South Campshire Flood Protection Project,
George’s Quay, City Quay &
Sir John Rogerson’s Quay, Dublin 2

Environmental Impact Statement
Volume 2 of 4: Environmental Impact Statement

June 2011
Preface:

The structure of the Environmental Impact Statement for the South Campshire Flood Protection Project is laid out in the preface of each volume for clarity. The document consists of the following four volumes:

**Volume 1 – Non Technical Summary**

A non technical summary of information contained in Volume 2.

**Volume 2 – Main Body of Environmental Impact Statement**

This volume is the main part of the EIS. In it the proposed development and the environmental impact of the proposed development is described.

**Volume 3 – Drawings and Illustrations**

A dedicated volume of drawings, maps, illustrations and photomontages that further describes the proposed development and is supplemental to the information set out in Volume 2.

**Volume 4 – Technical Appendices**

Technical data that is supplemental to the information in Volume 2.
Table of Contents

VOLUME 1 - NON TECHNICAL SUMMARY

1.0 Introduction
2.0 Description of the Campshires
3.0 Description of the Scheme
4.0 Alternatives Considered in the Development of the Scheme
5.0 Likely Significant Impacts
6.0 Mitigation Measures
7.0 Residual Impacts
8.0 The Do-Nothing Scenario

VOLUME 2 - MAIN BODY OF ENVIRONMENTAL IMPACT ASSESSMENT

TABLE OF CONTENTS

1.0 INTRODUCTION

1.1 Context
1.2 Background
1.3 Nature and Extent of Proposed Flood Protection Scheme
1.4 Legislative Background
1.5 EIS Structure and Content

1.5.1 Format of the Environmental Impact Statement
1.5.2 Information to be Contained in the Environmental Impact Statement
1.5.3 Outline of Environmental Impact Statement Sections
1.5.4 Layout of Section 4 Sub Sections

1.6 EIS Study Team
1.7 Consultation

1.7.1 EIA Statutory Consultees
1.7.2 EIA Stakeholders and No Statutory Consultees
1.7.3 Initial Consultation
1.7.4 Further Consultation with Stakeholders on Final Draft of EIS

2.0 PLANNING POLICY CONTEXT

2.1 European and National Policies
2.2 Regional Policies
2.2 Local Policies

3.0 EXISTING CONDITIONS AND DESCRIPTION OF THE DEVELOPMENT

3.1 Information on the Site of the Proposed Development
   3.1.1 General
   3.1.2 Historical Context
   3.1.3 Existing Vehicular, Pedestrian and Shipping Access
   3.1.4 General Land Uses in Site Environs

3.2 Description of the Proposed Development
   3.2.1 Description of the Flood Protection Project
   3.2.2 Interaction with B.J. Marine Buildings
   3.2.3 Construction

3.3 Do Nothing and Alternatives Considered
   3.3.1 Do Nothing Scenario
   3.3.2 Alternative Locations
   3.3.3 Alternative Designs
   3.3.4 Alternative Design – Cycle Facilities

4.0 ASPECTS OF THE ENVIRONMENT CONSIDERED

4.1 Human Beings
   4.1.1 Introduction
   4.1.2 Research Methodology
   4.1.3 Receiving Environment
   4.1.4 Characteristics of the Proposed Development
   4.1.5 Potential Impacts of the Proposed Development
   4.1.6 Mitigation Measures
   4.1.7 Residual Impacts
   4.1.8 Monitoring

4.2 Flora and Fauna
   4.2.1 Introduction
   4.2.2 Research Methodology
   4.2.3 Receiving Environment
   4.2.4 Characteristics of the Proposed Development
   4.2.5 Potential Impacts of the Proposed Development
   4.2.6 Mitigation Measures
   4.2.7 Residual Impacts
   4.2.8 Monitoring
4.3 Soils, Geology and Hydrology

4.3.1 Soils

4.3.1.1 Introduction
4.3.1.2 Research Methodology
4.3.1.3 Receiving Environment
4.3.1.4 Characteristics of the Proposed Development
4.3.1.5 Potential Impact of the Proposed Development
4.3.1.6 Mitigation Measures
4.3.1.7 Residual Impacts
4.3.1.8 Monitoring

4.3.2 Geology

4.3.2.1 Introduction
4.3.2.2 Research Methodology
4.3.2.3 Receiving Environment
4.3.2.4 Characteristics of the Proposed Development
4.3.2.5 Potential Impact of the Proposed Development
4.3.2.6 Mitigation Measures
4.3.2.7 Residual Impacts
4.3.2.8 Monitoring

4.3.3 Hydrology

4.3.3.1 Introduction
4.3.3.2 Research Methodology
4.3.3.3 Receiving Environment
4.3.3.4 Characteristics of the Proposed Development
4.3.3.5 Potential Impact of the Proposed Development
4.3.3.6 Mitigation Measures
4.3.3.7 Residual Impacts
4.3.3.8 Monitoring

4.4 Water

4.4.1 Water Supply

4.4.1.1 Introduction
4.4.1.2 Research Methodology
4.4.1.3 Receiving Environment
4.4.1.4 Characteristics of the Proposed Development
4.4.1.5 Potential Impact of the Proposed Development
4.4.1.6 Mitigation Measures
4.4.1.7 Residual Impacts
4.4.1.8 Monitoring
4.4.2 Waste Water Drainage

4.4.2.1 Introduction
4.4.2.2 Research Methodology
4.4.2.3 Receiving Environment
4.4.2.4 Characteristics of the Proposed Development
4.4.2.5 Potential Impact of the Proposed Development
4.4.2.6 Mitigation Measures
4.4.2.7 Residual Impacts
4.4.2.8 Monitoring

4.4.3 Surface Water Drainage

4.4.3.1 Introduction
4.4.3.2 Research Methodology
4.4.3.3 Receiving Environment
4.4.3.4 Characteristics of the Proposed Development
4.4.3.5 Potential Impact of the Proposed Development
4.4.3.6 Mitigation Measures
4.4.3.7 Residual Impacts
4.4.3.8 Monitoring

4.5 Noise and Vibration

4.5.1 Introduction
4.5.2 Research Methodology
4.5.3 Receiving Environment
4.5.4 Characteristics of the Proposed Development
4.5.5 Potential Impact of the Proposed Development
4.5.6 Mitigation Measures
4.5.7 Residual Impacts
4.5.8 Monitoring

4.6 Air Quality and Climate

4.6.1 Introduction
4.6.2 Research Methodology
4.6.3 Receiving Environment
4.6.4 Characteristics of the Proposed Development
4.6.5 Potential Impact of the Proposed Development
4.6.6 Mitigation Measures
4.6.7 Residual Impacts
4.6.8 Monitoring

4.7 Landscape and Visual Appraisal

4.7.1 Introduction
4.7.2 Research Methodology
4.7.3 Receiving Environment
4.7.4 Characteristics of the Proposed Development
4.7.5 Potential Impact of the Proposed Development
4.7.6 Mitigation Measures
4.7.7 Residual Impacts
4.7.8 Monitoring

4.8 Material Assets

4.8.1 Transportation
  4.8.1.1 Introduction
  4.8.1.2 Research Methodology
  4.8.1.3 Receiving Environment
  4.8.1.4 Characteristics of the Proposed Development
  4.8.1.5 Potential Impact of the Proposed Development
  4.8.1.6 Mitigation Measures
  4.8.1.7 Residual Impacts
  4.8.1.8 Monitoring

4.8.2 Properties
  4.8.2.1 Introduction
  4.8.2.2 Research Methodology
  4.8.2.3 Receiving Environment
  4.8.2.4 Characteristics of the Proposed Development
  4.8.2.5 Potential Impact of the Proposed Development
  4.8.2.6 Mitigation Measures
  4.8.2.7 Residual Impacts
  4.8.2.8 Monitoring

4.8.3 Services
  4.8.3.1 Introduction
  4.8.3.2 Research Methodology
  4.8.3.3 Receiving Environment
  4.8.3.4 Characteristics of the Proposed Development
  4.8.3.5 Potential Impact of the Proposed Development
  4.8.3.6 Mitigation Measures
  4.8.3.7 Residual Impacts
  4.8.3.8 Monitoring

4.9 Cultural Heritage

4.9.1 Archaeology
  4.9.1.1 Introduction
  4.9.1.2 Research Methodology
  4.9.1.3 Archaeological Heritage
  4.9.1.4 Characteristics of the Proposed Development
  4.9.1.5 Potential Impact of the Proposed Development
  4.9.1.6 Mitigation Measures
4.9.1.7 Residual Impacts
4.9.1.8 Monitoring

4.9.2 Local History

4.9.2.1 Introduction
4.9.2.2 Research Methodology
4.9.2.3 Local History
4.9.2.4 Characteristics of the Proposed Development
4.9.2.5 Potential Impact of the Proposed Development
4.9.2.6 Mitigation Measures
4.9.2.7 Residual Impacts
4.9.2.8 Monitoring

4.9.3 Architecture and Built Heritage

4.9.3.1 Introduction
4.9.3.2 Research Methodology
4.9.3.3 Receiving Environment
4.9.3.4 Characteristics of the Proposed Development
4.9.3.5 Potential Impact of the Proposed Development
4.9.3.6 Mitigation Measures
4.9.3.7 Residual Impacts
4.9.3.8 Monitoring

5.0 INDIRECT, CUMULATIVE IMPACTS AND INTERACTIONS

5.1 Introduction

5.2 Assessment

6.0 DIFFICULTIES IN COMPILING ANY SPECIFIED SECTION

LIST OF FIGURES

1.1.1 Site Location Map
1.1.2 Extent of Coastline Reviewed by the Dublin Coastal Flooding Protection Project (DCFPP)
1.1.3 Predicted Tide Levels for Various Return Period Events
1.1.4 South Campshire Flood Cell
1.1.5 Study Area
3.1.1 Vehicular Access Routes
3.3.1 200 Year Tidal Flood Hazard (Extract from Map 21)
4.4.1 Existing Watermain Layout
4.4.2 Existing Drainage Layout
4.4.3 Existing Drainage Layout
4.8.1 Vehicular Access Routes
4.8.2 Existing ESB Layout
4.8.3 Existing Bord Gáis Layout
4.8.4 Existing Eircom Layout
4.8.5 Existing British Telecom Layout
4.8.6 Existing UPC (NTL) Layout

LIST OF TABLES

1.5.1 EIS Section 4 Sub Section Format
1.6.1 EIS Study Team
3.1.1 Existing Traffic Data measured on Thursday 1\textsuperscript{st} April 2010-11-23
3.1.2 Pedestrian traffic – Sean O’Casey Bridge 5 October 2010 – 13.00 to 14.00
4.1.1 Pedestrians Using Sean O’Casey Bridge
4.1.2 Car Parking Survey
4.5.1 Example threshold of significant effect at dwellings
4.5.2 Allowable Vibration During Construction Phase
4.5.3 Indicative noise levels from construction plant items at various distances
4.7.1 Potential Visual Impacts from Photomontages
4.8.1 Car Parking Survey
5.1.1 Impact Matrix

LIST OF PLATES

1.2.1 Festival on Campshires
2.3.1 Tall Ships at City Quay
3.1.1 Georges Quay from the North
3.1.2 Residential area at City Quay
3.1.3 Sir John Rogerson’s Quay
4.1.2 City Quay – Docklands Maritime Festival May 2008
4.2.1 Georges Quay
4.2.2 City Quay
4.2.3 The River Wall
4.9.1.1 Quay wall on George’s Quay
4.9.1.2 Footpath and railings on George’s Quay
4.9.1.3 Quay wall and mooring hook on City Quay
4.9.1.4 Steps and case-iron rail on City Quay
4.9.1.5 Redeveloped Campshire on City Quay
4.9.1.6 Quay wall and B.J. Marine building on Sir John Rogerson’s Quay
4.9.1.7 Quay wall and timber fenders on Sir John Rogerson’s Quay
4.9.1.8 Stone setts and cast-iron railings on Sir John Rogerson’s Quay, west end
4.9.1.9 Quay wall and stone steps on Sir John Rogerson’s Quay
4.9.1.10 Stone setts and cast-iron railings on Sir John Rogerson’s Quay, east end
4.9.1.11 19\textsuperscript{th} century diving bell on Sir John Rogerson’s Quay, east end

REFERENCES

VOLUME 3 – DRAWINGS AND ILLUSTRATIONS

VOLUME 4 – TECHNICAL APPENDICES
1.0. INTRODUCTION

1.1. Context

This Environmental Impact Statement (EIS) has been prepared by Moylan Consulting Engineers, who were originally procured and briefed by the Dublin Docklands Development Authority (DDDA) and later on the instructions of Dublin City Council (refer to section 16.0, Volume 4 for novation agreement), to assess the impact of the proposed construction of a flood protection scheme along the south campsheires and surrounding area of the River Liffey, where the campsheires are the stretches of land between the road and the Liffey quay wall.

The proposed flood protection scheme extends from Butt Bridge eastwards beyond the Samuel Beckett Bridge, across Sir John Rogerson’s Quay road just east of Cardiff Lane.

Fig 1.1.1 Site Location Map

1.2. Background

1.2.1. Flooding Risk at the Liffey South Quays

Following recent extreme flood events and predictions of a rise in sea levels due to climate change, Dublin City Council has carried out a review of the capacity of the existing coastal flood defences to provide protection against tidal flooding of urban areas resulting from extreme weather conditions in the short and long term. The review was carried out as part of the Dublin Coastal Flooding Protection Project (DCFPP), which was published in 2005. Figure 1.1.2 shows the extent of coast line that the Dublin Coastal Flooding Protection Project (DCFPP) reviewed.
The Dublin Coastal Flooding Protection Project has been implemented in direct response to the extreme tide and flood event that was experienced across Dublin City and Fingal County on the 1 February 2002. The tide on this day was the highest recorded since 1922. As a result of this tide, extensive flooding occurred in several locations across Dublin City.

The highest level that occurred on that day was 2.95m above Malin Head datum, some 1.02m above the predicted level from the Dublin Port Tide Tables. This value compares to a 65 year return period event based on present water levels calculated from historical analysis of tide levels for Dublin (Greater Dublin Strategic Drainage Study – 2A: Figure 9.5.7) and summarised below.

The cause of this exceptionally high tide has been connected to a surge event coinciding more or less with the peak of a relatively high spring tide and south to south westerly gale force winds. It is likely that the surge was due in part to the extreme low pressure system forming over the north-west of Ireland a number of days preceding the event and due in part to the southerly gales evident on the day.
Reports on the flooding experienced on the 1 February 2002 indicate that Sir John Rogerson’s Quay suffered some minor overtopping of the quay wall (range from 3.0 to 3.1m Malin Head).

In addition to the current risk of flooding, the results of global warming and the consequent rise in sea levels significantly increase the risk of flooding into the future. While there are various forecasts of the quantum of the rise of the sea level in the Dublin area, the Greater Dublin Strategic Study, taking a precautionary position, suggests that a figure in the range of 400mm to 480mm is the possible rise in level over the next 100 years. This will result in a potential future flood level of 3.4 to 3.5m OD Malin.

The DCFPP identified a flood cell in the area of the city south of the Liffey which is at risk of flooding during a 200 year flood event. This study resulted in the flood maps which show that there is a risk of up to 0.25m depth of flooding along Sir John Rogerson’s Quay to Georges Quay (based on future 200 year flood level of 3.13m OD Malin). These maps are referred to as SAFER (Strategies & Actions for Flood Emergency Response Management) Atlas Maps which are located in Volume 3 of this report.

Flooding of the quays will also put at risk a large area south of the Liffey where levels are lower than the quay wall in places resulting in accumulated flood water more than 1.5 m deep in certain areas within the flood cell.
The extent of the flood cell associated with the south campshires is shown in Figure 1.1.4. The flood cell extends from Butt Bridge eastwards as far as the east end of Sir John Rogerson’s Quay. The cell extends southwards beyond Pearse Street east of Sandwith Street and almost reaches as far south as Grand Canal Street between Erne Street and Grand Canal Dock.

In order to protect this hinterland south of the River Liffey behind Georges Quay, City Quay and Sir John Rogerson’s Quay, Dublin City Council (DCC) in conjunction with the Office of Public Works (OPW) and Dublin Docklands Development Authority (DDDA) are proposing to construct a flood protection system along the south campshires from Butt Bridge eastwards beyond the Samuel Beckett Bridge and returning across Sir John Rogerson’s Quay road just east of Cardiff Lane.

Based on the above studies, the construction of a proposed flood protection barrier is required to protect the properties in the hinterland of the south campshires from flood damage resulting from extreme weather conditions. The level of the proposed protection has been set following consultation with Dublin City Council’s Flood Resilient City Office and with the Office of Public Works who are the national body with responsibility in relation to Coastal Flood Protection. The level chosen is 3.7m above Malin Head, which takes account of the above mentioned 200 year return event, required freeboard and rising tide levels due to climate change.

A small section of the flood cell extends to the east of the proposed flood protection along Sir John Rogerson’s Quay along the Grand Canal Harbour. Following an extensive risk assessment carried out by Dublin City Council, this area has been omitted from this proposed flood protection scheme as it sits on slightly higher ground.
and has been recently redeveloped with floor levels set above the critical flood levels. The predicted 1:200 flood cell for the Grand Canal Harbour area illustrates that Forbes Street is the only area affected by this flood event in this area. Forbes Street would be impacted for a short length on the north end of the street and would have a maximum flood depth of 250mm (10 Inches).

Following the extensive risk assessment carried out by Dublin City Council and given that Forbes Street has a significantly low level of flood risk with a low flood level, it was decided that the permanent flood defences would terminate at the current proposed location. However, during extreme flood event warnings this area will be protected by on-going reactive flood protection measures which will provide temporary demountable flood defences, in common with other areas of the city.

Refer to the Grand Canal Harbour Area Flood Risk Assessment provided in section 14.0, Volume 3, which further details the flood risk in this area east of this project and reasons why the proposed flood protection does not extend into this area.

Please refer also to the “Do Nothing” scenario in section 3.3 in which the flood hazard and the consequence of flooding are identified and the flood risk is addressed.

1.2.2. Description of the Study Area

The study area represents a section of the original Dublin docklands quay wall which is lower than the average wall height along the north or south quays. This is an area considered most vulnerable in the event of exceptionally high water levels in the river. The area consists of approximately 1.0km of the south quay walls, campshires, road way and buildings fronting the road from Butt Bridge eastwards beyond the Samuel Beckett Bridge and returning across Sir John Rogerson’s Quay road just east of Cardiff Lane, as indicated in Figure 1.1.5.

![Study Area Map](image-url)
1.2.3. Campshire Uses

Dublin Docklands Development Authority has defined the vision of the docklands fronting the Liffey in their Docklands Campshire Vision published in 2007.

Considerable progress has been made by the Dublin Docklands Development Authority in providing active and useable campshires and in integrating the campshires in to the hinterland with links attracting through movements along the waterfront.

The uses of the river frontage to be considered include the following mixed functions:-

1. Flood protection
2. Recreational uses, walking, cycling
3. Facilities for occasional festivals, markets, access to boats/ships and the water
4. Commercial buildings along the water frontage on the campshires
5. Residential and commercial buildings fronting the campshires
6. Local service traffic on the roads fronting the campshires
7. Provision for through traffic along the roads fronting the campshires
8. Provision for linkages across the Liffey
9. Provision for linkages to the hinterland
10. Boating activity including commercial docking and cross Liffey Ferry

1.3. Nature and Extent of Proposed Flood Protection Scheme

The proposed flood protection scheme consists of a new flood protection system, approximately 1.0km in length located on the south campshires of the River Liffey. The flood protection will extend from Butt Bridge beyond the Samuel Beckett Bridge and return across Sir John Rogerson’s Quay just east of the new pedestrian crossing at Cardiff Lane.

The scheme will provide flood protection from extreme high tides to a level of 3.7m above Malin Datum.

The proposed flood protection will consist of a new wall which will be approximately 800 to 900 mm high, depending on its location, and have a number of openings to allow access to the campshires, pedestrian bridges and walkways.
Wall structures proposed will be finished in fairfaced concrete or granite stone to integrate and co-ordinate with existing features depending on the context of the structure.

Landscaping designs incorporating the protection have been developed and these designs will form an integral part of the project.

Various lifting flood gates and swing flood gates will be installed, as appropriate at strategic openings along the flood protection. These dams/gates will be operated to seal the openings prior to extreme tide events.

The scheme also includes the upgrading of pedestrian facilities on the campshires and provides for a new and improved cycle track on the public road parallel to the campshires.

A detailed Cost Benefit Analysis for the project was carried out and predicted by Dublin City Council to be cost beneficial.

Further details of the flood protection project are provided in Section 3.2 and drawings and photomontages included in Volume 3 of this EIS show the alignment of the proposed protection and typical sections along the campshires.

1.4. Legislative Background

Part X Section 175 of the Planning and Development Act 2000 to 2010 sets out the requirements for an EIS where certain developments are to be carried out by or on behalf of a Local Authority.

In addition the thresholds in relation to types of development for which an Environmental Impact Assessment is required are set out in Schedule 5 of the Planning and Development Regulations 2001. The relevant sections of schedule 5 are Part 2, 10f (ii) and k which state as follows:-

- 10(f) (ii) Canalisation and flood relief works, where the immediate contributing sub-catchment of the proposed works (i.e. the difference between the contributing catchments at the upper and lower extent of the works) would exceed 1,000 hectares or where more than 20 hectares of wetland would be affected or where the length of river channel on which the works are proposed would be greater than 2 kilometres.

- 10(k) Coastal work to combat erosion and maritime works capable of altering the coast through the construction, for example, of dikes, moles, jetties, and other sea protection works, where the length of coastline on which works would take place would exceed 1 kilometre, but excluding the maintenance and reconstruction of such works or works required for emergency purposes.

Having regard to the scope of the proposed works and the importance of the campshires and Liffey banks in terms of amenity to the City, it was considered that a
sub threshold EIS should be prepared in accordance with Section 120 of the Planning and Development Regulations 2001.

1.5. EIS Structure and Content

1.5.1. Format of the Environmental Impact Statement

The EIS structure is based on the Grouped Format Structure which examines each topic as a separate section referring to the existing environment, the proposed development, impacts and mitigation measures. Residual impacts are identified and assessed and ongoing monitoring is recommended where appropriate.

1.5.2. Information to be Contained in the Environmental Impact Statement

Schedule 6 of the 2001 Regulations sets out the information which must be contained in an Environmental Impact Statement as follows:-

   a) A description of the proposed development comprising information on the site, design and size of the proposed development.

   b) A description of the measures envisaged in order to avoid, reduce and, if possible, remedy significant adverse effects.

   c) The data required to identify and assess the main effects which the proposed development is likely to have on the environment.

   d) An outline of the main alternatives studied by the developer and an indication of the main reasons for his choice, taking into account the effects on the environment.

Additional information is required to be provided by the EIS on the following topics:-

   a) A description of the physical characteristics of the whole proposed development and the land-use requirements during the construction and operational phases.

      An estimate by type and quantity, of expected residues and emissions (including water, air and soil pollution, noise, vibration, light, heat and radiation) resulting from the operation of the proposed development.

   b) A description of the aspects of the environment likely to be significantly affected by the proposed development, including in particular:

      • Human beings, flora and fauna

      • Soil, water, air, climatic factors and the landscape

      • Material assets, including the architectural and archaeological heritage and the cultural heritage

      • The inter-relationship between the above factors
c) A description of the likely significant effects (including direct, indirect, secondary, cumulative, short, medium and long-term, permanent and temporary, positive and negative) of the proposed development on the environment resulting from the existence of the proposed development and a description of the forecasting methods used to assess the effects on the environment.

d) An indication of any difficulties (technical deficiencies or lack of know-how) encountered by the developer in compiling the required information.

The EIS has been prepared with reference to documents such as “Guidelines on the Information to be Contained in Environmental Impact Statements” and “Advice Notes on Current Practice in the Preparation of Environments Impacts Statements”, as published by the Environmental Protection Agency.

1.5.3. Outline of Environmental Impact Statement Sections

For ease of reference, a general guide on the content and scope of each section within the EIS is provided below.

Volume 1

Non Technical Summary:

The non technical summary will address each of the sections within the EIS and describe the significant impacts identified during the EIA and set out the remedial and reductive measures proposed.

Volume 2

1.0 Introduction:

The introduction will outline the nature and extent of the proposed scheme and reason for the EIS. It will outline the structure; content and methodology used for the EIS and give the details of the EIS design team.

2.0 Planning Policy Context:

This section will outline European, National, Regional and Local Policies as they relate to the proposed development and works area. The policies will each be outlined and reviewed noting their relevance and influence on the proposed development.

3.0 Existing Conditions and Description of Proposed Development:

This section will outline the subject site in its current condition. The background of the scheme will be reviewed and will describe the site context and characteristics in terms of its location and layout. The local context, distance to other significant features on and offsite, setting, surroundings and any already existing development/operations within the site, including archaeological and architectural will be considered.
The section will also examine the potential of flooding in the area and the rational of the proposed development will be reviewed. The scale of the possible consequences of any flooding of the south campshires and the associated flood cell will be set out.

The section will give a description of the works and describe the visual and other impacts the flood protection will have on the area. A description of the construction works will be outlined.

The section will address the Do Nothing Scenario and Alternatives Considered, examining the design alternatives developed and reviewed during the preparation of the scheme. These will include, where relevant, references to alternative types of flood protection systems and the various alignments considered during the preliminary design.

It will not examine alternative site locations as the siting of the development at the proposed location is an essential element of the project if the at risk flood cell is to be protected.

A new and different location is not a feasible option for this project. This decision is on the basis that it is a development along the south campshire of the River Liffey where the existing quay wall no longer provides sufficient flood protection and within land specifically available for this development; thus negating the need for a search for alternative locations outside of the campshire lands. This section will however examine the alternatives considered in terms of the positioning of the proposed development within the site.

Alternatives in terms of the options which were considered for products, materials, finishes and construction processes will be described where relevant.

**4.0 Aspects of Environment Considered:**

The section will identify the potential impacts of the proposed development on the existing environment, propose remedial measures and set out the anticipated impacts on the environment if the remedial measures are implemented. A wide range of both positive and adverse impacts will be identified, including direct, indirect and cumulative. Positive impacts on property, land use and public safety need to be balanced with potential impacts on aquatic ecology, archaeology, amenities.

The structure of each of the subsections is set out in section 1.5.4 below.

**Human Beings:** - This section will deal with issues relevant to the people and populations in the surrounding area, residents, work places and people passing through the area.

Displacement of properties and rights to access and use will be considered as well as the creation/loss of amenities.
**Flora and Fauna:** - This section will deal with issues relevant to the natural habitats and their flora and fauna within the site and in the surrounding area.

**Soils, Geology and Hydrology:** - This section will deal with issues relevant to the soils, geology and hydrology within the site and in the surrounding area. The characteristics of the proposed development, with reference to potential impacts on the soil environment will be provided.

Proposed mitigation measures during both construction and operational phases will be discussed. Monitoring requirements during construction and operational phases will be provided.

**Water:** - The receiving Environment, in terms of Surface Water, Foul Water, Water Supply and Groundwater will be assessed and described. Data on surface and groundwater quality will be reviewed. The current and future potential flooding will be addressed as well as the effect the new flood protection will have on the immediate surrounding area.

The characteristics and impact of the development will be discussed in terms of impacts on the water environment during the construction and operational phase. This will include an assessment of the flooding potential and protection thereof.

Mitigation measures (during both the construction and operational phases) will be proposed and the containment and treatment of wastewater generated from the site during the construction phase will be assessed. Any monitoring requirements during the construction and operation phases will be provided.

**Noise and Vibration:** - This section will examine the impact of noise and vibration during the construction phase of the development and will review methods to mitigate their effect on the surrounding environment.

**Air Quality and Climate:** - Possible effects to the local climate will be considered. The impact resulting from the proposed development will have on the local air quality and climate will be assessed.

**Landscape and Visual Appraisal:** - Alterations to the current appearance and character of the River Liffey south campshires will be addressed, as well as the impact on the riverside amenities and land use. Photomontages will be produced to assess the potential visual impact on the campshires.

The impact of the proposed development on the existing trees along the campshires and proposals for further planting of new trees will be reviewed in this section.

**Material Assets:** - This section will deal with issues relevant to the traffic, transportation, property and services in the surrounding area. This section will include an assessment of utilities (gas, electricity, water and sewage), covering areas such as available supply and possible constraints, and mitigation measures.
**Cultural Heritage:** This section will describe the archaeology, local history and architecture in the area and the effects the proposed flood protection will have on them.

Elements of the cultural heritage in the area will be identified and consideration will be given to loss/disturbance to monuments, artefacts and cultural landscape due to excavation or disturbance. The objective of the assessment is to anticipate and avoid impacts on the archaeological resource. In particular the quay wall and the B.J. Marine buildings will be considered in detail. Impacts on events, festivals, recreational docking, etc will be addressed.

**5.0 Interactions:**

The interactions between the various sections of the EIS will be assessed and cumulative impacts identified and additional mitigation measures will be proposed, where required.

**6.0 Difficulties in compiling any specified section:**

Any technical difficulties or lack of data encountered in compiling the EIS will be outlined. The quality of the baseline information available will be assessed.

**Volume 3**

Volume 3 of this EIS contains drawings showing existing conditions and the proposed development

**Volume 4**

Volume contains technical appendices and additional technical detail and information.

**1.5.4. Layout of Section 4 Sub-Sections**

Each sub-section in section 4 should follow the format shown below in Table 1.5.1:

<table>
<thead>
<tr>
<th>Table 1.5.1: EIS Section 4 Sub Section Format</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Introduction:</strong></td>
</tr>
<tr>
<td>To include an introduction to the section and</td>
</tr>
<tr>
<td>the issues to be discussed, and a description</td>
</tr>
<tr>
<td>of the context of the subject lands.</td>
</tr>
<tr>
<td><strong>Research Methodology:</strong></td>
</tr>
<tr>
<td>A description of works carried out and a</td>
</tr>
<tr>
<td>list of sources of information.</td>
</tr>
<tr>
<td><strong>Receiving Environment:</strong></td>
</tr>
<tr>
<td>A description of the receiving environment</td>
</tr>
<tr>
<td>including an assessment of the major</td>
</tr>
<tr>
<td>environmental parameters within the study</td>
</tr>
<tr>
<td>area. In describing the receiving environment,</td>
</tr>
<tr>
<td>the context into which the proposed</td>
</tr>
<tr>
<td>development will fit shall be properly</td>
</tr>
<tr>
<td>assessed. This will also take into account</td>
</tr>
<tr>
<td>any proposed developments, which are likely</td>
</tr>
<tr>
<td>to occur. In order to allow for a</td>
</tr>
<tr>
<td>systematic evaluation of impacts which the</td>
</tr>
<tr>
<td>proposed development will have on the</td>
</tr>
<tr>
<td>receiving environment, it (the receiving</td>
</tr>
<tr>
<td>environment) will be discussed by way of its</td>
</tr>
<tr>
<td>context and situation / character /</td>
</tr>
<tr>
<td>significance / sensitivity.</td>
</tr>
</tbody>
</table>
### Characteristics of the proposed Development:
A description of the nature of the proposed development. Consideration of the ‘Characteristics of the Proposed Development’ will allow for a projection of the ‘level of impact’ on any particular aspect of the environment, which it could have.

### Potential Impact of the proposed Development:
A detailed description of the significant potential impacts expected from a scheme such as the proposed development.

### Mitigation Measures:
A detailed description of the type of mitigation measures which may be taken to reduce the impacts of the development. This includes a description of any remedial, or mitigation, measure that are either practicable or reasonable having regard to the impacts.

### Residual Impacts:
A discussion of the likely resultant impacts after mitigation measures have been applied. This section allows for a description of the specific, direct and indirect impacts, which the proposed development will have. This is done with reference to both the previous sections of Receiving Environment and Characteristics of the Proposed Development, while also referring to the magnitude, duration, consequences and significance of the development. This section will also allow for a description of any specific mitigation, or remedial measures, considered necessary, due to an assessment of the impacts which development is likely to have. Consideration of a ‘do nothing’ scenario where the development does not proceed will also be included.

### Monitoring:
Advice on any monitoring required.

### 1.6. EIS Study Team

This Environmental Impact Statement has been prepared by a study team led by Moylan Consulting Engineers, who are responsible for the overall management and co-ordination of the EIS.

Shaffrey Associates Architects led a central role along with Moylan Consulting Engineers in the design and all aspects of the EIS involving architectural input.

The members of the study team and their respective inputs are detailed below in Table 1.6.1:

<table>
<thead>
<tr>
<th>EIS CONSULTANT</th>
<th>EIS SECTION</th>
</tr>
</thead>
</table>
| Moylan Consulting Engineers | Non-Technical Summary  
|                       | Introduction  
|                       | Planning Policy Context  
|                       | Description of Proposed Development  
|                       | Human Beings  
|                       | Soils, Geology & Hydrology  
|                       | Water  
|                       | Material Assets  
|                       | Interactions  
|                       | Difficulties in Complying any Specified Section |
| **Shaffrey Associates Architects** | Introduction  
Description of Proposed Development  
Human Beings  
Cultural Heritage, Architectural Heritage, Landscape and Visual Appraisal |
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>ARC Architectural Consultants</strong></td>
<td>Photomontages and Visual Impact Assessment</td>
</tr>
</tbody>
</table>
| **CRDS** | Cultural Heritage, Archaeology  
Cultural Heritage, Local History |
| **AWN Consulting Ltd.** | Noise & Vibration, and Air & Climate |
| **Biosphere Environment Services** | Flora & Fauna |
| **DCC Flood Resilient City Project Management Office, Civic Offices** | Background of Scheme  
Description of Proposed Development  
Do Nothing Alternatives  
Water  
Climate Factors |
| **DCC Planning Department** | Legislative Background  
Planning Policy Context |
| **DCC Public Lighting Department** | Public Lighting |
1.7. Consultation

1.7.1. EIS Statutory Consultees

Prior to the making of an application for approval under Section 175(3) of the Act a copy of the application and EIS will be sent to the prescribed authorities set out in Section 121, Part 10 of the Planning and Development Regulations, 2001, as follows:

1. An Chomhairle Ealaion - The Arts Council
2. Bord Failte Eireann
3. An Taisce - The National Trust for Ireland
4. The Department of Arts Heritage and the Gaeltacht
5. The Eastern Regional Fisheries Board
6. The Heritage Council
7. Dublin Regional Authority

1.7.2. EIS Stakeholders and Non Statutory Consultees

A list of bodies that may not necessarily fall under the terms of the Planning and Development Regulations, 2001, that should be notified on the lodging of this EIS are listed in the Environmental Protection Agency “Advice Notes on Current Practice in the Preparation of Environmental Impact Statements”. From that list the following bodies will be notified on the lodging of the EIS with An Bord Pleanála:

1. The Office of Public Works
2. The Dublin Docklands Development Authority
3. The Dublin Transportation Office
4. Dublin Port Company
5. Emergency Services
6. Dublin City Council
7. Local Residents and Business Groups
8. Mobility Impaired / Access Groups
9. Private Landowners

1.7.3. Initial Consultation

As part of the EIA process the following consultees were circulated with a description of the proposed protection works and the EIA scoping document on 30 June 2010:

1. The Dublin Docklands Development Authority
2. The Office of Public Works
3. The Dublin Transportation Office
4. Dublin Port Company
5. Dublin City Council Transportation Department
6. Dublin City Council Architectural Department
Responses and inputs were received from several organisations in particular the Dublin Docklands Development Authority, the Office of Public Works, Dublin Port Company and Dublin City Council departments, all of whom attended a project workshop held on 13 August 2009.

Various options of design elements for the proposed flood protection were discussed at this workshop, including the location of the wall relative to the quay side, the alignment and type of materials to be used. The impact the various options would have on the campshire was discussed including aspects such as visual amenity, permeability, existing campshire uses, durability and suitability.

The design team progressed the options, incorporating views raised at the project workshop of 13 August 2009. Following further discussion with the City Architect’s Department it was agreed to engage Shaffrey Associates Architects as sub consultants to ensure that the design incorporated full architectural, urban design and conservation appraisal.

A second workshop was then held on 15 July 2010 attended by the same Stakeholders to review a revised scheme.

Shaffrey Associates Architects prepared and presented a Design Review Report to the workshop. A copy of the slides forming part of the presentation is included in section 5.0, Volume 4. There were further discussions on the wall location, alignment and types of materials to be used and finer details of the impact on the campshires were reviewed. In general the consensus of all those attending the workshop was that the design as presented represented a fair balance of a number of conflicting requirements.

Once again the design team took the views of the workshop on board and prepared the final design of the flood protection project and draft EIS which was circulated internally to DCC Departments and to the DDDA in December 2010.

1.7.4. Further Consultation with Stakeholders on Final Draft of EIS

ESB

ESB were issued with draft design drawings on 9 December 2010 showing the proposal to protect the ESB Substation as part of this flood defence project.

The ESB issued an email of agreement to the proposal on 20 December 2010. Refer to section 17.0 in Volume 4 for a copy of the email.
Dublin Docklands Development Authority (DDDA)

The DDDA initially procured and briefed Moylan Consulting Engineers to prepare the design and EIS for the proposed South Campshire Flood Protection Project before transferring the agreement to Dublin City Council in January 2010 (refer to copy of the novation agreement in section 15.0, Volume 4). However, the DDDA have been represented on the Steering Group throughout the EIA process and have had a significant input in steering the design from the outset.

A draft EIS Non Technical Summary and set of plan detailed drawings was issued to DDDA on 2 December 2010, followed by a full draft EIS issue on 12 December 2010.

Following the DDDA reviewing the draft EIS documentation a meeting was held on the 12 January 2011 between DDDA, Dublin City Council Project Management Office and Moylan Consulting Engineers, to address any issues. The DDDA raised the following items:

- Landscaping plans and its impacts on campshire festivals
- Impact on B.J. Marine Buildings, in particular the appearance of the render proposed on the outside of the building
- Anti-social behaviour on the campshires

The DDDA requested that a meeting be arranged between Dublin City Council Project Management Office and City Quay Residents. This took place on 2 March 2011. The main points raised were as follows:

- Proposed wall location / alignment leading to exacerbated anti-social behaviour
- Loss of Parking Spaces on Sir John Rogerson’s Quay road
- Excessive use of additional trees along the campshire as part of the project works that may leave areas of the campshires dark
- Flood Risk at Forbes Street

In summary, the residents insisted that, in their view, the only acceptable location for the wall would be on top of the existing quay wall, as any other location, in their opinion, would provide opportunities for those engaged in anti-social behaviour to hide or shelter themselves from view on the river side of the proposed structure.

The DDDA issued a letter of consent to the proposal on 20 April 2011. Refer to section 17.0 in Volume 4 for a copy of the letter.

Dublin Port Company

A meeting was held with Dublin Port Company on 1 April 2011 to review the proposed flood defence project in the light of the comments from the City Quay residents and the fact that Dublin Port Company had made it clear from the Workshop in 2009 that it would not be acceptable to them to have the proposed wall situated on the quay edge. This was confirmed by their e-mail dated 31st March 2011. Refer to section 17.0 in Volume 4 for a copy of the email.
Dublin Port Company repeated their views on this point. They went on to express concern regarding the section of proposed flood wall running from the ESB substation to the east most B.J. Marine building. In this area the wall is setback approximately 1.3m from the quay edge which is occasionally used for ships to dock. It was explained that the reasons for this was to protect the ESB sub station as required by the ESB and also to protect the DDDA owned campshire buildings, following consultation with the DDDA property section.

Dublin Port Company expressed some concerns that this would reduce the length of quay available for shipping, but accepted the requirement to protect these buildings from flood risk. However, they said that this reduction in shipping access increased their need to keep the remainder of the proposed wall well back from the existing quayside.

City Quay Residents

As outlined above, a meeting was arranged between Dublin City Council Project Management Office and City Quay Residents on 2 March 2011. The meeting was attended by DDDA, Minister Lucinda Creighton, Deputy Kevin Humphreys and Councillor Maria Parodi, Pearse Street Community Policing Unit and over 20 local residents.

The main points raised at the meeting were as follows:

1. Proposed wall location / alignment leading to exacerbated Anti-social behaviour
2. Loss of Parking Spaces on Sir John Rogerson’s Quay. Letters outlining these concerns were issued by Kathleen Rice of the City Quay Residents Group on 10 May 2011. A copy of these letters is provided in section 17.0, Volume 4.
3. Excessive use of additional trees along the campshire as part of the project works that may leave areas of the campshires dark
4. Flood Risk at Forbes Street

The above items were addressed as follows:

1. A Project Steering Group meeting was held on 5 April as detailed below in section headed Final Design Review. These resulting actions are further addressed in section 4.1, Human Beings. Letters outlining the same were issued following the Project Steering Group Meeting to Linda O’Toole Byrne (City Quay Resident), Deputy Kevin Humphreys T.D. and Ms Lucinda Creighton T.D. Copies of these letters are provided in section 17.0, Volume 4.
2. Loss of 22 No. parking spaces on Sir John Rogerson’s Quay will be accommodated within the surplus parking spaces on Lime Street, Windmill Lane and Creighton Street. This is addressed further in section 4.1, Human Beings.
3. The proposed trees are spaced, linear and have a light canopy. It is only proposed to provide additional trees where there are gaps in the current tree line. This is addressed further in section 4.1, Human Beings.
4. A letter and flood risk assessment report for the Forbes Street area, “Grand Canal Harbour Area Flood Risk Assessment”, was issued to the local resident who raised the issue. The report outlines the extensive flood studies of the Liffey carried out by Dublin City Council following recent flood events and the short
length of Forbes Street prone to 1:200 year return period flooding. The full report is given in section 14.0 of Volume 4. Details of the overall scope and extent of the flood cell and proposed flood defence is further detailed in section 1.0, Introduction and 3.0, Existing Conditions and Description of the Development.

McCann Fitzgerald Building

It is proposed to return the flood defence across Sir John Rogerson’s quay just east of Cardiff Lane tying into the front of the McCann Fitzgerald building.

A detailed demountable flood defence barrier brochure was issued to McCann Fitzgerald on 9th December 2010 followed by a meeting on 05 April 2011. A detailed design drawing was then issued to McCann Fitzgerald on 20 May 2011 detailing the location and proposal for tying the demountable flood defence barrier onto their building.

Following this consultation, McCann Fitzgerald indicated they have no objection to the proposal, subject only to final agreement on the detailed design of the connection point with the landlords, prior to commencement of construction.

Final Design Review

A Project Steering Group meeting attended by the following was held on 5 April 2011 to consider the outcome of the final round of consultations.

- Dublin Docklands Development Authority
- Dublin City Council Project Management Office
- Dublin City Council Flood Resilient Cities Project
- Dublin City Archaeologist
- Dublin City Council Planning Department
- Dublin City Council Architects
- Shaffrey and Associates Architects
- Moylan Consulting Engineers

The Project Steering Group addressed, in particular, the concerns raised at the meeting with City Quay Residents on 2 March 2011, with the main issue being the proposed position of the flood defence set back from the quay edge which, in the opinion of the residents, could exacerbate the existing anti-social behaviour along the campshires.

It was noted that Dublin Port Company requested that the quay walls be open and available for shipping and marine events. This coincides with Dublin City Council’s and DDDDA’s decision to have all bridges east of the Matt Talbot Bridge, most recently the Samuel Beckett Bridge, constructed as opening bridges to allow ships access this area.

It is also advised by Dublin City Council Planners and Steering Group team architects that the flood defence wall should be located away from the quay wall to maintain and enhance the unique river side nature of the campshires.
Current planning policies also promote connectivity to the River Liffey and support activities along the waterfront. These policies include the Dublin City Development Plan 2005-2011, Dublin Docklands Development Area Masterplan, 2008 and Docklands Campshire Vision, 2007 which are detailed in section 2.0, Planning Policy Context.

In light of the above, the Project Steering Group felt that the existing design represented the best possible balance of these requirements.

Issues considered for the design and alignment of the proposed flood defence included locating the flood protection along the road edge. This location provided an effective flood defence whilst retaining maximum space for campshire users. It would however create a significant barrier between the campshires and road, restricting crossing movements to opening locations and dramatically affecting the character of the street. The road would feel channelized and potentially feel like a motorway, encouraging greater speeds of road users.

It was also considered aligning the flood protection along the river edge. This option, from a flood protection point of view, would be the most desirable. It would provide a continuous line of defence with very few openings, and would retain maximum space of campshires for use with minimal impact on existing landscaping. It would however, have a significant impact on the open character of the campshires, restrict berthing along the quays and have a greater impact on the historic fabric and archaeology of the quay walls which, along with associated mooring hooks and features, are protected structures.

After recognising that the flood defence could not be located along the road edge or the quay edge for the length of the development it was apparent that the alignment would vary along the length of the campshires. Alignments along the campshires were then very carefully considered in terms of:-

- Provision of an effective flood defence
- Impact on campshire uses
- Impact on pedestrian routes and bridges
- Impact on existing cycle paths and routes
- Interaction with exiting buildings
- Interaction with existing walls
- Protection of existing transportation infrastructure
- Protection of existing utility infrastructure
- Impact on protected structures and conservation area
- Impact on archaeology
- Exasperating the current anti-social behaviour issue

In order to meet these requirements, while meeting the over riding requirements of flood defence, the location of the wall varies along the campshires dictated by the physical and use constraints at each location.
Further to the above, the Steering Group recognised the need to address the issue of anti-social behaviour in so far as possible within the existing design of the project. It was proposed to incorporate the following features to reduce the risk of the wall leading to anti-social behaviour along the campshires:

- The top of the flood defence wall will be angled to deter groups congregating at or sitting on or at the wall.
- A studded strip to be provided on the ground in front of the wall to deter people from sitting or lying behind the wall, out of site from the road side.
- An anti-graffiti finish to the wall.

A review of “Safer Places, The Planning System and Crime Prevention” document published by the UK office of the Deputy Prime Minister was carried out and informed the final design as further outlined in section 4.1.6.7.

Consultation with the local Garda Síochána and T.D. representatives was also carried out and is further outlined in section 4.1, Human Beings.

The Project Steering Group Meeting concluded with a decision to approve the current design, subject to these amendments. Minutes of the meeting are provided in section 17.0, Volume 4.
2.0 PLANNING POLICY CONTEXT

The south campshires of the River Liffey between Butt Bridge and the new pedestrian crossing of Sir John Rogerson’s Quay, just east of Samuel Becket Bridge at Cardiff Lane, is strategically located near the heart of the inner city. The area occupies a unique central location within walking distance of the city centre and major public transport infrastructure.

To the west of the campshires is Dublin’s historic core, principle shopping areas and Temple Bar. Trinity College and Georgian Dublin are located to the south and the developing area of Grand Canal Dock to the east. To the north of the campshires is the River Liffey and beyond it, on the opposite bank, are the International Financial Services Centre and the ongoing development of the North Docklands. The area fronting the campshires represents a grouping of business, residential and mixed use precincts.

During the development of the flood protection designs and in the preparation of this EIS due regard has been given to the following national, regional and local policies:

2.1. European and National Policies

EU Floods Directive 2007/60/FC

The Directive was proposed by the European Commission on 18 January 2006, and was published in the Official Journal on 6 November 2007. Its aim is to reduce and manage the risks that floods pose to human health, the environment, cultural heritage and economic activity. The Directive requires Member States to first carry out a preliminary assessment by 2011 to identify the river basins and associated coastal areas at risk of flooding. For such zones they would then need to draw up flood risk maps by 2013 and establish flood risk management plans focused on prevention, protection and preparedness by 2015. The Directive applies to inland waters as well as all coastal waters across the whole territory of the EU.

The flood risk associated with storm surges along the south campshires have been identified by flood studies carried out by Dublin City Council in association with the OPW and the proposed flood protection project is a result of these flood studies.

The Planning System and Flood Risk Management – OPW November 2009

These guidelines require the planning system at national, regional and local levels to:

- Avoid development in areas at risk of flooding, particularly floodplains, unless there are proven wider sustainable grounds that justify appropriate development and where the flood risk can be reduced or managed to an acceptable level without increasing flood risk elsewhere;
- Adopt a sequential approach to flood risk management when assessing the location for new development based on avoidance, reduction and mitigation of flood risk and
- Incorporate flood risk assessment into the process of making decisions on planning applications and planning appeals.
These guidelines introduce comprehensive mechanisms for the incorporation of flood risk identification, assessment and management into the planning process. Implementation of the Guidelines is achieved through actions at the national, regional, local authority and site-specific levels.

As the flood cell associated with the south campshires is an established and well developed urban area it is essential that the flood risk is reduced and managed to an acceptable level.

It is noted that the Office of Public Works (OPW) supports and is funding this project as part of its programme of coastal flood protection nationally.

National Spatial Strategy (2002 – 2020)

The National Spatial Strategy (NSS) sets out an ambitious but realistic vision for the future development of Ireland. It is the outcome of extensive public consultations as well as teamwork between public authorities.

This NSS is a twenty year planning framework designed to achieve a better balance of social, economic, physical development and population growth between regions. Its focus is on people, on places and on building communities. Through closer matching of where people live with where they work, different parts of Ireland will for the future be able to sustain:

- a better quality of life for people
- a strong, competitive economic position and
- an environment of the highest quality.

This Strategy is:

- national – it provides a national framework to guide policies, programmes and investment.
- spatial – it is concerned with the location of people, their work and other activities and with how different places relate to each other.
- strategic – it offers a broad, long-term, comprehensive twenty-year view for achieving more balanced patterns of development.

National Heritage Plan (2002)

The National Heritage Plan sets out the framework for the protection and enhancement of all aspects of Ireland’s heritage which includes its natural heritage. One of the key concepts is ‘placing heritage at the heart of public life’. The plan sets a framework within which priority actions can be taken for the benefit of heritage.

Protected structures adjoining the study area have been identified as part of the environmental assessment and details are provided in this EIS.

The guidelines set out the requirements and procedures for planning authorities to establish and maintain a Record of Protected Structures and to designate Architectural Conservation Areas. General best practice conservation principles are outlined, along with various criteria and development control standards in respect of projected structures. A number of key principles are explained, including the determination of the extent of ‘curtilage’ and ‘attendant grounds’.


The National Cycle Policy Framework (NCNF) sets out to develop cycling as the most desirable modes of transport, with it being good for health, economy and environment. The policy supports the planning, development and design of towns and cities in a cycling and pedestrian friendly way.

It ensures that the urban road infrastructure is designed / retrofitted so as to be cyclist friendly and that traffic management measures are also cyclist friendly. It provides cycling-friendly routes to all schools, adequate cycling parking facilities within schools, and cycling training to all school pupils.

The policy ensures that all of the surfaces used by cyclists are maintained to a high standard and are well lit. It ensures proper integration between cycling and public transport. It improves cyclists’ cycling standards and behavior on the roads while providing driver education and driving standards so that there is a greater appreciation for the safety needs of cyclists.

The policy provides appropriate levels of, and timely, financial resources towards implementing the NCPF. It develops a structure that can coordinate the implementation of activities across the many Government Departments, Agencies and NGO’s.

The policy also evaluates the cycling policy and monitors the success as the measures are implemented.

2.2. Regional Policies

Dublin Coastal Flooding Protection Project (2005)

The Dublin Coastal Flooding Protection Project has been implemented in direct response to the extreme tide and flood event that was experienced across Dublin City and Fingal County on the 1st February 2002. This tide was the highest on record since 1922. It caused extensive flooding and disruption at a number of locations across Dublin City and within Fingal County. The Dublin Coastal Flooding Protection Project is primarily aimed at addressing the risk from tidal flooding around the coastline and within the tidal reaches of a number of the rivers and canals including the River Liffey.

The main objectives and aims of the Dublin Coastal Flooding Protection Project were to:

- Undertake a strategic examination of the risk to Dublin from coastal flooding.
- Identify appropriate strategies and polices to combat and manage the risk.
• Identify short term urgent works on experience gained from the February 2002 event.
• Identify medium to long term options to reduce and/or manage the risk.
• Learn from the past.

In order to achieve these specific study objectives and aims, a number of study tasks and goals were achieved. These include:

• Capture and analyse all relevant project data.
• Consult and liaise with all other DCC and FCC flood risk initiative projects.
• Carry out a public information campaign, including the creation of a web site.
• Undertake a detailed asset condition survey of the coastal and tidal defences within the project area.
• Undertake a probabilistic assessment of existing tidal records.
• Undertake mathematical modelling for use in the development of a forecasting system.
• Identify areas at risk to coastal flooding and quantify the extent of those risks.
• Assess the impact of those flood risks identified.
• Identify risk reduction works and assess the merits of each to identify a preferred option(s).
• Develop preferred option(s) into work packages and prioritise.
• Investigate and provide a specification for the development of an Early Warning System.
• Identify a long term strategy for the area.

Specific outcomes of the Dublin Coastal Flooding Protection Project, in relation to the study area, are outlined in Section 1.2.1 of this Environmental Impact Statement.


The Regional Planning Guidelines (RPG) were made by the Dublin and Mid-East Regional Authorities on the 8th of July 2004. The Guidelines cover the Councils of Dun Laoghaire-Rathdown, Dublin City, Fingal and South Dublin in the Dublin Region and Kildare, Meath and Wicklow County Council areas in the Mid-East Region.

The Regional Planning Guidelines aim to give regional effect to the National Spatial Strategy summarised above and to guide the development plans for each county. It achieves this through appraisal of the critical elements involved in ensuring sustainable and good planning, and though the protection of sensitive and environmentally important locations.

The RPG inform and direct the City and County Development Plans of each of the Councils in the Greater Dublin Area. They provide the clear policy link between national policies, the National Development Plan and the National Spatial Strategy and other national policy documents and guidance; and Local Authority planning policies and decisions. The RPG aid each of the Councils in the Greater Dublin Area in working
together for the better planning of the whole area of Dublin and the surrounding Mid-East Region.

The first RPG for the GDA were adopted in 2004 and set out a strategic framework for planning and development for the region up to 2016. These RPG’s are currently under review and a draft update of the 2004 document will soon be in place for the RPG 2010 – 2020.

Catchment Flood Risk Assessment and Management Studies (2006)

The OPW has developed a Catchment Flood Risk Assessment and Management (CFRAM) Programme, which lies at the core of the assessment of flood risk and the long-term planning of the flood risk management measures throughout the country, including capital structural and non-structural measures.

The CFRAM Programme is being delivered through the CFRAM Studies. The CFRAM Studies are comprehensive catchment-based studies focused on Areas of Potentially Significant Risk (APSRs), for which detailed flood maps are produced and flood risk management measures are assessed and taken to outline design. These measures will be prioritised and set out in a Flood Risk Management Plan (FRMP).

The CFRAM Programme will, as well as delivering on national policy, meet the requirements of the EU ‘Floods’ Directive that came into force in November 2007. This Directive requires the production of flood maps for the APSRs by the end of 2013, and the development of FRMPs to manage risk within the APSRs by the end of 2015.

To identify the APSRs throughout the State, the OPW is undertaking a national Preliminary Flood Risk Assessment (PFRA), which is a screening exercise assessing the risk arising from possible flooding based on available and readily-derivable information. This exercise involves the assessment of a range of different sources of flooding (including riverine, estuarine, coastal, pluvial, groundwater and other possible sources).

2.3. Local Policies

Dublin City Development Plan 2005 - 2011

The Dublin City Development Plan proposes a sustainable and vibrant city in the context of the strategy for the development of a Greater Dublin. It focuses on intensification of the core area and protects the future of Dublin City Centre as the heart and pulse of the Dublin Region.

The Development Plan sets out the spatial framework for the city within the context of the National Development Plan, National Spatial Strategy, the Regional Planning Guidelines for the Greater Dublin Area and the recommendations of the Dublin Transportation Office. Taking cognisance of these national and regional development frameworks, the proposed strategy for Dublin promotes the consolidation of the city, maximising efficient use of land and integrating land use and transport. The plan seeks to meet the needs of the city, the wider region and the State as a whole. As the capital
city, it is vital that Dublin continues to grow and operate on an international scale while at the same time providing for the needs of its residents, workers and visitors alike. The vision is to create a sustainable framework that allows for a co-ordinated development approach.

In the Plan Dublin City Council has committed to the following policies in Section 12.2.3:

- **U14** - To cooperate with the other relevant local authorities to implement the recommendations, as appropriate, of the Greater Dublin Strategic Drainage Study and the Dublin Coastal Flooding Protection Project, subject to funding being available.
- **U15** - To introduce Flood Risk Management in all areas which have either been flooded in recent years or which are assessed as being at risk of flooding.
- **U16** - To cooperate with the appropriate statutory bodies, to facilitate the free flow of rivers and streams in the city subject to environmental considerations.

The proposed campshires flood protection project is therefore in compliance with the Dublin City Development Plan 2005 to 2011.

**Draft Dublin City Development Plan 2011 - 2017**

At the time of writing the Draft Dublin City Development Plan 2011 to 2017 is currently being finalised and will be adopted by the council to come into force during the lifetime of this project. The strategies and policies set out in the current draft of the Development Plan have been reviewed and have informed the nature and design of the proposed flood protection scheme.

In particular the connectivity of character areas as set out in Section 4.4.1.1 of the Draft Plan and in Policy SC1 has been taken into account. The campshires are recognised as part of the key lynch pins of the public space network linking existing and emerging communities such as the Docklands to each other and the City. The design of the proposed flood protection scheme has addressed the issue of permeability while still functioning as an effective flood protection system.

The need for Flood Defence Infrastructure within Dublin City is addressed in Appendix 15 of the Draft Development Plan.

Appendix 15 of the Plan sets out the requirements for flood protection infrastructure based on flood risks and specifically deals with the campshires on the River Liffey as follows:–

*Liffey: The Liffey is the subject of recently started works. A good portion of the Liffey fluvial area in the Dublin City Council area is well defended by the steep Liffey valley. Most of the city is relatively well defended by the quay walls. There are however a number of low points such as the Campshires, Victoria Quay, Wolfe Tone Quay and Matt Talbot Bridge.*
1. ‘Summary from East Wall Road Bridge to Sean Heuston Bridge’: City on both sides is defended by quay walls. Both quay walls exposed to 200-year event. Campshires are a low point. Matt Talbot Bridge is the lowest bridge.

The campshires and the quay walls around Matt Talbot Bridge are recognised as specific risk areas and are set out as objectives to be addressed within the Draft Dublin City Development Plan 2011 to 2017.

The proposed Campshire Flood Protection Project is therefore in compliance with the Dublin City Development Plan 2011 to 2017 and satisfies the objectives of the plan in relation to flood risk mitigation in the south campshire areas.

Dublin Docklands Development Area Masterplan, 2008

The Dublin Docklands Master Plan 2008 has been prepared under Section 24 of the “Dublin Docklands Development Authority Act 1997”.

The Masterplan extends from George’s Quay to Little Brittan Quay, encompassing the entire extent of the proposed flood protection scheme.

The Urban Design Framework section of the Master Plan addresses the issues and objectives associated with the campshires. Policy UD9 states that the Authority will ensure that streets and spaces link together to connect key areas of interest while incorporating the relationship between the water bodies, topography, vistas and markers. These policy objectives have informed the design of the required flood protection scheme, ensuring that the scheme has optimised permeability and retained the connectivity with the Liffey water body.

While there is no specific mention of the campshires in Section 4.10, Land Use, Open Space and Amenity, Policy LU56 seeks to preserve, provide and improve recreational amenity open space within the Masterplan area. The proposed flood protection scheme has been designed to be consistent with that policy and minimise the impact of the scheme on the existing and future land uses on the campshires.

Docklands Campshire Vision, 2007

Dublin Docklands Development Authority has developed a strategic vision as set out in their publication the Docklands Campshire Vision.

The Vision is for the docklands to become the “centre of east Dublin” in terms of culture, employment, leisure and arts serving not only the local community but also the wider city region. The Vision identifies a three step strategy for achieving this objective:-

- Make Connections
- Create Destinations
- Animate the Water
Connectivity to the wider city and creation of an active and vibrant commercial and leisure destination, including an active waterfront along the Liffey form the cornerstone of the strategy.

The objectives of the DDDA campshires vision are to create destinations, to animate the water, to generate new uses of the waterfront and encourage an active use of the campshires.

The Dublin Docklands Vision also includes the “greening” of the campshires. This involves the extensive planting of trees within the campshires and the introduction of planters, public seating and feature lighting to create a pleasant and attractive environment.

Grand Canal Planning Scheme, 2006

The Amended Grand Canal Planning Scheme was made by Dublin Docklands Development Authority on the 12th January 2006 & Approved by the Minister for the Environment, Heritage & Local Government on the 26th day of June 2006. The purpose of the Planning Scheme is to provide robust and detailed direction for the planning and development of the relevant part of the Grand Canal Docks.

The Planning Scheme addresses the campshires in Section 3.3.2. of the Plan. The Plan proposes that the campshires will be extended from Sir John Rogerson's Quay along the Britain Quay waterfront as an integral part of developments within the scheme. The sections of the campshires addressed by the Grand Canal Docks Planning Scheme are outside the campshires impacted by the proposed flood protection scheme and as such the impact of the proposal on the Grand Canal Plan is not significant. Pedestrian access along campshires will not be impacted and the proposed development will not pre-empt any developments envisaged by the Planning Scheme.

George’s Quay Local Area Plan, Issues Paper, 2011

The George’s Quay Local Area Plan is in pre-draft stage at the time of preparing this EIS. An Issues Paper is currently on public display requesting the public to submit issues for consideration.

The Local Area Plan aims to set out aspirations for the study area along the south bank of the River Liffey between Hawkins Street and Lombard Street and is bounded by
Pearse Street to the South and Burgh Quay, George’s Quay and City Quay to the North.

The Issues Paper outlines the vision for the George’s Quay Local Area Plan which is to be in line with the Dublin City Development Plan 2011-2017.

The Issues Paper recognises the crucial issue of climate change and the impact of flood risk due to the increasing instances of extreme weather events. This is particularly relevant to the George's Quay area given its proximity to the Liffey and Bay. Policies and standards in the local area plan address flood risk and indicate how it is intended to mitigate and adapt to the impacts of climate change.

The Issues Paper also acknowledges that the quality of the pedestrian experience is key to how people perceive and enjoy the city centre, and is an important factor in the economic and social life of the wider city. Walking is the most sustainable method of travel that delivers health benefits for the wider community, provides activity and vibrancy on the street and helps reduce traffic volumes. The Plan proposes to provide and maintain a high quality environment attractive to promoting a culture of walking in the city. With George’s Quay being one of the key pedestrian gateways into the city centre the Plan promotes the creation of a sustainable and connected urban environment.

The Local Area Plan will seek to improve the pedestrian environment generally and promote more direct pedestrian links within the area, and to the wider city and its attractions and services. This will involve wider footpaths, improved footpaths or reduced waiting times at pedestrian crossing points. Permeability in the area is promoted through the creation of new and safer pedestrian streets.

The proposed flood protection scheme is in keeping with these objectives in that it incorporates a significant upgrade of pedestrian facilities along George’s Quay including the removal of inappropriate parking and the transfer of road reservation to provide improved pedestrian facilities in the area, while facilitating the required flood protection for the area.
3.0. **EXISTING CONDITIONS AND DESCRIPTION OF THE DEVELOPMENT**

3.1. **Information on the Site of the Proposed Development**

3.1.1. **General**

The development site consists of the south bank of the River Liffey from Butt Bridge in the west to beyond the Samuel Beckett Bridge and across Sir John Rogerson's Quay road just east of Cardiff Lane.

The site includes the pedestrian areas along the river at George’s Quay, the campshires on City Quay and the campshires on Sir John Rogerson’s Quay. A detailed description of the existing conditions of each section of the scheme is set out in the relevant sections of this EIS. A general description setting out the context of the proposed development is included below.

**George’s Quay**

The section along Georges Quay extends from Butt Bridge to Matt Talbot Memorial Bridge and is approximately 170 metres in length. The site currently comprises of a public footway and parallel on street parking with a heavy duty painted steel railing along the river edge.

The geotechnical site investigation carried out at this location as part of the site investigations for this project indicates that a previous intervention has taken place along this quay and that the original quay wall and surface has been overlaid by a reinforced concrete slab forming the new footpath and carriageway.

Existing features on this section of the site include access steps to the river, located to the west under the Loop railway bridge, and a Dublin Bike stand on the footpath adjacent to the Matt Talbot Memorial Bridge to the east.

George’s Quay is a recorded monument on the record of sites and monuments, further discussed in section 4.9.1.

George’s Quay also lies within the Conservation Area which is further outlined in section 4.9.3, Architecture and Built Heritage.

**City Quay**

This section of the site extends from Matt Talbot Memorial Bridge to Creighton Street, just beyond the Sean O'Casey pedestrian bridge, and is approximately 270 metres in length.

The site comprises recently landscaped campshires with a contra flow off road cycle track and pedestrian routes with interspersed with lines of trees, pedestrian lighting, modern seating and bollards.

Existing features on this section include access steps to the river at each end of the quay, a feature bronze sculpture, known as The Linesman, at the edge of the quay and
an ESB sub-station at Creighton Street. Sean O’Casey pedestrian bridge is located within this section and provides an important north south pedestrian link crossing the River Liffey.

City Quay also lies within the Conservation Area which is further outlined in section 4.9.3, Architecture and Built Heritage.

**Sir John Rogerson’s Quay**

Sir John Rogerson’s Quay extends from Creighton Street to the end of the development site east of Cardiff Lane. This section is approximately 420 metres in length.

This section includes two traditional warehouse buildings known as the B.J. Marine buildings. The section of the quay to the west of these buildings has been recently landscaped as part of the City Quay landscaping while the remaining sections between the B.J. Marine buildings and to the west of the buildings are laid out as the traditional campshires with cobbled surfaces and in some areas with the original crane tracks still intact. This section of the scheme includes the new Samuel Beckett Bridge. The quay in the vicinity of this bridge has been significantly altered to accommodate the level of the bridge and the control structures required to operate the bridge.

Existing features on this section of the campshire include the aforementioned B.J. Marine buildings and Samuel Beckett Bridge.

Sir John Rogerson’s Quay is a protected structure and lies within the Conservation Area which is further outlined in section 4.9.3, Architecture and Built Heritage.

**3.1.2. Historical Context**

Development along the River Liffey and in the city of Dublin in general, gained pace during the second half of the 17th century. During the early 18th century several new quays were added to the south bank of the river, including George’s Quay, City Quay and Sir John Rogerson’s Quay.

These quays were in use for shipping well into the middle of the 20th century serving as loading and unloading facilities for general cargo. In particular City Quay was used by Guinness for the export of porter to the United Kingdom and Sir John Rogerson’s Quay was used for the import of coal to serve the town gas production facility at Cardiff Lane and Macken Street.

With the introduction of containerisation and the shutting down of the town gas production facility, these quays lost their significance as a part of the working port which moved further downstream to the North Wall and Ringsend.

Since the establishment of the DDDA, the campshires along City Quay and Sir John Rogerson’s Quay have been landscaped as amenity areas.

Full details of the history and archaeology of the area is contained in Section 4 of this EIS.
3.1.3. Existing Vehicular, Pedestrian and Shipping Access

3.1.3.1 Vehicular Access

Vehicular access to the study area is shown below in Figure 3.1.1:

Traffic from the north accesses the study area via Butt Bridge, Matt Talbot Bridge and Samuel Beckett Bridge. Traffic from the east comes from Cardiff Lane and Sir John Rogerson’s Quay east. Due to the one way system in the area no traffic can enter the study area directly from the west while Tara Street, Princess Street and Cardiff Lane are the main traffic feeders to the area from the south.

<table>
<thead>
<tr>
<th>Location</th>
<th>Direction of Flow</th>
<th>Traffic Volume pcu/day</th>
</tr>
</thead>
<tbody>
<tr>
<td>Georges Quay</td>
<td>West bound</td>
<td>15,179</td>
</tr>
<tr>
<td>City Quay</td>
<td>East bound</td>
<td>16,162</td>
</tr>
</tbody>
</table>

Note 1 pcu/day = passenger car units per day.

3.1.3.2 Pedestrian Access

The campshires form a key part of the east west pedestrian corridors in the docklands area and are crossed by the main north south links, in particular at Sean O’Casey Bridge.

Pedestrians coming from the east Docklands area access the campshire by Sir John Rogerson’s Quay east while the city centre is linked to George’s Quay via Burgh Quay in the west.

In the north south direction Butt Bridge, Matt Talbot Bridge, Sean O’Casey Bridge and Samuel Beckett Bridge offer pedestrian routes across the Liffey. There are multiple links to the study area from the south including Moss Street, Princess Street, Lombard Street, Creighton Street, Windmill Lane, Lime Street and Cardiff Lane. Tara Street DART station also offers an origin and destination for pedestrians from the north and south.
A study commissioned by Dublin Docklands Development Authority on pedestrian movements and linkages was carried out by GEHL Architects in 2005. The results of this study were published by Dublin Docklands Development in their report *Connecting the Docklands to Dublin*.

GEHL Architects also carried out a study on pedestrian counts in the area using a sampling technique developed for comparative use in international studies of cities in Europe. The sampling technique involves carrying out pedestrian counts over 10 minute intervals at various locations to provide average figures for pedestrians per minute and extrapolated to provide estimates of the number of pedestrians per hour at various times of the day.

A pedestrian survey was carried out by Moylan between 13.00 and 14.00 on Tuesday 5 October 2010 at Sean O’Casey Bridge. This survey was based on the sampling technique used by GEHL Architects. Weather during the counting period was fine and sunny. The results of this survey are shown in Table 3.1.2.

<table>
<thead>
<tr>
<th>Route</th>
<th>Direction</th>
<th>No.</th>
<th>Direction</th>
<th>No.</th>
<th>Two Way</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sean O’Casey Bridge</td>
<td>North</td>
<td>384</td>
<td>South</td>
<td>492</td>
<td>876</td>
</tr>
<tr>
<td>City Quay</td>
<td>East</td>
<td>174</td>
<td>West</td>
<td>186</td>
<td>360</td>
</tr>
<tr>
<td>Sir John Rogerson’s Quay</td>
<td>East</td>
<td>228</td>
<td>West</td>
<td>180</td>
<td>408</td>
</tr>
</tbody>
</table>

The pedestrian traffic estimate of 876 people per hour is the equivalent of almost 14 people per minute over Sean O’Casey Bridge. The bridge is approximately 4m wide resulting in a pedestrian density of 3.5 people per minute per metre path width.

GEHL Architects research, which is based on international comparison, would indicate that 13 people per minute per metre path width is the upper limit for reasonably acceptable walking space. The effective pedestrian width of Sean O’Casey Bridge is approximately 4 m wide and would have a capacity of approximately 50 people per minute or 3,000 people per hour.

3.1.3.3 Cyclist Access

**George’s Quay**

A with flow, on road cycle track is provided on George’s Quay from the intersection of Talbot Memorial Bridge to Butt Bridge. A toucan crossing is provided at the Talbot Memorial Bridge to facilitate cyclists. The existing cycle tracks are indicated on the plan drawings in Volume 3.

**City Quay**

City Quay has a contra flow cycle track located within the landscaped campshire. It runs from the first B.J. Marine Building (west) to Talbot Memorial Bridge.
Sir John Rogerson’s Quay

A new off-road section of two way cycle track from the Samuel Becket Bridge links via a short section of two-way on road cycle track to Lime Street to the west where it ends abruptly. This section was recently added as part of the Samuel Becket Bridge works and is under review by DCC as part of a proposed wider cycle network.

East of the new bridge is a short section of new off-road two-way cycle track which leads to an off road cycle track heading east down Sir John Rogerson’s Quay.

3.1.3.4 Shipping Access

Berthing locations are provided by Dublin Port along City Quay and Sir John Rogerson’s Quay from Talbot Memorial Bridge eastwards. Sean O’Casey and Samuel Beckett Bridges can both open to facilitate the passing of ships to these areas. Due to the requirements associated with opening of these two bridges, berthing of ships in this area is now generally associated with maritime festivals only refer to Plate 2.3.1 in Section 2 of this report. Berthing access has been considered however and provisions for access to and from berthed ships is included in the scheme and indicated on the design drawings in Section 3.

3.1.4. General Land Uses in Site Environs

Land uses associated with the campshires themselves are identified in Section 1.2.3 of this EIS. This section describes the surrounding environment within the flood cell as outlined in section 1.2.1 and the existing land uses in the area.

George’s Quay

To the east of Butt Bridge and Tara Street is the entrance to Tara Street mainline rail and DART station. This station generates significant pedestrian traffic in particular during the peak periods. This block also includes minor commercial premises and a public house.

Plate 3.1.1 George’s Quay from the North

To the east of Tara Street railway station is the George’s Quay commercial development consisting of a high rise office building with the corner block being occupied by Ulster Bank Ltd.

George’s Quay is part of the regional route R105 and vehicular traffic on the quay is one way west bound only. This quay accommodates significant volumes of traffic from Butt Bridge in a westerly direction as indicated in section 3.1.3.1.
City Quay

City Quay extends from Matt Talbot Bridge / Moss Street to Creighton Street in the east.

The principle buildings between Moss Street and Princes Street South are church buildings including the parish church of the Immaculate Heart Of Mary and the associated parish and educational buildings. The south side of the quay includes several disused buildings currently providing temporary parking facilities.

Between Princes Street South and Lombard Street East the buildings to the south west of the quay have been extensively re-developed with showrooms and offices predominating. To the south east approaching Lombard Street East there is residential neighbourhood consisting of duplex apartments around Petersons Court.

On the west corner of City Quay and Lombard Street East is Elizabeth O’Farrell Park and memorial to sailors lost at sea, ‘In honour of the seamen lost while serving on Irish merchant ships 1939 to 1945’.

Vehicular traffic on this section of City Quay is restricted to east bound traffic from Butt Bridge heading east and south to Lombard Street East.

The junction between City Quay and Lombard Street East is an important junction in terms of not only vehicular traffic heading to the south east of the city but also to pedestrians crossing the Liffey via Sean O’Casey Bridge towards Pearse Street and the DART and mainline rail services provided at Pearse Street Station.

Plate 3.1.2 Residential area at City Quay

The east side of Lombard Street as far a Creighton Street is a residential street with an established community.

This section of the City Quay provides for a one way system westbound only. On street parking is provided for residents.

Sir John Rogerson’s Quay

Plate 3.1.3 Sir John Rogerson’s Quay

From Creighton Street to Windmill Lane to Lime Street the south side of the quays consist primarily of newly re-developed commercial buildings with the occasional original building and vacant site.

Vehicular traffic on this section of the quays is limited to west bound traffic only and is relatively light.
3.2. **Description of the Proposed Development**

3.2.1 **Description of the Flood Protection Project**

The proposed development consists of a new flood protection system, approximately 1.0km in length located on the south campshires of the River Liffey. The flood protection project will extend from Butt Bridge to Samuel Beckett Bridge and across Sir John Rogerson’s Quay road just east of the new pedestrian crossing at Cardiff Lane.

The flood defence proposed will provide flood protection from extreme high tides to a level of 3.7m above Malin Head Datum. The flood protection will, for the most part, consist of a new wall approximately 800 to 900mm high, depending on its location and have a number of openings to allow access to the campshires, pedestrian bridges and walkways as well as to break up the visual linearity of the wall.

The flood defence will also take different alignments over its length. For the majority of its length the new wall will be located within the line of the existing cycle path which runs within the campshire zones. Adjacent to and between the B.J. Marine buildings, the wall will run close to the river edge, set back from the existing coping stone. At George’s Quay the wall will run along the river edge, similar to the quay parapet wall west of Butt Bridge.

At the east end of the proposal the flood defence returns across Sir John Rogerson’s Quay and ties into the front wall of the McCann Fitzgerald building. This part of the flood defence will be a demountable flood barrier that will be mounted on top of the quay road and footpaths. Regrading of this section of roadway and footpaths will be required to provide a flat base for the demountable flood barrier to be erected at times of alerted high flood levels. Details of this barrier are shown in the drawings in Volume 3 and in section 12.0 in Volume 4.

Architectural and landscaping designs incorporating the flood protection have been developed and these designs will form an integral part of the project. Sections of the flood protection are staggered throughout the length of the campshires to provide pedestrian permeability and integrate and improve the layout and landscape of the campshires.

The flood protection takes different forms at several sections over its length including high quality concrete finish wall, granite wall, raised parapets and waterproofing of existing buildings along the campshires. The various forms of the flood protection have been designed to match the existing context in to which the defence structures are to be built.

Lifting flood gates and swing gates will be installed at strategic openings along the length of the flood protection alignment. These dams/gates will be lifted into place to seal the openings prior to extreme tide events.

Openings for river and berthing access will generally remain permanently closed will be and opened when required by the relevant authority to gain access.
In order to improve the area of George’s Quay opposite the Customs House it is proposed, as part of this project, to remove the on street parking and widen the existing footpath with the inclusion of some new seating and tree planting. These works will enhance the area for pedestrians and visitors viewing the Customs House. Dublin City Council Roads Department support the above proposals and agree that the reduction in parking capacity resulting from the removal of these parking spaces can be accommodated with alternative parking in the area.

The flood protection works will also incorporate a significant upgrade of the existing contra flow cycle track. Approximately 650m of new 3m wide on road two way cycle track from Talbot Memorial Bridge to east of Samuel Becket Bridge is proposed as part of the scheme. This new cycle track will remove the existing cyclist / pedestrian conflicts on the campshire and extend the existing cycle facilities to link into the new proposed cycle network on Samuel Becket Bridge.

Improvement of pedestrian facilities is also included with the provision of a new high quality footpath and additional tree planting along the length of the campshires. The design has been developed to integrate with the existing quality public realm works, recently carried out by the DDDA and also accommodates future potential landscaping proposals as set out in the DDDA Campshire Vision of 2007.

Detailed drawings and photomontages included in Volume 3 show the full alignment of the proposed flood protection scheme, typical sections along the campshires, proposed upgrading of the existing cycle tracks and the provision for new trees.

### 3.2.2 Interaction with B.J. Marine Buildings

The two “B.J. Marine buildings” are located on the alignment of the proposed flood protection scheme.

It is an objective of the Dublin Dockland Development Authority, the current owners of the B.J. Marine buildings, to rejuvenate the buildings and to identify a commercially viable use for them. This objective is set out in the Dublin Docklands Development Authority Campshire Vision 2007. However, at this time no definite plans for the re-use of the buildings have been confirmed. It is therefore a requirement that the flood protection design is to provide flexibility of use and permeability of access in the vicinity of these buildings.

Following detailed consultation with the Property Section of the DDDA to ensure that the optimum use of the buildings is available for the future, it has been agreed that the proposed flood protection be provided on the river side of the buildings. Following a structural assessment of the superstructure and substructure of the buildings it has been decided that the rear wall of both buildings is adequate in terms of structural integrity to provide the required level of protection. It is proposed therefore that the river walls of the buildings be reinstated where required and that the existing blocked up openings be made good and reinforced where required and that a waterproof rendering system be provided along the outside of the building to the required level of 3.7m OD Malin which is approximately 900mm above the existing quay level.
The existing doors would be removed for these works and replaced on completion. The existing blocked up openings can be removed to allow for future access between the interior of the B.J. Marine buildings and the quayside/river, as was traditionally the situation, in the context of a future new use for these buildings. In this scenario, an alternative, approved, flood defence solution would be provided.

The Property Section of the DDDA also requested that the flood protection be kept along the quay side of the Campshire between the B.J. Marine Buildings to minimise the impact on the Campshire area between the buildings.

3.2.3 Construction

Construction of the protection elements is currently envisaged as being carried out in sections along the length of the quays and will generally involve the following procedures:

1. Fencing off of the section of the works from public access.
2. Protection of existing landscaping elements, quay walls/coping stones and protected structures, where adjacent to the works.
3. Removal of the existing surfacing along the alignment of the works.
4. Relocation of utilities along the alignment of the structure as required.
5. Excavation of subsoil to the line and level required for the foundations of the protection structure and the disposal of surplus material to an approved disposal site.
6. Construction of the foundations using either precast or insitu concrete.
7. Construction of the defence works and associated features using granite, precast or insitu concrete in accordance with the design.
8. Backfill to existing ground levels and make good the surfacing.
9. Construction of the ancillary works including landscaping, pedestrian and cyclist facilities and fittings for openings with flood gates.

In addition, specialist and specifically tailored works will be required to manufacture and install the flood gates, interfaces with existing bridges and other features and the interface with the B.J. Marine buildings.

A Construction Management Plan and a Waste Management Plan will be provided and approved prior to the commencement of the works.

3.3 Do Nothing and Alternatives Considered

3.3.1 Do Nothing Scenario

In Dublin, coastal flooding may occur when a high astronomic tide is accompanied by a significant surge event.
Such events, which are driven by meteorological conditions (low pressures; high winds) can increase the sea level by a metre or more, sufficient to overtop the sea defences where these are low (as the South City Quays).

With climate change impacts a number of phenomena may be anticipated which will increase the likelihood of flooding; the main ones which are currently recognised are:

1. Increases in mean sea level will elevate the astronomic tide levels so that the peaks i.e. the high tides themselves will be higher.
2. Storms will increase in frequency and severity which will result in larger surge values to be added to the high tide values.

In the event that the project does not proceed the flood risk to the flood cell south of the campshires (the area which is susceptible to flooding during a particular storm or tidal event) will remain and the probability of flooding of the area behind the campshires as a result of coastal flooding will increase.

3.3.1.1 Flood Cell

The area behind the south campshires is characterised by low lying lands much of which has been reclaimed from the Liffey estuary over the last centuries as the city of Dublin expanded eastwards.

In 2005 a series of Flood Hazard Maps were prepared as a part of the Dublin Coastal Flood Protection Project (DCFPP) completed by Royal Haskoning for Dublin City Council and for Fingal County Council. These maps present the indicative tidal flood hazard for tidal and storm events for different return periods along the coast of Dublin City and south Fingal County. Tidal flood hazard is defined as areas at risk from a combination of:-

a) extreme tide levels with wave actions as appropriate along the open coastline
b) extreme tide levels with a component of fluvial discharge as appropriate within the tidal reaches of the river.

The tidal flood hazard associated with the south campshires for a 200 year flood depth is shown Map 21 of the Dublin City Flood Hazard Maps and the extent of the flooding that would result for this two hundred year event is indicated in Fig 3.3.1.

Further details of the Dublin Coastal Flooding Protection Project and the Flood Hazard Mapping is including in section 10.0, Volume 4 of this EIS which contains the technical appendices.
The extent of the area at risk of flooding within the south east city centre in a 1/200 year tidal event can be seen in Fig 3.3.1. The area at risk consists of approximately 32 hectares of the inner city and includes major streets and links such as Townsend Street, Lombard Street and Sandwith Street Lower, Pearse Street and Macken Street.

The 1/200 year Tidal Hazard Map indicated in Fig. 3.3.1. above, indicates predicted water depths from 1m to 1.5m in the low lying areas off Pearse Street and Clarence Palace Great.

3.3.1.2 The Consequences of Flooding

The impacts of coastal flooding on existing property and infrastructure within the campshires flood cell would be severe and would have very significant and long term consequences. The flood cell includes significant business, critical infrastructure, retail and densely populated residential areas.

Photos from Dublin City Council’s Flood Resilient City Office, included in section 15.0 of Volume 4, show indicative flood levels of 3.5m and 3.7m OD along several streets within the flood cell including Lime Street, Creighton Street, Hanover Street, Windmill Lane and Pearse Street.

Health and Safety

Given the topography of the flood cell, with ground levels falling to the south away from the quays and the very developed nature of the area, including a large number of
inhabited basement properties, this is an extremely vulnerable flood cell with a real and significant risk for loss of life in addition to expected property and commercial damage.

With parts of the flood cell up to 1.5m below the existing quay wall (refer to SAFER Atlas Maps in Volume 3), flooding of the area would result in serious risk to life within the cell. Flooding can cause physical injury, spread disease and, in extreme conditions, can result in the loss of life. Even shallow flood water flowing at 2 m/sec can cause people to be knocked off their feet and may lead to drowning.

Flooding also exposes people to many hidden hazards such as floating debris, hidden obstructions such as open manholes and excavations etc.

In terms of potential health risks flooding will result in the inundation and overflowing of waste water sewers and pumping stations and damage power supplies leading to power outages.

**Damage to Buildings**

The consequences of flooding in a densely developed urban environment can be very severe. Floodwater will result in damage to building internal finishes, contents, services including gas, electricity and waste water drainage and can cause structural damage. Sea water flooding can cause more extensive damage due to corrosion and contamination.

**Damage to Businesses**

Besides the physical damage to buildings, flooding in an urban area will result in significant negative impacts on the business due to loss of customers, long term closure of the business, loss of stock etc. These impacts can lead to long term economic damage not only locally but also regional and result in significant business closures.

**Damage to Infrastructure**

Flooding will result in significant impacts on infrastructure including:-

- Transportation
- Electricity
- Waste Water Drainage
- Gas
- Telecommunications

The cost of repairs and long term disruption in both economic terms and in terms of health and safety is significant.

### 3.3.2 Alternative Locations

In terms of location, the options for a flood protection scheme is limited by the functional requirement to protect the specific flood cell. In this case the source of the flood hazard is the sea along the tidal zone of the River Liffey. The path of water overtopping the
quay is across the south campshires onto Georges Quay, City Quay and Sir John Rogerson’s Quay. The receptors (or items that may be harmed by flooding including people, buildings, businesses, infrastructure etc), are located directly along and behind the quays with direct links via the many north south streets in the area, deep into the flood cell to the south.

It is essential therefore that the flood protection is located close to the source in order to achieve the necessary level of protection. The location which would achieve complete flood protection is therefore limited to the campshires or the south quays.

The option of providing flood protection along the south of quays was considered but was discounted as the impact on businesses, dwellings and critical infrastructure (drainage; electricity & gas main sub-stations) along the quays was considered unacceptable. This option would also result in the flooding of the roadway and therefore closure to traffic along this main city traffic route.

The installation of flood protection along the road edge was also considered. The location provided an effective flood defence whilst retaining maximum space for campshire users. It would however create a significant barrier between the campshires and road, restricting crossing movements to opening locations and dramatically affecting the character of the street. The road would feel channelized and potentially feel like a motorway, encouraging greater speeds of road users.

Providing the flood protection along the river edge was also considered. This option, from a flood protection point of view, would be the most desirable. It would provide a continuous line of defence with very few openings, and would retain maximum space of campshires for use with minimal impact on existing landscaping.

It would however, have a significant impact on the open character of the campshires, restrict berthing along the quays and have a greater impact on the historic fabric and archaeology of the quay walls which, along with associated mooring hooks and features, are protected structures.

It was considered therefore, for the above reasons, that this would be an unacceptable location for the flood protection alignment:

Locations within the campshires were very carefully considered in terms of:-

- Provision of an effective flood defence
- Impact on campshire uses
- Impact on pedestrian routes and bridges
- Impact on existing cycle paths and routes
- Interaction with exiting buildings
- Interaction with existing walls
- Protection of existing transportation infrastructure
- Protection of existing utility infrastructure
- Impact on protected structures and conservation area
- Impact on archaeology
• Exasperating the current anti-social behaviour issue

In order to meet these requirements, while complying with the overriding requirements of flood defence, the location of the wall varies along the campshires dictated by the physical and use constraints at each location.

To assist in developing an appropriate design solution for the flood defence, and to ensure it will be appropriately integrated within the existing high quality public realm of the campshires, address opportunities to improve the public realm at George’s Quay and will also accord with the conservation area objectives, a preliminary design review assessment was carried out and PowerPoint slides from this report are included in section 5.0, Volume 4, of this EIS.

3.3.3 Alternative Design

The protection of the South Campshires Flood Cell requires the construction of physical flood protection systems which will prevent flood waters from entering the flood cell and into the low lying areas to the south. This flood protection is required to hold back rising water levels in the river Liffey to a height of 3.7m approximately 900mm in height at quay edge.

Options for the construction of this flood protection scheme have been carefully considered in terms of:-

• Impact on visual appearance
• Impact on surrounding area
• Impact on Heritage
• Ability to provide flood protection
• Constructability
• Pedestrian and cyclist permeability
• Cost
• Durability
• Maintenance
• Ongoing management of flood defence
• Loitering

Alternative materials considered included but were not limited to:-

• Glass wall
• Steel panel
• Concrete
• Granite
• Other stone types
Due to the sensitive and varying locations of the flood protection, a combination of granite construction, when the flood protection is provided on the quay edge, and a high quality concrete wall elsewhere, was considered the optimum solution.

Materials such as glass and steel, although attractive, provide difficult and ongoing maintenance issues over a long length.

3.3.4 Alternative Design – Cycle facilities

Although this is primarily a flood protection project, due to its location in such a high amenity area additional works associated with landscaping are inevitable.

The existing cycle facilities is one area in particular that it was considered could benefit greatly from these proposed works and many options were considered for this.

A number of schemes were prepared and after detailed consultation with Dublin City Council Roads Department the proposed scheme was selected as meeting with Roads Department requirements in terms of provision of cycle facilities. The proposed 650m of on road two way cycle track will greatly enhance the safety of cycling in the area of the campshires and connect to existing and proposed cycle tracks in the area.
4.1 Human Beings

4.1.1 Introduction

This section considers the environmental impacts of the proposed scheme on human beings and the community in relation to the following:-

- Tidal flood risk
- Uses of the Campshires
- Residents and work places
- Anti-Social Behaviour
- Pedestrians, cyclists, traffic and parking
- Economic activities and employment
- Recreational facilities
- Health and Safety

The impact of the flood protection structures on the uses of the campshires, pedestrians, cyclists and vehicular traffic and on the local residents and business is addressed.

The South Campshire Flood Protection Project is designed to provide long term flood protection to the flood cell south of the Liffey which extends from Tara Street Station to Cardiff Lane and as far south as Pearse Street and Lower Grand Canal Street. The benefits of the level of protection against flooding of the flood cells south of the river are summarised here and are addressed in detail elsewhere in this EIS.

In terms of impacts on human beings the development will not have a regional impact and will impact locally only. The study area extends from Georges Quay through City Quay to Sir Rogerson’s Quay, a distance of approximately 1.0km along the south bank of the Liffey.

4.1.2 Research Methodology

Sources of information used in the study include:-

- Dublin Coastal Protection Project 2005
- Assessment of land uses
- Ordinance Survey Mapping of the area
- Meetings with local residents, DDDA and Garda Síochána
- Pedestrian and Cyclist surveys
- Traffic data provided by Dublin City Council Roads and Traffic Department
- Review of DDDA requirements
- Parking survey carried out by Dublin City Council
The study was also informed by the Dublin City Development Plan 2005-2011 and the Draft Plan 2011-2017, as well as Dublin Docklands Development Authority Master Plan 2008 and the Docklands Campshire Vision 2007, refer to section 2.0 for further details.

4.1.3 Receiving Environment

The study area extends from George’s Quay through City Quay to Sir Rogerson's Quay, a distance of approximately 1.0km from Butt Bridge eastwards beyond the Samuel Beckett Bridge and returning across Sir John Rogerson’s Quay road just east of Cardiff Lane.

The south quays and campshires have a multi-functional use which are listed below and further described thereafter:

- Flood protection protection of the hinterland behind the campshires from flooding
- Movement pedestrians, cyclists and vehicular
- Recreation and Events walking, access to water, berthing, Docklands Festival, Tall Ships
- Commercial casual trading, potential use of the existing warehouse buildings
- Infrastructure ESB Creighton Street substation, sewerage and drainage.

4.1.3.1 Flood Protection

The south quays and campshires were originally constructed to provide a working quay along the river and to protect the hinterland from tidal flooding. The construction of the quays provided an opportunity for the reclamation of significant areas which were previously within the Liffey flood plain.

The subject flood defence proposes to extend the level of protection along the south campshire from Butt Bridge extending eastwards beyond Cardiff lane to a level of 3.7m above Malin Head.

4.1.3.2 Movement

Pedestrians
In terms of pedestrian routes, the main movement on the campshires is at Sean O’Casey Bridge with the predominant pedestrian route being north south, from the East Lombard Street to cross the Liffey.

Table 4.1.1 Pedestrians Using Sean O’Casey Bridge

<table>
<thead>
<tr>
<th>Year</th>
<th>Month</th>
<th>Time of Day</th>
<th>Pedestrian Traffic</th>
</tr>
</thead>
<tbody>
<tr>
<td>2005 *</td>
<td>September</td>
<td>12.00 to 13.00</td>
<td>540</td>
</tr>
<tr>
<td>2005 *</td>
<td>September</td>
<td>17.00 to 18.00</td>
<td>2,292</td>
</tr>
<tr>
<td>2010 **</td>
<td>September</td>
<td>12.00 to 13.00</td>
<td>876</td>
</tr>
<tr>
<td>2010 ***</td>
<td>September</td>
<td>17.00 to 18.00</td>
<td>3,718</td>
</tr>
</tbody>
</table>

Source * Connecting the Docklands to Dublin, GEHL Architects, 2005
** Moylan manual counts 2010
*** Estimated from interpolating from the previous survey results
The volumes of pedestrian traffic at this location have increased significantly and estimates for various times of the day and year are indicated in Table 4.1.1.

Pedestrian traffic along the campshires generally consists of both commuter and leisure traffic with a significant surge during the morning and evening peak hours.

Pedestrian movement is outlined further in sections 3.1.3 and section 4.8.1.

**Cyclists**

There is an existing cycle track within the campshire area along City Quay. These tracks are not integrated into a cycle route along the south quays and cyclists are currently very poorly served by discontinuous cycle tracks which are difficult to read.

**Vehicles**

Traffic accesses the south campshires from the north via Matt Talbot Bridge and Samuel Becket Bridge, while traffic from the east comes from Cardiff Lane and Sir John Rogerson’s Quay east. Due to the one way system in the area no traffic can access the south campshire directly from the west while Tara Street, Princess Street and Cardiff Lane are the main traffic feeders to the area from the south.

The built edge fronting George’s Quay, City Quay and Sir John Rogerson’s Quay consists of a mixture of residential, commercial and retail properties together with some vacant sites many of which are being used as temporary car parks. There are also parking spaces along Sir John Rogerson’s Quay which are used by local residents and businesses.

Existing vehicular traffic is outlined in further detail in sections 3.1.3 and section 4.8.1.

**4.1.3.3. Recreation and Events**

Regular river use is based mainly on the north quays where moorings for small boats have been provided. Occasional river use includes the mooring of small boats and ships, in particular sailing ships during maritime festivals and visiting naval ships.

The Liffey Ferry was located to the east of the study area and has now been discontinued.

The campshires form a significant part of occasional special events such as the Dublin Docklands Festival, tall ships races and other maritime events. Due to the close partnership with the River and the available open space, these events impose significant crowd loading on the campshires and require temporary barriers and safety structures to be erected to segregate pedestrians from vehicular traffic on the quays.
4.1.3.4 Commercial:

Commercial use of the campshires is limited to the occasional casual trader and the potential development of the B.J. Marine buildings. These buildings have been vacated by the original tenant, who has moved to Malahide, and are currently disused. The DDDA plan to develop them in the future.

4.1.3.5 Infrastructure:

The ESB substation on the south campshire, off Creighton Street distributes power supply for significant area within the south inner city area. There are several high tension power cables which run underground into the front of the substation. The alignment of the proposed flood defence will protect the substation from flooding up to 3.7m above Malin Head, while also avoiding the bank of power ducts and as such no diversion or power cable works are envisaged as part of the development.

There are also several large drainage pipes and culverts that cross the south campshire before outfalling to the Liffey. This is further detailed in section 4.4, Water.

4.1.3.6 Anti-Social Behaviour:

As outlined in section 1.7, Consultation, there is an existing issue of anti-social behaviour along some areas of the south campshires in particular around Sean O'Casey Bridge.

The issue of anti-social behaviour was raised at consultation meetings and was confirmed by further consultation with the Gardai at Pearse Street Station. Details of these meetings are given in section 1.7, Consultation, with minutes of the meeting in section 17.0, Volume 4.
The Gardaí confirmed there is a recognised issue of anti-social behaviour in the area particularly around Sean O’Casey Bridge but that the existing problem would not rank as very serious but rather a low grade nuisance.

The anti-social behaviour consists of groups loitering along the campshires which leads to intimidation for passing pedestrians and cyclists.

It was noted that there is currently an issue with organised fighting between local teenage groups and a drink and drug use problem along the campshires.

4.1.4 Characteristics of the Proposed Development

The proposed development consists of a new flood protection system, approximately 1.0km in length located on the south campshires of the River Liffey. The flood protection will extend from Butt Bridge to Samuel Beckett Bridge and across Sir John Rogerson’s Quay road just east of the new pedestrian crossing at Cardiff Lane.

The defence will, for the most part, consist of a new wall which will be approximately 900mm high and have a series of openings to allow access to the campshires and to Sean O’Casey pedestrian bridge. Lifting/swing flood gates will be installed at strategic openings along the flood defence. The proposed works will include the provision of new trees at several locations along the length of the campshires where there are currently gaps in the tree line. The proposed trees will match the existing trees and will have a similar canopy to those in the existing layout.

The location of the defence structures on the campshires varies throughout the length of the scheme to accommodate existing structures and uses.

The flood defence will return across Sir John Rogerson’s Quay, east of Cardiff Lane, in front of the McCann Fitzgerald Offices in the form a flood barrier which is erected only when extreme flood conditions are forecast.

The scheme will also incorporate an upgrade of the existing contraflow cycle track on the campshires and will provide for a two way on-road cycle track leaving the campshires available for improved pedestrian facilities. The provision of the new cycle track will result in the removal of 22 car parking places along Sir John Rogerson’s Quay between Creighton Street and Lime Street.

These proposals are in line with current planning policies including the Dublin City Development Plan 2005-2011, Dublin Docklands Development Area Masterplan, 2008, Docklands Campshire Vision, 2007 and the National Cycling Strategy which are detailed in section 2.0, Planning Policy Context.

Proposed design drawings and photomontages are included in Volume 3, showing the alignment of the proposed flood protection and typical sections along the campshires.
### 4.1.5 Potential Impacts of the Proposed Development

#### 4.1.5.1 Reduction of flood risk

The proposed development will result in the considerable reduction of risk of flooding to the flood cell that lies south of the River Liffey, outlined in section 1.2.

The object of the scheme is to reduce the likelihood of flooding which, if not reduced, will have a significant impact on the flood cell associated with the south campshires.

The scheme will provide flood protection from extreme high tides to a level of 3.7m above Malin Datum from Butt Bridge to beyond Cardiff Lane.

As outlined in section 1.2, the flood risk study carried out by the Dublin Coastal Flooding Protection Project (DCFPP) describes the risk to the flood cell south of the Liffey. The flood cell extends from Butt Bridge eastwards as far as the east end of Sir John Rogerson’s Quay. The cell extends southwards beyond Pearse Street east of Sandwith Street and almost reaches as far south as Grand Canal Street between Erne Street and Grand Canal Dock. The area at risk consists of approximately 32 hectares of the inner city and includes major streets and links such as Townsend Street, Lombard Street and Sandwith Street Lower, Pearse Street and Macken Street.

The DCFPP study and the subsequent Dublin City Council “SAFER” Project produced flood risk maps which show that there is a risk of up to 0.25m depth of flooding along Sir John Rogerson’s Quay to Georges Quay (based on future 200 year flood level of 3.13m OD Malin). These maps are referred to as SAFER (Strategies & Actions for Flood Emergency Response Management) Atlas Maps.

Flooding of the quays will put at risk a large area of the cell south of the Liffey where levels are lower than the quay wall in places resulting in accumulated flood water more than 1.5 m deep in certain areas within the flood cell. Refer to SAFER maps provided in Volume 3 for the extent and depth of flooding for a 1:200 year flood event.

The impacts of coastal flooding on existing property and infrastructure within the flood cell would be severe and would have very significant and long term consequences. The flood cell includes significant business, critical infrastructure, retail and densely populated residential areas, who will all benefit from the reduced flood risk.

The cell accommodates a large number of inhabited basement properties, which are extremely vulnerable to risk to life in addition to property and commercial damage.

With parts of the flood cell up to 1.5m below the existing quay wall, flooding of the area would result in serious risk to life within the cell.

The proposed South Campshire Flood Protection Project will minimise the above risks in accordance with Government and Dublin City Council Policies such as EU Floods Directive 2007, the OPW’s guidance on The Planning System and Flood Risk Management 2009, Dublin Coastal Flooding Protection Project 2005 and the Dublin City Development Plan 2005-2011, as outlined in section 2.0, Planning Policy Context.
4.1.5.2 Potential severance of pedestrian routes

The construction of a flood protection system will require the introduction of a barrier designed to a height which will provide the hinterland with protection against tidal flooding. To be effective, it will be essential to minimise the number of openings which will require manual sealing during a flood alert.

A balance between long term flood protection against extreme events and the daily use of the campshires is required, including permeability for pedestrians and cyclist through and along the campshires. It is considered that the proposed scheme best addresses this balance and provides a generous amount of permeability for campshire users.

4.1.5.3 Potential loss of Car Parking spaces

The proposed provision of a continuous two way cycle lane has an impact on car parking in a narrower section of Sir John Rogerson’s Quay. In this area, it will be necessary to remove 22 No. existing pay and display car parking spaces to ensure that the proposed cycle lane can be provided, while retaining a minimum carriageway width for other traffic.

In order to assess the impact of this proposed loss of car parking spaces, Dublin City Council Roads & Traffic Department carried out a car parking survey in the area.

The findings of this survey indicate that there is adequate residual car parking in the area and that the loss of this number of spaces on Sir John Rogerson’s quay would not be significant. See Appendix 13.0, Volume 4 for full copy of the car parking survey.

4.1.5.4 Potential impact on campshire festivals

Periods of exceptional crowd loading of the campshires during festivals were considered as part of this study. During these events specific crowd and traffic management procedures are designed and implemented by the event organisers in conjunction with the Gardai and other services.

The construction of the flood defence may restrict emergency exit routes from the campshire which are required during festive events.

4.1.5.5 Potential Impact on Cycling Facilities

There is an existing one way cycle lane incorporated into the campshire. This cycle lane is not integrated into other cycle routes along the south quays and cyclists are currently very poorly served by difficult to read and discontinuous cycle lanes.

A meeting with Dublin City Council Roads and Traffic Department was arranged for 14 October 2010 to review possible options. Following the meeting it was proposed to replace the existing cycle lane with a footpath and provide an enhanced two way cycle lane alongside the existing roadway, but segregated from the other traffic.
The design was supported by Dublin City Council Roads and Traffic Department at a follow up meeting on 2 November 2010 where they agreed to include the network as part of the overall strategy for cycle tracks in Dublin.

In addition to the above a Road Safety Audit and Accessibility Audit carried out as part of this assessment were complete on 30 November 2010. These reports are given in full in sections 8.0 and 9.0, Volume 4.

4.1.5.6 Potential reduction of ship berthing locations

If the flood defence structure is constructed along the quay edge it will lead to the loss of existing ship berthing points.

As noted in section 1.7, Consultation, Dublin Port Company required that, where possible, the wall be constructed at a set back distance from the quay to preserve such berthing locations.

It was also advised by Dublin City Council Planners and Steering Group team architects that the flood defence wall should be located away from the quay wall to maintain and enhance the unique river side nature of the campshires.

The policies of the Dublin City Development Plan 2005-2011, Dublin Docklands Development Area Masterplan, 2008 and Docklands Campshire Vision, 2007 each support connectivity to the River Liffey and promote activities along the waterfront, refer to Section 2.0, Planning Policy Context.

4.1.5.7 Potential impact on anti-social behaviour

The issue of anti-social behaviour was raised at consultation meetings with the DDDA on 12 January 2011 and the City Quay Residents on 2 March 2011.

It was suggested at these meetings that the proposed flood defence wall may offer opportunities for those already loitering in the area to sit on the proposed wall or hide behind it, thus exacerbating the current anti-social behaviour.

The linear nature of the campshires and the flood defence structure may also result in users of the campshires not being able to move laterally to avoid coming into contact with those engaging in anti-social behaviour.

The flood defence wall may also encourage graffiti artists to use the walls as their canvas.

4.1.5.8 Additional trees darkening the campshires

As outlined in section 1.7, Consultation, there were some concerns raised during the meeting with the City Quay Residents on 2 March 2011, that additional trees may darken the campshire.

It was suggested by a local resident that the provision of additional trees along the campshire could lead to the darkening of areas from public lighting which may again
encourage anti-social behaviour and the intimidation of passing pedestrians and cyclists.

4.1.6 Mitigation Measures

4.1.6.1 Reduction of flood risk

This is a positive impact and no mitigation measures are proposed.

4.1.6.2 Potential severance of pedestrian routes

The openings within the flood protection scheme have been carefully located and sized to minimise the impact of the protection system on pedestrians in the area. In particular north south movements of pedestrians at Sean O’Casey Bridge have been accommodated with a wider opening.

The protection structures have also incorporated a staggered alignment to accommodate east west pedestrian traffic. Using this staggered design, east west pedestrian traffic can be accommodated without significant deviation from the desire line.

The scheme will address the existing lack of definition of the pedestrian routes and cyclist routes which have been identified as leading to pedestrian / cyclist conflicts, particularly at Sean O’Casey Bridge.

Furthermore, the proposed change of use of the existing cycle lane on the campshire to a dedicated footpath results in a smooth continuous pedestrian friendly surface which is superior to the experience of walking on the existing cobbled areas.

While the long term uses of the B.J. Marine buildings has not be established at this time, the accessibility to the water side and to the gables of the buildings has been accommodated within the design of the protection structures.

4.1.6.3 Potential loss of Car Parking spaces

To accommodate the footpath and cycletrack upgrades along the campshires 22 No. car parking spaces will be removed along Sir John Rogerson’s Quay road.

Dublin City Council Roads and Traffic Department carried out a car parking survey in November 2010, to identify parking demand and to establish if the proposed lost parking spaces on Sir John Rogerson’s Quay can be reallocated within adjacent roads.

The survey showed that the 22 car parking spaces to be removed on Sir John Rogerson’s Quay can be accommodated within the existing parking system on the adjacent roads of Windmill Lane, Lime Street and Creighton Street.

As can be seen from table 4.1.2 below, there is adequate capacity to absorb the loss of the 22 parking spaces on the adjacent roads.
Table 4.1.2 Car Parking Survey

<table>
<thead>
<tr>
<th>Road</th>
<th>Total spaces</th>
<th>Maximum Spaces occupied at any one time</th>
<th>Total % usage</th>
<th>Residential occupancies</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sir John Rogerson’s Quay</td>
<td>22</td>
<td>8 (36%)</td>
<td>22.16%</td>
<td>3.42%</td>
</tr>
</tbody>
</table>

**Side Roads**

<table>
<thead>
<tr>
<th>Road</th>
<th>Total spaces</th>
<th>Maximum Spaces occupied at any one time</th>
<th>Total % usage</th>
<th>Residential occupancies</th>
</tr>
</thead>
<tbody>
<tr>
<td>Windmill Lane</td>
<td>33</td>
<td>5 (15%)</td>
<td>11.24%</td>
<td>43.82%</td>
</tr>
<tr>
<td>Lime Street West Side</td>
<td>23</td>
<td>9 (39%)</td>
<td>17.57%</td>
<td>0.00%</td>
</tr>
<tr>
<td>Lime Street East Side</td>
<td>20</td>
<td>15 (75%)</td>
<td>37.08%</td>
<td>0.00%</td>
</tr>
<tr>
<td>Creighton Street West Side</td>
<td>24</td>
<td>12 (50%)</td>
<td>43.94%</td>
<td>52.59%</td>
</tr>
<tr>
<td>Creighton Street East Side</td>
<td>15</td>
<td>7 (47%)</td>
<td>24.17%</td>
<td>38.79%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>115</strong></td>
<td><strong>25.80%</strong></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Refer to section 13.0, Volume 4 for the full car parking survey.

4.1.6.4 Potential impact on campshire festivals

The DDDA raised concerns in November 2010 regarding the alignment of the proposed flood defence and possible conflicts with the areas used for south campshire festival events. The issues concerned festival events such as the Tall Ships Festival and Maritime Festival and how the proposed flood defence wall would interact with the festival stalls.

Due to various design issues the wall element of the proposed development within these areas is located either at the back of the existing quay walls, effectively replacing the existing railing or, adjacent to the existing cycle track.

It is noted that when the wall is located along the line of the existing railing it has no affect on space available for festivals. This is the case for the area of campshire east of the ESB building at Creighton Street to the Samuel Beckett Bridge a length of some 400m.

The wall located within the remaining area of campshire from Talbot Memorial Bridge to Creighton Street (approx. 350m) will be within the tree lined strip that is the current cycle track. This area is used during festival events generally as an additional pedestrian route. This cycle track will be replaced with the wall and new footpath. Again it is not envisaged that space will be reduced but some stall locations may need to be adjusted to take advantage of the new wall.

The provision of a new 3m wide cycle track as part of the development has affectively widened the campshire. The use of this subject area will increase the festival area by 2000m²

Vehicular access required for festival set-up and maintenance, servicing ships and for emergency vehicles will need to be maintained. Vehicular access to the campshires is
currently limited due to the high number of trees or bollards lining the roadway. The proposed main point of access will be at the Sean O’Casey Bridge where a 6m wide clear opening is provided. In addition to this, 8 other openings of a minimum of 2m are provided for local access.

Michael Slattery & Associates have prepared the *Event Management Plan for the Docklands Maritime Festival* for 2010. This plan was reviewed in relation to crowd management, health and safety, access and egress. The plan indicates in section 4.1.2 that the estimated occupant capacity for City Quay area is 2,600 persons during festivals. It is further stated in section 4.1.3 that an aggregate emergency exit width in excess of 10m would be required to facilitate the egress of these occupants in this area.

The proposed development has 8 openings within this area with a total combined width of 27m. It is proposed that these opening will have an exit sign above them during festivals to assist festival crowds.

### 4.1.6.5 Potential Impact on Cycling Facilities

As this is a positive impact, no mitigation is proposed.

### 4.1.6.6 Potential reduction of ship berthing locations

Dublin Port Company require that the flood defence, downstream of Matt Talbot Bridge, be constructed away from the quay wall in order to maintain the quay edge for docking purposes. This requirement was, insofar as is possible, complied with as outlined hereunder.

The position of Dublin Port Company is consistent with the policies of Dublin City Council and Dublin Docklands Development Authority as evidenced by the fact that all three bridges constructed since the 1980s east of Matt Talbot Bridge have been constructed, at considerable additional cost, as opening bridges.

In order to ensure that this project does not result in the frustration of this policy, it is proposed to construct the flood defence away from the quay side unless this proves impossible.

The area where this was not feasible was along Sir John Rogerson’s Quay from the existing ESB Substation to a point east of Samuel Beckett Bridge.

The reasons for this are covered elsewhere but include:

- The requirement to protect the ESB sub station, being critical infrastructure, from flooding.
- The requirement of the DDDA as property owner that the existing campshire buildings (former B.J. Marine buildings) be protected from flooding and that this alignment be continuous between these buildings.
- The requirement to tie in with the abutment walls constructed both east and west of the Samuel Beckett Bridge as part of that bridge’s construction (in consultation with the bridge design team and Dublin City Council).
Following further discussions with Dublin Port Company regarding these difficulties encountered in aligning the flood defence in from the quay edge for the entire length of the campshire, Dublin Port Company confirmed that they were satisfied with the proposed alignment as outlined in section 1.7, consultation.

4.1.6.7 Potential impact on anti-social behaviour

The issue of anti-social behaviour was raised at consultation meetings and was confirmed by further consultation with the Gardai at Pearse Street Station. Details of these meetings are given in section 1.7, Consultation, and minutes of the meeting are included in section 17.0, Volume 4.

The Gardai confirmed that there is a recognised issue of anti-social behaviour in the area particularly around Sean O’Casey Bridge. They advised that the existing problem would not rank as very serious but rather as a low grade nuisance.

The Gardai confirmed that, in their professional opinion, the proposed flood defence would not impact in any significant way on the existing anti-social behaviour issue.

As a result of the concerns raised, a review of the document “Safer Places, The Planning System and Crime Prevention” was undertaken. The document was published by the UK office of the Deputy Prime Minister and is a useful guide indicating how planning has helped to deliver sustainable environments reducing crime and anti-social behaviour whilst offering advise on new developments.

The document indicates seven attributes of sustainable communities that are particularly relevant to crime prevention and reduction of anti-social behaviour which are listed below:

- Access and Movement
- Structure
- Surveillance
- Ownership
- Physical protection
- Activity
- Management and Maintenance

Each of the seven issues have been considered and are addressed within the design where appropriate. These can be summarised as follows:

Access and Movement:- As indicated within section 4.1.5, the need for a balance between the requirements for long term flood protection and the daily use of the campshire has had to be reached. Openings within the flood defence have been located to optimize their spacing and to accommodate desire lines for pedestrian...
permeability. This will ensure the correct balance of access and movement within the area whilst maintaining a robust flood defence.

Structure:- This is relating to the structure of the layout ensuring different users do not cause conflicts. The proposal as indicated has separated the existing cycle facilities from the pedestrian area and supplemented the pedestrian areas with a new direct footpath parallel to the road and new cycle track. This will remove the current cycle / pedestrian conflicts and provide a direct pedestrian route along the campshire which at present is missing from the current landscaping. Improving the structure of the campshire layout will create a safer environment for all users.

Surveillance:- The area of the campshire covered by the flood protection project are overlooked by numerous buildings facing the river over its length including residential, business and offices. As outlined in section 1.7, Consultation, local residents raised concerns over the proposed flood defence wall being used to obscure anti-social behaviour. A studded strip finish to the ground in front of the wall is proposed to deter people from lying or sitting down behind the wall out of site from surveillance.

The area is also visible by passing motorists and pedestrians. The construction of the flood defence, as can be seen from the proposed photomontages and described in section 4.7.5, has minimum impact on the existing surveillance of the area with the proposed flood defence wall at only 900mm in height. It is also considered that the increase of pedestrian and cycle users attracted to the area by the proposed structural improvements to the pedestrian and cyclist routes will further add to the existing passive surveillance in the area.

Ownership:- There is a certain sense of ownership within some areas of the project but these could be strengthened with collaboration of the local community and business. The project is limited within its scope to a flood defence so its ability to deliver additional improvements in this area are limited. The Dublin Docklands Development Authority have a vision for the campshires and as funding is made available the sense of ownership can be developed through cooperation with the local community, businesses and the implementation of their “Docklands Campshire Vision”. Great care has been taken to ensure the proposed scheme does not conflict with any current plans for the future and extensive consultation with the DDDA has been ongoing throughout the project in this regard.

Physical protection:- Despite the construction of a linear “wall” through the area, the flood defence element is relatively low at approximately 900mm high on average with numerous openings. The area will remain relatively open in nature and it is considered no additional security measures are required.

Activity: - The campshires are currently widely used area for pedestrians and it is expected with the improvements to the Georges Quay, the construction of the dedicated two way cycle track and improved pedestrian facilities, more people will use the area further reducing the risk of anti-social behaviour and increasing the sense of safety in the area.
Management and Maintenance: The proposed scheme has been designed to reduce to a minimum the need for management and maintenance. The flood defence element has been designed to deter those from walking or sitting on the wall and its finish to discourage graffiti. The scheme will blend into the existing landscape with limited maintenance requirements for the future.

It is considered that the introduction of a flood defence scheme in the area as proposed will not increase the current levels of anti-social behaviour. The improvement of the landscaping for both cyclists and pedestrians will increase its use by commuters and visitors to the area helping reduce anti-social behaviour in the area.

An integral objective of the design of the flood defence is to endeavour to achieve a design solution that would animate both the road and campshire side of the proposed flood defence wall and to ensure a generous provision of openings, encouraging movement and connections thus reducing the potential for isolated and cul-de-sac areas which in turn would reduce the potential for anti-social behaviour.

The flood defence structure is also designed with an angled top to discourage groups loitering and sitting on it.

A studded strip finish to the ground in front of the wall is also proposed to deter people from loitering and sitting down behind the wall, secreting themselves behind the wall, out of sight from the road.

It is also proposed to finish the flood defence wall with a finish that is non receptive to graffiti. As the proposed wall is only 900mm in height graffiti is not envisaged to be an issue.

4.1.6.8 Additional trees darkening the campshires

Local residents raised concerns at a consultation meeting on 2 March 2011, that additional trees may result in areas of the campshires being darkened with a reduction of public lighting.

The design team reviewed the issue and concluded that additional trees are only proposed within gaps along the current tree line and will not over darken any section of the campshire. The design team concluded the following:

- The proposed trees are in a single line, not in banks and are small with light canopies.
- View 7 of the photomontages in Volume 3 demonstrates the low impact the proposed trees will have on existing views, shading and in the creation out of site areas.
- The removal of some of the trees would weaken the continuity of the design approach.

The visual impact assessment detailed in section 4.7 also envisages no adverse visual impact from the proposed trees.
4.1.7 Residual Impacts

Some restrictions in north south access to the campshires will result. This is offset by the considered location of openings to accommodate pedestrians, provisions for disabled access and the inclusion of an enhanced cycle track within the scheme.

Some reduction to the flexibility of the use of the campshires for festival events will result. Pedestrians and traffic are managed for each individual event and are designed specifically to accommodate the event. Subject to adequate management of festival events the impact of the proposed development can be accommodated.

22 No. car parking spaces will be removed from Sir John Rogerson’s Quay road. These spaces can be accommodated within the surplus parking spaces on Lime Street, Windmill Lane and Creighton Street.

4.1.8 Monitoring

Monitoring of predicted high tide levels will be required to ensure that openings in the flood defence will be sealed ahead of possible flood tide levels arriving. This will be monitored and implemented by Dublin City Council.

It is also recommended that on-going policing of the area is maintained to ensure that existing and future anti-social behaviour in the area is addressed. The Garda Síochána has been notified and are aware of the current problem.

It is recommended that the uses of the campshires be monitored in the future to ensure that the openings and permeability provided meets with the development of the uses of the campshires. While the integrity of the flood protection system is paramount, all changes of the uses of the campshires in the future will require that the openings, locations and size, be reviewed as required to accommodate the use of the campshires.
4.2 Flora and Fauna

4.2.1 Introduction

Biosphere Environmental Services were commissioned by Moylan Consulting Engineers & Project Managers to carry out an assessment of the likely impacts on terrestrial ecology by the proposed South Campshire Flood Protection Project.

The work involved an assessment of terrestrial habitats, flora and fauna by field survey and literature review. Impacts of the proposed development are assessed and mitigation measures recommended as considered necessary. The assessment follows the Environmental Protection Agency’s Guidelines on the information to be contained in Environmental Impact Statements (EPA, 2002).

4.2.2 Research Methodology

A site survey of the entire section from Butt Bridge to beyond the Samuel Becket Bridge was carried out on 3rd October 2010. Habitats present were recorded and classified according to the system of Fossitt (2000). Observations were made on any other wildlife present.

During the survey, particular attention was given to the possible presence of habitats and/or species which are legally protected under Irish or European legislation (especially the Flora Protection Order 1999; Wildlife Act 1976; Wildlife Amendment Act 2000; EU Habitats Directive; EU Birds Directive).

The standard literature was checked for references to the site and locality, as were the listings and maps of sites of conservation importance in County Dublin held by the Department of the Environment, Heritage and Local Government (DoEHLG) (www.npws.ie).

Overall, no difficulties were encountered in compiling information on the flora and fauna of the study area.

4.2.3 Receiving Environment

4.2.3.1 Designated sites for nature conservation in area:

No part of the River Liffey within the study area is covered by a nature conservation designation. However, there are designated sites in the wider Dublin Bay area as follows:

**River Liffey**

- Royal Canal proposed Natural Heritage Area (pNHA) (code 02103) – includes all of the canal to the Spencer Dock basin.

- Grand Canal proposed Natural Heritage Area (pNHA) (code 02104) – includes the canal and canal basin.
North Dublin Bay

- North Dublin Bay candidate Special Area of Conservation (site code: 0206). Designated under the EU Habitats Directive, this site comprises the inner part of north Dublin Bay, the seaward boundary extending from the Bull Wall lighthouse across to the Martello Tower at Howth Head. The North Bull Island and the lagoons is the focal point of the site, with excellent examples of various estuarine habitats.

- North Bull Island Special Protection Area (site code 04006). Designated under Article 4 of the EU Birds Directive. This site comprises the inner part of north Dublin Bay, the seaward boundary extending from the Bull Wall lighthouse across to Drumleck Point at Howth Head. The North Bull Island SPA is internationally important for a number of waterbird species, namely Pale-bellied Brent Geese, Bar-tailed Godwit and Redshank. In addition, 14 other waterbird species regularly exceed the qualifying thresholds for national importance. The area also qualifies as an internationally important wetland for waterbirds under the Ramsar Convention on Wetlands of International Importance as it regularly supports over 20,000 individual waterbirds.

- North Bull Island Statutory Nature Reserves – two sites, one privately owned (118 ha), one state owned (1,318 ha). Both established September 1988. These two reserves, centred on the North Bull Island and including both lagoons, are of international scientific importance for botanical, ornithological, zoological and geomorphological interests.

- North Dublin Bay proposed Natural Heritage Area (site code: 0206). This site may be designated under the Wildlife Amendment Act 2000. Area and interests are the same as for the North Dublin Bay cSAC but also includes the area to the south of the Bull Wall and the Tolka Basin.

South Dublin Bay

- South Dublin Bay candidate Special Area of Conservation (code: IE0000210). Designated as a candidate Special Area of Conservation under EU Habitats Directive. The designated site comprises all of the intertidal area of south Dublin Bay. The seaward boundary is marked by the low tide mark, while the landward boundary is now almost entirely artificially embanked (sea walls, rock armour etc.). The site is selected specifically for several estuarine habitats.

- South Dublin Bay and River Tolka Estuary Special Protection Area (code IE0004024). Designated under the Birds Directive. It has been so designated because of its international importance for migratory waterbirds, including a number of species listed in Annex 1 of the Directive. The SPA has been specifically selected for the following species: Bar-tailed Godwit, Roseate Tern, Common Tern and Arctic Tern, all of which are listed in Annex I of the Directive. It is also selected for Pale-bellied Brent Goose, which occur in internationally important numbers. The site is also important for several other species of waders which occur in nationally important numbers, notably Oystercatcher,
Ringed Plover, Knot, Sanderling, and Dunlin. The site includes all of the intertidal area of south Dublin Bay, as well as the shallow marine zone. Also included are the ‘Dolphins’ in Dublin Docks (also a proposed Natural Heritage Area) – this breeding site for terns is situated at the entrance to Dublin port just off the old sewage works at Ringsend. It comprises two moorings (one derelict) used by Common and Arctic Terns (both Annex I Bird Directive species). The Common Tern population is of national importance.

- South Dublin Bay proposed Natural Heritage Area (code: 0210). Area and interests similar to the cSAC. May be designated under the Wildlife Amendment Act 2000.

4.2.3.2 Habitats, Vegetation and Flora

The study area comprises the area from the river wall to the public road. Virtually the entire area is of concrete or stonework and is classified as Buildings and artificial surfaces BL3. Apart from the western section along Georges Quay (between Butt Bridge and Matt Talbot Bridge), which has a concrete and tarmacadam surface, much of the area has been upgraded in recent years with reworked cobble stones and paving slabs a feature (complementing the granitic finish along the river edge). The recently upgraded areas are almost entirely free of colonising ‘weedy type’ vegetation. Along Georges Quay, some weedy plant species have colonised the strip between the edge of the river wall and the railing (c.20 cm wide) – species present include dandelion (Taraxacum spp.), chickweed (Stellaria media), willowherb (Epilobium spp.), groundsel (Senecio vulgaris), two plants of bitter stonecrop (Sedum acre) and young buddleia plants. The river wall is free of vegetation though there is a smooth covering of green algae at the water level.

Large numbers of trees have been planted in recent years and can be classified as strips of immature woodland WS2. These appear to be young limes (Tilia spp. or cultivar) and are mostly less than 5-6 m in height. Four alder type trees (Alnus spp.) occur along the western approach to the Beckett bridge.

4.2.3.3 Fauna

No mammal species were recorded within the study area or would be expected to occur due to the nature of the habitats present. Brown rats Rattus norvegicus are in the general area and may on occasions traverse the area.

The artificial surfaces do not provide useful habitat for birds, though species such as gulls (especially black-headed gull Larus ridibundus) and even cormorant (Phalacrocorax carbo) at times rest along the edge of the river wall (personal observations of writer). At the time of survey, one grey heron (Ardea cinerea) was roosting on the steps within the river wall.

The trees are still too young to support any nesting birds.
4.2.3.4 Assessment of ecological importance of survey area

The habitats within the study area are all artificial in origin and are not of any conservation importance. Further, the habitats do not support any notable species of flora and fauna.

Within a wider context, there are a substantial number of sites of high nature conservation associated with the greater Dublin Bay complex.

Plate 4.2.1  The surface along George’s Quay is concrete and tarmacadam. Some weedy plant species occur between the railings and edge of river wall.
Plate 4.2.2  The majority of the surface has been upgraded recently using cobble stones and paving. Large numbers of young trees are present.

Plate 4.2.3  The river wall does not support any plant growth other than green algae at the water line.
4.2.4 Characteristics of the Proposed Development

The proposed development is described in detail elsewhere (section 3.2). Briefly, it consists of a new flood defence system, approximately 1.0 km in length located on the south campshires of the River Liffey. The flood defence will extend from Butt Bridge to Samuel Beckett Bridge and across Sir John Rogerson’s Quay road just east of the new pedestrian crossing at Cardiff Lane.

The defence will, for the most part, consist of a new wall which will be approximately 900mm high and have a series of openings to allow access to the campshires. These openings will be provided with flood gates which will be closed during extreme weather conditions when there is a risk of tidal flooding.

The project involves the removal of approximately six existing young trees and the planting of approximately 40 trees along the length of the campshires.

The project will also incorporate an upgrade of the existing cycle track and improvement of pedestrian facilities.

4.2.5 Potential Impacts of the Proposed Development

Construction phase

The proposed development will involve loss of existing habitats where construction works occur – as these habitats are not of any ecological interest in the first place, this impact is not of significance.

No particular species of flora or fauna will be affected directly by the works.

The planting of additional trees will be a positive impact (albeit of minor conservation value).

As with any construction works close to a watercourse, there is some risk of potentially polluting substances (such as concrete run-off) reaching the water. While such substances could be carried downstream towards the various sites designated for nature conservation, it is considered that the risk of adverse impacts on the interests of the designated sites is very low due to the high dilution that would be expected. Nevertheless, measures will need to be enforced to prevent possible pollution incidents during the course of construction.

Apart from this possible risk of potential pollutants entering the River Liffey and making their way downstream, the proposed scheme would not have any impacts on the areas designated for nature conservation in Dublin Bay.

Operational phase

Once constructed, the development would not be expected to have any adverse impacts on the habitats or flora and fauna in the area.
4.2.6 Mitigation Measures

Construction Phase

As already noted, measures are required to be implemented during the construction period to ensure that potentially polluting substances do not enter the River Liffey.

Operational Phase

No particular mitigation measures are considered necessary relating to the habitats affected directly by the proposed works.

4.2.7 Residual Impacts

It is considered that the proposed project would not have any residual impacts on the ecological interests of the area.

4.2.8 Monitoring

Owing to the absence of features of ecological interest, monitoring is not considered necessary during the construction period or afterwards.
4.3 Soils, Geology and Hydrology

4.3.1 Soils

4.3.1.1 Introduction

This section on soils has been prepared by Moylan Consulting Engineers for the proposed South Campshire Flood Protection Project.

The existing soils within the study area are reviewed, the potential impacts of the proposed development are assessed and the mitigation measures to minimise the impact of the development on soils are proposed.

4.3.1.2 Research Methodology

Data for the subject lands was collected initially through a desktop study. Published data relating to the soils of the site and surrounding area was reviewed. The documents cited include:

- Geological Survey of Ireland – Bedrock Geology Sheet
- Geological Survey of Ireland – Subsoil Sheet
- Geological Survey of Ireland – Quaternary Geological Sheet
- Geological Survey of Ireland – Unconsolidated Sediments
- Geological Survey of Ireland – Bedrock Aquifer
- Geological Survey of Ireland – Ground Water Protection Areas

This information was augmented by a geotechnical site investigation carried out on the subject site. This site investigation study was carried out by Ground Investigations Ireland Ltd. in June 2010.

The investigation comprised the excavation of eleven trial pits and twelve slit trenches along the length of the campshires.

Information and soil samples gathered during the site investigation went forward for laboratory analysis by Jones Environmental Laboratory.

The results of the site investigation were included in a geotechnical report prepared by Ground Investigations Ireland Ltd, Report on Site Investigation for the South Campshire Flood Protection Project, Dublin dated 24 November 2010. The full geotechnical report is included in section 6.0, Volume 4.

Reference was also made to a site investigation carried out by IGSL under instruction of Barrett Mahony Consulting Engineers on behalf of DDDA in August 2006.

Archaeological monitoring of the site investigation works was undertaken by Margaret Gowen & Co. Ltd., who prepared a report Archaeological Monitoring Site Investigations, Liffey Flood Defences, South Quays, Dublin. This report accompanies the Site Investigation report in section 7.0, Volume 4.
4.3.1.3 Receiving Environment

The Liffey valley at this location consists of a thick sequence (up to 40m thick) of postglacial intertidal and estuarine deposits overlying a basal glacial till which in turn overlies limestone bedrock.

A borehole drilled by IGSL Ltd., as part of the site investigation in the vicinity of the B.J. Marine buildings identified made ground to a depth of 4 m overlying medium dense grey brown sandy gravel overlying very soft grey black peaty silt to a depth of approximately 12m. This silt in turn overlies gravels and a 2 m layer of black brown sandy gravelly clay. The borehole was terminated at an obstruction at a depth of 14m.

The campshires themselves are built on reclaimed land, as, is much of Dublin Docklands. The geotechnical investigation carried out by Ground Investigations Ireland Ltd. identified the subsurface conditions encountered as varied fill material mostly a gravelly sand with varied inclusions with mainly brick fragments, ceramic fragments and timber fragments.

Data from the slit trenches (1.5m to 2.0m deep) excavated as a part of the site investigation indicates that the subsoil is modern infill and post medieval reclamation deposits.

The surface of the campshires consists generally of modern paving with occasional areas of traditional cobbles.

Twenty soil samples selected on site were tested for pH and Sulphate Values as well as the Murphy Suite of contaminants. The full results of the laboratory testing are included in section 6.0, Volume 4 of this EIS.

The results of the laboratory tests are compared to the values contained in the European Council Directive 1999 131/EC Article 16 Annex II Criteria and Procedure for Acceptance of Waste at Landfills which lays down guidelines for classification of waste as “Inert”, “Non Hazardous” and “Hazardous”.

4.3.1.4 Characteristics of the Proposed Development

The proposed development is described in detail in section 3.2. It consists of a 1.0 km of flood defence system comprising principally of a low wall approximately 900mm high, on the south campshires of the River Liffey. The extent of the scheme is from Butt Bridge in the west to Samuel Beckett Bridge in the east and across the Sir John Rogerson’s quay just east of the new pedestrian crossing at Cardiff Lane.

The flood defence works will also incorporate an upgrade of the existing cycle track, improvement of pedestrian facilities and the provision of additional tree planting along the length of the campshires.

In terms of soils, the proposed development will involve the excavation of the subsoil to a depth of approximately 1.0m to 1.5m for the construction of foundations to the protection structures. Surplus subsoil from excavations will be removed and disposed of off site to an approved waste disposal facility.
4.3.1.5 Potential Impact of the Proposed Development

Construction Phase:

The impact of the proposed development on the sub soils within the site is limited to the impact excavation works associated with the construction of foundations.

The removal of sub soils from the site to accommodate the foundations may lead to the risk of spillage of soils on finished surfaces, into the river Liffey and on public roads in the area of the site.

Operational Phase

There are no significant impacts on the surrounding soil environment during operation of the flood protection.

4.3.1.6 Mitigation Measures

Construction Phase

Surplus material will be collected for disposal in an approved waste disposal facility and will be transported in covered tipper trucks to reduce the risk of spillage on the public roads.

To reduce the quantity of soil to be removed from or imported into the site, the extent of excavation will be kept to a minimum.

Operational Phase

There are no mitigation measures required for the operational phase.

4.3.1.7 Residual Impacts

Construction Phase

Taking into account the relatively minor amount of excavated subsoil required it is envisaged that there shall be no significant impact on the soil environment.

On completion of the construction phase of the development the surface will be reinstated and there will be no impacts on soils arising from the operational phase.
4.3.1.8 Monitoring

Construction Phase

Monitoring during the construction phase is recommended, in particular, in relation to the following:

- Supervision of excavation levels to ensure minimum required excavation.
- Adequate protection from contamination of soils for removal.
- Monitoring cleanliness of the adjoining road and campshire.

Operational Phase

No monitoring of the operation phase is required.

4.3.2 Geology

4.3.2.1 Introduction

This section has been prepared by Moylan Consulting Engineers. The Geology within the site area is reviewed and the potential impacts the proposed development will have on the underlying geology is assessed.

4.3.2.2 Research Methodology

Geological data for the subject lands was collected through a desktop study. Published data relating to the geology of the site and surrounding area was reviewed. The documents cited include:

- Geological Survey of Ireland – Bedrock Geology Sheet
- Geological Survey of Ireland – Subsoil Sheet
- Geological Survey of Ireland – Quaternary Geological Sheet
- Geological Survey of Ireland – Unconsolidated Sediments
- Geological Survey of Ireland – Bedrock Aquifer
- Geological Survey of Ireland – Ground Water Protection Areas

Reference was also made to a borehole which was drilled to a depth of 14m as part of a site investigation carried out by IGSL under instruction of Barrett Mahony Consulting Engineers on behalf of DDDA in August 2006.

4.3.2.3 Receiving Environment

Information from the Geological Survey of Ireland indicates that the underlying bedrock is Calp limestone.

The Calp limestone bedrock is estimated to be up to 800m thick. The homogeneous sequence consists of dark grey massive limestones, shaley limestones, and massive
mudstones and cherts are also common. The average bed thickness is less than 1 metre, but these normally thin-bedded lithologies can reach thicknesses of 2 metres or more.

Central Dublin bedrock is totally obscured by the overlying glacial and postglacial deposits.

The Superficial Deposits in the Liffey channel downstream of Butt Bridge contains a thick sequence (up to 40m thick) of postglacial intertidal and estuarine deposits overlying a basal glacial till.

4.3.2.4 Characteristics of the Proposed Development

The characteristics of the proposed development are described in detail in Section 3.2. It consists of a 1.0 km of flood defence system on the south campshires of the River Liffey, extending from Butt Bridge to Samuel Beckett Bridge and across Sir John Rogerson’s quay just east of the new pedestrian crossing at Cardiff Lane. The proposed protection structure will consist generally of a wall approximately 900mm on the campshires.

The flood defence works will also incorporate an upgrade of the existing cycle track, improvement of pedestrian facilities and the provision of additional tree planting along the length of the campshires.

The development consists entirely of surface works with foundations to a depth of approximately 1.0 to 1.5 metres and no deep excavations below the subsoils are envisaged.

4.3.2.5 Potential Impact of the Proposed Development

Construction Phase

Construction of the development involves the excavation of trenches for foundations to a depth of approximately 1 metre and these excavations will not impact on the geology of the area.

Operational Phase

There are no significant impacts on the surrounding geology environment during operation of the flood protection.

4.3.2.6 Mitigation Measures

No mitigation measures are required or proposed.
4.3.2.7 Residual Impacts

Construction Phase

There will be no residual impact from the proposed development on the geology of the area.

Operational Phase

There will be no residual impact from the proposed development on the geology of the area.

4.3.2.8 Monitoring

Construction Phase

No monitoring of the geology is required or proposed.

4.3.3 Hydrology

4.3.3.1 Introduction

This section on soils has been prepared by Moylan Consulting Engineers for the proposed South Campshire Flood Protection Project.

The potential impacts of the proposed development are assessed and the mitigation measures to minimise the impact of the development on ground water are proposed.

4.3.3.2 Research Methodology

Data for the subject lands was collected initially through a desktop study. Published data relating to the soils of the site and surrounding area was reviewed. The documents cited include:

- Geological Survey of Ireland – Bedrock Geology Sheet
- Geological Survey of Ireland – Bedrock Aquifer
- Geological Survey of Ireland – Ground Water Protection Areas

This information was augmented by a geotechnical site investigation carried out on the subject site. This site investigation study was carried out by Ground Investigations Ireland Ltd. in June 2010.

The investigation comprised the excavation of eleven trial pits and twelve slit trenches along the length of the campshires.

The results of the site investigation were included in a geotechnical report prepared by Ground Investigations Ireland Ltd, Report on Site Investigation for the South Campshire
**Receiving Environment**

The National Draft Bedrock Aquifer Map describes the bedrock in the area as Locally Important Aquifer Bedrock which is moderately productive only in local zones.

The site investigation carried out by IGSL included drilling of a borehole to a depth of 14.0 m. This borehole recorded a water strike at 2.5 m and noted that the water rose to a depth of 2.0 m below surface level.

Eleven trial pits were excavated by Ground investigations Ireland in 2010. These pits were excavated to a depth of 2.0 m and no ground water was encountered in any of these trial pits or slit trenches. It is noted however that the excavations did not remain open for long enough to determine the ground water level which in some areas may be less than two meters below ground level.

**Characteristics of the Proposed Development**

The proposed development is described in detail in Section 3.2. It consists of a 1.0 km of flood defence system on the south campshires of the River Liffey, extending from Butt Bridge to Samuel Beckett Bridge and across Sir John Rogersons quay just east of the new pedestrian crossing at Cardiff Lane.

The proposed development consists principally of a wall along the campshires approximately 900mm high.

The flood defence works will also incorporate an upgrade of the existing cycle track, improvement of pedestrian facilities and the provision of additional tree planting along the length of the campshires.

In terms of ground water the proposed development will involve the excavation of the subsoil to a depth of approximately 1.0 m to 1.5 metres for the construction of foundations to the protection structures.

**Potential Impact of the Proposed Development**

The proposed development involves the construction of shallow foundation structures which are generally above the level at which ground water is expected.

**Construction Phase**

During the construction phase there is a risk of contamination of ground water is the area as a result of accidental discharges or spillage of:

- Oils or fuels from plant or equipment
- Spillages of construction chemicals
- Washout from concrete trucks

**Operational Phase**

During the operations phase the development will have no impact on the ground water in the area.

**4.3.3.6 Mitigation Measures**

**Construction Phase**

All refuelling points will be located within bunded areas to ensure that all spillages from fuel storage tanks or from refuelling operations are confined and do not drain to ground.

Site management procedures prohibiting the washout of concrete trucks on site or on the public roads adjoining the site will be implemented and enforced.

Construction management procedures will include measures for remediation of any chemical spillages in the unlikely event that a spillage occurs.

**Operational Phase**

No mitigation measures are required or proposed.

**4.3.3.7 Residual Impacts**

**Construction Phase**

There is a risk of accidental spillage of oils, fuels or construction chemicals. However if the mitigation measures proposed are implemented the risk of contamination of the ground water from these sources will be minimised.

**4.3.3.8 Monitoring**

**Construction Phase**

Site monitoring will be undertaken by the Contractor during the course of the construction works.
4.4 Water

4.4.1 Water Supply

4.4.1.1 Introduction

This section has been prepared by Moylan Consulting Engineers for the proposed South Campshire Flood Protection Project.

The section reviews the existing water supply network, assesses potential impacts the proposed development will have on the local water supply network and sets out mitigation measures to minimise the impact on the water supply and surrounding environment.

4.4.1.2 Research Methodology

Data for the subject lands was collected through:

- Desktop study
- Site visits
- Review of records and meetings with Dublin City Council
- Site Investigation including underground services

Published data relating to the site and surrounding areas was reviewed. The documents cited include:-

- Dublin City Council Water Supply Layout
- Dublin City Council Water Services Division, Code of Practise for the Laying of Distribution Watermains, 2009
- EPA – The Quality of Drinking Water in Ireland, A Report for the Years 2007-2008
4.4.1.3 Receiving Environment

The existing watermain layout based on Dublin City Councils Water Services records is shown below on Figure 4.4.1.

Figure 4.4.1 Existing Watermain Layout

The existing watermain layout records were provided by Dublin City Council Water Services Division.

A site investigation was carried out in June 2010 by Ground Investigations Ireland Ltd. The investigation included a number of trial holes, slit trenches and Ground Penetration Radar to identify existing services including watermains.

The results of the site investigation were used to cross-check Dublin City Council’s watermain records and the layout was adjusted as necessary to match the information from the site investigation. The following is a brief description of the watermain layout within the campshires:

- A 250mm diameter watermain is located along George’s Quay road from Tara Street eastwards to Moss Street. There are 4 No. duck foot hydrants located on the south campshire connected to this main between Butt Bridge and Matt Talbot Bridge.

- Two number 250mm watermain cross the east side of Matt Talbot Bridge.

- The 250mm diameter watermain continues eastwards along Georges Quay and City Quay between Matt Talbot Bridge and Sean O’Casey Bridge. A 150mm diameter watermain loops from this 250mm main and is located along the south campshire parallel and adjacent to the proposed flood protection wall. There are 5 No. Hydrants located near the quay wall within this section.

- The 150mm watermain loop continues along the south campshire as far as the ESB Building where it feeds another hydrant before turning south under a proposed swing/lift gate and linking back into the 250mm diameter watermain in the City Quay roadway.
The 250mm watermain continues eastwards under the roadway along Sir John Rogerson’s Quay past the two B.J. Marine buildings and beyond the Samuel Beckett Bridge. A further 6 duckfoot hydrants located on the south campshire link to the main along this section of the site.

Refer to Drawing P181 in Volume 3 for the proposed flood protection overlaid onto the existing watermain layout.

**4.4.1.4 Characteristics of the Proposed Development**

The proposed development is described in detail in Section 3.2. It consists of a 1.0 km of flood protection system on the south campshires of the River Liffey, extending from Butt Bridge to Samuel Beckett Bridge and across the quay road just east of the new pedestrian crossing at Cardiff Lane.

The defence will, for the most part, consist of a new wall approximately 900mm high with a series of openings to allow access to the campshires and to Sean O’Casey pedestrian bridge. Lifting/swing flood gates will be installed at strategic openings along the flood defence.

Drawings included in Volume 3 show the alignment of the proposed flood protection, typical sections along the campshires, proposed upgrading of the existing cycle tracks and the provision for new trees.

Underground works which may impact on the water supply systems in the area are limited to the excavation of foundations approximately 1.0m to 1.5m deep.

**4.4.1.5 Potential Impact of the Proposed Development**

**Construction Phase**

During the construction of the flood protection along the south campshires there will be some impact on the existing water supply system where the proposed protection structure crosses and conflicts with existing watermains and apparatus.

Depending on the depth of foundation of the flood protection foundations and the depth of the watermains at the points of conflict there will be lengths of watermains that require relaying at a lower depth or realigning locally. The areas of possible impact are noted at the following locations:

- 140 meters length of 250m diameter watermain plus 4 number duckfoot hydrants on George’s Quay campshire between Butt Bridge and Matt Talbot Bridge
- 90 meters length of 150m diameter watermain plus 2 number duckfoot hydrants on City Quay campshire between Matt Talbot Bridge and Prince’s Street
- 150m diameter watermain in front of the ESB substation
- Watermain serving the hydrant to the east of the B.J. Marine building (west)
- 2 watermains serving the hydrants to the B.J. Marine building (east)
- 1 hydrant at the quay wall 45m east of the Samuel Beckett Bridge
• 150mm watermain within the south footpath of Sir John Rogerson’s Quay approximately 35 meters east of Cardiff Lane

These impacts will result in the relaying and/or realigning of existing watermains locally to make way for the flood protection structure, in particular to avoid the foundation of the flood protection walls or flood gates.

**Operational Phase**

Following completion of the works there are no impacts envisaged on the water supply network as a result of the development.

**4.4.1.6 Mitigation Measures**

Due care has been taken in the design of the alignment and type of flood protection structure to minimise the impact on existing services, including watermains within the south campshires.

Existing watermain layouts were received from Dublin City Council Water Services Division prior to design of the alignment and type of flood protection structure. Refer to figure 4.4.1 and drawing P181 in Volume 3 for the existing watermain layout.

Ground Investigations Ireland Ltd. carried out a site investigation including several slit trenches, trial pits and utility detection procedures along the campshires. These investigations were used to confirm the alignment and depth of services, including watermains along the south campshires. Refer to section 6.0, Volume 4 for the Site Investigation report and relevant drawings.

All excavations in the vicinity of known watermains will be hand dug.

Any relaid watermains will be cleaned by swabbing and chlorination and tested in accordance with the requirements of Dublin City Council Water Division, Code of Practise for the Laying of Distribution Watermains, 2009 and all reconnections to the existing network will be carried out under Local Authority supervision. This will limit the possibility of contamination from unclean pipe work and the likelihood of leaks.

In addition to the above testing and supervision, all water mains will be constructed with marker tape above the mains to reduce the risk of damage to pipes during any possible future construction or maintenance work.

**4.4.1.7 Residual Impacts**

**Construction Phase**

Minimum residual impacts are envisaged for the water supply in the area. There will be local disruption to the existing watermain during construction of parts of the flood protection structure.
The disruptions to the mains would be short term and these mains would be reinstated as the works proceed. Hydrants along the south campshires will be temporarily cut off from water supply during the works.

Operational Phase

There are no residual impacts envisaged to the water supply during the operational phase.

4.4.1.8 Monitoring

The relaying of any watermains will be monitored under the supervision of Dublin City Council Water Services Division and authorised experienced Engineers. No monitoring of watermains other than normal maintenance is required.

4.4.2 Waste Water Drainage

4.4.2.1 Introduction

This section has been prepared by Moylan Consulting Engineers for the proposed South Campshire Flood Protection Project.

The section reviews the waste water drainage network, assesses potential impacts the proposed development will have on the network and sets out mitigation measures to minimise the impact on the waste water system and surrounding environment.

4.4.2.2 Research Methodology

Data for the subject lands was collected through:

- Desktop study
- Site Visits
- Review of records and meetings with Dublin City Council
- Site Investigation including underground surveys

Published data relating to the site and surrounding areas was reviewed. The documents cited include:-

- Dublin City Council Drainage Records
- Greater Dublin Regional Code of Practice for Drainage Works, Version 6.0
- Greater Dublin Strategic Drainage Study
4.4.2.3 Receiving Environment

The existing drainage layout is shown below on Figure 4.4.2.

The existing waste water layout records were provided by Dublin City Council Drainage Division.

A site investigation was carried out in June 2010 by Ground Investigations Ireland Ltd. The investigation included a number of trial holes, slit trenches and Ground Penetration Radar to identify existing services including drainage pipes.

The results of the site investigation were used to validate Dublin City Council’s drainage records and the layout was adjusted as necessary. The following is a brief description of the waste water layout within the campshires:

- There is an existing 300mm diameter combined waste water sewer located in George’s Quay along the south side of the roadway from Moss Street past Tara Street.

- From Moss Street a 225mm/300mm diameter combined waste water sewer flows eastwards along the south side of City Quay road as far as Creighton Street before turning southwards heading down Creighton Street. This combined sewer also serves a 225mm diameter combined waste sewer which extends eastwards beyond Wind Mill Lane.

- A 225mm diameter combined waste sewer flows eastwards along the south side of Sir John Rogerson’s Quay road from Lime to Cardiff Lane where it joins a combined sewer which turns south heading down Cardiff Lane.

Refer to drawing 4.2.1 for the proposed flood protection overlaid onto the existing drainage layout and drawing P182 in Volume 3.
4.4.2.4 Characteristics of the Proposed Development

The characteristics of the proposed development are described in detail in Section 3.2 of this EIS. In general terms the development consists of a 1.0 km of flood protection system on the south campshires of the River Liffey, extending from Butt Bridge to Samuel Beckett Bridge and return across Sir John Rogersons quay just east of the new pedestrian crossing at Cardiff Lane. The defence will, for the most part, consist of a new wall approximately 900mm high.

The flood protection works will also incorporate an upgrade of the existing cycle track, improvement of pedestrian facilities and the provision of additional tree planting along the length of the campshires.

Drawings included in Volume 3 show the alignment of the proposed flood protection, typical sections along the campshires, proposed upgrading of the existing cycle tracks and the provision for new trees.

Underground works which may impact on the waste water drainage systems in the area are limited to the excavation of foundations approximately 1.0m to 1.5m deep.

4.4.2.5 Potential Impact of the Proposed Development

Construction Phase

During the construction of the flood protection along the south campshires there will be some impact on the existing waste water network where the proposed protection structure crosses the existing waste water sewers.

These impacts will result in the protection of existing waste water sewers locally where required. In particular as the foundation of the flood protection wall and/or swing/lift gate cross existing sewers.

Proposed works to the footpath and cycletrack along the length of the works area is mainly resurfacing and marking, and will not affect the structure of the underlying drainage. In addition some manhole covers may need to be replaced / upgraded or adjusted to suit.

Operational Phase

High water levels in the Liffey will give rise to the surcharging of foul and combined sewers which would provide a flow route through the flood defence and result in surcharged flooding of the areas south of the campshires and proposed flood protection.
4.4.2.6 Mitigation Measures

Construction Phase

Due care has been taken in the design of the alignment and type of flood protection structure to minimise the impact on existing services, including waste water sewers within the south campshires.

Existing drainage layouts were received from Dublin City Council Drainage Division prior to design of the alignment and the types of flood protection structures. Refer to drawings in Volume 3 for the existing layout overlaid onto the proposed flood protection structure.

Ground Investigations Ireland Ltd. carried out a site investigation including several slit trenches, trial pits and utility detection procedures along the campshires. These investigations were used to confirm the alignment and depth of services, including waste water sewers along the south campshires. Refer to Volume 4 for the Site Investigation report and drawings.

Any relaid pipes will be tested in accordance with the requirements of Greater Dublin Regional Code of Practice for Drainage Works, Version 6.0 and all reconnections to the existing network will be carried out under Local Authority supervision. This will limit the possibility of damaged drainage pipes.

All existing overflow connections that pentrate through the existing quay wall will be be sealed or closed off by non return valves to prevent surcharging of these pipes during times of high tide.

4.4.2.7 Residual Impacts

Construction Phase

Minimum residual impacts are envisaged for the waste water network in the area. There may be local disruption to the existing network during construction of parts of the flood protection structure.

Any disruptions to the waste water system would be short term and foul water pipes would be reinstated as the works proceed.

Operational Phase

The proposed development will provide flood protection from high tides in the Liffey up to 3.7m above Malin head. These floods waters would otherwise flood the flood cell to the south of the Liffey and will lead to overloaded foul water pipes.

The installation of non return valves on river overflows will prevent water entering the flood cell via the waste water drainage networks as river water levels rise.
4.4.2.8 Monitoring

Any works to existing sewers will be monitored under the supervision of Dublin City Council Drainage Division.

Following the completion of the construction works no monitoring other than normal maintenance is required.
4.4.3 Surface Water Drainage

4.4.3.1 Introduction

This section has been prepared by Moylan Consulting Engineers for the proposed South Campshire Flood Protection Project.

The section reviews the surface water drainage network, assesses potential impacts the proposed development will have on the network and sets out mitigation measures to minimise the impact on the surface water system and surrounding environment.

4.4.3.2 Research Methodology

Data for the subject lands was collected through:

- Desktop study
- Site Visits
- Review of records and meetings with Dublin City Council
- Site Investigation including underground surveys

Published data relating to the site and surrounding areas was reviewed. The documents cited include:

- Dublin City Council Drainage Records
- Greater Dublin Regional Code of Practice for Drainage Works, Version 6.0
- Greater Dublin Strategic Drainage Study

4.4.3.3 Receiving Environment

The existing surface water drainage layout is shown below on figure 4.4.3.

The existing surface water layout records were provided by Dublin City Council Drainage Division.
A site investigation was carried out in June 2010 by Ground Investigations Ireland Ltd. The investigation included a number of trial holes, slit trenches and Ground Penetration Radar to identify existing services including drainage pipes.

The results of the site investigation were used to validate Dublin City Council’s drainage records and the layout was altered as necessary. The following is a brief description of the foul water layout adjusted within the campshires:

There are 6 number surface water outfalls from the campshires to the River Liffey along the length of the subject site identified on these drawings. Some of these outfalls are from combined sewers and are located at the following locations:

- Mid way between Butt Bridge and Matt Talbot Bridge - Surface water outfall
- West side of the ESB Substation - Surface water outfall
- East side of the ESB Substation - Overflow from combined sewer
- West side of B.J. Marine Building (east) - Surface water outfall
- Between B.J. Marine Building (east) and the Samuel Beckett Bridge - Surface water outfall
- East of the Samuel Beckett Bridge opposite Cardiff Lane - Overflow from combined sewer

Refer to Drawing P182 in Volume 3 for the proposed flood protection overlaid onto the existing drainage layout.

4.4.3.4 Characteristics of the Proposed Development

The proposed development is described in detail in Section 3.2. It consists of a 1.0 km of flood protection system on the south campshires of the River Liffey, extending from Butt Bridge to Samuel Beckett Bridge and across Sir John Rogersons Quay just east of the new pedestrian crossing at Cardiff Lane.

The defence will, for the most part, consist of a new wall which will be approximately 900mm high and have a series of openings to allow access to the campshires and to Sean O’Casey pedestrian bridge. Lifting/swing flood gates will be installed at strategic openings along the flood defence.

The flood protection works will also incorporate an upgrade of the existing cycle track, improvement of pedestrian facilities and the provision of additional tree planting along the length of the campshires.

Drawings included in Volume 3 show the alignment of the proposed flood protection, typical sections along the campshires, proposed upgrading of the existing cycle tracks and the provision for new trees.

Underground works which may impact on the storm water drainage systems in the area are limited to the excavation of foundations approximately 1.0m to 1.5m deep.

new pedestrian crossing at Cardiff Lane.
4.4.3.5 Potential Impact of the Proposed Development

Construction Phase

During the construction of the flood protection along the south campshires there will be some impact on the existing surface water system, in particular where the flood protection crosses over the 6 outfall pipes outlined in section 4.4.3.3.

These impacts will involve the protection of existing surface water sewers.

Proposed works to the footpath and cycle track along the length of the works area is mainly resurfacing and marking, and will not affect the structure of the underlying drainage. In addition some manhole covers may need to be replaced / upgraded or adjusted to suit.

Operational Phase

Surface water drainage across the campshires will be impeded by the proposed flood protection in areas.

High water levels in the Liffey will give rise to the surcharging of surface water sewers which would provide a flow route through the flood defence and result in surcharged flooding of the areas south of the campshires and proposed flood protection.

4.4.3.6 Mitigation Measures

Construction Phase

Due care has been taken in the design of the alignment and type of flood protection structure to minimise the impact on existing services, including surface water pipes within the south campshires.

Existing drainage layouts were received from Dublin City Council Drainage Division prior to design of the alignment and the types of flood protection structures. Refer to drawing 4.4.3 for the existing layout overlaid onto the proposed flood protection structure.

Ground Investigations Ireland Ltd. carried out a site investigation including several slit trenches, trial pits and utility detection procedures along the campshires. These investigations were used to confirm the alignment and depth of services, including surface water pipes along the south campshires. Refer to Volume 4 for the Site Investigation report and drawings.

Any affected pipes will be cleaned and tested in accordance with the requirements of Greater Dublin Regional Code of Practice for Drainage Works, Version 6.0 and all connections to the existing network will be carried out under Local Authority supervision. This will limit the possibility of damage to existing sewers.

All surface water sewers that penetrate through the quay wall will be be sealed or closed off by non return valves to prevent surcharging of these pipes during times of high tide.
4.4.3.7 Residual Impacts

Construction Phase

Minimum residual impacts are envisaged for the surface water pipes in the area. These pipes are significantly lower than any proposed excavations for the flood protection foundations.

Any disruptions to the surface water system would be short term and surface water pipes and manholes would be reinstated as the works proceed.

The installation of non return valves on river overflows will prevent water entering the flood cell via the surface water drainage networks as river water levels rise.

Operational Phase

Opes and surface water drainage devices will be incorporated into the design of the proposed flood protection to allow surface water to drain from the campshire through the proposed flood protection. These opes and drainage devices will be designed to prevent flood water passing through proposed flood protection at times of high tide level in the Liffey, which would lead to flooding of the cell south of the proposed flood protection.

The proposed development will provide flood protection from high tides in the Liffey up to 3.7m above Malin head. These flood waters would otherwise fill the flood cell to the south of the Liffey and would lead to surcharged surface water pipes, popping of manhole lids, mixing of foul and surface water, and ultimately pollution of surface waters.

4.4.3.8 Monitoring

The laying of any new sewers or works to existing will be monitored under the supervision of Dublin City Council Water Services Division.

Following the completion of the construction works no monitoring other than normal maintenance is required.
4.5 Noise and Vibration

4.5.1 Introduction

This section, prepared by AWN Consulting, assesses the likely noise and vibration impact of the development, in the context of current relevant standards and guidance, and identifies any requirements or possibilities for mitigation.

4.5.2 Research Methodology

The proposed development will not have any noise or vibration impact during its operational phase. As a result it is only considered necessary to assess the potential noise and vibration impact on the surroundings during the construction phase.

The construction phase will involve:-

- site preparation works including fencing;
- excavations for wall foundations up to 1.5 metre deep;
- construction of swing/lift flood gates;
- services and utility diversions;
- construction of precast and cast in situ retaining wall up to approx 0.9m high;
- construction of footpaths and kerbs;
- blacktopping and resurfacing of cycletracks/footpaths;
- planting of trees, and;
- reinstatement of campshires / footpaths / roadways.

This impact is short-term in nature and is assessed in Section 4.5.6 of this document.

4.5.3 Receiving Environment

Environmental noise surveys were conducted in order to quantify the existing noise environment. The survey was conducted in general accordance with ISO 1996: 2007: Acoustics – Description, assessment and measurement of environmental noise. Full details of the survey are provided in Appendix 4.5, Section 1.0 of Volume 4.

In summary, the existing noise environment is dominated by road traffic noise along both City Quay and Sir John Rogerson’s Quay. Other noise sources noted were pedestrian activity, wind generated noise in foliage and distant sirens. Ambient noise levels were in the range of 65 to 73dB $L_{Aeq}$ and background noise levels were in the range of 55 to 62dB $L_{A90}$.

4.5.4 Characteristics of the Proposed Development

The proposed development consists of a new flood defence system, approximately 1.0km in length located on the south campshires of the River Liffey. The flood defence will extend from Butt Bridge to Samuel Beckett Bridge and return across Sir John Rogerson’s Quay just east of the new pedestrian crossing at Cardiff Lane.
When considering a development of this nature, the potential noise & vibration impact on the surroundings must be considered for each of two distinct stages: the short term impact of the construction phase and the longer term impact of the operational phase.

In this instance the nature of the development is such that there will only be a noise and vibration impact during the construction phase. There are no operational noise or vibration sources.

4.5.5 Potential Impacts of the Proposed Development

Construction Noise

There is no published statutory Irish guidance relating to the maximum permissible noise level that may be generated during the construction phase of a project. Local authorities normally control construction activities by imposing limits on the hours of operation and consider noise limits at their discretion.

In the absence of specific statutory guidance on construction noise limits, appropriate criteria relating to permissible construction noise levels for a development of this scale may be found in the British Standard BS 5228 – 1: 2009: Code of practice for noise and vibration control on construction and open sites – Noise.

The approach adopted here calls for the designation of a noise sensitive location into a specific category (A, B or C) based on exiting ambient noise levels in the absence of construction noise. This then sets a threshold noise value that, if exceeded at this location, indicates a significant noise impact is associated with the construction activities.

The closest neighbouring residential noise sensitive properties to the proposed development are the residential properties located to the south of the development along City Quay.

The BS 5228 document sets out guidance on permissible noise levels relative to the existing noise environment. Table 4.5.1 sets out the values which, when exceeded, signify a significant effect at the facades of residential receptors as recommended by BS 5228 – 1. These are cumulative levels, i.e. the sum of both ambient and construction noise levels.

<table>
<thead>
<tr>
<th>Assessment category and threshold value period (L_{Aeq})</th>
<th>Threshold value, in decibels (dB)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Category A^A</td>
</tr>
<tr>
<td>Night-time (23:00 to 07:00hrs)</td>
<td>45</td>
</tr>
<tr>
<td>Evenings and weekends</td>
<td>55</td>
</tr>
<tr>
<td>Daytime (07:00 – 19:00) and Saturdays (07:00 – 13:00)</td>
<td>65</td>
</tr>
</tbody>
</table>

^A^, ^B^, ^C^: Categories of noise sensitivity.
A) Category A: threshold values to use when ambient noise levels (when rounded to the nearest 5dB) are less than these values.

B) Category B: threshold values to use when ambient noise levels (when rounded to the nearest 5dB) are the same as category A values.

C) Category C: threshold values to use when ambient noise levels (when rounded to the nearest 5dB) are higher than category A values.

D) 19:00 – 23:00 weekdays, 13:00 – 23:00 Saturdays and 07:00 – 23:00 Sundays.

It should be noted that this assessment method is only valid for residential properties.

Based on the results of the noise survey discussed in Section 4.5.3 the appropriate category in this instance is Category C.

See Section 4.5.6 for the detailed assessment in relation to this site. If the total noise level (i.e. construction noise plus existing ambient noise level) exceeds the Category C value of 75dB, then a significant effect is deemed to occur.

Construction Vibration

Vibration standards come in two varieties: those dealing with human comfort and those dealing with cosmetic or structural damage to buildings. In both instances, it is appropriate to consider the magnitude of vibration in terms of Peak Particle Velocity (PPV).

It is acknowledged that humans are particularly sensitive to vibration stimuli and that any perception of vibration may lead to concern. In the case of road traffic, vibration is perceptible at around 0.5mm/s and may become disturbing or annoying at higher magnitudes. However, higher levels of vibration are typically tolerated for single events or events of short duration. For example, blasting and piling, two of the primary sources of vibration during construction, are typically tolerated at vibration levels up to 12mm/s and 5mm/s respectively. This guidance is applicable to the daytime only; it is unreasonable to expect people to be tolerant of such activities during the night.

Guidance relevant to acceptable vibration within buildings is contained in the following documents:

- British Standard BS 7385 (1993): *Evaluation and measurement for vibration in buildings Part 2: Guide to damage levels from ground borne vibration*, and;


BS 7385 states that there should typically be no cosmetic damage if transient vibration does not exceed 15mm/s at low frequencies rising to 20mm/s at 15Hz and 50mm/s at 40Hz and above. These guidelines relate to relatively modern buildings and should be reduced to 50% or less for more critical buildings.
BS 5228 recommends that, for soundly constructed residential property and similar structures that are generally in good repair, a threshold for minor or cosmetic (i.e. non-structural) damage should be taken as a peak particle velocity of 15mm/s for transient vibration at frequencies below 15Hz and 20mm/s at frequencies above than 15Hz. Below these vibration magnitudes minor damage is unlikely, although where there is existing damage these limits may be reduced by up to 50%. In addition, where continuous vibration is such that resonances are excited within structures the limits discussed above may need to be reduced by 50%.

The NRA document Guidelines for the Treatment of Noise and Vibration in National Road Schemes also contains information on the permissible construction vibration levels during the construction phase. These are listed in Table 4.5.2.

![Table 4.5.2 Allowable Vibration During Construction Phase](image)

<table>
<thead>
<tr>
<th>Allowable vibration (in terms of peak particle velocity) at the closest part of sensitive property to the source of vibration, at a frequency of</th>
<th>Less than 10Hz</th>
<th>10 to 50Hz</th>
<th>50 to 100Hz (and above)</th>
</tr>
</thead>
<tbody>
<tr>
<td>8 mm/s</td>
<td>12.5 mm/s</td>
<td>20 mm/s</td>
<td></td>
</tr>
</tbody>
</table>

Operational Noise & Vibration

There are no sources of operation noise or vibration associated with the operational phase of the proposed development. Therefore, it is not appropriate to set noise and vibration limit criteria for the operational phase.

4.5.6.1 Noise & Vibration Impact Assessment

Forecasting Methods

Construction noise calculations have been conducted generally in accordance with BS 5228-1 (2009): *Code of Practice for Noise and Vibration Control on Construction and Open Sites: Noise*.

Construction Noise Impact

A variety of items of plant will be in use, such as excavators, lifting equipment, dumper trucks, compressors and generators. The flow of vehicular traffic to and from a construction site is also a potential source of noise.

Due to the fact that the construction programme has been established in outline form only, it is not possible to calculate the actual magnitude of noise emissions to the local environment. However, the following paragraphs present calculations of indicative noise levels for typical noise sources associated with construction.

BS 5228: 2009: *Code of practice for noise and vibration control on construction and open sites – Part 1: Noise* sets out typical noise levels for items of construction plant. Table 4.5.3 lists the expected cumulative noise level, i.e. the noise level from construction activity plus the average existing noise level of 69dB LAeq, at various distances from the works.
Table 4.5.3 Indicative noise levels from construction plant items at various distances

<table>
<thead>
<tr>
<th>Item of Plant (BS5228 Ref.)</th>
<th>Predicted cumulative noise level at stated distance from edge of works, (dB $L_{Aeq(1hr)}$)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>20m</td>
</tr>
<tr>
<td>Pneumatic breaker (C.8.12)</td>
<td>71</td>
</tr>
<tr>
<td>Wheeled loader (C.3.51)*</td>
<td>70</td>
</tr>
<tr>
<td>Tracked excavator (C.3.43)*</td>
<td>70</td>
</tr>
<tr>
<td>Dozer (C.3.30)*</td>
<td>70</td>
</tr>
<tr>
<td>Dump truck (C.3.60)*</td>
<td>70</td>
</tr>
<tr>
<td>Vibratory roller (C.3.116)</td>
<td>71</td>
</tr>
<tr>
<td>Asphalt Spread (C.8.24)</td>
<td>73</td>
</tr>
<tr>
<td>Diesel Hoist (C.7.98)</td>
<td>70</td>
</tr>
<tr>
<td>Compressor (C.7.27)</td>
<td>70</td>
</tr>
<tr>
<td>Generator (C.7.49)</td>
<td>70</td>
</tr>
<tr>
<td>Road Roller (C.3.114)</td>
<td>72</td>
</tr>
<tr>
<td>HGV Movements (5 per hour)</td>
<td>69</td>
</tr>
</tbody>
</table>

* Note: Assume noise control measures as outlined in Table B1 of BS 5228 – 1 (i.e. fit acoustic exhaust).

Table 4.5.3 details the overall noise levels expected at these distances during the construction phase (i.e. construction noise plus the existing ambient noise levels) for comparison with the relevant significance threshold as outlined in Table 4.5.1. Note that a significant effect is deemed to have occurred when total noise levels (i.e. construction noise plus existing ambient noise level) exceed 75dB.

There are no activities which, when in operation, are expected to result in an exceedance of the adopted daytime noise criterion of 75dB $L_{Aeq}$. It should be noted that the predicted “worst case” levels are expected to occur for only short periods of time at a limited number of properties. Construction noise levels will be lower than these levels for the majority of the time at the majority of properties in the vicinity of the proposed development. Notwithstanding this, depending upon the number and type of sources operating and the potential for plant items to operate simultaneously, the noise levels may be higher than those stated. In these instances detailed consideration should be given to the mitigation measures outlined in Section 4.5.7 of this document.

In addition to construction activity on the development site, the noise impact of additional traffic on the local road network due to the construction activity should also be addressed. Access to the development site for construction traffic will be along City and Sir John Rogerson’s Quay. The closest noise sensitive dwellings along these routes are at a distance of approximately 7.5m from the road centre-line. The noise impact on these dwellings associated with construction traffic is assessed in the following paragraphs.
The noise level associated with an event of short duration, such as a passing vehicle movement, may be expressed in terms of its Sound Exposure Level ($L_{AX}$). The Sound Exposure Level can be used to calculate the contribution of an event or series of events to the overall noise level in a given period.

The appropriate formula is given below.

$$L_{Aeq,T} = L_{AX} + 10\log_{10}(N) - 10\log_{10}(T) + 10\log_{10}(r_1/r_2) \text{dB}$$

where:

- $L_{Aeq,T}$ is the equivalent continuous sound level over the time period $T$ (in seconds);
- $L_{AX}$ is the “A-weighted” Sound Exposure Level of the event considered (dB);
- $N$ is the number of events over the course of time period $T$;
- $r_1$ is the distance at which $L_{AX}$ is expressed;
- $r_2$ is the distance to the assessment location.

The mean value of Sound Exposure Level for truck moving at low to moderate speeds (i.e. 15 to 45km/hr) is in the order of 82dB $L_{AX}$ at a distance of 5 metres from the vehicle. This figure is based on a series of measurements conducted under controlled conditions.

Worst-case construction traffic volumes have been provided by Moylan Consulting Engineers as a maximum of 5 truck movements per hour. Using the equation detailed above and taking into account the attenuation due to distance, the predicted noise level at the nearest residential dwellings a distance of approximately 7.5m from the roadside, is 50dB $L_{Aeq,1hr}$.

The cumulative noise level at the nearest noise sensitive location due to both construction traffic and existing ambient noise is 69dB $L_{Aeq}$ which is less than the adopted daytime noise criterion of 75dB $L_{Aeq}$ and equal to the existing average ambient noise level. Therefore the likely noise impact on the local environment due to construction traffic during the daytime period is not significant.

**Construction Vibration Impact**

The construction activities expected to be utilised during the programme of works are not expected to generate perceptible vibrations at the nearby sensitive locations.

**Operational Noise & Vibration Impact**

There are no sources of noise and vibration associated with the operational phase of the development.

### 4.5.6 Mitigation Measures

In order to ameliorate the likely noise and vibration impacts sufficiently, where required, a schedule of noise control measures has been formulated for the construction phase.
Construction Noise

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. In particular, it is proposed that various practices be adopted during construction, including:

- Daytime working during which site activities likely to create high levels of noise or vibration are permitted;
- Establishing channels of communication between the contractor/developer, Local Authority and residents;
- Assigning the Resident Engineer responsible for matters relating to noise and vibration;
- Monitoring typical levels of noise and vibration during critical periods and at sensitive locations.

Furthermore, it is envisaged that a variety of practicable noise control measures will be employed. These may include:

- Selection of plant with low inherent potential for generation of noise and/ or vibration;
- Erection of barriers 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;

Construction Vibration

We would recommend that vibration from construction activities be limited to the values set out in Table 4.5.2. It should be noted that these limits are not absolute, but provide guidance as to magnitudes of vibration that are very unlikely to cause cosmetic damage. Magnitudes of vibration slightly greater than those in the table are normally unlikely to cause cosmetic damage, but construction work creating such magnitudes should proceed with caution. Where there is existing damage these limits may need to be reduced by up to 50%.

Operational Noise & Vibration

There are no sources of noise and vibration associated with the operational phase of the development. Therefore mitigation measures are not required.
4.5.7 Residual Impacts

Construction Phase

During the construction phase of the project there will be some small impact on nearby residential properties due to noise emissions from site traffic and other activities. However, given that the construction phase of the development is temporary in nature, it is expected that the various noise sources will not be excessively intrusive. Furthermore, the application of binding noise limits and hours of operation, along with implementation of appropriate noise and vibration control measures, will ensure that noise and vibration impact is kept to a minimum.

Operation Phase

There are no noise and vibration sources associated with the operational phase of the development. Therefore there will be no residual impact during the operation of the development.

4.5.8 Monitoring

Construction Phase

During the construction phase of the project noise and vibration monitoring may be conducted during certain activities. It is considered that short term attended noise and vibration measurements would be appropriate for this development. For the attended noise monitoring the following survey methodology should be employed:

- Survey engineers should measure $L_{Aeq}$, $L_{Amax}$, $L_{Amn}$, $L_{A10}$ and $L_{A90}$ at each location over a sample period of 15 minutes;
- Detailed notes should be taken in relation to primary noise sources, weather and prevailing winds;
- Measurements should be conducted at the locations on a cyclical basis over the course of a typical day.

Noise monitoring will be conducted in accordance with ISO 1996: 2007: Acoustics – Description, measurement and assessment of environmental noise.

For the attended vibration monitoring the following survey methodology should be employed:

- survey engineers should measure the maximum ppv at each location over a sample period of 15 minutes;
- detailed notes should be taken in relation to primary vibration sources; and
- measurements should be conducted at the locations on a cyclical basis over the course of a typical day.

Vibration monitoring should be conducted in accordance with either BS 7385-1 (1990) Evaluation and measurement for vibration in buildings — Part 1: Guide for measurement of vibrations and evaluation of their effects on buildings or BS 6841

**Operation Phase**

There are no noise and vibration sources associated with the operational phase of the development. Therefore there will be no monitoring requirements during the operational phase.
4.6 Air Quality & Climate

4.6.1 Introduction

AWN Consulting Limited were commissioned to conduct an assessment into the likely impact on air quality and climate associated with the proposed development.

Ambient Air Quality Standards

In order to reduce the risk to health from poor air quality, national and European statutory bodies have set limit values in ambient air for a range of air pollutants. These limit values or “Air Quality Standards” are health- or environmental-based levels for which additional factors may be considered. For example, natural background levels, environmental conditions and socio-economic factors may all play a part in the limit value which is set (see Tables 4.6.1 - 4.6.4 and Appendix 4.6.1 in Section 2.0 of Volume 4).

Air quality significance criteria are assessed on the basis of compliance with the appropriate standards or limit values. The applicable standards in Ireland include the Air Quality Standards Regulations 2002, which incorporate EU Directives 1999/30/EC and 2000/69/EC. These directives have now been supersedes in Irish law by Council Directive 2008/50/EC (published 11/06/08), which combines the previous air quality framework and subsequent daughter directives (see Table 4.6.1). Although the EU Air Quality Limit Values are the basis of legislation, other thresholds outlined by the EU Directives are used which are triggers for particular actions (see Appendix 4.6.1 in Section 2.0 of Volume 4).

There are no statutory guidelines regarding the maximum dust deposition levels that may be generated during the construction phase of a development in Ireland. Furthermore, no specific criteria have been set in respect of this development. However, guidelines from the Department of the Environment, Heritage and Local Government currently exist for dust emissions from quarrying and ancillary activities (4.6.1). These can be implemented with regard to dust emissions from the proposed construction works.

With regard to dust deposition, the German TA-Luft standard for dust deposition (non-hazardous dust) (4.6.2) sets a maximum permissible emission level for dust deposition of 350 mg/(m²*day) averaged over a one year period at any receptors outside the site boundary. Recommendations outlined by the Department of the Environment, Health & Local Government (4.6.1), apply the Bergerhoff limit of 350 mg/(m²*day) to the site boundary of quarries.

The concern from a health perspective is focussed on particles of dust which are less than 10 microns. EU ambient air quality standards (Council Directive 1999/30/EC transposed into Irish law as S.I. 271 of 2002) centres on PM₁₀ (particles less than 10 microns) as it is these particles which have the potential to be inhaled into the lungs and cause some adverse health impact. Council Directive 2008/50/EC on Ambient Air Quality and Cleaner Air for Europe has recently set an ambient standard for PM₂.5 (particles less than 2.5 microns) which will come into force in 2015 (see Table 4.6.1).
Climate Agreements

Ireland ratified the United Nations Framework Convention on Climate Change (UNFCCC) in April 1994 and the Kyoto Protocol in principle in 1997 and formally in May 2002\(^\text{[4.6.3, 4.6.4]}\). For the purposes of the EU burden sharing agreement under Article 4 of the Kyoto Protocol, in June 1998, Ireland agreed to limit the net growth of the six GHGs under the Kyoto Protocol to 13% above the 1990 level over the period 2007 to 2012\(^\text{[4.6.5, 4.6.6]}\). The UNFCCC is continuing detailed negotiations in relation to GHGs reductions and in relation to technical issues such as Emission Trading and burden sharing. The most recent Conference of the Parties (COP15) to the agreement was convened in Copenhagen in December 2009.

4.6.2 Research Methodology

The assessment of air quality has been carried out using a phased approach as recommended by the UK DEFRA\(^\text{[4.6.7, 4.6.8]}\). The phased approach recommends that the complexity of an air quality assessment be consistent with the risk of failing to achieve the air quality standards. In the current assessment, an initial scoping of possible key pollutants was carried out and the likely location of air pollution “hot-spots” identified. An examination of recent EPA and Local Authority data in Dublin\(^\text{[4.6.9 – 4.6.12]}\) (see below under “Available Existing Data” (Section 4.6.3)), has indicated that SO\(_2\), smoke and CO are unlikely to be exceeded at locations such as the current one and thus these pollutants do not require detailed monitoring or assessment to be carried out. Nevertheless, CO was included in the impact assessment. The initial scoping of pollutants did, however, indicate potential problems in regards to nitrogen dioxide (NO\(_2\)) and PM\(_{10}\) at busy junctions in urban centres\(^\text{[4.6.9 – 4.6.12]}\). Benzene, although previously reported at quite high levels in urban centres\(^\text{[4.6.11]}\), has recently been measured at several city centre locations to be well below the EU limit value\(^\text{[4.6.9, 4.6.11, 4.6.12]}\).

The current assessment thus focused firstly on identifying the existing baseline levels of NO\(_2\), PM\(_{10}\) and benzene in the region of the proposed development by an assessment of Dublin City Council monitoring data. Thereafter, the impact of the development during the construction phase of the project on air quality at the neighbouring sensitive receptors was determined by an assessment of the dust generating construction activities associated with the proposed development.

The construction phase will involve:

- site preparation works including fencing
- excavations for wall foundations up to 1.5 metre deep
- construction of swing / lift flood gates
- services and utility diversions
- construction of precast and cast in situ retaining wall up to approx. 0.9m high
- construction of footpaths and kerbs
- blacktopping and resurfacing of cycle tracks / footpaths
- planting of trees
- re-instatement of campshires / footpaths / roadways.
The impact of dust from the construction phase is short-term in nature and is assessed in Section 4.6.4 of this document.

4.6.3 Receiving Environment

Meteorological Data

A key factor in assessing temporal and spatial variations in air quality is the prevailing meteorological conditions. Depending on wind speed and direction, individual receptors may experience very significant variations in pollutant levels under the same source strength (i.e. traffic levels)\(^{(4.6.13)}\). Wind is of key importance in dispersing air pollutants and for ground level sources, such as traffic emissions, pollutant concentrations are generally inversely related to wind speed. Thus, concentrations of pollutants derived from traffic sources will generally be greatest under very calm conditions and low wind speeds when the movement of air is restricted. In relation to PM\(_{10}\), the situation is more complex due to the range of sources of this pollutant. Smaller particles (less than PM\(_{2.5}\)) from traffic sources will be dispersed more rapidly at higher wind speeds. However, fugitive emissions of coarse particles (PM\(_{2.5}\) – PM\(_{10}\)) will actually increase at higher wind speeds. Thus, measured levels of PM\(_{10}\) will be a non-linear function of wind speed.

The nearest representative weather station collating detailed weather records is Dublin Airport, which is located approximately 10 km north of the site. Dublin Airport met data has been examined to identify the prevailing wind direction and average wind speeds over a five-year period (see Figure 4.6.1). For data collated during five representative years (2001-2005), the predominant wind direction is south-westerly with an average wind speed of approximately 3-5 m/s.

Available Existing Data

Air quality monitoring programs have been undertaken in recent years by the EPA and Local Authorities. The most recent annual report on air quality “Air Quality Monitoring Report 2008” (EPA, 2009)\(^{(4.6.11)}\), details the range and scope of monitoring undertaken throughout Ireland. In terms of air monitoring, Dublin City Centre is categorised as Zone A (see Appendix 4.6.1 in Section 2.0 of Volume 4)\(^{(4.6.11)}\).

The results of long-term continuous monitoring carried out by Dublin City Council\(^{(4.6.11, 4.6.12)}\) is available for the city centre locations of Wood Quay (Winetavern Street) and Coleraine Street (see Tables 4.6.5 – 4.6.8). These locations are in close proximity to the proposed development and provide useful information on both recent trends and also the current air quality in the vicinity of the proposed development.

With regard to NO\(_2\), continuous monitoring data from the EPA\(^{(4.6.11)}\) at Wood Quay (Winetavern Street) and Coleraine Street show that current levels of NO\(_2\) are below both the annual and 1-hour limit values (see Table 4.6.5). Sufficient data is available to observe long-term trends over the period 2002 - 2008 at both locations\(^{(4.6.10 – 4.6.12)}\).

Continuous PM\(_{10}\) monitoring carried out at Wood Quay and Coleraine Street showed average levels of 17 and 19 mg/m\(^3\) respectively in 2008 at both locations, with 7 and 11 exceedences respectively of the 24-hour limit value of 50 mg/m\(^3\) (35 exceedences are
permitted per year)\(^{(4.6.12)}\) (see Table 4.6.6). In addition, average PM\(_{10}\) levels at the urban background monitoring location in the Phoenix Park in 2008 was 11 µg/m\(^3\), with only one exceedence of 50 µg/m\(^3\)\(^{(4.6.11)}\). The long-term trends show a general downward trend in PM\(_{10}\) concentrations at all locations\(^{(4.6.10 - 4.6.12)}\). Based on the above analysis, an estimate of existing levels of PM\(_{10}\) in Dublin City Centre is 20 µg/m\(^3\) on an annual basis and in terms of the 90\(^{th}\) percentile would average 35 µg/m\(^3\). The results of PM\(_{2.5}\) monitoring in Cork in 2008 indicated average PM\(_{2.5}/PM_{10}\) ratio of 0.56\(^{(4.6.11)}\). Based on this information, a ratio of 0.60 was used to generate a existing PM\(_{2.5}\) concentration in Dublin City Centre of 12 µg/m\(^3\).

A study by the UK ODPM\(^{(4.6.15)}\) gives estimates of likely dust deposition levels in specific types of environments. In open country a level of 39 mg/(m\(^2\)*day) is typical, rising to 59 mg/(m\(^2\)*day) on the outskirts of town and peaking at 127 mg/(m\(^2\)*day) for purely industrial area. As a worst-case, a level of 127 mg/m\(^2\)*day can be estimated as the existing dust deposition level for the current location.

In terms of benzene, Table 4.6.7 outlines measurements carried out over the period 2003 - 2008. The average concentration measured in 2008 in Rathmines was 0.9 µg/m\(^3\), which is well below the limit value of 5 µg/m\(^3\)\(^{(4.6.11)}\). The long-term trend shows a general reduction in benzene levels since 2003, although this is not as marked as that for PM\(_{10}\).

In terms of CO, results Wood Quay and Coleraine Street are low, peaking at 5% of the maximum 8-hour limit value (10 mg/m\(^3\))\(^{(4.6.11)}\) in 2005 (see Table 4.6.8). Similarly low levels were measured in 2004 - 2008, although trends in the data are not apparent.

In summary, existing baseline levels of NO\(_2\), PM\(_{10}\), PM\(_{2.5}\), CO and benzene based on extensive long-term data from Dublin City Council are below ambient air quality limit values in the vicinity of the proposed development.

### 4.6.4 Characteristics of the Proposed Development

Refer to Section 3.2 for a description of the proposed development. Construction of the proposed development will be the key aspect in relation to the air quality assessment.

**Process Emissions During Construction Period – Dust Generation Rates**

Material handling activities on site may typically emit dust. Dust is characterised as encompassing particulate matter with a particle size of between 1 and 75 microns (1-75 µm). Deposition typically occurs in close proximity to each site and potential impacts generally occur within 500 metres of the dust generating activity as dust particles fall out of suspension in the air. Larger particles deposit closer to the generating source and deposition rates will decrease with distance from the source. Sensitivity to dust depends on the duration of the dust deposition, the dust generating activity, and the nature of the deposit. Therefore, a higher tolerance of dust deposition is likely to be shown if only short periods of dust deposition are expected and the dust generating activity is either expected to stop or move on.
The potential for dust to be emitted will depend on the type of activity being carried out in conjunction with environmental factors including levels of rainfall, wind speed and wind direction.

As indicated, dust generation rates depend on the site activity, particle size (in particular the silt content, defined as particles smaller than 75 microns in size), the moisture content of the material and weather conditions. Dust emissions are dramatically reduced where rainfall has occurred due to the cohesion created between dust particles and water and the removal of suspended dust from the air. It is typical to assume no dust is generated under “wet day” conditions where rainfall greater than 0.2mm has fallen. Information collected from Dublin Airport Meteorological Station (1961-1990) identified that typically 185 days per annum are “wet” (see Table 4.6.9). Thus for 50% of the time no significant dust generation will be likely due to meteorological conditions.

Large particle sizes (greater than 75 microns) fall rapidly out of atmospheric suspension and are subsequently deposited in close proximity to the source. Particle sizes of less than 75 microns are of interest as they can remain airborne for greater distances and give rise to the potential dust nuisance at the sensitive receptors. This size range would broadly be described as silt. Emission rates are normally predicted on a site-specific particle size distribution for each dust emission source.

Whilst construction activities are likely to produce some level of dust during earth moving and excavating phases of the project, these activities will mainly be confined to particles of dust greater than 10 microns. Particles of dust greater than 10 microns are considered a nuisance but do not have the potential to cause significant health impacts. For instance, bulldozing and compacting operations release 84% of particles which are greater than PM$_{10}$ with only 16% of particles being less than 10 microns$^{(4.6.14)}$.

It is envisaged that the construction of the development will occur in distinct phases. As such, the potential for dust nuisance and significant levels of PM$_{10}$ & PM$_{2.5}$ concentrations will vary both temporally and spatially as the construction develops.

Truck movements during the peak construction period would be envisaged to average about 5 inward and 5 outward / hour or about 1 movement every 6 minutes. Construction traffic of this level will lead to dust emissions of the order of 4 g/m$^2$ each hour along the haul roads based on no mitigation being implemented$^{(4.6.14)}$. However, provided vehicle speeds are restricted to less than 40 km/hr (20 km/hr is proposed), this level of construction traffic will lead to dust emissions of the order of 1 g/m$^2$ each hour along the haul roads$^{(4.6.14)}$. Thus, it is unlikely that the emissions of this magnitude will lead to dust deposition levels at the site boundary which exceed the TA Luft limit value for dust nuisance of 350 mg/(m$^2$*day).

**Climate**

Construction traffic would be expected to be the dominant source of greenhouse gas emissions as a result of the development. Vehicles will give rise to CO$_2$ and N$_2$O emissions during construction of the proposed development.
4.6.5 Potential Impact of the Proposed Development

Construction Phase

With effective implementation of the dust minimisation plan, the proposed development is expected to have a negligible impact on air quality. Hence the impact on air quality of the proposed development during the construction phase will be insignificant.

Operational Phase

Due to the size, nature and location of the development, which will lead to no increase in road traffic emissions, the proposed development is expected to have an imperceptible impact on air quality. Hence the impact on air quality of the proposed development during the operational phase will be insignificant.

4.6.6 Mitigation Measures

Construction Phase

A dust minimisation plan will be formulated for the construction phase of the project, as construction activities are likely to generate some dust emissions. The potential for dust to be emitted depends on the type of construction activity being carried out in conjunction with environmental factors including levels of rainfall, wind speeds and wind direction. The potential for impact from dust depends on the distance to potentially sensitive locations and whether the wind can carry the dust to these locations. The majority of any dust produced will be deposited close to the potential source and any impacts from dust deposition will typically be within several hundred metres of the construction area (4.6.15).

In order to ensure that no dust nuisance occurs, a series of measures will be implemented. Site roads shall be regularly cleaned and maintained as appropriate. Hard surface roads shall be swept to remove mud and aggregate materials from their surface. Furthermore, any road that has the potential to give rise to fugitive dust must be regularly watered, as appropriate, during dry and/or windy conditions.

Speeds shall be restricted on hard surfaced roads as site management dictates. Vehicles delivering material with dust potential shall be enclosed or covered with tarpaulin at all times to restrict the escape of dust.

Public roads in the vicinity of the site shall be regularly inspected for cleanliness, and cleaned as necessary.

At all times, the dust mitigation measures put in place will be strictly monitored and assessed. In the event of dust nuisance occurring outside the site boundary, movement of materials will be immediately terminated and satisfactory procedures implemented to rectify the problem before the resumption of the operations.

The dust minimisation plan shall be reviewed at regular intervals during the construction phase to ensure the effectiveness of the procedures in place and to maintain the goal of minimisation of dust through the use of best practice and procedures.
Operational Phase

No mitigation measures are necessary.

4.6.7. Residual Impact

Construction Phase

No residual impact is anticipated.

Operational Phase

No residual impact is anticipated.

4.6.8. Monitoring

Construction Phase

If dust minimisation plan is effectively implemented there will be no need for monitoring during the construction phase.

Operational Phase

Not applicable.
4.7 Landscape and Visual Appraisal

4.7.1 Introduction

This section examines the visual impact of the proposed development on the surrounding area and was prepared by ARC Architectural Consultants Limited.

4.7.2 Research Methodology

Ten representative view locations, where there were considered to be a potential for the proposed development to be visible, were identified in discussions between Dublin City Council and the design team. At all these locations, photographs were taken looking towards the proposed development. All the photographs were taken in conditions of good light and clear visibility. All photography were taken using a high resolution digital camera suitable for architectural photography. All views were taken with the lens of the camera set at wide angle, giving a horizontal field of coverage of approximately 73°.

A wide-angle lens setting was used to provide sufficient context in each view. Photographs with a narrow field of view may exclude relevant context. Wide-angle views, capable of providing sufficient context are particularly important when the viewpoint is close to proposed development. Photographs and photomontages based on wide angle photography are printed at A3 size (refer to Volume 3 for Photomontages) so that the angle of vision covered by the print, when held at reading distance, is approximately the same as would be covered by the same extent of the real scene, when viewed from the camera position. The camera positions of views were established using GPS data and related to Ordnance mapping. The date and time when each photograph was taken was recorded.

Photomontages were prepared for each of the 10 no. view locations, as shown in Volume 3. Models of the proposed development were constructed by ARC using 3D Studio Max based on survey information and on design drawings provided by the design team. The model used for photomontages included appropriate detail of the proposed development as shown on design drawings. Renderings were made on computer from each camera position using the field of view of each photograph with the sun position correct for the date and time that each photograph was taken. The renders were inserted into the relevant view, and were scaled and positioned using the field of vision of each photograph.

4.7.3 Receiving Environment

The Flood Protection Scheme is proposed to run along the South Quays from the Butt Bridge east to just beyond the Samuel Beckett Bridge.

The Liffey Quays:

Dublin has seen considerable changes over recent times, no more so than along the river corridor. John Rocque’s map of the City of Dublin, published in 1756, shows the Old Custom House standing at the south side of the River Liffey just east of Essex Bridge, and facing north onto a short length of quayside then called Custom House Quay. Essex Bridge is now Grattan Bridge and the old Custom House Quay is now
Wellington Quay. In the late 17th century the city fathers began the reclamation of slob lands that stretched back north and south of the river east of what is now Butt Bridge. They planned the enclosing of the river between quay walls, but at the beginning of the 18th century only small sections of the river east of Essex Bridge were enclosed. Rocque’s map shows buildings backing directly onto the river at Temple Bar and near Hawkins Street.

On the south side of the river, John Rogerson, Alderman, Lord Mayor and M.P. for Dublin, started constructing the quay named after him in 1713. After his death, the work was continued by his son, also Sir John Rogerson, who was Lord Chief Justice. The land reclaimed behind the new sea wall became known as the South Lotts. The most important building on Rogerson’s Quay was the Marine School, or more correctly the Hibernian Marine Nursery of Dublin - ‘for the education of the orphans and children of Protestant seamen in distressed circumstances’. This building, with a 130 foot frontage, was designed by Thomas Cooley and was completed in 1770. Its interior was destroyed by fire in 1872. Behind the east end of Rogerson’s Quay the Ringsend Basins at the end of the Grand Canal were constructed between 1791 and 1796. The larger northern basin could hold 400 sailing ships of the time. On the north side, construction of the North Wall began in 1714.

The river remained accessible to shipping as far west as Essex Bridge until the construction of Carlisle Bridge, now O’Connell Bridge, designed by James Gandon and begun in 1791. The City of Dublin Steam Packet Company, was founded in 1823, and began a regular service from Dublin to Liverpool. At that time, their steamers docked outside the company’s offices at 15 Eden Quay, at the corner of Marlborough Street. The company crest can still be seen on the building. The City of Dublin Steam Packet Company was one of the first two steamship lines in the world. Further down river, the British & Irish Steam Packet Company was founded in 1835, and in 1836 took over the business of the Dublin and London Steam Packet Company. The B & I ran a direct ferry service from Dublin to London, a journey time of some 70 hours. It added services to Liverpool and other English ports in 1851.

In the 19th century the quays east of Carlisle Bridge were constantly full of ships, a fact that is well illustrated in a report to the harbour master in the early 1860s in which it is stated that every berth on both north and south quays was occupied, with a further forty coasters, both steam and sail, moored in tiers or anchored in the river awaiting berths; some of these vessels were discharging their cargoes into lighters for transport upriver or into the canals.

A swing bridge, on the line of the present Butt Bridge, was constructed in 1879. Its centre span could swing away to allow ships to continue as far as Carlisle Bridge. It was replaced by the present Butt Bridge in 1932. The Loop Line Bridge, carrying the elevated railway over the river just east of Butt Bridge was completed in 1890. This bridge largely concealed Gandon’s Custom House and separated the port from the city.

From the Gandon’s Four Courts to Gandon’s Custom House and on to the Point Depot, many important buildings lined the quays. Between these major structures the quays were with terraces of Georgian and Victorian buildings. West of Butt Bridge on Burgh Quay and Eden Quay a number of these more modest buildings still exist. The pattern of plots on 19th and early 20th century Ordnance maps show that this pattern continued
east of Butt Bridge. In the 1960s, west of Butt Bridge, large buildings began to replace the pattern of small plots. These included the 60 metre Liberty Hall, Hawkins house at 41.5 metres and O’Connell Bridge House at 42 metres. Liberty Hall replaced Northumberland Buildings dating from 1820. Hawkins House replaced the Theatre Royal. The construction of O’Connell Bridge House destroyed the Wide Streets Commission’s symmetrical arrangement either side of the junction of D’Olier Street and Westmoreland Street.

The quays east from the Loop Line Bridge remained full of shipping until the cargos began to be shipped in containers. Throughout the following years, the ships gradually disappeared and the cranes that loaded and unloaded them stood idle. Buildings standing at the quay edge along the campshires lost their purpose. The coming of the IFSC in 1990 began the regeneration of the Docklands. This regeneration has brought dramatic change, most of this change occurring in the last 10 years, and the quaysides are now lined with large modern buildings.

The campshires themselves have been remodelled. Nearly all of the buildings that once stood along them have been removed. The cranes are gone. There are new railings separating the campshires from the water, cycleways, sculpture, new lighting and groves of trees. The once robust dockside has become a public park.

The Custom House:

The Custom House, designed by James Gandon under the patronage of John Beresford was begun in 1781 and completed in 1791 at a cost of £400,000. It replaced the Old Custom House at Essex Bridge designed by Colonel Thomas Burgh. The Liffey was only six feet deep at the Old Custom House, and the new Custom House was located down river where large ships could berth. In addition to the berthage in front of the Custom House along the River, a large dock was constructed immediately east of the building. This dock was known variously as Custom House Dock or the Old Dock and was completed in 1797. There was a swing bridge on North Wall Quay at its entrance. The dock served the Custom House for 130 years before it was filled in in 1927.

Until that date ships could moor close to two sides of the Custom House. It was designed as a dockside building, not separated from the quayside. It was not, as it is today, surrounded on three sides by railings and a garden. Late 19th century photographs show that there was a line of bollards on the north and west side roughly where the present railings stand, but the space behind these bollards was paved and open to the public. The garden appears to have been started after the construction of the Loop Line Bridge. The railings were part of the reconstruction in 1927 after the building was gutted by fire in 1921.

The Custom House was set on fire by the IRA. Almost its entire interior was destroyed, as was the dome. The subsequent reconstruction retained the external appearance of the building, but the layout of the interior was changed substantially, and little remains of Gandon’s layout. The core of the building behind the dome was not reconstructed. In the Shell Guide to Ireland (1962) by Lord Killanin and Michael V. Duignan it is stated that: ‘…the Custom House and the Four Courts remain even yet – Time, War, and the Office of Public Works not withstanding.'
Apart from the five houses that form the shallow crescent of Beresford Place, constructed in the late 1790’s, and designed by James Gandon, the Custom House is entirely surrounded by modern buildings. These include Liberty Hall, The Irish Life Centre, Busarus, and the IFSC on the north side of the river, and the large expanse of the Ulster Bank Headquarters directly opposite across the river. The Custom House was finally separated from the river it was built to serve by the construction of Matt Talbot Bridge, completed in 1978, and of the wall at the quay edge in front of the Custom House. Until then, ships had moored outside the Custom House for a period of close to 190 years. For most of the 20th century, Guinness coal fired barges, with names like Castleknock and Killiney, billowed smoke down the River from James’s Gate to the quay in front of the Custom House.

4.7.4 Characteristics of the Proposed Development

The proposed development consists of flood protection works within the campshires of City Quay and Sir John Rogerson’s Quay to protect the area from future flood impacts and modifications to the riverside public realm area along George’s Quay. The development comprises the following elements:

- Construction of a flood protection wall with integrated retractable gates (swing/lift gates), which will normally be maintained in an open position to facilitate pedestrian permeability within and access to the campshires and riverside amenity areas. The flood protection wall will run primarily within the existing campshire zones along the area currently occupied by the cycle path and in a number of locations the wall will be located at the river edge.

- Other than where it runs along the river edge, the flood defence wall will be approximately 800 mm above existing ground level and will have a staggered alignment for visual diversity and to facilitate pedestrian permeability. It will be formed of high quality precast concrete units.

- Relocation and upgrading of the existing cycle route. This will run along the roadside edge of the campshires.

- Alterations to the existing paving to accommodate the new flood defence wall and facilitate a new dedicated pedestrian path alongside the staggered flood defence wall.

- New tree planting along the road edge to form a tree-lined edge to the campshires. New trees will match the existing species on the campshires.

- Removal of the existing car parking along the river side of George’s Quay will be required to provide an improved and enlarged public realm. Tree planting and seating will be aligned with the key architectural elements of the Custom House opposite.

- Alterations to existing pedestrian crossing management at Sean O’Casey Bridge/City Quay/Lombard Street.

- Works to the riverside walls of the existing 2 B.J. Marine buildings so that they will act as part of the flood defence wall.
4.7.5 Potential Impact of the Proposed Development

Definitions of Impacts on the Built Environment:

The assessment of visual impacts on landscape and on the built environment had regard to the Guidelines on the Information to be Contained in Environmental Impact Statements prepared by the Environmental Protection Agency (2002), and to the European Communities (Environmental Impact Assessment) (Amendment) Regulations, 1999.

The list of definitions given below is taken from Section 5: Glossary of Impacts contained in the Guidelines on the Information to be Contained in Environmental Impact Statements prepared by the Environmental Protection Agency. Some comment is also given below on what these definitions might imply in the case of visual impact or landscape and visual impact. The definitions from the EPA document are in italics.

Imperceptible Impact: An impact capable of measurement but without noticeable consequences. The definition implies that the development would be visible, capable of detection by the eye, but not noticeable. If the development were not visible, there could be no impact.

Slight Impact: An impact, which causes noticeable changes in the character of the environment without affecting its sensitivities. For this definition to apply, a development would be both visible and noticeable, and would also bring about a change in the visual character of the environment. However, apart from the development itself, the visual sensitivity of the surrounding environment should remain unchanged.

Moderate Impact: An impact that alters the character of the environment in a manner that is consistent with emerging trends. In this case, a development must bring about a change in the visual character of the environment; and this change must be consistent with a pattern of change that is already taking place.

Significant Impact: An impact which, by its character, magnitude, duration or intensity alters a sensitive aspect of the environment. The wording of the definition is clear. Difficulty in assessing whether an impact might or might not be significant lies in the word ‘sensitive’. In visual terms, particularly when related to the appearance of landscape or the built environment, what one person might be sensitive to another might not. A conservative approach, classifying impacts as significant even though many observers might not regard them as significant, is taken here.

Profound Impact: An impact, which, obliterates sensitive characteristics. In visual terms, profound impacts are only likely to occur on a development site, in that it is only on the site that all previous visually sensitive characteristics could be obliterated. Outside the site, some visual characteristic of the original environment is likely to remain.

The range of possible impacts listed above deal largely with the extent of impact; and the extent of the impact of a development is usually proportional to the extent to which that development is visible. The extent of impact will also, in part, depend on the sensitivity of the spaces from which the development is seen. This proportionality may
be modified by the extent to which a development is regarded as culturally or socially acceptable.

The character of the impact: positive, negative or neutral, will depend on how well a development is received by the public, and on the general contribution of the development to the city. The character of a visual impact, and even the duration of a visual impact, is very dependent on the attitude of the viewer. If a viewer is opposed to a new development for reasons other than visual, that viewer is likely to see the structure in a negative light, no matter how beautiful the structure might be. It is also the case that a development thought startling when first built, in time becomes part of the background, and what at first might have been regarded by the public a significant impact, fades to slight. Though structures, such as the proposed Flood Protection Scheme, are intended to be permanent, and will be permanently visible, the extent of visual impact associated with such a structure often diminishes with time.

Potential Impact of the Proposal:

Construction Impact

With the exception of additional plant, materials, fencing and general construction site activities, the extent of visual impact of the development during the construction phase is likely to be greater than that for the operational phase. The character of visual impacts during the construction phase is likely to be wholly negative at first, becoming potentially neutral to positive as work proceeds and the Flood Protection Scheme becomes apparent.

Operational Impact

The proposed Flood Protection Scheme consists of a series of walls, gates and other barriers running from the Butt Bridge east to just beyond the Samuel Beckett Bridge. For the most part, walls are constructed of fairfaced Architectural concrete with cast or applied finish on the side facing the river and with an inserted sinusoidal pattern in the concrete facing towards the roadway. At present, there is a red tarmac cycleway running along the campshires for much of the length of the proposed flood protection works. For much of its length, this cycleway is shared with pedestrians. The proposed development includes the moving of this cycleway on to the road surface running along the Quays and setting it out as a two-way cycleway dedicated solely to cycling and separate entirely from a new concrete pedestrian route running along the campshires. The works involve some realignment of the kerb between the back of the campshires and the road surface. The works also involve the removal of some bollards and a number of trees and the planting of a number of new trees.

It is undoubtedly the case that the provision of a new two-way dedicated cycleway will bring benefits as will the provision of the dedicated pedestrian route. The provision of these facilities is likely to lead to a positive response on the part of those viewing the completed works.

At Georges Quay, a new granite faced wall is proposed to replace the present sub standard railings along the Quay edge. This wall is designed to match in materials and profile of the wall running along the Quay in front of the Custom House opposite. It is
undoubtedly the case that this wall will be regarded as a wholly positive intervention. From Matt Talbot Bridge as far as Creighton Street, the proposed Flood Protection Scheme takes the form of a wall running close to the road side of the campshires. The proposed pedestrian walkway runs alongside this wall and the wall steps backwards and forwards so that in some places the wall is between the walkway and the road and, in others, between the walkway and the campshires. There are gaps in the wall to allow the walkway to run continuously. These gaps will be closed in the event of predicted high water levels by swing/lift gates.

The introduction of the new walls will change the character of the campshires. However, the Campshires have been undergoing a process of continuous change for the last number of years as has the Docklands area all around them. It is also the case that the changes brought about on the Campshires in recent years have altered them dramatically from their former industrial character. In the context of so much change, the changes arising from the construction of the proposed flood defence works and the new walkway and cycleway are minor, and their visual impact will consequently also be minor.

While the extensive environmental improvements proposed must bring a positive response, it must always be remembered that the character of visual impact rests entirely with the individual viewer. For instance, the presence of flood defences may alarm people and this may cause some individuals to regard the visual impact of the new flood defence structures as negative.

For most of the distance between Creighton Street and the Samuel Beckett Bridge, the proposed flood defences take the form of a wall running along the river about 2 metres back from the Quay edge. Since this wall is set at the river side of the campshire, it is not close to the walkway, cycleway or roadway. From eye level along this section of the walkway, cycleway and roadway, the wall is likely to obscure the view of the water of the river. This is a significant change from the present circumstance, which some people may regard as negative. It must be noted, however, that from Butt Bridge west to Heuston Station, there is a wall running along both sides of the river and that this wall obscures the view of the water for viewers at road level unless these viewers are right beside the wall.

The two B.J. Marine buildings stand some 2 metres back from the edge of the quay wall. It is proposed to render the bottom section of the river face of these buildings, and onto parts of the end elevations. It is proposed that this render will be approximately the same colour as the buildings. The proposed render will be only a modest change to what are quite substantial buildings, and is, therefore likely to have only a modest visual impact.

At the Samuel Beckett Bridge, existing new granite clad walls that run along the Quay edge flanking the bridge will be raised somewhat and the existing black railing on top of these walls will be replaced by railings of the same material and design as those used on the bridge itself. In that this treatment is likely to be more in keeping with the bridge than the existing situation, this is likely to be regarded by most observers as a positive visual impact.
The potential visual impact on each of the views for which photomontages were prepared is tabulated below:

### Table 4.7.1 Potential Visual Impacts from Photomontages

<table>
<thead>
<tr>
<th>Location of View</th>
<th>Extent of Visual Impact</th>
<th>Probable Character of Visual Impact</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Custom House Quay</td>
<td>Slight to Moderate</td>
<td>Positive</td>
</tr>
<tr>
<td>2. Matt Talbot Bridge</td>
<td>Slight to Moderate</td>
<td>Positive</td>
</tr>
<tr>
<td>3. Traffic Island at Moss Street</td>
<td>Moderate</td>
<td>Neutral</td>
</tr>
<tr>
<td>4. Campshire at City Quay</td>
<td>Moderate</td>
<td>Neutral</td>
</tr>
<tr>
<td>5. Sean O’Casey Bridge</td>
<td>Slight to Moderate</td>
<td>Neutral</td>
</tr>
<tr>
<td>6. City Quay at Lombard Street East</td>
<td>Moderate to Significant</td>
<td>Neutral</td>
</tr>
<tr>
<td>7. Creighton Street</td>
<td>Moderate</td>
<td>Neutral</td>
</tr>
<tr>
<td>8. North Wall Quay</td>
<td>Slight to Moderate</td>
<td>Neutral</td>
</tr>
<tr>
<td>9. Samuel Beckett Bridge</td>
<td>Moderate</td>
<td>Positive</td>
</tr>
<tr>
<td>10. The Ferryman</td>
<td>Moderate</td>
<td>Positive</td>
</tr>
</tbody>
</table>

### ‘Do Nothing’ Impact

In the ‘do-nothing’ scenario, no development will take place, and the present character of the site will remain.

#### 4.7.6 Mitigation Measures

**Construction Phase**

The following measures have been designed into the proposed flood protection:

- The design of the proposed flood protection materials and alignment has been designed to mitigate the visual impact and to interface successfully with the existing landscaping at the corresponding locations along the campshires.
- The flood wall interface between the existing landscaped scheme, between Matt Talbot bridge and the B.J. Marine buildings, have been incorporated in such a way that the proposed wall, new pedestrian path and new trees will itself become an integral part of the existing designed landscape.
- The proposed design allows for the future upgrading and use of the B.J. Marine building as an inherent part of the flood defence. This ensures that the contextual setting of the B.J. Marine buildings along the river will remain unaltered.
- The durable design of the proposed flood protection was taken into account to ensure it will age well with time.

Construction standards and workmanship will be supervised by a Resident Engineer to ensure a quality finish.

**Operational Phase**

The proposed development is for an essential piece of flood protection infrastructure, for improved infrastructure for pedestrians and cyclists, and for hard and soft landscaping. The design of these works is intended to be both appropriate and visually attractive.
Where works are designed to be visually positive, mitigation measures are not applicable.

4.7.7 Residual Impacts

Since remedial and reductive measures do not apply, predicted impacts will be as set out above for potential impacts.

‘Worst Case’ Scenario

The impacts considered above represent the ‘worst case’ scenario.

4.7.8 Monitoring

Construction Phase

Construction standards and workmanship will be supervised by a Resident Engineer to ensure a quality finish.

Operational Phase

The flood defences and associated public domain will be maintained in accordance with the overall maintenance of the area. The operation and maintenance of the flood gates will be the responsibility of Dublin City Council.
4.8 **Material Assets**

4.8.1 **Transportation**

4.8.1.1 **Introduction**

This section has been prepared by Moylan Consulting Engineers and presents a review of the existing road network, potential impacts of the proposed development and mitigation measures proposed to minimise any negative impact on the network and surrounding environment.

4.8.1.2 **Research Methodology**

In order to prepare this section of the EIS, an examination of the site for the proposed development and of the existing road network and pedestrian facilities in the vicinity of the development site was carried out as follows:

- Examination of available mapping of the area
- Site Visits
- Visual inspection of the road network in the vicinity of the site
- Survey existing traffic and pedestrian movements within the site area
- Stage 1 Road Safety Audit (Refer to section 8.0, Volume 4)
- Accessibility Audit (Refer to section 9.0, Volume 4)
- Car Parking Survey for the Area Carried out by Dublin City Council (Refer to section 13.0, Volume 4)

Information on the existing public transport facilities in the area was determined from a review of current route and timetable information available from Bus Éireann and Irish Rail.

Existing traffic and pedestrian flow statistics for roads in the area were determined from the following:-

- Pedestrian counts and observations received from Dublin Docklands Development Authority, dated July 2005.
- Traffic counts received from Dublin City Council, carried out on April 2010 (as shown on Table 3.1.2).
- Traffic counts carried out by Moylan in October 2010 (as shown on Table 3.1.2).

4.8.1.3 **Receiving Environment**

The subject site and surrounding road network as shown on Figure 3.1.1 is repeated again below for ease of reference.
The site is located along the south campshires from Butt Bridge to just beyond Cardiff Lane. The quay road, footpaths and associated bridges act as a link for traffic and pedestrians between north and south Dublin and also locally links Dublin City centre with the Dublin Docklands area.

4.8.1.4 Characteristics of the Proposed Development

The proposed development is described in detail in Section 3.2. It consists of a 1.0 km of flood protection systems on the south campshires of the River Liffey, extending from Butt Bridge to Samuel Beckett Bridge and across the quay road just east of the new pedestrian crossing at Cardiff Lane with a demountable defence.

The flood protection works will also incorporate an upgrade of the existing cycle track to provide 650m of new on-road cycle track, improvement of pedestrian facilities and the provision of additional tree planting along the length of the campshires.

Drawings and photomontages included in Volume 3 show the alignment of the proposed flood protection, typical sections along the campshires, proposed upgrading of the existing cycletracks and the provision for new trees.

4.8.1.5 Potential Impact of the Proposed Development

Construction Phase

For the duration of the construction phase of the development, there is a potential for adverse impacts arising from traffic generated from the removal of demolition spoil, waste and excavated material together with the delivery of construction material and plant. The truck traffic generated by the construction process is estimated at a peak hour of 5 vehicles and should not affect traffic patterns on the surrounding road network.

Construction of the proposed flood protection will require diversion of pedestrians and cyclist and some local traffic management but is not envisaged as requiring a road closure.
Proposed upgrade of the existing pedestrian and cyclist facilities will require the diversion of pedestrians, cyclists and vehicular traffic. It is envisaged that no more than one lane of the roadway will be closed at any given time and due to the linear nature of the site and proposed phasing of the works the extent of roadway being worked on at any one time will be kept to a minimum.

**Operational phase**

Cyclists will be provided with a new two way cycletrack extending from Matt Talbot Bridge to the Samuel Beckett Bridge. Pedestrian facilities will also be improved along the length of the three campshires, providing a dedicated footway, while reducing possible conflicts with cyclists.

The proposed new cycle track and improved pedestrian facilities will result in the loss of 18 No. parking spaces from Georges Quay and 22 No. car parking spaces and loading bays on City Quay and Sir John Rogerson’s Quay.

The upgrade of the existing cycle track and improved pedestrian facilities will also result in the narrowing of the quay road at locations along the length of the three campshires.

During extreme storm events when the flood protection system will be in operation, the erection the flood protection barrier east of Cardiff Lane will be necessary. Traffic crossing from the north side of the river at Samuel Beckett Bridge will be restricted from travelling east along Sir John Rogerson’s Quay but will continue to have access to Cardiff Lane as normal.

Some pedestrian routes along the campshires will also be affected during the operation of the flood protection system by the erection of the lift gates and flood protection barrier of the flood protection. Clear signage will be provided advising pedestrians to use the footpaths on the south side of the quay which will be unaffected.

Due to the low level of the abutments and open construction of the Sean O’Casey Bridge it is not feasible to incorporate this into the flood protection scheme and therefore the pedestrian bridge will be closed to pedestrians during extreme storm events. Signage will again be provided to advise pedestrians of alternative routes.

**4.8.1.6 Mitigation Measures**

**Construction Phase**

The construction works will be phased to minimise disruption to pedestrians, cyclists and traffic at any given time.

The traffic management and amenity protection measures proposed for the construction period are outlined as follows:

- Implementation of a Construction Phase Traffic Management Plan in accordance with ‘Guidance for the Control and Management of Traffic at Roadworks’, by the Department of Transport and ‘Guidelines for Working on Roads’ by the Health
and Safety Authority. The plan should include strategic routing for HGV’s coming from and going to the site.

**Operational Phase**

In November 2010 Dublin City Council carried out a Car Parking Survey to ensure that the loss of the 22 No. car parking spaces on City Quay and Sir John Rogerson’s Quay can be accommodated in the surplus parking spaces on the adjacent streets.

The project works incorporate proposed road markings for the quay roads from Matt Talbot Bridge to east of Cardiff Lane. This will assist to guide traffic along the quays which have been reduced in width due to the introduction of the new cycle track and improved pedestrian facilities. Lane widths will be reduced to a minimum of 3.375 meters from Matt Talbot Bridge to Lombard Street and to 3.2 meters from Lombard Street to Cardiff Lane.

During extreme storm events when the proposed flood protection lift gates and flood defence barrier are in place, clear signage will be provided advising vehicular traffic of the temporary diversion and advise pedestrians to use the footpaths on the south side of the quay which will be unaffected. Signage will also be provided on both the northside and southside of the Sean O’Casey Bridge advising that the bridge is temporarily closed.

**4.8.1.7 Residual Impacts**

**Construction Phase**

Minor temporary and local diversions of pedestrians, cyclists and vehicular traffic will be required along the south campshires for the duration of the works.

**Operational Phase**

There will be a loss of 18 No. car parking spaces on Georges Quay as a result of the improved pedestrian area.

The car park survey showed that the 22 car parking spaces to be removed on City Quay and Sir John Rogerson’s Quay can be accommodated within the existing parking system on the adjacent roads of Windmill Lane, Lime Street and Creighton Street. Dublin City Council Roads department agree that the relocation of these parking spaces and loading bays is feasible considering the surplus of parking spaces on the surrounding streets.

As can be seen from table 4.1.2, which is repeated again below for ease of reference, there is adequate capacity to absorb the loss of the 22 parking spaces on the adjacent roads.
### Table 4.8.1 Car Parking Survey

<table>
<thead>
<tr>
<th>Road</th>
<th>Total spaces</th>
<th>Maximum Spaces occupied at any one time</th>
<th>Total % usage</th>
<th>Residential occupancies</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sir John Rogerson’s Quay</td>
<td>22</td>
<td>8 (36%)</td>
<td>22.16%</td>
<td>3.42%</td>
</tr>
<tr>
<td><strong>Side Roads</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Windmill Lane</td>
<td>33</td>
<td>5 (15%)</td>
<td>11.24%</td>
<td>43.82%</td>
</tr>
<tr>
<td>Lime Street West Side</td>
<td>23</td>
<td>9 (39%)</td>
<td>17.57%</td>
<td>0.00%</td>
</tr>
<tr>
<td>Lime Street East Side</td>
<td>20</td>
<td>15 (75%)</td>
<td>37.08%</td>
<td>0.00%</td>
</tr>
<tr>
<td>Creighton Street West Side</td>
<td>24</td>
<td>12 (50%)</td>
<td>43.94%</td>
<td>52.59%</td>
</tr>
<tr>
<td>Creighton Street East Side</td>
<td>15</td>
<td>7 (47%)</td>
<td>24.17%</td>
<td>38.79%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>115</strong></td>
<td></td>
<td><strong>25.80%</strong></td>
<td></td>
</tr>
</tbody>
</table>

Refer to section 13.0, Volume 4 for the full car parking survey.

A dedicated loading bay on City Quay will be removed as result of the proposed new cycle track and improved pedestrian facilities narrowing the road way. However, there are adequate loading bay facilities on adjacent streets, Princess Street and Lombard Street.

However, it is predicted that the narrowing of the existing roadway will have a calming affect on the traffic as the existing roadway is up to 9.5 meters wide, with little or no road markings which encourages high speeds. Proposed new road markings will also assist the flow and safety along the quay roads from Matt Talbot Bridge to Cardiff Lane.

During extreme storm events when the flood protection system will be in operation, the erection the flood protection barrier east of Cardiff Lane will be necessary. Traffic crossing from the north side of the river at Samuel Beckett Bridge will be restricted from travelling east along Sir John Rogerson’s Quay but will continue to have access to Cardiff Lane as normal. However alternative routes are available and will be sign posted during these periods.

#### 4.8.1.8 Monitoring

During the construction of the development, there will be ongoing monitoring by the Contractor to ensure that:

- The Construction Phase Traffic Management Plan is being adhered to,
- The Construction Phase Traffic Management Plan adequately addresses the control of traffic to and from the development site,
- The road surface and footpath requirements of Dublin City Council are complied with.
• Adequate signage to be provided for pedestrians, cyclists and vehicles during extreme storm events when the lifting / swinging gates and flood defence barriers are in place.
4.8.2 Properties

4.8.2.1 Introduction

This section has been prepared by Moylan Consulting Engineers for the proposed South Campshire Flood Protection Project.

The section reviews the properties within and adjacent to the site, assesses potential impacts the proposed development will have on them and sets out mitigation measures to minimise adverse impacts to the properties.

4.8.2.2 Research Methodology

Data for the subject lands was collected through a desktop study and site visits.

In order to prepare this section of the EIS, an examination of the site for the proposed development and of the properties in the vicinity of the development site was carried out as follows:

- Examination of available mapping of the area
- Site visits
- Visual inspection (external) of properties in the vicinity of the site
- Consultation with the various effected property owners

4.8.2.3 Receiving Environment

Properties affected by the proposed flood defence project are as follows:

- Georges Quay which is the property of Dublin City Council
- The Campshires which are the property of the DDDA
- ESB Substation which is the property of the ESB
- The two B.J. Marine Buildings which are the property of DDDA
- Samuel Beckett Bridge which is the property of Dublin City Council
- McCann Fitzgerald Building which is leased by McCann Fitzgerald
- The Properties within the rest of the Flood Cell (commercial, business, retail and residential).

The majority of the proposed development is within the campshires which is the property of the DDDA. The DDDA have provided DCC a letter of consent to apply for planning approval. A copy of the letter dated 20 April 2011 is included in Section 16.0 Volume 4.

As outlined in section 1.2.1, every property within the entire flood cell is at risk of flooding from extreme high tide events. The proposed flood defence will provide protection to the flood cell environment for extreme high tide events will be protected
from the Liffey overtopping along the campshires up to 3.7 metres above Malin Head Datum.

4.8.2.4 Characteristics of the Proposed Development

The proposed development is described in detail in Section 3.2. It consists of a 1.0 km of flood protection system on the south campshires of the River Liffey, extending from Butt Bridge to Samuel Beckett Bridge and the quay road just east of the new pedestrian crossing at Cardiff Lane with a demountable flood defence tying into the McCann Fitzgerald building.

The flood protection works will also incorporate an upgrade of the existing cycle track to provide 650m of new on road cycle track, improvement of pedestrian facilities and the provision of additional tree planting along the length of the campshires.

Drawings and photomontages included in Volume 3 show the alignment of the proposed flood protection, typical sections along the campshires, proposed upgrading of the existing cycletracks and the provision for new trees.

4.8.2.5 Potential Impact of the Proposed Development

Construction phase

Georges Quay

There will be disruption to Georges Quay and the quay users during the construction of the proposed flood defence project. The construction works along Georges Quay will include the replacing of the existing river edge railing with a granite clad concrete wall approximately 900mm high, the provision of tree planting with seating and widening of the footpath area.

Campshires

There will be disruption to the campshires along City Quay and Sir John Rogerson's Quay and the quay users during the construction of the proposed flood defence project. The construction works along the campshires will include the construction of the flood defence wall generally 800mm high, the provision of a new cycletrack, improved pedestrian facilities and the planting of trees.

ESB Substation

The proposed flood protection structure traverses around the rear of the ESB Substation. The wall will be constructed at the back of the quay wall with flood gates on either side to allow permeability along the campshires. There will be some disruption along the rear and either side of the ESB substation, however, with the entrance to the ESB Substation on the road side of the building there should be no adverse affect to the operation of the station during the construction works.

Construction of the flood defence structure will require foundations which may affect the underground power cables feeding to and from the Substation.
The Two B.J. Marine Buildings

The two B.J. Marine buildings will form part of the flood protection. It is proposed to render the outside of the building, along the rear, with a waterproof render up to the proposed flood defence level of 3.7m above Malin Head Datum. It is also proposed that any existing openings will be made water tight and the structure will be reinforced as necessary. Access to the rear and inside of the buildings will be required to carry out these construction works.

The Samuel Becket Bridge

The proposed flood defence is provided in the form of a raised parapet which ties into the end of the raised bridge parapets on both the east and west side. Construction of these raised parapets will cause some minor disruption to pedestrians using the bridge during the works.

The McCann Fitzgerald Building

The proposed flood defence barrier proposed across the entire quay at the east end of the defence, which will be erected at times of extreme high tides, will require a fixing rail to be fitted to the low wall in front of the McCann Fitzgerald Building. Their will be minor disruption at the front wall of the McCann Fitzgerald building during the construction of the fixing rail.

Properties within the rest of the Flood Cell

There is no impact envisaged to the rest of the properties in the flood cell during the construction works.

Operational Phase

Georges Quay

Georges Quay will have a granite clad concrete wall approximately 900mm high along the river edge quay, the provision of mature tree planting with seating and widened footpath area.

Georges Quay will also have lifting / swinging gates erected during extreme high tides which will protect the property south of the defence from flooding.

There will be no adverse impact on the permeability and general land use of George’s Quay.

Campshires

The campshires along City Quay and Sir John Rogerson’s Quay will have flood defence wall generally 800mm high, a new cycletrack, improved pedestrian facilities and new trees.
Prior to extreme high tide events all flood gates and barriers will be erected by Dublin City Council staff to provide flood protection to properties on the campshires and within the flood cell.

There will be minimal impact on the permeability and general land use of the campshires under normal operating conditions. However, at time of extreme high tides when the lift / swing gates are closed certain areas of the campshires will be temporarily closed to pedestrians and cyclist.

**ESB Substation**

The ESB Substation will be protected against extreme high tides from overtopping the proposed flood defence up to a level of 3.7 metres above Malin Head Datum. And there will be no adverse impact on this property.

**The Two B.J. Marine Buildings**

The two B.J. Marine buildings will be rendered on the outside of the building, along the rear, with a waterproof render up to the proposed flood defence level. The internal structure will also be made secured to resist water pressure from the Liffey at times of high tide.

The B.J Marine Buildings will be protected against extreme high tides from overtopping the quay wall up to a level of 3.7 metres above Malin Head Datum.

**The Samuel Becket Bridge**

The proposed flood defence will be provided in the form of a raised parapet which ties into the end of the raised bridge parapets on both the east and west side.

**The McCann Fitzgerald Building**

A fixing rail will be fitted to the low wall in front of the McCann Fitzgerald Building to provide support for the proposed flood defence barrier.

During times of alerted high flood levels the demountable flood barrier will be erected up to the front wall of the McCann Fitzgerald building. Access to the property will be available to pedestrians following the erection of this temporary barrier.

**Properties within the rest of the Flood Cell**

Properties in the rest of the flood cell which are currently at risk of flooding during extreme high tide events will be protected from the Liffey overtopping along the campshires up to 3.7 metres above Malin Head Datum.
4.8.2.6 Mitigation Measures

Georges Quay

The construction works will be phased to minimise disruption to pedestrians, cyclists and traffic at any given time minimising impact on existing properties.

Campshires

The construction works will be phased to minimise disruption to pedestrians, cyclists and traffic at any given time minimising impact on existing properties.

The traffic management and property protection measures proposed for the construction period are outlined as follows:

Implementation of a Construction Phase Traffic Management Plan in accordance with ‘Guidance for the Control and Management of Traffic at Roadwork’s’, by the Department of Transport and ‘Guidelines for Working on Roads’ by the Health and Safety Authority. The plan should include strategic routing for HGV’s coming and going to the site and avoid residential and commercial properties where ever possible.

During high tides when the lift / swing gates are closed certain areas of the campshires will be temporarily closed to pedestrians and cyclist. Signs will be put in place to direct pedestrians and cyclist to use the southern side of the quays.

ESB Substation

The proposed flood protection structure traverses around the rear of the ESB Substation.

The ESB have been consulted at an early stage of the project and welcome the inclusion of the ESB substation within the protection of the scheme. The existing ESB substation is a critical piece of infrastructure and supplies most of the buildings within the area.

A desktop review of ESB services and an onsite Ground Penetrating Radar Survey of the area around the ESB Substation has been carried out. The flood protection alignment has been designed to avoid the main existing underground services which enter the substation from the south and east side of the Substation.

As outlined in section 1.7, Consultation, the ESB issued an email of agreement to the proposal on 20 December 2010. Refer to section 17.0 in Volume 4 for a copy of the email.

The Two B.J. Marine Buildings

Detailed consultation with the DDDA and in particular the Properties Section has been on going to reach an agreement on the proposed scheme ensuring the B.J. Marine
Buildings are protected and the use of the buildings and adjacent areas is not compromised for any future plans the DDDA may have.

It was agreed that the render used on the two J.B. Marine Buildings will be similar in colour to the existing external brick work to minimise the aesthetic impact on the buildings.

**The Samuel Becket Bridge**

The phasing of works will be coordinated to ensure that pedestrians can use either the bridge’s east or west footway at all times. Signage will be provided during the works to assist pedestrians and cyclists around the work areas.

**The McCann Fitzgerald Building**

During times of alerted high flood levels the demountable flood barrier will be erected by Dublin City Council operatives to the low wall in front of the McCann Fitzgerald building. For representative details of the demountable flood barrier and its connection to the building refer to drawings in Volume 3 and section 12.0 in Volume 4.

Consultation with McCann Fitzgerald Building representatives was undertaken as outlined in section 1.7.

It was agreed that the design of the fixing rail to hold the flood defence barrier will be flush with the existing wall so not to form an obstruction.

The location of the fixing rail was also agreed so as to tie onto the low wall in front of the building and directly onto the building itself. The location of the tie in also maintains access to Admiral Brown Walk, adjacent to the McCann Fitzgerald Building.

Following consultation with McCann Fitzgerald they indicated they have no objection to the proposal, subject only to final agreement on the detailed design of the connection point with the landlord, prior to commencement of construction.

**Properties within the rest of the Flood Cell**

There are no predicted adverse impacts on the properties within the rest of the Flood Cell and as such no mitigation measures are proposed.

**4.8.2.7 Residual Impacts**

**Construction Phase**

**Georges Quay**

There will be minimum disruption to Georges Quay and the quay users during the construction of the proposed flood defence project.

Minor temporary and local diversions of pedestrians, cyclists and traffic will be required along the south campshires for the duration of the works.
Campshires

There will be minimum disruption to the campshires along City Quay and Sir John Rogerson’s Quay and the quay users during the construction of the proposed flood defence project.

Minor temporary and local diversions of pedestrians, cyclists and traffic will be required along the south campshires for the duration of the works.

ESB Substation

There are no adverse impacts envisaged to the ESB Substation during the works. On site supervision by the ESB shall be arranged and best practise for excavation near ESB cables will be followed when working adjacent to the existing substation and control room.

The Two B.J. Marine Buildings

There will be temporary disruption to the B.J. Marine Buildings during the construction works. It is noted that the two buildings are currently only used for maintenance storage so these works should have very little impact.

The Samuel Becket Bridge

There will be minor disruption to the parapets of the bridge during the construction works.

The McCann Fitzgerald Building

There will be minor disruption to the low wall in front of the McCann Fitzgerald Building during the construction works.

Properties within the rest of the Flood Cell

There is no impact envisaged to the rest of the properties in the flood cell during the construction works.

Operational Phase

Georges Quay

Georges Quay, south of the defence, will be protected from extreme high tides from overtopping the proposed flood defence up to a level of 3.7 metres above Malin Head Datum.

Georges Quay will be provided with improved pedestrian facilities.
Campshires

The campshires, south of the defence, will be protected from extreme high tides from overtopping the proposed flood defence up to a level of 3.7 metres above Malin Head Datum.

The campshires will be provided with a two-way cycle track, improved pedestrian facilities and new trees.

During extreme high tide events when the swing / lift gates are closed certain areas of the campshires will be temporarily closed to pedestrians, cyclists and vehicles.

ESB Substation

The ESB Substation will be protected from extreme high tides from overtopping the proposed flood defence up to a level of 3.7 metres above Malin Head Datum.

The Two B.J. Marine Buildings

The two B.J. Marine Buildings will be protected from extreme high tides from overtopping the proposed flood defence up to a level of 3.7 metres above Malin Head Datum.

The Samuel Beckett Bridge

The Samuel Beckett Bridge will not be affected upon during the operation of the flood defence.

The McCann Fitzgerald Building

There will be no adverse impact on the McCann Fitzgerald Building from the proposed flood defence.

Properties within the rest of the Flood Cell

There is no impact envisaged to the rest of the properties in the flood cell during the construction works.

Flood protection for all properties south of the defence, within the entire flood cell, will be provided during extreme high tides from overtopping the proposed flood defence up to a level of 3.7 metres above Malin Head Datum.

4.8.2.8 Monitoring

Construction Phase

During the construction of the development, there will be ongoing monitoring by the Contractor to ensure that:-
• The Construction Phase Traffic Management Plan adequately addresses the control of traffic to and from the development site and affect on local properties.

• The Construction Phase Traffic Management Plan is being adhered to.

• The road surface and footpath requirements of Dublin City Council are complied with.

• Dust levels from any construction works do not affect existing properties.

Operational Phase

Prior to extreme high tide events all flood gates and barriers will be erected by Dublin City Council staff to provide flood protection to properties on the campshires and within the flood cell.
4.8.3 Services

(Note: Water and drainage services are covered in section 4.4)

4.8.3.1 Introduction

This section has been prepared by Moylan Consulting Engineers for the proposed South Campshire Flood Protection Project.

The section reviews the services within and adjacent to the site, assesses potential impacts the proposed development will have on them and sets out mitigation measures to minimise the impact to the services.

4.8.3.2 Research Methodology

Utility data for the subject lands was collected through the following:

- Desktop study
- Site Visits
- Review of utility records provided by the various utility providers including ESB, Bord Gáis, Eircom, British Telecom and UPC (NTL).
- Site Investigation including underground surveys and Ground Penetration Radar

4.8.3.3 Receiving Environment

The existing utility layouts are based on records received from the various utility providers listed in section 4.8.3.2 and are shown below in Figures 4.8.2. to 4.8.6.

In addition a site investigation was carried out in June 2010 by Ground Investigations Ireland Ltd., the results of which are shown in section 6.0, Volume 4. The investigation included a number of trial holes, slit trenches and Ground Penetration Radar to identify existing utilities and validate the utility records.

The following is a brief description of the utility layouts along the south campshires within the subject site:

**ESB:**

- ESB 10/20kV power lines are located along the south side of the quay road from Georges Quay west of Moss Street to Sir John Rogerson’s Quay past the Samuel Beckett Bridge.

- ESB10/20kV power lines cross City Quay to the east side of Matt Talbot Bridge.

- Several crossings of 10/20kV ducts cross the south campshires from the ESB substation to City Quay road and down Creighton Street.

- An ESB10/20kV power line crosses Sir John Rogerson’s Quay road to the B.J. Marine building (west).
- ESB substation associated with the Samuel Beckett Bridge

**Figure 4.8.2 Existing ESB Layout**

- Bord Gáis:
  - A 450mm gas main is located along the south campshire between Butt Bridge and Matt Talbot Bridge. The gas main crosses Matt Talbot Bridge along the west side of the bridge.
  
  - A 900mm (4 bar) gas main is located along the south side of the quay road from Tara Street to Matt Talbot Bridge and along the north side of the quay road from Matt Talbot Bridge to Cardiff Lane.
  
  - A 450mm (25 mbar) and a 150mm (25 mbar) gas main are located along the south side of the quay road from Tara Street to Cardiff Lane

**Figure 4.8.3 Existing Bord Gáis Layout**
Eircom:

- Eircom ducting is located along the south of George’s Quay road before crossing onto the south campshire just west of Moss Street where it continues to cross over the west side of Matt Talbot Bridge.

- Eircom ducting is located along the south side City Quay and Sir John Rogerson’s Quay from Moss Street eastwards beyond Cardiff Lane.

- Eircom ducting crosses over the east side of Matt Talbot Bridge before turning eastwards along the north side of City Quay road before returning southwards across the quay road approximately 25m west of Lombard Street.

- An Eircom duct crosses Sir John Rogerson’s Quay road to service the B.J. Marine Building (east).

- No. Eircom ducts cross Sir John Rogerson’s Quay road to the south campshire at Cardiff lane before turning eastwards along the south campshire.

Figure 4.8.4 Existing Eircom Layout
British Telecom:

- British Telecom ducting traverses the south side of the quay road from Tara Street to Cardiff Lane.

- A British Telecom duct crosses the west side of the Matt Talbot Bridge to the south side of Georges Quay road at the Moss Street junction.

Figure 4.8.5 Existing British Telecom Layout

UPC (Formally NTL):

- UPC ducting crosses the site area from the west side of Matt Talbot Bridge southwards over the campshire and down Moss Street.

Figure 4.8.6 Existing UPC (NTL) Layout

Refer to Drawings 4.8.1 to 4.8.5 for the proposed flood protection overlaid onto the existing utility layouts.
4.8.3.4 Characteristics of the Proposed Development

The proposed development is described in detail in Section 3.2. It consists of a 1.0 km of flood protection system on the south campshires of the River Liffey, extending from Butt Bridge to Samuel Beckett Bridge and across the quay road just east of the new pedestrian crossing at Cardiff Lane with a demountable defence.

The flood protection works will also incorporate an upgrade of the existing cycle track to provide 650m of new on road cycle track, improvement of pedestrian facilities and the provision of additional tree planting along the length of the campshires.

Drawings included in Volume 3 show the alignment of the proposed flood protection, typical sections along the campshires, proposed upgrading of the existing cycletracks and the provision for new trees.

4.8.3.5 Potential Impact of the Proposed Development

Construction Phase

Most existing utilities are located south of or within the quays with the occasional crossing such as the ESB ducting to the sub station at Creighton Street.

Some modern services exist within the campshires areas but are generally associated with local lighting of the pedestrian areas within the campshires.

During the construction of the flood protection along the south campshires there will inevitably be areas of conflict between the proposed works and existing utilities.

These impacts may involve the relaying and/or realigning existing utilities locally to make way for the flood protection structure, in particular to avoid the foundation of the flood protection wall and/or swing/lift gate. It is not envisaged that these local diversions will have a significant impact on the service to the area.

Proposed works to the footpath and cycletrack along the length of the works area is mainly resurfacing and marking, and is unlikely to affect the integrity of the underlying utilities.

Operational Phase

High water levels in the Liffey may give rise to ingress of water into service ducts and chambers which lie on the north of the proposed flood defence and would flow through the ducts and result in surcharging of the ducts and local flooding areas south of the campshires and proposed flood protection.

4.8.3.6 Mitigation Measures

Due care has been taken in the design of the alignment and type of flood protection structure to minimise the impact on existing utilities, in particular in the vicinity of the ESB substation.
Existing utility layouts were received from the various utility providers prior to design of the alignment and design of the types of flood protection structures. Refer to Drawings 4.8.1 to 4.8.5 for the existing layout overlaid onto the proposed flood protection structure.

Ground Investigations Ireland Ltd. carried out a site investigation including several slit trenches, trial pits and utility detection procedures along the campshires. These investigations were used to confirm the alignment and depth of services, including surface water pipes along the south campshires. Refer to section 6.0, Volume 4 for the Site Investigation report.

All relaid utilities will be laid in accordance with the requirements and under the supervision of the relevant utility provider.

4.8.3.7 Residual Impacts

Construction Phase

Some minor and temporary disruptions to existing services will occur due to lowering and diversion of services due to the construction of the proposed flood defence works.

The disruptions to existing services would be short term and services would be realigned/reinstated in a linear fashion along the campshires as the works proceed.

Operational Phase

The proposed works will provide protection for the utilities from possible floods up to 3.7m above Malin Head.

4.8.3.8 Monitoring

Monitoring of the relaying of any utilities will be monitored under the supervision of the relevant utility provider.
4.9 Cultural Heritage

4.9.1 Archaeology

4.9.1.1. Introduction

This section has been prepared by CRDS Ltd. and assesses the likely impacts on Archaeological Heritage of the construction and operation of the proposed development. It proposes mitigation measures to minimise these impacts and outlines the resulting residual impacts and monitoring requirements.

4.9.1.2 Research Methodology

For the purpose of setting the proposed development within its wider archaeological landscape and to assess the archaeological potential of the site, a desk-based assessment utilising the Record of Monuments and Places, the National Museum of Ireland Topographical Files and the Dublin City Industrial Heritage record was undertaken supplemented by a site inspection of the proposed site.

The Record of Monuments and Places was consulted for the relevant parts of the city. This is a list of archaeological sites known to the National Monuments Service. The relevant files for these sites contain details of documentary sources and aerial photographs, early maps, OS memoirs, OPW Archaeological Survey notes and other relevant publications. Further information on individual monuments was obtained in the Urban Archaeological Survey for Dublin City. The list of National Monuments in State Ownership or State Guardianship, the Register of Historic Monuments, the Sites and Monuments Record and National Monuments covered by Preservations Orders were also assessed. All sites within the study area were identified and are listed in Appendix 4.9.1.1 (see Figure 4.9.1.1) in Section 3.0 of Volume 4.
The proposed development is located within the Zone of Archaeological Potential for the historic city of Dublin (RMP DU018-020) and three recorded archaeological monuments namely the quay wall along City Quay (DU018-020479), the quay wall along George’s Quay (DU018-020458) and the quay wall along Sir John Rogerson’s Quay (DU018-020201).

Dublin City Council recognises the role that industry has played in the creation of the city and seeks to protect the buildings and features of industrial heritage in situ and their related artefacts and plant. Where the retention of artefacts and plant in situ would mitigate against finding a suitable new use for the buildings, consideration may be given to the removal of the artefacts and machinery to a different but secure place. The Dublin City Industrial Heritage Record was assessed and a number of industrial archaeological sites were identified within close proximity to the proposed development. These are listed in Appendix 4.9.1.2 in section 3.0 of Volume 4.

The topographical files in the National Museum of Ireland were consulted to determine if any archaeological artefacts had been recorded from the area. This is the national archive of all known finds recorded by the National Museum. It relates primarily to artefacts but also includes references to monuments and has a unique archive of records of previous excavations. Other published catalogues of prehistoric material were also studied: Raftery (1983 - Iron Age antiquities), Eogan (1965; 1993; 1994 - bronze swords, Bronze Age hoards and goldwork), Harbison (1968; 1969a; 1969b - bronze axes, halberds and daggers) and the Irish Stone Axe Project Database (School of Archaeology, U.C.D.). All streets within the study area were assessed. Recorded finds from the area are listed in Appendix 4.9.1.3 in Section 3.0 of Volume 4.

The Excavations bulletin website (www.excavations.ie) was consulted to identify previous excavations that may have been carried out within the study area. This database contains summary accounts of excavations carried out in Ireland from 1970 to 2007. Excavations undertaken in the vicinity of the proposed development are listed in Appendix 4.9.1.4 in Section 3.0 of Volume 4.

An assessment of the site of the proposed development was undertaken in September 2010. The purpose of the site assessment was to examine known archaeological monuments and places in the vicinity of the proposed development and to identify new sites and areas of archaeological heritage potential (see section 4.9.1.3 Archaeological Heritage).

While permanent occupation of the area during the prehistoric and medieval periods may have been problematic due to the nature of the Liffey shoreline, it may have been used on a temporary basis for hunting and fishing. Archaeological material associated with this form of exploitation would include fish traps and other fishing structures and dug out boats (O’Sullivan and Breen 2007). Archaeological excavations undertaken at a site on North Wall Quay to the north of the proposed development revealed a primary shoreline associated with the River Liffey and the remains of at least two fish-traps dating to the Mesolithic period (McQuade and O’Donnell 2006, 569). The deposits, which were dated to around 6100-5700 BC or the Late Mesolithic period, were found at a depth of 6.3m below mean sea level indicating significant changes in the ground level conditions. The site was located under land reclaimed from the Liffey, but would...
originally have been on the foreshore of the river. Movement through the estuarine landscape would have been assisted by the dumping of brushwood, or by the construction of hurdle panels or timber trackways (O’Sullivan 2001, 131). Stray finds recorded in the area, including a flint pick from the River Dodder, demonstrate exploitation of riverine resources in the area in the prehistoric period.

The River Liffey has long been critical to communications in this area. Since the medieval period, the Liffey’s shores have been gradually walled in, and tracts of land reclaimed from its waters now form the ground upon which much of the modern city centre and the study area itself are built (De Courcy, 1986).

To the south of the proposed development on the corner of Luke Street and Townsend Street, archaeological excavations revealed the presence of timber revetments and associated century river silts. The remains of two parallel revetments, constructed of oak, were discovered on the site. They ran in a north-south direction before turning east-west and running parallel to the River Liffey. The revetment seems to have been short-lived and pottery recovered from the lowest levels date the site to the mid-17th century (Walsh, 1998:192, www.excavations.ie).

Extensive archaeological investigations undertaken at 17-19 Sir John Rogerson’s Quay have revealed further evidence for the reclamation and subsequent development of the area. The earliest deposits on the site consisted of reclamation deposits and contained rows of irregular wooden posts which may have been used to consolidate the ground (Cryerhall 2002:0577; Frazer 2006:641, www.excavations.ie). Remains of industrial buildings and the Hibernian Marine School, constructed on the site following its reclamation were also discovered in the upper levels of the site. The structural remains were supported on timber foundation piles. Approximately 170 timbers were excavated on the site and comprised worked wood from a number of sources including ships’ timbers, boatyard timbers and possible 17th century timber revetments. (Scally 2006:643, www.excavations.ie)

Archaeological monitoring of site investigation works undertaken for the proposed Liffey Quay Walls Flood Project was requested by the City Archaeologist. Monitoring took the form of site inspections, which were carried out under licence to the National Monuments Service, DoEHLG and the National Museum (licence ref: 10E108). The depth of the excavation achieved in the test pits and slit trenches ranged between 1.50m and 2m. Natural ground was not exposed in any of the trenches. The trenches contained modern fill and post-medieval reclamation deposits (dated by finds of 18th and 19th century pottery), the foundations of two of the standing buildings along the quays, underground services and industrial features including the remains of two small railway or tram lines.

4.9.1.4 Characteristics of the Proposed Development

The proposed development consists of a new flood defence system, approximately 1.0km in length located on the south campshires of the River Liffey. The flood defence will extend from Butt Bridge to Samuel Beckett Bridge and return across the quay road just east of the new pedestrian crossing at Cardiff Lane (for full description of the development see Section 3.2).
The defence, at a level of 3.7m above Malin Head Datum, will provide flood protection from extreme high tides. The defence will, for the most part, consist of a new wall which will be approximately 900mm high and have a series of openings to allow access to the campshires, pedestrian bridges and walkways.

The flood defence takes different forms at several sections over its length including high quality concrete finish wall, granite cladding wall, raised parapets and waterproofing of existing buildings along the campshires.

The northern end of the proposed development is located on George’s Quay immediately to the south of Butt Bridge. Along George’s Quay the quay wall is constructed of ashlar granite (see Plate 4.9.1.1).

The level of the quay wall has been built up slightly with a concrete footpath and a low plinth wall with mild steel railings lines the edge of the quay (see Plate 4.9.1.2). The west end of the quay terminates in a set of wide granite steps leading down to the river. The proposed flood defence wall run along the quay wall at the river edge.
The quay wall along City Quay is constructed of ashlar granite with stone setts to the south (see Plate 4.9.1.3). Cast-iron mooring hooks are located along the northern edge of the quay. Between Matt Talbot Bridge and Sean O’Casey Bridge there are granite steps leading down to the river and the remains of a short length of cast-iron rail (see Plate 4.9.1.4). The remainder of the campshire has been resurfaced and landscaped in recent years (see Plate 4.9.1.5). The proposed flood defence wall will be set back from the quayside as far as the ESB sub-station.
Plate 4.9.1.3: Quay wall and mooring hook on City Quay
Plate 4.9.1.4: Steps and cast-iron rail on City Quay
The quay wall along the west end of Sir John Rogerson’s Quay is constructed of ashlar granite with stone setts to the south (see Plate 4.9.1.6). Cast-iron mooring hooks and mooring rings are located along the northern edge of the quay and there are timber fenders to the north of the B.J. Marine building (see Plate 4.9.1.7). There is a set of granite steps to the northeast of the ESB sub-station with a short length of cast-iron rail immediately to the south. The west end of the campshire has been resurfaced and landscaped in recent years. From the ESB sub-station to the warehouse building the proposed flood defence will be set back from the river. Between the B.J. Marine buildings there are sections of the original stone setts and cast-iron rails (see Plate 4.9.1.8). Along this stretch of the quay the proposed flood defence wall will run in line with the north walls of the B.J. Marine buildings.
Plate 4.9.1.6: Quay wall and B.J. Marine building on Sir John Rogerson’s Quay

Plate 4.9.1.7: Quay wall and timber fenders on Sir John Rogerson’s Quay
The quay wall along the east end of Sir John Rogerson’s Quay is constructed of ashlar granite (see Plate 4.9.1.9). To the east and west of Samuel Beckett Bridge the height of the quay wall has been built up slightly with a low plinth wall with mild steel railings. To the east of Samuel Beckett Bridge the campshire is lined with stone setts with inset cast-iron rails (see Plate 4.9.1.10). There is a set of granite steps leading down to the river to the east of the bridge. The proposed flood defence wall will run across the campshire from northwest to southeast and will then be within the campshire returning across the Sir John Rogerson’s Quay road just east of Cardiff lane.

Plate 4.9.1.8: Stone setts and cast-iron railings on Sir John Rogerson’s Quay, west end
Plate 4.9.1.9: Quay wall and stone steps Sir John Rogerson’s Quay

Plate 4.9.1.10: Stone setts and cast-iron railings on Sir John Rogerson’s Quay, east end
4.9.1.5 Potential Impact of the Proposed Development

Construction Phase

The proposed flood defence is located within the Zone of Archaeological Potential for the historic city of Dublin (DU018-020).

The proposed flood defence has been set back along City Quay (DU018-020479) and Sir John Rogerson’s Quay (DU018-020201) to avoid direct impacts on the quay walls.

While the proposed flood defence is located on the quay wall on George’s Quay (DU018-020458) it will not directly impact the wall structure as it will be constructed on the existing reinforced concrete slab.

There is the potential that the proposed development will impact on previously unrecorded sub-surface archaeological remains including features associated with the industrial use of the area from the 18th to the 20th centuries.

Operational Phase

The operational phase of the scheme is unlikely to have any significant impacts on archaeological heritage.
4.9.1.6 Mitigation Measures

Construction Phase

In order to mitigate against the potential impact the proposed development would have on sub-surface archaeological remains the following archaeological mitigation measures will be applied:

An archaeological monitoring brief will be required during all sub-surface works associated with the construction phase of the proposed development. Archaeological monitoring should be undertaken by an archaeologist licensed by the Department of Environment, Heritage and Local Government. The archaeological monitoring brief will have due regard to National Monuments Legislation and should be formulated in conjunction with the Dublin City Archaeologist, National Museum of Ireland and the National Monuments Section Department of the Environment, Heritage and Local Government.

Mitigation will take due regard to the heritage policies and objectives included in Chapter 10 of the Dublin City Development Plan 2005 – 2011.

- It is the policy of Dublin City Council that sites within Zones of Archaeological Interest be subject to an archaeological assessment in consultation with the City Archaeologist prior to a planning application being lodged (POLICY H33),
- It is the policy of Dublin City Council to protect archaeological material in situ by ensuring that only minimal impact on archaeological layers is allowed, by way of the re-use of buildings, light buildings, foundation design or the omission of basements in the Zones of Archaeological Interest (POLICY H34)
- It is the policy of Dublin City Council that, where preservation in situ is not feasible, sites of archaeological interest shall be subject to archaeological investigations and recording according to best practice, in advance of redevelopment (POLICY H35)
- It is the policy of Dublin City Council to ensure the public dissemination of the findings of archaeological investigations and excavations (POLICY H36)
- It is the policy of Dublin City Council to acknowledge the importance of underwater archaeology. Proposed developments that may have implications for the underwater heritage shall be subject to an underwater archaeological assessment in advance of works (POLICY H37).
- It is the policy of Dublin City Council that the National Monuments Advisory Service will be consulted in assessing proposals for development which relate to Recorded Monuments and Places (POLICY H38).
- It is the policy of Dublin City Council to preserve, and enhance where feasible, the surviving sections of the city wall (POLICY H39).
- It is the policy of Dublin City Council that in evaluating proposals for development in the vicinity of the surviving sections of the city wall that due recognition be given to their national significance and their special character (POLICY H40).
- It is the policy of Dublin City Council to protect the buildings and features of industrial heritage in situ, and their related artefacts and plant where appropriate (POLICY H25).
Operational Phase

No archaeological mitigation is required for the operational phase of the proposed development.

4.9.1.7 Residual Impacts

Construction Phase

Should the recommended archaeological mitigation measures be implemented it is unlikely that there will be any significant residual impacts on archaeological heritage associated with the construction phase of the proposed development.

Operational Phase

Should the recommended archaeological mitigation measures be implemented it is unlikely that there will be any significant residual impacts on archaeological heritage associated with the operational phase of the proposed development.

4.9.1.8 Monitoring

Construction Phase

An archaeological monitoring brief will be required during all sub-surface works associated with the construction phase of the proposed development. Archaeological monitoring should be undertaken by an archaeologist licensed by the Department of Environment, Heritage and Local Government. The archaeological monitoring brief will have due regard to National Monuments Legislation and should be formulated in conjunction with the Dublin City Archaeologist, National Museum of Ireland and the National Monuments Section Department of the Environment, Heritage and Local Government.

Operational Phase

No archaeological monitoring will be required during the operational phase of the proposed development.
4.9.2 Local History

4.9.2.1 Introduction

This section has been prepared by CRDS Ltd. and assesses the likely impacts on Local History of the construction and operation of the proposed development. It proposes mitigation measures to minimise these impacts and outlines the resulting residual impacts and monitoring requirements.

4.9.2.2 Research Methodology

For the purpose of setting the proposed development within its wider local historical context and to assess the historical potential of the site, a desk-based assessment utilising documentary and cartographic sources was undertaken supplemented by a site inspection of the proposed site.

Reference to cartographic sources provides information on the development of the area in the period after 1700. Pre-Ordnance Survey cartographic sources included Bernard de Gomme’s ‘The City and Suburbs of Dublin’, 1673 (Figure 4.9.1.2), Charles Brooking’s ‘A map of the city and suburbs of Dublin’, 1728 (see Figure 4.9.1.3), John Rocque’s ‘Plan of the city of Dublin’, 1756 (see Figure 4.9.1.4) and ‘Plan of the County of Dublin’, 1760 (see Figure 4.9.1.5). Additional maps were consulted in the Trinity College Map Library and consisted of the Ordnance Survey 6" maps, first and later editions (see Figure 4.9.1.6, 4.9.1.7 and 4.9.1.8).

Historical sources consulted included The Liffey in Dublin (De Courcy 1996) and the Dublin Docklands Architectural Survey (University College Dublin School of Architecture, 1996), the Royal Historical Society Bibliography (www.rhs.ac.uk/bibl), the Planning Architecture Design Database Ireland (www.paddi.net) and the British and Irish Archaeological Bibliography (www.biab.co.uk).

An assessment of the site of the proposed development was undertaken in September 2010. The results of the field survey are outlined in section 4.9.1.2 above.

4.9.2.3 Local History

Development along the River Liffey and in the city of Dublin in general, gained pace during the second half of the 17th century (see Figure 4.9.1.2). During the very early 18th century several new quays were added to the south bank, including Sir John Rogerson’s Quay, City Quay and George’s Quay.
Sir John Rogerson had been a member of the City Council and Lord Mayor of Dublin. In 1713 he was given fee farm estate rights to an area extending from Lazy Hill to Ringsend including the strand. He quickly proposed and began construction of the quay wall (RMP no. DU018-020201). A second wall was constructed to the south of this and the space between was filled with material dredged from the River Liffey.

This work, the most ambitious privately funded quay development in Dublin to that date, comprised the construction of a wall from Creighton Street towards Ringsend, where the quay wall turned at a right angle to run along the River Dodder (De Courcy 1996, 334). By the late 1720s the wall extended from Creighton Street to the Rope Walk or Lime Street and is depicted on Brookings map of 1728 (see Figure 4.9.1.3 in ).

The remainder of the wall was named as ‘Horse Road to Ringsend’. The land enclosed behind the quay was subject to regular inundation during high tides and strong storms. The Hibernian Marine School was constructed on the quay between Cardiff’s Lane and Lime Street between 1770 and 1773.
In 1712 the city faced a problem regarding the embankment of the Liffey along part of the south side of the channel. John Mercer was required on the basis of his lease to complete a wall from the Hawkins wall to a point east of modern Creighton Street which was to join up to a wall being built by Sir John Rogerson from the River Dodder at Ringsend. When Mercer was unable to finish his section the City decided to complete it so as not to leave a gap. In 1715 the city began construction of a length of river wall eastward from Moss Street (RMP no. DU018-020479).

The wall was similar in design to that on Sir John Rogerson’s Quay and consisting of two parallel faces infilled with reclaimed stone and sand. By 1719 the construction of this section of the wall was nearing completion and the newly made land behind the quay was sold to David Latouche. The land reverted to the City in 1723 who proceeded to lay out a grid of east-west and north-south streets and established 51 lots of ground, the South Lotts, fronting the river (De Courcy 1996, 372-3).

The quay wall is lined with two and three-storey gabled-fronted houses on ‘A prospect of the City from the North’, on Charles Brooking’s map of 1728. Rocque’s map of 1756, however, depicts a number of undeveloped plots with timber and store yards between George’s Quay and Sir John Rogerson’s Quay (see Figure 4.9.1.4).

These yards may have been associated with shipbuilding. The end of the 18th century saw the completion of the quays and beginnings of residential development in the grid of streets to the south of the quay. The development of the Grand Canal Docks to the west of the site in the early 19th century led to an intensification of industrial uses in the area and a reduction in residential use.
Prior to the downstream bridging of the Liffey in the 20th century, river crossings were made by means of ferry. In the 18th and early 19th century two ferry services crossed the Liffey on City Quay. The Ferryman Hotel was built in the 1780s by Lord Cardiff to provide accommodation for travellers.

George’s Quay was being constructed in the early 18th century in parallel with development of the adjoining Mercer’s Ground and City Quay (RMP no. DU018-020458). Throughout the 18th and 19th centuries the quay functioned as an important berthing place or terminal for cross-channel passenger ships and buildings along the quay housed associated trades including chandlers, commercial agents and shipbrokers (De Courcy 1996, 173). The western end of the quay, where it links with Burgh Quay, is shown by Brooking (1728) and Rocque (1756) as containing buildings which fronted directly onto the river. These buildings were demolished during the reconstruction of the Burgh Quay/City Quay area in the early 19th century.

The proposed development is located within the area known as the Dublin Docklands which comprises 520 hectares on the north and south banks of the River Liffey. The construction of the Custom House, the completion of the Royal Canal and Grand Canal and the provision of railway links within the docklands provided the impetus for the commercial and industrial development of the area in the 18th and 19th centuries.

The deterioration of the area and subsequent depopulation was evident in the late 19th and early 20th century. This trend was worsened by the advent of containerisation within the port of Dublin in the mid-20th century which led to a fall off in local employment.
The Custom House Docks Area Renewal Act in 1986 and the creation of the Dublin Docklands Development Agency in 1997 heralded a period of regeneration of the docklands through the provision of mixed use schemes including new residential and commercial development.

4.9.2.4 Characteristics of the Proposed Development

The proposed development consists of a new flood defence system, approximately 1.0km in length located on the south campshires of the River Liffey (see Section 3.2 and section 4.9.1.4 for full descriptions of the scheme). The flood defence will extend from Butt Bridge to Samuel Beckett Bridge and return across the quay road just east of the new pedestrian crossing at Cardiff Lane (for full description of the development see Section 3.2).

The defence, at a level of 3.7m above Malin Head Datum, will provide flood protection from extreme high tides. The defence will, for the most part, consist of a new wall which will be approximately 900mm high and have a series of openings to allow access to the campshires, pedestrian bridges and walkways.

The flood defence takes different forms at several sections over its length including high quality concrete finish wall, granite cladding wall, raised parapets and waterproofing of existing buildings along the campshires.

4.9.2.5 Potential Impact of the Proposed Development

Construction Phase

The construction phase of the proposed development will have no significant impacts on local history context.

Operational Phase

The operation phase of the proposed development will have no significant impacts on local history context.

4.9.2.6 Mitigation Measures

Construction Phase

No mitigation measures are required for the construction phase of the proposed development.

Operational Phase

No mitigation measures are required for the operational phase of the proposed development.
4.9.2.7 Residual Impacts

Construction Phase

There will be no significant residual impacts on local history context associated with the construction phase of the proposed development.

Operational Phase

There will be no significant residual impacts on local history context associated with the operational phase of the proposed development.

4.9.2.8 Monitoring

Construction Phase

No monitoring will be required during the construction phase of the proposed development

Operational Phase

No monitoring will be required during the operational phase of the proposed development
4.9.3. Architecture and Built Heritage

4.9.3.1 Introduction

This section has been prepared by Shaffrey Associates Architects, Grade 1 RIAI conservation accredited architects, on the instructions of Dublin City Council to assess the architectural and built heritage impacts of the proposed construction of a flood defence scheme along the south campshires and quays of the River Liffey, between Butt Bridge and Samuel Beckett Bridge. The area includes structures and spaces of architectural, historical, archaeological, cultural, scientific, technical and social interest. The site comprises the campshires areas along City Quay and Sir John Rogerson’s Quay and the riverside area of George’s Quay. The site extends from Butt Bridge to east of the new Samuel Beckett Bridge and is bounded to the north by the quay walls and to the south by the built edge of Georges’s, City and Sir John Rogerson’s Quay.

Archaeology is dealt with separately in section 4.9.1 and Local History in section 4.9.2.

4.9.3.2 Research Methodology

This report has been prepared following fieldwork assessment of the site – external assessment only of buildings - research and study of historic maps (refer to Figures 4.9.3.4 to 4.9.3.8 in Volume 4) and documents, review of relevant legislation, statutory plans and guidance and, following assessment of the proposed development.

4.9.3.3 Receiving Environment

Current Character

Physical Character

The physical character of the site is defined by the linear quality of the River Liffey and the open nature of the campshires which forms a distinctive contrast to the walled (canalised) quality of the River within the historic city centre. This character is noted in both the Dublin City Development Plans (current and draft) and the DDDA Master Plan and all these statutory documents contain objectives to protect and maintain these characteristics.

Both City Quay and Sir John Rogerson’s Quay have been landscaped in recent years, as civic amenity spaces. Large areas have been paved with stone setts, in keeping with other areas of the Docklands (including the campshires) where historic setts (granite and limestone) survive. Granite and concrete paving flags provide easier walking surfaces within these landscaped areas; cyclists are partially facilitated by a contra flow cycle path which runs within the campshire area and, tree planting and high quality contemporary street furniture have been added, which all reflect the changing functions of the campshires – from a working dockside handling the loading and unloading of berthed cargo, to a civic amenity space. A large section of the quay edge has been railed off with a protective metal guardrail, designed to allow for temporary removal of sections to facilitate mooring boats. This guardrail extends to just east of the Samuel Beckett Bridge, further east of this (and outside the site area) the open campshires continue and there are also extensive sections of historic stone setts.
The public realm at George’s Quay – which lies directly opposite the internationally significant Custom House - contrasts strongly with that of City Quay and Sir John Rogerson’s Quay. Poor quality concrete paving – which partially covers the historic coping stones forming the quay edge – and a basic metal guardrail which is poorly maintained, along with the adjacent on-street parking, contribute to the generally degraded environmental quality of George’s Quay.

The built edge to George’s Quay, City Quay and Sir John Rogerson’s Quay is quite varied in building type, age, architectural style and scale. This contrasts with the more homogenous north quays of the Docklands area.

Apart from the quay walls, which in themselves are probably the defining element of the architectural and cultural heritage and also retain historic steps, mooring bollards, fixings and other physical traces of former dockland use, the section of campshire which retains the strongest historic Dockland character is that area including the B.J. Marine buildings and the section of campshire between these buildings. This latter space retains historic stone setts along with sections of mobile crane tracking. It also retains the open quay edge with a low concrete kerb added as a safety precaution. The two brick buildings, although not protected structures, are the only surviving examples along the campshire (both north and south) of typical dockside buildings.

**Functional Character**

The campshires along City and Sir John Rogerson’s Quays serve a number of functions which directly inform the cultural character of the area. These include the historic function as a place for berthing of ships, boats – thus supporting the ongoing active use of the River; general landscaped amenity space; a walking and cycle route and a place for occasional events, festivals, etc. The variety of uses which these campshire spaces support and their civic, tourism, recreational, cultural and economic value to the city is significant and noted within several objectives within the Dublin City Development Plan 2005-2011, the Draft Dublin City Development Plan 2011-2017 and the Dublin Docklands Area Master Plan 2008.

It should be noted that George’s Quay does not share the variety and intensity of functions which pertains to City Quay and Sir John Rogerson’s Quay. In contrast it is poorly used for civic amenity, primarily serving for car parking, a small amount of pedestrian activity and, more recently, as a station for the Dublin Bike rental scheme.

**Historic Development**

The origins of the earliest settlements and subsequent developments in Dublin relate to its location on the estuary of the River Liffey opening onto Dublin Bay, facing Britain and Europe. Trade—both inland and overseas—was facilitated by the river and the bay and existed for many years before the great projects of the seventeenth and eighteenth centuries saw the formal channelling of the river to form active quaysides and the construction of substantial masonry bridges to accommodate river crossing. The relative peace and political autonomy throughout the eighteenth century saw considerable urban expansion beyond the walled medieval city, with one of the significant projects being the construction of the quay walls, with both North and South Walls completed as far as Ringsend by 1728.
Initially, buildings were constructed along the river edge, however, beginning with Ormond Quay in the late seventeenth century, formal quays were gradually laid out, providing a thoroughfare for transport between the docked ships and the buildings. The forming of the embankment along the North and South Walls was overseen by the Ballast Office, which was established in 1708. Up until then, leaseholders on the north bank of the river were required to form the river boundaries to their properties by fixing of piles. This, however, proved unsuccessful in implementation and in 1710 the Ballast Office began to dredge the river and form the boundaries.

The original river edges were formed with ‘kishes’, basket containers filled with stones, gravel and shingle—not unlike gabions of today—and these were laid along the river bed from small sailing boats. These were gradually replaced by the more robust ashlar quay walls as subsequent development took place on adjacent lands.

Figs. 4.9.3.1; 4.9.3.2; & 4.9.3.3 above.: Taken from H.A. Gilligan’s A History of the Port of Dublin, the above maps chart the changing shoreline of the River Liffey, and the building of the quay walls. The top map is a conjectural diagram of the medieval shoreline, the middle covers the period 1708 to 1785 and the bottom map the years 1788 to 1866.

George’s Quay dates to 1723 (ref. McCready’s Dublin Street Names of 1892), before that the area was known as Mercer’s Dock and – as part of the area of sand between here and the Dodder estuary – the South Strand. Brookings map of 1728 marks both the present George’s Quay and City Quay as ‘St. George’s Quay’ (which suggest an origin for the name at odds with the conventional understanding that the quay was named after King George 1). Rocque’s 1756 map indicates building plots as primarily domestic with gardens to the rear. Prior to the building of the Custom House, George’s Quay was used for unloading corn and salt. Today, George’s Quay is dominated by the Ulster Bank complex, designed by Keane Murphy Duff architects in 1993.

The construction of City Quay dates to 1715 and its name appears to relate to its being built by the City, to fill a gap in the quays between Mercer’s Dock (which became George’s Quay) and Sir John Rogerson’s Quay (1713 onwards). Neither Brookings map of 1728 or Rocque’s 1756 map name City Quay – the latter including this stretch of
quays as Sir John Rogerson’s Quay and the former naming it, with George’s Quay, as St. George’s Quay. City Quay first appears on Pool & Cash’s 1780 map. City Quay was used for berthing by Guinness ships up until 1992.

Sir John Rogerson’s Quay was commenced in 1713 after Sir John Rogerson – a former Lord Mayor and MP for Dublin - received 133 acres of slob land in fee farm grant. The construction of the quay – which extended to the mouth of the Dodder was a considerable feat of engineering. By 1729 the embankment went almost as far as Ringsend and the reclaimed land was leased out in plots for agriculture – known as the South Lotts.

There are a number of bridges within the area:

- The present Butt Bridge replaced an earlier swivel bridge built between 1877 and 1879 to the design of Binden B Stoney, port Engineer. Provision had been made in this structure for the replacement of the metal swing section by a single central stone arch and due to is restricted road width and steep gradients, the swing bridge was decommissioned in 1888 and replaced by a reinforced concrete bridge with granite parapets between 1930 and 1932, designed by Joseph Mallagh, chief engineer to the Port & Docks Board and Pierce Purcell, consultant engineer.

- The Loopline Bridge (Liffey Viaduct), is a steel lattice girder bridge supported on metal piers dating from 1889 to 1891. It was designed by J. Chaloner Smith, engineer to the Dublin, Wicklow and Wexford Railway Company.

- The Talbot Memorial Bridge is a three span bridge using prestressed beams, an insitu concrete deck with reconstituted stone cladding at the abutments. It dates to 1978 and was designed by De Leuw, Chadwick and O’hEocha Consulting Engineers.

- Sean O’Casey pedestrian bridge is a swing bridge, designed by Cyril O’Neill and O’Connor Sutton Cronin, engineers and dates to 2005.

- Samuel Beckett Bridge is a cable-stayed structure with a span of 120m, mechanised to swing open horizontally. Designed by Santiago Calatrava was opened in 2010.

Protected Structures and associated Statutory Objectives

Refer to Section 2.1 and Section 4.9.1 of this EIS for further details of the statutory planning context and which also address some of the issues described under this heading.

The Dublin City Development Plan 2005 – 2011 contains the Record of Protected Structures (RPS), i.e. the list of statutorily protected structures which are protected under the Planning and Development Act 2000. Within the South Campshire Flood Defence project site, the only protected structure is Sir John Rogerson’s Quay, which is listed as follows in the Record of Protected Structures:
It should be noted, therefore, that the protected status extends to the surviving stone setts, mooring rings, steps, bollards, lamp standards and machinery in addition to the quay walls themselves.

There are also a number of buildings on George’s Quay, City Quay and Sir John Rogerson’s Quay which are listed on the Record of Protected Structures:

<table>
<thead>
<tr>
<th>Ref</th>
<th>No.</th>
<th>Address</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>3207</td>
<td>10</td>
<td>George’s Quay</td>
<td>Licensed Premises.</td>
</tr>
<tr>
<td>1857</td>
<td></td>
<td>City Quay</td>
<td>St. Mary’s Church, belfry, boundary walls &amp; railings</td>
</tr>
<tr>
<td>1858</td>
<td></td>
<td>City Quay</td>
<td>Presbytery</td>
</tr>
<tr>
<td>1859</td>
<td>21</td>
<td>City Quay</td>
<td>Stone facade</td>
</tr>
<tr>
<td>1860</td>
<td>22</td>
<td>City Quay</td>
<td>Stone facade</td>
</tr>
<tr>
<td>1861</td>
<td>23</td>
<td>City Quay</td>
<td>Business premises</td>
</tr>
<tr>
<td>7714</td>
<td></td>
<td>Sir John Rogerson’s Quay</td>
<td>Remaining side pavilion of former Marine School</td>
</tr>
<tr>
<td>7715</td>
<td></td>
<td>Sir John Rogerson’s Quay</td>
<td>Former B&amp;I Steampacket Company office building</td>
</tr>
<tr>
<td>7716</td>
<td>1</td>
<td>Sir John Rogerson’s Quay</td>
<td>Business premises at corner of Creighton Street</td>
</tr>
<tr>
<td>7717</td>
<td>4</td>
<td>Sir John Rogerson’s Quay</td>
<td>Building</td>
</tr>
<tr>
<td>7718</td>
<td>5</td>
<td>Sir John Rogerson’s Quay</td>
<td>Building</td>
</tr>
<tr>
<td>7719</td>
<td>6</td>
<td>Sir John Rogerson’s Quay</td>
<td>Building</td>
</tr>
<tr>
<td>7720</td>
<td>14-15</td>
<td>Sir John Rogerson’s Quay</td>
<td>Columbia Mills</td>
</tr>
<tr>
<td>7721</td>
<td>30-32</td>
<td>Sir John Rogerson’s Quay</td>
<td>Tropical Fruit Company</td>
</tr>
<tr>
<td>7722</td>
<td>35</td>
<td>Sir John Rogerson’s Quay</td>
<td>Georgian-style commercial/residential premises</td>
</tr>
<tr>
<td>7723</td>
<td>36</td>
<td>Sir John Rogerson’s Quay</td>
<td>Georgian-style commercial/residential premises</td>
</tr>
</tbody>
</table>
The entire site lies within a Conservation Area Objective within the Dublin City Development Plan 2005 to 2011, the Draft Development Plan 2011 to 2017 and the DDA Master Plan 2009. Within this zoning objective, it is a stated policy of Dublin City Council (DCC) “to protect and enhance the character and historic fabric of conservation areas in the control of development “ (Policy H13), and it is a further stated policy of DCC and the DDDA “to protect and reinforce the important civic design character of Dublin’s quays, which are designated a conservation area and infill development should complement the character of the quays in terms of context, scale and design” (Policy H16). FC43 of the Draft Development Plan states it is a policy of DCC “To protect and enhance the important civic design character of Dublin’s Quays and historic public spaces”

The quay walls are listed in the Record of Monuments and Sites and the site also lies within a Zone of Archaeological Interest.

The campshires along City Quay and Sir John Rogerson’s Quay are zoned Z9 land use objective within the Dublin City Development Plan, i.e. “to preserve, provide and improve recreational amenity and open space”. The riverside area on George’s Quay is also zoned Z9 in the Draft Dublin City Development Plan 2011 to 2017. The area of the site east of Lime Street lies within the Grand Canal Dock Planning Scheme 2000, amended 2006.

Finally, within the statutory objectives which impact on, or relate to architectural and built heritage, is the Flood Defence Objective within the Dublin City Development Plans (both current and draft) which is the primary objective driving the proposed development.

In addition to the above statutory designations and objectives which affect the site, a number of other non-statutory policies, plans and objectives, particularly those of the DDDA are of relevance. These include the Campshire Vision 2007; the City Quay and Westland Row Area Action Plan, 2001; the DDDA River Regeneration Strategy (2001) and, the Play Space Guidelines 2007. While these may not explicitly relate to architectural heritage, they remain relevant to the specific proposals of this scheme.

4.9.3.4 Characteristics of Proposed Development

The principal characteristic of the proposed development is a direct result of the primary purpose of this project, i.e. a new defence wall to protect the area from future flood impacts.

The proposed development consists of development works within the campshire zones of City Quay and Sir John Rogerson’s Quay and to the riverside public realm area along George’s Quay. The development comprises the following elements:

- Construction of a flood defence wall with integrated lifting/swinging flood gates and swing flood gates, which will normally be maintained in an open position to facilitate pedestrian permeability within and access to the campshires and riverside amenity areas. The flood defence wall will run primarily within the existing campshire zones, within the area currently occupied by the cycle path. In a number of locations the wall will be located at the river edge as follows:
- George’s Quay: where the wall will be fixed to the existing concrete pavement above the historic coping stone of the quay edge. The new wall will be granite to match the existing height and profile of the adjacent quay wall at Butt Bridge and will replace the existing poor quality metal railing.
- Between the existing ESB substation and the Samuel Beckett Bridge: Here the wall will be set back approximately 1.8 metres from the quay edge to avoid impacting on the historic coping stone and approximately along the line of the existing metal guardrail. The new wall will be to an approximate height of 900mm with a metal rail to maintain the 1100mm height of the existing guardrail.

- Other than where it runs along the river edge, the flood defence wall will be approximately 800 mm above existing ground level and will have a staggered alignment for visual diversity and to facilitate pedestrian permeability. It will be formed of high quality precast concrete. At a number of locations along its length there will be feature seats integrated within the wall.
- Relocation and upgrading of the existing cycle route. This will run along the roadside edge of the campshires.
- Alterations to existing paving to accommodate the new flood defence wall and facilitate a new dedicated pedestrian path alongside the staggered flood defence wall.
- New tree planting along the road edge to form a tree-lined edge to the campshires. New trees will match the existing species on the campshires.
- New tree planting and seating areas on George’s Quay. This will involve the removal of the existing car parking along the river side of George’s Quay to provide an improved and enlarged public realm. Tree planting and seating will be aligned with the key architectural elements of the Custom House opposite.
- Alterations to existing pedestrian crossing management at Sean O’Casey Bridge/City Quay/Lombard Street.
- Works to the riverside walls of the existing 2 B.J. Marine buildings so that they will act as part of the flood defence wall.

4.9.3.5 Potential Impact of the Proposed Development

The following addresses the potential impacts of the proposed development during construction and operational phases on the architectural and built heritage.

While Sir John Rogerson’s Quay is the only protected structure which will be directly impacted by the works, the main impacts are likely to be on the Conservation Area objective which pertains to the entire area.

Construction Phase

The potential impacts on the architectural and built heritage during construction phase will be:

- Where the proposed new flood wall is to be located on or adjacent to the quay walls there is a potential for physical damage to the quay walls and associated steps, mooring bollards, and other historic elements of the quay
walls. This damage could arise from inappropriate or insufficient protection measures incorporated within either temporary or permanent works design and implementation.

- Damage to historic elements such as stone setts, former crane tracks within the campshire areas could arise from the same inappropriate practices or insufficient protection measures outlined above.
- Unforeseen below ground conditions may require alterations to the scheme design which may impact on the architectural and built heritage.
- Due to the scale of works it is likely damage due to blown dust and dirt accumulating on the historic fabric may occur if sufficient protection measures are not implemented

Operational Phase

The main impacts of the operational phase will be visual and physical.

The visual impacts arise from the introduction of the proposed flood defence wall as a new vertical element within what is an open setting. As this wall is mostly to be set well back from the river’s edge, the visual impact when viewed from a distance – i.e. from the opposite river bank – will be minor. However, from within the campshire area the visual impact will be notable. Also, in the campshire areas where the wall will run along the river edge, this will alter the formerly open character of this part of the campshires and be of significant impact.

The physical impacts will be where the flood defence wall runs on, or close to the historic quay wall. While the design has been developed to avoid damage to the visible quay walls, damage may occur to historic layers which are currently not visible and exist behind the current wall faces. Further impact is likely in the areas where historic stone setts and former crane tracking survive which will require removal of sections of setts and possibly partial removal or relocation of the former crane tracks. This is most likely to occur in the area between the 2 B.J. Marine buildings and the area east of Samuel Beckett Bridge.

Potential physical impact may also inhibit pedestrian permeability within and access to campshires, in particular where the number of openings is low.

The impact on George’s Quay will be a significant improvement as the current quality of the environment is very poor.

The proposed development will have a positive impact on the future protection of the existing architectural and built heritage in the event of a flood event.

Do Nothing Scenario

The purpose of the proposed development is to protect the landside area against likely flood impacts. Therefore, the potential impacts of the Do Nothing Scenario is flood damage. There are several protected structures which could be severely damaged due to flooding.
4.9.3.6 Mitigation Measures

The main mitigation measure to avoid or minimise potential negative impacts arising from the proposed development, for both construction and operations phases will be adherence to the DoEHLG Guidelines on Protection of Architectural Heritage, which is a statutory guidance document.

Construction Phase

The following are specific mitigation measures against potential construction phase negative impacts on Architecture and Built Heritage:

- Designs and specifications will be brought to sufficient level and standard of detail to address fixing/foundation details and impacts; junctions between new and historic materials; alignment with architectural features and proportions.
- Detailed construction methodology will be provided in advance of any works.
- All due protections and temporary works will be required to be put in place to avoid consequential damage to the protected structures.
- All works will be designed, detailed and specified with inputs from appropriately experienced and qualified conservation professionals.
- All contractors will be required to prove relevant experience, skill and qualifications to work on such historic structures.

Operational Phase

- Material specification and detail design will be of a high quality which has regard for immediate and long term visual impact and durability.
- Sufficient staggering of proposed flood defence wall will reduce visual impact and loss of open character of campshire and will reduce disruption of pedestrian access to and use of the campshires.
- Design, specification and construction of George’s Quay to be of a sufficiently high quality with regard to its proximity to the Custom House and Custom House quay.
- Design to ensure protection of 2 B.J. Marine buildings which, although these are not protected structures they are rare surviving examples of dockside buildings and to facilitate future use of these buildings in line with DDDA Campshire Vision 2007
- A regular maintenance regime to be put in place for the campshires.
- Any historic elements (including those of the protected structure at Sir John Rogerson’s Quay) which may be removed as a result of the proposed works – e.g. mooring rings, bollards, stone setts – are to be reused in the Docklands area, in locations which reflect the original use of these elements.

The need to balance the civic design, public realm and architectural heritage objectives for permeability and minimal visual impact through staggering the wall and introducing swing/lift gates, against the flood defence imperative and associated management
challenges and costs of flood swing/lift gates, is acknowledged within the proposed scheme.

4.9.3.7 Residual Impacts

The mitigation measures outlined above are vital to ensure the proposed development is successfully integrated within the existing high quality landscape of the campshires. It will also result in a significant improvement to the public realm of George’s Quay and thus the broader setting of the internationally important Custom House. While the following residual impacts will remain, their impact will be significantly reduced through the quality of design and construction of the new scheme:

Construction Phase

- Possible impacts arising from unforeseen site conditions which have not been identified during site investigations, surveys, etc.

Operational Phase

- Reduced permeability within campshire areas.
- Close-up visual impact of proposed flood defence wall within campshire area
- Localised loss of open character of campshires between the ESB substation and the western most of the 2 B.J. Marine buildings on Sir John Rogerson’s Quay.

4.9.3.8 Monitoring

Construction Phase

- Architectural conservation and civic design expertise to input into detailed design and works implementation stages.
- All building works to be carried out by suitably experienced, skilled and knowledgeable contractors and tradesmen.

Operational Phase

- Maintenance plans to be implemented to ensure condition and operation of flood defence scheme is properly monitored and maintained.
5.0 INDIRECT, CUMULATIVE IMPACTS AND INTERACTIONS

5.1 Introduction

Section 5 of the EIS addresses indirect and cumulative impacts and interactions between the impacts that the development may have on the surrounding environment.

Indirect impacts on the environment are impacts which are not a direct result of the scheme, often produced away from or as a result of the scheme.

Cumulative impacts are those which result from incremental changes caused by other past, present or foreseeable developments or may be considered as cumulative within the proposed development.

Impact interactions are those impacts within the scheme or with other projects in the area.

5.2 Assessment

The assessment of indirect, cumulative impacts and impact interactions has been carried out based on expert advice and on a checklist cross referencing the aspects of the environment considered with components of the proposed scheme. This checklist is shown if Table 5.1.1.

Table 5.1.1 Impact Matrix

<table>
<thead>
<tr>
<th>EIS Sect</th>
<th>Aspect of The Environment</th>
<th>Construction</th>
<th>Operations</th>
<th>Flood Condition</th>
<th>Cumulative Impacts</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Ground Works</td>
<td>Structure</td>
<td>Normal Operating Conditions</td>
<td>Quay Wall</td>
</tr>
<tr>
<td>4.1</td>
<td>Human Beings</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>4.2</td>
<td>Flora &amp; Fauna</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4.3</td>
<td>Soils Geology &amp; Hydrology</td>
<td>✓</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4.4</td>
<td>Water</td>
<td>✓</td>
<td></td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>4.5</td>
<td>Noise &amp; Vibration</td>
<td>✓</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4.6</td>
<td>Air Quality &amp; Climate</td>
<td>✓</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4.7</td>
<td>Landscape &amp; Visual Appraisal</td>
<td>✓</td>
<td></td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>4.8</td>
<td>Material Assets</td>
<td>✓</td>
<td></td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>4.9</td>
<td>Cultural Heritage</td>
<td>✓</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Cumulative Impact</td>
<td>✓</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
The following significant indirect impacts have been identified:

- Interaction with the Dublin City Council objective to improve regional cycle facilities. Consultation with DCC Transportation department has been held and the proposed scheme integrates with the objectives of the council in terms of the provision of cycle facilities.

- Local and regional planning and land use objectives in the study area and in the flood cell to the south of the campshires. These objectives are addressed in the body of the EIS. As a result of the flood protection project indirect impact will be the increase of the development potential of the flood cell will result.

In terms of cumulative impacts no significant impact with other developments were identified. Impacts which may be considered as cumulative within the development itself were also considered and two issues were identified possible cumulating impacts which should be addressed during the detail design and construction phases of the project:

- The Construction Phase of the development may result in cumulative impacts occurring. In particular a combination of the impacts of noise and vibration combined with possible visual impacts during the construction stage may result in a more noticeable overall impact on Human Beings. These are however temporary impacts and will be mitigated by the implementation of a Construction Management Plan.

- It is considered that the impacts of the various components of the development will have a cumulative impact on Human Beings in that the construction of the flood defences and the tidal flood protection that will be provided, the upgrade of the landscaping and the provision of improved cycle facilities will result in an overall impact with perceived benefits offsetting perceived disbenefits.

No significant interactions between the impacts which would aggravate or enhance the effect of the impact were identified.
6.0 DIFFICULTIES IN COMPILING ANY SPECIFIED SECTION

No significant difficulties in compiling any Section of the EIS was reported or noted.
REFERENCES:

Section 4.2.9:


Section 9.4.1:


**Section 9.4.3:**

Planning and Development Acts, 2000 to 2006  
Dublin Docklands Area Master Plan 2002  
Draft Dublin Docklands Area Master Plan 2008  
DoEHGL Guidelines on Protection of Architectural Heritage for Planning Authorities  
Dublin Docklands Area Inventory of the Architectural and Industrial Archaeological Heritage – UCD  
Historic OS Maps  
Dublin Port Archives  
McCullough, Niall, *Dublin and Urban History*, Dublin 1989  