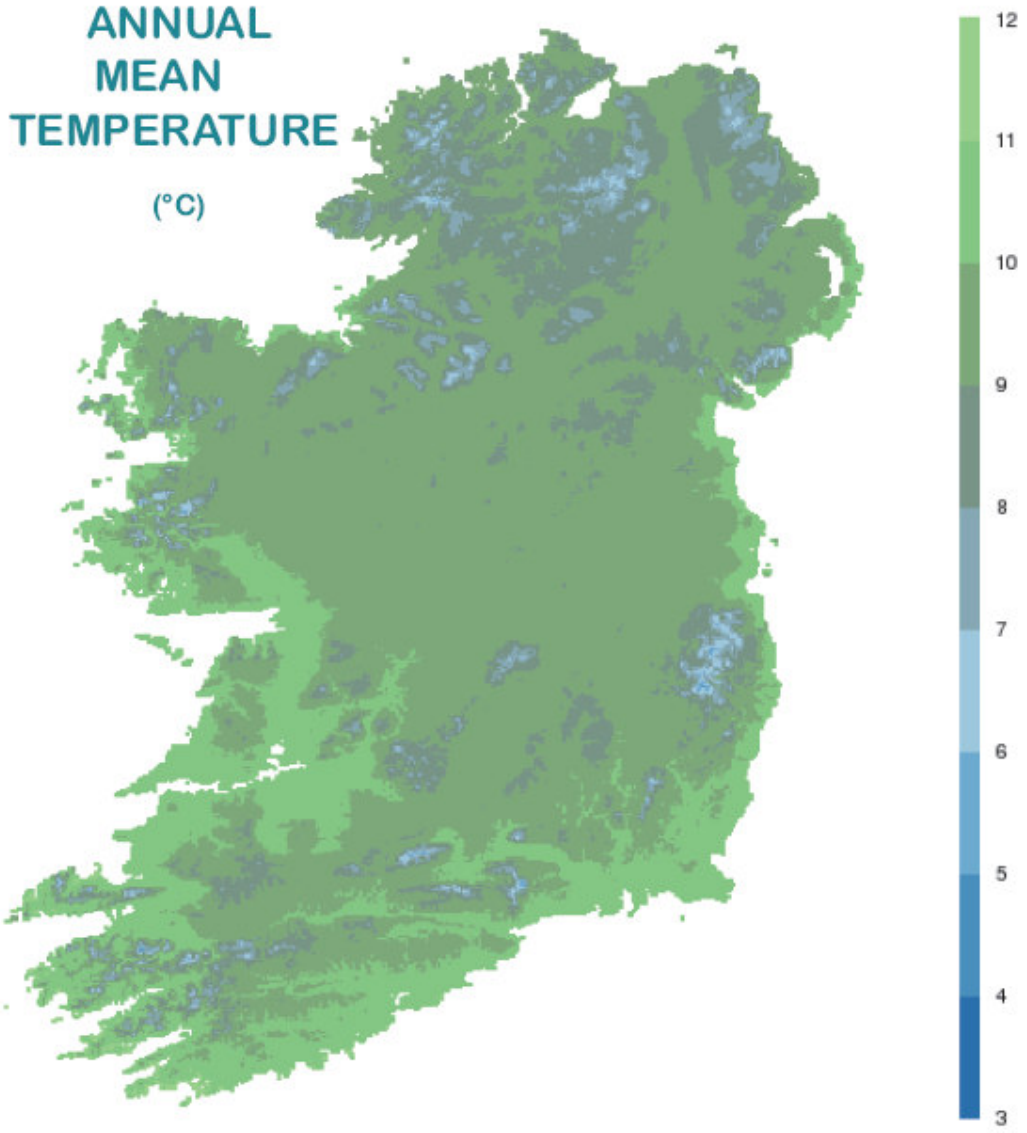
Galway is about equidistant from the each of the permanent stations. A climatological station was set up at University College Galway (now NUIG) in 1965 and Temperature, Rainfall and sunshine are recorded since then. A thirty year summary for the period 1966-1995 was published in September 1996.

The data from the NUIG site has been combined with data from the Met Office (including the recent revisions to annual averages) and earlier data recorded at the UCG site, which has operated since 1861 to give the following climatological picture for the Galway area:

11.2.1.1 Receiving Environment

11.2.1.1.1 Temperature

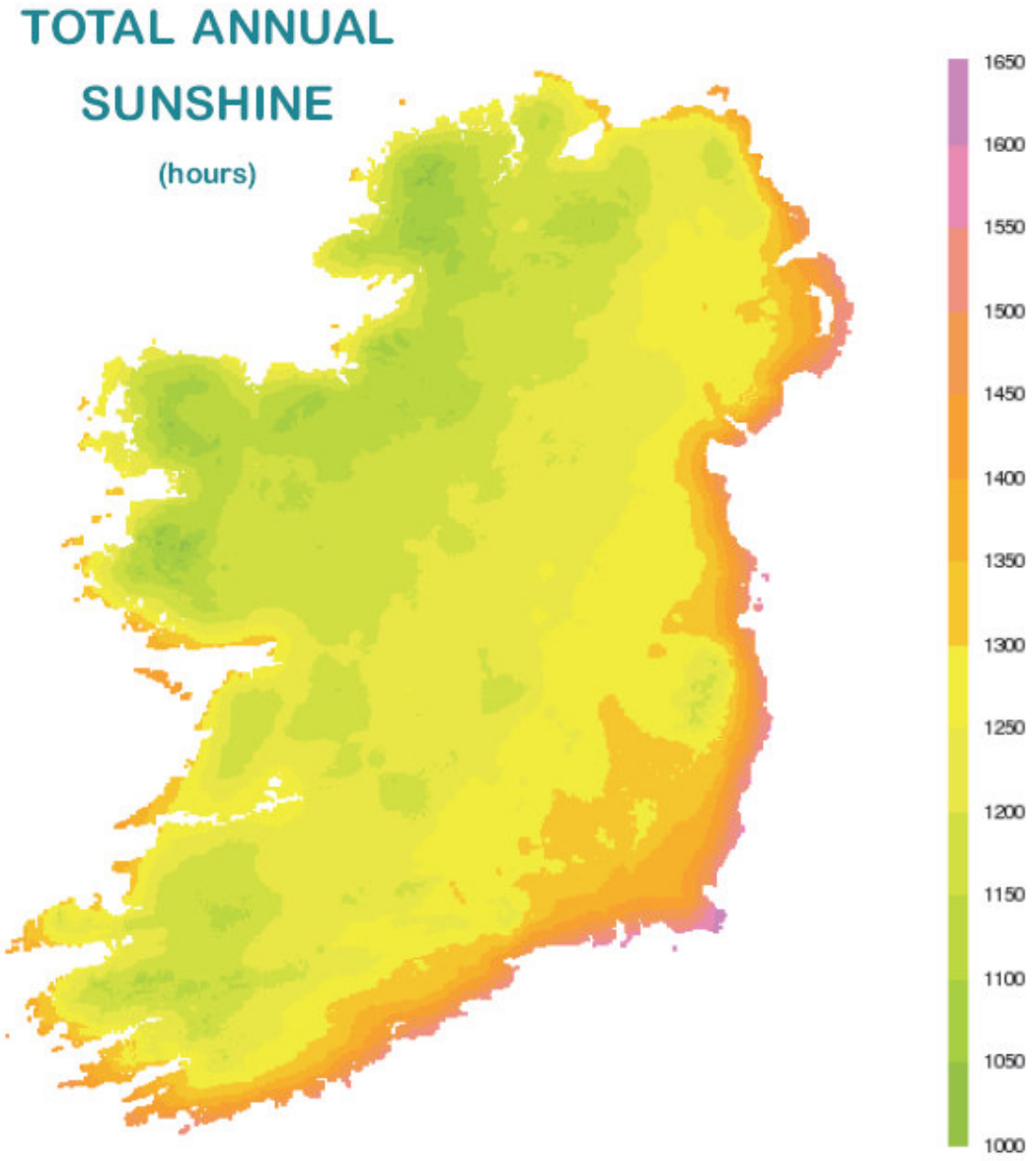
The mean annual air temperature was 10.1°C with a range of extreme temperatures from –10.5°C to 30.6°C. This makes Galway one of the milder areas in Ireland with a lower than average number of frost days of 22 days per year.



11.2.1- Annual Mean Temperature 1981-2010

11.2.1.1.2 Sunshine

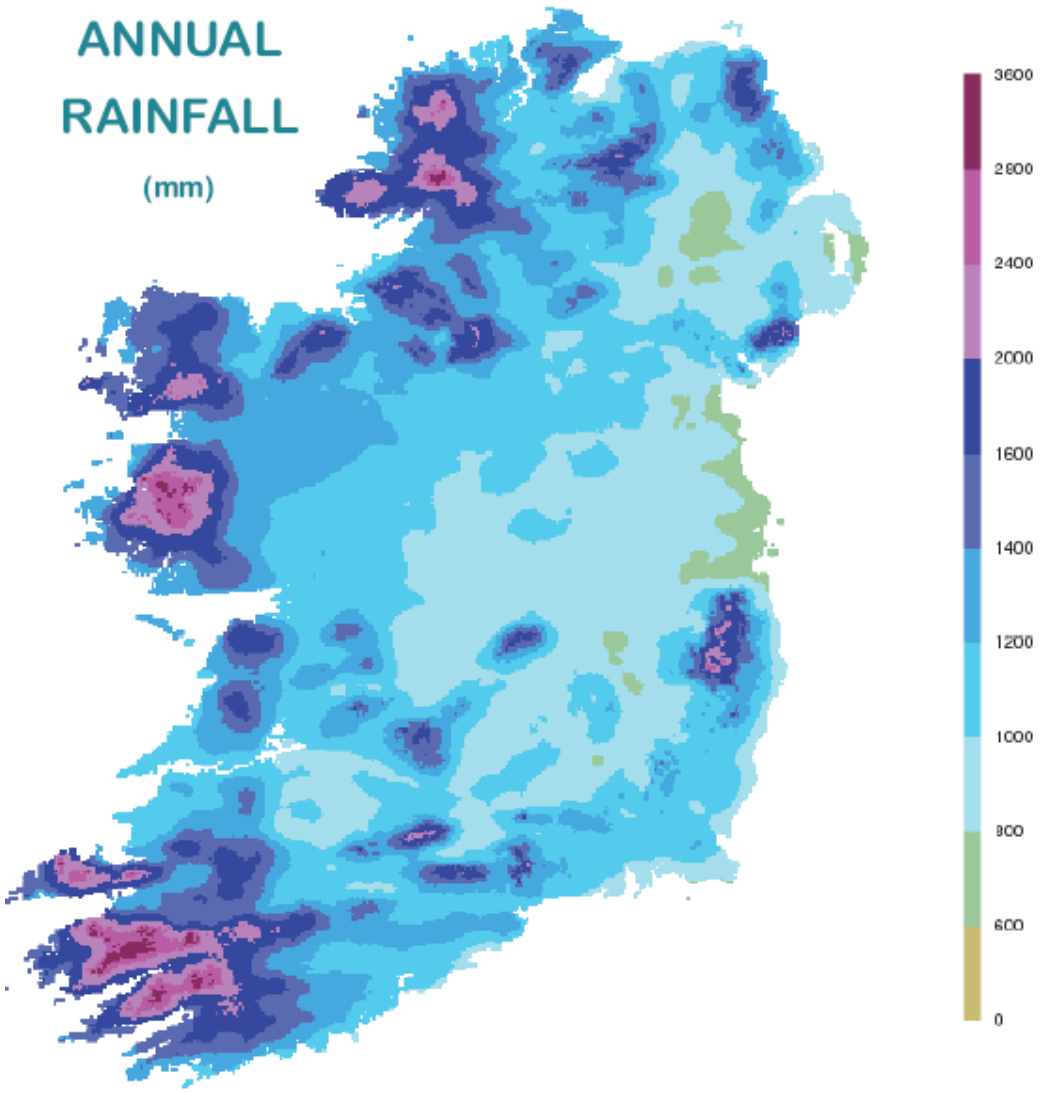
The annual average sunshine hours are 1272 hours of sunshine with a maximum of 1448 hours and a minimum of 994 hours in the thirty year period.



11.2.2 - Annual Total Sunshine Hours 1981-2010

11.2.1.1.3 Rainfall

The annual rainfall amount is 1168 mm indicating that it is one of the “wetter” locations in the country. There are however 226 days with greater than 0.2mm of rain on an annual basis indicating that it rains on average two out of every three days.



11.2.3 - Annual Mean Rainfall 1981-2010

11.2.1.1.4 Windspeed

Wind Speed is not recorded at NUIG. The annual mean wind speed is 8.8 m/s at Claremorris and 9.8 m/s at Shannon Airport. Galway can be regarded as reasonably exposed and windy and probably closer to Shannon Airport values due to the coastal and exposed location. Wind is generally from a westerly direction with a tendency towards southwest in summer and Northwest in winter.

11.3 CLIMATIC CONDITIONS

11.3.1 Summary

Ireland does not suffer from the extremes of temperature experienced by many other countries at similar latitude. The warm North Atlantic Drift has a marked influence on sea temperatures. This maritime influence is strongest near the Atlantic coasts and decreases with distance inland. The hills and mountains provide shelter from strong winds and from the direct oceanic influence. Winters tend to be cool and windy, while summers are mostly mild and less windy.

11.4 POTENTIAL SIGNIFICANT IMPACTS

The nature and scale of the proposed development is such that no direct impact is likely to be caused to the climate. The construction phase of the development is limited in scope and duration, while the long-term impact of the new port area may possibly result in localized changes to the microclimate at most. Any such changes will be highly localized and will, in effect, be insignificant.

Under the current National Climate Change Strategy, Ireland agreed to a target of limiting its greenhouse gas emissions to 13% above 1990 levels. 1990 levels were quantified at 55 Million Tonnes of Carbon Dioxide equivalent. From Chapter 9 we see that the quantities of CO_2 arising from the 2032 'Medium' Scenario are in the order of 5600 Tonnes per annum from freight shipping in port.

The development is not of a scale that will result in global climate change. There are however changes in greenhouse gas emissions which will result from the development and these changes are quantified as follows:

11.4.1 Construction Phase Impacts

Construction activities giving rise to greenhouse gas emissions are:

11.4.1.1 Construction materials

The use of concrete, aggregates and steel materials in the project will result in significant 'embedded' greenhouse gas emissions. This is a consequence of any significant construction project. The design of the development, including the passive re-use of all of the dredged material and the use of rock breakwaters minimises the use of high embedded energy materials. Alternative construction methods using virgin materials would result in a far more significant environmental footprint.

11.4.1.2 Construction machinery and traffic

The quantities of construction machinery are set out in Section 4, Description of the Proposed Development. As is evidenced from there, the quantity of machinery proposed is of a modest scale for an infrastructural development such as this. The construction methods outlined in Section 4 are designed to minimise the use of heavy machinery and consequently minimise greenhouse gas emissions during the construction phase.

11.4.1.3 Dredging activities

The dredging activity will result in CO_2 emissions from the equipment used for dredging and a limited release of CH_4 from the dredged material. With regard to the dredging equipment, such equipment is subject to several EU Directives on fuel use and emissions to minimise environmental impact. The European Dredgers Association, to which the majority of contractors are affiliated have a position paper on reduction of greenhouse gasses by introduction of fuel efficient vessels and methods to their operations.

The release of CH_4 as a result of dredging does result in a concentrated release period for the gas. CH_4 is formed during the anaerobic decomposition of organic matter deposited on the seafloor. The

CH_4 generated in this process is released naturally from the sediment, with only a tiny fraction retained in the sediment and disturbed during dredging.

The removal of sediment by dredging will result in the release of small quantities of CH_4 from the sediment. It is not possible to assess the quantum of this release other than to state that it will not result in any flammability risk or in any significant impact on climate change. It is reasonable however to state that the quantum of such emissions during the construction phase will be greatly outweighed by the positive impacts during the operation phase. These are outlined in Section 9 Air Quality.

11.4.2 Operational Phase Impacts

As outlined in Chapter 9, the transport of freight by sea has a significantly lower carbon footprint than other means. When aligned with the rail proposal at the new port, the overall proposal will significantly reduce CO_2 emissions from current levels. In line with CO_2 emissions other airborne pollutants will also reduce and the overall climatic impact of the proposed development is positive. The development does however reduce CO_2 emission levels below the Do-Nothing scenario option and in the period to 2035 reduces the quantity of CO_2 emitted below current levels by enabling vessels with lower specific emission levels to access the port.

11.4.2.1 Carbon Dioxide Emissions

The quantity of CO_2 emitted from port operations has been outlined in Chapter 9 Air Quality. By utilising a regional port and transporting goods by sea to the region, the carbon footprint of those goods is considerably reduced. As outlined in Chapter 9, in the Do-Nothing Scenario, the alternative transportation of goods by road from Foynes, Cork or Dublin would result in significantly higher CO_2 emissions.

As discussed in Chapter 9 the option of diverting freight to other ports is a complex issue requiring full origin-destination datasets to carry out a detailed analysis. What is beyond question however is that the option of having a regional port with 24 hour marine access and both rail and road links to the region has the potential to significantly reduce national CO_2 emissions in the longer term.

11.5 MICROCLIMATE

The development is not of a scale to influence the global climate. Due to the design, scale and location of the development there is however an opportunity to create a significantly positive microclimate close to the heart of the city. Details of the landscaping and amenity features are described in Chapter 12.

11.5.1 Microclimate Impacts

The introduction of the development at the mouth of the River Corrib has the potential to create a small microclimate in the immediate area of the development. The most significant change will be the replacement of a section of the water body with a developed area. This area has the potential to develop local heat changes. The land area reclaimed from the sea will result in the generation of wind thermals and updrafts, similar to those occurring along the north shore of Galway Bay, along the promenade at Salthill and the causeway to Mutton Island. These updrafts are a useful benefit to seabirds using the area.

The construction of the marina breakwater and the landscaping plan provide a coastal walkway with a degree of shelter in addition to landscaped paths and a softened landscape close to coastal amenities such as the marina and maritime park / nautical centre areas. Integrated in the proposal are seating and observation areas for the wildlife of Galway Bay.

The extent of the developed area relative to the scale of Galway Bay is small. The proposed development will be surrounded by water on three sides so any localised changes will not be carried ashore other than in SW winds and most likely confined to the Galway Harbour Enterprise Park.

11.6 MITIGATION

11.6.1 Mitigation Measures

No specific mitigation measures are required.

11.6.2 Monitoring Proposals

No monitoring measures are proposed.

11.7 REFERENCES

Ireland – National Climate Change Strategy 2007-2012, Department of Environment, Heritage and Local Government, 2007

EPA, *Ireland's Environment A Millennium Report,* 2000

EPA, *Environment in Focus – Key Environmental Indicators for Ireland*, 2002,

Walsh, Séamus, Climatological Note No.14. A Summary of Climate Averages for Ireland 1981-2010, Met Éireann, Dublin 2012