



**Proposed Brewery Development
St. James's Gate
Environmental Impact Statement
Volume 2 – Main Report
December 2011**

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List of Abbreviations

Below is a list of abbreviations used in this statement.

AA	Appropriate Assessment
AER	Annual Environmental Report
BOD	Biochemical Oxygen Demand.
c.	Circa (in approximately).
COD	Chemical Oxygen Demand.
CSO	Central Statistics Office.
CSOs	Combined Sewer Overflow
dB(A)	Decibel level - the (A) denotes that levels are 'A'-weighted.
DO	Dissolved Oxygen.
EC	European Community
EIA	Environmental Impact Assessment
EIS	Environmental Impact Statement
EPA	Environmental Protection Agency.
EU	European Union
GSI	Geological Survey of Ireland.
ha	Hectares = 10,000 square metres.
HGV	Heavy Goods Vehicle.
IDA	Industrial Development Authority
IPPC	Integrated Pollution Prevention Control
ISO	International Standards Organisation
L_x	Sound that exceeds the level L for x% of the sampling duration.
L_{eq}	Equivalent continuous steady sound level. Effectively an average value.
L_{den}	The day-evening night composite noise indicator adopted by the EU for the purposes of assessing overall annoyance.
l/s	Litres per second.
MD	Maximum Demand.
m/s	Metres per second.
mg/l	Milligrams per litre.
m³/day	Metres cubed per day.
m³/hr	Metres cubed per hour.
mg/m³	Milligrams per metre cubed.
mg/kg	Milligrams per kilogramme.
MIC	Maximum Import Capacity
mg/m²/day	Milligrams per metre squared per day.
N	Nitrogen

NHA	Natural Heritage Area
NIAH	National Inventory of Architectural Heritage
NO_x	Oxides of Nitrogen.
NRA	National Roads Authority
NTS	Non-Technical Summary
NTS (drawings)	Not to scale
OD	Ordnance Datum
OPW	Office of Public Works
OS	Ordnance Survey
P	Phosphorus
PPV	Peak Particle Velocity
PM₁₀	Particles measuring 10µm or less.
QA	Quality Assurance
QC	Quality Control
RMP	Record of Monuments and Places
SAC	Special Area of Conservation
SPA	Special Protection Area
SRI	Sound Reduction Index
SPA	Special Protection Area
WDC	Western Development Commission
RBD	River Basin District

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Glossary

Below is a partial glossary of terms used in this statement. The definitions therein are not to be taken as comprehensive but solely as an aid to the non-technical reader.

Aquifer	A subsurface layer or layers of rock or other geological strata of sufficient porosity and permeability to allow either a significant flow of groundwater or the abstraction of significant quantities of groundwater.
Alluvium	Deposits from a river or stream.
Archaeology	The study of past societies through its surviving structures, artefacts and environmental data.
Architectural Heritage	Structures, buildings, traditional and designed, and groups of buildings including streetscapes and urban vistas, which are of historical, archaeological, artistic, engineering, scientific or technical interest, together with their setting, attendant grounds, fixtures, fittings and contents.
Baseflow (hydrogeology)	The flow of water entering stream channels from groundwater sources.
Baseline survey	A description of the existing environment against which future changes can be measured.
Bedrock	Rock, usually solid, that underlies soil or other unconsolidated, superficial material.
Catchment	That area determined by topographic features within which falling rain will contribute to run-off at a particular point under consideration.
Conservation Status	An indicator of the likelihood of that species remaining extant either in the present day or the near future.
Cumulative Impact	The addition of many small impacts to create one larger, more significant, impact.
Population Demographics	Demographics are the characteristics of a human population as used in government, marketing or opinion research, or the demographic profiles used in such research.
“Do-Nothing” Scenario	The situation or environment that would exist if the extension was not carried out.
“Do-Minimum” Scenario	The situation or environment that would exist if minimal intervention or development were carried out.

“Do-Something” Scenario	The situation or environment that would exist if the proposed brewery development is implemented.
Dry Weather Flow	The annual minimum daily mean flow rate (expressed in m ³ /s) at a given location on a river with a probability of exceedance of 0.98 (i.e. with a return period of 50 years).
Environmental Impact Assessment- EIA	The process of examining the environmental effects of the proposed brewery development - from consideration of environmental aspects at design stage through to preparation of an Environmental Impact Statement, evaluation of the EIS by the competent authority and the subsequent decision as to whether the development should be permitted to proceed, also encompassing public response to that decision.
Environmental Impact Statement- EIS	A statement of the likely significant effect, if any, which the proposed brewery development, if carried out, is likely to have on the environment.
EIA Screening	Screening is a process used to establish whether an EIA is required as part of the planning process for a proposed development.
Estuarine	Environment associated with semi-enclosed coastal body of water which has a free connection with the open sea and where fresh water, derived from land drainage, is mixed with sea water.
Facade	The face or front of a building.
Fauna	A collective term for the animals of a region.
Fermentation	The process of growing microorganisms within an enclosed tank (fermenter) under controlled conditions of aeration, agitation, temperature, and pH.
Fissure (hydrogeology)	A fracture or crack in rock along which there is a distinct separation.
Flora	A collective term for the plants of a region.
Fluvial	Pertaining to a river.
Free-field noise levels	Sound radiates into space from a source uniformly in all directions
Geology	Geology is the science and study of the physical matter and energy that constitute the Earth.

Glacial deposits	A load of rock material transported and deposited by a glacier. Glacial drift is usually deposited when the glacier begins to melt.
Groundwater vulnerability	The vulnerability to contamination of groundwater within an aquifer, or the groundwater produced by a well.
Headroom	Difference between the actual and allowed quantities.
Hinterland	Undeveloped areas.
Hydrogeology	Is the area of geology that deals with the distribution and movement of groundwater in the soil and rocks of the Earth's crust
Hydrometric Area	Grouping of catchments for monitoring and reporting purposes
Impact	The degree of change in the environment resulting from the proposed brewery development.
Imperceptible Impact	An impact capable of measurement but without noticeable consequences.
Indirect Impact	Impacts on the environment which are not a direct result of the project, often produced away from the project or as a result of a complex pathway.
Infrastructure	Basic public facilities e.g. roads, sewers, water supply, telephones and electricity.
Long-Term Impact	Impact lasting twenty to fifty years.
Made Ground	Solid ground formed by filling in an artificial or natural pit with hard rubble such as broken brick, concrete, etc., or with rubbish.
Magnitude (impact)	Impact magnitude depends on the degree and extent to which the project changes the environment.
Mean Annual	Maximum flow per annum for the full dataset presented as a mean value.
Medium-Term Impact	Impact lasting seven to twenty years.
Methodology	The specific approach or techniques used to analyse impacts or describe environmental features and conditions.
Mitigation	Measures designed to avoid, reduce, remedy or compensate for adverse impacts.

Mitigation Measures	The manner by which a proposed development is modified to avoid, reduce or remedy anticipated adverse environmental effects.
Moderate Impact	An impact that alters the character of the environment in a manner that is consistent with the existing and emerging trends.
Natura 2000 site	A site protected under the EU Habitats Directive and the EU Birds Directive.
Negative Impact	A change which reduces the quality of the environment (for example, by lessening species diversity and the reproductive capacity of the ecosystem, by damaging health, property or by causing nuisance).
Neutral Impact	A change which does not affect the quality of the environment.
Noise Contours	Predicted noise level at a given distance.
Overburden	The soil and other material that lies above a specific geologic feature.
Permanent Impact	Impact lasting over fifty years.
Permeability (hydrogeology)	Capacity for transmitting a fluid.
Piling	A column of wood, steel or concrete that is driven into the ground to provide support for a structure
Positive Impact	A change which improves the quality of the environment (for example, by increasing species diversity and the reproductive capacity of the ecosystem, or by removing nuisances or improving amenities).
Receptor	Any person, creature or element in the environment which is subject to impacts.
Recharge	The addition of water to the zone of saturation; also, the amount of water added.
Return Period	The frequency with which a certain event would be expected to occur on average over a long period of record.
Residual Impact	The degree of environmental change that will occur after the proposed mitigation measures have taken effect.
Sensitivity (impact)	The potential of a receptor to be significantly changed.

TA Luft	Technical Instructions for Maintaining Air Quality.
Temporary Impact	Impact lasting for one year or less.
Visual Robustness	Ability of the visual receptors to incorporate change.

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1.0 INTRODUCTION

1.1 The Project

Diageo Ireland is making a capital investment to upgrade and expand the world famous St. James's Gate Brewery. The expansion will be a world-class brewery to support the growth and development of its global beer business and will rejuvenate the historic St. James's Gate brewery. It follows a long-term assessment of all brewing operations in Ireland over the past several years. This assessment chose the upgrade of St. James's Gate as the optimum strategy to meet the emerging demands of the business.

Diageo Ireland is seeking to develop its new brewery within the existing St. James's Gate site. On its completion, planned for late 2013, the proposed brewery development will be Diageo Ireland's biggest brewery and the largest in Ireland. The proposed brewery development will use the same brewing ingredients – high quality water supply, yeast, hops, malts and barley.

St. James's Gate is recognised by Diageo Ireland for its strategic and iconic position within Dublin. The entire St. James's Gate site is approximately 20 hectares, in size, and the proposed brewery development will require approximately 2.7 hectares of this space for new buildings and structures.

Diageo Ireland has commissioned Jacobs to undertake an Environmental Impact Assessment (EIA) of the proposed brewery development; this Environmental Impact Statement (EIS) presents the results of the EIA process.

1.2 EIA Legislation and Requirements

The EIA process is defined by, and derived from, the "EIA Directive" (EU Directive 85/337/EEC as amended by Directives 97/11/EC and 2003/35/EC), which has been transposed into Irish legislation in 1989 by Statutory Instrument S.I. 349 (1989) and the Local Government Planning and Development Regulations, S.I. 25 (1990). Later amendments have been transposed into Irish law through a range of Acts and Regulations, including the European Communities (Environmental Impact Assessment) (Amendment) Regulations, 1999, the Local Government (Planning and Development) Regulations, 1999, the Planning & Development (Amendment) Act 2010 and the Planning & Development Regulations 2001.

Schedule 5 of the Planning & Development Regulations 2001 presents the thresholds over which certain types of development require an EIS to be prepared as part of the planning application process. Part 2 of Schedule 5 states that an EIS is required for:

'installations for commercial brewing and distilling; installations for malting, where the production capacity would exceed 100,000 tonnes per annum'.

The information to be contained in an EIS is listed in Annex III of the Directive (85/337/EEC) and in Article 25 (Second Schedule) of the European Communities (Environmental Impact Assessment) (Amendment) Regulations, 1999.

This document is submitted in accordance with the Planning & Development (Amendment) Act 2010 and the Planning and Development Regulations 2001 (Statutory Instrument S.I No. 600 of 2001).

1.3 EIA Objectives and Process

This EIS presents the results of the EIA process, which was undertaken to inform the permitting and decision-making process. The objectives of the EIA may be summarised as follows:

- To identify the likely significant environmental impacts associated with the construction and operation of the proposed brewery development, having regard to the characteristics of the local environment; and
- To evaluate the magnitude and significance of likely impacts and to propose appropriate measures to mitigate potential adverse impacts.

The process undertaken involves the following steps:

- Collating existing baseline data for the St. James's Gate site and the surrounding area;
- Undertaking environmental surveys to supplement existing baseline data;
- Evaluating the proposed construction and operational activities associated with the proposed brewery development;
- Identifying features of the existing environment likely to be affected by the development of the brewery development;
- Identification, description and evaluation of the potential environmental impacts arising from the development;
- Providing feedback into the planning and design of the proposed brewery development;
- Identifying mitigation and enhancement measures;
- Description of residual impacts; and
- Production of an EIS to support the planning application.

This EIS is a statutory document which presents the results of the EIA process undertaken for the proposed brewery development at St. James's Gate. It will be provided to Dublin City Council as supporting information for the planning application in accordance with the Planning Acts.

1.4 Report Structure

The format of this EIS is as follows:

Chapter 1: Introduction

Presents background to the development and provides an overview of the assessment process.

Chapter 2: Environmental Assessment Process

Summarises the assessment methodology adopted.

Chapter 3: Consideration of Alternatives

Describes the site selection process and consideration of site layout and design alternatives.

Chapter 4: Planning and Legislative Framework

Describes the broad planning and environmental legislative framework under which the development will be carried out.

Chapter 5: Project Description

Provides a description of the development in terms of both its construction and operation.

Chapters 6-17: Impact Assessment and Mitigation

Describes baseline conditions for various environmental topics and provides an assessment of significant environmental effects taking into account mitigation measures to be implemented. The following topics have been assessed:

6. Socio-Economic
7. Ecology
8. Soils, Geology and Hydrogeology
9. Surface Water and Drainage
10. Air Quality and Odour
11. Noise and Vibration
12. Landscape and Visual Impact
13. Transportation
14. Cultural Heritage, Archaeological and Architectural
15. Waste Management
16. Material Assets
17. Statement of Sustainability

Chapter 18: Interaction of the Foregoing and Cumulative Effects

Chapter 19: Summary of Environmental Commitments

1.5 Project Team

The EIS was prepared by a study team with oversight and control provided by the Diageo Ireland Project Team. The overall study team and elements within the EIA process for which they are responsible is presented in **Table 1-A** below.

Table 1-A: Project Team for the EIS

Role	Team Member
EIS Oversight	Diageo Ireland
Project Leader	Gerry Loughrey
Environmental Study Manager	Norita Casey
EIA Coordinator	Scott D. Johnson
Peer Review	Peter Marsden
Specialist Topics	
Description / Scope of Development	Ziemann / Jacobs
Planning	RPS
Socio-Economic	Jacobs
Ecology	Scott Cawley Ltd.
Surface Water Quality / Drainage	Jacobs/Arup Ltd.
Flood Risk Assessment	Jacobs
Air Quality / Odour	Jacobs
Noise and Vibration	Jacobs
Landscape and Visual Impact	Jacobs
Transportation	Arup Ltd.
Cultural Heritage - Archaeological & Architectural Heritage	Jacobs
Material Assets	Jacobs
Waste Management	Jacobs
Sustainability	Jacobs
Soils, Geology & Hydrogeology	Arup Ltd.

The overall design team members are presented in the table below:

Role	Organisation
Architects	RKD Architects
Brewing Process Experts	Ziemann
Utilities and Building Services	Jacobs Engineering
Civil and Structural Engineering	Arups
Project Controls	Bruce Shaw

1.6 EIS Regulations

This EIS addresses each of the topics specified by the Regulations as follows:

EIA Regulation Topics	EIS Chapter Topics
Flora	Ecology
Fauna	Ecology
Soils	Soils Geology
Water	Surface Water Waste (Liquid) Hydrogeology Flood Risk Assessment
Air	Air Quality Noise
Climate	Air Quality
Human Beings	Planning Socio-Economic
Landscape	Landscape & Visual Impact
Material Assets	Roads and Traffic; Material Assets; Sustainability; Waste (Solid)
Cultural Heritage	Cultural Heritage - Archaeological & Architectural Heritage
Interaction of Topics	Interaction of the Foregoing and Cumulative Effects

1.7 Statement of Difficulties Encountered and Data Limitations

It is an express requirement of the Legislation to include a statement of the difficulties encountered in preparing this EIS.

Difficulties encountered were as follows:

- In Ireland as a whole, the precise flood risk management requirements and associated drainage design standards, whilst accounting for climate change, are evolving, as new flood models and associated actions are being developed over the next several years. In addition to local policy and liaison with Dublin City Council, both national and international guidelines have been applied.

2.0 ENVIRONMENTAL ASSESSMENT PROCESS

2.1 Introduction

The Environmental Impact Assessment (EIA) process detailed within this Environmental Impact Statement (EIS) has been undertaken in accordance with the planning & Development Regulations 2001 (the '2001 Regulations'). Consideration has also been given to other relevant guidance, including the *Guidelines on the Information to be contained in Environmental Impact Statements* (EPA, March 2002) and the *Advice Notes on Current Practice (in the preparation of Environmental Impact Statements)* (EPA, September 2003).

The requirement for an EIS is determined by Schedule 5 (Development for the purposes of Part 10) of the 2001 Regulations, under:

- Part 2, Item 7 (Food Industry) (d), Installations for commercial brewing and distilling, installations for malting where the production capacity would exceed 100,000 tonnes per annum.

In accordance with the requirements of the 2001 Regulations and relevant EPA Guidance, this EIS provides a description of the likely significant impacts of the proposed brewery development with reference to the potential impact upon humans, ecology, flora, soil, water, air, climatic factors, material assets including architectural and archaeological heritage, landscape and the inter-relationship of these factors, together with a full description of the following elements:

- The proposed brewery development, comprising information on the site, design and size of the development;
- The measures envisaged in order to avoid, reduce and, if possible, remedy significant adverse effects;
- The data required to identify and assess the main effects which the development is likely to have on the environment;
- An outline of the alternatives studied by the applicant and an indication of the main reasons for the choice; and
- A non-technical summary of the information.

2.2 Aims of the Assessment

The key objectives of the EIA process undertaken for the proposed brewery development and reported within this EIS have been to:

- Provide a framework for the assessment of environmental impacts within the context of the proposed brewery development, including construction and development phasing;
- Outline the geographical, temporal and technical scope of each assessment, together with a breakdown of excluded elements and relevant qualifications for these;

- Outline the methods and assessment criteria employed in undertaking baseline and environmental impact assessments for each separate study;
- Assess the environmental baseline conditions for all disciplines scoped as requiring assessment;
- Assess the impact of the development on each of the identified baseline conditions;
- Assess the cumulative impacts of the development on all identified baseline conditions;
- Outline recommendations to mitigate against all significant impacts identified;
- Detail residual impacts assuming mitigation will take place as recommended; and
- Provide conclusions to each study and the EIA as a whole and outline requirements for further studies and assessments where necessary.
- The requirements for further studies and assessments include the monitoring and investigation of measures recommended to mitigate predicted construction and operational impacts.

2.3 Outline of EIA Principles

2.3.1 Overview

The environmental effects of the proposed brewery development have been predicted for each relevant environmental topic (e.g. ecological resources, noise, traffic and transport, etc.). This has involved comparing existing baseline environmental conditions with the conditions that would prevail if the proposed brewery development were to proceed.

The environmental effects have been predicted in relation to their effect on the receiving environment – that is, people, wildlife, cultural heritage and natural resources. The process of impact prediction involves the application of a number of the following key principles and concepts:

- Significance of environmental effects;
- Geographical (or spatial) scope of the EIA;
- Temporal scope of the EIA; and
- Technical scope of the EIA.

The application of each of these elements to the proposed brewery development is further explained in the subsections that follow; further definition, specific to particular technical areas, is provided in each of the technical Chapters 6 – 17.

2.3.2 Defining the Significance of Environmental Effects

Whilst there is no statutory definition of what constitutes a significant effect, progressive environmental legislation and guidance over the past several decades has established limit values, thresholds and intervention criteria for many of the technical areas assessed. For some topics, such as, for example, landscape and visual assessment,

practitioners have defined best practice methods and assessment criteria, which provide an agreed framework within which professional judgment is exercised.

Whether derived from quantitative standards or through professional judgment, the significance of an impact is assessed through a combination of two factors:

- the size or *magnitude* of the impact (e.g. source noise levels or proximity of the development to a potential receptor); and
- the *sensitivity* or importance of what is being affected by the development (e.g. a local landuse sensitive to increased noise levels or a rare and/or designated habitat).

Whilst the above two factors (magnitude and sensitivity) are key factors in assessing significance, it may also be important to take into account the likelihood of the impact actually taking place and the period of time for which the impact will be experienced.

2.3.3 Mitigation of Predicted Environmental Effects

The role of the EIA within the development process has been both to identify, assess and report on impacts that are likely to arise, and also to identify measures to prevent, reduce and, where practicable, remedy identified significant adverse impacts.

An integrated team of architects, engineers, designers and environmental specialists appointed by Diageo Ireland early on in the design process has ensured that the proposals have been developed in conjunction with ongoing environmental evaluation. Recommendations for mitigation measures either incorporated into design or to be taken up during implementation are detailed in each of the technical Chapters 6 – 17, and summarised in Chapter 19.

2.3.4 Mitigation Measures

In order to reduce the magnitude of an impact, and thus reduce the significance of an environmental effect, mitigation measures have been both implemented and recommended. The following hierarchy is used when determining mitigation measures.

- **Prevent** – to avoid adverse impacts as far as possible by designing out or using preventative measures during the construction process thus resulting in an environmental effect of negligible significance.
- **Reduce** – to minimise the magnitude of adverse impacts as far as possible by using preventative measures thus resulting in an environmental effect of minor – negligible significance.
- **Offset** – to compensate for environmental effects of major to moderate significance arising from unavoidable impacts that cannot be further reduced in magnitude.

Mitigation measures can be incorporated at three stages of the development:

- During the design stage in order to design out or reduce the magnitude of predicted impacts. The project has currently completed conceptual design and will commence detailed engineering design after project approval.
- During construction in order to minimise the magnitude of adverse impacts arising during the construction process; and/or

- Following commissioning of the proposed brewery development in order to minimise the magnitude of adverse impacts arising during operation.

2.3.5 Geographical Scope of the EIA

This EIA covers the physical extent of the proposed brewery development and defined by the limits of land to be used, the nature of the current environmental conditions and the manner in which impacts are likely to be generated.

In addition, the significance of some predicted impacts can extend beyond the immediate site; for example, the EIA has considered the potential for air and noise emissions during both construction and operation to reach receptors.

The geographical extent also considers the potential implications of related and unrelated development activities such as:

- Existing activities which will change or cease as a consequence of the proposed brewery development (e.g. cessation of brewing activities elsewhere at St. James's Gate); and
- Potential cumulative effects with other proposed (but unrelated) developments.

The assessment of cumulative impacts has aimed to ensure that where a number of developments are proposed within the wider area, each set of effects (which may in themselves be insignificant) are assessed in combination (i.e. cumulatively) to determine whether the total of these effects is in itself significant.

2.3.6 Temporal Scope of EIA

The temporal scope of the EIA relates to the duration or timescale of potential impacts and is broadly concerned with:

- The anticipated duration of the construction and development phases of the proposed brewery development. This currently predicts a construction start date of early 2012 with the commissioning of the proposed brewery development in mid 2013; and
- On the basis that these indicative dates are met, the operational phase of the proposed brewery development will commence from mid 2013. In assessing impacts from the development, consideration has been given to periods beyond the commissioning date in order to take account of those environmental effects that are dependant upon longer-term considerations.

2.3.7 Technical Scope of EIA

The range of environmental topics in this EIS has been identified through an informal scoping process (see Section 2.6 below), which has provided the main focus for the technical scope of the EIA.

2.4 Outline of EIA Assessment Process

The EIA process undertaken has involved the following steps:

- Collating existing baseline data for the development site and the surrounding area;

- Identifying features of the existing environment likely to be affected by the development;
- Identifying the environmental impacts of the development;
- Undertaking environmental surveys to supplement existing baseline data;
- Substantiation of the environmental impacts arising from the development;
- Providing feedback into the design of the scheme;
- Identifying mitigation and enhancement measures; and
- Production of an EIS to support the planning application.

This EIS is a statutory document which presents the results of the EIA process undertaken for the proposed brewery development at St. James's Gate.

2.5 Assessment Methodology

2.5.1 Nature of Impacts

The significance of environmental effects has been determined according to their magnitude and the sensitivity of receptors. Significant impacts may be of the following nature:

- Adverse or beneficial;
- Temporary or permanent;
- Short or long term;
- Direct or indirect;
- Reversible or irreversible; and/or
- Cumulative.

2.5.2 Magnitude

Magnitude (scale of change) has been determined by considering the predicted deviation from baseline conditions and the scale of the impact. Quantifiable assessment of magnitude has been undertaken where possible. In cases where only qualitative assessment is possible, magnitude has been defined as fully as possible, in some cases using professional judgement. In the absence of specific methodologies, the methodology for determining the magnitude of an impact shown in **Table 2-A** has been followed.

Table 2-A: General Methodology for Assessing Magnitude

Scale of Impact	Description
Substantial	Impact resulting in a considerable change in baseline environmental conditions: (i) with severe undesirable/desirable consequences on the receiving environment, or (ii) causing statutory objectives to be exceeded. [An impact which caused a breach in legislation would be substantial however all environmental legislation will be adhered to in carrying out the development]
Moderate	Impact resulting in a discernible change in baseline environmental conditions: (i) with undesirable/desirable conditions, or (ii) possibly causing statutory objectives to be exceeded.
Slight	Impact resulting in a discernible change in baseline environmental conditions with undesirable/desirable conditions that can be tolerated.
Negligible	No discernible change in baseline environmental conditions.

2.5.3 Sensitivity

Sensitivity or the importance of a receptor is determined in terms of geographical extent and/or the importance of a receptor based on statutory designations. For example, if a river were a Special Area of Conservation (SAC) designated at a European level, then the receptor will be more sensitive than if it were of local importance. Receptors such as individual properties and small watercourses are generally considered to be of local importance. The sensitivity of a receptor is determined according to the methodology shown in **Table 2-B**.

Table 2-B: Methodology for Determining Sensitivity

Sensitivity	Examples of Receptors
International	Special Area of Conservation, Ramsar Site, World Heritage Site, etc.
National	National Monument, proposed National Heritage Area, major aquifer used for potable water supply
Regional or County	County Wildlife Site, minor aquifer used for general water supply purposes, Sites and Monuments Record, regional transport network
Local or Borough	Single property or group of properties, ordinary watercourse, unclassified drainage ditch, footpath

2.5.4 Significance

Table 2-C shows how the interaction of magnitude and sensitivity results in the significance of an environmental effect. Significance should always be qualified as in certain cases an impact of minor significance could be considered to be of great importance by local residents and deserves further consideration.

Table 2-C: Impact Significance Matrix

Importance of Receptor	Magnitude of Impact			
International	Major	Major - Moderate	Moderate-Minor	Negligible
National	Major	Major - Moderate	Moderate-Minor	Negligible
Regional or County	Major - Moderate	Moderate-Minor	Minor	Negligible
Local or Borough	Moderate - Minor	Minor	Minor – Negligible	Negligible

2.5.5 Level of Confidence

Given that predictions can only be as accurate as the data they are based on it is important to attribute a level of confidence to which the significance of environmental effects has been assessed. **Table 2-D** defines the confidence levels referred to in this report.

Table 2-D: Impact Prediction Confidence

Confidence Level	Description
High	The significance of an environmental effect is an informed estimate likely to be based on reliable data or subjective judgement with reference to similar schemes. Further information would not result in any change to assessment of significance.
Low	The significance of an environmental effect is an estimate likely to be based on subjective judgement without reference to similar schemes. Further information would be needed to confirm assessment of significance.

2.6 The EIA Scoping Process

2.6.1 Overview

The aim of the scoping process was to identify key issues specific to the project or the receiving environment, which were to be addressed in detail in the EIA process. The determination of the significant issues to be assessed for potential significant impacts was achieved through:

- Review of existing assessments / reports previously undertaken in relation to the proposed development site; and
- Consultation with the environmental specialists with significant experience in the preparation of EISs and with knowledge of the requirements of the brewing industry.
- Agreed scoping with DCC's Planning Authority.

2.6.2 EIS Scoping Format

Environmental issues with the potential to be significantly impacted by the proposed brewery development are addressed under the individual chapter headings.

2.7 Scoping – Environmental Aspects

The following environmental aspects have been considered in the proposed brewery development EIS:

2.7.1 Socio-Economic

The approach to this assessment has included:

- An assessment of the demographics of the local region, employment and use of public resources;
- A review of the impacts on surrounding recreational, commercial and residential areas in the vicinity of the proposed brewery development;
- Consideration to the impacts of the development on the local community;
- Consideration to the impacts of the development on nearby properties and local amenity issues; and
- An assessment of the commercial impacts of the development on the local economy.

2.7.2 Ecology

The approach to this EIS assessment has included a review of all available information relating to the proposed site against the relevant legislation and any further requirements which may be required to appropriately assess the potential significant

impacts resulting from the construction and operation of the development. The ecological assessment includes:

- Desk-based review of available information;
- Extended Phase 1 habitat survey;
- Bat surveys;
- River corridor assessment; and
- Appropriate Assessment (AA) Screening.

The AA Screening stage has been conducted in enough depth to establish whether the proposed brewery development itself could have a significant impact on *Natura 2000* sites at Dublin Bay indirectly, and thus whether further AA is required (i.e. the full assessment stage).

Methodology

An evaluation has been made of the overall conservation value, ecological sensitivity and significance of habitats and species likely to have been present on a local, regional, national or international level. Proposals for the reduction and minimisation of likely impacts which will be caused by the development have been made. Where possible, appropriate recommendations have also been made for the amelioration and enhancement of the site's ecology through the appropriate design of the proposed brewery development.

2.7.3 Geology, Soils and Hydrogeology

The objectives of this chapter have been to characterise the existing geology, soils and hydrogeology resources that exist beneath and in the near vicinity of the proposed site and to assess any potential impacts the brewery development may have on these aspects of the site.

The existing geology and hydrogeology of the proposed site has been characterised by firstly undertaking a desktop study utilising publicly available information from sources such as the Geological Survey of Ireland (GSI).

Consideration and reference have also been made to other recognised best practice and guidance relevant to the assessment such as *Geology in Environmental Impact Statements – A Guide* (The Institute of Geologists in Ireland, 2002).

Soils and Geology

A soils and geology analysis has included the following:

- A topographical analysis;
- An initial rock profiling of the site;
- An assessment of soils and rock characteristics and vulnerability;

- An assessment of the site history, land use and thus potential for contaminated land on-site; and
- An assessment of mitigative and protective measures to ensure no off-site impacts arising from the development.

Hydrogeology

A hydrogeological analysis has been undertaken to include the following:

- Identify and review known aquifers and water supplies in the region
- Produce groundwater contour plots for the potential upper and lower aquifers;
- Identify potential linkages to the groundwater environment – shallow aquifer, overland transport, deeper aquifer; and
- An assessment of the vulnerability of the aquifers and their significance and mitigative measures to contain them.

2.7.4 Surface Water and Drainage

This chapter provides an assessment of the likely significant impacts of the proposed brewery development on flood risk and surface water quality in the vicinity of the site. A Flood Risk Assessment (FRA) addresses the potential for impacts on flooding of the surrounding area, including with relation to local surface water drainage infrastructure. The analysis of the proposed brewery development includes surface water attenuation assessment. The FRA has taken climate change projections for increased rainfall into account, and discusses how flood resilience has been incorporated into design.

A desktop study of surface water quality at locations downstream and upstream of the site on the River Liffey has been undertaken. The analysis of the proposed brewery development includes surface water quality assessment, an assessment of the vulnerability of the receiving waters and the requirement for pollution control and monitoring during construction and operations, and an assessment of the protection measures required from potential fire water impacts.

Groundwater has been addressed under the 'Geology, Soils and Hydrogeology' chapter described above.

2.7.5 Air Quality and Climate

This chapter includes a detailed assessment to identify if there are any significant potential air quality impacts related to the operation of the proposed brewery development and its construction. An air quality assessment has been developed which establishes the baseline suitability of the site for the proposed brewery development.

Baseline Air Quality

Baseline air quality has been assessed for the pollutants relevant to the scheme and included in EU Directive 2008/50/EC on Ambient Air Quality and Clean Air for Europe.

A desktop study of baseline measurements of licensed emissions at St. James's Gate (NO_x, total organic compounds, particulates), and also of nitrogen dioxide in the vicinity of St. James's Gate has been undertaken. This study has further established the baseline from measurements and predictions made in the Dublin City area to fulfil Ireland's statutory duties to the EU under the framework directive for ambient air quality. Any other relevant sources of information have been taken into account (e.g. published data from EISs for nearby developments).

Proposed Brewery Development Combustion, Process and Traffic Emissions

A detailed dispersion model has been used to quantify the impact of the proposed brewery development combustion and process emissions on air quality. The 'with scheme' model was compared against the baseline situation, and the significance of the impact assessed. The mitigation of these emissions was also assessed.

It is not expected that the change in traffic flows will be significant. However, to check for this, traffic was assessed by the DMRB screening method, in a staged approach. If the predicted change in traffic were to be deemed significant under the screening method, the use of a detailed dispersion model, ADMS Roads would have been recommended and an assessment conducted in line technically with the NRA Guidance on Air Quality and the UK Technical Guidance for Local Air Quality Management TG (09).

The impact of the proposed brewery development on air quality has been considered with reference to the national air quality standards. The impact on climate change emissions is considered in terms of absolute emissions of CO₂. The potential for nuisance from dust associated with construction has been assessed, and mitigation measures proposed.

Odour Assessment

The British Standard in relation to Odour Assessment [The Environment Agency's *H4 Odour Management: How to comply with your environmental permit* (EA, 2011)] allocates brewery and bakery odours in the same non offensive category. Irish Environmental Protection Agency guidance on EIA states that the potential for impacts related to odour should be considered within an EIS. Also, the proposed brewery development will be regulated as a prescribed process under the Irish national legislation made under the EU Integrated Pollution Prevention and Control Directive 2008/1/EC. Odour is included in the definition of 'pollution', which includes any introduction of substances into the air which may impair or interfere with amenities and other legitimate uses of the environment.

An odour impact assessment has been developed in parallel with the air quality assessment which includes an emission scenario developed on the project proposals for the site, taking the existing environmental conditions into account. The assessment was developed based on the guidance, and has utilised an appropriate dispersion modelling software package, in accordance with EPA Guidance Note AG4. It should be noted that the guidance states that:

"Currently there is no general statutory odour standard in Ireland relating to industrial installations."

Odour Impact Assessment of Proposed Brewery Development

A review of local sources of odour in the vicinity of the proposed brewery development has been made, and of receptors likely to be affected by odour.

An assessment of the odour impact of the proposed brewery development has been made using a description of the odour-causing processes and their emission rates and locations. The timings of these processes, their management and mitigation were described. Suitable technical descriptions and drawings to illustrate the processes and the emission locations have been required for this assessment. A 'with scheme' model has been prepared using the proprietary dispersion model ADMS 4.A and the modelled impact of the 98th percentile of odour concentrations has been depicted on OS Maps, and specific odour concentrations predicted at identified receptors. The indicative criterion for odour offensiveness for breweries is 6.0 OU_E/m³, (EPA TGN AG4). Models were run using 3 years' of meteorological data from Dublin International Airport.

The assessment of odour impact has been reported with regard to the legislation and practice for managing odour nuisance. The potential for future odour complaints has been predicted based on an assessment of the sites historical performance and 'with scheme' odour models.

2.7.6 Noise & Vibration

A noise and vibration assessment has been undertaken including desk study and baseline noise monitoring, which has captured all relevant noise sources relative to identified key receptor locations.

The aim of this assessment has been to identify and quantify any potential significant noise and vibration impacts and suitable mitigation measures for inclusion into the EIS.

Baseline Noise Surveys

The baseline noise measurements have been carried out at three locations, which are considered to be representative of the closest potentially affected receptors:

1. Atop the St. James's Gate site building directly east of the Standby Equalisation Tank of the Neutralisation Plant, within 1 m of the wall, representing The Maltings and The New Maltings apartment blocks along Watling Street; and
2. Atop the Bi-Centenary Centre, representing the Emmet Buildings apartments along Watling Street.
3. In the southern end of the Camac Yard at an elevated location representing St. James's Apartment Block.

It is anticipated that the proposed brewery development will operate 24-hours a day, 7 days per week. On this basis, the following noise surveys would be required as a minimum:

- 24-hour weekday noise survey; and
- 24-hour weekend noise survey.
- Additional short-term surveys as required

Noise Impact Assessment

Operational Noise

Potential noise impacts from the following have been considered:

- Increased road traffic associated with the proposed brewery development, including HGVs;
- Fixed plant and equipment associated with the facility; and
- Mobile plant and external activities such as loading and unloading operations.

In order to assess the potential noise impacts from the brewery, a computer based noise model was constructed for the proposed brewery development. The model encompassed the brewery site together with the surrounding area.

Noise impact predictions have been made using the CADNA-A Noise Modelling package. This software package utilises the noise propagation algorithms within ISO 9613: Acoustics - Attenuation of sound during propagation outdoors. As well as individual predicted noise levels for receptors, noise contours have been produced which illustrate the noise contribution from the proposed brewery development operations based on the worst case day / night scenario.

Construction Noise

An assessment of the potential construction noise impacts has been made using the CADNA-A noise model and information relating to the likely plant and equipment to be used during the worst-case phases of construction.

Consideration will be given to the potential noise and vibration impacts from road traffic movements associated with construction of the proposed brewery development.

The construction noise impacts have been assessed using the procedures laid out in British Standard BS 4142: 1997 *Method for Rating Industrial Noise Affecting Mixed Residential and Industrial Areas*. This standard is generally used by local authorities in determining acceptable noise levels.

Using the standard, a comparison has been made between the noise attributable to the development, expressed as L_{Aeq} (defined in BS 4142 as the 'specific noise'), adjusted to take into account tonal or impulsive characteristics ('rating level'), and the existing background noise level expressed as L_{A90} . Where the characteristics of the operational noise are such that it tends to attract attention (i.e. tonal or impulsive noise), a +5 dB correction is made in the assessment. The British Standard states, "A difference of around +10 dB or more indicates that complaints are likely. A difference of around +5 dB is of marginal significance. If the rating level is more than 10 dB below the measured background noise level this is a positive indication that complaints are unlikely".

Mitigation Measures

Based on the noise levels predicted and associated assessment results, consideration has been given to the implementation of noise mitigation measures. The potential effectiveness of proposed mitigation measures will be predicted using the CADNA-A

model, and once proven, will be included within the proposed brewery development layout and design.

Vibration

It is not anticipated that vibration will be a significant issue associated with the construction or operation of the proposed brewery development. Consideration has been given to potential vibration impacts from road traffic movements. Vibration has thus been scoped out of the assessment in the EIS.

2.7.7 Landscape and Visual Impact

The visual impact assessment has included an assessment of the visual robustness or vulnerability of the site including its local and regional significance. An appropriate level of assessment of the impact of on-site lighting to the surrounding environs has been undertaken.

A description and assessment has been provided of the effects of the development on the landscape / townscape, on views from adjoining areas, on key views as indicated in the Dublin City Development Plan (and any further 'views and prospects' material available at the time of assessment), and on protected structures.

Appropriate measures for mitigation against long-term landscape and visual impacts as a result of the proposed brewery development have also been addressed.

2.7.8 Material Assets

According to the EPA, 'the material assets chapter of an EIS is intended to deal with physical resources in the environment which maybe either of human or natural origin'. What material assets are may be interpreted very widely, however, for the purposes of this report, material assets are taken to be:

- Natural Resources of Economic Value; and
- Infrastructure.

The impact of the proposed brewery development on direct natural resources of economic value (e.g. watercourses) has been assessed in the respective specialist chapters.

The impact of the proposed brewery development on existing infrastructure, including existing public services, has been assessed in this chapter of the report.

2.7.9 Cultural Heritage, Archaeology and Architectural Heritage

Methodology

A desk-based assessment and walkover survey has been undertaken. The following sources of information were consulted:

- Record of Monuments and Places (RMP);
- The topographic files of the National Museum of Ireland;

- Dublin City Development Plan 2011 – 2017 for information on for information on planning policy and Zones of Archaeological Interest;
- First edition of Ordnance Survey 6" mapping (1829-1841) and first edition of the Ordnance Survey 25" mapping (1897-1913) from <http://maps.osi.ie/publicviewer>;
- Archaeological reports held in the Dublin City Archaeological Archive;
- Documentary, cartographic and literary sources held by the Dublin City Archives;
- Cartographic and documentary sources held by the Guinness Archives;
- Documentary and cartographic sources held in the Guinness Archive;
- Database of Irish Excavation Reports and the published Excavation Bulletins; and
- Walk-over survey of the study area.

The walkover survey was undertaken by a team comprising an experienced archaeologist and a built heritage specialist. This included an assessment of potential impacts on the setting of designated and non-designated sites of heritage interest within the study area and in the wider landscape.

The report is supported by an inventory giving full details of the individual cultural heritage assets identified, appropriate maps/plans showing the location and extent of the study area and the location and extent of identified cultural heritage resources; and copies of historic maps and plans as appropriate.

2.7.10 Waste Management: Liquid Waste and Solid Wastes

The scope of work has included a desktop study of all available relevant information including but not limited to the following:

- Relevant waste legislation;
- EPA, National Waste Report 2004;
- EPA, Ireland's Environment, 2004; and
- Local Waste Management Plans

This chapter of the EIS examines two main areas of concern (as listed below) and consider mitigation measures that can be employed to offset the potentially adverse environmental impacts:

- Solid Waste Management (Construction and Demolition Waste); and
- Liquid Waste Management.

Solid Waste

The assessment of the solid waste management includes the following:

- Re-use of operational waste and brewers grains;

- Re-use and recycling of both operational and construction wastes; and
- Assessment of waste reduction strategies both in operations and in construction.

Liquid Waste

It is intended that the development will process all liquid effluent arising from the brewery operations. The assessment of the liquid wastes has included the following:

- Waste minimisation and characterisation of the waste;
- An assessment of ongoing waste reductions and control of these systems.

Engagement has commenced with DCC to ensure that the effluent load can be processed by the Ringsend WWTP without any impacts.

2.7.11 Transportation

The traffic assessment has included the following:

- An existing traffic count on all potentially affected local junctions;
- A safety assessment of traffic arising in and outside the site;
- The impacts from both construction and operational traffic;
- Appropriate consideration of the development of traffic mitigation measures / plans for the proposed brewery development and surrounding road network; and
- Transport sustainability will be incorporated into the report and the Dublin Transport Initiative considered in such as assessment.

2.7.12 Sustainability

The development sustainability analysis provides an assessment of the sustainability aspects that are relevant to the proposed brewery development. The analysis has identified a planning and sustainability policy framework with sustainability objectives and indicators and demonstrates how the project will deliver these objectives.

2.7.13 Interrelationship between Environmental Factors

All of the prescribed topics for the study will have been discussed separately in the preceding chapters of the statement. The EPA in its Advice Notes on '*Current Practice in the Preparation of Environmental Impact Statements*' (EPA, September 2003) states that this chapter should draw attention 'to significant interaction and interdependencies in the existing environment'.

While all environmental factors are inter-related to some extent, the significant interactions and inter-dependencies will be taken into consideration by our environmental specialists when drafting their technical reports, and summarised in this chapter of the statement.

2.8 Conclusions

Whilst the general principles adopted in the EIA of the proposed brewery development are outlined in Sections 2.2 – 2.6 above, further topic-specific information is included in each of the individual technical chapters presented in Chapters 6 to 17 below.

This EIS represents a principal output of the EIA process and will contribute to, and inform, the permitting decision-making process.

The mitigation and monitoring measures identified within this document will form part of the ongoing environmental actions to be undertaken as part of the construction and operation of the proposed brewery development. The scope of these ongoing actions is defined within Chapter 19 of this document.

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3.0 CONSIDERATION OF ALTERNATIVES

3.1 Objectives of this Chapter

This Chapter of the EIS describes the evaluation of the principle alternatives identified during the site selection process and subsequently during the design of the proposed brewery development. The main reasons for the selection of the preferred site and scheme are presented, taking into account the effects on the environment.

In this respect, Diageo Ireland has considered the following:

- What is the best strategy for asset replacement;
- What is the scale of the brewing capacity required;
- What is the preferred manufacturing solution;
- What is the preferred layout/configuration option.

Strategy for Asset Replacement

Starting in 2007, Diageo Ireland began a review on how to best to replace some of its critical brewing infrastructure in Ireland. Diageo Ireland has considered the need for efficient and sustainable operation, alongside strategic asset replacement which is essential for its future brewing operations.

This review has established the opportunity to build a sustainable brewing facility to replace the existing brewing facilities at Saint James's Gate some of which are now in excess of 30 years old.

The Scale of the Brewing Capacity Required

The determination of the scale (in terms of brewing capacity) of the development was decided on the basis of brewery capacity studies and market trends in Ireland. The studies concluded that a new facility, employing new sustainable technologies and higher production efficiencies to deliver an annual brewing capacity of circa 8.2 million hectolitres, was the optimum solution to meeting future market import and export needs.

The Identification of the Preferred Manufacturing Solution

Following an extensive internal review of its existing operations, Diageo Ireland has proposed to expand operations at Saint James's Gate. A number of other production options were also considered.

The Selection of the Preferred Layout/Configuration Option

Diageo Ireland's St. James's Gate site is relatively large, at approximately 20 hectares. Therefore, a number of viable locations within the site were considered possible. As the eventual configuration would determine the setting of precise layout boundaries at each of these locations, they were termed 'zones' for the purposes of comparative evaluation. Four zones were investigated in detail in order to determine the optimum location for the proposed brewery development. However, it was established that certain elements are common to all zones (i.e. location of the existing Fermentation Beer Processing Plant and upgrade to the existing utilities area). - see Figures 3A-3D in Volume 2 of the EIS for zoning diagrams.

In brief, the four zones considered were:

- Zone A: replacement of the power station building with the proposed brewery development;
- Zone B: replacement of the medical centre with the proposed brewery development;
- Zone C: a continuous linear brewery layout just west of the existing fermentation plant in the middle of the North Site; and
- Zone D: brewhouse in the northeast quadrant of the North Site.

The four zones were evaluated against a range of social, environmental and economic issues, such as the potential for noise and visual impacts, effects on cultural and industrial heritage, transport impacts, etc, and against criteria for determining the extent to which the proposed brewery development would integrate with the rest of the brewery constructability and 'future proofing' the brewery and the impact on existing operations.

On the basis of the adopted assessment criteria, Zone D was selected as offering minimal disadvantages and a number of advantages when compared to the other zones. It was the best location for potential noise impact, tying into the existing brewery, transport constructability, 'future proofing' and potential industrial heritage impact.

3.2 Alternative Sites Within St. James's Gate

3.2.1 Zones A – D

Diageo Ireland's St. James's Gate site is very large for a city centre location, at approximately 20 hectares. Therefore, a number of viable alternative sites were considered possible. As the sites could not all be held to specific boundaries at this stage, they were termed 'zones'. Four zones were investigated in detail in order to determine the optimum location for the proposed brewery development.

The zones were initially identified on the basis of the following requirements:

- A site of sufficient size to accommodate the scope and scale of the proposed brewery development;
- An existing utility infrastructure in the surrounding area that will meet the needs of the proposed brewery development; and
- A site that could accommodate the proposed brewery development without unreasonable adverse environmental or physical impacts.

Section 5.1 described the existing St. James's Gate site, the entirety of which is shown in Figure 5.1 in Volume 3 of the EIS. The four zones (Zones A to D) identified are described below, and shown in **Figures 3-A to 3-D** further below. It was established that for all zones, the Fermentation Plant and associated vessels will be located to the west of the existing Fermentation Plant. The existing Fermentation Plant location is fixed as there is no technical or commercial logic to its removal. In addition, the necessary upgrade to the utilities area will be located in the environs of the existing utilities.

- Zone A: replacement of the power station building (demolition) with the new brewery facility and Raw Materials, on other side of Cooks Lane;

- Zone B: replacement of the medical centre (demolition) with the new brewery facility, with re-building of the medical centre elsewhere;
- Zone C: a basically continuous linear brewery layout just west of the existing fermentation plant in the middle of the North Site; and
- Zone D: brewhouse facility to be located in the northeast quadrant of the site, in a relatively open, low-level area.

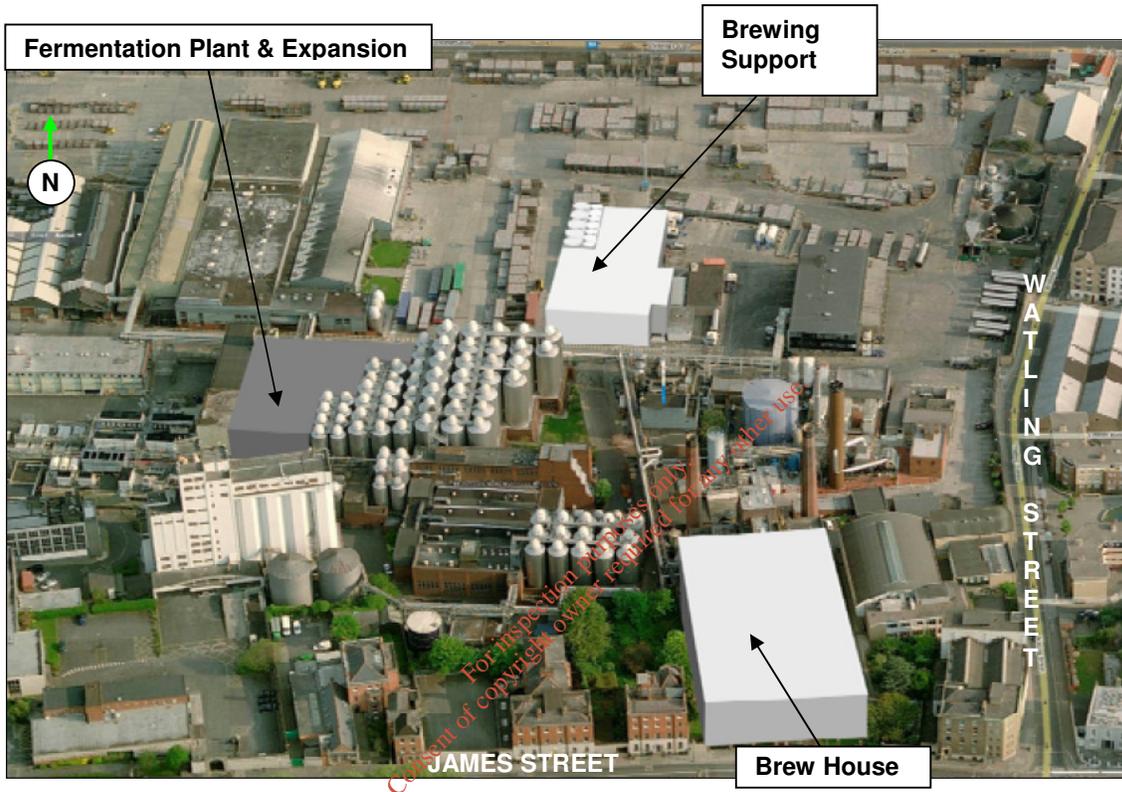
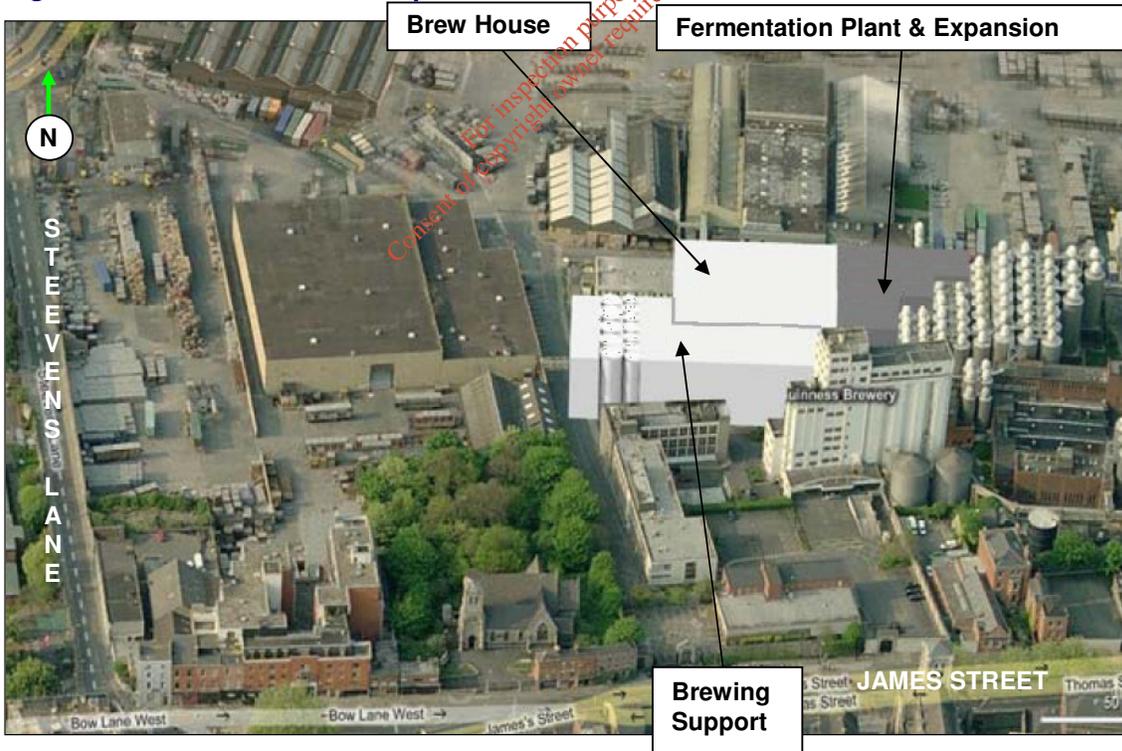
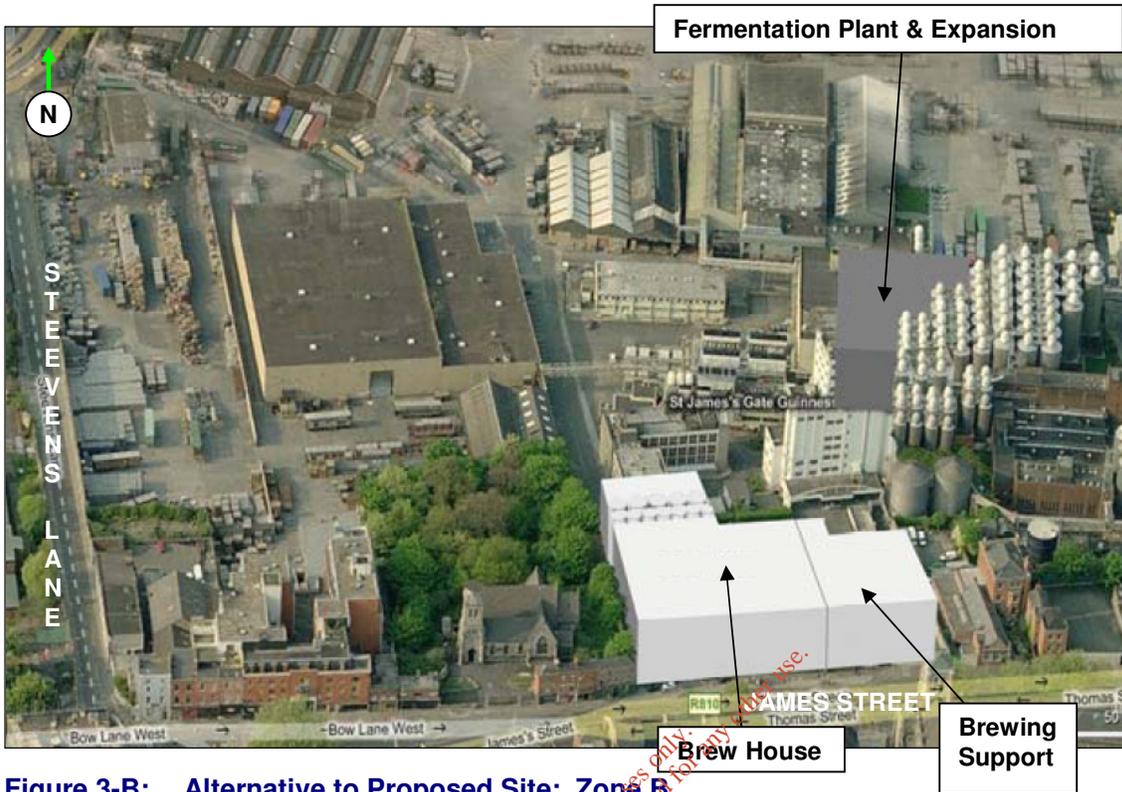


Figure 3-A: Alternative to Proposed Site: Zone A



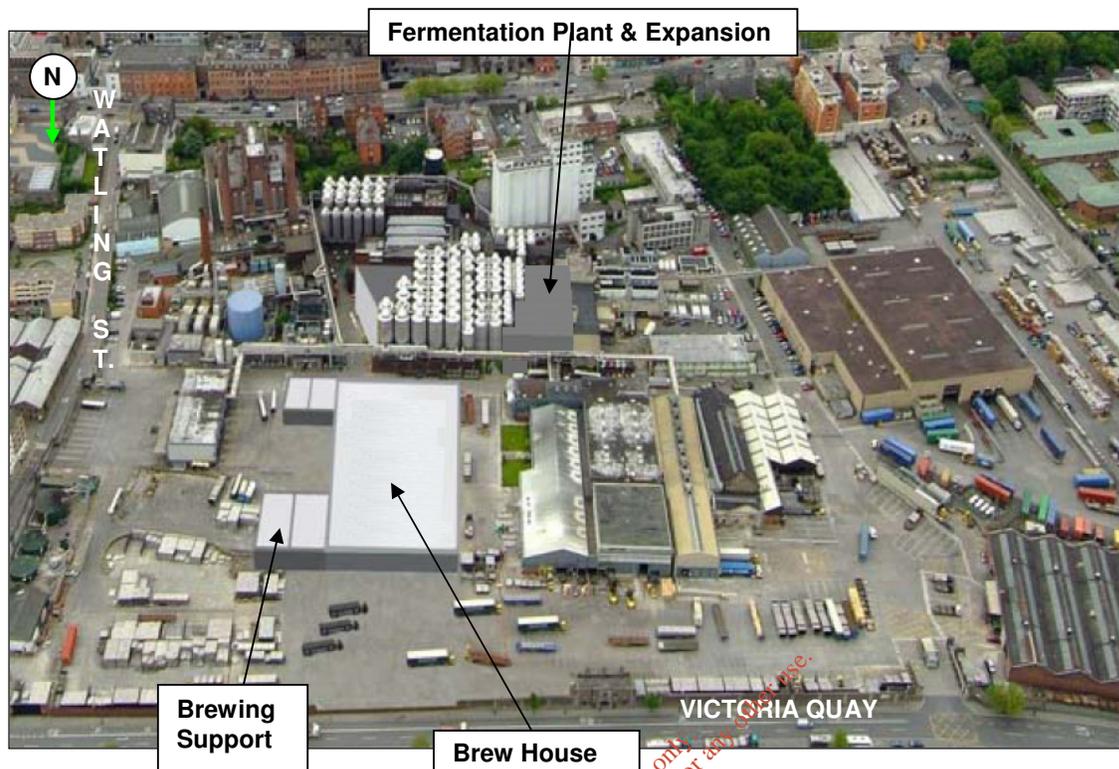


Figure 3-D: Proposed Site: Zone D

3.2.2 Zone Assessment, Ranking and Rating

The Diageo Ireland project team evaluated the four zones, and the project team defined the following assessment criteria to assist in determining the most suitable zone:

- **Process Adjacencies** – the distances between the overall process components, which has a significant impact on construction stage costs and operational efficiencies;
- **Traffic/Logistic Transport Access** – takes account of pending reorganisation of Gate 6 (towards the west end of Victoria Quay) to facilitate vehicle stacking off the public road. The basis of assessment was all raw materials being delivered by trucks from the existing raw materials intake facilities on Roberts Street to the zone (A, B, C or D);
- **Visual Branding** – the relative potential visual prominence to the city generally, and also to the St. James's Gate entrance to the southern site, in terms of the possible utilisation of the development for product branding and promotion;
- **Planning / Conservation Impact, etc.** – the potential problems caused by the need to demolish existing buildings, or adjacency of the large-scale brewhouse block to existing Protected Structures;
- **Environmental Impact – Landscape & Visual** – assessment based on the lowest visual impact with respect to visual screening by topography and existing

structures, including height and place in relation to the existing industrial skyline (particularly viewed from north across the river);

- **Environmental Impact – Noise** – the two key issues are the replacement of the brewers grains facility on the southern site with a new one on the northern site, and also the potential for impact on existing residential uses at Watling Street and Camac Yard. The new brewers grains facility will remove an existing noise nuisance issue close to existing residential use, but its new location needs to consider potential new receptors;
- **Cost** – adjacencies to existing facilities and any requirement for demolition / relocation of facilities are key drivers, but also considers drainage, ground conditions and piling;
- **Constructability** – considers in particular access, space availability and impact on existing brewery operations;
- **Expandability / Asset Replacement / Future Proofing** – considers the potential to expand or enlarge the facility to accommodate related development (noting adjacency requirement) or replacement with new plant or technologies;
- **Impact on Existing Operations** – considers the level of risk to disrupting the existing brewing and related activities on-site, and the relative complexity of avoiding or minimising this disruption;
- **Archaeology** – considers the potential impact on archaeology, which is the buried remains of past human activity on the site, and
- **Industrial Heritage** – considers the potential impact on the industrial heritage of the site (both their integrity and their setting), which are the surviving industrial structures of historic significance.

The following issues were omitted from this assessment for the following reasons:

- Future proofing – it was agreed that all sites have roughly equivalent future proofing capacity;
- Site conditions – although Zone D is the best site in relation to levels and location of existing underground services, this would not be significant in the overall assessment; and
- Emissions to air – new process proposed will reduce emissions compared to current brewery outputs, and given low impacts anticipated for all locations, it was decided not to score this criterion.

This evaluation was done as a high-level comparative analysis, and did not involve detailed environmental assessment methods. The evaluations were relative, and do not reflect the net impact of the development against the environmental baseline.

The output of the evaluation is presented on the following page.

Criterion	Zone A Score	Comment	Zone B Score	Comment	Zone C Score	Comment	Zone D Score	Comment
Process Adjacencies		remote from other major process components		relatively good adjacencies, particularly to fermentation plant		good adjacencies, but organisation of a rational process flow would not be straightforward for this site		relatively good adjacencies
Logistic Transport Access		James's Street access issues, internal access within site to rear is poor		as for Zone A, but better potential internal access with some problems remaining		good access - direct via Gate 6		access via Gate 6 and Cook's Lane has space available which gives greater flexibility in layouts
Visual Branding		best location - prominent site directly opposite the St. James's Gate entrance		good location on James's Street		visually obscure site, deep within site from boundaries to public streets		potentially good location, with high visibility from Victoria Quay and adjacent city areas
Planning & Conservation Impact		poor due to loss of power station building		poor due to adjacencies to protected structures on James's Street		development site is central to brewery lands, so least impact on existing setting		within brewery lands, but closer to and more visible from Victoria Quay
Environmental Impact Landscape & Visual*		highly visible - at high point of site, increasing general visual impact from Liffey, etc.		highly visible - at high point of site, increasing general visual impact from Liffey, etc.		least visual impact		intermediate visual impact
Environmental Impact Noise		potential noise issues arise at James's Street		potential noise issues arise at James's Street		reasonably close to Camac Yard apartments, although screened by trees		potential for good separation of brewers grain facility from Watling Street flats - best location to minimise nuisance
Cost		environmental impact is likely very expensive to remedy		Medical Centre relocation causes significant costs, and also steeply sloping site		high costs and impacts on programme from relocating fridge plant and offices		least cost risk* - some remediation risk due to historical location of tanneries
Constructability		limited access and very restricted site		limited access and very restricted site		poor access, substantial impacts on existing production operations likely		good access, largely separated from existing live brewery facilities
Expandability / Asset Replacement / Future Proofing		very little potential for expansion exists		relatively limited scope for expansion exists		expansion potential to the north only, limited due to change in ground level		least constrained site - best option for future expansion
Impact on Existing Operations		little impact		need to replace medical facilities impacts programme / phasing		need to relocate fridge plant and offices impacts phasing		reasonably free of impacts on existing operations
Archaeology		no known difference between sites		no known difference between sites		no known difference between sites		no known difference between sites
Industrial Heritage		very poor due to loss of power station building		potential visual impacts to adjacent Protected Structures		potential visual / setting impacts on adjacent flaking plant		lesser visual / setting impacts to flaking plant and other smaller features nearby

* Need for somewhat deeper piling due to greater sediment depth close to river was noted – not significant. Need to pump effluent from this location rather than gravity feed to existing drains noted – again costs not significant



The qualitative matrix above clearly demonstrates that Option D is the preferred location taking all relevant factors into account. Within Zone D, a further assessment was carried out on locating the development adjacent to Victoria Quay or in closer proximity to Cookes Lane. Due to the process efficiencies arising from closer proximity to other plant areas, it was decided to locate the development as close as possible to Cooke Lane within Zone D.

3.3 Conclusions

Based on the adopted assessment criteria, Zone D offered minimal disadvantages and a number of advantages when compared to the other zones. It is the best location for process adjacencies (tied with Zone B), access / transport, potential noise impact, cost, constructability, expandability and potential industrial heritage impact. It is the second best location for visual branding, planning / conservation, potential landscape / visual impact, and potential impact on existing operations.

The detailed design of Zone D has taken account of a number of environmental factors, including potential flood risk on the site, visual impact, noise generation, and the historic value of features along Victoria Quay. This has helped to optimise the proposed brewery development. Refer to Chapter 5 for a further description of current proposals.

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4.0 PLANNING AND LEGISLATIVE FRAMEWORK

4.1 Introduction

Chapter 4 of the EIS sets out the planning and development context relating to the proposed development on the subject site. This section reviews the national, regional and local planning policy relevant to the proposed brewery development.

The subject lands are in the ownership of Diageo Ireland. The lands are located to the north of James's Street, Dublin 8.

The following planning documents are relevant to the assessment of the proposed brewery development:

- *National Development Plan (2007 - 2013) and the Infrastructure and Capital Investment 2012 -2017* (Medium Term Exchequer Framework);
- *National Spatial Strategy (2002 – 2020)*;
- *Smarter Travel – A Sustainable Transport Future 2009-2020*;
- *Greater Dublin Area Draft Transport Strategy 2011-2030*;
- *The planning System and Flood Risk Management - Guidelines for Planning Authorities* (November 2009);
- *Regional Planning Guidelines for the Greater Dublin Area (2010-2022)*;
- *Dublin City Development Plan 2011-2017*; and
- *The Liberties Local Area Plan*.

4.2 Proposed Development

The proposed brewery development comprises the construction of a new relocated, upgraded brewing facility for Diageo Ireland on part of their landholding in Dublin 8. Diageo Ireland's vision is to create a modernised brewery which will meet the highest standards in terms of technology, efficiency and environmental management. The proposed brewery development will maintain the brewery within Dublin City, where it has existed for over 250 years. A detailed description of the proposed brewery development is set out in Section 5.0 of this EIS.

4.3 National Planning Context¹

The National Development Plan 2007-2013 and the Infrastructure and Capital Investment (Medium Term Exchequer Framework)

The National Development Plan (NDP) has four basic strategic objectives:

¹ Only the national planning and development policy considered particularly relevant and appropriate to this proposed development has been considered in this Section.

- To continue sustainable national economic and employment growth;
- To strengthen and improve Ireland's international competitiveness;
- To foster balanced regional development; and
- To promote social inclusion.

The NDP sets out an investment programme which prioritises certain projects under the five strategic headings of:

- Economic Infrastructure;
- Enterprise, Science and Innovation;
- Human Capital;
- Social Infrastructure; and
- Social Inclusion.

It is a key objective of the plan to maintain competitiveness and to continue to attract foreign direct investment into Ireland. It is also an objective of the plan to integrate regional development in accordance with the National Spatial Strategy. In this context, the plan underlines the importance of maintaining a strong and competitive Greater Dublin Area. The proposed brewery development is in line with the investment priorities outlined in the NDP and will help ensure that the returns on these investments are maximised.

It is noted that on 10th November 2011 the Department of Public Expenditure and Reform launched a document entitled, *Infrastructure and Capital Investment 2012-2016: Medium Term Exchequer Framework*. This report presents the findings of a Government-wide review of infrastructure and capital investment policy. The report identifies that "Within the context of tight fiscal constraints, the Government is committed to ensuring that the country's stock of infrastructure is capable of facilitating economic growth and that the enterprise development agencies have ample resources to foster opportunities for enterprise development and job creation". The document acknowledges that over the medium term, there will be a lower level of recourse available for capital investment. The Department of Public Expenditure and Reform have stated that the document replaces the NDP for 2007-2013.

There are four main components of the Infrastructure and Capital Investment strategy, namely:

- **Economic Infrastructure** – encompassing transport networks, energy provision and telecommunications capacity;
- **Investment in the productive sector and human capital** – such as direct support for enterprise development; science, technology and innovation advancement, supports for tourism, agriculture, fisheries, forestry and capital investment in education;
- **Environmental infrastructure** – including waste and water systems and investment for environmental sustainability; and

- **Critical social investment** – such as health services and social housing programmes.

These pillars are identified as the main components of a viable infrastructure base for a modern, competitive economy.

The proposed significant brewery investment will ensure the retention of current employment levels of the existing Diageo Ireland site and at its peak provide several hundred construction jobs on-site. Diageo Ireland employs more than 2,000 people across Ireland. Diageo Ireland also contribute significantly to approximately 15,000 jobs and spend in excess of €345 million annually on wages, purchases of materials, services and other requirements for operations on the island of Ireland. The value of their annual total exports from Ireland is €517 million.

Having regard to the above the proposed brewery development is consistent with the aims of the NDP and the new Infrastructure and Capital Investment Framework as it will provide significant investment in Dublin City. This investment will make a major contribution towards the maintenance of a strong competitive Greater Dublin Area and is in line with the investment priorities of the NDP.

The National Spatial Strategy (2002-2020)

The National Spatial Strategy (NSS) for Ireland is a planning framework designed to achieve a better balance of social, economic, physical development and population growth between regions.

The NSS supports the consolidation of the metropolitan area and the concentration of growth in the hinterland area into identified growth centres in the Greater Dublin Area. The NSS recognises that Dublin plays a vital national role and that the performance of the cities economy is essential to the success and competitiveness of the national economy. In order to sustain this role, the NSS advocates the physical consolidation of Dublin, supported by effective land-use and transportation policies, as an essential requirement for a competitive city.

The NSS encourages enterprise development on lands that are aligned with the spatial structure outlined in Section 3. The lands should provide a high quality setting and location, easy access to key infrastructure such as transport, energy, water services and communications and be well integrated with the spatial structure of adjoining urban areas and their educational facilities. The NSS calls on public policies which recognise the locational requirements of enterprise in order to attract investment and support economic development.

It is also noted that the NSS places an emphasis on Dublin City's capacity for employment, innovation and achieving intensification without compromising amenity or environmental quality.

The proposed brewery development on part of Diageo Ireland's lands will ensure that this traditional industry is retained in Dublin City. This proposal will secure and maintain a historical industry use and an important employment base in the City. The consolidation of the St James Gate brewing operation on the northern lands will also have the benefit of freeing up the lands to the south of James's Street for future development, such as residential, offices and retail facilities and a potential new urban quarter. This is in accordance with the objective of the National Spatial Strategy to consolidate the growth of the metropolitan area. In addition the proposed brewery

development in accordance with the principles of sustainable development as it will lead to a more intensive use of brownfield lands located in Dublin City Centre.

Smarter Travel – A Sustainable Transport Future 2009-2020

The Government publication, '*Smarter Travel, A Sustainable Transport Future: A New Transport Policy for Ireland 2009-2020*' is designed to show how Ireland can reverse current unsustainable transport and travel patterns and reduce the health and environmental impacts of current trends and improve our quality of life. Chapter 4 notes that Ireland has been making progress in aligning transport and spatial planning through the National Spatial Strategy (NSS), Regional Planning Guidelines and the National Development Plan (NDP).

Aligning Spatial Planning and Transport

Action 1

A key action is to enhance existing legislative provisions to deliver deeper integration of travel and spatial planning and to support the full integration and alignment of transport plans with the development plan process and local area planning.

Action 2

Ensure better integration of land use planning and transport policies in the relevant planning guidelines as part of their ongoing review in tandem with the use of policy directives to give effect to specific measures needed to meet the vision for sustainable travel.

Action 3

A wider rollout of LUTS-type strategies, supported through a technical assistance programme at national level.

Action 4

The delivery of public transport, cycling and promotion of more sustainable travel patterns generally in many existing urban centres can only be achieved through retrofitting.

Smarter Travel also seeks the promotion of targets requiring a minimum percentage of new residential and mixed-use development to take place on brownfield/existing sites to consolidate urban growth and enable organic development of urban areas from the centre out.

The proposed brewery development is in line with the sustainable transport principles of Smarter Travel. The subject lands at the Guinness Brewery are highly accessible by means of foot, bicycle and public transport. Visitors to the brewery and staff are able to use the local and national commuter rail links at Heuston Station, the LUAS (tram) stops at Museum, St. James's Hospital and Heuston Station and a number of Dublin Bus routes (including stops adjacent to the site at James's Street and Victoria Quay).

Greater Dublin Area Draft Transport Strategy 2011-2030

The Greater Dublin Area Draft Transportation Strategy (DTS) is a long-term transport Strategy which will guide all transport planning in the Greater Dublin Area (Counties

Dublin, Kildare, Meath and Wicklow) until 2030. It sets out objectives and proposals in relation to how transport should evolve over that period in order to ensure that the Dublin region continues to meet the needs of its citizens.

The Strategy's role is to establish appropriate policies and transport measures that will support the Greater Dublin Area in meeting its potential, as a competitive, sustainable city-region with a good quality of life for all.

The Strategy objectives can be grouped into economic, social and environmental categories. The Strategy aims to meet:

- Economic objectives by reducing delays and improving journey time reliability, particularly for business travel and the movement of goods, and by improving access to and within town centres;
- Social objectives by improving safety, reducing travel related stress and reducing the adverse impacts of traffic on neighbourhoods and centres whilst enabling all sectors of society to travel to the destinations they need to reach; and
- Environmental objectives, by giving priority to those means of travel that are less damaging to our natural and built environment.

The proposed brewery development accords with the objectives of the strategy. The subject site is strategically located close to a range of public transport facilities. The Brewery lands are located along an important existing transport corridor which includes Heuston Station, the LUAS tram line and Dublin Bus routes. The proposed brewery development is also accessible by foot and bicycle.

The Planning System and Flood Risk Management – Guidelines for Planning Authorities

The Planning System and Flood Risk Management – Guidelines for Planning Authorities were published in November 2009 by the Office of Public Works (OPW). The Guidelines introduce mechanisms for the incorporation of flood risk identification, assessment and management into the planning process. The Guidelines aim to ensure that flood risk management is an important consideration in the drafting of Development Plans and Local Area Plans and also in the decision making process when dealing with planning applications.

It is noted at city and county level that the Guidelines state that:

Planning authorities will introduce flood risk assessment as an integral and leading element of their development planning functions under the Planning Code and at the earliest practicable opportunity in line with the requirements of these Guidelines.

Given the location of the subject site adjacent to the River Liffey this guidance is relevant to this application. The application is accompanied by a comprehensive Flood Risk Assessment which has been carried out by Jacobs (refer to Appendix 9.2, Volume 4).

4.4 Regional Planning Context

The Regional Planning Guidelines for the Greater Dublin Area 2010-2022

The Regional Planning Guidelines (RPGs) were published on 15th June 2010 by the Regional Planning Guidelines office. These guidelines pertain to the Dublin Regional Authority and the Mid-East Regional Authority. The RPGs provide a planning framework for the Greater Dublin Area within the context of the Planning and Development Act 2000 and the National Spatial Strategy 2002 – 2020. They provide a long-term strategic planning framework for the development of the Greater Dublin Area.

The Guidelines set out separate development policies within the Greater Dublin Area for the Metropolitan Area and the Hinterland Area. It is envisaged that development within the Metropolitan Area will be consolidated with an increase in residential densities and increased public transport linkages. Development in the Hinterland Area will be concentrated into identified towns separated from each other by strategic green belt land.

The Guidelines set out a strategy for economic development. The challenges facing the Greater Dublin Area and the current economic environment are outlined in the Guidelines, including recent growth in unemployment. Interestingly the Guidelines make reference to the fact that there is a notable growth in high value manufacturing. The RPGs identify that growth has occurred in high-value manufacturing industries, particularly the pharmaceutical and food and drink industries in Ireland. These guidelines acknowledge the need for Ireland to remain a competitive location for these types of high value firms.

The Guidelines state that:

The Greater Dublin Area [sic] by virtue of its location offers advantage for high value manufacturing: access to a large skilled workforce international accessibility; proximity to leading third level educational institutions and research organisations; a critical mass of economic activity allowing the emergence of business networks; and concentrations of activity across a range of sectors.

In addition the RPG's set out a number of critical issues for regional stakeholders in enhancing the business environment for manufacturing in the Greater Dublin Area must include:

- (1) Optimising the knowledge resources that are available in the region to support the increasingly diverse array of activities carried on by high value manufacturing, to drive increased levels of productivity; and to stimulate and drive new innovation based business start-ups;
- (2) Good land-use planning, incorporating transport systems/accessibility; residential development, adequate and serviced land banks for future development, and necessary physical/social infrastructure
- (3) A constructive approach to local authority development charges in the context of the increasingly competitive global environment
- (4) Advanced broadband connectivity (next generation networks)

Diageo Ireland's brewing operations constitute a high value manufacturing process within Dublin City. Diageo Ireland views Dublin City as an attractive location for their brewing operations going forward. They intent to secure their existing manufacturing operations within part of their lands in Dublin. The proposed brewery development was borne out of this vision. The proposals seek to consolidate and upgrade a long established drinks industry/brewing facility and maintain a significant employment base within the city. Diageo Ireland's proposals for the subject lands will secure, upgrade and strengthen the existing high level manufacturing brewing operation in Dublin City. In this regard it is considered that the proposed brewery development complies with the principles of the RPG's.

4.5 Local Planning Context

Dublin City Development Plan 2011-2017

The current statutory development plan for the subject lands is the Dublin City Development Plan 2011-2017. The policies considered relevant to the proposed brewery development are detailed in this section of the EIS.

All of the policies and objectives of the Dublin City Development Plan flow from and are consistent with higher level national and regional planning guidance, which is set out in this chapter of the EIS. In this regard, the plan promotes intensification and consolidation of Dublin City. The plan states that:

This will be achieved by way of in-fill and brownfield development, regeneration and renewal of the inner city, redevelopment of strategic regeneration areas; and the use of higher densities especially in public transport catchments.

These measures will assist Dublin City achieve the critical mass that is needed to compete at an international level and fulfil its role as the national gateway and the driver of the national economy.

The city centre zone is defined as extending from the Docklands in the east to Heuston in the west and encompassing the majority of lands within the canal cordons. The Diageo Ireland lands which are the subject of this EIS are located within this area.

The Development Plan has identified six broad themes which are integral to the future growth and development of the city as follows:

- **Economic** – Developing Dublin City as the heart of the Dublin region and the engine of the Irish economy;
- **Social** – Developing Dublin City as a compact city with a network of sustainable neighbourhoods;
- **Cultural** – Making provision for cultural facilities and protection of our built heritage throughout the city and increasing our awareness of our cultural heritage and built heritage;
- **Urban Form and Spatial** – Creating a connected and legible city based on active streets and quality public spaces with a distinctive sense of place;

- **Movement** – Helping to build an integrated transport network and encouraging the provision of greater choice of transport; and
- **Environmental** – Providing for an overall framework involving key principles, strategies and objectives to drive a vision of ‘Sustainable Dublin over the next 25 to 30 years.

The vision for the city is as follows:

Within the next 25 to 30 years, Dublin will have an established international reputation as one of the most sustainable, dynamic and resourceful city regions in Europe. Dublin, through the shared vision of its citizens and civic leaders, will be a beautiful, compact city, with a distinct character, a vibrant culture and a diverse, smart, green, innovation-based economy. It will be a socially inclusive city of urban neighbourhoods, all connected by an exemplary public transport, cycling and walking system and interwoven with a quality bio-diverse greenspace network. In short, the vision is for a capital city where people will seek to live, work and experience as a matter of choice

According to the plan the long-term vision is based on the principles of sustainable development contained in the Framework for Sustainable Dublin (FSD) and also on the 6 Themes Approach utilised by Dublin City Council in the formulation and implementation of policy.

Guiding Principles

It is noted that one of the Guiding Principles set out in the Development Plan for the Strategic Regeneration of the Heuston and Environs area (SDRA 7) is as follows:

To support Guinness Brewery in their continued development and safeguard employment, industry and tourism in the south west inner city

The Development Plan and Dublin City Council acknowledge the important contribution that the existing Brewery's has made in Dublin City as an established industry, a significant employment base and a tourism resource for the city. The Development Plan supports the existing and continued Brewery operation on the Diageo Ireland lands in Dublin 8.

Existing Zoning

The overall strategy to zoning in the plan is based on a number of principles which include:

- That enough land should be zoned so that the anticipated development needs of the economy and society in the city within the lifetime of the plan and for a reasonable period beyond can be met;
- That intensification of sustainable development should be permitted adjacent and close to public transport nodes and corridors in order to maximise the use of public transport, to minimise trip generation and distribution, and to promote sustainable development; and

- Dublin City Council recognises that certain public bodies, and educational and health institutions, private owners and clubs, sports organisations, provide important facilities for the city on their sites. The continued provision of these facilities is desirable for the economic, social and cultural health of the city, and it is the policy of Dublin City Council to co-operate with these bodies and institutions in relation to future planning and development of these sites so as to consolidate these uses in their present locations. Notwithstanding the foregoing, permission will not be granted for any development which materially contravenes the zoning of the site of the proposed brewery development.

There are two existing zonings on the application lands as follows;

- Z7 Employment (Industry) Zoning which has a land use objective:

To provide for the protection and creation of industrial uses and facilitate opportunities for employment creation

and

- Z5 City Centre Zoning objective which has a land use objective:

To consolidate and facilitate the development of the central area, and to identify, reinforce and strengthen and protect its civic design character.

The plan identifies land uses that are permitted in principle and open for consideration. The existing brewing operations on the Diageo Ireland lands fit into a general industrial use. It is noted that general industrial uses are not permitted in principle on Z5 zoned lands. General industrial uses are permitted in principle within Z7 lands. Having regard to the existing use on the portion of the Diageo Ireland lands that are Zoned Z5, it is important to note that this is a long established activity for over 250 years.

General industrial uses are not permitted in principle on Z5 lands, therefore the existing brewery use on this portion of land may be categorised as a non-conforming one. There is specific provision in the Dublin City Development Plan for “Non Conforming Uses”. The following is set out in Section 15.8 of the Development plan:

“Throughout the Dublin City Council areas there are uses which do not conform to the zoning objective for an area. All such uses, where legally established (the appointed day being 1st October 1964) or where in existence longer than 7 years, shall not be subject to proceedings under the Act in respect of the continuing uses. When extensions to or improvements of premises accommodating such uses are proposed, each shall be considered on their merits, and permission may be granted where the proposed development does not adversely affect and amenities of premises in the vicinity and does not prejudice the proper planning and sustainable development of the area.” (our emphasis)

The Guinness Brewery is long established on the subject lands, therefore it is considered that Dublin City Council may consider any future application to modify, consolidate, extend or reconfigure the existing premises accommodating the brewery uses by way of Section 15.8 of the Development Plan. The non-conforming uses section of the Development Plan clearly provides the appropriate means for the consideration and determination of the proposed development.

Other Designations

According to Map E of the plan the following designations are relevant to the subject lands:

- Part of the brewery lands which front onto Victoria Quay are located within a Conservation Area. These are within the application area. (Conservation areas are further discussed under the heading “Heritage”); and
- It is noted that the Granite Piers and a Guinness Building located along Victoria Quay are Protected Structures.

Settlement Strategy

The Core Strategy of the plan includes a Settlement Strategy. Under the Settlement Strategy, the plan identifies 9 Key Developing Areas (KDA's). These represent significant areas of inner and outer city with substantial development capacity and the potential to deliver the residential, employment and recreational needs of the city. It is noted that the Digital Hub/Liberties and Heuston are identified as two KDA's within the plan. Diageo Ireland's lands are located within the Digital Hub/Liberties area and in close proximity to the Heuston area. Dublin City Council envisages that these areas will support the economic or cultural specialisms essential for the growth and diversification of the city's economy.

Economic Strategy

The plan states that:

Economic success and employment generation is critical to the success of Dublin and the quality of life and prosperity of its citizens.

The Strategic Approach to respond to the challenges facing the economy of the city and its role as a national and regional economic engine is set out in the Development Plan. It is noted that the Strategic Approach contained in the plan includes the following:

- Developing economic, cultural and institutional clusters with the city centre to optimise its economic potential;
- Improving the general attractiveness of the city for people and investors as a key part of maintaining competitiveness and creating a vibrant place that attracts and retains creative people within the city;
- Continuing and enhancing regeneration, particularly in the city centre zoned areas, as the next big move for major improvements in Dublin's competitiveness; and
- Promoting tourism as a key driver for the city's economy particularly through making the city attractive for visitors, international education, business tourism and conventions.

In this regard it is the general policy of Dublin City Council:

RE2 (i) *To promote and enhance the role of Dublin as the national economic engine and driver of economic recovery and growth, with the inner city including the Docklands as its core economic generator*

(ii) To promote and enhance the city's competitiveness and address deficits, to improve the business environment so that existing jobs are supported and employment generated, and be creative and practical in its responses to present economic challenges

RE3 *To recognise the crucial need for the planning and sustainable development system to be agile and responsive in the face of challenging and rapidly changing circumstances. Dublin City Council will promote sustainable development by balancing complex sets of economic, environmental and social goals in planning decisions*

RE4 (i) *To take a positive and pro-active, approach when considering the economic impact of major planning applications in order to support economic development, enterprise and employment growth and also deliver high-quality.*

In addition to the above, the Brewery economic contribution are also set out in SDRA7 (item 10) of the Development Plan which emphasises the Brewery's importance in Dublin 8 as an established industry, a significant employment base and a tourism resource for Dublin City overall.

The proposed brewery development constitutes a major investment by Diageo Ireland in Dublin City. This development will enhance and consolidate the existing brewery at James's Gate. In addition the proposals will secure and retain a significant employment base in Dublin City.

Transport

The delivery of an efficient, integrated and coherent transport network is a critical component of the plan's core strategy to achieve a compact, sustainable and connected city.

Consistent with the national vision for sustainability as set out in the Department of Transport's '*Smarter Travel*', the plan places a stronger emphasis on sustainable forms of transport such as public transport, walking and cycling, as well as a "pro-active approach to influencing travel behaviour and effective traffic management, all underpinned by an integrated land-use and transportation strategy that promotes intensification in accessible areas."

In this regard, the lands which are the subject of this application are strategically located in Dublin City adjacent to national and local bus services, to city-wide commuter rail, LUAS services. The proposed brewery development's position is consistent with the transportation vision, policies and objectives of the plan. Visitors and employees of the brewery may walk, cycle or avail of public transport in order to access the proposed brewery development.

Tourism

The plan notes that attracting visitors, international students and conventions is crucial to the economic success including the global connectivity of the city and it is critical to continually improve the city's attractions, facilities and price competitiveness. Key to this is promoting Dublin as a world class tourist destination.

RE30 To promote and enhance Dublin as a world class tourist destination for leisure, culture, business and student visitors

RE31 To promote and facilitate the optimum benefits (including the international marketing benefits) to the city of the Convention Centre Dublin, as well as all other major existing and future visitor attractions such as the National Cultural Institutions including The Abbey Theatre, IMMA, Collins Barracks, the National Gallery and the Chester Beatty Library, the Hugh Lane Gallery, the Phoenix Park, the Guinness Storehouse, the Georgian squares , and to promote the Convention Centre Dublin area as a major business, tourism, hotel, entertainment and leisure destination of international standard and to encourage development of further tourist attractions and cultural developments and facilities.

In terms of tourism/cultural attractions the following is also noteworthy:

- The Guinness Store House is listed and illustrated as attraction No. 23 on Figure 12 of the Development Plan entitled “*Main Cultural Attractions Map*”.
- The Guinness Complex is located within the Liberties area. The Liberties is identified/illustrated on Figure 13 “*Main Cultural Quarters Map*”.

The Guinness Brewery complex has a significant heritage and tourism value to Dublin City. These are significant in terms of attracting tourists to Dublin City and Dublin 8. The proposed brewery development will consolidate and maintain the brewing activities within Dublin 8. In addition the proposed development will free up lands to the south of James’s Street in Diageo Ireland’s ownership, these lands could be developed into a new “*urban quarter*”.

Heritage

It is noted that part of the subject lands is located within a Conservation Area (the frontage of the subject site with Victoria Quay). Section 17.10.8.1 of the plan states the following:

All new buildings should complement and enhance the character and setting of conservation areas. In considering proposals for development in conservation areas, it is policy to have particular regard to:

- *The effect of the proposed development on the buildings and the surrounding environment, both natural and man made.*
- *The impact of development on the immediate streetscape in terms of compatibility of design, scale, height, plot width, roof treatment, materials, landscaping, mix and intensity of use proposed.*

In addition to the above the plan also states the following:

Development within conservation areas should be so designed so as not to constitute a visually obtrusive or dominant form of development. New alterations and extensions should complement existing buildings/structures in terms of design, external finishes, colour, texture, windows/doors/roof/chimney/design and other details.

Throughout the design process the design team had full regard to the importance of the setting of the subject site.

Liberties Local Area Plan

The Liberties Local Area Plan (LAP) was adopted in May 2009. It is an objective of the LAP to support the retention of brewing at St. James's Gate. The LAP sets out objectives for both the Diageo Ireland lands to the north and south of Thomas Street. The objectives and aspirations of the LAP specific to the Diageo Ireland lands were conceived and prepared on the basis of 'creating a distinctive new city quarter' on both the northern and southern lands, whilst also retaining the brewery in consolidated form.

It is noted that the key objectives of the LAP for the Diageo Ireland lands were conceived and written at a time when Diageo Ireland had intended to remove its brewing operations out of Dublin City. This is acknowledged throughout the LAP.

The LAP states the following in relation to the Guinness lands to the north of Thomas Street:

it is understood that the retention and consolidation of the manufacturing site [shown as a reduced core of the overall northlands], is at the heart of unlocking the redevelopment and that proposals for redevelopment of the remaining lands can only be agreed fully when the industrial site boundary is finalised (LAP, p.178)

the illustrated land was identified by Diageo as the space required to maintain and upgrade their brewing operation in Dublin; supporting the retention of brewing at St James's Gate is an objective of the LAP. An in-depth study analysing the exact space requirements for the manufacturing plant and the redevelopment quanta needed has yet to be finalised. It is therefore possible that the site boundary may vary, although once finalised, respect for the defined industrial site boundary has to drive any redevelopment proposals (LAP, p.180)

The Figure Ground, Height and Land Use Diagrams are indicative. It is a requirement of the LAP that a Masterplan be prepared demonstrating how the objectives of the Liberties Local Area Plan and the specific key site objectives for the Guinness Lands North can be delivered (LAP, p.185)

The Liberties LAP stipulates that a comprehensive masterplan is to be prepared as a pre-requisite to any planning application for the Guinness North lands.

Lands North of Thomas Street

Page 186 of the LAP identifies that a comprehensive masterplan is to be prepared as a pre-requisite to any planning application for the Guinness North lands. The masterplan must address and demonstrate how the proposed brewery development can meet the strategic objectives of the Liberties Local Area Plan and the key site objectives as listed below.

- Create new community facilities (key objectives including accessible high quality open space, mix of land uses, provision of school (secondary and/or primary) and a short-term strategy to bring the Rupert Guinness Theatre into use)
- Preserve the massing onto James's Street – intensification can occur behind, not between existing buildings
- Specific public realm and movement objectives
- Ensure that future development on the Guinness North Lands respects and has regard to the ongoing industrial nature of the brewing activities on-site,
- To maintain and increase employment opportunities on the lands now and into the future,
- Generally enhance the tourist appeal of the area,
- Prepare the conservation assessment and industrial archaeological survey of the Guinness lands as part of the Masterplan proposals,
- To facilitate the substantial pedestrianisation of Victoria Quay by re-routing west bound traffic from Victoria Quay,
- Create a very high quality civic space in Heuston Square,
- Create a major high quality open space in the form of a public park of city significance, preferably Thomas Street to Victoria Quay,
- Provide for a mix of land uses,
- Provide school size etc. to be determined in consultation with the Department of Education and Science.

The LAP recognises that the retention and consolidation of the St James Gate brewing activities is at the heart of unlocking development opportunities and that proposals for redevelopment of the remaining lands can only be agreed fully when the industrial site boundary is finalised (LAP, p.178). In this regard it requires an in-depth study to be undertaken which will analyse the exact space requirements for the brewery. It points out that the redevelopment quanta needed has yet to be finalised and it is therefore possible that the site boundary may vary (LAP, p.180).

The Masterplan for the northern lands was completed and submitted to Dublin City Council in November 2011. The Masterplan sets out Diageo Ireland's vision for the northern lands and defines the boundaries of future development on these lands.

4.6 Conclusion

This chapter of the EIS reviews the proposed brewery development in the context of all relevant national, regional and local planning policy.

The proposed development will lead to significant competitive advantages for the Irish economy and for Diageo Ireland.

It is national and regional planning policy to maintain the competitiveness of the Greater Dublin Area by attracting mobile foreign direct investment. The proposed brewery development will create significant direct and indirect economic benefits. The proposed significant brewery investment will ensure the retention of current employment levels of the existing Diageo Ireland site and at its peak provide several hundred construction jobs on-site.

It is also national and regional planning policy to consolidate the growth of the metropolitan area by increasing the intensity of use of brownfield sites located in the city centre.

The proposed brewhouse will compliment and enhance the long established brewing operations on the Diageo Ireland lands. The importance of the brewery to Dublin City is emphasised within the Development Plan which seeks to “To support Guinness Brewery in their continued development to safeguard employment, industry and tourism in the south west inner city”. The Development Plan and the Liberties LAP supports Diageo Ireland’s intention to modernise their brewery on a reduced site and release significant areas of brownfield land for alternative use.

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5.0 PROJECT DESCRIPTION

5.1 Site Location & Context

The location chosen for the proposed brewery development is located within the St. James's Gate site of western Dublin, which is within the city's 'inner city core' area and approximately 2.0 km west of Dublin City Centre. St. James's Gate is an active brewery surrounded by boundary walls and gated security on two distinct sites – the North Site and the South Site, which are separated by James's Street. The majority of the proposed brewery development is in the north-eastern corner of the North Site, directly to the south of the N4 (Victoria Quay) roadway, and directly west of Watling Street (see **Figure 5-A** below, and also Figure 5.1 in Volume 3). In total, the North Site is approximately 13 hectares in size; of which approximately 2.7 hectares will be redeveloped.

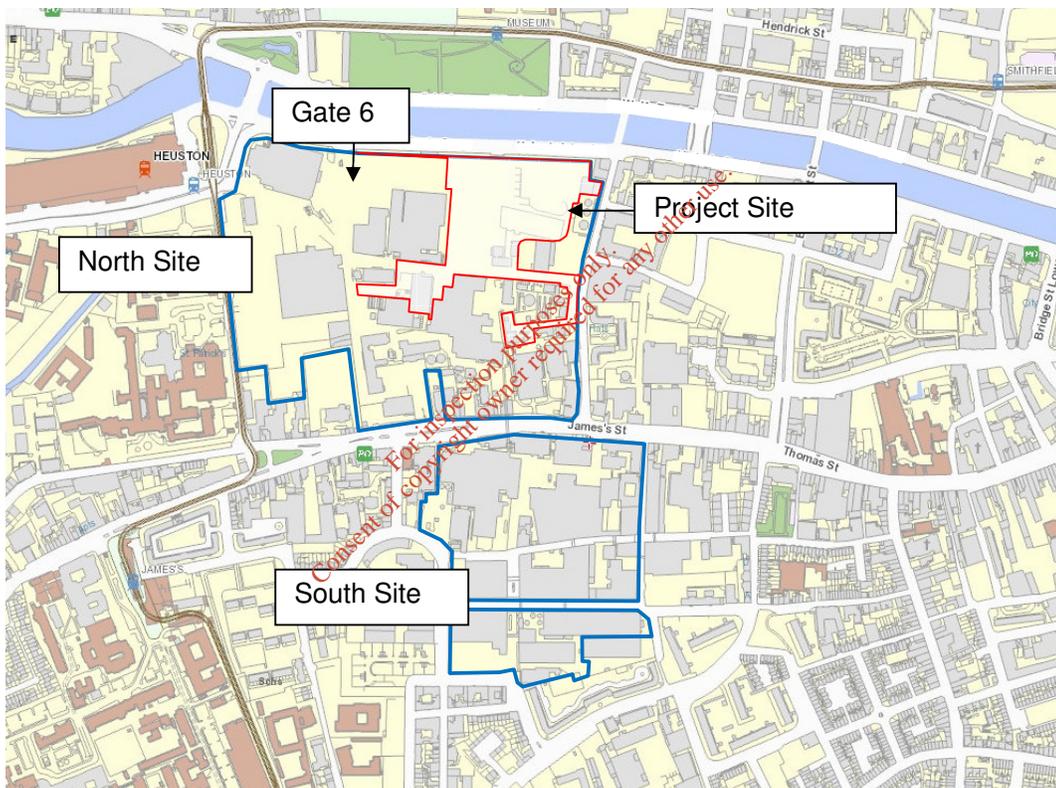


Figure 5-A: St. James's Gate Brewery and Project Boundary

The North Site is directly east of Heuston Train Station (a mainline station) and west of residential development along Watling Street and beyond. To the north is the N4 heading west, followed by the River Liffey, Palatine Square and the National Museum. To the south is James's Street and the further brewery development of the South Site, followed by residential and other land uses. The topography is a moderate slope down to the River Liffey from James's Street.

St. James's Gate is very accessible by a variety of transport modes, including walking, cycling and public transport. Visitors to the brewery and staff are able to use the Mainline Train Station at Heuston, the LUAS (tram) stops at Museum, St. James's

Hospital and Heuston Station, and a number of Dublin Bus routes (including stops adjacent to the site at James's Street and Victoria Quay).

St. James's Gate is quite central to the overall historic core of Dublin which is famous in particular for its churches and two cathedrals, and the site itself contributes a significant industrial heritage. Across the River Liffey to the north is the 'Heuston Gateway' along which the LUAS tram line runs – a very important transport corridor.

The precise location of the proposed brewery development is bordered by walls approximately ranging from four to five metres in height to the north and east, and existing brewery buildings and external plant to the south and west. Heuston Station is approximately 0.5 km west of the proposals. Apartment buildings overlook the site from Watling Street – The Maltings and The New Maltings are directly across Watling Street from St. James's Gate at this location, and the Emmet Buildings are further south and uphill from the site. Across the River Liffey is the N4 heading east, followed by Palatine Square and some apartments east of the square that also have some clear views of the site.

St. James's Gate and the North Site itself are part of the foundation of the success of the Guinness family and the Guinness brewing company, with Arthur Guinness having moved his brewing operations to St. James's Gate in 1759. By 1838, St. James's Gate was the largest brewery in Ireland, and by 1914, it was the largest in the world. It remains the largest brewer of stout in the world.

The purpose of the proposed brewery development is to sustain brewing activities on this historic site well into the future.

5.2 Project Need

5.2.1 History

Diageo Ireland and the Guinness brand are closely entwined with the history of Dublin, with roots stretching back 250 years. Over this period, successive Guinness brewing companies have been one of the largest employers in the region, noted also for its significant cultural and charitable contributions to Dublin society.

Diageo Ireland

Diageo Ireland was created in 1997 by the merger of Guinness plc and Grand Metropolitan plc, two of the world's best-known drinks companies. Diageo is a global company, trading in over 180 markets across the world, with offices in over 80 countries and over 20,000 employees, and is listed on both the London Stock Exchange (DGE) and the New York Stock Exchange (DEO).

Diageo in Ireland

Diageo Ireland's roots in Ireland are well established and stretch back well over two centuries, including both Guinness and Bushmills. Today, Diageo Ireland's operations are collectively a €1.17 billion business. With exports over €517 million annually, Diageo Ireland is one of Ireland's most important exporters in the high value-added and beverage category.

As the leading business in the drinks industry, Diageo Ireland makes an important contribution to the Irish economy. Diageo Ireland currently employs more than 2,000 people across Ireland, as well as supporting an estimated 15,000 jobs; the Company spends in excess of €345 million annually on wages, purchases of materials, services and other requirements for their operations.

Diageo Ireland's proposed brewery development at St. James's Gate represents a significant investment in a new world-class brewing centre of excellence in Ireland to support the growth and development of its global beer business in Europe and internationally.

5.2.2 Project Purpose

Diageo Ireland's purpose of this project is as follows:

To deliver a sustainable beer supply business, located on a long-term secure site(s), using a best fit for purpose asset base, operated with maximum efficiency and flexibility by a committed workforce, producing the highest quality product at best-in-class cost. The change will be value-creating, and will have been completed with no adverse impact on Guinness or other brands, on our relationships with 3rd party brand owners or on Diageo's standing within Ireland.

Context and Drivers for the Development

Since June 2007, Diageo Ireland has conducted a review of their brewery operations in Ireland. This review was driven by two prevailing key factors in their decision-making process.

Key Factor 1. Economic Drivers:

- The need to drive efficiencies to reduce costs and ensure future cost competitiveness; and
- The brewing assets in St James Gate are ageing and inefficient and significant capital investment is needed to maintain the current network.

Key Factor 2. The critical importance of St. James's Gate to Diageo Ireland consumers and the Guinness brand:

- The importance of a site with significant heritage link to the Guinness brand – St. James's Gate enjoys a unique position in Dublin's and Ireland's history and heritage, and the Diageo Ireland decision to expand Irish Guinness production here reflects the bond that exists between the brand and the location;
- This bond is unique to Guinness, which unlike other brands in other locations has shaped and built the City of Dublin.

The proposed brewery development at St. James's Gate is a major investment to create a new world-class brewing centre of excellence in Dublin to support the growth and development of Diageo Ireland's global beer business.

This proposal is intended to support the long-term success and growth of Guinness around the world, as well as the other beers that Diageo Ireland brews for the Ireland, Great Britain and international markets.

5.3 Brewing Process Description

5.3.1 Overview of the Brewing Process

In the text below, a brief overview of the brewing process used at St. James's Gate is provided (see **Figure 5-B**).

Stage 1 Malting: Grain (barley) is soaked in water in order to allow it to partially germinate, which releases enzymes that convert starches into fermentable sugars. The partially germinated barley is then dried in a roaster / kiln, and different roasting times and temperatures are used to produce the desired darkness of the malted barley. This step is carried out off-site.

Stage 2 Milling: Malted barley is fed into the brewhouse mills which crush the grain, releasing the inner starch and flour, and leaving the outer barley husk material as intact as possible. Once the grain has been milled, it is referred to as 'grist' and is passed into a grist case where it is collected ready for the next stage. The phrase 'grist for the mill' has its origins here.

Stage 3 Mashing: This is the first phase of brewing, in which the grist is mixed with hot water (known as 'liquor' in brewing terms) in a mash tun in order to create an extract of the malt. This 'mash' undergoes a series of temperature rises and rest periods, which allow the natural enzymes contained in the malt to convert the malt starches into fermentable sugar. This sugar is dissolved in the hot water, and this sweet liquid is known as 'wort'.

Stage 4 Lautering or Sparging: The mash is transferred to a lauter tun, which is a large vessel with a perforated base that allows the liquid (wort) containing the fermentable extract to be separated from the grain husks by filtering through the bed of husks and out the bottom of the vessel. The grain is retained in the lauter tun and washed (this is the lautering / sparging process) with 'sparge water' to gather as much of the fermentable liquid from the grains as possible. The leftover grain husks are then pumped into 'brewer's grain' silos where they are then taken away by trucks, usually for reuse in agricultural applications (e.g. animal feed).

Stage 5 Boiling: The wort collected from lautering is transferred to a brew kettle (or 'copper') and boiled to sterilise and concentrate it. Hops in the form of pellets or liquid extract are added at various times during the boil. Bittering and flavouring components are extracted from the hops during boiling to impart characteristic flavour to the beers. Spent hops are passed on to the spent grains silo for transport away by trucks, usually for reuse in agricultural applications.

Stage 6 Whirlpool: After boiling, solid material ('trub') is removed from the wort using a whirlpool process.

Stage 7 Wort Cooling and Aeration: After boiling and trub removal, the wort is cooled and aerated prior to the pitching of yeast for fermentation.

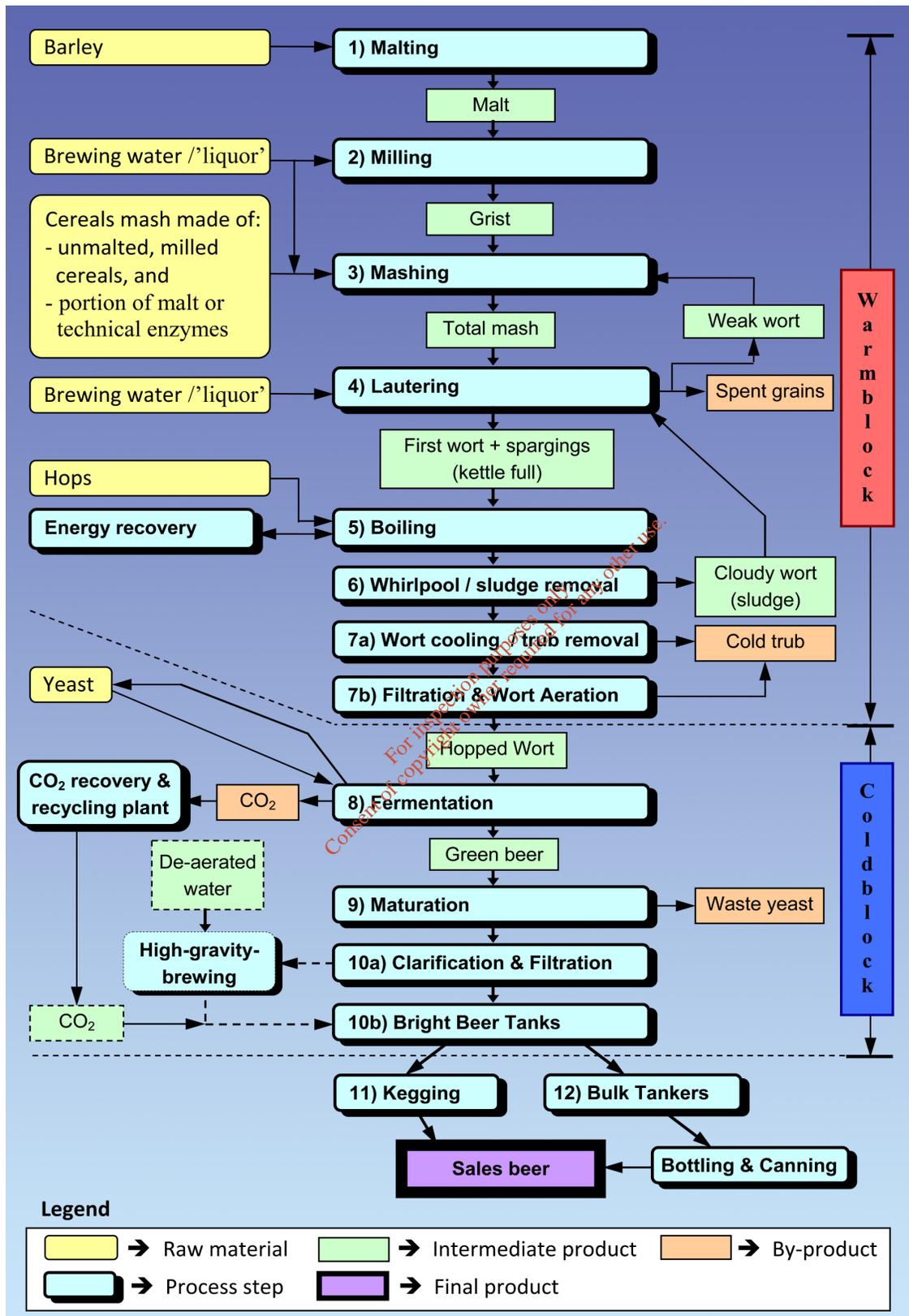


Figure 5-B: Overview of the Brewing Process

Stage 8 Fermentation: The cooled hopped wort is sent to a fermenter, where yeast is added which converts fermentable sugars in the wort to alcohol. At the end of fermentation, yeast is removed from the beer either by cooling followed by settling, or by centrifugation (depending on the beer to be made). The spent yeast is collected in a tank for transport away (normally by truck) and use in such applications as yeast extract or agricultural applications. The fermented beer ('green beer') is transferred either to maturation or to storage tanks prior to filtration.

Stage 9 Maturation: Some beers undergo a secondary fermentation (maturation) process to achieve the required flavour and consistency. During this process, the flavour is matured in the presence of reduced numbers of yeast cells. When maturation is complete, the beer is transferred to storage tanks prior to filtration / clarification.

Stage 10 Beer Clarification / Filtration: Beer in storage tanks needs to undergo a clarification process to remove remaining yeast and protein sediment prior to dilution to final sales gravity and packaging. This is achieved by chilling the beer to low temperature and removing any sediment by gravity settling, followed by filtration or centrifugation (depending on beer type). The resulting clear beer ('bright beer') is filled into a bright beer tank.

Stage 11 Kegging: Beer from the bright beer tank is pasteurised, before filling into sterile stainless steel kegs. Prior to filling, kegs are washed externally followed by internal washing, sanitization and sterilisation. The filled kegs are stored in a kegging yard where forklifts place the kegged beer on to flat bed trucks for distribution to customers.

Stage 12 Bulk Tankers: At the Tank Station, beer for bottling and canning is filled into bulk tankers for transport to packaging sites in Ireland, the UK and Europe.

Other Major Plant: CO₂ is a by-product of fermentation, and a collection and recycling plant allows it to be reused to carbonate fermented beer, or for sale externally. Also, an on-site Waste Water Neutralisation Plant (WWNP) adjusts the pH of process effluent before being discharged to the Dublin City Council sewer for final treatment.

The proposed brewery development will be state-of-the-art and best available technology with regard to:

- **Energy**

- Using an energy recovery system, with which the consumption of primary steam energy to heat up the wort to boiling temperature can be reduced by 60 %;
- An option is under consideration to employ a vacuum evaporation plant that reduces the evaporated volume per brew by up to 2 %. This saves up to 30 % primary steam energy; and

- **Water Demand**

- Teflon bands on the brewers grain blades ensure a very thorough removal of brewers grains on the false bottom, so that water demand is significantly reduced for rinsing out residuals;
- A spraying device for trub removal that needs less water than conventional systems; and

- Highly ground inner surfaces with low roughness to avoid adherence of product or cleaning agent remains.

5.3.2 Brewing Process on the Existing St. James's Gate Site

Central to the concept of locating a new brewery capacity at St. James's Gate is the active and sustainable use of existing structures, buildings, services and transport systems.

Table 5-A below sets out broadly where on the existing St. James's Gate Site the stages of brewing, as described in the previous section, currently happen. It also indicates whether or not the proposed brewery development will move these processes into new facilities.

Table 5-A: Current Location of Brewing Processes at St. James's Gate

Stage	Location	To Be Retained or Replaced?
Malting and Raw Material Storage	Existing malt and barley storage on South Site	Retained
	Roasting at the Roast House on the South Site	Retained
Milling	Brewhouse near the Store House on the South Site	Replaced
Mashing	Brewhouse near the Store House on the South Site	
Lautering	Support facilities southwest of brewhouse and near the southeast corner of St. James's Gate	
Boiling		
Whirlpool	Brewhouse near the Store House on the South Site	
Wort Cooling		
Fermentation	Fermentation plant on the North Site, south of the site of the proposed brewery development	Retained and expanded
Maturation	Storage and refrigeration plants (Fermentation Plant) on the North Site, southwest of the site of the proposed brewery development	Retained and expanded
Beer Clarification / Filtration		
Kegging	Keg lines and keg pens, west of the site of the proposed brewery development	Keg lines retained on South Site
Bulk Tankers	Tank Station	Retained

Stage	Location	To Be Retained or Replaced?
Other Major Plant	CO ₂ Collection and Recycling Plant south of the site of the proposed brewery development Waste Water Neutralisation Plant east of the site of the proposed brewery development	CO ₂ Plant retained & expanded slightly Waste Water Neutralisation Plant retained & expanded

In earlier times, some of the barley was ‘flaked’ as part of Stage 1 processing in the Barley Flaking Plant at the centre of the North Site. Today, there is no flaking undertaken, and a small section of the building is currently used as the waste and recycling area for St. James’s Gate. The proposals do not include any change in use of this building.

5.4 Proposed Brewery Development

5.4.1 Summary of the Proposals

Diageo Ireland is proposing to replace its brewhouse facilities with a more modern, higher-capacity, integrated facility on the North Site. This will create a new site activity of up to 8.3 million hectolitres (hL) annual capacity. In support of the increased capacity, Diageo Ireland is also proposing an extended Fermentation Plant to provide proportionate increases in the fermentation, maturation and beer clarification / filtration stages of brewing. The proposals will also require proportionate upgrades to supporting utilities and infrastructure, including expansion of the existing Waste Water Neutralisation Plant.

The brewery development is proposed to be entirely on brownfield land, replacing mostly undeveloped but paved land and unoccupied buildings. Raw materials storage and roasting are to be retained on the South Site with additional raw material provided adjacent to the proposed brewhouse. Other areas retained are existing activities on the North Site, including fermentation, maturation and clarification facilities, kegging, the tank station, CO₂ collection and recycling, water treatment and other supporting utilities. The redundant brewhouse facilities are to be decommissioned and relegated to the future masterplanning of St. James’s Gate, with their future use yet to be decided. All existing entrances/exits to the brewery will be retained with the intention of Gate 6 being the main production access point.

The proposed brewery development will operate 24 hours per day throughout the year. Key operational changes to the area will result from the presence of the new brewhouse and other facilities and plant (including Fermentation Plant) which will be more internal to the site and/or replacing existing buildings. The new brewhouse will lead to the relocation of keg pens and loading activity from the north-eastern part of St. James’s Gate near Watling Street, to the western part of the site. There will be an altered internal road network for HGVs / LGVs and other vehicles.

The new brewhouse will also lead to the closure / cessation of certain air emissions on the South Site, but will have new emission points on the North Site (refer to Chapter 10 for the impact assessment). Overall, there will be some increase in water consumption and effluent generation, however this will be minimised through the improved technology to be used. Regarding transport, there will be an increase in trucks

importing grains, the elimination of 'import beer' trucks into St. James's Gate, increases in 'export beer' trucks, and additional local transport to carry raw materials between the North Site and South Site. This results in a minimal net increase in traffic arising from this development.

This EIS includes an assessment of the impacts of the above changes in detail.

5.4.2 Principals of the Brewery Layout

In the design of the proposed brewery development at St. James's Gate, Diageo Ireland has sought to optimise the facility in terms of functionality, operating costs, aesthetics and environmental sustainability.

The design of the proposed brewery development has considered each aspect of the brewing process and its associated support activities, namely:

- process and technological requirements;
- safe operation for all employees;
- that the arrangement of departments should follow the process flow;
- logistical and other (e.g. administrative, social, recreational) requirements related to the brewery;
- a layout objective to provide the most effective and efficient overall operation and performance, with optimised space usage; and
- flexibility for possible future expansion, combined with budget-focused planning and execution.

These general principles informed and guided Diageo Ireland's designers in the design of the proposed brewery development. The key brewery layout decisions may be summarised as follows:

- 1. Design of Silo Block:** The number and height of raw material silos has been determined by the different raw materials to be used and their minimum buffer time to secure safe and uninterrupted operation. In order to minimise the number of silos needed, square silos were chosen, as they allow better usage of space.
- 2. Brewhouse Layout:** To maximise energy efficiency and optimise the process, the brew vessels will be positioned as close as possible to the Raw Material Handling Plant. All cellar process equipment (mainly consisting of Filtration, Yeast handling and CIP) should be centralised to secure low energy usage and high product quality.
- 3. Tanking Arrangement:** The key component of any brewery is the in-process storage and process vessels. The development has in excess of 33 additional vessels arranged externally to the side of the existing tank farm. To allow safe operation and efficient design, these tanks are arranged adjacent and perpendicular to the existing tank farm, since it is intended that the existing tank farm will be reused. There will be a mix of tank sizes appropriate to the brewhouse design.
- 4. Utility Pipe Bridge:** To connect all process equipment to the utilities such as steam, air and water, an existing central utility pipe rack is located central to the entire brewery. This rack will be extended to connect with the new utility users in this development.

5.4.3 Capacity / Volumes

St. James's Gate Brewery's annual product output varies with demand, but the current total capacity at St. James's Gate is approximately 6.4 million hL² and its current production is approximately 5.0 million hL. The proposed brewery development will increase this capacity to 8.3 million hL.

Table 5-B below summarises the increases in key inputs and outputs from the St. James's Gate site as a result of the proposed brewery development.

Overall the volume of keged beer will remain at the same level as the current operation. There will still be a net increase in bulk beer exports associated with the increased capacity of the brewhouse.

Table 5-B: Forecasted Changes in Inputs and Outputs to/from St. James's Gate

Material	Current Amount (Annual)	Proposed Amount (Annual)	Difference
INPUT			
Water consumption	2.12 million m ³	3.06 million m ³	+ 0.94 million m ³
Malt / Barley / Roast Grains	90,000 tonnes	133,000 tonnes	+ 43,000 tonnes
Bulk beer imports (for keging, etc.)	800,000 hL	None	- 800,000 hL
OUTPUT			
Beer exports	6.3 million hL	7.4 million hL	+ 1.1 million hL
Brewers grain (by-product)	90,000 tonnes	133,000 tonnes	+ 43,000 tonnes
Effluent (water discharged to sewer)	1.12 million m ³	2.12 million m ³	+ 1.0 million m ³

5.4.4 Description of the Development

Figure 5.3 in Volume 3 of this EIS illustrates the proposed brewery development at St. James's Gate.

It is defined by the following distinctive elements:

- The new brewhouse with control room and satellite laboratory
- The new brewhouse grain intake building and associated silo with raw material handling connected to the brewhouse to the east;
- Support rooms, workshops and staff amenities;

² One hectolitre (hL) is equal to 100 litres.

- Extension of the existing Fermentation Plant to the southwest of the new brewhouse; and
- Extension to utilities and support, including electrical sub-station, incoming water treatment, Waste Water Neutralisation Plant and CO₂ collection and recycling;

A description of each of these elements is presented below.

The Brewhouse Facility

The brewhouse is to be developed in an area currently occupied by keg pens and which is otherwise generally open and paved. Three existing buildings are to be demolished, along with the demolition of a temporary support building. The permanent buildings are an electricians' shed, a staff welfare building with lockers and toilet block, and storage / maintenance shed, which will be accommodated either within the new building, or in other existing buildings on-site.

The brewhouse is the largest single element of the proposed brewery development, extending to over 9000sq m in floor area. The building takes the form of a main two storey block which houses the brewing tanks and vessels, consisting of an extensive ground floor process area, together with upper mezzanine areas giving access to the upper sections of the large brewing vessels. This element of the building rises to a height of about 14M to parapet level.

Flanking this main block to the east and west, which are the two long sides, are a series of support functions – on the east side the raw materials handling area consisting of a canopy and enclosure for a drive through grain truck facility to offload incoming grain into a series of grain handling area served by a grain silo which extends to about 25M in height. This tower also accommodates a process vent stack which extends to about 3M over parapet level of the tower. Also on the east side a block of single storey stores are provided, served by a delivery yard area. On the west side a second canopy is provided to shelter trucks serving the Delivery and Dispatch area. Also on this side are a series of large silver finish tank structures the highest being a series of four Spent Grain Tanks which rise to over 25m.

The South Front of the building, facing the FBP Plant across the main road within the brewery 'Cooke's Lane', takes the form of a high quality double height glazed entrance hall, including a feature staircase and lift. It is intended that this entrance should form an appropriate arrival point for visitors to the Brewhouse.

The north front of the building, facing towards Victoria Quay, consists of the plain gable end of the brewhouse building, but enlivened by a glazed gallery extending partway along the north face, to incorporate a 'Guinness' sign within the gallery space.

Further accent signage is proposed to the building in the form of Guinness harp logos at high level on each face of the tower, and a wall mounted Guinness sign and harp logo on the south face close to the glazed entrance block.

It is proposed that the building be finished in high quality materials for an industrial building, consisting of a combination of white stone cladding to the higher elements of the brewhouse visible from areas external to the brewery, with either reconstituted stone or stone cladding to the lower elements which face the adjacent service yards etc. Matt finished dark grey flat metal cladding panels are proposed to the grain tower element, to produce a striking contrast with the rest of the building.

In massing terms the elements facing towards the river, consisting of the brewhouse block and the grain tower block are designed to read harmoniously against the existing backdrop of major brewery buildings, such as the old Power Station and Flaking Plant rising up the hill to the rear. The location of the brewhouse adjacent to Victoria Quay will also contribute a new focus to this currently somewhat dead frontage.

Fermentation Plant Extension

The new Fermentation Plant extension will be constructed in the area of plant occupied by the decommissioned Lager Plant. This area is very central to the northern St. James's Gate site, and surrounded by other tall structures. This extension extends to just over 2,000 sq m, in a single storey footprint located on the western side of the existing building. The extension is designed to continue the form of the existing building, with a single storey brick finished podium supporting a series of fermentation tank structures, with a maximum height of approx 19.15M (24.6M OD). The podium extension will continue the articulation of the brickwork based present in the podium of the existing FBP plant, while the upper level silver finished vessels will further reinforce the industrial imagery of the existing complex series of fermentation tanks when viewed from the north across the River Liffey from the vicinity of Wolfe Tone Quay.

Support Rooms, Workshops and Staff Amenities

This consists of a Control Room and associated areas with sanitary facilities. All other staff amenities are provided by the existing site.

Extension to Utilities and Support

Most of the extension and updating of utilities and supporting services will take place within the confines of existing infrastructure. The main structural additions of note are:

- Two water storage tanks (Towns Water from DCC and Recovered Water for reuse), approximately 9 m high;
- Additional process cooling and compressed air equipment will be located within the existing VQ Plant adjacent to the Fermentation and Beer Processing Plant;
- Additional tiers will be required on the existing piperack to support the development;

Waste Water Neutralisation Plant (WWNP) extension

The proposed brewery development gives rise to the need to increase the capacity of the existing WWNP by the addition of two new equalization tanks, with a maximum height of approx 8.1M (11.3M OD), and associated plant. It is proposed to demolish two existing low quality shed buildings to provide a location for these tanks, to the west an existing Mechanical Workshop building accessed from within the brewery, and an adjoining disused Store building with a frontage directly onto Watling Street, and accessed from the street. While there is no technical requirement to enclose the two new tanks it is proposed to rebuild the shape and form of the Stores building facing onto Watling Street to ensure that they can be visually screened from Watling Street, and from the upper levels of existing buildings to the east of the street. The front of the existing Store building to Watling Street consists of a very poor quality rendered face, while it is proposed to articulate the replacement facade with a brick plinth and piers, to incorporate self coloured render panels. The roof form and profile of the new building will approximately follow the form and profile of the existing roof, and will be finished

with grey coloured profiled metal roofing, to match the existing adjacent building to the north. The floor area of this screening building extends to slightly over 300sq.m, and a height to roof ridge level of approximately 9.8M is proposed.

Water Treatment Plantroom

An existing disused Pump House located in the Central Utilities Area serving the brewery will be removed to provide space to develop this small single storey utility block, which will have a floor area of approximately 280 sq.m. In addition two associated external storage tanks, and associated plant will be located next to the new building. The Plantroom height will be approx 7.0M (13.26M OD) and the maximum tank height will be approx 9.0M (15.26M OD). It appears unlikely that these new facilities will be visible from outside the brewery boundary walls, except perhaps from upper floors of buildings on the east side of Watling Street, and the new building and tanks will mesh into the existing complex of plant structures in this area of the brewery. Profiled metal cladding is proposed to form the external finish of the new Plant House, with painted metal finishes to the tank structures; the colours of the external finishes will be selected to harmonise with the existing surrounding structures.

Roasters

There are already two roasters in the roast house on the South Site of St. James's Gate. A third roaster is being progressed as part of a separate planning application. It will be possible to produce enough roast for the current market demand using the 3 roasters. Should the export market increase beyond the maximum capacity of the three roasters in the future, Diageo Ireland will investigate the alternative options for supply available at that time. Alternative supply options include procurement of roasted barley from the open market, retaining the roast house in the current location in Waterford to supply St. James's Gate or extending the roasting capacity on-site at the St. James's Gate site.

5.4.5 Traffic and Transport Changes

The EIS Transportation Chapter (Chapter 14) provides a detailed analysis of the transport implications of the proposed brewery development. The development is proposed to maintain current employment levels; however additional vehicular movements are expected due to the increase in production activity. In summary, the key changes in transport movements are anticipated to be:

- the South Site will continue to accommodate the grain intake facilities, but grain amounts will increase along with associated truck movements;
- the grain will be transferred from the South Site to the North Site by trucks;
- the brewing support facility will be de-commissioned, and the trucking movements associated with this facility will transfer to the North Site and increase;
- the beer imported into the site (both bulk and kegged) will cease;
- the volume of kegged beer will remain at the same level as the current operation, however there will be an increase in bulk beer exports associated with the increased capacity of the brewhouse; and

- brewers grains journeys will change from the South Site to North Site, and will increase proportionately.

The transport assessment includes a daily and road-by-road analysis, and concludes that the proposed brewery development will have no material impact on prevailing traffic conditions on relevant roads on a daily basis.

This represents a minor city traffic increase i.e. circa 150 per day.

5.5 Construction of the Development

5.5.1 Development Area and Sites Access

The footprint of the proposed brewery buildings extends to some 2.7 hectares. The site master plan integrates the proposed brewery development and associated roads and footpaths into the existing facility bordering Victoria Quay. Construction compounds, materials storage and workshop / fabrication areas will all be accommodated within St. James's Gate. Refer to Figure 5.4 in Volume 3 of the EIS or further details.

The existing access arrangements to the site for operational heavy goods vehicles and staff/visitor access will be retained to ensure safety and security is maintained. It is proposed to create a temporary construction traffic access point (Gate 51A) near the intersection of Watling Street and Victoria Quay.

It is not proposed to provide additional car parking spaces for this development, as the St. James's Gate facility has existing parking spaces and is well served by public transport.

5.5.2 Site Preparation Works

The proposed brewery development will require a brewhouse finished floor level of 4.250 mAOD. The existing levels range from approximately 3.0 mAOD adjacent to Victoria Quay to approximately 4.25 mAOD at the southern end of the brewhouse. This will require the creation of the building platform using imported fill material.

No significant excavation or fill are required for the Fermentation Plant extension apart from demolition of the existing redundant plant and removal of the existing concrete slab.

5.5.3 Building Construction Works

General and Site Protection Measures

Prior to any works on-site, including the construction compound, the necessary site protection measures as agreed with DCC in the Construction Environmental Management Plan (CEMP) will be undertaken.

A construction compound will be established on the northern part of the site to accommodate contractors' cabins and workshops. Site development works will reduce the existing ground levels to the required formation for the buildings prior to their construction.

Foundations and Structures

Pile cap foundations shall be provided for the brewhouse with driven piles provided to transfer the building load to solid subsoil. Piling is necessary as the ground in this area was created from infill behind the River Liffey quay wall and therefore has variable load bearing capability. Ground beams will span between the pile caps. The building structures will be structural steel with concrete floors on metal decks. The steel columns will extend down to the pad foundations to be set in concrete below ground.

Building Envelopes

The building walls will be cladded using insulated sandwich panels, glazing and curtain walling. Buildings will have sloped roofs with minimum 1.1 m-high safety railings to provide safe access for maintenance or inspection of roofs.

Roads, Services and Landscaping

All temporary site services will be installed underground and site roads will be constructed to base course asphalt as early as possible, with a view to minimising dust and maintaining a clean orderly site.

Wheel washing facilities will be provided to prevent tracking debris off-site onto the local road network.

Once the building shell is complete, the brewery equipment and tanks will be installed, piped up and commissioned.

5.5.4 Project Schedule

The construction of the proposed brewery development is envisaged to take approximately 17 months, with the following main stages as follows:

Stage 1 – Site development, underground activities and structures (7 months);

Stage 2 – Cladding and mechanical (5 months);

Stage 3 – Brewing fit-up and electrical (3 months); and

Stage 4 – Commissioning and Testing (2 months).

The following early target dates have been identified for this project in order to meet the projected needs.

Item	Date
Commence Preliminary Design	Summer 2011
Apply for Planning Permission	Q4 2011
Commence Detailed Design	Q1 2012
Commence Construction (pending Planning)	Q2 2012
Complete Detailed Design	Q2 2012
Brewhouse Operational	Mid-2013

5.5.5 Environmental Control

Diageo Ireland is committed to ensuring that the construction and operation of the proposed brewery development is achieved in accordance with the best environmental practice and procedures. The design and operation of the facility will ensure the minimum use of raw materials and energy demand. Particular attention will be paid to protecting the environment during construction by the adoption of the Contractor's Construction Environmental Management Plan.

Construction works will generally be limited to typical daytime construction hours, although there may be phases where extended working hours may be desirable.

Construction Phase Environmental Management

The Contractor will develop a Construction Environmental Management Plan (CEMP) which shall be in accordance with the following:-

- *Best Practice Guidelines on the Preparation of Waste Management Plans for Construction and Demolition Projects* (DEHLG, 2006); and
- *The Guidelines for the Creation, Implementation and Maintenance of an Environmental Operating Plan*, (NRA, 2007).

Guidelines for the development of a CEMP are available in Appendix 20.2, Volume 4.

5.6 Conclusion

The planning and design of the proposed brewery development at St. James's Gate has fully integrated environmental considerations with the intention that the new facility achieves the distinction of being a highly efficient and environmentally responsible brewery. Ongoing environmental evaluation and intervention will be integrated within the proposed construction and operational phases and environmental performance reporting will be a key factor in demonstrating Diageo Ireland's commitment to sustainable and environmentally acceptable practices.

6.0 SOCIO-ECONOMIC

6.1 Introduction

This chapter considers the impact of the proposed brewery development in the context of population and settlement, land use, employment and other impacts of a social and economic nature. In terms of human beings, the types of issues which developments such as this typically raise (both during construction and operation) include: impacts on amenities and services in the area; additional economic opportunities; increased traffic; and impacts on existing land uses. References are made in this chapter to other environmental topics (such as traffic, visual, etc.) in so far as they impact indirectly on human beings; they are examined and assessed in detail in other chapters of the EIS.

A desktop review of existing information was undertaken. Relevant information and statistical sources including the National Development Plan, National Spatial Strategy, Greater Dublin Area Regional Planning Guidelines, and other major planning applications were consulted. Information from the Central Statistics Office (CSO) on population, demographics, household structure, employment status, etc. has informed the assessment presented in this chapter.

6.2 The Existing Environment

General

Dublin City is an international city that has experienced strong economic growth over the 15-year period prior to 2007. The city has been transformed economically, socially and physically by measures such as a revitalisation of the city centre through the construction and renovations of many buildings.

Since 2007, the world economy entered an economic crisis which deeply affected Ireland. According to The Economist (November 18th 2010 edition)³, by the end of 2010 consumer spending was still low as aggregate household incomes have fallen and many households have increased their saving rates. Ernst & Young⁴ have forecasted that the Irish economy will have contracted by a further 2.3% of GDP by the end of 2011 before emerging from recession in 2012. As a result, house prices are significantly below their 2006 peak. Employment rates have dropped – particularly in the construction industry which employed 272,000 in 2007 but has since fallen to less than half of that.

6.2.1 Planning and Development Context

General

The Guinness Lands are within the Liberties which occupies circa 20 hectares of land west of the inner city of Dublin. In the northwest, the Guinness properties contain industrial buildings of considerable height and bulk set within tightly packed urban blocks.

Historically, the Liberties have been important for brewing industries since the mid 1700s, when Arthur Guinness first leased the St. James's Gate site in 1759. By the mid

³ <http://www.economist.com/node/17522578>

⁴ http://www.finfacts.ie/irishfinancenews/article_1022435.shtml

1900s, the Guinness Brewery owned most of the buildings around St. James's Gate, with many streets of housing built for brewery employees. See Chapter 13, Cultural Heritage, for more information on the history of the brewery and surrounding area.

Nearby, the Digital Hub area, once part of the Guinness Lands, is in the process of redeveloping into a creative industry cluster which includes a mixture of performing arts institutions and creative industries.

Land use in the Liberties Area, apart from the brewery, is mainly light-industrial (Newmarket) with two main residential areas – Maryland in the southwest and Pimlico/The Coombe in the centre. The remaining areas immediately surrounding the Guinness Lands have a large mix of uses due to the proximity to the river and city centre.

Land Use Structure adjacent to the Site

A separate Planning Chapter (Chapter 4) provides a detailed assessment of how the proposed brewery development is consistent with the proper planning and development of the area.

Socio-Economic Factors

The Liberties area can be regarded as the immediate area in terms of socio-economic impacts that potentially could arise from the proposed brewery development. This socio-economic impact assessment concentrates on Dublin City Centre, in terms of population, employment, recreation, amenities and heritage.

6.2.2 Population

Population Change

In terms of the County, Region and State, population change is strongly influenced by migration and emigration rates, rather than birth and death rates. The mid to late 1980s in Ireland was a period of heavy population outflow, mainly due to the poor economic and employment situation. Census information shows that since 1990 there has been a large movement of people into the Country due to improvements in the economy of Ireland. Whilst the level of migration into the State has significantly slowed since 2007, the population of the State continues to increase. The Greater Dublin Area, including the Liberties, and surrounding areas have experienced high levels of population growth as a result of strong economic growth in the region.

Table 6-A below shows the changes in population for immediate (The Liberties) and secondary (Greater Dublin Area) areas of the proposed brewery development as well as the State, so comparisons can be made.

Table 6-A: Population Change at State, Secondary and Primary Hinterland Level

	2006	2011	% Change 1996 - 2002	% Change 2002 - 2006	% Change 2006 - 2011
State	4,239,848	4,581,269	+8.1%	+8.2%	+8.1%
Greater Dublin Area	1,664,185	1,795,986	+9.2%	+8.4%	+5.7%
The Liberties	13,157	14,325	*	*	+8.2%

(Source: Census of Population 1996, 2002, 2006 and preliminary 2011)

Table 6-A above shows that the Greater Dublin Area is a high-population-growth centre. The figures from Census 2006 indicate that significant population growth has taken place in the Greater Dublin Area since 1996, with a significant portion of this growth taking place in the Liberties, South Dublin and Fingal County Council administrative areas. Despite the recent economic slowdown, the population of Greater Dublin Area has continued to grow, although at a slightly slower rate than seen between 1996 and 2006, yet the rate is higher than the state average for the Liberties. As a result of population growth the projected demand for housing is also projected to increase significantly. By extension, since the geographical boundaries of these areas have not increased, the population densities have increased in line with the population increases.

Over the ten year period from 1996 to 2006 the population of the State grew by over 16%, while the population in the Greater Dublin Area increased by over 18%.

Age Profile

The age profile of the population may be indicative of the potential labour force, the demand for schools, amenities and other facilities and future housing demand.

Figure 6-A below shows the approximate age profiles for secondary (Greater Dublin Area) area of the proposed brewery development. This allows the changes in the population profile to be compared between census years, 2002 and 2006. *(source: Central Statistics Office Census of Population 2006).*

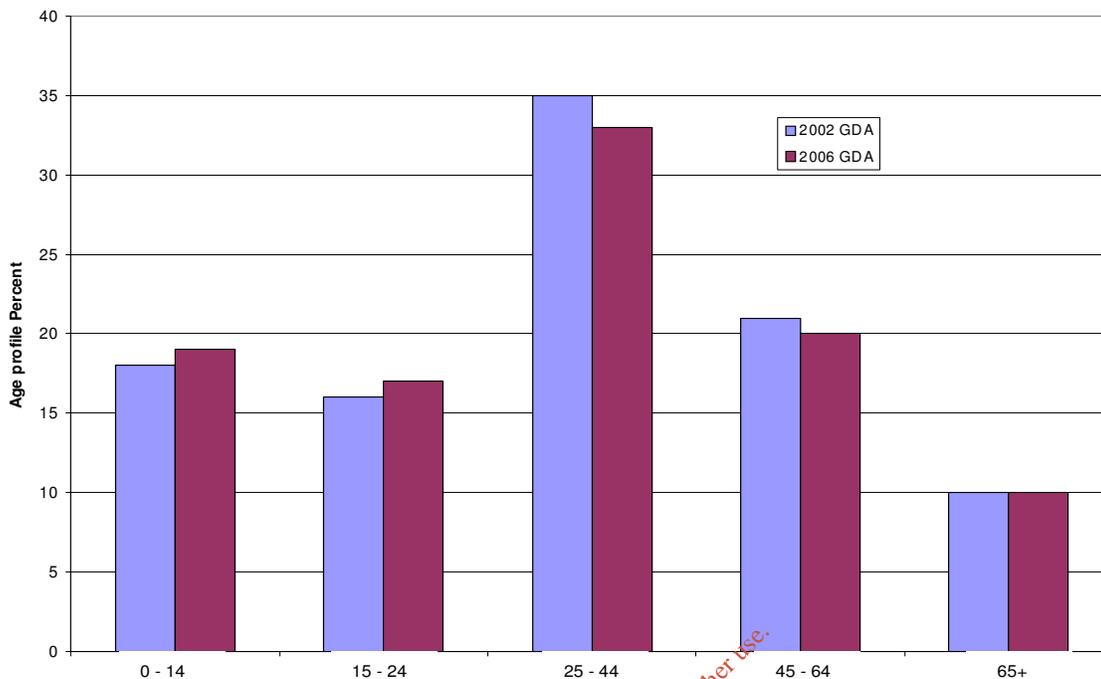


Figure 6-A: Age Profile of the Population of the Greater Dublin Area

Figure 6-A shows that the age profile of the population of the Greater Dublin Area in 2002 showed a slightly lower percentage within the 0-14 age group, at 19%, compared with the State average of 21%. At the other end of the scale the national figure for persons aged 65+ in 2002 was 11% of population, with the Greater Dublin Area. In the Liberties, people over 65 only make up 8% of the population while 15% of the population are children younger than 18. These figures are indicative of a very youthful population in these areas, reflecting the arrival of a sizeable percentage of the resident population in recent years.

In 2002 the percentage of the Greater Dublin Area population, including the Liberties, within the working age groups (15-64) amounted to 70%, compared to the State average of 67%. This is indicative of a youthful population of working age, thereby creating a big labour pool in the area.

Since 2002, the overall trend for changes in the age structure of the population the Greater Dublin Area has been static or declining marginally in the proportion of the population in the 0-14 age cohort. Between the years of 2002 and 2006 the proportion of 0-14 year olds within the Greater Dublin Area dropped from 19% to 18%.

In 2002 the proportion of the State population within the working age groups was 67% and this figure has remained the same up to 2006. The Dublin Region experienced a slight growth in the working age groups, increasing from 70% to 72% between 2002 and 2006. Note the 2011 Census results are not yet available for these statistics⁵.

Data from the 1996 and 2002 and 2006 Census of Population suggest that the reason for changes in the age structure may be partly attributed to the rapid surge in population

⁵ Preliminary results were published on 30th June 2011; however these do not include an age breakdown of the population.

growth within the area, which took place in the last ten years and also partly attributable to a young population growing up and coming of working age. The volatility of migration makes it difficult to accurately estimate future population changes⁶.

In summary, the Greater Dublin Area has experienced a sustained population growth over the last ten years due almost entirely to in-migration into the These strong rates of population growth around the site are indicative of the increasing job opportunities and the continuing expansion of the Greater Dublin Area.

6.2.3 Housing Demand

Housing demand arising directly from the proposed brewery development is unlikely to create significant additional demand that has not already been anticipated in Regional and Local Planning Documents.

6.2.4 Employment

Introduction

To assess the potential impacts on employment it is first necessary to examine current employment patterns in terms of:

- The number of persons at work; and
- Levels of unemployment.

Numbers at Work

Between 1996 and 2006 there was a significant rise of 54% in the total number of persons in employment in the State. Yet the recent global economic downturn meant the rise in numbers employed have been lost after peaking in June 2007 at 2,113,900 employed to 1,804,200 in 2011. **Table 6-B** shows changes that have occurred in the State, and the Greater Dublin Area.

Table 6-B: Numbers of people at work at State, Greater Dublin Area

Area	1996	2006	2011
State	1,307,236	1,930,042	1,804,200
Greater Dublin Area	367,414	800,240	515,100

*(Source: Central Statistics Office Census of Population 1996-2011)
 Note information not tabulated for primary area (The Liberties)*

The number of people at work in 2006 is substantially higher in all geographical areas due to the strong economic growth in Ireland since 1996. There has however been a recent economic slowdown, particularly in the construction sector; this has resulted in significant increases in unemployment since 2006 census data was published. **Table 6-**

⁶ 2006 Updates of the Regional Planning Guidelines for the Greater Dublin Area 2004-2016.

C below indicates more recent employment trends at state level. It reflects the economic slowdown with higher unemployment being apparent.

Table 6-C: Recent Employment Status at State Level, 2006-2011

State Employment (thousands)	Jan – Mar 2006	Jan – Mar 2007	Jan – Mar 2008	Jan – Mar 2009	Jan – Mar 2010	Jan – Mar 2011
Total in employment	2,009.4	2,088.5	2,124.1	1,965.8	1857.6	1,804.2
Total unemployed	92.9	98.1	109.4	222.8	275.0	295.7
Unemployment Rate	4.4%	4.5%	4.9%	10.2%	12.9%	14.1%
Labour Force	2,102.3	2,186.6	2,233.5	2,188.4	2,132.7	2,099.9

(Source: Central Statistics Office)

The Liberties Local Area Plan 2011 gives an indication of the employment trends to 2006, with unemployment rates halved over the past 15 years which is broadly in line with national trends.

Employment growth is in line with the overall growth of the economy of Dublin and the State. Given the relatively high skills nature of the jobs in Diageo Ireland, the proposed brewery development is expected to sustain existing employment levels in the long term.

Levels of Unemployment

Table 6.4 below shows that unemployment levels have dropped considerably over time at all geographical levels. Unemployment in The Liberties has not decreased to the same degree in the state or Dublin City. The proposed brewery development will help reduce unemployment at city level by creating short-term construction jobs.

Table 6-D: Unemployment Rates at State, County and Local Level

Area	1996 %	2002 %	2008 %	2011
State	12.9	8.8	4.9	14.1
Greater Dublin Area	14	6.0	4.7	12.5

(Source: Central Statistics Office)

As a result of the economic slowdown unemployment rates have risen quite significantly from recent historical lows. Based on the Quarterly National Household Survey, the CSO estimated the unemployment rate in the first quarter of 2011 at 14.1%, which was a significant increase on the 4.7% unemployment rate in the first quarter of 2008.

It is estimated that the proposed brewery development once operational will ensure the retention of current employment levels of the existing Diageo Ireland site and a peak of several hundred construction jobs will be created during the construction phase. However the actual numbers that will be employed may vary to those indicated above,

depending on operational start levels, level of activity on the rest of the site and other factors.

Diageo Ireland will where possible utilise the skills and technical expertise available in Ireland. It is anticipated that construction staff will be employed locally and materials will be sourced from local providers, where possible.

6.2.5 History, Tourism, Amenities and Recreation

History

The Guinness brand through Arthur Guinness first began brewing ale in Leixlip in 1755 before moving to St. James's Gate in 1759. Ten years later in 1769 the first exports were made to England. By 1838 it had become the largest brewery in Ireland and today remains the largest brewer of stout ale in the world. See Chapter 13, Cultural Heritage, for more information on the history of the brewery and surrounding area.

Tourism

The Liberties has numerous landmarks and institutions; commercial, academic and ecclesiastical. The Guinness Brewery is the oldest and best-known landmark and commercial enterprise in the area and also contains the Guinness Storehouse that is one of the most popular tourist attractions in Ireland. The proposed brewery development will utilise circa 2.7 hectares of the existing brewery-dedicated lands. From 2001 to 2010, the national Government's digital and creative technology initiative, The Digital Hub was housed on previous brewery facilities.

Amenities and Recreation

There are three primary routes for vehicles moving from the city centre to the Liberties in an east/west direction, while there are two routes for north/south movement. Links between these primary routes are limited by the industrial and institutional nature of the area, such that links to secondary and tertiary routes through neighbourhoods have barriers to movement. Pedestrian routes to the east of the Liberties in particular are well lit and signposted. In addition, the area is well provided with bus and Luas routes and also contains the Heuston Station rail terminus. The area also has several notable city amenities such as the Modern Art Gallery, Collins Barracks and Croppies Acre.

6.3 Predicted Impacts

6.3.1 Introduction

The proposed brewery development is expected to sustain existing employment levels. Therefore, it is not likely to have any direct impact on the population of the hinterlands. It is predicted, however, that the proposed brewery development will have effects on indirect employment as created by 'the multiplier effect'. The multiplier effect is essentially the number of jobs supported outside of the brewery for every job created by the brewery (e.g. by purchasing goods and services in order to operate the brewery, or through Diageo Ireland employees spending their earnings). The beneficial impacts of the development are likely to be diffused over an extensive area.

6.3.2 Population and Housing Demand

The proposed brewery development is not likely to increase the population of the immediate area. It is therefore unlikely that the proposed brewery development will create any adverse housing impacts

6.3.3 Employment, Capital Investment and Payroll

The proposed brewery development is consistent with the creation of employment opportunities in the Greater Dublin Area.

The proposed significant brewery investment will ensure the retention of current employment levels of the existing Diageo Ireland site. During the construction phase of the project it is estimated that employment on-site will increase gradually over the first few months of construction, to a peak of several hundred persons and then fall gradually over the last few months as the project nears completion. It is envisaged that local contractors, services and materials will be utilised where possible.

It is estimated that this construction stage will last approximately 17 months. The proposed brewery development is expected to sustain direct employment and increase indirect employment.

In the current economic climate the employment associated with the project during construction will be a positive benefit to the immediate and secondary areas and will create positive economic impacts.

6.3.4 History, Tourism, Amenities and Recreation

It is anticipated that during the construction period temporary impacts will occur on the amenity of the area. The visual amenity of the area may be intruded during the use of tall cranes and delivery of materials to and from site. There will be no impact on the Guinness Storehouse as it is remote from the development. Due to the variety of land uses and buildings in the locality, the creation of construction facilities on the existing industrial brewery site will not create an uncommon feature. Other chapters in the EIS address issues such as noise, air quality, visual etc. which are often the cause of adverse construction impacts, where such impacts are identified mitigation measures are proposed.

Following construction it may be the case that local amenities and recreational facilities may be impacted through a higher level of usage but these impacts are considered neutral.

6.3.5 Additional Traffic

This section considers traffic in general terms and its impact on human beings. The EIS Chapter 14, Transportation, provides a comprehensive analysis of all traffic impacts and mitigation measures.

The existing road network is currently operating within its capacity level, and the proposed brewery development will lead to increases in construction and operational vehicle numbers on the road. As Chapter 14 concludes, there will be no material impact from the proposed brewery development on prevailing traffic conditions at any location. The impact of the traffic generated by the proposed brewery development will have only minor effects on the amenity of the area. The elements of the necessary road infrastructure are already in place to facilitate the proposed brewery development.

It is planned to bring an existing gate on Victoria Quay into temporary use for the construction period to alleviate any impacts on Victoria Quay traffic.

The area is very well served by public transport being in a major city centre and some vehicular and pedestrian traffic impediments already exist. These are not expected to worsen during the construction or operation of the proposed brewery development. The project will promote the use of public transport in preference to other alternatives.

6.3.6 Human Health

In an EIS the potential for effects on human health are dealt with under the more specific topics of the environmental medium by which it might be caused. The topics include water (see Chapter 9), air (see Chapter 10), noise (see Chapter 11), and waste (see Chapter 15).

Health and safety related to construction and operation of the development scheme are governed by specific legislation and have been covered in the design and construction plans so as to ensure zero harm to human health.

6.4 Mitigation

No specific mitigation measures are proposed in this chapter to ameliorate the impacts on human beings as the potential impacts are positive. Other chapters in the EIS set out specific mitigation measures where it is anticipated that adverse impacts will arise. Implementation of these measures will ensure that adverse impacts on human beings are minimised.

6.5 Conclusions

The proposed brewery development will have a positive long-term impact on the Dublin area through continued employment and the associated economic and social benefits.

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7.0 ECOLOGY

7.1 Introduction

An Ecological Impact Assessment of the proposed brewery development was undertaken as part of this EIS.

This Ecological Impact Assessment (EclA) provides an assessment of the likely significant impacts of the proposed brewery development on ecological features within the zone of influence of the proposed development.

The aims of this Ecological Impact Assessment are to:

- establish baseline ecological data for the proposed brewery development site and other relevant areas;
- determine the ecological value of the identified ecological features;
- assess the impact of the proposed brewery development on ecological features of value;
- recommend mitigation measures to avoid, reduce and remedy the identified impacts; and
- Identify any residual impacts after mitigation.

This report should be read with the site photographs at the end of this report and the following Figures and Appendices:

Figures in Volume 3:

- Figure 7.1: Habitat Map;
- Figure 7.2: Natura 2000 Sites within 1 km, 5 km and 15 km of the proposed brewery development;

Appendices in Volume 4:

- Appendix 7.1: National Roads Authority (NRA) Ecological Valuation Criteria;
- Appendix 7.2: Institute of Ecology and Environmental Management (IEEM) Impact Assessment Criteria;
- Appendix 7.3: Screening Statement for Appropriate Assessment;
- Appendix 7.4: Consultation Responses; and
- Appendix 7.5: Ecology Site Photographs.

7.1.1 **Project Description**

A detailed description is provided in Chapter 5 of this EIS.

The proposed brewery development is entirely on brownfield land, replacing mostly developed land and derelict buildings, with the exception of a small garden and several relatively small outbuildings/sheds.

The proposed brewery development will discharge surface water directly to the River Liffey at an existing surface water outfall at the junction of Usher's Quay/Victoria Quay following attenuation and treatment. This separation from process/effluent waters will reduce hydraulic loading on the public network. Process and foul effluent discharges will also be separated in the proposed brewery development so that only the former is treated by the on-site Wastewater Neutralisation Plant (WWNP) which provides pH balancing and flow equalisation.

7.2 Methodology

7.2.1 Desk Study and Consultations

A desk study was carried out to collect any available information on the local ecological environment. The following resources were consulted:

- Ordnance Survey Ireland maps;
- Aerial photography from National Biodiversity Data Centre and Google Maps;
- Data on species that are rare, protected or threatened located within 10 km of the proposed development site, as held by the National Park and Wildlife Service (NPWS) Database (www.npws.ie);
- Direct consultation with the National Parks and Wildlife Service (NPWS), Inland Fisheries Ireland (formerly Eastern Regional Fisheries Board), Botanical Society of the British Isles (BSBI) and Bat Conservation Ireland;
- Relevant publications, reports and literature produced by NPWS (as referenced in the reference list at the end of this report);
- Biodiversity Audit Of St. James's Gate (2007);
- Bat Survey for Liberties Regeneration Area Plan (2008); and
- Dublin City Graveyards Study (2004).

7.2.2 Relevant Legislation and Context

The assessment of the likely impacts of the proposed brewery development on ecological resources has had regard to the following policy documents and legislation:

National and International Policy and Legislation

- Wildlife Act, 1976 and all subsequent amendments. In this report, the legislation is referred to collectively as the Wildlife Acts
- European Communities (Natural Habitats) Regulations 1997 and all subsequent amendments. In this report, the legislation is referred to collectively as the Habitats

Regulations. These regulations transpose the EC Habitats Directive 92/43/EEC into Irish law

- EC Birds Directive 79/409/EEC
- European Communities (EIA) Regulations, including all amendments
- Flora (Protection) Order, 1999
- Planning and Development Act, 2000 and Planning and Development amendment Act (2010), including all amendments
- National Biodiversity Plan, 2002 – 2008

Relevant Local Policies and Plans

- Eastern Region River Basin Management Plan
- Dublin City Development Plan 2011 – 2017
- Dublin City Biodiversity Action Plan 2008-2012
- Liberties Local Area Plan (DCC, 2009)

References to relevant Objectives and Policies of these plans have been made in this report where appropriate.

7.2.3 Field Survey

Field surveys of the proposed site were conducted in 2011 on 26th July for habitats and fauna and the 27th/28th August and 20th September for bats, and involved the identification of all habitats, flora and fauna encountered.

Habitat and Flora

The proposed development site was surveyed using methodology outlined in: *Best Practice Guidance for Habitat Survey and Mapping* (Heritage Council, 2011). The principal habitats present within the site were identified and classified using *A Guide to Habitats in Ireland* (Fossitt, 2000). The dominant species were noted and a species list of other frequent, rare, or notable species compiled for each habitat represented. Plant nomenclature follows that of the Checklist of the Flora of Britain & Ireland (BSBI, 2007).

Fauna

The surveying of fauna presence on subject lands cannot be based upon direct sightings alone. The presence of fauna was substantiated through the detection of field signs such as tracks, habitats, markings, feeding signs, and droppings, as well as by direct observation. The likely fauna species were assessed in relation to the habitats present within the site. In the absence of evidence, potential for species to occur was also noted.

Specialist surveys were undertaken with regard to the potential use of the site and its buildings by bats. All buildings were assessed for suitability as potential bat roosts

according to the criteria in the Bat Conservation Trust *Good Practice Guidelines* (BCT, 2007), and the National Roads Authority *Guidelines for the Conservation of Bats in the Planning of National Roads Schemes*.

Internal inspections for bat usage were undertaken of all buildings proposed for demolition during field survey. Notes were made on potential crevices, gaps, and roof spaces suitable for bats. The spill from night lighting on buildings with high bat roost potential and those proposed for demolition was sketched. In addition to visual observations of live or dead bats, field signs indicating bat usage include:

- Droppings,
- Feeding remains,
- Scratch marks/smoothed surfaces around entrance points, and
- Oil staining from fur.

Following the inspections, all buildings proposed for demolition were surveyed using two surveyors; on 23rd/24th August at dusk⁷ and 90 minute thereafter and prior to dawn⁸, and on 20th September (prior to dawn only⁹). All bat calls were recorded using a heterodyne/time expansion (Pettersson D-240x) detector and Mp3 recorder for subsequent analysis by 'BatSound' software enabling species identification.

Transects were also walked along the hedge and treelines to record any foraging/commuting bat activity. An Anabat SD1 frequency-division was also placed along the tree-lined walled boundary with the St. James's gate graveyard, located along the southern boundary, which was considered to have the highest potential bat foraging value in the vicinity of the site. The recorder was analysed for the period between dusk and dawn on 23rd/24th August for bat calls.

All bat activity was recorded and mapped where relevant. The conservation status and behaviour of all recorded species was described, and potential impacts of the proposal on any bat populations assessed using relevant guidelines.

7.2.4 Evaluation and Impact Assessment Criteria

The ecological value of the proposed development site and the impact of development on ecology have been assessed according to the following guidelines:

- *Guidelines on the information to be contained in Environmental Impact Statements* (Environmental Protection Agency, 2002);
- *Guidelines for Ecological Impact Assessment* (Institute of Ecology and Environmental Management, 2006);
- *Guidelines for assessment of Ecological Impacts of National Road Schemes* (NRA, 2009); and

⁷ Sunset at 20h36

⁸ Sunrise at 06h19

⁹ Sunrise at 07h07

- *Best Practice Guidance for Habitat Survey and Mapping* (Heritage Council, Pre-publication version 2010).

Relevant summary elements of the principles contained in these guidelines are reproduced in Appendix 7.1 NRA Ecological Valuation Criteria and Appendix 7.2 IEEM Impact Assessment Criteria, Volume 4.

Impact assessment is only undertaken of Sensitive Ecological Receptor's (SER's), which are those features valued at Local Importance (Higher Value) or higher in accordance with the NRA categories in Appendix 7.1, Volume 4 and which have potential to be impacted upon due to the existence of a source-pathway-receptor link.¹⁰

A 'screening exercise' was conducted in order to determine whether the development would require an 'Appropriate Assessment' under Article 6(3) and (4) of the European Habitats Directive. The screening exercise followed the procedure of: *Assessment of plans and projects significantly affecting Natura 2000 sites*, produced by the European Commission (2001), and *Appropriate Assessment of Plans and Projects in Ireland – Guidelines for Planning Authorities* (Department of Environment, Heritage and Local Government, Rev Feb 2010). The results of the exercise have been included in Appendix 7.3 Screening for Appropriate Assessment.

7.3 Consultation

Consultation requests containing site maps and a brief project description were issued to statutory and non-statutory consultees for comment. Responses have been summarised below and are included in Appendix 7.4, Volume 4 of the EIS.

- National Parks and Wildlife Development Applications Unit (22/09/2011):
 - EclA should include all designated sites, protected species, red-listed species, and biodiversity in general
 - Cumulative impacts should be included
 - Appropriate assessment screening should be included
- The National Parks and Wildlife Service Conservation Ranger for North Dublin (19/08/2011):
 - The Liffey holds a good population of Otters, and there was some potential for breeding holts in the Liffey in the vicinity of the site
 - Seals travel up-stream as far as Islandbridge
 - Herring Gulls have undergone massive declines of 90% as illustrated in Lynas *et al.*, 2007.

¹⁰ In ecological and environmental impact assessment, for an impact to occur there must be a risk enabled by having a 'source' (e.g. construction works at a proposed development site), a 'receptor' (e.g. a SAC or other ecologically sensitive feature), and a pathway between the source and the receptor (i.e. a watercourse which connects the proposed development site to the SAC). The risk of the impact does not automatically mean it will occur, nor that it will be significant. However, identification of the risk does mean that there is a possibility of ecological or environmental damage occurring, with the level and significance of the impact depending upon the nature and exposure to the risk and the characteristics of the receptor.

- Inland Fisheries Ireland (12/08/2011)
 - River Liffey holds some of most important salmonid populations in the region.
 - Breeding Atlantic Salmon *Salmo salar*, resident Brown Trout *Salmo trutta*, migratory Sea Trout *Salmo trutta trutta*, Lamprey *Lampetra spp.* and *Petromyzon marinus*, and Freshwater Crayfish *Austopotamobius pallipes* breed and/or migrate within nearby River Liffey
 - Liffey is sensitive and impact avoidance should be prioritised above secondary options of mitigation by reduction and remedy
 - Only uncontaminated surface waters must be discharged to surface water network due to potential for developments to impact directly on fish populations
 - Ground preparation and associated construction works have significant potential to cause the release of sediments and pollutants into surrounding watercourses.
 - An Environmental Management Systems approach should be adopted during construction and operation.
- Botanical Society of the British Isles (BSBI)
 - No response to request for rare flora records has been received.
- Bat Conservation Ireland (BCI) (20/07/2011) highlighted:
 - Importance of detailed survey of the proposed development in relation to roosting, commuting and foraging bats. Such surveying should follow the guidelines set out by the NRA and additional guidelines listed.
 - Surveying should be completed principally during the active season (May to September) and where necessary represent the four seasons (spring, summer, autumn and winter).
 - Surveying should identify the following:
 1. Roosting areas at a 1km level (distinguishing between maternity, transitional, mating and satellite roosts, where possible)
 2. Commuting routes
 3. Foraging areas
 4. Potential Bats Roosts (PBRs) in mature trees
 5. Desktop study of historical bat records
 - BCI also provided roost and transect data for a 10 km buffer around the site (see Protected Species section below)

7.4 Description of Existing Environmental

The proposed development site is located on the southern banks of the River Liffey in Dublin City. The development site corresponds to the Guinness Processing Plant, which extends from James's Street to the south to Victoria Quay to the north. The site is bounded by Steeven's Lane and Watling Street to the east and west respectively.

The terrestrial habitats within the development boundary are almost entirely dominated by hardstanding and existing industrial plant and office buildings, with scattered patches of managed amenity grassland and ornamental trees and shrubs accounting for the majority of vegetated areas. There are occasional areas of scrubby vegetation in marginal or disused areas, but none are extensive. The site is surrounded by existing urban development to the east, north and south, and the River Liffey to the north. The banks of the Liffey in the local area have been entirely artificially modified and are in intensely industrial/commercial use, although there are scattered amenity grassland areas and street treelines.

The existing site does not discharge foul or process effluent to the Liffey. Foul and process effluents are currently treated by the on-site WWNP which then discharges into a combined DCC sewer and treated at the Ringsend Wastewater Treatment Plant (WWTP).

7.4.1 Zone of Influence of Proposed Development

The zone of influence of the proposed brewery development is more or less limited to the site boundary in terms of physical disturbance from vibration, noise and light during construction and operation.

However, this assessment has also checked for the potential for pollution events from surface/foul/process effluent discharges to extend beyond the boundaries of the proposed development site into the River Liffey and the inner mouth of Dublin Bay. Mixing and dispersal of pollutants entering the bay is considered to limit the zone of pollutant influence to the River Liffey prior to its discharge into Dublin Bay.

Impacts to Dublin Bay by discharge of inadequately treated effluent by the Ringsend Wastewater Treatment Plant (WWTP) are not considered within this report because the proposed brewery development will not increase loading beyond the current IPPC Licence limit. The plant is undergoing upgrades as part of the Eastern Regional River Basin Management Plan Actions under the Water Framework Directive. In this regard, the zone of influence is not considered to extend to the entirety of Dublin Bay

7.4.2 Designated Areas and Protected Species

The area covered by the proposed brewery development is not under any designation as per the Wildlife Act or the Habitats or Birds Directives. There are candidate Special Areas of Conservation (cSAC) and Special Protection Areas located 5km downstream of the site at Dublin Bay.

There are also other designated sites within 15km of the proposal including several in the Dublin/Wicklow Mountains, and several on the coast to the north of Dublin Bay. All these sites are illustrated in **Figure 7.2**, Volume 3 of the EIS. All sites within 5 km of the proposal are illustrated in **Table 7-A** below. There are source-pathways-receptor linkages with two nationally designated sites via the River Liffey (River Liffey Nutrient Sensitive Area and North Dublin Bay pNHA) and indirect impacts to protected species whose populations are unconnected with designated areas (e.g. otters, Salmon, or Kingfisher). However, there are no internationally designated Natura 2000 sites potentially impacted by the scheme due to distance and site design features that reduce potential pollution impacts as discussed in the Screening Statement in Appendix 7.3, Volume 4.

Table 7-A: Summary of Designated Sites within Vicinity of the Proposed Development

Site Name and Code	Distance	Qualifying Features/Features of Interest	Do potential source-pathway-receptor links to development site exist?
River Liffey (Nutrient Sensitive Area under the Water Framework Directive)	Immediately N of site (ca. 15m)	N/A	Yes <u>but unlikely</u> , via nutrients in surface/foul/process waters entering overland or via drainage network
Grand Canal pNHA (2104)	1.5km to south (3.8km downstream)	Protected flora (Opposite-leaved pondweed <i>Groenlandia densa</i>), protected amphibians (Common Frog <i>Rana temporaria</i> , and Smooth Newt <i>Triturus vulgaris</i>), and a protected mammal (Otter <i>Lutra lutra</i>)	No, there is no tidal exchange due to sea locks at the confluence with the Liffey
Royal Canal pNHA (2103)	3km to northeast (3.5km downstream)	Opposite-leaved pondweed, A rare stonewort <i>Tolypella intricata</i>	No, there is no tidal exchange due to sea locks at the confluence with the River Liffey
North Dublin Bay pNHA (205)	3.8km to northeast (downstream)	See cSAC	Yes <u>but unlikely</u> , via pollutants in surface/foul/process waters entering Dublin Bay via the River Liffey.
Liffey Valley pNHA (128)	4.5 km to west (upstream)	<i>Equisetum variegatum</i> , <i>Salix myrsinifolia</i>	No, there is no hydrological or other linkage with the site.
Sandymount Strand/Tolka Estuary SPA (4024)	4.5km to east (downstream)	Light-bellied Brent Goose & six species of national importance	No, due to distance.
South Dublin Bay and River Tolka Estuary cSAC (210)	Approx 5km to northeast (downstream)	Mudflat	No, due to distance

Sandymount Strand/Tolka Estuary SPA (Site No. 4024) is the nearest Natura 2000 site located approximately 4.5 km downstream of the site on the northern side of inner Dublin Bay. This site and others in south Dublin Bay are considered outside the zone of influence of hydrological pollutant pathways. The cSACs have been designated in order to protect a range of coastal habitats including saltmarsh, mudflats, inter-tidal lagoons and some marine species. The SPAs have been designated in order to protect a large number of coastal birds.

The nearest designated site outside the Natura 2000 network is the Royal Canal pNHA (Site Code 2103), located approximately 3km north east of the site, or 3.5 km downstream of it. The canal also contains *Groenlandia densa* populations in addition to a stonewort *Tolypella intricata* listed as Vulnerable on the Irish red-listed (Curtis & McGough, 1988, 2005 update). The canal joins the Liffey at Spencer Dock, where a sea lock prevents movement of tidal waters upstream.

The next nearest designated pNHA is the Grand Canal pNHA (Site Code 2104) located 1.5 km to the south, and approximately 3.8km downstream of the site. The canal is notable for Opposite-leaved Pondweed *Groenlandia densa*, which is legally protected under the Flora (Protection) Order 1999, and Endangered on the red data list (Curtis & McGough, 1988, 2005 update) being found in recent years in only three counties in the Republic; Limerick, Laois and Dublin. The canal also holds breeding populations of Otter *Lutra lutra*, and Smooth Newt *Lissotriton vulgaris*, which are both protected by the Wildlife Acts. The Otter is also a European protected species under Annex II and IV of the Habitats Directive. Three sea locks in the basin prevent any flow of incoming waters at high tide.

The North Dublin Bay pNHA (3.8km downstream of the site), and South Dublin Bay pNHA (5.3 km downstream of the site) are designated for the dune and intertidal habitat qualifying features of the South Dublin Bay and River Tolka Estuary cSAC, and North Dublin Bay cSAC as outlined in **Table 7-A** above. The sites are also important for the wintering bird populations in the North Bull Island SPA, and Sandymount Strand/Tolka Estuary SPA.

Protected Species

A search of the NPWS records of protected species in 10km National Grid Square O13 revealed records for 22 legally-protected species in the area, including 10 protected plant species. Records are summarised in **Table 7-B**.

Only one of the species in **Table 7-B** was recorded by Brunker (*Groenlandia densa*) in his survey of the locality in the 1940's, but there is no note as to its location which is presumed to be its historic station in the Grand Canal to the south of the site. There is no wetland habitat within the development site where it could occur.

Another species recorded by Brunker (Canadian pondweed *Elodea canadensis*) is notable as a serious aquatic invasive species. Neither this 2011 EclA survey nor the ecological survey conducted as part of a biodiversity audit in 2007 by Scott Cawley recorded any of the species in **Table 7-B** within the proposed development lands.

The response to a consultation request with Inland Fisheries Ireland (formerly the Eastern Regional Fisheries Board) additionally highlighted the presence of several protected fisheries interests in the River Liffey as shown in **Table 7-C**.

The Bat Conservation Ireland data revealed presence of 30 known roosts within 10km of the site, all within private dwellings. The nearest roost sites are 1km distant in the Phoenix Park. There were no records of known roosts within the proposed development location. Any roosts within 2 km have been detailed in **Table 7-D** below. The Bat Conservation Ireland car transect database also indicated presence of six species of foraging bats within 10km of the site (see **Table 7-E**). It should be noted however, that there was no known record of foraging bats within the development site itself despite surveys of the area and immediate surroundings in 2007 and 2008. The authors have recorded bat roosts in the National Concert Hall (4 *Pipistrellus pipistrellus*)

and bats have also been recorded in St Stephen's Green and flying over the Liffey in the Spencer Dock area (P. Scott, personal communication, 2011).

Table 7-B: NPWS Protected Species Records (within National Grid Square O13)

Scientific Name	Common Name	Status	Red List Status	10 km	Date (Most Recent)
Meles meles	Badger	Protected	Least Concern	O13	2007
Tyto alba	Barn Owl	Protected	Red List	O13	2009
Larus ridibundus	Black-Headed Gull	-	Red List	O13	2007
Erigeron acer	Blue Fleabane	Protected	Endangered	O13	1991
Puccinellia fasciculata	Borrer's Saltmarsh-Grass	Protected	Vulnerable	O13	1906
Rana temporaria	Common Frog	Protected		O13	2007
Larus canus	Common Gull	-	Amber List	O13	2007
Zootoca vivipara	Common Lizard	Protected		O13	1968
Carex divisa	Divided Sedge	Protected	Critically Endangered	O13	1886
Sciurus vulgaris	Eurasian Red Squirrel	Protected	Near Threatened	O13	1978
Hypericum hirsutum	Hairy St John's wort	Protected	Endangered	O13	1895
Viola hirta	Hairy Violet	Protected	Endangered	O13	1983
Hyoscyamus niger	Henbane	Protected	Vulnerable	O13	1882
Larus argentatus	Herring Gull	-	Red List	O13	2007
Mustela erminea subsp. hibernica	Irish Stoat	Protected	Least Concern	O13	1969
Hordeum secalinum	Meadow Barley	Protected	Endangered	O13	1866
Groenlandia densa	Opposite-leaved Pondweed	Protected	Endangered	O13	2010
Lutra lutra	Otter	Protected	Near Threatened	O13	2010
Galeopsis angustifolia	Red Hemp-Nettle	Protected	Endangered	O13	Unknown
Lampetra fluviatilis	River Lamprey	Protected	-	O13	Unknown
Triturus vulgaris	Smooth Newt	Protected	-	O13	2010
Alosa fallax	Twaite Shad	Protected	-	O13	2010
Lacerta vivipara	Viviparous Lizard	Protected	-	O13	1968
Erinaceus europaeus	West European Hedgehog	Protected	Least Concern	O13	1969

Scientific Name	Common Name	Status	Red List Status	10 km	Date (Most Recent)
<i>Lamiastrum galeobdolon</i>	Yellow Archangel	Protected	Vulnerable	O13	1905

Table 7-C: Protected Fisheries Species from River Liffey

Scientific Name	Common Name	Protected
<i>Salmo salar</i>	Atlantic Salmon	Protected (Annex II, V)
<i>Salmo trutta</i>	Sea Trout / Brown Trout	-
<i>Austropotamobius pallipes</i>	Freshwater Crayfish	Protected (Annex II)
<i>Lampetra fluviatilis</i>	River Lamprey	Protected (Annex II, V)
<i>Petromyzon marinus</i>	Sea Lamprey	Protected (Annex II)

Table 7-D: Bat Conservation Ireland Roost Data

Scientific Name	Common Name	Roost Details	Distance from site
<i>Plecotus auritus</i>	Brown Long-Eared Bat	Private dwelling in Phoenix Park	Approx. 2km northeast of site
<i>Nyctalus leisleri</i>	Leisler's bat	Private dwelling in Phoenix Park	Approx. 1km northeast of site
<i>Myotis mystacinus</i>	Whiskered Bat	Private dwelling in Phoenix Park	Approx. 1km northeast of site

Table 7-E: Bat Conservation Ireland Foraging Bat Data within 10 km

Scientific Name	Common Name	Red-list Status ^{9F11}
<i>Plecotus auritus</i>	Brown Long-Eared Bat	Least Concern
<i>Pipistrellus pipistrellu</i>	Common Pipistrelle	Least Concern
<i>Myotis daubentonii</i>	Daubenton's bat	Least Concern
<i>Nyctalus leisleri</i>	Leisler's bat	Near Threatened
<i>Pipistrellus pygmaeus</i>	Soprano Pipistrelle	Least Concern
<i>Myotis sp.</i>	Unidentified Myotis	NA

Designated Watercourses

In accordance with the requirements of the Water Framework Directive 2000/60/EC and the associated national regulations, the Environmental Protection Agency have

¹¹ Source: Marnell *et al.*, 2009

compiled Registers of Protected Areas. Under this legislation, the EPA is further required to maintain and update the register as needed.

The protected areas are identified as those requiring special protection under existing national or European legislation, either to protect their surface water or groundwater, or to conserve habitats or species that directly depend on those waters.

The nearest designated watercourse under the Water Framework Directive is the River Liffey located approximately 10m north of the northern site boundary. The river is a Nutrient Sensitive Estuary (Code EA_090_0300). The River Liffey is tidal as far as Islandbridge, and this upper section is classified as a moderately eutrophic estuary by the Environmental Protection Agency (EPA). The Liffey estuary has been categorised as a Heavily Modified Water under the Eastern Region River Basin District Management Plan (ERBDMP) due to the intensive modification for flood defences, navigation, and dredging.

The Camac River joins the Liffey by Heuston Station approximately 400m west of the site boundary, but is not designated. The Camac River is of limited ecological value due to extensive culverting, historical industrial pollution, and the poor wildlife opportunities of the concrete walls that contain it. The Camac is also a Heavily Modified Water under the ERBDMP. There is a project under consideration to abstract water from the on-site Cooperage Well which is believed to be within the catchment of the Camac River, which is a sub-catchment of the River Liffey. The alluvial gravels from which water is abstracted are interpreted to be in hydraulic connection with the Camac River. Based on historical data and recent investigations, there is no effect on the Camac or Liffey Rivers as a result of pumping from the Cooperage Well.

7.4.3 Habitat, Vegetation and Flora

The following habitat categories were found within the survey area, which included all lands within the boundary of the proposed development site.

Amenity Grassland (GA2)

This habitat has been sparingly created at building entrances and communal areas. The sward is moderately diverse and therefore evidently not intensely fertilised or sprayed and includes dominant Clovers *Trifolium* spp. amongst Creeping Buttercup *Ranunculus repens*, Creeping Bent *Agrostis stolonifera*, Dandelion *Taraxacum officinale* agg., Daisy *Bellis perennis*, Red Fescue *Festuca rubra*, Ragwort *Senecio jacobaea*, Yarrow *Achillea millefolium*, Primrose *Primula vulgaris*, Cat's Ear *Hypochaeris radicata*, Selfheal *Prunella vulgaris*, and Lesser Trefoil *Trifolium dubium*. There is a frequent bryophyte layer dominated by *Rhytidiadelphus squarrosus*.

This habitat is valued at Local Importance (Lower value).

Hedgerows (WL1)

Hedgerows are restricted to a single well-pruned hedge bordering a car park in the south of the site outside the development zone. Dog Rose *Rosa canina* and Elder *Sambucus nigra* are minor native components in the 2m high hedge which is dominated by non-native shrubs, predominantly *Viburnum* sp. The field layer is densely shaded and dominated by Ivy *Hedera helix* plus a scattering of weedy species such as Smooth Sow Thistle *Sonchus oleraceus*, and Groundsel *Senecio vulgaris*. The habitat does not

serve a significant corridor function due to the absence of adjacent semi-natural habitats.

This habitat is valued at Local Importance (Lower value).

Treelines (WL2)

A single semi-mature Sycamore *Acer pseudoplatanus* treeline is located along a fence line in the south of the site outside the development zone. This species is invasive in wetland and woodland habitats in Ireland and is on the Invasive Species Ireland Amber list of invasive species.¹²

This habitat is valued at Local Importance (Lower value).

Ornamental (WD5)/ Flower Beds and Borders (BC4)

Semi-mature ornamental trees, shrubs, and flowerbeds have been planted for amenity value in marginal areas and beside building entrances throughout the site. Species are predominantly non-native (Leylands Cypress x *Cuprocyparis leylandii*, *Cistus* sp., *Hebe* sp., Rose of Sharon *Hypericum calycinum*) and therefore of low ecological value. Native (or naturalised) trees and shrubs such as Rowan *Sorbus acuparia*, Bird Cherry *Prunus padus* and Beech *Fagus sylvaticus* are occasional but are not mature specimens. The ground flora includes a small number of native species including Hedge Bindweed *Calystegia sepium*, Thale Cress *Arabidopsis thaliana*, Common Chickweed *Stellaria media*, Red Dead Nettle *Lamium purpureum*, and Yellow-juiced Poppy *Papaver dubium* subsp. *lecoqii*. Ornamental beds are frequently found fringing small areas of Amenity grassland (GA2).

The invasive ornamental *Rhododendron ponticum* is frequent throughout the site in this habitat and has been recently planted in ornamental beds. The species is 'Most Wanted' on the Invasive Species Ireland (ISI) National Invasive Species Database¹³

This habitat is valued at Local Importance (Lower) value. However *Rhododendron ponticum* is of risk to habitats of Local to international Importance higher, due to its potential to spread and damage higher value habitats outside of the site.

Scrub (WS1)

Two small areas of scrub have developed in unmanaged areas outside the development zone. One has spread down a nearby slope from the single hedgerow described above and is dominated by non-native *Cotoneaster* sp., Butterfly bush *Buddleija davidii*, and sapling Sycamore. The second area of scrub dominates the overgrown garden of No. 98 James's Street which is currently unoccupied. This area is dominated by a scattering of Sycamore and Bird Cherry trees above an understorey of Butterfly bush, Dog Rose, and Brambles with occasional Bush Vetch *Vicia sepium*. The field layer is densely shaded and species-poor. However red-brick walls in a nearby clearing have a small number of dry grassland/bank species not found elsewhere such as Lady's Mantle *Alchemilla vulgaris*, Common Bent *Agrostis capillaris*, Meadow Fescue *Festuca pratensis*, and Harebell *Campanula rotundifolia*. Holly blue butterflies were abundant here.

This habitat is valued at Local Importance (Lower value).

¹² Source: Invasive species Ireland website <http://invasivespeciesireland.com/>

¹³ Source: Invasive species Ireland website <http://invasivespeciesireland.com/>

Buildings and Artificial Surfaces (BL3)

Buildings were generally devoid of vegetation apart from some older derelict structures that hosted Butterfly Bush in gutters gaps in stonework.

This habitat is valued at Local Importance (Lower value).

Depositing, Lowland River (FW2)

The following section is based upon a survey (undertaken in compliance with the 'River Habitat Survey Manual' (2003) of the UK Environment Agency) of the river banks along the shoreline of the proposed development site, and provides some information on the structure of the river banks and channel. The river is fully tidal as far as Islandbridge, approximately one kilometre upstream of the proposed brewery development site. At high tide, the river is fast-flowing, deep, and smooth without riffles. The substrate is mud and small cobbles, with sediment accumulating at the retaining side-walls containing a low cover of green algae and Bladder Wrack seaweed *Fucus vesiculosus*. There is no natural riparian vegetation due to the proximity of the adjacent roadways and condensed urban development of Dublin City. The nearest natural riparian vegetation is located south of Phoenix Park, approximately 240m upstream. The outer wall of Victoria Quay does contain some minor vegetation in the form of self-seeded Alder *Alnus glutinosa* and Sycamore saplings amongst Red Valerian *Centranthus* rubble, False Wood Brome *Brachypodium sylvaticum* and Ivy-leaved toadflax *Cymbalaria muralis*.

There is a single colony of the highly invasive shrub Japanese Knotweed *Fallopia japonica* on the quay wall immediately upstream of the Heuston Street Station Bridge. The species is 'Most Wanted' on the Invasive Species Ireland (ISI) National Invasive Species Database¹⁴.

7.4.4 Fauna

Mammals

Badgers (Meles meles)

All badgers and their setts are legally protected under the Wildlife Acts.

No prints, hair snags, latrines, signs of foraging or other evidence of badger activity were found on-site as would be expected on built over land. There is no suitable sheltered scrub or grassland habitat for the species to breed within the site.

The site offers no potential to support Badger.

Otters (Lutra lutra)

Otters and their breeding/resting places are fully protected under the EC Habitats Directive as transposed by the Habitats Regulations, and the species is a Biodiversity Action Plan (BAP) Species under the Dublin City Council. There is very low potential for Otters to occur within the site due to its urban-industrial setting, and the absence of water features containing foraging opportunities. Otters have been recorded along the River Liffey (Bailey & Rochford, 2006) and it is possible that they may move and feed in the Liffey immediately north of the site.

¹⁴ Source: Invasive species Ireland website <http://invasivespeciesireland.com/>

The site offers no potential to support Otter, but the nearby Liffey is likely to contain commuting or feeding populations of Local Importance (Higher value).

Bats

All bats and their roosting sites are legally protected under the Habitats Directive as transposed by the Habitats Regulations, as well as under the Wildlife Act. All bat species are Biodiversity Action Plan (BAP) species under the Dublin City Council BAP 2008-2012.

Internal and external inspections of all buildings proposed for demolition were undertaken during July, August and September 2011 surveys. The structures to be demolished are located in the northeast of the site and are described below and shown in the photographic plates at the end of this report.

- Electricians Building
 - It is a single storey, flat-roofed concrete structure with a low roof void (to ca.10 cm, but to 1 m in places). The roof void is deepest in side rooms where a partition roof has been installed. The void is well lit during day light hours from lighting within, and external windows. There are no notable crevice opportunities for bats. The building is well-lit by adjacent permanent security lighting at night, except on the western side.
- Welfare Centre
 - It is a modern single-storey brick building with a flat-top corrugated roof without crevice opportunities. There are however some gaps and crevices in the external concrete brick wall in occasional holes, or mortar cracks.
 - There are a series of porta-cabins and recycling facilities to the rear of the welfare buildings which are well sealed with no crevices or holes for bats to enter.
- Warehouse
 - This is a recently constructed modern corrugated warehouse structure with no roof space, no stone or brick with crevice opportunities and very poor thermal properties unsuitable for bats. It is well lit except on the western and southern sides.
- Cooling plant
 - This is a ca. 20m high disused industrial unit composed of red-brick overlain in the upper part by corrugated sheeting. The external walls of the building are covered by exposed piping. Older brickwork on the upper external wall has some gaps in mortar. The building is well-lit except for the west and eastern sides, and top which are in subject to partial light spill from nearby lighting.
- Boiler Makers Workshop
 - This is a single storey building with stone walls and corrugated sheet roofing and cladding of the walls at the upper levels. There were few crevices or opportunities for bats and no evidence for bats internally or externally. A floodlight was mounted on Buddleija-covered wall facing south and illuminated the general area.

Floodlights and street lights on Watling Street also contributed to a generally well-lit environment.

Photos of all these buildings have been provided in Appendix 7.5, Volume 4.

There were no buildings with high roost potential identified within the footprint of the works. The tall red brick chimneys of the disused power plant offer potential for roosting bats, and are located above light spill from the site. However, the chimneys will not be affected by the proposal and were not investigated any further. No other buildings within the site have high potential for roosting bats.

All buildings to be demolished share the following features highlighted as indicating decreased bat roost likelihood in the Bat Conservation Trust (BCT) Good Practice Guidelines:

- Modern, well maintained buildings;
- Small, cluttered roof spaces (or none);
- High level of regular disturbance;
- Highly urbanised location with few or no mature trees, parkland, woodland, or wetland; and
- All buildings are well lit by permanent security lighting and/or floodlights, which further reduces their potential as bat roosts.

All buildings proposed for demolition have low bat roost potential.

Bat Survey Findings

No signs of bats were found during internal and external inspections. The dusk and dawn survey recorded no bats entering or leaving buildings proposed for demolition. No bats were recorded during walked transects of hedge and treelines, and the Anabat recorder results indicated no bats foraging along the tree-lined boundary with the St. James's Graveyard.

A single unidentified Pipistrelle *Pipistrellus* sp. bat was heard but not seen flying near the welfare buildings at 06h08 on 24th August. There are no known roosts within 1km of the site.

This bat is the only known record for bat usage of the proposed development site. A bat survey by Scott Cawley in June-July 2008 for the Liberties Regeneration Project Area surveyed the south west of Dublin City Centre between the North Quays to the north, Patrick Street to the east, the Luas (Red) line to the West and Cork Street to the south. A combination of car-based transects surveys and dusk/dawn surveys of buildings with high bat potential produced no foraging/commuting/roosting bat records. The report concluded that the lack of surrounding vegetation combined with the high light levels resulted in a low value of the locality for bat usage. A separate bat survey report by Scott Cawley in 2007 of the entire Guinness site (brewery and processing plant) similarly revealed no bat activity, as did a survey of the St. James's graveyard by Scott Cawley in 2010. Taking the results of previous surveys into account, the site is regarded to be of low value to bats due to high lighting levels and the absence of semi-natural vegetation.

A single commuting Pipistrelle bat was recorded crossing the site and is likely to roost in the local area. The disused power station chimneys have bat roost potential but are outside of the zone of influence of the proposed brewery development. Taking the results of previous surveys into account, the site is regarded to be of low value to bats due to high lighting levels and the absence of semi-natural vegetation.

Fish

Salmon, Crayfish and Lamprey species and their breeding grounds are protected under Annex II of the European Habitats Directive (92/42/EEC).

Consultations with Inland Fisheries Ireland revealed that the entire course of the River Liffey acts as important habitat for Atlantic salmon (*Salmo salar*) in addition to Brown and Sea Trout (*Salmo trutta*). These are all BAP species in the DCC BAP. The Liffey is also home to feeding Flounder, Eel *Anguilla anguilla*, Mullet *Mugil cephalus* and Three-spined Stickleback *Gasterosteus aculeatus* (Moriarty, 1997), none of which are protected under European legislation.

The nearest known Salmon spawning grounds are in the 'Rye Water/Carton' SAC (see description above), located approximately 20km upstream of the site.

Brook Lamprey (*Lampetra planeri*) and River lamprey (*Lampetra fluviatilis*) have been recorded in the River Liffey (Igoe *et al.* 2001), including a record of Sea Lamprey at Islandbridge from the turn of the previous century. As the river is fully tidal, and enclosed by high stone quay walls there is no potential for lamprey spawning grounds or nurseries in the riverbank.

The site offers no potential to support fish species, although the adjacent River Liffey fisheries are valued at National Importance (Salmon & Lamprey) or Local Importance -Lower Value (Other fish).

Birds

All wild birds and their nests are protected under the Wildlife Act. The site survey was undertaken in late July which is sub-optimal for recording breeding bird diversity as most species are no longer singing to advertise territories. However, the site is mostly developed and composed of sparse natural vegetation affording very few nesting possibilities to suburban fringe/woodland species. **Table 7-F** below details all species of conservation concern in Ireland recorded within the site. The BoCCI (Lynas *et al.*, 2007) assigns all resident/breeding/migratory species with Green (0-25% population declines), Amber (25-49% declines) or Red status (25-49% declines).

In addition to the species below, common species including Blue Tit *Parus caerulea*, Blackbird *Turdus merula*, Hooded Crow *Corvus cornix*, Pied Wagtail *Motacilla alba*, Robin *Erithacus rubecula*, Woodpigeon *Columbus palumba*, and Wren *Troglodytes troglodytes* were recorded in ornamental plantings and scattered scrub/hedges, however these species are considered possible breeders only as no fledglings, family groups, nests, or other evidence of breeding was recorded.

Only Herring Gull and Lesser Black-backed gull can be confirmed as breeding within the proposed development site. Starling and Linnet were recorded in the Brewery to the south and to the west of the site. Starling may breed in buildings on-site, but Linnet requires cover of scrub vegetation which is lacking from the site.

Table 7-F: Birds of Conservation Concern Recorded Within the Site and Adjacent the River Liffey

Common Name	Scientific Name	Within Site	Status and Notes
Cormorant	<i>Phalacrocorax carbo</i>	No	Amber-listed. Commutes in adjacent River Liffey, and feeds there and in nearby canals and Dublin Bay. No breeding habitat within Dublin City environs.
Grey Heron	<i>Ardea cinerea</i>	No	Amber-listed. Pair commuting downstream. Likely to breed in wider area. No suitable breeding or foraging habitat within site.
Herring Gull	<i>Larus argentatus</i>	Yes	Red-listed. Confirmed breeder on corrugated rooftops of repair bays in the northwest of the site (juveniles observed), Gas Cylinder filling plant in the north of the site, and power house in the east of the site. Colony size unknown but likely to be in region of 5-20 pairs. Seven pairs recorded on Brewery lands to south in 2007.
Kingfisher	<i>Alcedo atthis</i>	No	Amber-listed. 2-3 birds recorded commuting up and downstream past the site at dawn. Likely to use nearby Liffey only for commuting or for occasional foraging, particularly in cold weather.
Lesser Black-backed Gull	<i>Larus fuscus</i>	Yes	Amber-listed. Probable breeder on roof of fermentation and processing plant (juveniles not observed). Colony size unknown but likely to be less than 5 pairs as only 2-3 adults recorded.
Starling	<i>Sturnus vulgaris</i>	No	Amber-listed Party of 7 recorded outside western boundary on church spire on Stephens Hill. May breed on buildings within site.
Linnet	<i>Carduelis cannabina</i>	No	Amber-listed Recorded in late summer 2007 in Brewery lands to south of James's Street. Not recorded in 2011, and very unlikely to breed within site due to scarcity of scrub habitats.

Herring Gulls are predominantly resident species primarily breeding in rough grassland on off-shore islands (e.g. nearby Ireland's Eye), and wintering in urban and/or coastal estuaries where scavenging opportunities are good. The species is widespread and common in Ireland with an estimated population of 6,000 birds (Boland & Crowe, 2009). The species has undergone catastrophic declines of 90% in recent decades due to botulism (food poisoning from *Clostridium* bacteria found in rubbish tips). The species has colonized urban buildings as breeding areas in the last century; however the majority of the breeding population is still sustained by the ground-nesting off-shore colonies. None of the probable breeding sites within the Diageo Ireland lands are located on buildings proposed for demolition. The population is likely to be of county importance and is a BAP species under the DCC BAP.

Lesser Black-backed Gulls are predominantly summer migratory species, breeding in small colonies on offshore islands. They are less numerous than Herring gulls with national populations estimated at around 5,000 (Boland and Crowe, 2009). The species is Amber-listed due to its localised breeding range. None of the probable breeding sites

within the Diageo Ireland lands are located on buildings proposed for demolition. The population is likely to be of county-importance.

Dispersing Kingfisher *Alcedo atthis* commute down the Liffey to coastal wintering quarters in late summer and are afforded special protection via Annex 1 of the Birds Directive. 2-3 birds were recorded flying up and downstream in front of the proposed development site in the early morning of 24th August. Kingfisher is a resident breeding water bird, whose populations may be boosted in winter by continental birds. The species breeds in clay or sand banks on clean sluggish fish-rich waters, but females leave breeding territories to winter on the coast in winter when freshwaters may freeze over. County population data is not known, but 3 birds is likely to constitute 1% of the Dublin population as the birds have very large territories in the region of 10-20km (BWI, 2007; BWI 2009).

Other commuting species recorded included a single Cormorant *Phalacrocorax carbo*, and two Grey Herons *Ardea cinerea*. Cormorant and Kingfisher are both Amber-listed BoCCI which have undergone moderate declines in recent decades.

The site is considered to be of County Importance for bird species due to the presence of breeding gull colonies, and nearby commuting Kingfisher populations. None of the identified breeding sites will be impacted by demolitions proposed for this development. Common passerine birds and crows are possible breeders in ornamental plantings, but no breeding evidence was confirmed.

Amphibians

The Frog *Rana temporaria* and Smooth Newt and their breeding places are fully protected under the Wildlife Acts. There is no potential for amphibians to occur due to the absence of standing water on-site.

The site offers no potential to support Amphibians.

Reptiles

The Common Lizard *Lacerta vivipara* and its breeding places are fully protected under the Wildlife Acts. The Common Lizard was not recorded on-site at the time of survey. They are extremely difficult to survey due to their timidity, and hence their distribution across Ireland has been difficult to determine. The absence of significant vegetation cover and the intensely urban context for the site implies a very low potential for lizard habitat.

The site offers very low potential to support Common Lizard.

Invertebrates

Several species of *Lepidoptera* (butterflies and moths) would be expected to use the site, but the timing of the site surveys precluded undertaking any specific surveys. The Marsh fritillary (*Eurodryas aurinia*), Ireland's only protected butterfly will not occur within the site because the food plant of its larvae (Devils-bit scabious, *Succisia pratensis*) and suitable breeding habitat does not occur within the site or surrounding area.

The Holly Blue Butterfly *Celastrina argiolus* was the only species recorded within the site. This species occurs abundantly in marginal areas of scrub and ornamental plantings where Ivy grows. The species lays a second brood on Ivy in late summer, following its initial early brood. The species is listed as of Least Concern on the 'Irish

red-list for butterflies, and is widespread within but restricted to the eastern and southern coastal counties.

The site is considered to be of Local Importance (Lower value) for invertebrate species.

7.5 Site Evaluation

The ecological value of the site and the impact of the proposed brewery development on ecology are assessed following the guidelines set out in the Environmental Protection Agency's *Guidelines on the information to be contained in Environmental Impact Statements* (2002) and the Institute of Ecology and Environmental Management's *Guidelines for Ecological Impact Assessment* (2006). Judgements on the evaluation are made using the geographic frames of reference of the NRA (Appendix 7.1, Volume 4) e.g. International, National, Regional or Local (High or Low).

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Table 7-G: Ecological Evaluation of Proposed Brewery Site

Evaluation Criterion	Evaluation of Proposed Site
Designated Sites and Features	There are nationally important designated sites within the zone of influence of the site
<p>Biodiversity Value</p> <p>(This is manifested in many ways such as rarity of species or sub-species, locally distinct sub-populations, ecosystems, habitat diversity, connectivity and/or synergistic associations, unusually large populations, plant communities typical of natural/semi-natural or valued vegetation types, species on the edge of their geographic range etc.)</p>	<p>All habitats are Local Importance (Lower) excluding the buildings home to breeding gulls which are of county importance. None of the identified breeding sites will be impacted by demolitions proposed for this development. The invasive Rhododendron may damage a range of habitats from Local to International importance should it spread outside the site.</p> <p>The River Liffey is of national importance, for Otter, Fisheries, and Kingfisher and the proposed site will discharge surface waters to the River.</p>
<p>Valuing species</p> <p>(Flora or fauna with limited distribution or endangered, rather than protected, are taken into account here. These include species covered by Species Action Plans.)</p>	<p>Within the site, breeding populations of both species of gull have been assigned status of county importance, while the commuting Pipistrelle bat is of Local Importance (Higher value). None of the identified breeding sites will be impacted by demolitions proposed for this development.</p> <p>Adjacent to the site, the commuting Kingfisher population in the River Liffey is protected on a European level under the Birds Directive and is likely to be of county importance. The feeding gulls, and commuting Cormorant and Heron in the Liffey are of Local Importance (Higher Value).</p>
<p>Potential value</p> <p>(Habitats which are capable of being improved or enhanced particularly if they are habitats listed under the EC Habitats Directive are taken into account.)</p>	Overall, the site has low potential for most wildlife due to the intensive existing disturbance regime and sparseness of semi-natural vegetation.
<p>Secondary or Supporting Value</p> <p>(If a site is itself of no ecological value but performs an ecological function that supports an off-site habitat of value, then this is taken into account.)</p>	The site supports a small breeding population of two species of gull of conservation concern, which are likely to feed and roost in urban parks and other foraging areas in the locality.
Social Value	The site is not regarded to be of importance for its environmental attributes due to its urban, heavily-

Evaluation Criterion	Evaluation of Proposed Site
(Sites may be of importance to people due to the biodiversity or other aspects of the environment.)	disturbed character.
Economic Value (Sites may be of economic importance e.g. fisheries, forests, recreation etc.)	None, although the River Liffey is of recreational fishing importance of county scale or higher.
Legal Protection	None of the habitats within the proposed development site are subject to any legal protection. Within the site, only the breeding gulls/passerines and commuting Pipistrelle bat species are legally protected
Overall Judgement	Taking all factors into account, the site is regarded to be of local (low) value but has several higher-level features within it and connectivity to higher-level sites downstream.
Confidence in judgements based upon desktop and field surveys.	Flora surveys were carried out in July which is optimal for botanical survey. Observations on breeding birds were undertaken at the end of the breeding bird season which was sub-optimal for breeding birds, but optimal for dispersing Kingfisher in the River Liffey. The site is however generally considered of limited value to breeding birds (excluding gulls) due to the sparse vegetation and high disturbance regime. Although colonies of gulls could not be accurately counted, they have been estimated based on the approximate number of adult/fledgling feeding pairs observed, and are considered to be of county importance applying the precautionary principle. None of the identified breeding sites will be impacted by demolitions proposed for this development. Bat surveys were carried out in August which is within the optimal period for surveying breeding bats. Desktop studies revealed that a number of freshwater fish of interest occur in the River Liffey. As it was not possible to definitively confirm the presence or absence of all of these species during field surveys, it is assumed for the purposes of this impact assessment that they are present in the section of the Liffey adjacent to the site.

Table 7-H provides an ecological evaluation of all identified Sensitive Ecological Receptors (SER's). SER's are those features potentially subject to impacts which are classified as Local Importance (Higher value) or above as per the criteria set out in Appendix 7.2, Volume 4, which take into consideration legal protection, conservation status and local abundance of ecological features and which are also deemed to be within the zone of influence of the proposed development. Natura 2000 sites are not SER's as detailed in the Screening Report in Appendix 7.3, Volume 4.

Table 7-H: Ecological Evaluation of Sensitive Ecological Receptors

Habitat / Species	Highest Ecological Valuation Level	Sensitive Ecological Receptor?
Designated Sites		
Natura 2000 Sites (See Volume 4)	International	No
River Liffey Nutrient Sensitive Area	National	Yes
North Dublin Bay pNHA	National	Yes
Habitats Within Site		
Rhododendron ponticum invasive shrubs within WS4/BC4 habitat	Local (High) – National	No
Buildings and Artificial Surfaces (BL3)	County where gull colonies are established Local (Low) for buildings proposed for demolition.	Yes No
Amenity Grassland (GA2)	Local (Low)	No
Hedgerows (WL1)	Local (Low)	No
Treelines (WL2)	Local (Low)	No
Scrub (WS1)	Local (Low)	No
Ornamental and Non-Native Shrubs (WS4)/ Flower Beds and Borders (BC4)	Local (Low)	No
Protected Fauna Within/Adjacent To Site		
Fish (Salmon, Lamprey) in River Liffey	National	Yes
Kingfisher in River Liffey	County	Yes
Nesting birds (Gulls) on buildings on-site	County	Yes
Bats commuting across site	Local (low)	No
Otters in River Liffey	Local (High)	Yes

Habitat / Species	Highest Ecological Valuation Level	Sensitive Ecological Receptor?
Aquatic mammals (Common Seal) in River Liffey	Local (High)	Yes
Nesting birds (Passerines) within site.	Local (High)	Yes
Other Fauna		
Other terrestrial mammals (Brown Rat, house mouse)	Local (Low)	No
Other fish and aquatic fauna in River Liffey	Local (Low)	No
Invertebrates within site.	Local (Low)	No

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7.6 **Potential Impacts**

As per relevant guidelines in Appendix 7.1, Volume 4, likely significant impacts have only been assessed for Sensitive Ecological Receptors, (see **Table 7-H** above). An impact is considered to be ecologically significant if it is predicted to affect the integrity or conservation status of a Sensitive Ecological Receptor at a specified geographical scale. These are all impacts described in the absence of any additional mitigation.

In addition to the above guidance, the EPA's (2002) definitions of duration have been employed as follows:

- Temporary: up to 1 year;
- Short-term: from 1-7 years;
- Medium-term: 7-15 years;
- Long-term: 15-60 years; and
- Permanent: over 60 years.

7.6.1 **“Do Nothing” Scenario**

Should the proposed brewery development not proceed, the site will remain under its current use, which is the processing of Guinness brewery products. The site will continue to provide habitat to the limited and mostly artificial plant habitats, in addition to bird breeding sites (primarily gulls and some common passerines), and commuting grounds for occasional bat species.

The habitats and fauna in the River Liffey, Grand Canal pNHA, Royal Canal pNHA and complex of estuarine/marine Natura sites in Dublin Bay will remain unaffected by surface/process/effluent discharges from the site which are IPPC-regulated and currently treated by Ringsend WWTP.

7.6.2 **Potential Impacts during Construction**

Designated Sites

There are no significant potential impacts to designated Natura 2000 sites as addressed in the Screening Statement in Appendix 7.3, Volume 4. Impacts to pNHAs and the River Liffey Nutrient Sensitive Area are addressed below.

River Liffey Nutrient Sensitive Area

Surface Water Run-off of oils/sediment

The proposed brewery development will use Sustainable Urban Drainage Systems containing petrol/oil interceptors to treat surface waters from hardstanding prior to discharge off-site. During construction, small hydrocarbon spillages from abnormal activities of construction vehicles are not considered likely to enter the River Liffey as a result of applied mitigations. In the unlikely event of a significant spillage during construction, there is a risk that contaminated surface water could be discharged into the Liffey.

Given the application of mitigations, it is highly unlikely that spilled oil, cement, or other toxic construction materials, and/or mobilised silt and rubble from excavations/demolition rubble could be carried into the River Liffey via surface waters moving overland and/or via an existing drainage network.

In the unlikely event of a significant incident, it is possible that there could be a **short-term, reversible, negative impact significant at High Local-National levels.**

North Dublin Bay pNHA

This pNHA is located at least 3.8km downstream of the proposed site. Potential pollution impacts to fauna and habitats from incidents or accidents involving discharge of oils/sediments from the site are likely to be reduced compared to those described for the River Liffey above, due to distance (mixing and dispersion of pollutants will occur). However, applying the precautionary principle, and assuming the absence of any mitigation, it is possible that a pollution incident at the site could result in a **short-term, reversible, negative impact significant at High Local-County levels.**

Habitat & Fauna

Surface Water Run-off affecting Protected Aquatic Fauna and Habitats

Suspended or deposited solids, oil and other toxic substances can cause indirect ecological impacts upon protected aquatic fauna including Otters, Seals, Atlantic Salmon, Lamprey and Kingfisher. The River Liffey is also an estuary, which is listed under Annex 1 of the EU Habitats Directive. Unless mitigated, these species and habitats could potentially be negatively impacted in the adjacent River Liffey within the zone of influence. Intertidal habitats in the Liffey adjacent to the site may be similarly affected by deposition of silt.

In the unlikely event of a significant incident, it is possible that there could be a **short-term, reversible, negative impact significant at a High Local-National level.**

Habitat loss for Site Clearance

The majority of the proposal will be constructed on existing developed land. A small number of buildings are proposed for demolition and these have no significant ecological value. No significant impacts are predicted.

Physical Disturbance/Displacement of Breeding Birds during Site Construction

The nests and eggs of all birds are protected during the bird breeding season (1st March to 31st August), and any damage would constitute an offence under the Wildlife Act.

During the breeding season (in the absence of mitigation), noise and vibration from movement of construction vehicles, building demolition, erection of new structures, and site clearance may result in reduced breeding success or mortality of passerine birds breeding in semi-natural vegetation or gull breeding colonies within or adjacent to the construction zone. Birds are likely to have become habituated to disturbance due to the existing activities of the site so the effects may be less than normally expected.

Impacts are currently unlikely as gull colonies appear to be located on buildings outside of the construction zone, and passerines are unlikely to breed in the small, isolated

area of ornamental plantings proposed for clearance. However, should new colonies become established on rooftops proposed for demolition, construction may result in **short-term, negative impacts significant at a High Local level only.**

Potential Disturbance to Roosting Bats

The assessment of buildings within the construction zone concluded all structures proposed for demolition / modification have low bat roost potential.

Designated Sites

There are no significant potential impacts to designated Natura 2000 sites as addressed in the Screening Statement in Appendix 7.3, Volume 4.

Potential Impacts during Operation

River Liffey Nutrient Sensitive Area (including Aquatic Fauna) and, North Dublin Bay pNHA

Surface Water

The development will result in a change in the discharge pathway of surface waters from the existing (petrol interceptors to combined sewer to Ringsend WWTP to Dublin Bay), to the proposed (petrol interceptors to alarmed attenuation tank to the River Liffey – refer to Chapter 9). The diversion of surface waters from the combined sewer network to the surface water sewer will result in a reduction in hydraulic loading on the Ringsend WWTP¹⁵. However, a failure of the DCC drainage system could allow pollution to enter the Liffey via the local drainage network causing **short-term, negative impacts significant at a County level.**

Foul and Process Effluent

Process and foul effluent are currently combined and treated at the on-site WWNP located along the eastern site boundary, prior to discharge to public sewerage network and Ringsend WWTP for further treatment.

The proposed brewery development will separate process and foul effluent to decrease loading on the on-site WWNP. The on-site WWNP has sufficient capacity to receive the increased volumes of process effluent from the development, and there will be no significant increase in foul effluent.

It is projected that the proposed brewery development will result in an increase in effluent volumes discharged to the DCC sewer. Constructive engagement is ongoing with DCC to ensure that the additional load can be managed by DCC via the Ringsend WWTP and that no residual impacts will remain after implementation of mitigation.

However, in the absence of mitigation, and in the unlikely event of overflow from the DCC combined sewer which receives foul water and treated effluent there is the potential for contamination of the River Liffey. Such an impact could result in **reversible, short-term impacts significant at High-Local to National Scales** to water quality and protected aquatic habitats and fauna in the River Liffey & Dublin Bay including the North Dublin Bay pNHA.

¹⁵ Source: Eastern Region River Basin Management Plan, 2010

7.6.3 Potential Impacts during Decommissioning

The following activities associated with site decommissioning have the potential to significantly impact upon SER's:

- Building demolitions impacting on bats and breeding gull colonies established during site operation;
- Discharge of surface waters carrying silt, oils, and other toxic substances into the local network and the River Liffey impacting on aquatic fauna and water quality;
- Dewatering operations (particularly of industrial plant) if required, impacting on aquatic fauna and water quality; and

Depending on the magnitude of impacts, and in the absence of mitigation measures, decommissioning may result in reversible negative impacts to the River Liffey, North Dublin Bay pNHA and/or bats, gulls and aquatic fauna significant at High Local-National Levels.

7.6.4 Potential Cumulative Impacts during Construction

Designated Sites (River Liffey and pNHAs)

Water Quality and Aquatic fauna

Any surface water or unsewered foul/industrial discharges generated during construction works on the banks of the River Liffey within the vicinity of the site have the potential to increase oil, sediment, effluent, and/or other toxic chemical discharges to the River Liffey. The proposed brewery development does not extend beyond the northern boundary at Victoria Quay and any potential discharges will be fully mitigated. These may cumulatively act to negatively impact water quality and/or aquatic fauna (Salmon, Lamprey, and Kingfisher) in the River Liffey and North Dublin Bay pNHA downstream.

Habitat & Fauna

Impacts to Breeding Gulls

Significant impacts to breeding gulls from the proposed brewery development are currently not likely due to their location away from proposed demolitions, however there is a possibility that new colonies will become established on buildings prior to demolition. Should this occur, any construction or demolition works at other gull breeding sites may potentially act cumulatively with the current proposal to impact upon the overall breeding success of the gull species concerned. The primary threat facing Herring and Lesser Black-backed gull species is not habitat loss or disturbance from human activity, but botulism and avian influenza¹⁶. Given the availability of alternative nesting sites within Dublin City, there is potential for **reversible, negative, impacts significant at a High Local Level only.**

¹⁶ Source: Birdlife International (2011); Species factsheets for Herring Gull and Lesser Black-Backed Gull. Downloaded from <http://www.birdlife.org> on 30/08/2011.

7.6.5 Potential Cumulative Impacts during Operations

Due to the design measures integrated into the proposed brewery development that will reduce the surface water volumetric loading on the Ringsend WWTP and the measures designed to avoid contamination of the Liffey by discharged surface water, the proposed development will not act in combination with other nearby projects to create significant adverse impacts.

7.7 Mitigation

7.7.1 Construction Impacts to Habitats and Fauna

Site Clearance

The treeline, hedgerow and areas of scrub shall not be cut or removed between the first of March and the end of August. These are all outside the proposed development area. This is to avoid negative impacts to nesting bird species which are protected under the *Wildlife Act as amended*. If it is not practicable to limit the removal of hedgerows to this period, then it is recommended that they be inspected by a specialist for the presence of any nests immediately prior to removal. If any bird nests are present on-site, a licence will be required from the NPWS to permit their removal during the nesting season.

Breeding Gulls

The protection of breeding Gull roosting and feeding sites is an action of the DCC BAP. Should demolitions occur during the breeding season (1st March-31st August); a specialist shall be commissioned prior to construction to survey the buildings from an elevated vantage point to confirm there are no recently established gull nests.

Surface Water Runoff

All surface water discharges will be subject to appropriate licensing from the DCC. Detailed pollution prevention guidance is outlined in Chapter 9. The management of surface waters shall follow the guidance set out in the CIRIA guidance note *Control of Water Pollution from Construction Sites* (CIRIA, 2001).

The proposed drainage design (as described in the Chapter 9 of the EIS), includes comprehensive procedures for the management of surface water on the site during the construction process.

These measures shall be formulated in a Construction Environmental Management Plan (CEMP) and agreed with Inland Fisheries Ireland.

7.7.2 Operational

Surface, Foul, and Water Management

All measures concerned with the protection of the River Liffey from accidental spillages and malfunction of the proposed drainage network shall be contained within Diageo Ireland's Environmental Management Plan. Measures will include a requirement to consult with the Environmental Protection Agency, DCC, National Parks & Wildlife Service, and Inland Fisheries Ireland in the unlikely event of a toxic spillage to the

surface water network, or failure of the on-site WWNP. Detailed mitigation measures are outlined in Chapter 9.

All existing and proposed effluent discharge is subject to monitoring and regulation under an existing IPPC licence, and the projected discharge volumes are within that permitted by the existing licence. It is the responsibility of the EPA and DCC to ensure that the water quality of the River Liffey is not significantly decreased by existing and/or future volumes discharged under the IPPC licence agreement through ongoing monitoring and regulation.

Removal of *Rhododendron Ponticum* from Landscaped Areas

Diageo Ireland shall liaise with the gardener/horticultural manager to agree the removal of all *Rhododendron* plantings from the site, and their disposal to landfill. Diageo Ireland shall ensure that none of the known invasive species in Appendix 7.4, Volume 4, shall be planted in place of the *Rhododendron*.

7.7.3 Decommissioning

It is likely that SER's potentially impacted shall be similar to those affected by the current proposal (River Liffey, north Dublin pNHA, aquatic fauna, breeding gulls, passerines). However, given the location of the proposed brewery development, it is unlikely that additional features may be impacted in semi-natural habitats within and adjacent to the site, most notably bats, badgers and other small mammals.

7.8 Predicted / Residual Impacts

There is a low residual impact to the River Liffey, North Dublin pNHA, and protected aquatic fauna from overflow of foul, surface and/or process effluent in the unlikely event of storm overflows or a blockage in the public sewerage network outside of the site. No other significant impacts are predicted with full implementation of mitigation measures.

7.9 Monitoring

No monitoring is proposed.

7.10 Summary of Key Findings for SERs

Table 7-1: Summary of Potential Impacts and Proposed Mitigation for SERs

Impact Receptor	Ecological Value	Nature of Potential Impact	Magnitude of Potential Impact	Mitigation Measures	Residual Impact
River Liffey Nutrient Sensitive Area	Nationally important	Construction and operation: decreases in water quality from surface/process/effluent discharges.	Short-term, negative, national scale	Detailed pollution prevention measures as outlined in AWN Report and Chapter 9 of EIS including - Construction Method Statement in line with best practice CIRIA and ERFB guidance documents. - Environmental Operating Plan in line with best practice guidance. - Fitting of alarmed attenuation tanks and treatment of water by maintained petrol interceptors. - Monitoring ongoing as part of IPPC licensing.	Low
North Dublin Bay pNHA	Nationally important	Construction and operation: Indirect disturbance via decreases in water quality from silt/oil other pollutants and sedimentation impacts.	Short-term, negative, County scale	As above	Low
Protected Aquatic Species (Salmon, Lamprey, Otter, Kingfisher, Common Seal)	National (Salmon and Lamprey); County (Kingfisher); High Local (Otter)	Construction and operation: Indirect disturbance via decreases in water quality from silt/oil other pollutants and sedimentation impacts.	Short-term, negative, County-National scales	As above	Low
Breeding Birds including Herring/Lesser	High Local-County Importance	Construction: Indirect disturbance and/or direct injury or habitat loss during breeding season	Short-term, negative, High Local	Avoid demolitions during breeding season (1st March - 31st August). Alternatively, pre-construction checks for breeding birds during this	Neutral

Impact Receptor	Ecological Value	Nature of Potential Impact	Magnitude of Potential Impact	Mitigation Measures	Residual Impact
Black-backed Gulls (and building breeding sites)			scale	period.	
Rhododendron ponticum	Local Importance (High value),	Operation: Degradation of semi-natural habitats in wider area from invasion by Rhododendron cuttings following disposal.	Local importance (High value) or higher	Site Management to agree removal of plantings to landfill.	Neutral

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8.0 SOILS, GEOLOGY AND HYDROGEOLOGY

8.1 Introduction

This chapter describes the existing soils, geology and hydrogeology environment in the area of the proposed brewery development and its immediate surroundings and also describes the likely soils, geology and hydrogeology impacts.

An assessment is made of the likely impact associated with both the construction and operational phases of the development on these resources. Possible mitigation measures are put forward to reduce the impact of the proposed brewery development and residual impacts described.

8.2 Assessment Methodology

In assessing the impact of the proposed brewery development on the prevailing geological and hydrogeological condition this chapter has been prepared using the following guidelines:

- Environmental Protection Agency (EPA, 2002). Guidelines on the Information to be Contained in Environmental Impact Statements;
- Environmental Protection Agency (EPA, 2003). Advice Notes on Current Practice in the Preparation of Environmental Impact Statements;
- Institute of Geologists of Ireland (IGI, 2002). Geology in Environmental Impact Statements – a Guide;
- Institute of Geologists of Ireland (IGI, 2007). Recommended Collection, Presentation and Interpretation of Geological and Hydrogeological Information for Quarry Developments;
- Groundwater Directives (80/68/EEC) and (2006/118/EC);
- Water Framework Directive 2000/60/EC and SI 722 of 2003 European Communities (Water Policy) Regulations 2003 – 2005; and
- European Communities Environmental Objectives (Groundwater) Regulations 2010 (S.I. 9 of 2010).

8.2.1 Assumptions and Technical Limitations

No significant assumptions were made during the assessment. The description of existing conditions was based on desk study information as outlined below.

8.2.2 Desk Study

The existing conditions within the site and study area have been interpreted from desk study information comprising publically available information and historic site investigation data. The review included the following sources of information:

- Archival reports on-site investigations carried out in the vicinity of the site as part of the DART Underground scheme (www.dartundergroundrailwayorder.ie) and from the database of the Geological Survey of Ireland (GSI);
- Geotech Specialists Ltd., (August 2007), Dublin Interconnector Feasibility Stage Ground Investigation Phase 1, Report on Ground Investigation, Report No. KD7009;
- Geotech Specialists Ltd., (November 2007), Dublin Interconnector Feasibility Stage Ground Investigation Phase 2, Report on Ground Investigation, Report No. KD7009;
- IGSL (2010), DART Underground Factual Report, Ground Investigation Report;
- Ground investigation information from the Geotechnical Map Viewer dataset available from the GSI online mapping service in the vicinity of the proposed brewery development. This is public information available from www.gsi.ie where previous site investigation information such as borehole information can be publicly viewed and downloaded for use in desk studies. Available site investigation information from locations in the vicinity of the proposed brewery development was reviewed;
- Creighton, J.R., Daly, D. And Reilly, T.A. (1979) The Geology and Hydrogeology of County Dublin, with particular reference to the Location of Waste Disposal Sites. Report to Dublin County Council, Geological Survey of Ireland;
- Dublin City Council (2010). Water Supply Project – Dublin Region;
- Farrell, E.R., and Wall D., (1990). Soils of Dublin, Trans. Instn. Engrs. Ireland, 115, 78-9;
- Farrington, A. (1929). The Pre-Glacial Topography of the Liffey Basin. Proceedings from the Royal Irish Academy, 38B, 148-170;
- Geological Survey of Ireland 1:100,000 scale Bedrock Series geology Map Sheet 16 Geology of Kildare-Wicklow (1999);
- Geological Survey of Ireland 1:10,560 scale Bedrock Series geology Map Sheet Dublin 14/2 (19th Century);
- Geological Survey of Ireland 1:63,360 scale Bedrock Series geology Map Sheet 102 (1901);
- Geological Survey of Ireland National Draft Bedrock Aquifer map;
- Geological Survey of Ireland Groundwater Database;
- Geological Survey of Ireland Quaternary Geology map of Dublin;
- General Soil Map of Ireland 2nd edition, (1980), An Fóras Taluntais, Dublin;
- Gardiner, M.J. and Radford, T. (1980) Soil Associations of Ireland and their Land Use Potential, Explanatory Bulletin to General Soil Map of Ireland. An Fóras Taluntais, Dublin;

- Kissane, N. (1988), Historic Dublin Maps, National Library of Ireland ISBN 0 907328148;
- Long, M. & Murphy, B. (2003), Difficulties with Ground Anchorages in Hard Rock in Dublin, Ireland. Geotechnical & Geological Engineering, 21, 87 – 111;
- McConnell, B. and Philcox, M. , (1994.) Geology of Kildare-Wicklow: A geological description to accompany the Bedrock Geology 1:100,000 Scale Map Series, Sheet 16, Kildare-Wicklow. Geological Survey of Ireland;
- Nolan, S.C. (1986) The Carboniferous Geology of the Dublin Area. Unpublished PhD Thesis, Univ. Dub;
- OGE Water and Earth Science (March 2011). Report on Ground Water Analysis for Sample Round November 2010. Ground Water Monitoring Programme to Address Condition 10.3.3 IPC Licence No.301;
- OGE Water and Earth Science (September 2010). Report on Ground Water Analysis for Sample Round June 2010. Ground Water Monitoring Programme to Address Condition 10.3.3 IPC Licence No.301;
- OGE Water and Earth Science (January 2010). Report on Ground Water Analysis for Sample Round June 2010. Ground Water Monitoring Programme to Address Condition 10.3.3 IPC Licence No.301;
- Skipper, J., Follett, B., Menkiti, C.O., Long, M. & Clark-Hughes, J. (2005), The engineering geology and characterisation of Dublin Boulder Clay, QJEGH, 38, 171-187; and
- Sweeney, C.L. (1991). The Rivers of Dublin, Dublin Corporation.

8.3 Baseline Environment

8.3.1 Landscape, Topography and Landuse of the Site and Surrounding Area

The proposed brewery development is located within the existing St. James's Gate Brewery located in Dublin City Centre (Figure 5.1 in Volume 3) The city centre of Dublin is situated on a low lying coastal plain dominated by the presence of the River Liffey which follows an easterly course through the city centre.

Historical OS maps were consulted as part of this study; six-inch maps dating from 1837-42 and the 25-inch maps dating from 1888-1913. The six-inch maps indicate the presence of a sulphuric acid factory (vitriol works) and a quarry (gravel pit) on the site. By the time the 25-inch maps were made, the brewery and a tramway depot were in operation on the site.

The proposed location for the development is currently a hardstanding area used predominantly for the storage and exportation of kegs. The topography slopes gently from south to north with an elevation ranging from 5.0 to 2.5 mOD.

8.3.2 Surface Water Features

The potential impacts to surface water features are dealt with fully in Chapter 9, and the receiving environment is summarised in this section.

Nearby surface water features are shown in Figure 8.1 in Volume 3 of this EIS. The major water features in the area are the Rivers Liffey, Camac and Poddle and the Grand Canal.

The River Liffey flows parallel to the northern boundary of the study area from west to east at a distance of approximately 15m from the Brewery walls. The Liffey is estuarine as it flows through the city until it enters the Irish Sea via Dublin Bay. It has been a major force on the most recent geomorphology of Dublin City and is also a prevailing influence on drainage in the area around St. James's Gate Brewery.

The River Camac is culverted beneath the grounds of an old hospital at a point approximately 400 m west of the western boundary of the study area. It enters the River Liffey at a point 150 m west of the study area. The culverted River Poddle flows in a north-south direction into the River Liffey at a point approximately 1 km east of the study area. The Grand Canal is situated 1.3 km south-west of the boundaries of the study area and flows from north-west to south-east in this area.

The six-inch historical maps of the area dating from before 1842 indicate the presence of a man-made stream called the Camac Millrace flowing towards the east through the present-day brewery site (Figure 8.2 in Volume 3). This stream is no longer visible on the later 25-inch maps indicating that the Camac Millrace may have been culverted or re-directed in the intervening years. Sweeney (1991) indicates that the Camac Millrace entered the St. James's Gate Brewery through a culvert and resurfaced 70 m east of Steeven's Lane into a 5-m wide channel as far as Watling Street where it entered the Limerick Watercourse excess water overflow from the city cistern. According to Sweeney (1991), the Camac Millrace progressively went underground and while some of the old culvert is still in existence but filled in, the Camac Millrace course has now disappeared.

8.4 Regional Overview of Soils, Geology and Hydrogeology

8.4.1 Regional Soils

This sub-section deals with overburden material or essentially unconsolidated material overlying the bedrock. Within Dublin City, the overburden generally comprises made ground, alluvial sediments and glacial drift deposits.

Figure 8.3 in Volume 3 illustrates the drift geology of the study area and its environs. Information from the Teagasc subsoils map was used in the production of this drawing. The boundaries of the site and study area have been superimposed.

Drift is a general term applied to all mineral material (clay, sand, silt and boulders) transported by a glacier and deposited directly as till by or from the ice, or as fluvioglacial deposits by running water emanating from the glacier. During the Pleistocene epoch of the Quaternary (the most recent geological time period) two glaciations covered the Dublin region. These glaciations gave rise to the deposition of the till strata known as the Dublin Boulder Clay and were presumably not continuous. Local withdrawal and re-advance of the ice sheet led to the formation of fluvioglacial sediments (gravel and sand lenses) and glaciomarine sediments (stiff/firm laminated clays, silts, and sands). The glacial deposits can exhibit significant lateral and vertical variations in grain size distributions over short distances.

The Geological Survey of Ireland Quaternary Geology map of Dublin shows the drift geology of this area to be till derived from Lower Carboniferous limestone. This drift

layer can be encountered close to the surface in undeveloped areas in Dublin such as the Phoenix Park in Dublin (Figure 8.3).

Following on from the glaciations, rising sea levels resulting from climatic changes led to the deposition of raised beach deposits and terrace gravel sediments around the estuary of the River Liffey. Recent alluvial sediments have been deposited along the rivers in Dublin city and into the river estuaries.

Due to its industrial history and urban setting the presence of made ground is widespread throughout the study area. The soils which are expected to be encountered beneath the proposed brewery development area are discussed in Section 8.5.1.

8.4.2 Regional Geology

The majority of the Greater Dublin area is underlain by an argillaceous Limestone, Lower Carboniferous in age, colloquially known as Calp (Skipper *et al.*, 2005). Much of the bedrock in Dublin is contained within the fault-bounded Dublin Basin.

The GSI Sheet 16, 1:100,000 scale map indicates that the Dublin City Centre area is underlain by Calp. McConnell *et al.* (1994) have described this bedrock unit as dark grey to black limestones and shales. It is undifferentiated on the geological map but comprises varied dark grey to black basinal limestones and shales in several different formations.

The limestone was deposited in a shallow marine environment. Cyclical changes in the depth of the water and depositional conditions led to marked changes in the rock properties such as thickness, variations in the sand and clay content, and the inclusion of shale and mudstone layers that are occasionally weathered to clay (Farrell and Wall, 1990; Skipper *et al.*, 2005).

Weathering and erosion during the Tertiary period and during the glaciations gave the Carboniferous bedrock an irregular surface profile. Sea level variations and/or tectonic activities gave rise to drainage channels cut into the bedrock. Due to the thick cover of glacial till overlying the bedrock and the consequential lack of bedrock exposures, very little information is available on faulting within the Carboniferous bedrock. It is suggested (by Nolan, 1985) that the overall fault pattern observed in the vicinity of Dublin indicates the predominance of strike directions NE-SW, with subordinate faults striking NNW-SSE and ENE-WSW to E-W.

According to the GSI (borehole records and literature), the bedrock topography of Dublin City is dominated by a major buried channel that occurs between Islandbridge and the coast. This is the pre-glacial channel of the River Liffey. This buried channel was originally identified by Farrington (1929) who indicated that it turns south of the present River Liffey course to the west of Heuston Station at Islandbridge before turning northwards under the site of the Diageo Ireland's St. James's Gate Brewery at depths of between 20 and 25 metres below ground level and on towards the north side of the city. The existing River Liffey course which formed during late and postglacial times flows eastwards towards Dublin Bay. The pre-glacial channel has effectively been filled with sediments related to both marine and transgressional periods.

Long and Murphy (2003) have described local engineering experience of highly stressed and fractured zones at folds in the limestone rock. They have noted that conditions during the period immediately before the ice age led to erosion and alteration of the rocks at the level of rockhead. This led to the formation of buried rock

channels and the removal of calcium from argillaceous layers, reverting them to clay. Long and Murphy (2003) also note that there are almost no records of solution features in the Dublin Limestone and that the beds generally dip at 5° to 30°, with typical layer thicknesses of between 300 mm and 500 mm.

8.4.3 Regional Hydrogeology

The hydrogeology of Dublin comprises a variety of hydrogeological conditions, from low permeability boulder clay to highly permeable gravels. The hydrogeological regime in Dublin is dependent upon the hydraulic connections between the different overburden deposits, the bedrock and the surface watercourses in the area, particularly the River Liffey. The overburden deposits have a major effect on the hydrogeological regime of an area as they can influence the amount of recharge and the hydraulic and confining conditions. They can also provide additional storage and baseflow to rivers and streams.

As part of the requirements for the Water Framework Directive (WFD) the groundwater in Ireland has been divided into River Basin Districts. These have been further subdivided into Groundwater Bodies (GWB). The groundwater in Dublin City belongs to the Eastern River Basin District and the Dublin Urban Groundwater Body (Figure 8.4 in Volume 3). This groundwater body includes various different hydrogeological units including the Dinantian Limestones beneath the study area at St. James's Gate. The groundwater classification status is currently 'Good' however its overall objective has been classified as 'Protect' and it is classified as being 'At Risk of not Achieving Good Status' by 2015.

It is expected that most groundwater flow within the Dublin and Dublin Urban GWBs will take place close to the surface or along isolated fractures and joints up to 50 metres below ground level as the permeability of these rock units will decrease with depth. The bedrock aquifers tend to be dominated by fissure or fracture flow with very little or no flow in the matrix. The low permeability nature of the bedrock matrix means that there is very little storage capacity.

The groundwater will discharge directly to the Irish Sea or to local rivers and streams where the watercourses are in hydraulic continuity with the groundwater. It is thought that the Dublin and Dublin Urban GWBs do not support large baseflow to rivers during summertime.

Aquifer Description

The Geological Survey of Ireland has devised a system for classifying the aquifers in Ireland based on the hydrogeological characteristics, size and productivity of the groundwater resource. The three main classifications are Regionally Important Aquifers, Locally Important Aquifers and Poor Aquifers. Each of these types of aquifer is further subdivided and has a specific range of criteria associated with it such as the transmissivity (m²/day), productivity, yield and the potential for springs.

Under this system, the bedrock aquifer beneath the site of the proposed brewery development has been given a Locally Important classification (Figure 8.5 in Volume 3). Locally Important Aquifers are subdivided into those that are generally moderately productive (Lm), those that are moderately productive only in local zones (LI), and smaller sand and gravel aquifers (Lg). In these aquifers, there is the potential for contamination and the derogation of local water supplies and springs through changing groundwater flow paths during earthworks and dewatering.

The bedrock aquifer beneath the site is classified as “LI: Locally Important Aquifer – Bedrock which is moderately productive only in local zones”. While the environmental impact of a development on a Locally Important Aquifer will be significantly less than one on a Regionally Important Aquifer, it still needs to be considered and mitigation implemented for any adverse impacts identified.

The sand and gravel deposits in Dublin have not been mapped by the Geological Survey of Ireland (GSI) yet and do not have an aquifer classification. The alluvial sand and gravel deposits in Dublin are encountered along the banks of the River Liffey and its tributaries. Beach and estuarine permeable deposits are encountered near the coast and glacial sands and gravels are also encountered in Dublin City.

Aquifer Vulnerability

Aquifer or groundwater vulnerability is the ease with which the groundwater may be contaminated by human activity and depends upon the aquifer’s intrinsic geological and hydrogeological characteristics. The vulnerability is determined by the permeability and the attenuation capacity of any overlying deposits. For example, bedrock with a thick, low permeability, clay-rich overburden is less vulnerable than bedrock with a thin, high permeability, gravelly overburden.

The vulnerability of the aquifer directly beneath the site is classified by the GSI as having ‘High to Low’ vulnerability. This indicates that only an interim study of the vulnerability in the area has taken place.

Precipitation and Recharge

Precipitation is measured by Met Éireann at Dublin Airport approximately 9.5 km north of the study area. The 30-year average rainfall for the area is 733 mm/yr. The yearly rainfall values for Dublin Airport from 2003 to 2010 are summarised in **Table 8-A** below.

Monthly potential evapotranspiration (PE) data are also collected (Penman method) at Dublin Airport. These monthly data for the period between 2003 and 2010 are also presented in **Table 8-A**. The data show that the rate of potential evapotranspiration has not changed much since 2003.

Potential or effective rainfall is the amount of rainfall which is available to infiltrate the ground and which will not evaporate or be taken up by plants. It is determined by subtracting evapotranspiration from rainfall. The annual effective rainfall is also summarised in **Table 8-A**.

Table 8-A: Annual Rainfall and Potential Evapotranspiration (Penman) Measured at Dublin airport

Year	Rainfall (mm/yr)	Potential Evapotranspiration (Penman) (mm/yr)	Effective Rainfall (mm/yr)
2010	671.4	515	156.4
2009	920.2	521	399.2
2008	942.3	531	411.3
2007	784.4	531	253.4
2006	740.6	597	143.6

Year	Rainfall (mm/yr)	Potential Evapotranspiration (Penman) (mm/yr)	Effective Rainfall (mm/yr)
2005	680.3	526	154.3
2004	752.4	563	189.4
2003	643.2	558	85.2

These values influence the amount of recharge the site receives and will influence the groundwater throughput beneath the site.

Actual recharge is the measure of how much rainfall can actually be assumed to infiltrate the ground and recharge the water table. It is based on the potential rainfall, but also takes into account rainwater that does not enter the ground but rather becomes overland flow and enters streams. This occurs when the soil is saturated or has reached its field capacity, which is common in Ireland.

The Working Group for Groundwater in Ireland has determined that the actual recharge can be set at 95% of the effective rainfall. This indicates that despite high levels of actual rainfall being measured in the area, the amount of rainfall that may eventually enter groundwater is comparatively low.

As the majority of Dublin City is built-up, the GSI have estimated that only 10% of the city area is available for diffuse recharge through gardens, parks and other green spaces. Point recharge may also occur through leaking drains and sewers. A large proportion of this potential recharge will be rejected as the bedrock in the area is generally a poor aquifer and does not have the necessary capacity for storage to hold all of the recharge. Thus, the proportion of run-off to streams is likely to be higher in areas where the aquifer is poor.

Protected Features

Groundwater Resources

The WFD Risk Test has been undertaken on the Dublin Urban Groundwater Body. It was established that the groundwater body was most at risk from contaminated land and urban activity and it had a general groundwater quality risk. These items which the groundwater body is at risk from were classified as '1a – At Risk'. Groundwater-dependent Terrestrial Eco-systems were classified as '1b – Probably at Risk'. The quantitative aspect of the groundwater body (water balance) was classified as '2a – Probably not at Risk'. The overall risk status assigned to the groundwater body was '1a – At Risk'.

The Dublin City Council report on groundwater resources in the Central Leinster region (2008) found that within 25 km of the city the available resources of potable groundwater are quite low. It was found that within Dublin City Centre there are limited resources available in the faulted/fractured bedrock and in the gravel deposits; however they are non-potable due to urban development of the city and potential saline intrusion due to the proximity of the coast.

Ecology

The National Parks and Wildlife Service online database was consulted to establish whether any ecologically protected sites which are dependent on groundwater exist in

the vicinity. A full assessment of the ecological features along the route is outlined in Chapter 7 while this section will deal with those which may be influenced by changes in the groundwater regime.

There are five protected features present within a 5 km radius of the site. These are:

- the South Dublin Bay pNHA and SAC (site code: 000210),
- the South Dublin Bay and River Tolka Estuary SPA (site code: 004024),
- the North Dublin Bay pNHA and SAC (site code: 000206),
- the Royal Canal pNHA (site code: 002103), and
- the Grand Canal pNHA (site code: 002104).

The South Dublin Bay pNHA and SAC lies south of the River Liffey and extends from the South Wall to the west pier at Dun Laoghaire. It is protected as it is Annex I habitat from the EU Habitats Directive. It is not a groundwater-dependent environment, however it is fed by the River Liffey which may be in hydraulic continuity with groundwater in the gravel deposits beneath the site. Considering the distance from the site to the pNHA, the dilution in the river will be enough to mitigate any contamination that does occur indicating that this does not need to be considered further.

The South Dublin Bay and River Tolka Estuary SPA comprises a substantial part of Dublin Bay and is a protected feature due to the bird habitats located there. It includes the estuary of the River Tolka to the north of the River Liffey and the intertidal area between the River Liffey and Dun Laoghaire. Again, the SPA is not groundwater-dependent but receives flow from the River Liffey which is hydraulically connected to groundwater. However, considering the distance from the site to the pNHA, the dilution in the river will be enough to mitigate any contamination that does occur indicating that this does not need to be considered further.

North Dublin Bay pNHA covers the inner part of north Dublin Bay and the North Bull Island is the focal point of the site. The site is protected for the habitats present there, particularly wildfowl. As with the SPAs discussed previously, the pNHA is not groundwater-dependent but receives flow from the River Liffey which is hydraulically connected to groundwater. However, considering the distance from the site to the pNHA, the dilution in the river will be enough to mitigate any contamination that does occur indicating that this does not need to be considered further.

The Royal Canal is a man-made waterway linking the River Liffey at Dublin to the River Shannon near Tarmonbarry. The canal NHA comprises the central channel and the banks on either side of it. A number of different habitats are found within the canal boundaries – hedgerow, tall herbs, calcareous grassland, reed fringe, open water, scrub and woodland. The ecological value of the canal lies more in the diversity of species it supports along its linear habitats than in the presence of rare species. It is canalised in the area of the proposed brewery development, is not in connection with groundwater and is separated from the site by the River Liffey. As it will not be affected by changes to the groundwater regime or chemistry in the area it will not be covered in the impact assessment section of this chapter.

The Grand Canal is a man-made waterway linking the River Liffey at Dublin with the Shannon at Shannon Harbour and the Barrow at Athy. The Grand Canal Natural Heritage Area (NHA) comprises the canal channel and the banks on either side of it. A

number of different habitats are found within the canal boundaries - hedgerow, tall herbs, calcareous grassland, reed fringe, open water, scrub and woodland. The ecological value of the canal lies more in the diversity of species it supports along its linear habitats than in the presence of rare species. It, too, is canalised in the area of the proposed brewery development and is not in connection with groundwater. As it will not be affected by changes to the groundwater regime or chemistry in the area, it will not be covered in the impact assessment section of this chapter.

Groundwater Abstractions

The GSI have delineated certain areas nationwide as groundwater Source Protection Zones (SPZs) in order to provide protection for groundwater resources, in particular group water schemes and public water supplies. An SPZ is delineated according to the hydrogeological characteristics of the aquifer, the pumping rate and the recharge in the area. Activities which may impact on groundwater are tightly controlled within the SPZ. No SPZs exist nearby the site.

The GSI databases and maps were consulted to see if any records existed for wells in the area. Two wells were identified at distances of 900 m and 1.3 km from the site, on the north side of the River Liffey. It is not known whether these wells are still in use however their separation from the site by the River Liffey indicates that they will not be impacted by the proposed brewery development.

Historic site records show that wells have been drilled on the Diageo Ireland site over time. There is one known abstraction well within the Diageo Ireland site. This well is known as the Cooperage well and is located in a warehouse to the west of the proposed development area. The well is not currently active and has not been in use since 2007, however it may be put into production in the future.

The well was drilled in the 1880 and there are no drilling records available for it. Surveys completed in the last 30 years indicate that it is a large diameter well (approximately 4 m diameter at ground level to 5 m bgl) which is 27.7 m deep. The well is thought to be screened (or open hole) in both the limestone bedrock and the gravel deposits.

Tests undertaken in the limestone indicate that it is an unproductive groundwater resource with a yield of approximately 1000 Ga/hr or 3.8 m³/hr. This indicates that as would be expected, the limestone is a poor source of groundwater and the well is abstracting mainly from the gravel aquifer.

Step-tests undertaken in the Cooperage well indicate that it has a high specific capacity. Monitoring of the pumping rate in 2001 gave an average mean abstraction rate of 98.7 m³/day over a 4-day period. No long-term pumping test data is available.

These results are consistent with data from the wider Dublin city area. These show the gravel deposits close to the river are a productive source of groundwater (with varying degrees of salinity) and are likely to receive some element of recharge from the River Liffey while the limestone bedrock is not productive.

Geological Heritage Areas

Geological Heritage Areas (GHA) are designated as part of the Irish Geological Heritage Programme; a partnership with the Geological Survey of Ireland (GSI) and the Department of Environment, Heritage and Local Government. The aim of the

programme is to identify, document and protect the wealth of geological heritage in Ireland.

The Irish Geological Heritage Programme is an ongoing process and currently there is one GHA site identified within the study area. The GSI recognise Victorian borehole wells within the St. James's Gate Brewery as comprising a county geological site under the Irish Geological Heritage programme. It cannot be confirmed with the GSI and Diageo Ireland which of the historic wells drilled on-site are part of the GHA.

8.5 Soils, Geology and Hydrogeology within Diageo Ireland, St. James's Gate

The site-specific soils, geology and hydrogeology of the study area at St. James's Gate were investigated using information from previous site investigations. Geotechnical borehole logs were available for a series of cable percussive boreholes and deeper rotary coreholes. The locations of all exploratory holes consulted as part of this desk study are featured in Figure 8.6 in Volume 3. A series of groundwater monitoring wells are presently in use within the study area and groundwater records from these wells were consulted for this study. Existing monitoring well locations are shown in Figure 8.8.

8.5.1 Local Soils

The overburden geology within St. James's Gate was investigated using available desk study information. The expected soil stratigraphy of the area is listed in **Table 8-B**.

Table 8-B: Expected Stratigraphy in St. James's Gate

Stratigraphic Divisions		Stratigraphy*	Approximate thickness (m)	Principal Materials
Quaternary	Recent	Made Ground	0.0-4.0	Variable
		Alluvial Silts and Clays	1.0-3.0	Uncompact or loose soft silts and clays. May contain organic material.
		Alluvial Estuarine Sands and Gravel	0.0-2.0	Dense to very dense sub-angular to sub-rounded sandy gravels and gravelly sands
	Pleistocene	Glacial Sands and Gravel	7.0-18.0	Dense, angular to sub-angular sandy, slightly silty gravels or very gravelly, slightly silty sands
		Glacial Till / Lodgement Till	May be present locally	Firm to stiff brown sandy gravelly clay (with cobbles and boulders in places) overlying very stiff dark grey to black sandy gravelly clay (with cobbles and boulders in places). May have thin sand and gravel lenses present in places.
Lower		Calp Limestone		

Stratigraphic Divisions	Stratigraphy*	Approximate thickness (m)	Principal Materials
Carboniferous			

*Stratigraphic units described may not be present at all locations throughout a given range

Made Ground

Desk study information indicates that made ground will be encountered over the entire study area and varies in thickness with a maximum thickness of approximately 4.0 m BGL although locally deeper pockets of made ground may occur. By its nature though, the extents, thickness and properties of Made Ground can vary significantly over a very small area.

The area of the proposed brewery development is underlain predominantly by a reinforced concrete slab overlying hardcore and brick fill and made ground generally described as dark grey to brown, slightly sandy, slightly gravelly, Clay with cobbles of limestone and many redbrick cobbles.

Alluvial Sediments

The alluvial/estuarine sands and gravels which dominate the area around the Brewery are generally described as dense to very dense sub-angular to sub-rounded sandy gravels and gravelly sands. These commonly form the uppermost strata along the existing River Liffey Channel and may also be associated with superficial natural streams or drainage channels which may now be filled in.

The alluvial/estuarine sands and gravels may be locally overlain with a thin layer of very recent soft estuary clays and silts although with the industrial history of the site it is likely these sediments may generally have been excavated and replaced with made ground or mixed with other material to form a firmer material. Borehole CP16 indicates the presence of organic material within these clays and silts.

Alluvial clays and silts may occur along superficial natural streams or drainage channels which have been filled with made ground, culverted and/or re-directed within recent centuries and may be found as isolated pockets or along infilled channels.

Glacial Gravels and Sands

Glacial gravels and sands can occur beneath, within and on top of the glacial till and prevail along the northern boundary of St. James's Gate Brewery.

The deposits occur commonly as water bearing lenses of variable lateral and vertical extent and thickness, ranging from several centimeters to several metres and are commonly not interconnected. They were presumably deposited under fluvio-glacial conditions in glacial ponds or small streams.

Glacial Till

Glacial till is present in the southern half of the Brewery and may be present in isolated pockets within the project area. This till is typically described as a stiff to very stiff sandy gravelly Clay known locally as Dublin Boulder Clay. It is a well-graded soil with numerous cobbles and boulders predominantly derived from Carboniferous Limestone.

8.5.2 Local Bedrock Geology

The Brewery is underlain by Carboniferous Limestone known as Calp Limestone. Calp consists of predominantly dark-grey argillaceous micritic limestone interbedded with thickly laminated to thinly bedded calcareous mudstone and thickly to thinly laminated black shale.

The Calp is distinctly bedded with bedding typically dipping from 0 to 30° although localised folding and faulting may be expected.

The bedrock profile has been particularly influenced by recent geological history where stress relief and weathering, along with scraping and scouring by boulders along the bedrock surface by advancing and receding glaciers has scarred the top of rock. This has formed a weathered layer in the bedrock where a higher degree of fracturing and a corresponding increase in water flow exists. These fractured zones are commonly limited to the uppermost 0.5 to 3m of the underlying bedrock, but deposition of silty clay materials along open fractures and joints can reach to considerable depths within the bedrock.

Borehole logs across the study area indicate that the depth to bedrock varies from 16.1 m BGL to 32 m BGL as indicated in Figure 8.7 in Volume 3. Along the north-eastern side of the Brewery the depth to bedrock averages 18.0 to 20.0 m BGL. This bedrock profile indicates an undulating bedrock profile formed where changes in the ordnance level of the top of rock can change relatively quickly over short distances.

8.5.3 Local Hydrogeology

Groundwater levels

Groundwater levels have been monitored regularly at 11 monitoring points in the study area by Diageo Ireland and OGE for the past several years. **Table 8-C** provides details on the 11 groundwater wells sampled in these monitoring rounds. Of these, seven are inside the study area (MW5, MW6, MW6a, MW8, MW10, MW13 and MW14).

Table 8-C: Groundwater Monitoring Data (June 2010)

Borehole / Well ID	Predominant Soil Type	Depth (m)	Static Water Level (mbTOC) June 2010	Static Water Level (mbTOC) Nov 2010
MW1	Boulder Clay	8.0	2.06	2.02
MW1a	Boulder Clay	20.5	10.42	7.65
MW2	Boulder Clay	7.1	2.68	2.54
MW3	Boulder Clay	2.5	1.26	1.28
MW5	Clay/Gravel	8.2	4.52	4.11
MW6	Gravels	5.2	2.66	2.21
MW6a	Gravels	16.0	2.68	
MW8	Made Ground	6.1	4.78	4.83
MW10	Gravels	6.0	4.4	3.68
MW13	Clay/Gravels	6.0	2.51	1.93
MW14	Made Ground	5.6	4.82	4.39

It is presumed that the monitoring wells were screened in the “predominant soil type” as indicated in the table above. In that case, the groundwater levels observed are indicative of groundwater levels in the overburden rather than the bedrock aquifer. The construction borehole logs and installation details for these monitoring wells were not available for this desk study.

The groundwater level data collected in November 2010 have been used in Figure 8.8 in Volume 3 to gain an impression of the spatial changes in water table elevation within the study area. Each monitoring point within the study area is indicated along with the groundwater level measurement and the predominant lithology at each point. The elevations of the monitoring points were not available for this study and the groundwater levels are recorded in metres below top of casing (mbTOC). As most of the monitoring points are flush to the pavement, the casing level is taken to be at or near ground level and so the groundwater levels can be considered as metres below ground level (mbgl). For this reason no groundwater contour maps can be produced for the groundwater level data available, however it is presumed that the groundwater flow will be predominantly towards the river.

As these levels were measured in the middle of the summer, they are probably representative of the lowest seasonal groundwater levels for the area. Winter groundwater levels are expected to be higher.

Hydraulic Interactions and Flow Directions

The hydrogeological regime near the study area is controlled by the geological characteristics of the area and adjacent surface water bodies. Groundwater flow is generally towards the River Liffey and the coast with localised variations and perched tables.

No groundwater level data exist for the bedrock aquifer beneath the site. However, it is likely that groundwater flow in the bedrock is generally towards the River Liffey to the north and the coast to the east. The majority of flow in the bedrock will be through weathered or fractured rock.

The limestone bedrock is overlain by low permeability glacial till for most of the study area. This till may provide a barrier to hydraulic interaction between the bedrock and the overburden. As the limestone is overlain by glacial sands and gravels along the northern boundary of Diageo Ireland, it is possible that the overburden is in hydraulic continuity with the bedrock aquifer in this area.

It is likely that the alluvial and glacial sands and gravels that make up the overburden on the site are permeable and water-bearing. The water in gravels closest to the River Liffey is likely to be in hydraulic continuity with the river. It is the water table associated with these water-bearing horizons that is observed in the shallow monitoring wells on-site. Because the glacial till or boulder clay has a lower permeability than the glacial and alluvial sands and gravels, water which infiltrates through the sands and gravels may accumulate on top of the glacial till.

Any flow present in the overburden is likely to flow towards surface water features and discharge to the River Liffey. Any deep man-made structures (such as the quay walls on Victoria Quay to the north of the Brewery) could possibly provide a barrier to groundwater flow and deflect it in other directions.

The groundwater levels within the study area as measured in 2010 range from approximately 2.5 to 5 metres below ground level. Taking into account the gentle

topographical gradient across the study area it is likely that the groundwater table slopes gently to the north, towards the River Liffey, as expected.

8.5.4 Contaminated Soil and Groundwater

Diageo Ireland St. James's Gate works under an Integrated Pollution Prevention and Control Licence (IPPC) 301-01 and as such, the brewery is required to prepare Annual Environmental Report (AER) for submission to the Environmental Protection Agency (EPA). As part of the license agreements, an on-going groundwater monitoring programme has been carried out since 2004. Appendix 8.1, Volume 4, contains the results of the groundwater analysis from 2008- 2010.

In June 2010 contaminant indicators of elevated pH, temperature and conductivity at MW8 were identified by Diageo Ireland. This was reported to the EPA and a programme of further investigation and remediation is ongoing at this location.

The urban environment and industrial site history may result in the existence of possible contamination sources within the proposed brewery development area.

No soil contamination data was available during this study, however it is intended that soil sampling will be carried out across the site of the proposed brewery development, with analysis for contamination in accordance with the parameters for disposal of excavated material to landfill (European Council decision of 19 December 2002 pursuant to Article 16 of and Annex II to Directive 1999/31/EC).

8.5.5 Radon

Radon is a radioactive gas which is naturally produced in the ground from the uranium present in small quantities in all rocks and soils. The Radiological Protection Institute of Ireland (RPII) has produced a Radon Map of Ireland based on the results of the RPII's National Radon Survey where radon measurements were carried out in a number of houses in each 10km grid square of the National Grid.

The results were used to predict the percentage of homes in each 10 km grid square with radon concentrations in excess of the national Reference Level of 200 Bq/m³. The radon map has five categories: less than 1%, 1-5%, 5-10%, 10-20% and greater than 20%. These categories refer to the number of homes in the 10km grid square that are likely to have radon concentrations above the Reference Level.

This map was accessed online at www.rpii.ie/radon-map.aspx on the 12th August 2011 and the 10 km grid of the Greater Dublin area indicated that only 1-5% of the homes surveyed in this area had radon concentrations above the Reference Level.

8.6 Predicted Impacts

8.6.1 'Do Nothing' Scenario

Without the proposed brewery development there will be no resulting impacts on the soils, geology or hydrogeology in this location, impact would therefore be neutral.

8.6.2 Do Something Scenario

There are a number of elements associated with the construction of the proposed brewery development which have the potential to impact on the environment with respect to soils, geology and hydrogeology.

Construction Phase

Preparatory Works

Construction activities have the potential to impact on soil quality of the local drift deposits. Firstly, made ground and potentially some overburden will be excavated during the construction phase. There is potential for these activities to impact on soil erosion. Soils can be disturbed and eroded by vehicular activity. Winds and heavy precipitation can also impact on non-vegetated areas (e.g. stockpiles) resulting in soil disturbances, which can enter water bodies as runoff.

Soil (predominantly made ground but some natural ground may be encountered) will be excavated as part of the preparatory works and realignment of existing services. This is likely to be restricted to the shallow subsoil and in most cases to made ground although some locally deep services may exist requiring deeper excavations. No soil contamination testing results were available for this study. However, there is the possibility that contaminated soil may be encountered. The excavation of contaminated soil may potentially lead to a risk to human health or the environment if not dealt with in an appropriate manner.

No basements will be constructed on the site so the possibility of creating a barrier to groundwater flow towards the river will not occur. However, two shallow areas of excavation have been identified on the site: for an attenuation tank and a material intake sump. Localised dewatering works may be required where necessary during the construction of these. If required the preferred option would be to discharge the abstracted groundwater to sewer, which would require an appropriate license from Dublin City Council. To do this the discharged water must meet the requirements stipulated by Dublin City Council.

Main Buildings

Potential impacts during the construction phase include the potential for leakage or spillage of construction-related materials on-site.

Material accumulations such as building materials are often stored in outdoor stockpiles. Rainwater can percolate through stockpiles and have the potential to produce leachate.

While it is proposed that the main buildings will be piled there is the potential dependant on the proposed pile type to generate spoil. This spoil is likely to include made ground and sands and gravel. The spoil produced as part of piling works within the made ground may contain contaminants and may require specialist disposal.

Construction and demolition waste encountered in reworking this material will be recycled where feasible and disposed of, if appropriate, off site in accordance with the requirements of the Waste Management Acts, 1996 and 2001.

Operational Phase

The proposed brewery development will have an overall neutral long-term impact on soils, geology and hydrogeology.

8.7 Mitigation

This section describes mitigation measures designed to avoid, reduce or offset any of the adverse impacts predicted.

8.7.1 Construction Phase

Contingency measures will be put in place to deal with striking any unknown services such as old sewers, culverts etc to manage and repair without delay.

Contaminant testing will be undertaken on soil samples in the construction area. This will allow any potential contamination to be identified and a plan to be developed for their handling, storage and disposal.

Water pollution will be minimised by the implementation of good construction practices. Such practices will include adequate bunding for oil containers, wheel washers and dust suppression on-site roads, and regular plant maintenance. The Construction Industry Research and Information Association, (CIRIA) provides guidance on the control and management of water pollution from construction sites in their publication Control of Water Pollution from Construction Sites, Guidance for Consultants and Contractors (Masters-Williams et al, 2001). A contingency plan for pollution emergencies shall also be developed by the appointed contractor prior to work and regularly updated, which will identify the actions to be taken in the event of a pollution incident.

The CIRIA document (2001) recommends that a contingency plan for pollution emergencies should address the following:

- Containment measures;
- Emergency discharge routes;
- List of appropriate equipment and clean-up materials;
- Maintenance schedule for equipment;
- Details of trained staff, location, and provision for 24-hour cover;
- Details of staff responsibilities;
- Notification procedures to inform the relevant environmental protection authority;
- Audit and review schedule;
- Telephone numbers of statutory water undertakers and local water company; and
- List of specialist pollution clean-up companies and their telephone numbers.

Appropriate foundation construction techniques will be adopted to comply with the requirements of statutory bodies in terms of noise, vibration, soil and groundwater contamination and disposal of contaminated material.

Negative impacts on groundwater can occur due to construction leading to increased amounts of leachate from the existing made ground if this material is contaminated locally. Causes of this may include increased exposure of the made ground material to rainwater due to removal of an existing paving surface, excavations, ponding and flooding. The mitigation measures described with regard to earthworks will also apply in this case. All ground disturbances or excavations will be completed and covered as soon as practical.

Good housekeeping (daily site clean-ups, use of disposal bins, etc.) on the project site, and the proper use, storage and disposal of many substances used on construction sites, such as lubricants, fuels and oils and their containers can prevent soil contamination.

Excavated materials will be inspected for potential contamination, so that the appropriate disposal route can be chosen.

Prevention measures will be taken to minimise the risk of mixing of contaminated materials with 'clean ground.'

Oil storage tanks will be bunded appropriately. Smaller quantities of these substances will be stored in suitable, secure buildings or enclosures with an impermeable floor surface.

Appropriate measures will be put in place to minimise the risk of soil/water contamination from re-fuelling of vehicles, e.g., re-fuelling to be undertaken in designated areas with drained hard standing, and spill kits in place. Storage tanks will either be double-skinned or stored in bunded areas.

8.7.2 Operational Phase

Negative impacts on groundwater may occur due to the operation of the facility leading to increased amounts of leachate from the existing made ground if this material is contaminated locally. Causes of this may include increased exposure of the made ground material to rainwater due to removal of an existing paving surface during the operational phase. Adequate falls, profiling and drainage will be provided to promote safe run-off and prevent ponding and flooding. Run-off will be controlled through silt/sediment traps as appropriate to minimise the turbidity of water in outfall areas.

Substances used during the operation of the proposed facilities, such as lubricants, fuels and oils, detergents and other chemicals are harmful to the environment. In most cases, good housekeeping (daily site clean-ups, use of disposal bins, etc.) and the proper use, storage and disposal of these substances and their containers can prevent soil contamination. Oil storage tanks will be sited on bunded hard standing. Smaller quantities of these substances will be stored in suitable, secure areas with an impermeable floor surface.

8.8 Residual Impacts

If the recommended mitigation measures are adhered to, there will be no significant residual negative impacts on the soil, geological or hydrogeological environment.

9.0 SURFACE WATER AND DRAINAGE

9.1 Introduction

This chapter addresses impacts to water quality during construction of the proposed brewery development, and then during the routine operational processes of the brewery. Impacts are categorized and assessed in terms of surface water, foul and process effluent drainage and their subsequent impacts on the water quality of receiving water bodies.

The water quality impact assessment methodologies are explained in Section 9.3, including details of the main sources of information that were utilized. The existing surface water environment is discussed in Section 9.4, including the existing water consumption and effluent discharges from the brewery. A summary of the proposals for surface water, foul water and process effluent drainage are provided in Section 9.4 with further details in the Drainage Report at Appendix 9.1, Volume 4. Potential impacts on water quality, both direct and indirect, are then considered for the construction and operational phases in Section 9.5. Mitigation to avoid, reduce or offset the potential impacts is described in Section 9.6. These mitigation measures are informed by published guidance and best practice, and residual impacts are then identified after the implementation of the proposed mitigation, in Section 9.7.

A standalone Flood Risk Assessment Report is provided at Appendix 9.2, Volume 4.

9.2 Legislative Framework

The Water Framework Directive (WFD) 2000/60/EC came into force on 22 December 2000 and was transposed into Irish legislation through Statutory Instrument S.I. 722 of 2003, European Communities (Water Policy) Regulations 2003. The legislation provides a co-ordinated approach to water policy across Europe, and the establishment of a management structure in which to manage future water policy. Under the WFD 2000/60/EC, the status of water is assessed using a range of parameters including chemical, ecological, physical, morphological and hydrological measures to give a holistic assessment of aquatic ecological health. The legislation requires that member states must identify and monitor any pressures on water bodies that may threaten the aims of the WFD and must implement the necessary measures to prevent deterioration of the status of water bodies (www.wfdireland.ie). The key objectives of the Directive are to:

- Protect all waters, including rivers, lakes, groundwater, transitional and coastal waters;
- Achieve “Good” status in all natural waters by 2015 and maintain “High” status where it already exists. Certain water bodies are designated as artificial/heavily modified and will have less stringent targets to meet, however, these will still need to demonstrate ‘Good Ecological Potential’ by 2015 and include measures to restore the water body to a natural state. The status of water bodies is to be reviewed over subsequent six-year management cycles; and
- Monitor and manage waters based on hydrological units, termed river basin districts (RBDs), comprising individual or groups of catchments, incorporated within a River Basin Management Plan (RBMP). The brewery site is located within the Eastern RBD, co-ordinated and managed by Dublin City Council (DCC).

Statutory Instrument (S.I.) 272 of 2009, European Communities Environmental Objectives (Surface Water) Regulations, which came into force on 30 July 2009, addresses the requirements of the WFD, Dangerous Substances and Priority Substances Directives: (<http://www.environ.ie/en/Legislation/Environment/Water/>). The Regulations apply to all surface waters and provide for, amongst other things:

- The establishment of legally binding quality objectives for all surface waters and environmental quality standards for pollutants; and
- The classification of surface water bodies by the Environment Protection Agency (EPA) for the purposes of the Water Framework Directive (WFD).

9.3 **Assessment Approach**

9.3.1 **Data Collection and Consultation**

Baseline conditions and assessment of potential impacts were identified through a combination of consultation and desk-based assessment.

A desk study was carried out to collate the available information on water quality. DCC and the EPA were consulted with regard to the water quality condition and status of surface water bodies within the study area. In addition, a review of the information held by the EPA online (www.epa.ie) was carried out to determine current status and recent trends in the water quality of the River Liffey in the vicinity of the proposed brewery development.

In-house annual average water quality information was obtained from Diageo Ireland at monitoring locations in the River Liffey, upstream and downstream of the emission discharge point (SW-1) as part of the Integrated Pollution Prevention and Control (IPPC) licence conditions. These are published each year in Diageo Ireland's IPPC Annual Environmental Report. Additional physico-chemical water quality information has been obtained from the EPA at other monitoring locations on the River Liffey and the River Camac, upstream of the Brewery site, as well as for the Upper and Lower Liffey Estuary.

9.3.2 **Assessment of Baseline Conditions**

The EPA assesses the water quality of rivers and streams across Ireland using a biological assessment method, which is regarded as a representative indicator of the status of surface waters and reflects the overall trend in conditions of the watercourse.

The Q index (or biotic indices) is used as a classification system for river water quality in Ireland, using index values ranging from Q1 to Q5. Q5 waters are of the highest quality and Q1 the lowest. Intermediate classification values are also used (Q1-2, 2-3, 3-4 and 4-5) to denote transitional conditions (EPA, 2005b). The biotic indices are related to the four water quality classes as presented in **Table 9-A** below.

Table 9-A: EPA River Water Quality Classification (Source: EPA, 2005b)

Biotic Index (Q value)	Quality class	Pollution status
Q4, Q4-5, Q5	Class A	Unpolluted
Q3-4	Class B	Slight pollution
Q2-3, Q3	Class C	Moderate pollution
Q1, Q1-2, Q2	Class D	Serious pollution

Under the WFD 2000/60/EC, the Q value is used similarly to denote the status of a water body at that sampling location, with five status categories. **Table 9-B** provides a summary of the classification

Table 9-B: Water Framework Directive Classification

Q Value Index	Status
Q4-5 and Q5	High
Q4	Good
Q3-4	Moderate
Q2-3 and Q3	Poor
Q1 and Q1-2 and Q2	Bad

9.3.3 Impact Assessment Methodology

The significance of the effects of the proposed brewery development on water quality have been categorised taking into account the sensitivity of the receiving environment and the potential magnitude of the effect.

The sensitivity of the receiving water environment was categorised on a scale of 'low' to 'very high' using the criteria provided in **Table 9-C**, which is based on the guidance provided in the National Roads Authority (NRA) 2010 publication "Guidelines on Procedures for Assessment and Treatment of Geology, Hydrology and Hydrogeology for National Road Schemes", as well as using professional judgment.

Table 9-C: Sensitivity of Water Bodies

Sensitivity	Surface Water Criteria
Very High	Attribute is of high environmental importance (e.g. WFD overall status 'High'; Biotic Index Q4-5 or Q5), and/or of national or international value, e.g. nature conservation designation with water-dependent ecosystems, such as a Site of Special Scientific Interest (SSSI), Special Area of Conservation (SAC), or Special Protection Area (SPA). No anthropogenic pressures on the water body; meeting the aims of the WFD. Designated for freshwater ecological interest, e.g. salmonid fishery or freshwater pearl mussel and water body nationally important for recreation. Widely important potable water source supplying >2500 homes.

Sensitivity	Surface Water Criteria
High	<p>Attribute has a high quality and rarity on a local scale.</p> <p>Attribute is of high/good environmental importance (e.g. WFD overall status 'Good'; Biotic Index Q4).</p> <p>Only limited anthropogenic pressures on the water body not significantly affecting the aims of the WFD.</p> <p>Designated salmonid fishery and water body locally important for recreation. Locally important potable water source supplying >1000 homes.</p>
Medium	<p>Attribute has a medium quality and rarity on local scale. Attribute is of medium environmental importance (e.g. WFD overall status of 'Moderate'; Biotic Index Q3-4) or of local/regional value. Likely to exhibit a measurable degradation in water quality as a result of anthropogenic pressures, leading to a moderate risk of failure of water body meeting the aims of the WFD.</p> <p>Designated cyprinid fishery. Watercourse not widely used for recreation, or recreation use not directly related to watercourse quality.</p> <p>Local potable water source supplying >50 homes.</p>
Low	<p>Attribute has a low quality and rarity on local scale.</p> <p>Attribute is of low environmental importance (e.g. WFD overall status of 'Poor' / 'Bad'; Biotic Index Q1-Q3), and fish sporadically present or restricted, no designated fisheries. Heavily engineered or artificially modified and may dry up during summer months. Not used for recreation purposes. Fails to meet the aims of the WFD.</p> <p>Local potable water source supplying <50 homes.</p>

The magnitude of impact is influenced by timing, scale, size and duration of change to the baseline conditions. **Table 9-D** provides a guide to the magnitude of change and this has been used with professional judgement to determine impact magnitudes.

Table 9-D: Magnitude of Potential Impacts on Water Bodies

Magnitude	Surface Water Criteria
Substantial	<p>Results in loss of attribute. Major shift away from baseline conditions or fundamental change to water quality condition either by a relatively high amount over a long-term period or by a very high amount over an episode such that watercourse ecology is greatly changed from the baseline situation.</p> <p>Impact on "integrity" of European designated nature conservation area under the provisions of the Habitats Directive.</p> <p>Equivalent to downgrading one WFD class, e.g. from 'Good' to 'Moderate', or any change that downgrades a site from overall 'Good' status as this does not comply with the WFD.</p> <p>Loss or extensive change to an EC designated fishery.</p> <p>Pollution of potable water sources.</p>
Moderate	<p>Results in moderate impact on attribute or loss of part of attribute.</p> <p>Deterioration in water quality but not to the extent that causes a change in WFD class.</p> <p>Partial loss in productivity of a fishery.</p>

Magnitude	Surface Water Criteria
Slight	Results in minor impact on attribute. Detectable but non-material changes to water quality where watercourse ecology is slightly affected. Measurable change in attribute but of limited size and/or proportion.
Negligible	Results in insufficient magnitude to affect use or integrity of attribute. No perceptible changes to water quality such that no discernible effect upon the watercourse's ecology occurs.

The significance of impact was determined as a function of the sensitivity of the receiving water body and the magnitude of the impact, as outlined in Table 9-E.

Table 9-E: Matrix for Determination of Impact Significance

Magnitude of Impact \ Importance of Receptor	Substantial	Moderate	Slight	Negligible
	Very High	Major	Major - Moderate	Moderate - Minor
High	Major	Major - Moderate	Moderate - Minor	Negligible
Medium	Major - Moderate	Moderate - Minor	Minor	Negligible
Low	Moderate - Minor	Minor	Minor - Negligible	Negligible

9.3.4 Limitations to Assessment

There were no limitations to the assessment from a water quality perspective.

9.4 Baseline Conditions

9.4.1 Study Area

The water bodies within the study area include the River Liffey, the Liffey Estuary and the River Camac, which flows into the River Liffey upstream of the brewery site. The baseline study area and associated water bodies are shown in Figure 9.1 in Volume 3.

The study area is limited to the main proposal site in the North Site of St. James's Gate Brewery, as any potential works on the South Site will be relatively minor in nature and therefore unlikely to lead to a significant effect on the water environment.

The main proposal site is located within the existing St. James's Gate northern brewery yard, bounded by Victoria Quay and the River Liffey to the north, Cookes Lane (an internal circulation route) and James's Street further to the south, Watling Street to the east and Steeven's Lane to the west (refer to Figure 5.1, Volume 3 of the EIS, and **Figure 5-A** in Chapter 5).

9.4.2 Water Body Description

The proposed brewery development is located adjacent to the Upper Liffey Estuary, downstream of Island Bridge weir which is the tidal limit, and is situated in the Liffey River Catchment, Hydrometric Area 09, within the Eastern River Basin District (RBD). The Liffey Catchment covers an approximate area of 1,300 km² (www.erbd.ie).

With its headwaters in the Wicklow Mountains, the River Liffey flows for approximately 138 km before entering the Irish Sea at the mid-point of Dublin Bay. The River Liffey has three major impoundments (reservoirs) along its course - at Poulaphouca, Golden Falls and Leixlip, together named the Brohernabreena Reservoirs. The Poulaphouca Reservoir is a source of water supply to Dublin, and all three reservoirs supply hydroelectric power (www.erbd.ie). These reservoirs have the capacity to store part of the flood flows and therefore largely control the high flows in the River Liffey. Refer to Flood Risk Assessment at Appendix 9.2, Volume 4, for further information.

The River Liffey is a salmonid river containing salmon and brown trout. However the impoundments along the river, as stated above, currently impede the upstream passage of fish. The river is also designated as a Nutrient Sensitive Area; a protected area under the WFD 2000/60/EC.

The main recreational uses of the River Liffey / Liffey estuary include boat tours through Dublin City Centre, rowing clubs and fishing. Fishing activities in the Liffey are generally controlled by a number of angling associations or private owners, including North Kildare Trout & Salmon Angling Association and the Dublin and District Salmon Anglers Association. Cargo ships were previously used to export Guinness from the St. James's Gate Brewery along the River Liffey until the 1990s.

Figure 9.1 in Volume 3 of the EIS illustrates the classification of river water quality in the surrounding study area, which is discussed below.

The stretch of the River Liffey, immediately upstream of the transition to tidal waters at Island Bridge weir, had a WFD status of Moderate in 2010, but it was considered Poor in 2009. At the monitoring site '0.2 km downstream of Chapelizod Bridge' (09L012360), the EPA reports slight pollution, attaining a Q value of Q3-4 (Moderate). It was also Moderate in 2007.

The EPA noted that there was ecological disruption at the 'Leixlip Bridge' (09L011900) monitoring site due to heavy siltation from the Leixlip water treatment works, and that the reach from Leixlip Bridge to Lucan, downstream, remained moderately polluted by suspected sewerage and water treatment plant effluents.

Despite the WFD status of the watercourse, the River Liffey is considered overall to be of high environmental importance on an 'International to National' scale due to its European designated status as a salmonid water and nutrient sensitive area, its use for water abstraction and supply, and its wide recreational uses. It therefore has been assigned a 'very high' sensitivity for water quality.

The River Camac upstream of the confluence with the River Liffey had a WFD status of Poor in 2010, but was considered Bad in 2009. At the monitoring site 'Camac Close Emmet Road' (09C020500), the EPA reports moderate pollution in 2010 with suspected or apparent toxic effects, attaining a Q value of Q3/0. This is roughly equivalent to (but perhaps slightly better than) its Q value of Q2-3 in 2008, but

improved from Q2 in 2007. Prior to 2005, the Q value was recorded at or below Q2, indicating that water quality in the River Camac has improved in recent years.

As a result, the River Camac is considered to be of low environmental importance and has been assigned a 'low' sensitivity for water quality.

Since the River Camac is upstream of the proposed brewery development, the watercourse is not proposed to be impacted by drainage discharges or construction works and therefore is not considered further in this assessment.

The Upper Liffey Estuary in the vicinity of the proposed brewery development had a WFD status of Poor in 2011. The EPA classified the estuary as being of Intermediate water quality in 2008 and 2009. The Lower Liffey Estuary had a WFD status of Moderate / Pass in 2011. The EPA classified the lower section of the estuary as being of Intermediate water quality in 2008, improving to Unpolluted in 2009. The Liffey Estuary is also designated as a Nutrient Sensitive Area; a protected area under the WFD 2000/60/EC.

9.4.3 Existing Drainage System

The existing drainage systems within the curtilage of the proposed brewery development are generally 'combined' (surface water and effluent), discharging into the existing DCC combined sewerage system.

There is an existing Main Diageo Ireland Process Drainage carrier, located along Cookes Lane, discharging to the existing Waste Water Neutralisation Plant (WWNP), further north along the Watling Street boundary wall.

There are no existing surface water sewers along the Victoria Quay frontage of the proposed brewery development. There is however a combined sewer overflow (CSO) into the Liffey located approximately mid-way along the proposed development frontage on to Victoria Quay.

There is also an existing Diageo Ireland owned surface water outfall to the Liffey that passes through the No. 6 Gate on Victoria Quay. The invert level of this surface water outfall will not be sufficiently deep to facilitate a gravity connection from the proposed brewery development.

The nearest existing surface water sewerage is a 600mm diameter pipe located along Watling Street and discharging into the Liffey at the Victoria Quay / Ushers Quay junction. This outfall was confirmed as suitable to receive surface water drainage from the site during pre-planning discussions with DCC Main Drainage engineers.

9.4.4 Diageo Ireland Integrated Pollution Prevention and Control (IPPC) Licence

The St. James's Gate Brewery was granted an Integrated Pollution Control (IPC) Licence Number 301 on 4 July 2000. This licence was subsequently converted to an Integrated Pollution Prevention and Control (IPPC) Licence (Licence Number: P0301-01) on 9 November 2005 through the addition of Amendment A to the licence, which was required to comply with the IPPC Directive (EPA, 2005a).

The Brewery includes three licensed emission points to sewer from the site, SE-1, SE-2 and SE-3, and a single licensed emission point to water from the site, SW-1, which discharges to the River Liffey (refer to Figure 9.1, Volume 3). The licence requires that a number of physico-chemical parameters are monitored at specified intervals at these emission points. The licence also requires that monitoring is undertaken at two

locations upstream and downstream of SW-1, at ASW-2 and ASW-3, respectively, although there are no specific locations for these.

This chapter considers the existing and proposed discharges at emission points SE-1 (Watling Street sewer) and SW-1 only.

9.4.5 Water Consumption and River Discharge

Towns Water (Potable) is supplied to the brewery by DCC via a series of incomers dispersed around the site boundary. Service water is drawn from the Dublin Corporation eight and fifth lock mains at Bellevue and piped separately to the service water reservoirs located under Hop Stores 12 and 13 and the Roast House. Potable town water is used for the brewing process, whilst service water is used in fire hoses and other ancillary activities. Total annual water consumption at the brewery between 2008 and 2010 is summarised in **Table 9-F** below, as reported in the Diageo Ireland Annual Environmental Reports.

Table 9-F: Annual Water Consumption 2008-2010 (Diageo Ireland 2010 and 2011)

Source	2008 (m3)	2009 (m3)	2010 (m3)
Town	1,945,043	1,779,106	1,805,135
Service	642,276	277,190	239,262
Cooling	0	0	0
Total	2,587,319	2,056,296	2,044,397

Until March 2007 the emission point, SW-1, discharged cooling water to the River Liffey which originated from an underground well at the site. However, in March 2007 the discharge of cooling water ceased and since then only surface water has been discharged via an interceptor at SW-1. As there is no longer any process emission to the river, monitoring at this location has been discontinued, however the Brewery continues to carry out monitoring at the two monitoring locations (ASW-2 and ASW-3) in compliance with the IPPC Licence conditions. **Table 9-G** summarises the results of the monitoring in 2009 and 2010 against established biological quality class thresholds as stated within the National Roads Authority (NRA) publication 2010 "Guidelines on Procedures for Assessment and Treatment of Geology, Hydrology and Hydrogeology for National Road Schemes".

Table 9-G: Water quality monitoring at ASW-2 and ASW-3 (2009-2010)
 (Source: Diageo Ireland 2010 and 2011, NRA 2010)

		Annual Average Value				WFD Overall Status (NRA, 2010)
		ASW-2		ASW-3		
Parameter	Units	2009	2010	2009	2010	
pH	pH unit	7.95	8.15	8.0	8.18	n/a
Biological Oxygen Demand (BOD)	mg/l	2.4	3.08	2.8	3.08	Class B
Chemical Oxygen Demand (COD)	mg/l	18.5	26.7	20.8	22.1	n/a
Suspended Solids	mg/l	9.8	16.1	9.6	21.3	n/a
Fats, Oils & Greases (FOG)	mg/dm ³	1.0	1.0	1.0	1.0	n/a
Detergents (as MBAS)	mg/dm ³	0.09	<0.47	0.08	<0.21	n/a
Ammonia (as N)	mg/dm ³	0.23	0.53	0.21	0.17	Class B
Total Oxidised Nitrogen	mg/dm ³	1.34	1.43	1.40	1.47	n/a
Total Phosphorus (as P)	mg/dm ³	0.09	96.5	0.13	99.9	n/a
Sodium	mg/dm ³	251	1,128	203	1,165	n/a

9.4.6 Foul Water Drainage

The existing foul drainage network collects foul water from the St. James's Gate facility and pumps it to the DCC Foul Sewer. Foul waste does not currently, and is not proposed to, outfall to the River Liffey and therefore impacts associated with foul water drainage are not considered further in this chapter in terms of water quality. Further details are provided in Chapter 15.

9.4.7 Process Effluent Drainage

Process effluent from the brewing process consists mainly of liquid residues from the brewing equipment generated during routine cleaning of the equipment and pipework. The cleaning regime involves the use of mild acidic and caustic cleaning solutions. There are also miscellaneous food grade additives and ingredients used in the brewing

process that are present in trace amounts in the effluent. Further details of the nature of the process and production of effluent are provided in Chapter 15.

This process effluent is directed to the on-site WWNP where flow and pH peaks are controlled, before being pumped to the foul sewer on Watling Street. This sewer discharges to the Dublin City Council operated Ringsend WWTP for final treatment.

Table 9-H summarises the average monthly discharges (both concentration and load) from SE-1 (Watling Street sewer) between January and June 2011 against the IPPC Licence Emission limits.

Table 9-H: Average monthly discharges from SE-1 (Source: EPA 2011a)

Parameter:	Month: Units	Jan	Feb	March	Apr	May	Jun	Licence Emission Limit (monthly)
Flow	m ³ /d	2,995	3,130	2,960	2,960	2,591	2,435	7,500 (max daily)
BOD	kg/d	8,088	10,308	8,453	7,944	7,696	6,605	18,750
COD	kg/d	11,572	14,714	12,514	11,788	11,556	9,992	37,500
Suspended Solids	mg/l	520	497	378	541	789	655	1,400 (max daily)
Suspended Solids	kg/d	1,543	1,540	1,127	1,479	2,065	1,612	10,500 (max daily)
Temp	°C	26	28	28	29.4	32	32.1	42 (max)
pH	pH unit	7	6.6	7	6.7	7	6.7	6-10

The results in **Table 9-H** above indicate that, apart from BOD concentrations, all average monthly discharges to SE-1 were within the IPPC Licence Emission limits. In 2010 and 2011, there were several weekly/monthly non-compliances for BOD concentration in the effluent discharge to sewer at SE-1; however, BOD expressed in terms of mass remained in compliance. Diageo Ireland have made significant reductions in BOD load in recent years, however these non-compliances were attributable to a reduction in hydrologic load resulting from water usage reduction initiatives implemented by Diageo Ireland in recent years, which has resulted in an increase in both BOD and COD concentration of the effluent.

In 2010, there were also a number of reported instances where higher than normal temperatures were experienced at SE-1. This was attributed to a reduction in the cooling buffering capacity at SE-1 as a result of the water usage reduction initiatives mentioned above, and a number of options are being investigated to address this issue. In 2011, there were also reported short-term instances of non-compliant pH levels at SE-1, however again these were mostly attributable to the reduced dilution capacity, which therefore affects the pH balancing ability of the WWNP to quickly adjust the dosing regime in response to changes in effluent pH.

9.4.8 Local Flooding

The Office of Public Works (OPW) provides a national flood hazard mapping service. The FRA Report at Appendix 9.2, Volume 4, includes a Flood Map (source: www.floodmaps.ie) which indicates that no flood events have been recorded by the OPW within the area of the proposed brewery development site. Minor flooding occurred on the lower levels of Victoria Quay during the February 2002 tidal flood event. The presence of flood storage reservoirs owned by the Electricity Supply Board (ESB) significantly controls the flow of the River Liffey and there is a flood defence structure present along the river frontage.

9.4.9 Proposed Drainage

Drainage proposals associated with the proposed brewery development are described in detail in the Drainage Report at Appendix 9.1, Volume 4 and summarised below.

9.4.10 Surface Water Drainage

Surface water runoff from roofed areas, hard standing, paved and yard areas, access roads and car parks will be conveyed underground in a gravitational piped system. Production storage areas and where necessary specific roof areas liable to possible contamination shall be excluded from the surface water drainage system and discharged into the process drainage network.

Runoff will be directed via silt/petrol/oil separation to a combined attenuation/firewater retention system. Outflow will be pumped at a controlled rate in accordance with the requirements of the Greater Dublin Strategic Drainage Study and the specific requirements of Dublin City Council (DCC) i.e. 2 litres/second/hectare for impermeable areas across the site. Discharge will be to the existing 600 mm surface water sewer along Watling Street (refer to Figure 9.2, Volume 3, for the drainage plan).

The attenuation storage tank will be located in the north-west of the development and shall be sized to store runoff across the impermeable areas up to and including the minimum 1-in-30-year storm event with the balance of storage up to the 1-in-100-year event stored on the adjacent surface as discussed and required by Dublin City Council main drainage engineers during Pre-Planning discussions. All surface water hydraulic calculations have been assessed with an additional allowance included for 10% increase for climate change as recommended in the Greater Dublin Strategic Drainage Study.

Prior to discharge, appropriately designed management measures will be provided to allow for discharge to the Liffey waters during high tidal conditions and non-return valves shall be installed to prevent back-flow from the public surface water sewerage system.

A water quality monitoring facility will be included in the surface water outfall which will trigger an alarm in the event of spillages or contaminated material entering the surface water drainage system. Shut-off arrangements will be incorporated to allow for the retention of contaminated surface water / fire fighting water within the attenuation storage facility.

The surface water discharge system, therefore, shall be closed in the event of the fire alarm sounding. Where required the contaminated surface water shall be pumped to the process effluent system which will discharge to the on-site Waste Water

Neutralisation Plant for treatment as required. Further testing of the runoff can be carried out in situ as required.

The control and management of surface water runoff from the site will be of uppermost imperative to protect the receiving Liffey water quality.

The design of the surface water drainage system therefore includes a range of appropriate safeguards and protocols for management of any contamination incidents. All necessary protection protocols shall be implemented by Diageo Ireland personnel as necessary.

9.4.11 SUDS

The adoption of Sustainable Urban Drainage Systems (SUDS) was considered early on in the design cycle for the development. As described above, it is proposed that the following SuDs features shall be incorporated:

Water Quality: the scheme includes provision of a silt/petrol/oil separator on the surface water disposal stream. In addition the provision of water quality monitoring probes will ensure that only 'clean' storm water will be discharged to the receiving surface water sewerage system.

Water Quantity: the scheme includes attenuation storage to ensure that the rate of discharge is restricted in accordance with the requirements of DCC.

9.4.12 Foul Water Drainage

The proposed foul water drainage network for the development shall collect foul discharges from toilets and welfare facilities etc around the site. No on-site treatment of foul water will be required for the foul / wastewater generation within the proposed brewery development. As stated above, as foul waters do not currently, and are not proposed to, outfall to the River Liffey, impacts associated with foul water drainage are not considered further in this chapter in terms of water quality. See Chapter 15 for further details.

9.4.13 Process Effluent Drainage

A process effluent system shall be provided to intercept and convey liquid waste associated with the brewing process and surface water runoff from higher risk zones, where brewery operation activities have the potential to contaminate the surface water drainage system. As stated above, this process effluent drainage will then be pumped to the existing process effluent drainage system for treatment.

The existing on-site WWNP is to be upgraded as part of the proposed brewery development. The modifications comprise of the following:

- Additional Effluent storage capacity for equalization;
- A settlement tank to reduce suspended solids;
- Additional capacity to store infrequent discharges of out-of-specification products.

The improved equalization capability will reduce the current frequency of IPPC Licence non-compliances by smoothing peaks in pH and temperature from the brewing

operations. The existing WWNP process steps for effluent neutralisation and transfer to the Watling Street sewer will be retained.

9.5 Potential Impacts

A summary of the existing and proposed brewery processes, as well as the key construction activities associated with the proposed brewery development are discussed in Section 5.5 of this EIS. This section describes the potential impacts on water quality that could arise in the absence of mitigation, during both the construction and operational phases of the proposed brewery development, based on the design/drainage proposals described in Section 9.4 above. A summary of potential impacts are presented in **Table 9-K**.

Mitigation measures to reduce any significant potential impacts are described in Section 9.6 (Mitigation) and any residual impacts taking into account proposed mitigation are then provided in Section 9.7.

Potential impacts to aquatic ecology are discussed in Chapter 7 and impacts to Groundwater are discussed in Chapter 8 of this EIS.

9.5.1 Construction Phase

During construction, the main potential contaminants affecting surface waters will be suspended solids and the discharge of silt-laden or contaminated water into the surface water sewerage system.

The construction of the proposed brewery development, including new and upgraded surface water and process effluent sewerage systems associated with the new / upgraded buildings and facilities, will not directly impact the River Liffey as there are no new outfall structures or in-channel works required. However, contamination of runoff entering the receiving sewerage systems, prior to or following connection of the new sewer outfalls, could potentially occur due to:

- Inappropriate handling and accidental spillage of oils, fuels, lubricants, chemicals and hydraulic fluids from construction plant and storage tanks.
- Inappropriate handling and storage of hazardous materials and wastes, including cement, cleaning products, waste electrical and electronic components, batteries, asbestos, wood preservatives and contaminated soil;
- Leakage of drains;
- Accidental/uncontrolled release of sewage from foul sewers through damage to pipelines during service connections and upgrades;
- Solid (municipal) wastes being disposed or blown into drainage systems;
- Water removed from excavations as a result of rainfall or groundwater seepage (refer to Chapter 8 for further details);
- Vehicle wheel wash water;
- Overland flow across exposed works areas;
- Runoff from exposed spoil heaps;

- Runoff from cement washdown areas. The potential for cement to increase the pH of water above a neutral range, typically pH 6.0 to 9.0, can pose a threat to aquatic organisms in the River Liffey (refer to Chapter 7 Ecology for further details);
- Dust from soil or construction materials such as cement may be released from wagons or batching plants and collect on roads and wash into the surface water drainage system. Stockpiles or material excavated during the works may create sediment rich runoff which may also enter local drainage;

In the unlikely event of contaminated surface waters, and accidental release of effluent, enter the surface water drainage system and discharge to the River Liffey before the design proposals stated in Section 9.4 are in place, then the IPPC Licence Emission limits are likely to be breached having a short/medium-term adverse impact on the water quality of the River Liffey and its associated ecology. However, the relatively high dispersal/dilution capacity of this large water body will help to reduce the magnitude of these potential impacts. As a result, the impact is considered to be of 'moderate' magnitude and therefore an impact of 'Major/Moderate' significance on the water quality of the River Liffey during the construction phase. The implementation of mitigation measures with the brewery design will serve to significantly reduce the risk of such accidental spills occurring.

9.5.2 Operational Phase

During the operational phase of the proposed brewery development, water consumption and process effluent discharge are anticipated to increase in line with an increase in brewing capacity and production, as summarised in Table 9-I below.

Table 9-I: Projected water consumption and process effluent discharge (approximate figures)

		Volume	Difference
Water Consumption (m ³)	Current	2,128,000	+ 908,462
	Opening Year	3,036,462	
Process Effluent Discharge (SE-1) (m ³)	Current	1,184,000	+ 936,000
	Opening Year	2,120,000	

Diageo Ireland has constructively engaged with DCC drainage section and have jointly agreed a strategy to handle future effluent discharges.

Although there is a projected increase in water consumption and effluent discharge arising from the development, this will be minimised through the implementation of improved brewing technology and the continuation of water usage reduction initiatives implemented by Diageo Ireland in recent years. In particular, the existing brew house is over 40 years old and the proposed new brew house incorporates advancements in brewing process equipment design.

Surface Water Drainage

The diversion of the current surface water run-off (from the development area) away from the existing combined sewerage system in Victoria Quay, and into the surface

water sewer for direct discharge to the Liffey represents a positive impact in alleviating the hydraulic load on the Ringsend WWTP.

Chemicals including hydrocarbons, oils and lubricants will be stored on-site in maintenance and workshop areas. Contamination of the receiving surface sewerage systems may occur, although to a lesser extent than during the construction phase, as a result of:

- Inappropriate handling and accidental spillage of oils, fuels, lubricants, chemicals and hydraulic fluids from maintenance plant and storage tanks;
- Inappropriate handling and storage of hazardous materials and wastes, including cement, cleaning products, waste electrical and electronic components, batteries, wood preservatives and contaminated soil.

These potential impacts are not anticipated to be perceptibly greater than in the existing situation, as potentially contaminating materials are currently stored on-site. Therefore this is considered to have a 'negligible' impact magnitude and therefore an impact of 'Negligible significance on the water quality of the River Liffey.

The upgraded facilities and increased production activity will result in an increase in vehicular movements on-site, particularly trucks and heavy good vehicles (HGVs), importing grains and exporting beer, and additional local transport to carry raw materials between various internal facilities within the brewery site. Refer to Section 5.4.5 and Chapter 14 of the EIS for information on projected vehicular numbers and resulting transport implications of the proposed brewery development where it concludes that the additional traffic is not significant. An increase in operational traffic on-site could lead to the following impacts:

- Increased risk of contaminated runoff entering the surface water drainage system. Contamination by oil and related compounds could have physical and chemical impacts on water quality and many mineral oils and other hydrocarbons are toxic, persistent and bio-accumulate in the environment. In addition de-icing salt, used during the winter months, can cause localised impacts on the environment, as increased chloride levels in the environment could have impacts on fish and freshwater invertebrates.
- Increased risk of vehicular collision resulting in spillage of fuels, oils or chemicals, particularly if tankers are involved. This could lead to a serious pollution incident, with spills or contaminated runoff entering the surface water drainage system. For impacts to groundwater from accidental spillages during operation, refer to Chapter 8.

As stated in Section 9.4.4, a water quality monitoring facility will be included in the surface water outfall which will trigger a shut-down of the pumping discharge in the event of contaminated runoff entering the surface water drainage system. Runoff that is tested to be uncontaminated will be pumped to the process sewer and WWNP. All other liquid will be contained within the combined attenuation/firewater retention tank to be recovered and disposed of in accordance with the IPPC Licence.

In the unlikely event of a failure of this system, large spillages are likely to breach emission limits, having a short/medium-term adverse impact on the water quality of the River Liffey and its associated ecology. However the impacts, although measurable, are anticipated to be fairly similar to the existing situation and the relatively high dispersal/dilution capacity of this large water body will help to reduce the magnitude of

these potential impacts. As a result, the impact is considered to be of 'slight' magnitude and therefore an impact of 'Moderate/Minor' significance on the water quality of the River Liffey during the operational phase.

Process Effluent Drainage

As stated above, process effluent discharges are anticipated to increase as a result of increased production activities on-site. However, the existing on-site WWNP is proposed to be modified as part of the development and therefore the increased volume of wastewater can be accommodated at these facilities (refer to Chapter 5 for more details). The anticipated effluent discharge volume to the WWNP will be 7,300 m³/day peak flow, with an average of 5,800 m³/day. **Table 9-J** provides a breakdown of projected effluent discharge in the year of opening at emission point SE-1 compared to the IPPC Licence Emission limits.

Table 9-J: Average and maximum projected discharges (Source, EPA 2005a)

Parameter	Units	Average	Maximum	Licence Emission Limits (EPA, 2005a)
Flow	m ³ /day	5,800	7,300	7,500
BOD	kg/d	12,100	27,400	45,000 (max daily) 18,750 (max monthly average)
COD	kg/d	18,500	40,400	90,000 (max daily) 37,500 (max monthly average)

The results in **Table 9-J** above indicate that all projected effluent discharges to SE-1 are within the IPPC Licence Emission limits, and therefore the wastewater can be discharged from the existing emission point SE-1, within the current IPPC Licence.

As described in Section 9.4, process effluent shall be directed towards the on-site WWNP which will involve pH and flow balancing, as required, with discharge to Ringsend WWTP. As a result, the impact is considered to be of 'negligible' magnitude and therefore of 'Negligible' significance on the water quality of the River Liffey during the operational phase.

Flood Risk Assessment

Appendix 9.2, Volume 4, presents a Flood Risk Assessment (FRA) for the proposed brewery development. The drainage for the proposed brewery development will comply with the Greater Dublin Regional Code of Practice for Drainage works, and therefore the development will not have any significant impact on local flood risk. The FRA noted that the level of the flood defence adjacent to the proposed brewery development is not known and without this knowledge there is a risk that lower areas of the proposed development could be at risk of flooding from the Liffey whether by tidal or fluvial mechanisms. Consequently it has been recommended that the floor levels of any new building within the proposed brewery development will not be set lower than 4.25 mOD, thereby minimising the potential for any future flooding of the new site. The FRA concludes that on the basis of the information available it is anticipated that the development will be safe, without increasing flood risk elsewhere.

9.5.3 Summary of Potential Impacts

A summary of potential impacts to the water quality of the River Liffey are presented in **Table 9-K** below.

Table 9-K: Summary of Potential Impacts

Water Feature	Sensitivity	Drainage type	Source of Impact	Potential Impact (unmitigated)	
				Magnitude	Significance
River Liffey	Very High	Surface Water and Process Effluent Drainage	Construction General construction works, including new / upgraded facilities and sewerage connections	Moderate	Major/ Moderate
		Surface Water Drainage	Operation Inappropriate handling, storage and spillage of chemicals and hazardous materials.	Negligible	Negligible
			Increase in trucks / HGVs with increased risk of spillages and pollution incidents	Slight	Moderate/ Minor
		Process Effluent Drainage	Increase in process effluent discharge	Negligible	Negligible

9.6 Mitigation

The potential for adverse environmental effects is highest during the construction period, as this is the time when there is most activity on-site. The design of mitigation measures has been developed using best practice, including the legislation described in Section 9.2. Additional details are provided in the Drainage Report at Appendix 9.1, Volume 4.

9.6.1 Construction Phase

It should be noted that all mitigation measures included within this chapter will be included within the Contractor's Construction Environmental Management Plan (CEMP) and approved in advance of construction with appropriate stakeholders including the EPA.

All measures will aim to ensure that the River Liffey is not adversely affected and does not result in unacceptable deterioration in its water quality. This will contribute towards achieving the objectives of the WFD 2000/60/EC (refer to Section 9.2). Diageo Ireland will be required to:

- Prepare an Emergency Response Plan (ERP) detailing the contingency measures and procedures to be undertaken in the event of a spillage, pollution incident, a fire or other non-compliant incident. Contingency plans will be regularly updated and

will detail actions to be taken in the event of pollution and general process drainage emergencies. The plans and method statements will identify any actions to be taken in the event of a pollution incident or a negative impact on the WWNP. This will be in conjunction with the Contractor's CEMP. The ERP will include a protocol for immediate consultation with the EPA, DCC, National Parks & Wildlife Service and Inland Fisheries Ireland in the event of a toxic spill to the surface water network or failure of the WWNP.

- Prepare a specific strategy and detail the proposed safeguards to protect the River Liffey and underlying groundwater within the site considering the anticipated sources, pathways, volume and impact of potential pollution.
- Ensure staff are trained in the implementation of the Emergency Response Plan and the use of any control equipment as necessary.
- Prepare method statements for the control, treatment and disposal of potentially contaminated surface water, the works involved in connecting to the WWNP and excavation works through existing structures, as required.
- Prepare a site construction drainage plan for review. The plan will include the location of all existing and proposed surface water protection measures, including for example monitoring points, sediment traps, contained settling basins, interceptors and wheel wash facilities.
- Implement good housekeeping measures on site such as daily site clean ups, use of disposal bins etc., though the proper use, storage and disposal of substances and chemicals used on construction sites.

Best practice will be followed to control water pollution and avoid negative impact on the operation of the existing WWNP and inappropriate discharges to the receiving sewerage system. Pollution control measures and strategies will follow best practices outlined in:

- CIRIA Reports R164 (1997) Design of Containment Systems for the Prevention of Water Pollution from Industrial Accidents;
- CIRIA C532 (2001) Control of water pollution from construction sites;
- CIRIA C648 (2006a) Control of water pollution from linear construction projects – Technical Guidance; and
- CIRIA C649 (2006b) Control of water pollution from linear construction projects – Site Guide.

The location of temporary facilities will be carefully planned to minimise potential impacts, i.e. truck wash facilities, toilets and site compound, and areas of chemical and fuel storage will be carefully located, managed and bunded.

Oil, chemical and fuel storage tanks will be bunded appropriately and sized in accordance with best practices to ensure containment of the spill in the event that the tank or containment vessel bursts or leaks. Furthermore, storage will be either double skinned or more likely stored in bunded walled areas that are fully sealed.

Diesel pumps and static plant in drip trays will be located as far as practically possible away from the surface water drainage network. Refuelling and minor servicing of plant

and machinery will be confined to designated areas which will comprise impermeable surfacing and be suitably bunded with spill kits in place.

Major servicing of plant and machinery shall be conducted off site where applicable or on impermeable surfacing where any pollutants can be contained.

Any contaminated/hazardous material if found will be appropriately removed from site by a specialist Contractor and tipped in the appropriate land fill depending on the nature of the material.

All stockpiled material will be constructed no more than 2 m high to limit erosion, located away from drains and will be provided with stabilisation measures, as required, to ensure runoff does not cause erosion and sediment transfer.

Surface water flowing onto the construction area will be minimised through the provision of berms and diversion channels as appropriate in order to keep the work surface dry and prevent mixing and runoff of contaminated waters. Where appropriate, surface water from surrounding yard areas will be diverted around the active works area.

Where feasible any permanent works that can be installed up front as part of the temporary works, e.g. services and roads, will be undertaken thereby avoiding the requirements for any re-excavation works and potential pollution from silt.

Open trenches will be closed and stabilised as soon as possible and the works will be phased so that open portions of the trench are closed before new trenching is started. Fill material will be placed, compacted and finished in a manner that will suppress dust.

All plant and equipment wash-water and wastewater, including concrete waste waters and discharge from wheel wash facilities, will be discharged to the appropriate drainage systems as described in Sections 9.4.

Monitoring

Site plant including pumps and compressors will be routinely monitored and their contents removed and appropriately discharged.

Routine water quality monitoring will be conducted at the surface water outlet as soon as it is connected to the receiving surface water sewerage system. Diageo Ireland will ensure that the Licence Emission limits are not exceeded and implement appropriate measures in the event of non-compliance.

This monitoring regime will ensure that only uncontaminated drainage and runoff is discharged to the WWNP. The parameters to be monitored are those specified within the IPPC Licence. Refer to Chapter 15 for further mitigation measures relating to discharges from the proposed brewery development to the WWNP.

Water quality will continue to be monitored during the construction phase at emission points SE-1 and SW-1 and at the upstream and downstream monitoring locations ASW-2 and ASW-3, at the monitoring frequency specified within the IPPC Licence or as agreed with the EPA. This will help to ensure current water quality and effluent discharge concentrations / volumes are at least maintained and corrective action taken in the event of non-compliance.

All permanent surface water drainage pipes and manholes will be appropriately tested during construction. This will include testing and routine inspection of any temporary

systems by the Contractor to ensure these temporary systems are suitable and operating effectively.

9.6.2 Operational Phase

Certain mitigation has been employed through the iterative design process, as summarised in Section 9.4 and as described in the Drainage Report at Appendix 9.1, Volume 4. During operation of the proposed brewery development, additional mitigation measures will include:

- Restricting/controlling the rate of surface water runoff from the site and Sustainable Urban Drainage Systems (SUDS), including a silt/petrol/oil separator on the surface water disposal stream and an underground combined retention/firewater tank.
- A non-return valve will be installed on the existing surface water system to ensure the River Liffey does not surcharge or contaminate the proposed site drainage during high tide or flood events.;
- Compliance with relevant site drainage strategy and DCC and EPA specifications, including IPPC Licence conditions;
- All areas containing and storing bulk chemicals or oils will be bunded. Runoff that is tested to be uncontaminated will be directed to the process sewer and WWNP. The surface water attenuation system will serve to alarm in the event of any contamination being detected prior to discharge.
- Water quality will continue to be monitored during the operational phase at emission points SE-1 and SW-1 and at the upstream and downstream monitoring locations ASW-2 and ASW-3, at the monitoring frequency specified within the IPPC Licence or as agreed with the EPA;
- Water quality monitoring equipment will be connected to a penstock shut off valve which will ensure that any contaminated runoff is detected and fully retained in the combined attenuation/firewater retention tank. As stated above, uncontaminated water will be directed to the on-site WWNP for pH balancing, otherwise will be managed through the attenuation system;
- Regular inspection and maintenance of all surface water drains, petrol interceptors and attenuation tanks;
- Regular inspection and maintenance of all foul and effluent drainage systems including the alarm systems; and
- Testing and monitoring of the surface water and process effluent drainage systems will be carried out regularly to ensure the integrity of the system is maintained during plant operation. This procedure will be completed routinely by Diageo Ireland as well as in accordance with the testing regime and frequency outlined in EPA guidelines.

9.7 Residual Impacts

The mitigation measures outlined above will be implemented to ensure that there are no significant residual impacts to water quality from drainage discharges entering the

drainage and sewerage systems and ultimately to the River Liffey, particularly during the construction phase when most impacts are likely to arise.

With these mitigation measures in place, it is considered that the impacts on the River Liffey shall not exceed 'negligible' magnitude and therefore 'Negligible' significance during both the construction and operational phases of the proposed brewery development.

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10.0 AIR QUALITY AND CLIMATE

10.1 Air Quality

10.1.1 Introduction

This section of this Chapter presents the findings of the air quality impact assessment for the proposed brewery development.

The existing brewery is a regulated process under the Integrated Pollution Prevention and Control legislation (now codified as Directive 2008/1/EC). This legislation stipulates that any such regulated activity must not cause significant harm to the environment. Diageo Ireland holds Environment Protection Agency license 301-01 for the St. James's Gate Brewery. The licensed activities are for commercial brewing and for the aggregated combustion plant in the Energy Centre.

The arrangement of the existing Energy Centre (EC), comprising of three combined heat and power (CHP) gas turbine/boilers and one conventional boiler is unchanged with the proposed brewery development. There is a separate planning application to include an additional roaster with gas-fired afterburner to be operational in 2012 alongside the current arrangement on the South Site. For the proposed brewery development, the main point sources of combustion emissions to air will remain unchanged. There will be a change to the grain handling facilities which has the potential to give rise to additional dust emissions.

It is predicted that there will be additional vehicular movements due to the increase in production activity and the relocation of the brewhouse from the South site to the North site. The predicted increase in traffic emissions as a result of the proposed changes in vehicular movements is assessed and the cumulative impact determined.

Construction and demolition impacts typically cause temporary changes in local air quality. A qualitative assessment will be made of these and appropriate mitigation measures outlined.

The proposed brewery development has the potential to impact on carbon emissions, and an assessment is made of this impact.

The main source of air pollution within the vicinity of the Brewery is from combustion emissions associated with transport and domestic and commercial heating.

The development site is urban in character, adjacent to a national road, and as such the background air quality is considered to be acceptable in the context of the European Air Quality Standards, although potentially relatively poor close to busy roads and junctions.

10.1.2 Method

The purpose of this work is to assess the impact of the proposed brewery development on air quality. The assessment identifies and quantifies any potential significant impacts at the planning stage and proposes mitigation measures so that impacts can be avoided or minimised.

The method includes an assessment of the baseline air quality against the relevant air quality standards (AQS) for the suitability of the site for its proposed use. Desk-based research into pollution measurements in the vicinity of the site, supplemented with

indicative pollution measurements around the site are used to determine the baseline air quality. Consideration is made of the significant sources of air pollution in the area and any local effects that they may have. The baseline air quality is assessed for air pollutants likely to be present in significant quantities around the site that fall under legislative control. The baseline will change slightly between 2011 and 2012 due to the addition of a third roaster in 2012.

Fixed Emissions Sources

A review is made of the existing fixed emissions sources and their contribution to the baseline situation. This includes consideration of stack emissions monitoring data, ambient measurements and previous dispersion modelling assessments undertaken on behalf of Diageo Ireland. A third roaster is proposed for operational use in 2012 and is the subject of a separate planning application.

The influence of the plant on local air quality is reviewed in the context of the baseline air pollution situation.

Traffic Emissions

The National Roads Authority (NRA) provides '*Guidelines for the Treatment of Air Quality during the Planning and Construction of National Road Schemes*'. This relies in part on the method described in the UK Highways Agency - Design Manual for Roads and Bridges (DMRB). The DMRB method is followed in this instance, to determine if an assessment of the transport changes and resulting vehicular emissions is required. A quantitative assessment is required if the affected roads meet any of the following criteria:

- Daily traffic flow changes by 1,000 (annual average daily traffic) AADT or more;
- Heavy Duty Vehicles (HDV) flow changes by 200 AADT or more;
- Daily average speed changes by 10km/hr or more.

A Transport Assessment carried out for this EIS is reviewed and the changes in vehicular movements considered for the construction and operational scenarios.

Construction Emissions

The proposed brewery development has the potential to give rise to changes in local air quality as a result of vehicular emissions from construction vehicles and plant on-site and from dust. Construction traffic is considered within the transport emissions section and a qualitative assessment of the likely impact of dust is carried out as part of the cumulative emissions section.

Impact Significance General Overview

The significance of environmental effects is determined according to their magnitude and to the prevailing air quality. The method for assessing the significance of the predicted impacts is described below.

A quantifiable assessment of the impact significance of the proposed brewery development is undertaken using the methodology outlined within the National Roads Authority Guidelines presented in Table 10-A below. This is considered an acceptable

method for use in EISs. The EPA AG4 gives no guidance on the assessment of the significance of impacts.

Magnitude of Impact

Magnitude (scale of change) is determined by considering the predicted deviation from baseline conditions and the scale of the impact as presented in Table 10-A below.

Table 10-A: Definition of Impact Magnitude for Changes in Ambient Pollutant Concentrations

Magnitude of change	Annual Mean NO ₂
Very Large	Increase/decrease >25%
Large	Increase/decrease >15-25%
Medium	Increase/decrease >10-15%
Small	Increase/decrease >5-10%
Very Small	Increase/decrease >1-5%
Extremely Small	Increase/decrease <1%

The Regulations set out standards for the same pollutant which are higher for short periods and lower for longer periods. The objectives use concentrations which are derived from those shown to have adverse effects in the scientific literature, incorporating a margin of safety.

The impact magnitude criteria use readily understandable adjectives to convey the meaning of air quality statistics to a non-technical reader (Table 10-B). Table 10-C below provides the definition of impact magnitude for changes in ambient pollutant concentrations.

Table 10-B: Magnitude Criteria

Magnitude	Air Pollutants Regulated under the Air Quality Standards Regulations 2011
Negligible	Change would not be readily detected using current measurement techniques.
Low	Predicted concentrations are less than relevant Air Quality Standards.
Medium	Predicted concentrations would occasionally exceed relevant Air Quality Standards.
High	The predicted number of exceedences of a relevant Air Quality Standard is greater than that set out in the Regulation.

Table 10-C: Air Quality Impact Significance Criteria

Absolute Concentration in relation to Standard	Change in Concentration (Increase with Scheme)					
	Extremely Small	Very Small	Small	Medium	Large	Very Large
Above Standard in Do-Min	Slight adverse	Slight adverse	Substantial adverse	Substantial adverse	Very substantial adverse	Very substantial adverse
Below Standard in Do-Min, Above with Scheme	Slight adverse	Moderate adverse	Substantial adverse	Substantial adverse	Very substantial adverse	Very substantial adverse
Below Standard with Scheme, but not Well Below	Negligible	Slight adverse	Slight adverse	Moderate adverse	Moderate adverse	Substantial adverse
Well Below Standard with Scheme	Negligible	Negligible	Slight adverse	Slight adverse	Slight adverse	Moderate adverse

Whether the impact is beneficial or adverse depends on the direction of change in level of the air pollutant in question. For brevity, only the increase with the scheme criteria is listed above.

Levels of Confidence

Given that predictions can only be as accurate as the data they are based on it is important to attribute a level of confidence to which the significance of environmental effects has been assessed. Table 10-D below defines the confidence levels referred to in this report.

Table 10-D: Descriptions used to determine Confidence Levels

Confidence Level	Description
High	The significance of an environmental effect is an informed estimate likely to be based on reliable data or subjective judgement with reference to similar schemes. Further information would not result in any change to assessment of significance.
Low	The significance of an environmental effect is an estimate likely to be based on subjective judgement without reference to similar schemes. Further information would be needed to confirm assessment of significance.

Legislation

The European Union issues Directives for the control of ambient air pollution, industrial pollution and transboundary pollution.

Irish Regulations put these Directives into force in Ireland. Ambient air quality is regulated by setting standards or limits for common pollutants. Regulations may set lower limits than in the Directive.

Up to 1996, separate Directives were issued for the control of air pollution parameters such as Directive 80/779/EEC of 1980 on air quality limits values and guide values for sulphur dioxide and suspended particulates.

The 1996 Framework Directive on air quality established a structure for the long-term control of air pollution. Subsequent "daughter" Directives set ambient air quality standards for 12 pollutants. The first two of those have been adopted. These control particulates, nitrogen oxides, sulphur dioxide, lead, benzene and carbon monoxide. These have been transcribed into Irish Regulations (S.I No 271 of 2002).

The first daughter directive (1999/30/EC) relates to limit values for sulphur dioxide, nitrogen dioxide and oxides of nitrogen, particulate matter and lead in air. The second daughter directive (2000/69/EC) relates to limit values for benzene and carbon monoxide in ambient air. The third Directive controlling ozone has been published (2002/3/EC). Since ozone is a largely transboundary air pollutant it is beyond the control of local government to manage its concentration.

In 2008, Directive 2008/50/EC for ambient air quality and cleaner air for Europe (CAFÉ) was published, which superseded the foregoing Directives. The Directive drops provisional tighter limits for PM₁₀ and introduces a limit value for a smaller size fraction of particulate matter, PM_{2.5}.

This was transposed into Irish Law by the recently published Air Quality Standards Regulations 2011, S.I. No 180 of 2011. These Regulations also provide for the dissemination of public information including information on any exceedences of the target values, the reasons for the exceedences, the area(s) in which they occurred and appropriate information regarding effects on health and impact on the environment. These Regulations replace S.I. No. 33 of 1999, S.I. No. 271 of 2002 and S.I. No. 53 of 2004 which are revoked.

Pollution from industrial plant and processes is regulated under the Protection of the Environment Act 2003 (S.I. No. 27 of 2003) which sets into Irish law Council Directive 96/61/EC concerning Integrated Pollution Prevention and Control (IPPC Directive and subsequent amendments – these are now codified in Directive 2008/1/EC). Operators permitted under the system should be prevented from causing harm to the environment and from allowing emissions from their operations to cause exceedences of the air quality standards. The regulations are enforced by the EPA.

Air Quality Standards

The Air Quality Standards set out by the EU have been adopted under Irish regulation in the form of the Air Quality Standards Regulations 2011 (SI 180) and a summary of these are presented in Table 10-E below. A proposed lower Stage 2 limit for PM₁₀ (dropping the annual mean limit to 20 µg/m³) has not been retained as it was dropped from the 2008 EU Directive. A limit value for the smaller size fraction of particulate matter, PM_{2.5} has been introduced.

Table 10-E: Relevant Air Quality Standards

Pollutant	Objective		Pollutant
	Concentration		
Nitrogen Dioxide (NO ₂)	200 µg/m ³ not to be exceeded more than 18 times a year	1-hour mean	1 January 2010
	40 µg/m ³	Annual mean	1 January 2010
Nitrogen Oxides (NO _x)	30 µg/m ³	Annual Mean*	17 June 2002
Sulphur Dioxide (SO ₂)	350 µg/m ³ not to be exceeded more than 24 times a year	Hourly Mean	1 January 2005
	125 µg/m ³ not to be exceeded more than 3 times a year	24-hour mean	
	20 µg/m ³	Annual Mean*	17 June 2002
Particulates (PM ₁₀) Stage 1 (2005)	50 µg/m ³ not to be exceeded more than 35 times a year	24-hour mean	1 January 2005
	40 µg/m ³	Annual mean	1 January 2005
Particulates (PM _{2.5}) Stage 1	25 µg/m ³	Annual mean	1 January 2015
Particulates (PM _{2.5}) Stage 2 (1)	20 µg/m ³	Annual mean	1 January 2020
Carbon Monoxide (CO)	10 µg/m ³	Running 8-hour mean	1 January 2005

* for the protection of vegetation and ecosystems (this does not apply in industrial areas);

(1) Stage 2 — indicative limit value to be reviewed by the Commission in 2013 in the light of further information on health and environmental effects, technical feasibility and experience of the target value in Member States.

Where limits are set for the prevention of harm to health, averaging periods are laid out based on medical evidence as to the periods over which harm has been shown to occur and the technical practicalities of pollution measurement.

Air pollutants can be separated into 'primary' and 'secondary' pollutants. 'Primary' pollutants are emitted directly to the atmosphere, and 'secondary' pollutants are formed by reactions in the atmosphere. Some pollutants including nitrogen dioxide and PM₁₀ particulate matter are formed from both 'primary' and 'secondary' components.

Sulphur dioxide (SO₂) emissions and the resulting airborne concentrations arise from the combustion of fuels containing sulphur. Sulphur dioxide concentrations have been brought down by limiting of sulphur content of diesel and reduction in the use of coal for domestic heating.

Carbon monoxide (CO) is emitted as a result of the incomplete oxidation of fuel. Emissions of carbon monoxide from cars have been much reduced by the introduction of three-way catalysts to the car fleet.

Nitrogen oxides (NO_x) are comprised of nitrogen dioxide and nitric oxide which are emitted from the combination of nitrogen and oxygen in reactions during combustion. The actual concentration of nitrogen dioxide (NO₂) in the atmosphere is mainly influenced by the reaction of nitric oxide (NO) with ozone, and it is mainly a secondary pollutant. With respect to predicted pollutant concentrations, guidance is given in regards to short and long-term conversion factors for model output results. The following factors are applied as per EPA guidance¹⁷:

- Short-term (1 hour) average – NO₂/NO_x of 0.5;
- Annual mean - NO₂/NO_x of 1.0 (total conversion).

Particulate matter (PM₁₀) is emitted as soot during incomplete combustion of fuels, is formed in the air from the reactions of other pollutants, and arises naturally from the Earth's crustal matter (dust) and sea-salt.

PM₁₀ particulate matter may reach the level set in the short-term standard, particularly as a result of polluted air being blown on easterly winds from Britain and the continent.

Concentrations of ambient sulphur dioxide and carbon monoxide tend to be well within the standards set down.

The two pollutants most at risk of breaching Air Quality Standards are NO₂ and PM₁₀. The proposed brewery development has the potential to increase emissions of PM₁₀ and NO_x.

10.1.3 Description of Existing Environment

The Diageo Ireland site is located in the west of the City of Dublin and is situated adjacent to the River Liffey, which runs parallel to its northern boundary. The site is divided in two by James's Street (R810). The North site is accessed through Gate 6 on Victoria Quay and accommodates the energy centre in addition to the kegging operations, tanker operations, the fermentation and beer processing and other general services. The North site also receives bulk beer imports for kegging on site. The south site accommodates the grain intake facilities, the existing brewhouse and its associated collection of spent grains, the roasters and the support facilities and other activities (offices, stores, general deliveries). Vehicular movements other than those described above are staff and visitor trips.

The site is currently permitted for emissions to air from the CHP boiler and bypass stacks, afterburner roasters and the grain intake stores.

The Diageo Ireland site is urban in character and accessible by national and local transport networks. The background air quality is considered to be acceptable in the context of the European Air Quality Standards, although relatively poor close to busy roads and junctions. Figure 10.1, Volume 3, illustrates the site areas, stack locations and selected sensitive receptors within close proximity to the brewery.

Sources of Information

Under the provisions of EU Directive 96/62/EC, there is a requirement for air quality measurements to be made at appropriate locations to establish the air quality environment across national regions. The councils of the counties of Dublin make

¹⁷ EPA, Air Dispersion Modelling from Industrial Installations Guidance Note (AG4).

measurements at appropriate locations and these are presented on the website of the EPA. Air quality measurements at continuous monitoring stations in Ireland are archived on the Environmental Protection Agency (EPA) website (<http://coe.epa.ie/air/index.html>).

Use has also been made of other relevant reports readily available, and these are listed below:

- Air Quality in Ireland 2010 - Environmental Protection Agency.
- Dublin City Annual Report - Air Quality Monitoring and Noise Control Unit 2008 and 2009;
- Air Dispersion Modelling Final Report, Project Management Group (PM), May 2008;
- Dublin Regional Air Quality Management Plan 2009-2012;
- EPA - Air Guidance Note 4 Air Dispersion Modelling from Industrial Installations Guidance Note (AG4);
- National Roads Authority – Guidelines for the Treatment of Air Quality During the Planning and Construction of National Road Schemes;
- Air Quality Standards Regulations 2011, S.I. No. 180.
- Air Dispersion Modelling Report Diageo Ireland, PM Group, 2008

The Air Quality Monitoring and Noise Control Unit operate and maintain a number of air monitoring sites around Dublin City. Continuous monitoring measurements are available for, PM₁₀, PM_{2.5}, NO₂, CO, SO₂ and black Smoke. There is no diffusion tube network to measure nitrogen dioxide (NO₂) within Dublin City.

Monitoring local to the St James's site was carried out by Diageo Ireland until August 2011, adjacent with James's Street as a condition of its environmental licence.

Sources of Air Pollution

Air Quality in the Dublin region continues to comply with national and international air quality standards (AQS) for most pollutants. There are no issues with compliance for the pollutants lead, benzene, black smoke, carbon monoxide and sulphur dioxide with an overall downward trend. Trends in nitrogen dioxide and particulate concentrations appear to have stabilised in recent years (2006-2010), but there is no evidence to suggest that the levels are falling. There have been several exceedences of NO₂ Objectives at roadside monitoring locations and there is a risk of breaches in PM₁₀ also. The principal source of pollution is from traffic emissions. Advances in vehicle emission control technology appear to have been offset by increases in traffic. Other contributing factors are domestic and industrial activities and energy demands.

The Diageo Ireland site is industrial and urban in character. The site is surrounded by residential, commercial and office buildings typical of a city environment. The predominant road sources are the N4 and R810. Heuston Rail depot, St. James's Hospital and St Brendan's Hospital are situated within 1 km of the site and contribute to background pollution levels. It is unlikely that emissions associated with Dublin Port will

affect background concentrations as the prevailing wind direction is predominantly west-south-westerly.

Given the sources of air pollution described above, it is expected that the Air Quality Standards will be met in the vicinity of the site, except perhaps within a few metres of principal roads. The region is being declared an air quality management area (AQMA) in 2011.

Air Quality in Dublin City

The Dublin Regional Air Quality Management Plan (AQMP) 2009-2012 supersedes and builds upon the 1999 AQMP. It identifies a range of strategies and actions to address the potential for deterioration in the good air quality experienced across the region. Key initiatives include tackling air quality issues within the transport and energy sectors, such as effective traffic management plans and effective enforcement controls on illegal burning, excessive industrial emissions and emissions from construction activities. The whole region is expected to be declared an Air Quality Management Area for NO₂ in 2011.

Monitoring within Dublin City is shared between the EPA, Dublin City Council and Fingal County Council and meets the requirements set out within the AQMP. A map of the monitoring locations is available on the EPA website.

Data provided by Dublin City Council has been reviewed. Monitoring results from two urban background locations and the two closest monitoring locations to the Diageo Ireland site (Winetavern Street and Coleraine Street) is presented in the table below.

Table 10-F Measured Pollutant Concentrations in Dublin City

Monitoring Station	Annual Mean Pollutant Concentration µg/m ³					
	2006	2007	2008	2009	2010	Average
Ballyfermot -Urban Background						
NO _x	36.0	33.0	29.0	27.0	*	31.3
NO ₂	22.0	19.0	17.0	17.0	*	18.8
PM ₁₀	*	*	*	*	*	N/A
Rathmines - Urban Background						
NO _x	*	*	*	*	*	N/A
NO ₂	*	*	*	*	*	N/A
PM ₁₀	19.0	17.0	15.0	15.0	16.0	16.4
Coleraine Street – Roadside						
NO _x	64.0	98.0	86.0	65.0	64.0	75.4
NO ₂	31.0	43.0	36.0	36.0	33.0	35.8
PM ₁₀	21.0	19.0	19.0	10.0	12.0	16.2
Winetavern Street – Roadside						
NO _x	71.0	73.0	65.0	85.0	66.0	72.0
NO ₂	34.0	36.0	34.0	45.0	35.0	36.8

Monitoring Station	Annual Mean Pollutant Concentration $\mu\text{g}/\text{m}^3$					
	2006	2007	2008	2009	2010	Average
PM ₁₀	20.0	18.0	17.0	18.0	19.0	18.4

* Data unavailable, bold type indicates an exceedence of AQS Objectives

The measured results of key pollutants at points around Dublin City between 2006 and 2010 suggest that air quality within the Dublin region is stable. Concentrations are lower at urban background locations as would be expected. Most of the results are compliant with AQS Objectives, with the exception of NO₂ (2007 and 2009 at Coleraine Street and Winetavern Street respectively). The reduction in PM₁₀ at Coleraine Street monitoring site in 2009 and 2010 is not readily explicable given its location.

Monitoring in the Vicinity of the Development

The ambient NO₂ concentration was monitored on the Diageo Ireland site up to August 2011 in compliance with section 5.6 of the Brewery's IPPC permit. This has taken place at street level on James's Street at ITM grid co-ordinates x 714099, y 733947. The most recent monitoring results are presented in Table 10-G below. These show that the annual mean Air Quality Standard for nitrogen dioxide is being met at this roadside location. Pollution concentrations which are elevated by roadsides from vehicle emissions fall away rapidly within 5m from the road edge. The trend in measurements is downwards year-on-year, suggesting a reduction in emissions. It is possible that this is related to a reduction in vehicular traffic since the start of the economic down-turn. The measurements include the contribution of the emissions from the existing operation. The measurements suggest that the plant contribution to local NO₂ concentrations is small.

Table 10-G Measured NO₂ at the Diageo Ireland St. James's Gate Brewery Site

Annual Average NO ₂ Concentration $\mu\text{g}/\text{m}^3$			
2008	2009	2010	Average
39.0	37.7	34.7	34.5

Air Quality in Ireland

The Environmental Protection Agency Review of Ambient Air Quality Monitoring in Ireland, December 2010 assessed Ireland's compliance with the national and EU statutory requirements for ambient air monitoring and made recommendations for the development and co-ordination of Ireland's monitoring network. Air Quality is considered generally to be good, although it was noted that attention is required within urban centres where breaches of Air Quality Standards are possible.

Summary of Background Air Quality

A review of available data indicates that air quality in the vicinity of the Diageo Ireland site is within the Air Quality Standards, although the NO₂ annual mean standard may possibly be exceeded at roadside locations due to traffic.

10.1.4 Description of Likely Impacts

The likely impacts of the redevelopment to the Diageo Ireland site will be different at the construction and operation phases. Construction on the scale proposed can give rise to temporary dust emissions, which have the potential to be a cause of nuisance.

On operation, there will no change to the combustion plant of the Energy Centre, and the operational set-up will be the same. This is on the basis that the Energy Centre will continue to operate within the parameters of IPPC Licence 301-01. There will be no increase to point source combustion emissions as a result of the proposed brewery development.

Vehicle emissions will increase as a result of the increased production levels of the new brewhouse and its relocation to the North site. Staff numbers will not contribute to additional vehicle movements as a result of the proposed brewery development, as they will remain about the same.

A summary of the proposed changes to vehicle movements is detailed below.

- Vehicle movements associated with the existing brewhouse facility will transfer to the North site;
- New truck movements from the grain intake store to the new brewhouse on the North site.

However; the increase in traffic is not considered significant (refer to Chapter 14) and will not impact air quality. There are a number of residential properties within 200m of the proposed site boundary.

On Construction

The construction phase of the proposed brewery development may result in temporary dust emissions and vehicle exhaust emissions from construction vehicles. Emissions from on-site construction traffic will be temporary in nature and is unlikely to be significant. Dust emissions are generally variable in nature, and their potential impact is primarily dependent on the type of construction activity, ground conditions and weather conditions at the time. Mitigation will be applied to these emissions during construction.

In terms of health impacts, the most significant portion of particulate matter is that which is smaller than 10 microns in diameter (PM_{10}). Dust created from construction activities is generally of significantly greater diameter, and has less potential to cause adverse health impacts. The larger dust particles generated during construction tend to be deposited within 200m of their emission point. Consequently, because of the nature of the emissions, any potential impacts are most likely to be related to nuisance dust deposition in the immediate vicinity of the site rather than ambient air quality (PM_{10}) concerns.

On Operation

The proposed brewery development will require energy for the brewing process. This is to be supplied by steam and electricity from the existing Energy Centre using gas-fired Combined Heat and Power (CHP) plant and a conventional boiler. The existing operational plant comprises of three CHP gas turbines with heat recovery boilers, and

one conventional boiler. The emissions from the CHPs are ducted via a single wind-shield containing four stacks adjacent to the CHP plant. There are two barley roasters on the South Site. A third emission source from the natural gas after-burner used to abate odour emissions from a third roaster is planned for operation in 2012 and is the subject of a separate planning application.

The primary fuel of the Energy Centre is natural gas. Natural gas combustion emits mainly carbon dioxide and water vapour, with small quantities of nitrogen oxides and carbon monoxide as by-products. The Energy Centre falls under regulation by the IPPC Licence 301-01 and from this it may be inferred that its impact will be controlled so as not to cause significant harm to the environment.

There is no change to the Energy Centre emissions predicted as it will continue to operate under IPPC Licence 301-01.

There will be a change to the grain-handling process, which has the potential to emit dust however; this will be mitigated by appropriate design.

10.1.5 Emissions from Fixed Plant

There will no change to the combustion emissions from fixed plant resulting from the proposed brewery development. The development will have no impact on local air quality, with respect to combustion emissions as the Energy Centre will continue to operate within the parameters of IPPC Licence 301-01.

10.1.6 Emissions from Traffic

On Construction

A review of the Transport Assessment carried out for the EIS has been made. It is predicted that a maximum of 250 daily trips will be generated as a result of the development. This equates to an increase of 0.9 % in the AADT along Victoria Quay, which is well below the assessment requirement criteria for air quality impact assessment. Construction staff will be encouraged to travel via public transport to the site.

On Operation

Table 10-I below presents the predicted annual average daily traffic flows (AADT) with the redevelopment of the brewery operational in 2013. The 'base' and 'do something' flows are compared in the table.

Table 10-I: Predicted Daily Traffic Flow surrounding the Diageo Ireland Brewery Site

Affected Roads	AADT			
	Base	DS	% change	Change
Victoria Quay (E of Diageo Entrance)	27394	27462	0.2	68
Victoria Quay (W of Diageo Entrance)	27740	27808	0.2	68
Wolfe Tone Quay	26302	26370	0.3	68

Affected Roads	AADT			
	Base	DS	% change	Change
Watling Street	3600	3611	0.3	10
Thomas Street (E of Watling Street)	23475	23485	0.0	10
James's Street (W of Watling Street)	24979	24999	0.1	20
Echlin Street	7282	7302	0.3	20
James's Street (W of Bow Lane)	19142	19142	0.0	0

The predicted change at affected roads is well below the DMRB screening criteria at which it is required to carry out a quantitative assessment. As such the impact of traffic can be screened out from this assessment, as having a negligible impact on local air quality.

10.1.7 Mitigation

On Construction

The only likely significant air quality impact during construction will be the generation of dust. The CEMP will ensure that any potential emissions arising from dust during the construction phase will be mitigated. Typical elements of such a program are set out below and could be used during construction of this development

(i) *Minimise Fugitive Dust Emissions from Material Storage*

- The cut and fill programme can be designed to minimise internal site movement of material. All handling areas shall be maintained in a dust free state as far as is practicable. Sprinklers and hoses can be used to minimise any dust escape from site boundaries.
- Stockpiles of dusty materials shall be damped down using water sprays during dry weather.
- Procedures shall be established so that the site is regularly inspected for spillage of dusty or potentially dusty materials and any such spillage dealt with promptly.

(ii) *Ensure that Dust from Vehicle Movements within the Site are Minimised*

- Access to the site shall be from a single location. Roads shall be kept free of dust and cleaned as far as practicable.
- Routes shall be regularly damped down using water bowsers during periods of dry weather as necessary.
- Appropriate speed limits shall be established and enforced over all unmade surfaces.
- Wheel washing facilities shall be installed as necessary and heavy vehicles leaving the site will be required to use the installations as appropriate.

(iii) Implement Appropriate Cleaning of the Public Highway

- Subject to approval from DCC, the public highway immediately outside the site entrance shall be cleaned using vacuum sweeper brushes and other specialised road cleaning equipment as necessary to maintain an appropriate state of cleanliness.

(iv) Monitor Compliance with this Code

- Contractors shall be required to set up their own monitoring programme to evaluate compliance with this code.
- All policies, practices and procedures shall be periodically reviewed to ensure their appropriateness.

On Operation

The greatest contribution to mitigating the energy consumption of the development will rely on the building design and construction. The technologies selected to provide its energy requirements will determine the actual emissions of air pollutants. Of the possible sources of fossil fuel energy for the development, natural gas is likely to emit the smallest quantity of combustion by-products relative to other fuel options. As the Energy Centre will continue to operate under IPPC Licence 301-01, the carbon emissions of the developed development are not expected to increase significantly. However, as a result of improved processing technologies in the proposed brewery development, the carbon footprint per unit of product is expected to decrease.

There will be a change to the grain-handling process, which has the potential to emit dust however; this will be mitigated by appropriate design.

10.1.8 Residual Impacts

On Construction

With appropriate mitigation in place the residual impact of this aspect is considered to be negligible.

On Operation

The operation of the proposed brewery development will have no significant impact on local air quality as the energy centre continues to operate under IPPC Licence 301-01.

10.1.9 Summary of Key Findings

The key findings of the assessment are summarised below:

- Air quality in the vicinity is acceptable relative to EU Standards, except perhaps close to some roadsides;
- The impact of the fixed plant emissions on air quality in the vicinity of the proposed brewery development is likely to have no significant effect.

- Dust may cause nuisance during the demolition and construction phase, but this can normally be completely mitigated by good construction practice. In any event, the impact will be temporary.

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10.2 Odour Assessment

10.2.1 Introduction

This section of the Chapter presents the findings of the odour impact assessment for the re-development of the brewing facilities at St. James's Gate Guinness Brewery, Dublin.

Under Section 172 (1) of the Planning and Development Act 1990 and Article 24 of the European Communities (Environmental Impact Assessment) Regulations 1989-2001 an EIS shall be prepared to meet the planning requirement of the proposed brewery development.

Schedule 1, Part 2 of the European Communities (Environmental Impact Assessment) Regulations 1989-2001 outline that an Environmental Impact Statement (EIS) is required for "all installations for commercial brewing and distillation, installations for malting where the production capacity would exceed 100,000 tonnes per annum".

The permit to operate includes condition 5.9, which states:

The licensee shall ensure that all operations on-site shall be carried out in a manner such that air emissions and/or odours do not result in significant impairment of, or significant interference with amenities or the environment beyond the site boundary.

The EPA Acts 1992 and 2003 provides a definition of Environmental Pollution as follows:

The direct or indirect introduction to an environmental medium, as a result of human activity, of substances, heat or noise which may be harmful to human health or the quality of the environment, result in damage to material property, or impair or interfere with amenities and other legitimate uses of the environment

This definition of pollution is defined in Article 2 of Directive 2008/1/EC. It is interpreted to include odour, since it results from the introduction to the air of substances which impair or interfere with amenities.

Irish Guidance AG4 Air Dispersion Modelling Note includes advice on assessing the odour impact for existing installations. Also, Air Guidance Note 5 is a document describing the method of odour assessment for exiting facilities licensed by the Agency. These guidance notes have been reviewed and the methods recommended have been followed to assess the impact. This guidance is considered in conjunction with the odour guidance from the UK Environment Agency, and the guidance produced for Local Councils in the UK.

Guidance Note AG4 refers to UK Environment Agency Integrated Pollution Prevention and Control Horizontal Guidance for Odour - H4 (June 2008 working draft). This guidance was originally drafted in 2002, and has changed substantially since then. The original draft is prescriptive in terms of numerical levels which would be expected to cause annoyance. The current working draft is still prescriptive in this way, but now includes psychological evaluation of the reasons for likely annoyance from odour.

There are no significant sources of odour in the locality other than those present on the Diageo Ireland site.

10.2.2 Methodology

The purpose of this work is to assess the impact of the proposed brewery development on local residents as regards odour, as part of an Environmental Impact Assessment, as is required by European law for a development of this size. The assessment must identify and quantify any potential significant impacts at the planning stage and recommend mitigation measures so that impacts can be avoided or minimised.

The method includes an assessment of the baseline odour environment in terms of what the complaints record is for the existing site. A monitoring campaign was undertaken to measure representative sources of odour from the current brewing operation to inform the development of a model for the proposed brewhouse.

The new sources of emissions from the proposed brewery development include the emissions from the three brewery process lines. These are assigned the same odour concentrations as the similar emissions sources on the existing brewery.

Information was sought from the brewery designers on the location and strength of the odour emissions. Odours are usually categorised by hedonic tone. The interaction of one odour with another is not straightforward, and one odour may mask another, or amplify it. For this assessment, all odours have been characterised as having the same hedonic tone, and are treated in the same way in the model.

The impacts from the proposed sources of odour are assessed using modelling techniques as set out below.

Mitigation measures are suggested to reduce the impacts identified, and assessment of the likely residual impact is made.

The AG4 guidance reproduces information from the UK H4 guidance, which categorised brewery odours as relatively inoffensive. This same category includes confectionery manufacture, coffee roasting and bakeries. It suggested that at a 98th percentile concentration of 6 OUE/m³, there would be likely cause for annoyance among 10% of the exposed population (see 'Benchmarks' in Appendix 2 of the appended H4 guidance). This is taken as the benchmark for this assessment. 1 European Odour Unit (OUE) is defined as the point of detection at a concentration of 1 per cubic metre of air (1 OUE/m³). Therefore 6 OUE/m³ is the concentration not at which the odour becomes detectable, but at which it becomes a nuisance, to a proportion of the population.

It should be noted that there is a great deal of uncertainty associated with odour measurement. As a consequence, odour guidance provides benchmarks, though these are not legal standards.

Fixed Emissions Sources – ADSM4.2 Modelling Assessment

The existing brewery has several vents to atmosphere which were screened for their potential to be odour sources. These potential sources were then screened for significance. A detailed dispersion model is used to quantify the impact of the emissions from the proposed brewery processes. Emissions from the roaster after-burners and waste water neutralisation plant (WWNP) were considered and screened out. The roaster offgases are routed through an afterburner to eliminate odours and

WWNP odours are fugitive by nature and are not amenable to modelling. Predicted odour emissions from the significant sources are modelled using the industrial point source model ADMS4.2. This UK model is regularly used to assess the impact of emissions from industrial sources for the purposes of regulatory compliance.

In consultation with Diageo Ireland, a single operational scenario is modelled for the odour emissions from the proposed brewhouse, based on the batch processes in place, with time-varying emissions. The scenario assessed is average production and takes place 365 days a year.

Impact Significance

It is not possible to predict the significance of the impact of the odour against any prescriptive threshold, on a scale that is recognised in common use.

Impacts above the benchmark level at residential locations may be taken to be substantial, depending on the sensitivity of the receptor.

10.2.3 Description of Existing Environment

The St. James's Gate is located in an urban area with mixed land uses nearby, including major roads, a hospital, Heuston Railway Station, the River Liffey and residences. There are no significant sources of food or drink industry odours nearby.

Sources of Information

The following sources of information have been used in assessing the potential odour impact of the proposed brewery development:

- EPA – Air Guidance Note 4 (AG4) Air Dispersion Modelling Guidance Note
- EPA - Air Guidance Note 5 (AG5) Odour Impact Assessment Guidance for EPA Licensed Sites.
- Odour Testing of Exhaust Emission from Diageo Ireland Brewing Process, September 2011,
- Annual Environmental Reports for the St. James's Gate Brewery, 2008-2010,

Process description of the proposed brewhouse,

Odour Complaints Record

The current operation has an Environmental Management System, which systematically records complaints of an environmental nature. The complaints record is published in the Annual Environmental Report.

Odour Measurement from Fixed Sources on the Existing Brewery

An odour measurement campaign was carried out on the 13th September 2011, taking samples from representative emission points on the existing brewery. The odour concentrations are combined with calculated volume flowrates to arrive at emission rates for each of the vessels in use in the brewhouse.

10.2.4 Description of Likely Impacts

The dispersion of the odour emissions from the proposed brewery development is predicted below, and concentrations are explicitly calculated at the nearest residential locations.

The new brewhouse will have three process lines. There will be vented emissions from the Lauter Tuns, Mash Tuns, Mash Cooker, Wort Kettles, RMX Tanks, Wort Aerator and Whirlpools. Odour concentration measurements made on the existing plant are comparable with values obtained from the literature.

It is the case that process management, general housekeeping and waste management can affect odour emissions from process plant in a variable way. For example, plant break-downs will likely give rise to un-planned emissions from time to time, and these will be minimised by an effective management system. Odour will be managed under the Diageo Ireland Environmental Management System.

10.2.5 Odour Emissions from Proposed Fixed Plant

Modelling of Emissions from Fixed Plant

The dispersion of odour emissions from the fixed plant on-site was modelled using the proprietary dispersion model ADMS4.2. The model was developed in the UK and is regarded as being appropriate for assessments of this kind. The modelling methods are described in Volume 4, Appendix 10.1. Odour emission values were measured on the existing brewery and mapped to corresponding operations in the proposed brewery development. The volume flow rates from the proposed brewery development were supplied by the brewery designer.

Within the model, 98th percentile odour predictions were made. This predicts the odour concentration for the highest 175 hours of the year. Modelling was carried out using three different years' meteorological data from nearby Dublin International Airport. The use of different meteorological years gives an insight into the interannual variability of dispersion caused by weather conditions. For simplicity, the results from 2005 are presented in this assessment, which predicted the highest pollutant concentrations during the sensitivity tests.

Calculations of odour concentrations are made at specific receptors near to the plant. These are shown in Figure 10.1, Volume 3.

(a) Assessment Results

(i) Modelling Assessment

There are no residential locations where the prediction is above the benchmark level of 6.0 OUE/m³ for the proposed brewhouse. A contour plot of the predicted odour concentration with the proposed brewery development is shown in Volume 3, Figure 10.2.

(ii) Impact Significance Assessment

There is no recognised system for categorising the significance of the odour impact. The majority of selected receptors meet the threshold set out in the UK working guidance, adopted by the Irish EPA guidance. The assessment shows that no

residential properties are likely to experience odour concentrations at levels which are likely to result in odour complaints.

10.2.6 Mitigation

The brewing processes proposed will represent the 'state-of-the-art' in terms of brewing technology. As such, the proposed plant will be more advanced than the existing brewery, in terms of minimising odorous emissions to atmosphere. For example, the wort kettles will vent for a much shorter time than is the case with older technology. The proposed brewhouse will be an integrated design, replacing a brewhouse which developed in vessel capacity and brew lines over a period of approximately 40 years.

In addition, several of the new brewhouse stacks are increased in elevation to ensure that any brewing odours are diluted and dispersed.

10.2.7 Residual Impacts

On Operation

The location of the proposed brewery development is located adjacent to receptors previously less affected by existing brewing odours. However, the elevated stack heights incorporated into the brewery design will result in significant odour dispersion and dilution. There are no residential receptors shown to exceed the benchmark level of 6.0 OUE/m³ so the residual impact is insignificant.

10.2.8 Summary of Key Findings

The key findings of the assessment are summarised below:

- Brewery odours are categorised as relatively inoffensive;
- There is a working UK benchmark of an hourly concentration 6.0 OUE/m³ as a 98th %ile of the annual hourly concentrations for annoyance from odour, which has been adopted in Ireland by the EPA;
- An odour model of the proposed brewhouse shows no offsite receptors are exposed to odour concentrations above the guidance threshold.
- Mitigation of the odour emissions is incorporated into the design by releasing the most significant emissions at an appropriate height to allow sufficient dispersion and dilution.

11.0 NOISE AND VIBRATION

11.1 Introduction

This chapter presents the findings of the noise and vibration assessment for the proposed brewery development. The existing site is within a mixed commercial and residential area with further details provided in Chapter 5. The closest noise sensitive receptors are identified below:

- The Maltings Residential Apartment Blocks, on Watling Street, to the east;
- Emmet Buildings Residential Apartment Blocks, on Watling Street, to the east;
- Apartments above shops on St James's Street, to the south-west;
- St James's Church, on St James's Street, to the south-west;
- St James's Gate Residential Apartment Blocks, on St James's Street, to the south-west;
- Saint Patricks University Hospital, on Steeven's Lane, to the west.

To aid the understanding of this assessment, definitions of some of the terms used are detailed in Appendix 11.1 in Volume 4 of this EIS. The overall aim of this Chapter is to address noise under the following headings:

1. Baseline noise as determined at potentially sensitive receptors.
2. Noise arising from construction of the proposed brewery development.
3. Predicted future operational noise excluding baseline noise. This is added to the baseline noise at potentially sensitive receptors to give the overall projected noise.

11.2 Methodology

11.2.1 Baseline Data Collection

The Diageo Ireland facility operates under IPPC Licence 301-01 and there are licence limits applied for day and night time. These limits are 55 dBA LAeq for day and 45 dBA LAeq for night. An interpretation margin of 2 dB is applied in assessing limit exceedance.

As required by this licence, Diageo Ireland carry out a noise survey annually at the boundary and at off site noise sensitive location. These results are reported to the EPA and included in the Diageo Ireland Annual Environmental Report (AER). This monitoring is carried out at multiple receptors adjacent to both the North and South sites. Recent IPPC noise survey data only for the relevant receptors is included in this assessment.

In order to generate additional baseline information specifically for the proposed brewery development, further baseline noise monitoring has been undertaken. Measurements were undertaken at three locations considered representative of the nearest noise sensitive receptors to the proposed alterations at the existing facility. The baseline data for the sensitive receptors does not differentiate between noise

generated by Diageo activities and noise arising from routine city centre activities including cars, HGVs, buses, Luas, pedestrian traffic etc.

11.2.2 Construction Noise and Vibration

In assessing the potential noise and vibration impact at nearby sensitive receptors during construction, the model has focussed on the worst-case phases early in the construction phase without application of mitigation steps as these are typically defined in the Construction Environmental Management Plan.

In order to estimate the potential noise levels at the nearest sensitive receptors, a computer based noise model has been prepared. The CadnaA Noise Modelling Software package has been used. This software package utilises the noise propagation algorithms within ISO 9613: Acoustics - Attenuation of sound during propagation outdoors for noise from fixed and mobile plant and equipment on-site. Predicted free-field daytime noise levels have been determined at various receptor heights. The model takes into account the ground topography in the local area, the heights of noise sources, and screening by intervening buildings and structures.

Noise predictions were made for a temperature of 10 °C, 70% relative humidity and with a light wind blowing directly towards each of the receptors.

Construction Traffic

The proposed HGV movements for the development are well below 1,000 vehicles per day and as such the methodology within the UK Calculation of Road Traffic Noise 1988 (CRTN) cannot be used for predicting noise from on site vehicle movements. Therefore, the Haul Route Calculation procedure within British Standard (BS) 5228: 2009 – Code of practice for noise and vibration control on construction and open sites, Part 1: Noise has been used to calculate the typical noise from the on site HGV movements.

Construction Activities

At this stage, the exact construction schedule and plant and equipment to be used have not been finalised. However, based on experience of similar construction projects, details of anticipated construction plant and equipment have been selected for modelling.

The worst case noise generation activities will happen in the initial phase of construction during cutting and removal of existing concrete slabs, cut and fill, piling and other ground works. Inclusion of these in the model will provide an accurate assessment of worst case noise levels. For the purposes of modelling, the initial construction activities are split across two phases:

- Enabling Works (Site Preparation), including Demolition;
- Foundations and Groundworks, including Piling.

The above construction phases would take place in a number of locations on the North site. Construction scenarios with the equipment positioned at each of these locations have been undertaken. Full details of the plant and equipment in the phases above, together with the modelling basis, are presented in Appendix 11.2 with suggested mitigation identified in Section 11.9.3.

11.2.3 Operational Noise and Vibration

In order to predict operational noise emissions associated with the proposed brewery development, consideration has been given to the identification of noise sources that may have a potential impact outside the site boundary. The plant equipment located within the new brewhouse or associated buildings were screened out as the building fabric represents full mitigation. The selected noise sources are:

- Outdoor water pumps located in the Utility Plant;
- Rooftop Air Handling Units (AHUs);
- Rooftop Evaporative Condensers;
- Raw Material Tower aspiration
- Additional forklift trucks (FLT) operating in the Camac Yard arising from relocated logistics activities;
- Uplift in numbers of HGV movements, for deliveries to and collections from the proposed development area.

The fixed noise sources at the proposed brewery development area will be operational throughout a 24 hour period. For this assessment, a conservative assumption of continuous operation over 24 hours has been assumed. Similarly, the FLT activities would potentially take place at any point over a 24-hour period, so have been included in both the daytime and night-time predictions. There would however be fewer forklift trucks in operation at night, and this has been taken into account in the modelling undertaken.

The HGV movements and off-load/loading activities will be restricted to daytime operation only for 16 hours per day (approximately 06:00 – 22:00). Therefore, consideration has been given to two operational scenarios within this assessment. The first scenario is considered to represent a “typical” working day, with a variety of operations taking place throughout the course of the day. The second scenario is considered to represent a “typical” working night, with the same brewing operations, reduced forklift activity in the Camac Yard but no HGV movements.

Full details of the operational scenarios considered are presented in Appendix 11.3.

Operational Road Traffic

Consideration has been given to the potential impact of noise arising from changes to road traffic flows as a result of construction and operation of the proposed brewery development. Predicted total traffic flows for the assessment year of 2015, in terms of daily flow levels and percentage of Heavy Goods Vehicles (HGVs), have been provided. Refer to Chapter 14 for this assessment where the additional operational traffic on public roads external to the site is deemed to be insignificant. Section 11.8.3 includes details of additional internal site traffic that is included in the assessment.

11.3 Legislation and Guidance

11.3.1 Construction Noise and Vibration

BS 5228-1: 2009

In order to give an indication of the potential noise impact from construction activities, reference has been made to BS 5228-1: 2009 for basic information and procedures for noise and vibration control. The standard provides information on the factors which affect the acceptability of site noise and the degree of control necessary. It also provides a methodology for the prediction of site noise at sensitive receptors and provides guidance on possible mitigation measures.

BS 5228-1: 2009 provides two methodologies for the prediction of significance during typical construction works, based upon noise change and existing measured ambient noise levels. Since there are a mix of residential and other sensitive receptors in the vicinity (such as a church and hospital), the procedure within Method 2 has been utilised (as Method 1 is for residential receptors only).

Method 2 – The 5 dB(A) Change Method

Noise levels generated by construction activities are deemed to be significant if the total noise (pre-construction ambient plus construction noise) exceeds the pre-construction ambient noise by 5 dB or more. This criterion is subject to lower cut-off values of 65 dB, 55 dB and 45 dBLAeq from construction noise alone, for the daytime, evening and night-time periods respectively. This applies for a period of one month or more, unless works for a shorter duration are likely to result in significant effect.

The evaluation criteria in Method 2 is generally applicable for residential housing, hotels and hostels, buildings in religious use, schools and health or community facilities.

BS 5228-2: 2009

Reference has been made to BS 5228-2: 2009 – Code of practice for noise and vibration control on construction and open site – Part 2: Vibration which provides guidance on human responses to vibration and building structural responses to vibration. The standard also presents guidance for the control of vibration from construction works.

The standard provides guidance on the human response to vibration, reproduced from BS 6472-1: 2008 - Guide to evaluation of human exposure to vibration in buildings: vibration sources other than blasting, in terms of peak particle velocity (PPV), which is the instantaneous maximum velocity reached by a vibrating element as it oscillates about its rest position. For construction works, the following guidance is provided:

Table 11-A: Guidance on the Effects of Vibration Levels from BS 5228-2: 2009

Vibration Level	Effect
0.14 mm/s	Vibration might just be perceptible in the most sensitive situations for most vibration frequencies associated with construction. At lower frequencies, people are less sensitive to vibration
0.3 mm/s	Vibration might just be perceptible in residential environments

Vibration Level	Effect
1.0 mm/s	It is likely that vibration of this level in residential environments will cause complaint, but can be tolerated if prior warning and explanation has been given to residents
10.0 mm/s	Vibration is likely to be intolerable for any more than very brief exposure to this level

For building structure response, BS 5228-2: 2009 reproduces the advice given in BS 7385-2: 1993 - Evaluation and measurement for vibration in buildings: guide to damage levels from ground borne vibration. The response of a building to ground borne vibration is affected by the type of foundation, underlying ground conditions, the building construction and the state of repair of the building. **Table 11-B** reproduces the guidance detailed on building classification and guide values for cosmetic building damage.

Table 11-B: Transient vibration guide values for cosmetic building damage

Type of Building	PPV in frequency range of predominant pulse	
	4 Hz to 15 Hz	15 Hz and above
Reinforced or framed structures	50 mm/s	50 mm/s
Industrial and heavy commercial buildings		
Un-reinforced or light framed structures	15 mm/s at 4 Hz increasing to 20 mm/s at 15 Hz	20 mm/s at 15 Hz increasing to 50 mm/s at 40 Hz and above
Residential or light commercial buildings		

Minor damage is possible at vibration magnitudes which are greater than twice those given in **Table 11-B**, with major damage at values greater than four times the values in the table. BS 7385-2: 1993 also notes that the probability of cosmetic damage tends towards zero at 12.5 mm/s peak component particle velocity.

NRA Guidance

Although not strictly applicable to a commercial development such as this, the National Roads Authority (NRA) publication titled Guidelines for the Treatment of Noise and Vibration in National Road Schemes provides guidance on indicative limits for construction noise. **Table 11-C** below provides the indicative noise limits typically deemed acceptable by local authorities for national road schemes.

Table 11-C: Maximum Permissible Noise Levels at the Façade of Dwellings during Construction

Days and Times	LAeq (1-hour) dB	LAmx (slow) dB
Monday to Friday 07:00 – 19:00	70	80
Monday to Friday	60*	65*

Days and Times	L _{Aeq} (1-hour) dB	L _{Amax} (slow) dB
19:00 – 22:00		
Saturday 08:00 – 16:30	65	75

* Construction activity at these times, other than that required in respect of emergency works, will normally require the explicit permission of the relevant local authority

The noise levels quoted in **Table 11-C** above are façade levels. The CadnaA noise model created generates free-field predictions, therefore, a -2.5 dB reduction is required to the noise levels above in order to compare them against the predicted noise levels.

According to the NRA publication, there is no published Irish guidance relating to vibration during construction activities. Instead, common practice in Ireland has been to use guidance from internationally recognised standards.

Vibration is typically expressed in terms of Peak Particle Velocity (PPV) in millimetres per second (mm/s).

As such, reference has been made to the guidance within BS 5228-2: 2009, detailed above, for the construction vibration impact assessment.

11.3.2 Operational Noise and Vibration

Environmental Protection Agency

Condition 9.3 of the Diageo Ireland IPPC Licence 301-01 for the site states that “noise attributable to on-site activities should not generally exceed a free-field A-weighted rating noise level of 55 + 2 dB by daytime (08:00 to 22:00) and a free-field L_{Aeq} noise level 45 + 2 dB by night-time (22:00 to 08:00), at any noise sensitive location. These limits assume that the noise emissions are not tonal or impulsive.

BS 4142: 1997 Assessment

The likelihood of complaints about noise from industrial establishments, made by persons living in the vicinity, is assessed using the procedures laid out in BS 4142: 1997 - Method for Rating Industrial Noise Affecting Mixed Residential and Industrial Areas. A comparison is made between the noise attributable to the development, expressed as L_{Aeq} (defined in BS 4142 as the ‘specific noise’), adjusted to take into account of tonal or impulsive characteristics (‘rating level’), and the existing background noise level expressed as LA90. Where the characteristics of the operational noise are such that it tends to attract attention (i.e. tonal or impulsive noise), a +5 dB correction is made in the assessment.

The standard states, “A difference of around +10 dB or more indicates that complaints are likely. A difference of around +5 dB is of marginal significance. If the rating level is more than 10 dB below the measured background noise level this is a positive indication that complaints are unlikely”. Although this is not an Irish standard, it has been included within the assessment as a recognised approach for determining the potential for noise complaint.

IOA/IEMA Draft Guidelines for Noise Impact

The Institute of Acoustics (IOA) and Institute of Environmental Management and Assessment (IEMA) have produced draft guidance on noise impact assessment in a document titled 'Guidelines for Noise Impact, Consultation Draft, 2002'. According to this guidance, the noise impact at a property/location may be categorised according to the changes in noise level as shown in **Table 11-D** below.

Table 11-D: Noise Change Criteria

Noise Change (dB)	Category
0	No Impact
0.1 – 2.9	Slight Impact
3.0 – 4.9	Moderate Impact
5.0 – 9.9	Substantial Impact
10.0 or more	Severe Impact

Various factors such as the time of day, nature of the noise source and frequency of occurrence must also be considered to determine whether the impact should be placed in a higher or lower category. From a summary of the effects at relevant receptors, a judgement is made of the overall noise impact.

11.3.3 Road Traffic Impact

In order to determine if there is an increase in noise from additional traffic arising from the development; predictions have been undertaken to the methodology contained in CRTN produced by the UK Department of Transport. Refer to Chapter 14 for this assessment where the additional operational traffic is deemed to be insignificant. Traffic noise is generally assessed in terms of change in dBLA10, 18-hour noise levels. This represents the arithmetic mean of noise levels exceeded for 10% of the time in each of the 18 hours between 06:00 and midnight.

11.4 Description of Existing Environment

The proposed brewery development is located on the North site of the existing Diageo Ireland brewing facility at St James's in Dublin. The nearest sensitive receptors to the proposed brewery development construction sites are residential apartment blocks located to the east of the site. Further sensitive receptors are located to the south (St James's Church and an adjacent apartment block) and to the west (Saint Patricks University Hospital). The receptors to the south and east are notably further from the proposed development construction areas however; logistics activities will be relocated to this area (Camac Yard) to facilitate the construction of the new brewhouse.

The closest properties to the site have been chosen to ensure that this assessment accurately reflects the potential impact of construction work on receptors.

11.5 Noise Surveys

In order to determine the baseline, existing monitoring information was assessed in addition to new specific monitoring.

IPPC Baseline Noise Survey 2010

The following is extracted from the Environmental Noise Survey submitted by Diageo Ireland in the 2010 AER for monitoring completed at Watling Street.

- Full compliance was achieved with the daytime noise limit.
- The maximum night-time noise was measured at 49 dBA.
- There was no clearly audible or measurable tonal or impulsive noise component in the noise emission from the activity.

IPPC Baseline Noise Survey 2011

The following data was collected in November 2011 at Watling Street for the purposes of the 2011 AER. This information has not been formally issued to the EPA but is included for completeness.

- Full compliance was achieved with the daytime noise limit.
- The maximum night-time noise was measured at 49 dBA.
- There was no clearly audible or measurable tonal or impulsive noise component in the noise emission from the activity.

EIS Baseline Noise Surveys

In order to provide a specific baseline for the proposed brewery development to supplement the existing IPPC data, weekday and weekend noise monitoring has been undertaken at the three locations in **Table 11-E**:

Table 11-E: Baseline Noise Monitoring Locations

Measurement Location	Location Description	Co-ordinates (ITM)	
		xxxxxx	yyyyyy
Location 1	Western side of Watling Street near the Emmet Buildings apartment block on top of the eastern Bi-Centenary (leisure) Centre building - upper roof, southern edge, four storeys high at roof line)	714216	734199
Location 2	Western side of Watling Street on top of the narrow derelict building between the St. James's Gate water treatment plant and The Maltings apartment block (southern edge, two storeys high at roof line)	714192	734054
Location 3	Adjacent to site boundary with St James's Gate Apartment Blocks, elevated on mobile platform at approximately 8 m height	713842	733996

Baseline noise monitoring was undertaken at these locations as the following times:

Location 1 Thursday 28 July to Thursday 4 August 2011

Location 2 Thursday 28 July to Thursday 4 August 2011

Location 3 Friday 4 November to Monday 7 November 2011

Each of the monitoring locations were within the Diageo Ireland boundary to ensure that noise monitoring equipment could be left unattended over the extended survey periods. The locations chosen are in the same direction as the receptors and are intended to closely reflect the baseline noise at selected receptors. As these are internal site measurements and do not account for increased distance to receptors, they represent a conservative approach.

The noise measurement locations used are illustrated in the Baseline Noise Monitoring Location Plan, which is provided as Figure 11.1 in Volume 3.

11.5.1 Instrumentation

Measurements were undertaken using class 1 precision grade instrumentation integrated into all-weather monitoring stations. The instruments were located in free field locations, with the microphone at a height of approximately 1.5 m above roof / mobile platform height. Measurements were undertaken with due regard to BS 7445-1: 2003 - Description and Measurement of Environmental Noise. The data collected included LAeq, LA90, LA10 and LA1 noise levels.

For the noise monitoring at Locations 1 and 2, each monitoring station consisted of a Cirrus 811B sound level meter, protected by an environmental enclosure and connected to an external Cirrus microphone. The monitoring stations were set to record continuously and store results every 60 minutes. Each noise monitoring station was calibrated using a Cirrus CR-511 calibrator. Calibrations were undertaken at the start of the survey at each location and checked at the end. There were no variations in calibration.

For the noise monitoring at Location 3 from Friday 4 to Monday 7 November, the monitoring station consisted of a Cirrus Optimus Green sound level meter, protected by an environmental enclosure and connected to an external Cirrus microphone. The monitoring station was set to record continuously and store results every 60 minutes. The noise monitoring station was calibrated using a Cirrus calibrator. Calibrations were undertaken at the start of the survey at each location and checked at the end. There were no variations in calibration.

11.5.2 Weather Conditions

Noise Survey from 28 July to 4 August 2011

In general, weather conditions were considered suitable for noise monitoring. However, for the daytime periods, wind speeds were generally greater than ideal and two periods of light rain (on Sunday 1 August and Tuesday 3 August 2011) were also noted. However, measured noise levels did not appear to be significantly affected during these periods and, as such, all data has been included in the averages derived. Further details of the weather conditions throughout the survey period are presented below.

Thursday 28 July was dry and cloudy, with moderate winds generally in the order of 4 m/s.

Weather conditions on Friday 29 July were again dry and cloudy, with winds in the order of 3.5 m/s up until 07:30, when speeds increased to over 6 m/s. Average wind speeds stayed above 5 m/s until about 17:00. Wind speeds then gradually eased towards midnight.

Saturday 31 July was dry and cloudy, with average wind speeds in the order of 2 m/s until 09:00, when wind speeds started to increase. By 10:00, average wind speeds were above 5 m/s and continued as such until 21:00. The wind then eased towards midnight.

On Sunday 1 August between 00:00 and 19:00, average wind speeds were generally above 5 m/s with light rain and drizzle noted periodically between 14:30 and 21:00. Between 19:00 and midnight wind speeds again eased.

For Monday 2 August, the weather was cloudy and dry, with moderate wind speeds.

Tuesday 3 August was dry up until 04:30 with moderate winds. Some light drizzle was noted during the morning period. Wind speeds were on average above 5 m/s for the period between 07:00 and 15:00. The wind eased towards the end of the day.

On Wednesday 4 August, weather conditions were cloudy with moderate winds until midday. After midday, conditions started to get windier with average wind speeds above 5 m/s for the rest of the day.

Thursday 5 August was mostly cloudy, with moderate winds and some early morning light drizzle. After 08:00, wind speeds started to increase with average wind speeds above 5 m/s for the rest of the day.

On Friday 6 August, weather conditions were dry and partly cloudy with average wind speeds generally above 5 m/s.

Noise Survey from 4 to 7 November 2011

Weather conditions on Friday 4 November were generally clear and sunny, with winds speed generally below 5 m/s. Wind speeds then gradually decreasing from 15:00 towards midnight.

Saturday 5 November was generally clear with some cloud cover between 07:00 and 19:00. Wind speeds were generally below 5 m/s. The weather remained dry overnight.

On Sunday 6 November weather conditions were clear for most of the day, with scattered clouds from 17:30. Wind speeds were generally below 4 m/s, gradually easing towards the end of the day.

For Monday 7 November weather conditions were partly cloudy with winds in the order of 3 m/s up until 11:00, when speeds increased to over 6 m/s around 13:00.

11.5.3 Dominant Noise Sources

Notes of the dominant noise sources at each location were made at the start and end of the survey period. The current noise climate is influenced by noise from distant road traffic, as well as plant and machinery.

At Location 1, noise from traffic, general facility noise, a steady hum from machinery / plant directly to the northwest and seagulls were noted.

At Location 2, noise from hoses at Tank Station No.3 (as they fill the tanker trucks), a hum from the adjacent Effluent Treatment Plant, road traffic, and occasional engine noise from keg loading trucks to the northwest were noted.

At Location 3 from Friday 4 to Monday 7 November 2011, noise from road traffic, general facility noise, vehicle movements within the Diageo Ireland site and intermittent noise from keg and equipment handling were noted. In addition, noise from earthworks (breaking of hard top material) was audible at the start and end of the survey but ceased for the weekend period.

11.5.4 Results Summary

Refer to Appendix 11.1 for a definition of individual averaged noise level units of measurement. For this assessment, LAeq is the measurement utilised. A summary of the baseline daytime, evening and night-time noise levels is provided in **Tables 11-F** and **11-G** below.

Table 11-F: Summary Noise Results for Location 1

Date and Day of Week	Period	Averaged Noise Levels dB				
		LAeq	LAmx	LA1	LA10	LA90
Weekday Average	07:00 – 19:00	58	76	63	59	54
	19:00 – 23:00	57	74	61	58	54
	23:00 – 07:00	55	72	61	56	52
Weekend Average	07:00 – 19:00	56	74	61	58	53
	19:00 – 23:00	56	74	61	57	53
	23:00 – 07:00	55	72	61	56	52

It can be seen from the table above that averaged ambient and background noise levels were reasonably consistent for the periods monitored despite the variation in weather conditions throughout the survey. There was relatively little variation between daytime, evening and night-time noise levels.

Daytime ambient LAeq noise levels varied from 55 dB on the Bank Holiday Monday (1 August) to 59 dB on Thursday 28 July, with background LA90 noise levels varying between 53 and 56 dB. Evening averaged ambient and background noise levels varied between 55 and 58 dBLAeq and 52 and 56 dBLA90 respectively. Night-time averaged ambient noise levels varied from 54 to 57 dB, with averaged background noise levels in the range 51 to 55 dB.

Daytime and evening weekend averaged noise levels were slightly lower (by 1 or 2 dB) than the equivalent weekday averaged levels. Night-time averaged noise levels were identical for both the weekend and weekday periods.

Table 11-G: Summary Noise Results for Location 2

Date and Day of Week	Period	Averaged Noise Levels dB				
		LAeq	LAmx	LA1	LA10	LA90
Weekday Average	07:00 – 19:00	62	80	69	64	57
	19:00 – 23:00	60	80	66	62	56
	23:00 – 07:00	57	75	64	58	54
Weekend Average	07:00 – 19:00	60	78	67	63	55
	19:00 – 23:00	60	79	66	62	55
	23:00 – 07:00	57	74	64	58	54

Note - Monday 1 August was a bank holiday and as such has been included in the weekend data

It can be seen from the table above that averaged ambient and background noise levels were reasonably consistent for the periods monitored despite the variation in weather conditions throughout the survey. Daytime and evening noise levels were relatively consistent, with slightly lower noise levels overnight.

Daytime ambient LAeq noise levels varied from 60 dB on Saturday 30 July to 63 dB on Thursday 28 July, with background LA90 noise levels varying between 55 and 58 dB. Evening averaged ambient and background noise levels varied between 58 and 61 dBLAeq and 54 and 57 dBLA90 respectively. Night-time averaged ambient noise level varied from 56 to 58 dB, with averaged background noise levels in the range 53 dB to 55 dB.

Daytime and evening weekend averaged noise levels were generally slightly lower (by 1 or 2 dB) than the equivalent weekday averaged levels. Night-time averaged noise levels were virtually identical for both the weekend and weekday periods.

Table 11-H: Summary Noise Results for Location 3

Date and Day of Week	Period	Averaged Noise Levels dB				
		LAeq	LAmx	LA1	LA10	LA90
Weekday Average	07:00 – 19:00	59	78	66	59	50
	19:00 – 23:00	51	69	58	51	47
	23:00 – 07:00	50	67	55	50	46
Weekend Average	07:00 – 19:00	55	74	61	54	47
	19:00 – 23:00	50	67	56	51	47
	23:00 – 07:00	51	69	53	49	44

It can be seen from the table above that for Friday 4 November to Monday 7 November, daytime ambient LAeq noise levels were notably higher (by 8 to 9 dB in the week and 4 to 5 dB at the weekend) during the daytime, compared to the evening and night-time noise levels, which were very consistent. Daytime averaged ambient LAeq noise levels varied from 48 dB during the late afternoon of Friday 4 November to 60 dB on Monday 7 November, with background LA90 noise levels varying between 44 and 51 dB. It should be noted that the referenced construction activities during daytime

hours would have contributed to the measured baseline and therefore may not be typical of routine operational noise. Evening averaged ambient and background noise levels varied between 49 and 51 dBLAeq and 46 and 48 dBLA90 respectively. Night-time averaged ambient noise level varied from 49 to 52 dB, with averaged background noise levels in the range 44 dB to 46 dB.

Analysis of Baseline Noise

The following conclusions may be made in relation to the baseline noise as reflected by the measurements from the three locations:

1. There is a difference in methodology between the IPPC and the EIS monitoring programs that contributes to a disparity in the results. The IPPC data was measured at ground level directly at the receptor whereas the EIS data was generated at an elevated location within the Diageo Ireland boundary adjacent to the receptor location.
2. It is clear that sound power levels reduce as distance from the source increases. Where a single sound source at a fixed location is measured, the impact of distance can be readily calculated (EPA Environmental Noise Survey Guidance Document). However, in this specific instance, where there are multiple noise sources at various locations reflected in the EIS baseline data, there is no means of deriving a numerical reduction that can be applied. As the EIS baseline data is closer to the noise sources than the IPPC data, it may be stated that the actual noise at the receptors is less than that reported in the EIS baseline by an unquantified amount. The distance from the site boundary to receptors is variable but significant in some cases.
3. Given the urban location of St. James Gate, the measured baseline is a combination of both noise arising from Diageo Ireland activities and off-site noise sources. Offsite sources include road traffic (cars, HGVs etc.) and public transport (buses, Luas, Heuston rail terminus etc.).
4. As it is not possible to fully eliminate either on-site or off-site noise sources for an extended time period, it is not possible to definitively quantify the relative contributions to the baseline.
5. On July 31st, there was a cessation of logistics activities on the North site. The baseline monitoring over this period does not record any significant reduction in the baseline and this indicates a measurable contribution to the baseline from offsite noise sources.
6. There was a clearly identified period on November 6th at Location 3 where there was a cessation of logistics activities on the North site. Baseline monitoring during these cessations indicate that there is a measurable contribution to the baseline from offsite noise sources.
7. The baseline noise along the eastern boundary of the North site will reduce significantly as current logistics activities will relocate to the Camac Yard. It is not possible to predict the reduction in baseline due to the multiple constituents.

11.6 Construction Noise & Vibration

Noise

Two different construction scenarios were considered in the construction assessment. These two scenarios represent the worst case construction activities from a noise point of view, and are programmed to last for only a number of weeks each out of the total construction programme. Predicted noise levels are unmitigated and this will be addressed following development of the CEMP. The two scenarios considered were:

- Enabling Works (Site Preparation) – 2 separate Groups of plant;
- Foundations and Groundworks – 3 separate Groups of plant.

Details of the plant and equipment assumed for each scenario (including approximate % on-time) are included in Appendix 11.2.

It is planned that construction works would generally be limited to typical daytime construction hours; although there may be phases where extended working hours may be required. There would be no over-night construction works.

For each scenario, the groups of plant were modelled in 4 different on site locations to predict the noise impact for varying construction scenarios to represent the actual activities taking place on site in the worst case month of construction. The locations considered were:

- The main brewhouse construction area;
- The boiler workshop area;
- The Fermentation Plant
- The water treatment area adjacent to the energy centre

The tables below summarise the potential noise impacts at the nearest sensitive receptors for each of the scenarios above. Note that the predicted noise levels do not allow for any mitigation that is likely to be applied under the CEMP.

a) *Enabling Works (Site Preparation) – Group 1*

Table 11-I: Predicted Noise Levels for Enabling Works (Site Preparation) – Without Mitigation

Receptor	Predicted LAeq Noise Level (dB)			
	Boiler Workshop	Main Area	Cold Block	Water Treatment
Saint Patricks University Hospital (E façade)	44.5 to 50.0	42.9 to 46.2	47.1 to 50.9	39.1 to 40.4
Emmet Building Apartments - East Block (W façade)	46.3 to 48.2	50.4 to 58.8	41.6 to 56.4	57.1 to 64.5

Receptor	Predicted LAeq Noise Level (dB)			
	Boiler Workshop	Main Area	Cold Block	Water Treatment
Emmet Building Apartments - North Block (W façade)	51.3 to 58.9	51.8 to 60.5	42.7 to 54.4	55.8 to 65.4
Emmet Building Apartments - South Block (W façade)	59.0 to 63.1	49.9 to 61.2	43.0 to 52.0	52.2 to 60.0
St James Street Apartments (N façade)	45.4 to 46.6	45.4 to 47.1	53.7 to 57.7	51.1 to 53.4
St James Church	44.9	50.2	58.4	47.9
St James Gate Apartments - Block 1 (N façade)	46.5 to 52.8	52.7 to 57.7	55.9 to 62.2	40.6 to 43.7
St James Gate Apartments - Block 2 (N façade)	39.3 to 51.2	46.6 to 57.4	52.1 to 63.0	40.4 to 45.3
The Maltings Apartments (W façade 1)	62.1 to 68.4	62.3 to 70.4	45.4 to 57.8	52.1 to 60.9
The Maltings Apartments (W façade 2)	64.5 to 72.9	62.6 to 70.1	45.4 to 56.9	51.0 to 59.1
The Maltings Apartments (W façade 3)	69.8 to 79.4	55.0 to 72.0	45.1 to 62.4	51.9 to 55.4

With the exception of the closest apartment building (The Maltings), predicted unmitigated noise levels from construction are below the NRA maximum noise level of 67.5 dB typically imposed for weekday, normal daytime hours. The predicted worst-case noise levels would also be below the daytime 65 dB threshold level within BS 5228 at the majority of receptors (with the exception of the Maltings and one façade of the Emmet Buildings), and would not be significant at the majority of receptors as a result.

It should be noted that the predicted levels are for the worst-case construction scenarios and noise levels at other times during the construction works are likely to be significantly lower than those predicted here. The Enabling Works are anticipated to last for a short number of weeks.

Appropriate noise mitigation measures will be applied for this phase of construction, as detailed in Section 11.7.

b) Enabling Works (Site Preparation) – Group 2

Table 11-J: Predicted Noise Levels for Enabling Works (Site Preparation) – Without Mitigation

Receptor	Predicted LAeq Noise Level (dB)			
	Boiler Workshop	Main Area	Cold Block	Water Treatment
Saint Patricks University Hospital (E façade)	41.2 to 46.3	40.5 to 40.9	45.1 to 47.0	36.1 to 35.9
Emmet Building Apartments - East Block (W façade)	43.8 to 45.8	48.9 to 56.2	38.6 to 57.5	56.1 to 63.4
Emmet Building Apartments - North Block (W façade)	53.1 to 59.9	50.2 to 58.3	40.9 to 52.3	53.8 to 64.5
Emmet Building Apartments - South Block (W façade)	56.5 to 60.9	46.1 to 59.3	40.7 to 53.9	50.7 to 57.3
St James Street Apartments (N façade)	43.6 to 44.3	46.6 to 47.2	52.2 to 56.8	49.8 to 51.0
St James Church	42.2	48.2	56.0	45.1
St James Gate Apartments - Block 1 (N façade)	43.8 to 49.8	50.1 to 55.2	49.8 to 56.5	37.2 to 40.9
St James Gate Apartments - Block 2 (N façade)	38.1 to 48.8	44.5 to 55.1	49.6 to 59.7	37.0 to 42.7
The Maltings Apartments (W façade 1)	54.9 to 64.3	59.3 to 66.6	40.8 to 52.7	49.4 to 57.2
The Maltings Apartments (W façade 2)	57.6 to 68.2	59.6 to 66.7	40.8 to 59.3	48.2 to 54.6
The Maltings Apartments (W façade 3)	62.2 to 73.4	52.3 to 67.9	39.3 to 51.5	46.1 to 51.4

With the exception of the closest apartment building (The Maltings), predicted noise levels from construction are again below the NRA maximum noise level of 67.5 dB typically imposed for weekday, normal daytime hours. The predicted worst-case noise levels would also be below the daytime 65 dB threshold level within BS 5228 at most

receptors (with the exception of The Maltings and Emmet Building upper floors), and would not be significant at the majority of receptors as a result.

Noise levels in excess of the 67.5 dB target have been predicted at the higher floors of The Maltings for the Main Area and Boiler Workshop demolition scenarios only.

It should be noted that the predicted levels are for the worst-case construction scenarios and noise levels at other times during the construction works are likely to be significantly lower than those predicted here. The Enabling Works are anticipated to last for in the order of 4 weeks.

Appropriate noise mitigation measures will be applied for this phase of construction, as detailed in Section 11.7.

c) Foundations and Groundworks – Group 1

Table 11-K: Predicted Noise Levels for Foundations and Groundworks – Without Mitigation

Receptor	Predicted LAeq Noise Level (dB)			
	Boiler Workshop	Main Area	Cold Block	Water Treatment
Saint Patricks University Hospital (E façade)	44.0 to 49.6	41.7 to 44.9	44.5 to 47.3	38.7 to 39.8
Emmet Building Apartments - East Block (W façade)	46.5 to 48.7	49.6 to 58.4	42.4 to 58.5	57.8 to 66.7
Emmet Building Apartments - North Block (W façade)	60.0 to 66.1	54.2 to 61.8	43.8 to 55.6	55.7 to 68.8
Emmet Building Apartments - South Block (W façade)	60.3 to 64.8	49.6 to 62.7	43.9 to 53.2	53.7 to 58.8
St James Street Apartments (N façade)	45.0 to 45.7	46.5 to 48.3	52.3 to 56.8	49.2 to 51.4
St James Church	45.9	53.0	59.0	47.0
St James Gate Apartments - Block 1 (N façade)	47.5 to 53.5	52.1 to 58.7	53.1 to 60.5	40.4 to 42.8
St James Gate Apartments - Block 2 (N façade)	41.9 to 52.7	46.4 to 59.4	50.6 to 62.6	40.7 to 44.7
The Maltings Apartments (W façade 1)	57.1 to 67.7	63.1 to 71.7	43.7 to 56.1	52.9 to 61.2
The Maltings Apartments (W façade 2)	59.5 to 70.0	62.5 to 71.1	44.7 to 56.9	51.1 to 58.1

Receptor	Predicted LAeq Noise Level (dB)			
	Boiler Workshop	Main Area	Cold Block	Water Treatment
The Maltings Apartments (W façade 3)	63.1 to 76.3	54.1 to 73.1	43.4 to 61.7	48.9 to 54.3

The predicted noise levels from construction are below the NRA maximum noise level of 67.5 dB typically imposed for weekday, normal daytime hours at the majority of receptors with the exception of the two closest apartment blocks. The predicted worst-case noise levels would also be below the daytime 65 dB threshold level within BS 5228 at the majority of receptors, again with the exception of the two closest apartment blocks, and would not be significant at the majority of receptors as a result

Noise levels in excess of the 67.5 dB target have been predicted at the higher floors of The Maltings for the Main Area and Boiler Workshop groundworks, and for Emmet Building (North Block third floor only) during the Water Treatment groundworks scenario.

It should be noted that the predicted levels are for the worst-case construction scenarios and noise levels at other times during the construction works are likely to be significantly lower than those predicted here. The Foundations and Groundworks are anticipated to last for in the order of 4 weeks.

Appropriate noise mitigation measures will be applied for this phase of construction, as detailed in Section 11.7.

d) Foundations and Groundworks – Group 2

Table 11-L: Predicted Noise Levels for Foundations and Groundworks – Without Mitigation

Receptor	Predicted LAeq Noise Level (dB)			
	Boiler Workshop	Main Area	Cold Block	Water Treatment
Saint Patricks University Hospital (E façade)	39.9 to 43.3	42.0 to 44.2	36.7 to 38.2	40.9 to 46.5
Emmet Building Apartments - East Block (W façade)	48.8 to 56.4	39.0 to 54.8	53.2 to 62.7	43.6 to 46.0
Emmet Building Apartments - North Block (W façade)	48.7 to 58.1	41.2 to 56.2	57.7 to 68.4	49.7 to 58.1
Emmet Building Apartments - South Block (W façade)	46.5 to 58.4	41.0 to 50.3	51.4 to 56.4	55.5 to 59.7
St James Street Apartments (N façade)	42.6 to 43.7	49.6 to 54.7	48.6 to 51.8	42.9 to 43.7
St James Church	49.1	55.9	44.9	42.4

Receptor	Predicted LAeq Noise Level (dB)			
	Boiler Workshop	Main Area	Cold Block	Water Treatment
St James Gate Apartments - Block 1 (N façade)	50.6 to 54.7	50.9 to 57.5	37.5 to 40.5	43.9 to 48.8
St James Gate Apartments - Block 2 (N façade)	41.4 to 52.3	48.7 to 59.8	36.9 to 42.5	37.8 to 48.2
The Maltings Apartments (W façade 1)	60.0 to 67.9	39.5 to 48.7	50.8 to 58.1	55.0 to 65.7
The Maltings Apartments (W façade 2)	60.3 to 67.8	41.4 to 52.4	49.4 to 57.4	57.6 to 68.2
The Maltings Apartments (W façade 3)	52.1 to 69.8	40.4 to 56.6	49.3 to 57.3	66.4 to 76.0

The predicted noise levels from construction are below the NRA maximum noise level of 67.5 dB typically imposed for weekday, normal daytime hours at the majority of receptors, with the exception of the two closest apartment blocks. The predicted worst-case noise levels would also be below the daytime 65 dB threshold level within BS 5228 at the majority of receptors, again with the exception of the two closest apartment blocks, and would not be significant at the majority of receptors as a result

Noise levels in excess of the 67.5 dB target have been predicted at the higher floors of The Maltings for the Boiler Workshop groundworks and Water Treatment groundworks, and for Emmet Building (North Block only) during the Cold Block groundworks scenario.

It should be noted that the predicted levels are for the worst-case construction scenarios and noise levels at other times during the construction works are likely to be significantly lower than those predicted here. The Foundations and Groundworks are anticipated to last for in the order of 4 weeks.

Consideration will be given to appropriate noise mitigation measures for this phase of construction, as detailed in Section 11.7.

e) Foundations and Groundworks – Group 3

Table 11-M: Predicted Noise Levels for Foundations and Groundworks – Without Mitigation

Receptor	Predicted LAeq Noise Level (dB)
	Main Area
Saint Patricks University Hospital (E façade)	40.9 to 41.2
Emmet Building Apartments - East Block (W façade)	46.4 to 55.8

Receptor	Predicted LAeq Noise Level (dB)
	Main Area
Emmet Building Apartments - North Block (W façade)	50.0 to 58.7
Emmet Building Apartments - South Block (W façade)	48.3 to 58.8
St James Street Apartments (N façade)	45.1 to 47.1
St James Church	47.3
St James Gate Apartments - Block 1 (N façade)	51.0 to 55.2
St James Gate Apartments - Block 2 (N façade)	45.3 to 56.8
The Maltings Apartments (W façade 1)	60.3 to 68.5
The Maltings Apartments (W façade 2)	59.2 to 68.0
The Maltings Apartments (W façade 3)	52.7 to 69.5

The predicted noise levels from construction are below the NRA maximum noise level of 67.5 dB typically imposed for weekday, normal daytime hours at all receptors with the exception of the closest apartment block (The Maltings). The predicted worst-case noise levels would also be below the daytime 65 dB threshold level within BS 5228 at all receptors with the exception of the closest apartment block (The Maltings), and would not be significant at the majority of receptors as a result.

Noise levels in excess of the 67.5 dB target have been predicted at the higher floors of The Maltings during the Main Area piling scenario.

It should be noted that the predicted levels are for the worst-case construction scenarios and noise levels at other times during the construction works are likely to be significantly lower than those predicted here. The Piling Operations within the Foundations and Groundworks phase are only anticipated to last for less than 4 weeks.

Appropriate noise mitigation measures will be applied for this phase of construction, as detailed in Section 11.7.

Analysis of Construction Noise

The following conclusions may be made in relation to the predicted construction noise:

1. There is an insignificant impact to receptors located to the west and south of the North site.
2. There is a predicted worst case significant impact to receptors along Watling Street during early construction activities.
3. The impact to receptors along Watling Street will be intermittent and will be of short duration.
4. The period during construction where a noise impact is most likely, enabling works & foundations/groundworks, is planned to be of short duration.

5. The impact on the receptors along Watling will be reduced below the predicted level by application of mitigation. This mitigation is further detailed in Section 11.7

Vibration

The transmission of ground vibration is largely determined by site soil conditions, the particular nature of any structures involved and the distance to nearby sensitive receptors. Piling works tend to be the main source of vibration during construction works. At present, piling works are proposed in the area of the proposed brewhouse building, which is approximately 90 m away from the nearest residential receptors. Other construction activities will take place approximately 20 m from the nearest sensitive receptors, however, Watling Street separates the construction works and the nearest receptor.

Given the significant distance of the piling works from nearby sensitive receptors (90 m minimum) and the lack of significant vibration sources during construction, it is considered very unlikely that vibration levels would exceed vibration limits normally set for construction works.

11.6.1 Operational Noise & Vibration

Noise

The proposed brewery development will relocate activities within St James Gate that will have a positive impact on areas with some existing noise issues. These include the relocation of brewing and brewers grain handling away from the Presbytery and the relocation of logistics activities away from Watling Street to the north west corner of the site where there is the least number of sensitive residential locations.

At present, the area proposed for development is used as a beer keg storage area, with numerous forklift truck (FLT) movements throughout the day, evening and night-time. As part of the proposals, this operation will be significantly reduced in this area, and thus, a significant existing noise source will be removed. This is likely to cause a reduction in the overall noise generated by site. It has not been possible to quantify this noise reduction as the baseline is comprised of multiple variable on-site and off-site sources. However, the reduction is likely to be significant and should be noted. The forklift truck activities will move to the Camac Yard and the additional noise contributions from this has been included within the noise predictions made for that area.

For the purposes of this assessment, a daytime target noise level of 55 (± 2) dB and a night-time target noise level of 45 (± 2) dB has been used, as per Condition 9.3 of the IPPC Licence for the site.

This data is initially generated without any noise mitigation incorporated into the model and then repeated, as required, with mitigation applied.

The following noise sources have been included in the noise model.

Rooftop Air Handling Units(AHU)

The rooftop AHUs are located on the roof of the proposed brewhouse at a height of 16.75 m (on the roof of a 16.25 m tall building). As a worst case assumption, these AHUs are specified to be in operation for 24 hours a day and the noise source data for the roof top AHUs is provided in Appendix 11.3, Volume 4.

Forklift Trucks

The forklift trucks are located in the north-west corner west of the site. The operational model is as follows:

- Daytime: 2 x 4.5 tonne FLTs
 2 x 9 tonne FLTs
 In operation 90% of the time
- Night-time: 2 x 4.5 tonne FLTs
 2 x 4.5 tonne FLTs
 In operation 90% of the time

The noise data for the forklift trucks is provided in Appendix 11.3, Volume 4.

Rooftop Evaporative Condensers

The rooftop Evaporative Condensers are located on the roof of the existing Refrigeration Plant Building at a height of 7.5 m (on the roof of a 7 m tall building). As a worst case assumption, these Evaporative Condensers are specified to be in operation for 24 hours a day and the noise data for this source are provided in Appendix 11.3, Volume 4.

Heavy Goods Vehicles

Consideration has been given to the likely worst-case number of HGVs operating during the day (no HGV movements will be required during the night). Arising from the operational model, BS 5228 haul routes were created in the noise model to represent the total daily deliveries and departures for the operation of the proposed brewery development. The following additional deliveries were included in the model:

- 61 HGVs to Keg Lines;
- 1 HGV to Fermentation Plant;
- 47 HGVs to Support Building;
- 49 HGVs to Tank Station;
- 38 HGVs to Raw Materials;
- 8 HGVs to Brewing Support Building;
- 39 HGVs to Gypsum Building.

Water Pumps

Six external water pumps were included in the noise predictions, at various locations (2 near to the WWNP and 4 near the existing energy centre). As a worst case assumption, these pumps are specified to be in operation for 24 hours a day and the noise levels used are provided in Appendix 11.3, Volume 4.

The tables below summarise the potential noise impacts at the nearest sensitive receptors.

(a) Daytime Noise

Table 11-N: Future Operational Daytime Noise Levels – Without Baseline Addition and No Mitigation Applied

Receptor	Predicted LAeq Noise Level (dB)
Saint Patricks University Hospital (E façade)	44.1 to 47.4
Emmet Building Apartments - East Block (W façade)	40.1 to 44.7
Emmet Building Apartments - North Block (W façade)	42.9 to 49.5
Emmet Building Apartments - South Block (W façade)	38.7 to 45.7
St James Street Apartments (N façade)	45.5 to 46.8
St James Church	46.2
St James Gate Apartments - Block 1 (N façade)	47.2 to 50.6
St James Gate Apartments - Block 2 (N façade)	46.2 to 50.7
The Maltings Apartments (W façade 1)	41.6 to 51.1
The Maltings Apartments (W façade 2)	41.4 to 50.5
The Maltings Apartments (W façade 3)	38.8 to 49.1

During daytime operational hours, predicted noise levels are below the assessment target of 55 + 2 dB at all locations and are therefore in compliance with IPPC licence requirements.

(b) Night-time Noise

Table 11-O: Future Operational Night-time Noise Levels – Without Baseline Addition and No Mitigation Applied

Receptor	Predicted LAeq Noise Level (dB)
Saint Patricks University Hospital (E façade)	43.0 to 46.1
Emmet Building Apartments - East Block (W façade)	39.8 to 44.3
Emmet Building Apartments - North Block (W façade)	41.1 to 47.5
Emmet Building Apartments - South Block (W façade)	36.0 to 44.1
St James Street Apartments (N façade)	43.7 to 45.5
St James Church	45.3

Receptor	Predicted LAeq Noise Level (dB)
St James Gate Apartments - Block 1 (N façade)	46.8 to 49.5
St James Gate Apartments - Block 2 (N façade)	45.4 to 49.7
The Maltings Apartments (W façade 1)	37.4 to 44.9
The Maltings Apartments (W façade 2)	37.4 to 45.1
The Maltings Apartments (W façade 3)	35.5 to 44.1

Although there are no HGVs accessing the facility at night, the predicted noise levels are very similar to, or only slightly lower than, those for the daytime situation. Without mitigation in place, predicted night-time noise levels are above the assessment target of 45 + 2 dB. The highest predicted night-time noise level of 49.7 dB is 2.7 dB above the target level of 47 dB. Analysis of the noise model shows that the rooftop AHUs and Evaporative Condensers are the dominant noise sources, with forklift truck activities also significant at receptors to the south west of the site (St James Street Apartments, St James Church, St James Gate Apartments and Saint Patricks University Hospital).

Without mitigation, the site's IPPC licence requirements would not be met and adverse impacts would be experienced at some of the nearest noise sensitive receptors.

Therefore, appropriate noise mitigation measures are incorporated into the scheme design and the resultant operational noise levels are detailed in section 11.7.

(c) Traffic Noise

The following table presents the expected change in traffic flow as a result of the development in Annual Average Daily Traffic (AADT). 18-hour Annual Average Weekday Traffic (AAWT) flows were not available; however they are expected to be very similar to the AADT flows.

Table 11-P: Summary of Traffic Flow Increase on Local Roads

Road Name	AADT Traffic Flows		
	Base 2015	Increase	2015 with scheme
Victoria Quay (East of Diageo Entrance)	27,394	68	27,462
Victoria Quay (West of Diageo Entrance)	27,740	68	27,808
Wolfe Tone Quay	26,302	68	26,370
Watling Street	3,600	10	3,611
Thomas Street (East of Watling Street)	23,475	10	23,485
James's Street (West of Watling Street)	24,979	20	24,999
Echlin Street	7,282	20	7,302
James's Street (West of Bow Lane)	19,142	0	19,142

The traffic data shows that the increase in road traffic as a result of the development will be less than 1%. Increases in noise level at the nearest sensitive receptors as a result would be well below 1 dB and, as such, there would be no perceptible changes in traffic noise.

Vibration

No significant sources of vibration would be introduced on-site as a result of the proposed brewery development. The nearest sensitive receptors are over 90 m away from the closest potential source of vibration (HGV movements) and are also separated from the site by Watling Street. At this distance, and considering the type of operational activities taking place, operational vibration is not considered to be an issue.

11.7 Mitigation

11.7.1 Construction

All construction work will be undertaken to the guidance in BS 5228: 2009 – Code of practice for noise and vibration control on construction and open sites, Part 1: Noise and Part 2: Vibration.

The construction noise assessment has demonstrated that it is likely that the noise generated during what is considered to be worst-case construction conditions, has the potential to exceed the NRA guidance noise levels at the nearest sensitive receptors. However, it should be noted that the scenarios considered represent the worst case activities and will be in operation for a short number of weeks each, and less time still at individual locations (such as the water treatment area).

BS 5228 gives guidance on construction best practice, which should be considered in order to mitigate potential noise impact. Mitigation measures for the construction phase may include:

- Fitting of more efficient exhaust sound reduction equipment to earth moving plant where possible;
- Fitting more efficient sound reduction equipment to compressors and generators;
- Pneumatic tools to be fitted with suitably designed muffler or sound reduction equipment to reduce noise without impairing efficiency;
- Ensuring that air lines to pneumatic equipment do not leak;
- Enclosures or screens to minimise noise from pneumatic tools, pumps and other static plant to noise sensitive receptors;
- Optimising haul roads to minimise noise emissions to noise sensitive receptors;
- Switching off plant and equipment when not in use;
- Machinery required during the night to be fitted with acoustic screening.

When a construction contractor has been appointed, further construction noise predictions shall be made when the construction programme and actual plant and equipment to be used are known.

11.7.2 Operation

In order to mitigate the potential noise impact from the rooftop AHUs and Evaporative Condensers, a rooftop screen has been considered for the evaporative condensers on top of the VQ Plant building, which will be incorporated into the facility design. Additional mitigation has been applied including the incorporation of many Air Handling Units within the building enclosure. The following tables provide the results of the assessment with this mitigation measure in place.

(a) Daytime Noise – with mitigation of 2.5m high barrier on top of VQ Plant

Table 11-Q: Predicted Operational Daytime Noise Levels – Without Baseline Addition and With Mitigation Applied

Receptor	Predicted LAeq Noise Level (dB)
Saint Patricks University Hospital (E façade)	43.7 to 46.9
Emmet Building Apartments - East Block (W façade)	40.1 to 44.7
Emmet Building Apartments - North Block (W façade)	42.9 to 49.5
Emmet Building Apartments - South Block (W façade)	38.7 to 45.7
St James Street Apartments (N façade)	45.0 to 45.3
St James Church	44.4
St James Gate Apartments - Block 1 (N façade)	46.5 to 49.2
St James Gate Apartments - Block 2 (N façade)	45.9 to 48.9
The Maltings Apartments (W façade 1)	41.6 to 51.1
The Maltings Apartments (W façade 2)	41.4 to 50.5
The Maltings Apartments (W façade 3)	38.9 to 49.7

During daytime operational hours, predicted noise levels at the nearest noise sensitive receptors are below the assessment target of 55 + 2 dB at all locations and in compliance with the IPPC licence requirements.

The potential noise changes and assessment to the IOA/IEMA Draft Noise Impact Guidelines are provided in the table below for the nearest sensitive receptors:

Table 11-R: Significance of Daytime Operational Levels

Receptor Location	Predicted LAeq Noise Level (dB)	Existing LAeq Baseline Noise Level (dB)	Total LAeq Noise Level (dB)	Difference (dB)	Significance
Saint Patricks University Hospital	46.9	55 (Note 1)	55.6	0.6	Slight
Emmet Building East Block	44.7	56 (Note 2)	56.3	0.3	Slight
Emmet Building North Block	49.5	56 (Note 2)	56.9	0.9	Slight
Emmet Building South Block	45.7	56 (Note 2)	56.4	0.4	Slight
St James Street Apartments	45.3	55 (Note 1)	55.4	0.4	Slight
St James Church	44.4	55 (Note 1)	55.4	0.4	Slight
St James Gate Apartments - Block 1	49.2	55	56.0	1.0	Slight
St James Gate Apartments - Block 2	48.9	55	56.0	1.0	Slight
The Maltings W Facade 1	51.1	60 (Note 2)	60.5	0.5	Slight
The Maltings W Facade 2	50.5	60 (Note 2)	60.5	0.5	Slight
The Maltings W Facade 3	49.7	60 (Note 2)	60.4	0.4	Slight

Note 1 The baseline for St James Street Apartments was measured at Location 3 and was applied as the baseline for Saint Patricks University Hospital and St James Church. This is a conservative assumption for Saint Patricks University Hospital and the Total LAeq is less than stated for this location.

Note 2 The baseline noise in the north east part of the site will reduce as logistics activities are being relocated to the north west and are included in the predicted operational noise. It is not possible to model the reduction in baseline on the eastern boundary of the North site but the Total LAeq is less than stated for the Maltings and Emmet Buildings.

It can be seen from the table above that, when combined with the existing daytime ambient noise levels, the daytime operational noise impact would be within the 'slight adverse' category for all receptors.

Consideration has also been given to a BS 4142 assessment, to determine the likelihood of noise complaint, as detailed in the table below:

Table 11-S: BS 4142 Assessment for Daytime Operational Levels

Receptor Location	Predicted LAeq Noise Level (dB)	Existing LA90 Noise Level (dB)	Difference (dB)	Rating
Saint Patricks University Hospital	46.9	47	-0.1	Less than Marginal Significance
Emmet Building East Block	44.7	53	- 8.3	Less than Marginal Significance
Emmet Building North Block	49.5	53	- 3.5	Less than Marginal Significance
Emmet Building South Block	45.7	53	- 7.3	Less than Marginal Significance
St James Street Apartments	45.3	47	- 1.7	Less than Marginal Significance
St James Gate Apartments - Block 1	44.4	47	- 2.6	Less than Marginal Significance
St James Gate Apartments - Block 2	49.2	47	+ 2.2	Less than Marginal Significance
The Maltings W Facade 1	48.9	55	- 6.1	Less than Marginal Significance
The Maltings W Facade 2	51.1	55	- 3.9	Less than Marginal Significance
The Maltings W Facade 3	50.5	55	- 4.5	Less than Marginal Significance

The BS 4142 assessment indicates a change of less than marginal significance for the receptor locations considered. Forklift truck activities are the dominant noise source at these locations and it has been assumed that an Acoustic Feature correction is not necessary within the assessment as the forklifts will not general generate tonal noise. This will be achieved by use of non-pulsing forklift reversing sounders.

All other locations would still have a less than marginal significance with regard to complaint.

(b) Night-time Noise – with mitigation of 2.5m high barrier on top of refrigeration building

Table 11-T: Predicted Operational Night-time Noise Levels – Without Baseline Addition and With Mitigation Applied

Receptor	Predicted LAeq Noise Level (dB)
Saint Patricks University Hospital (E façade)	42.4 to 45.5
Emmet Building Apartments - East Block (W façade)	39.8 to 44.3
Emmet Building Apartments - North Block (W façade)	41.1 to 47.5
Emmet Building Apartments - South Block (W façade)	36.0 to 44.1
St James Street Apartments (N façade)	42.8 to 43.3
St James Church	43.0
St James Gate Apartments - Block 1 (N façade)	46.0 to 47.6
St James Gate Apartments - Block 2 (N façade)	45.0 to 47.3
The Maltings Apartments (W façade 1)	37.5 to 44.9
The Maltings Apartments (W façade 2)	37.5 to 45.1
The Maltings Apartments (W façade 3)	35.6 to 44.1

The mitigation measures applied to the rooftop AHUs and Evaporative Condensers have reduced the impact significantly. Although predicted night-time operational noise levels are below the 45 + 2 dB target level for many of the receptors considered, they remain marginally above the target level at St James Gate Apartments, Saint Patricks University Hospital, the North Block of Emmet Building Apartments and The Maltings Apartments West Façade 2.

The highest predicted noise levels are for the upper floors of St James Gate Apartments which directly overlook the site. The dominant noise source for these receptors is the forklift truck activities in the north west corner. Existing night-time baseline noise levels measured in this area are also above the target level at 51 dB. This baseline is a combination of on-site and off-site noise sources. When this baseline is added to the predicted noise from the new activities, a combined noise level of in the order of 52 to 53 dB would be anticipated. This is a conservative assessment as the baseline was not measured at the receptor but within the site. A reduction is anticipated at the receptors from the level presented but this cannot be quantified due to the complexity of the baseline make-up.

Consideration will be given during detailed design to identification and reduction of noise emissions arising from the proposed brewery development.

The potential noise changes and assessment to the IOA/IEMA Draft Noise Impact Guidelines are provided in the table below for the nearest sensitive receptors:

Table 11-U: Significance of Night-time Operational Levels

Receptor Location	Predicted LAeq Noise Level (dB)	Existing LAeq Baseline Noise Level (dB)	Total LAeq Noise Level (dB)	Difference (dB)	Significance
Saint Patricks University Hospital	45.5	51 (Note 1)	52.1	1.1	Slight
Emmet Building East Block	44.3	55 (Note 2)	55.4	0.4	Slight
Emmet Building North Block	47.5	55 (Note 2)	55.7	0.7	Slight
Emmet Building South Block	44.1	55 (Note 2)	55.3	0.3	Slight
St James Street Apartments	43.3	51	51.7	0.7	Slight
St James Gate Apartments - Block 1	47.6	51	52.6	1.6	Slight
St James Gate Apartments - Block 2	47.3	51 (Note 1)	52.5	1.5	Slight
The Maltings W Facade 1	44.9	57 (Note 2)	57.3	0.3	Slight
The Maltings W Facade 2	45.1	57 (Note 2)	57.3	0.3	Slight
The Maltings W Facade 3	44.1	57 (Note 2)	57.2	0.2	Slight

Note 1 The baseline for St James Street Apartments was measured at Location 3 and was applied as the baseline for Saint Patricks University Hospital and St James Church. This is a conservative assumption for Saint Patricks University Hospital and the Total LAeq is less than stated for this location.

Note 2 The baseline noise in the part of the site will reduce as logistics activities are being relocated to the Camac Yard and are included in the predicted operational noise. It is not possible to model the reduction in baseline on the eastern boundary of the North site but the Total LAeq is less than stated for the Maltings and Emmet Buildings.

It can be seen from the table above that, when combined with the existing night-time ambient noise levels, the night-time operational noise impact would be within the 'slight adverse' category for most receptors.

Consideration has also been given to a BS 4142 assessment, to determine the likelihood of noise complaint, as detailed in the table below:

Table 11-V: BS 4142 Assessment for Night-time Operational Levels

Receptor Location	Predicted LAeq Noise Level (dB)	Existing LA90 Noise Level (dB)	Difference (dB)	Rating
Saint Patricks University Hospital	45.5	44	+ 1.5	Less than Marginal Significance
Emmet Building East Block	44.3	52	- 7.7	Less than Marginal Significance
Emmet Building North Block	47.5	52	- 4.5	Less than Marginal Significance
Emmet Building South Block	44.1	52	- 7.9	Less than Marginal Significance
St James Street Apartments	43.3	44	- 0.7	Less than Marginal Significance
St James Gate Apartments - Block 1	47.6	44	+ 3.9	Less than Marginal Significance
St James Gate Apartments - Block 2	47.3	44	+ 3.3	Less than Marginal Significance
The Maltings W Facade 1	44.9	54	- 9.1	Less than Marginal Significance
The Maltings W Facade 2	45.1	54	- 8.9	Less than Marginal Significance
The Maltings W Facade 3	44.1	54	- 9.9	Less than Marginal Significance

The BS 4142 assessment indicates a change of less than marginal significance for the receptor locations considered. Forklift truck activities are the dominant noise source at these locations and it has been assumed that an Acoustic Feature correction is not necessary within the assessment as the forklifts will not generate tonal noise. This will be achieved by use of non-pulsing forklift reversing sounders.

11.8 Residual Impacts

11.8.1 Construction

There is the potential for noise impacts at the eastern boundary of the North site during the worst case phases of construction, which are likely to last for a short number of weeks out of the entire construction programme. During this initial period, without appropriate mitigation, moderate adverse impacts are likely at nearby properties, with major adverse impacts at the closest apartment block. Use of mitigation will reduce but not eliminate the impacts. Construction noise levels are likely to be significantly lower at other times.

11.8.2 Operation

With the proposed 2.5m high reflective barrier on top of the VQ Plant building, predicted noise levels would be considerably reduced over those predicted without noise mitigation. Additional improvement will be sought during the detailed design phase of the project by seeking to enclose equipment within buildings where possible.

Predicted daytime operational noise levels are below the 55 dB target level for all receptors considered.

Receptors adjacent to the eastern boundary of the site (The Emmet Building Apartments and The Maltings Apartments) are more than 3 dB below the 55 dB target level. The predicted noise levels are also well below the daytime baseline noise levels recently measured at these locations (56 and 60 dB). The removal of forklift truck activities from this area of the site, as part of the proposed brewery development, would lead to significant reductions in the existing noise baseline in this area. As such, an overall daytime noise benefit is anticipated for The Emmet Building Apartments and The Maltings Apartments as a result of the proposed changes introduced.

By contrast, increased daytime operational noise levels are anticipated for receptors adjacent to the southern and western boundaries of the site as a result of the additional forklift truck activities introduced into the north west area of the site as part of the proposed brewery development. In order to minimize the impact of these activities, their activity has been concentrated towards the Victoria Quay boundary. St James Gate Apartments, which are at high level and directly overlook the site, may experience a noise impact, with overall daytime noise levels of in the order of 48 to 49 dB. These predicted levels fall within the IPPC licence requirements.

The same situation is predicted for the night-time, with noise decreases anticipated for The Emmet Building Apartments and The Maltings Apartments, but noise increases at receptors adjacent to the southern and western boundaries, in particular at St James Gate Apartments. Predicted noise levels from the new activities, when combined with the existing night-time baseline noise level, would lead to a total noise level of in the order of 51 to 52 dB, although it should be noted that the predicted noise levels from the new plant and forklift truck movements are of the order of 47dB, which is 4dB lower than the measured baseline noise level of 51dB. This falls outside the IPPC licence requirements and solutions shall be identified during detailed design to the noise emissions from forklift truck activities to reduce operational noise levels during the night.

It should be noted that these predicted noise levels do not include any allowance for the reduction in baseline caused by the distance from the baseline measurement point (the site boundary) to the receptor.

11.9 Summary of Key Findings

- Baseline noise monitoring highlights elevated day and night background noise levels in the North site. Diageo Ireland is committed to ongoing monitoring to identify and mitigate noise emissions from on-site activities in St James Gate.
- Baseline monitoring was carried out within the North site out at or near the site boundary. The predicted noise levels at the receptors do not include any allowance for the reduction in baseline caused by the increase in distance from the baseline measurement point to the receptor.
- Baseline monitoring during planned logistics cessations indicates that there is a measurable offsite contribution to the baseline noise.
- During the construction phase there is the potential for moderate adverse noise impacts during the worst case phases. However, this is likely to be for a short number of weeks out of the entire construction programme;
- Given the significant distance to nearby sensitive receptors and the lack of significant vibration sources on-site, vibration is not considered to be an issue for either construction or operation of the brewery;
- As a key mitigation measure, a 2.5m high reflective barrier is incorporated into the design of the VQ Plant evaporative condensers and other equipment has been located indoors;
- As a key mitigation measure, forklifts operating in the Camac Yard area will incorporate alternative reversing alarms to the standard pulsed alarm to reduce sound impact;
- The removal of current forklift truck activities from the site of the proposed brewing buildings is likely to result in noise benefits at receptors to the east of the facility, in particular The Emmet Building Apartments and The Maltings Apartments;
- The introduction of increased forklift truck activities in the Camac Yard, as a result of the proposed brewery development, will lead to slight adverse noise impacts at receptors adjacent to the southern and western boundaries. Predicted noise levels do not exceed the IPPC limit value for the daytime but do exceed the limit value for the night time. However, it should be noted that the existing measured baseline noise levels are more significant than the predicted noise levels generated in this assessment.
- During detailed design, additional mitigation will be investigated for noise emissions from the additional activities proposed in the Camac Yard in order to reduce their noise impacts, particularly during the night-time period.
- The overall noise impact from operation of the proposed brewery development is considered to be beneficial for receptors to the east of the North site as the overall noise level will be reduced.
- The predicted operational noise in the Camac Yard is compliant with IPPC limits for daytime however; there are slight exceedences for night time. Incorporation of predicted noise with the existing baseline along the southern and western boundary of the North site creates a slight adverse impact for receptors.

- Diageo Ireland is committed to achieving full compliance with IPPC Licence requirements for noise.

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12.0 LANDSCAPE AND VISUAL

12.1 Introduction

A landscape and visual assessment for the proposed brewery development has been commissioned for inclusion in the Environmental Impact Assessment (EIA) required for this scheme. This chapter assesses the impacts of the proposed demolition and brewery development on the landscape and visual environment.

12.2 Methodology

General

Both desktop and field studies were undertaken for the landscape and visual assessment. The baseline assessment included a review of national and local development plans and relevant documents in order to consider the likely impact of the proposed brewery development within the context of existing landscape policy for the area. A list of baseline reference documents is provided in Section 12.11, at the end of this Chapter. The desk study included a review of Ordnance Survey mapping, aerial photography and site plans. The site visit was carried out in July 2011 to understand the potential effects to the area surrounding the St. James's Gate Brewery site.

Assessment Methodology

The assessment methodology has regard to advice notes and guidelines for landscape and visual assessment as set out in the following documents:

- Advice notes on current practice in the preparation of Environmental Impact Statements, 2003; Environmental Protection Agency;
- Guidelines on information to be contained in Environmental Impact Statements, 2002; Environmental Protection Agency; and
- Guidelines for Landscape and Visual Impact Assessment 2nd Edition, 2002; Landscape Institute and Institute of Environmental Management and Assessment.

Landscape and visual impact assessment has two separate but closely related aspects. The first is visual impact i.e. the extent to which a new structure in the landscape can be seen. The second is landscape character impact, i.e. responses that are felt towards the landscape, drawing on the appearance of the land, including shape, form and colour, and the interaction of these elements to create specific patterns and "pictures" that are distinctive to particular localities.

In carrying out the landscape and visual assessment the baseline study of the receiving landscape describes:

- The landscape planning context, including any special values that may apply, e.g. regional or local landscape designations;
- The landscape character, including patterns and scale of landform, land cover, land use and built development;
- The visual landscape, including location of visual receptors; and

- In summary, the significance and sensitivity of the landscape and visual environment.

The impacts of the proposed brewery development on the receiving landscape and visual environment are assessed and impacts described in terms of their significance as described under Significance Assessment Criteria below. In the assessment, landscape impacts are defined as:

- Direct impacts upon specific landscape elements;
- Changes in the fabric, character and quality of the landscape;
- Impacts on the overall pattern of landscape, regional and local distinctiveness, and
- Impacts on designated landscapes, amenity and conservation areas.

Visual impacts are defined as:

- Direct impacts on views;
- Impacts on viewers, properties, and
- Impacts on visual amenity

Measures which aim to avoid, reduce and remediate significant impacts are described where appropriate under 12.7 Mitigation Measures and any remaining impacts are noted under Residual Impacts.

Three assessments of visual impact are made:

- 'construction phase' - the temporary or short-term period from the commencement of works up until the operational phase, a period during which construction disturbance will be most pronounced;
- 'operational phase' - the effects of the scheme as assessed during operation; and
- 'residual effects' – the effects remaining 15 years after completion of construction where proposed mitigation, such as additional planting, will have sufficiently developed.

Impact on Visual Receptors

The Zone of Visual Influence (ZVI) of the proposed brewery development has been estimated and used in the visual assessment. The ZVI is discussed in detail in Section 12.4 and shown on Figure 12.1, Volume 3. Within the ZVI, residents in properties, for reason of relative elevation, openness or otherwise, are considered likely to be exposed to views of the proposed brewery development. The extent of these views will depend upon aspect, distance, intervening topography, buildings and vegetation or where the development comprises a very small element of the overall panorama.

The visual impact survey is recorded in the Visual Effects Schedule (Appendix 12.3, Volume 4) and illustrated on the Visual Receptors Figure 12.3, Volume 3. The figure

shows where residents are affected by visual impacts and cross-referenced to the Visual Effects Schedule.

The setting for areas and structures of cultural value should be considered and assessed within the landscape chapter where there is likely to be an impact to the quality and character of that landscape setting. Chapter 13, Cultural Heritage, has undertaken an assessment of the likely changes to the understanding of the cultural heritage aspects.

Impact on Landscape Character

Landscape character is defined as the distinct recognisable and consistent pattern of elements that makes one area different from another. The character comes from a combination of elements including landform, land use, street patterns, types and sizes of buildings, roads and railways. On the basis of the evaluation of these characteristics the potential impact on the landscape is assessed. Similarly, relevant planning documentation is reviewed and potential for conflict or compliance with the policy is discussed.

The Liberties Local Area Plan (LAP) Landscape Character Assessment has been used to inform the Landscape Character Units. In addition supplementary landscape character units have been defined at a local level by the landscape specialist to cover the study area and are illustrated on Figure 12.2, Volume 3. Landscape Character Areas are provided in Figure 3 of the Dublin Development Plan, however the description and evaluation of these areas has not been made available.

Significance Assessment Criteria

The significance criteria (i.e. imperceptible, slight, moderate, significant, profound) used for the landscape and visual impact assessment are given in the EPA Guidelines on the information to be contained in Environmental Impact Statements (March 2002). Impacts may be positive, neutral or negative and impact duration may be considered as being temporary (up to 1 year); short-term (from 1 to 7 years); medium-term (from 7 to 15 years); long-term (from 15 to 60 years) or permanent (in excess of 60 years).

The construction period will be temporary, lasting approximately 17 months. The operational period of the scheme is classed as permanent where the operational lifetime could be in excess of sixty years.

For full descriptions of sensitivity, magnitude and significance threshold criteria, refer to Appendix 12.1, Volume 4.

12.3 Landscape Planning Context

The proposed brewery development is to be located within the existing St. James's Gate brewery complex, west of Dublin centre. Within the Dublin City Council Zoning Plan the existing St. James's Gate Brewery site is designated in two categories. The plan recognises the central manufacturing 'core' as Zone 26 'to provide for the creation and protection of industrial uses'.

The plan recognises areas within the St. James's Gate Brewery site that are south of James's Street closest to and facing Victoria Quay, Heuston Station and Watling Street as within Zone 25 within the context of the River Liffey and their important contribution to the urban context. The majority of the site function is existing industrial use and the

plan identifies the requirement 'To consolidate and facilitate the development of the central area, and to identify, reinforce, strengthen and protect its civic design, character and dignity.' Refer to Chapter 4 for further details on planning context.

The following provides a detailed overview of landscape objectives, policies and strategies relevant to the site.

12.3.1 Dublin City Development Plan 2011 - 2017

Core Strategy

The overall core strategy for Dublin City builds on the framework provided by the National Spatial Strategy (NSS) 2002-2020 and the Regional Planning Guidelines for the Greater Dublin Area (RPGs) 2010-2022. It sets out a strategic approach to the management of development in the city. This is expanded upon in the policies and objectives contained within the remainder of this Plan.

Dublin City Council has prepared local area plans for areas subject to large-scale development within the lifetime of the plan. The Liberties Local Area Plan was approved by the Council in 2009 and covers the study area.

The Dublin City Development Plan sets out policies and objectives to create a sustainable and vibrant city at the heart of the Greater Dublin Region. This plan guides how and where development will take place in the city over the next 6 years. This plan was adopted by Dublin City Council at a special adjourned meeting on 24th November 2010. The plan came into effect on 22nd December 2010.

Policies and Objectives

Landscape Character

The Development Plan States, 'A positive feature of the identity of the inner city is the strength of local character existing in different areas. In order to promote this diversity of character, the main character areas have been identified and mapped.'

The development plan seeks to strengthen individual character areas in order to consolidate and enhance the city centre, at the heart of the city region. However the areas of character must also be interconnected. This will be achieved by delivering a high quality public realm in and between key public spaces, both established and in emerging clusters. The key lynch pins of this public space network are: inter alia; The River Liffey Quays.

Although there are no specific policies protecting the vistas from Phoenix Park, the development plan recognises interconnection of city areas and effects development can have over neighbouring areas as stated above.

Further, Chapter 10 of The Development Plan sets out Guiding Principles in order to achieve a quality, compact, well connected city - Principles for Building Height in a Sustainable City.

For the Western Cluster (Heuston Area – See framework development plan), two principles relevant to development within and surrounding Phoenix Park are as follows:

- To integrate the Diageo Ireland lands fronting Victoria Quay into the Western Cluster, by means of a new Heuston Plaza, the proposed DART Underground

station, and links south to the Digital Hub. This area could accommodate some local mid-rise buildings, set back from the quays, and which enhance views from Phoenix Park.

- Any proposals for high buildings must have regard to existing views and vistas, e.g. those between IMMA and Phoenix Park and along the Liffey, while also enhancing and protecting the setting and character of the main station building,

According to the Character Areas (Figure 3 on Page 30 of the Development Plan), the St. James's Gate Brewery Site is located:

- in the north east corner of The Liberties Character Area,
- adjacent to the Smithfield / Collins Barracks Character Area; and
- adjacent to the Heuston / Kilmainham Character Area.

However, the Development Plan does not provide character descriptions of these areas. A series of local Landscape Character Units (LCU) (refer to Figure 12.2, Volume 3) have therefore been identified for this report to enable understanding of the potential changes to the local landscape character and quality.

Dublin's setting on the River Liffey, with the Dublin mountains to the south, Howth to the north, and also the amenities and wildlife of Dublin Bay – is a unique one, and it is critical to retain existing key landscapes and open spaces which offer so much to the city in terms of amenity and character. Landscapes and key open spaces can help give people a sense of identity and place.

It is the policy of Dublin City Council:

GC12, *'To protect and enhance views and prospects which contribute to the appreciation of landscape and natural heritage.'*

Architectural design

The geometry of a building should be carefully considered to strike a balance between its urban design role and its internal function. The scale of buildings is an important consideration, for example, frequent setbacks or changes in materials while often thought to reduce the visual scale of a building can often detract from its coherence and generate cluttered streetscapes.

Assessment Criteria for High Buildings

All proposals for mid-rise and high buildings must have regard to the assessment criteria for high buildings as set out below.

'When submitting plans for high buildings the developer will be required to submit a visual impact analysis study including a 3-D model of the scheme, photomontages of the impact of the building(s) at a city-wide and local scale, and site-specific masterplans.'

It is the policy of Dublin City Council:

SC19, *'To promote a coordinated approach to the provision of taller buildings through local area plans in order to prevent visual clutter or cumulative negative visual disruption of the skyline.'*

Key Views and Prospects

Key Views and Prospects are shown on Figure 4 of the Development Plan where one key view adjacent to the site has been identified looking east from Heuston Station along the River Liffey corridor. Views from this point include the northern boundary of the St. James's Gate Brewery site and filtered views into the site.

It is the policy of Dublin City Council:

SC7, *'To protect important views and view corridors into, out of and within the city, (Figure 4 of the Development Plan) and to protect existing city landmarks and their prominence.'*

These important views will be identified through the views and vistas programme that will be undertaken under Objective **SCO6**, *'To prepare a set of Guiding Principles for views and prospects in the city with the aim of undertaking a views and prospects study with a view to preparing a list for protection which will be integrated with and complement the building height policy in the city.'*

Reference has also been made to Key Views and Prospects within the Document 'Maximising the City's Potential: A Strategy for Intensification and Height & Recommendations for the Way Forward, September 2008'

'Key views and prospects should be included in the strategy, but this should not be seen as a negative tool, in that it could be used to ensure sensitive orientation of building to frame views.' (Page 4)

Protecting and Enhancing Dublin City's Cultural Assets

Dublin is endowed with many prestigious, world-renowned cultural facilities and institutions in the city centre which play a vital part in the cultural, social and economic life of the city.

It is the policy of Dublin City Council;

FC13, *'To protect and support Dublin City's existing cultural assets by facilitating the enhancement and/or growth of existing cultural spaces, including performance and entertainment spaces, while protecting the existing amenities of an area.'*

The Collins Barracks, National Museum and Guinness Storehouse are recognised as Cultural Attractions. Due to the elevated location of the Barracks and Museum and iconic reference of the Guinness brand the brewery site has some influence over visual amenity of these facilities.

Protected Structures and the Built Heritage

The Planning and Development Act, 2000 (as amended) defines 'Protected Structures' as structures, or parts of structures, which form part of the architectural heritage and which are of special architectural, historical, archaeological, artistic, cultural, scientific, social or technical interest.

The purpose of protection is to manage and control future changes to these structures so that they retain their significant historic character. Works which would materially affect the character of the protected structure require planning permission.

It is the policy of Dublin City Council:

FC30, *'To include those structures considered to be of special architectural, historical, archaeological, artistic, cultural, scientific, social or technical interest in the Record of Protected Structures. To protect these structures, their curtilage and the setting from any works that would cause loss or damage to their special character.'*

FC31, *'To maintain and enhance the potential of protected structures and other buildings of architectural/historic merit to contribute to the cultural character and identity of the place, including identifying appropriate viable contemporary uses.'*

The Protected Structures listed below indicate the properties we have identified likely to have views towards the scheme:

- Collin's Barracks,
- Rory O'More/Victoria Bridge,
- Granite Piers on Victoria Quay,
- Guinness Building,
- Heuston Station,
- Health Services Executive (HSE) St John's Road West,
- Smock Mill,
- St. James's Church and Graveyard (Church of Ireland), and
- 82 James's Street.

Refer to cultural heritage Figure 13.1, Volume 3, for Protected Structure and Conservation Area locations.

Waterways Protection (See Figure 4 of the Development Plan). (Land Use Zoning)

It is the objective of Dublin City Council:

Z11, *'To protect and improve canal, coastal and river amenities. These areas generally include all the waterways and water bodies in Dublin City Council area. The purpose of the zoning is to protect the amenity of these areas including views and prospects into/out of the areas.'*

The proposed brewery development is close to, and will be viewed from, the River Liffey corridor.

12.3.2 Liberties Local Area Plan – 11th May 2009

A Local Area Plan (LAP) is a statutory document that acts according to requirements set out in the Planning & Development Act of 2000 and the related Amendment of 2002.

Overarching Objectives

The objective of the LAP is to set out an inspirational vision that will guide the sustainable regeneration of the Liberties:

No. 8, *'To promote the principles of good urban design including improving connectivity and enhancing the legibility and permeability of the Liberties in relation to the wider cityscape.'*

Heritage

The need to protect the area's built heritage is a key concern. Much has already been destroyed or compromised by inappropriate development built in close proximity. There is a pressing need to encourage the re-use rather than demolition of key heritage buildings. New buildings also need to be designed with sensitivity to context. Guidance for conservation and re-use of heritage structures is included in proposals for key Significant Redevelopment Sites and in the built heritage action plan. However, the LAP (Page 9) also recognises the imperative to encourage contemporary interventions in order to effect the transformational change required to encourage investment in the former industrial areas:

Spatial & Urban Form Objectives

To *'Ensure that new buildings respect to their surroundings, particularly their impact on existing heritage buildings, spaces, landmarks and important views.'*

12.4 Description of the Receiving Environment

12.4.1 Study Area Context

The area surrounding the brewery site has various uses typical of an urban location and includes transport hub, museum, church, hospital and residential use. The brewery is bounded on all sides by city streets and flanked by generally three to five-storey buildings. James's Street bisects the Diageo Ireland brewery site. To the west, the Luas system, on Steeven's Lane links Heuston Station with Bow Lane West and James's Street and is overlooked by Saint Patrick's University Hospital, the HSE building and Heuston Station for the bus and Luas system. The northern boundary is defined by the N4 and River Liffey, north of this is the National Museum of Ireland, Collin's Barracks and Croppies Acre Memorial Park. From the east on Watling Street, residential apartments overlook the brewery site. The wider area consists mainly of residential properties and large office blocks.

12.4.2 Zone of Visual Influence (ZVI)

The ZVI for the Diageo Ireland site, see Figure 12.1, Volume 3, is relatively constrained due to the built up nature of the surrounding townscape. To the north the topography rises southwards towards James's Street and then levels out to Newport Street which forms the southern most limit of the ZVI. Buildings along the Diageo Ireland boundary on James's Street obscure views for much of the brewery, but there are glimpsed views across the site through gaps in the building frontages, particularly from St. James's Court Apartments.

To the north, the ZVI extends across the River Liffey and Croppies Acre Memorial Park up towards Arbour Hill. The facades of Collins Barracks and the National Museum of

Ireland form the limit of views in most cases but there are glimpsed views created by entrances and access roads along Arbour Hill. Views also extend up Temple Street West up to Arbour Terrace.

To the east and west, the views are more constrained due to the tall boundary walls and proximity of adjacent buildings. To the east, the ZVI is constrained along Watling Street by the Emmett Buildings, The Maltings and other residential blocks. To the west, HSE building and the tall boundary wall along Steeven's Lane constrain the views. East and west there are more extended views along the River Liffey and the N4 where the townscape is more open, east to Arran Quay and west to the new Courthouse, Park Gate building and Heuston Station. The ZVI extends into Phoenix Park. Some views within the area identified as the ZVI will be constrained by existing Diageo Ireland buildings.

The study area for the southern site is extremely constrained by surrounding large brewery buildings extends to the south as far as the overlooking apartment blocks on Newport Street.

12.4.3 Landscape Character Areas

In addition to the character areas developed by the LAP, supplementary landscape character units have been identified for this report to understand the effects of the proposals recognising that development could have an impact at the local level. Refer to Appendix 12.2 in Volume 4 for Landscape Character Assessment for full descriptions and Figure 12.2, Volume 3, for locations of the Landscape Character Units (LCU).

Based on the findings of the Landscape Character Assessment, a landscape sensitivity rating was developed for each of the six Landscape Character Units. Landscape sensitivity is a measure of the ability of the landscape to accommodate change or intervention without suffering unacceptable effects to its character and values. It is determined using the following factors: slope, ridgeline, water bodies, land use and prior development.

Medium-Sensitivity Landscapes

Medium sensitivity landscapes can accommodate development pressure but within certain limits in scale and magnitude. In this rank of sensitivity, landscape elements can accept some changes while others are more vulnerable to change.

These landscapes comprise:

- LCU 2 Quays/Bridgefoot Street/Oliver Bond (Liberties LAP) and Residential Areas;
- LCU 3 Diageo Ireland (Guinness) Lands (Liberties LAP); and
- LCU 5 Heuston Station, Conyngham Road and Hospitals.

High-Sensitivity Landscapes

High sensitivity landscapes are vulnerable landscapes with the ability to accommodate limited development pressure. In this rank of sensitivity, landscape quality is at a high level and landscape elements are highly sensitive to certain types of change. If

changes resulting from a development exceed the landscape's capacity to accept them, the character of the landscape may change.

These landscapes comprise:

- LCU 1 Collin's Barracks, National Museum of Ireland and Croppies Acre;
- LCU 4 River Liffey Corridor; and
- LCU 6 James's Street Conservation Area.
- LCU 7 Phoenix Park axis

Visual Receptors

Set out below are descriptions of views from areas surrounding the site. Photo Sheets, Figures 12.5.1 to 12.5.3, Volume 3, have been referenced to provide context for the descriptions below.

Views from residential Areas Northeast of the River Liffey (Photos 1 & 2, Figure 12.5.1; Photos 20, 21 & 22, Figure 12.5.2)

Generally consists of residential properties with local businesses which are medium height, 3-5 storeys, with views over the River Liffey and the brewery site. The N4 runs either side of the River Liffey making it a very busy corridor leading directly to Dublin city centre. Views for properties include the River Liffey with tree lined embankments and views of other residential properties lining the river corridor. Property receptors generally have short range elevated views of a typical city skyline but medium distance views are frequent, although restricted due to low levels of vegetation. Properties will have direct or oblique medium range views towards the proposed brewery development.

Views from St. James's Gate Brewery (Northern zone) (Photos 25, 26 & 27, Figure 12.5.2)

The St. James's Gate Brewery is visually and physically contained by 4-5m high brick walls or buildings that make up the boundary. Structure of the site gives an appearance of being cluttered, with very little unity between the different building/structures and a mix of different building materials. Topography of the site rises away from the River Liffey and heights of buildings tend to be greater towards the rear of the brewery site. For properties viewing from the north into the site, this has created a more open backdrop to the River Liffey compared to areas where residential properties directly front the river. The Guinness Storehouse and Storehouse Gravity Bar are important tourist attractions with the Gravity Bar providing panoramic views as far as the Wicklow Hills to the south and the city centre. Views, however, of the proposed brewery development area are substantially obscured by other tall buildings.

Views from areas Northwest of the River Liffey (Photo 17 Figure 12.5.2; Photo 30, Figure 12.5.3)

Areas northeast and east comprise a diverse mix of uses including the local retail area on the R109 Conyngham Road, the modern Court House, Park Gate Place Business and Residential area, the Heuston Station transport hub and the Health Services Executive building. Views from these buildings comprise the busy R109 with some

oblique or filtered views towards the brewery site and the River Liffey corridor. Views from Phoenix Park extend from within the park on Chesterfield Avenue where the road is at an elevated level and approximately 800m from the St. James's Gate Brewery. Views include the taller brewery structures and silos.

Views from areas to the west on Steeven's Lane, south on James's Street and east on Watling Street (Photo 16, Figure 12.5.1; Photos 20 & 21, Figure 12.5.2)

The area consists of business and residential buildings between 3-6 storeys high. Generally views are restricted by buildings within the brewery site, although where openings arise short range views are open to the brewery. Views from properties on James's Street are over the busy road from the southern Guinness site. Steeven's Lane is the route for the Luas red line and has restricted traffic usage.

Views from Parkgate Street (Photo 17 Figure 12.5.2)

Mixed use business premises comprising pubs, guest house, bank and large hotel, the Ashling Hotel. Views south towards the brewery take in the Luas red line running along Parkgate Street and across Croppies Park. Mature trees within the park substantially filter views beyond the park although views from the top floors of the Ashling Hotel will have open views to the River Liffey corridor and brewery.

Views from The Irish National Museum, Croppies Acre Memorial Park and Luas Station on Benburb Street (Photo 10, Figure 12.5.1; Photos 27 & 28, Figure 12.5.2)

This is a busy tourist area supported by the Luas station. The National Museum of Ireland and the Barracks set within open grounds are in an elevated location on the north bank of the River Liffey overlooking Croppies Acre, the River Liffey, the busy N4 and brewery. Views are substantially filtered by mature trees within Croppies Acre's southern boundary with the N4, although there will be more elevated views towards the brewery from the upper two stories of the museum.

12.4.4 Landscape Significance and Sensitivity

In relation to the site, the landscape and visual aspects that are considered to be of significance include:

- the general landscape fabric of the river corridor;
- the landscape amenity, character, key views and prospects along the river corridor and the National Museum and Heuston Station public buildings;
- the setting of the heritage properties of the Military barracks and Croppies Acre, of other Protected Structures, Recorded monuments and Conservation Areas including Phoenix Park; and
- views from residential properties, particularly north, northeast and east of the site.

All of the above aspects are considered to be of particular landscape and visual sensitivity in terms of potential alteration or change of their inherent character and setting.

12.5 Proposed Development

General Project Description

The development will comprise demolition of a number of small ancillary structures, outbuildings and sheds. A 130-m section of the Victoria Quay boundary wall will be cleaned and new 'dummy' steel gates installed. The proposed brewery development will include a new brewhouse (with sections as tall as 26 m), a new FBP and other facilities. The proposed brewery development will be located towards the east of the northern part of the brewery site close to the N4/River Liffey boundary and on an area that is presently hard-standing, single-storey work shops and keg pens. The site will require large-scale redevelopment to construct the new structures and provision of an altered internal road network for HGVs / LGVs and other vehicles.

Proposed buildings heights will vary between 26 m and 4 m. The highest structures will be the grain silos, brewers grains and concentrated RMX buildings at 26.0 m. The larger in footprint, but lower in height, of the structures are the brewhouse at 14 m high and Fermentation Plant extension at 17 m high. The Fermentation Plant will be separately located further into the site adjacent to the existing fermentation and beer processing plant (large stainless steel silos). The loading bay canopies will be 15 m high and the sub-station will be 4 m high. Two WWNP equalisation tanks (8 m high), will replace an existing structure on the very north east corner. The overall development footprint for the proposed brewery structures will be approximately 2.7 hectares.

The type of finish or cladding material and colour can affect the perception of visual mass of the new structures and have an affect on visual amenity. The modern white, black and grey coloured cladding materials selected will help reduce visual mass of the proposed brewery development.

In relation to the brewhouse, the following feature lighting is proposed:

- A low level external lighting scheme will be developed to highlight the architectural features of the building after dark, particularly the Victoria Quay front and brewhouse tower elements.
- In addition backlit gold finished metal harp logo devices are proposed to be fixed to the brewhouse tower element on all four sides.
- A glazed gallery is proposed to the north front of the brewhouse, fronting on to Victoria Quay. This gallery will incorporate an externally illuminated 'Guinness' sign consisting of individual letters located internally with the gallery.
- A wall mounted backlit 'Guinness' sign is also proposed on the south elevation of the brewhouse, adjacent to the main entrance.

The precise lighting design will be confirmed during detailed design but will be implemented to minimise light spill.

12.6 Assessment of Impacts

12.6.1 Introduction and Context

The proposals represent a large-scale development within the sensitive landscape setting of the River Liffey corridor and adjacent to the Quays Conservation Area. However, given the nature of the development, the assessment of landscape and visual impacts will also consider the existing industrial context of the receiving site.

The compliance or conflict with Landscape policies are considered in Section 12.9, Compliance with Planning Policy.

12.6.2 'Do Nothing' Scenario

Should the proposed brewery development not proceed, it is considered likely that brewing operations will continue on the existing site for the foreseeable future and therefore landscape character and views from visual receptors would remain as the existing baseline environment.

12.6.3 Impacts – Construction

The following principal elements are likely to give rise to landscape and visual impacts during construction:

- Physical construction disturbance ; and
- Views of construction activity and lighting.

Landscape and visual impacts will arise during the construction stage on residential and other visual receptors with views towards the construction site. During the construction stage, impacts will arise primarily from visual disturbance and visual intrusion from construction plant and crane movement and the building construction. During construction, issues such as noise, dust and general construction activity will have the effect of drawing visual attention to the works and thereby increase the impact associated with visual disturbance. Due to the site's industrial use the removal of the industrial buildings and portable cabins will not alter the overall character or fabric of the site. However, the renovation of a 130 m section of the 4-5 m high Victoria Quay boundary wall will alter the character of views along the River Liffey corridor.

The development proposals described in Section 12.5 are predicted to give rise to the following impacts upon landscape character and visual amenity. The overall visual impact on grouped properties during the construction phase is set out in the Visual Effects Schedule (see Appendix 12.3, Volume 4), and summarised below.

Impact on Landscape Character

The nature of the existing urban landscape is such that large residential buildings, mature vegetation and subtle topographical variations between the River Liffey Valley and surrounding urban districts create a landscape character where development could often be reasonably visually screened from the surrounding area. However, these characteristics have only limited mitigating effects on views for receptors immediately within the vicinity of the St. James's Gate Brewery site.

The physical change to the receiving landscape, Diageo Ireland Lands LCU 3 (Liberties LAP), will be from the introduction of new structures which will have the effect of developing and enclosing the comparatively open north area of the site. The existing brewery site is almost entirely surrounded by high brick walls and buildings. The renovation of a large section of the Victoria Quay wall will not alter the character of the Diageo Ireland site. The Guinness Brewery site, although a busy and to some extent visually unstructured site, is an important cultural landmark and the landscape character unit has been assessed as having a moderate sensitivity to change. The proposed brewery development, due to the scale and magnitude of change proposed will have a moderate magnitude of impact. Therefore, it is considered that the scheme will have a moderate negative effect on LCU 3 during the construction period.

Construction stage impacts to the surrounding Landscape Character Units will be limited to indirect impacts from disruption associated with construction activities and traffic increase. Changes to the surrounding landscape character units LCU 1 Collin's Barracks, National Museum of Ireland and Croppies Acre, LCU 2 Quays/Bridgefoot Street/Oliver Bond (Liberties LAP) and Residential Areas, LCU 4 River Liffey Corridor, LCU 5 Heuston Station, Conyngham Road and Hospitals and LCU 6 James's Street Conservation Area have therefore, been assessed as minor during the construction stage. LCU 7 Phoenix Park will not experience any changes to its character during the construction stage.

Visual Impact

The proposed brewery development is within the visually open northern area of the brewery site, which allows longer distance vistas than are usually experienced along the River Liffey corridor. The main visual effects of the proposed brewery development will occur where the proposed structures will obstruct existing views from close-by receptors and enclose other longer distance views particularly from Wolfe Tone Quay and Victoria Quay.

For the purposes of the visual assessment, properties have been grouped together by location where the visual impacts will be the same. The visual impact of the development is discussed in terms of likely impact on these viewer groups (Refer to Volume 4 Appendix 12.3, Visual Effects Schedule and Volume 3 Figure 12.3 Receptors, Designated Structures and Views).

Of the 26 receptor groups identified, eight were considered to experience a 'slight' negative effect during construction. A further twelve receptor groups were likely to see a 'moderate' negative effect as a result of construction activities. The remaining six receptor groups will experience 'significant' negative effects associated with the construction phase which are RG 2 Clifden Court Apartments, Ellis Quay, RG 4 Ellis Court, Sarsfield Quay, RG 8 Steeven's Gate Apartments, Lamb's Court, RG 11 Emmet Buildings, Watling Street, RG 12 Maltings Apartments, Watling Street and RG 13 Maltings Apartments, Watling Street.

A further seven Protected Structures were individually identified which are assessed as follows:

- Collin's Barracks – Moderate Negative;
- Rory O'More/Victoria Bridge - Moderate Negative;
- Heuston Station - Moderate Negative;

- Health Services Executive - Moderate Negative;
- St. James's Church and Graveyard (Church of Ireland) - Significant Negative; and
- 82 James's Street - Slight Negative.

The Public Realm

The proposed brewery development will cause visual intrusion to some extent from all areas within the public realm where views are not obscured by buildings, topography or mature trees.

The proposed brewery development will be a noticeable element in views for pedestrians within an existing busy urban environment and the development, at construction stage, will alter the quality of views where pedestrians will experience moderate negative effects in the localised area.

12.6.4 Impacts – Operation

Impact on Landscape Character

During operation, impacts will arise from the physical built presence of the proposed brewery development. The proposed brewery development is solely within LCU3 Diageo Ireland (Guinness) Lands (Liberties LAP). While the Diageo Ireland brewery site as a whole has an intrinsic value as an iconic brand, the site is not designated as being of regional or local significance. The proposed brewery development will be consistent with development within a large industrial complex. High quality modern design is considered an improvement to existing facilities and during operational phase there will be a slight positive effect on the LCU.

'Openness' is a comparatively rare characteristic where most properties flank and enclose the river corridor. However, the river location from Heuston Station along Wolfe Tone Quay and Victoria Quay to Rory O'More/Victoria Bridge does provide a relatively open character with river corridor views less restricted due to the relative openness of Croppies Acre and the St. James's Gate Brewery site. The proposed brewery development will alter the setting provided by Croppies Acre and the existing brewery site resulting in some enclosure to local character to a similar extent to that of existing river side properties. However, by providing a more visually permeable boundary to Victoria Quay it will compensate for the loss of 'openness' resulting from the new building.

Collin's Barracks, the National Museum of Ireland and Croppies Acre (LCU1) and River Liffey Corridor (LCU4), which have been assessed as having a high sensitivity to change, Quays/Bridgefoot Street/Oliver Bond (Liberties LAP) and Residential Areas (LCU2), of medium sensitivity, will all be affected by the changes to the riverside setting.

The proposed brewery development will have a minor magnitude of impact resulting in a slight positive effect on the character of Collin's Barracks, the National Museum of Ireland and Croppies Acre (LCU1). The River Liffey Corridor (LCU4) as views are only partially blocked by the proposed brewery development and the buildings and new boundary wall do not detract from the character of the areas. The Quays/Bridgefoot Street/Oliver Bond (Liberties LAP) and Residential Areas (LCU2) will experience a

minor magnitude of impact resulting in a slight negative effect to its character overall where views from the residential areas are restricted.

Heuston Station, Conyngham Road and Hospitals LCU 5, James's Street Conservation Area LCU 6 and Phoenix Park LCU 7 will not experience any changes to their respective landscape characters.

Visual Impact

In total, 26 receptor groups were identified as having potential for some degree of visual impact as described in the Visual Effects Schedule Appendix 12.3, Volume 4 and Figure 12.3, Volume 3. Of the 26 receptors groups, two will experience neutral effects during the operational stage. A further seven receptors will be subject to only 'slight' negative effects with no receptors experiencing moderate or significant effects. Three receptors will experience Imperceptible positive effects and fourteen receptors will experience slight positive effects as the proposed brewery development will not block views of the river and the structures will improve existing vistas along the river corridor.

A further six Protected Structures were identified. The visual effects are assessed as follows:

- Collin's Barracks – Slight Positive;
- Rory O'More/Victoria Bridge – Slight Positive;
- Heuston Station – Neutral;
- Health Services Executive – Slight Negative;
- St. James's Church and Graveyard (Church of Ireland) – Slight Negative; and
- 82 James's Street – Imperceptible Negative.

The Wider Landscape Setting

The scheme will cause some changes to views to all areas within the ZVI where they are not obscured by topography, buildings or mature trees. The generally unstructured and industrial views of the site currently experienced by pedestrians will be lessened with the development of new infrastructure. The proposed brewhouse development and boundary wall and landscaping will partially screen mixed industrial structures providing a sense of consistency along the frontage of the site without adversely effecting the quality of 'openness' experienced at present. Therefore, receptors within the public realm will experience imperceptible or slight positive effects as the development will improve the quality of the views.

12.7 Mitigation

Mitigation for landscape and visual impact has been considered throughout the design and development process of the overall scheme and the relationship the site has to the River Liffey. It is considered that such a large-scale development cannot be organised in terms of layout, or effectively screened, so as to have no impact upon the river corridor or surrounding visual receptors. Therefore, the design of the scheme has

sought to present a high-quality, architecturally iconic north face to the river and the N4 road.

The large scale of the structures proposed and the fully utilised site for brewery operations offer limited opportunities for landscape mitigation. The proposed 'dummy' gates will allow some direct views from the footpath to the brewhouse and other tall buildings within the Brewery and provide a strong boundary definition to the brewery.

Due to the constraints posed by the busy, developed city infrastructure surrounding the brewery site, off site mitigation will not be feasible.

The effect of the design and layout is to propose a development that though large in scale, respects its setting by establishing what will be an aesthetically considered series of buildings of good architectural quality using modern cladding materials and colours that are consistent, i.e. simple black, white and grey. The high-quality modern architectural design proposed for the brewery development is consistent with other new buildings within the River Liffey corridor including the new Court House and Park Gate Place on Conyngham Road and the large office block on St. John's Road West.

12.8 Residual Effects

Residual impacts after 15 years will remain the same as the opening year.

12.9 Compliance with Planning Policy

Impact on Landscape Planning Aspects: Dublin City Development Plan 2011 – 2017

Landscape Character

Policy **GC12** aims, '*To protect and enhance views and prospects which contribute to the appreciation of landscape and natural heritage.*'

The development of new structures is within close proximity to the river where both the National Museum and Collin's Barracks (Protected Structure) are located. The brewery site has an open setting which will be altered by the proposed brewery development however this will not alter the appreciation of the local landscape setting. Therefore the development does not conflict with Policy GC12.

Architectural Design

Policy **SC19** aims, '*To promote a coordinated approach to the provision of taller buildings through local area plans in order to prevent visual clutter or cumulative negative visual disruption of the skyline.*'

The Local Area Plan indicates there is significant new residential development potential of land owned by Diageo Ireland along the River Liffey corridor adjacent to Victoria Quays. Although the proposals are for residential developments and not brewery operations, the proposed brewery development will conform to the aspirations of the LAP to 'establish consistent scale and grain' with other areas along the river corridor. The design of the development therefore supports the coordinated approach promoted by this policy.

Key Views and Prospects

Policy **SC7** aims, 'To protect important views and view corridors into, out of and within the city, (Figure 4 of the Development Plan) and to protect existing city landmarks and their prominence.'

One key view adjacent to the site has been identified looking east from Heuston Station along the River Liffey corridor. Views from this point will include the northern boundary of the St. James's Gate Brewery site and filtered views into the site.

The proposed brewery development will not be detrimental to the quality of the Key View along the River Liffey corridor, therefore the proposals will not conflict with this policy.

Protected Structures and the Built Heritage

Policy **FC30** aims, 'To include those structures considered to be of special architectural, historical, archaeological, artistic, cultural, scientific, social or technical interest in the Record of Protected Structures. To protect these structures, their curtilage and the setting from any works that would cause loss or damage to their special character.'

FC31, 'To maintain and enhance the potential of protected structures and other buildings of architectural/historic merit to contribute to the cultural character and identity of the place, including identifying appropriate viable contemporary uses.'

The Protected Structures listed below indicate the properties that are likely to be subject to impacts upon their settings as a result of the proposed brewery development:

- Collin's Barracks,
- Rory O'More/Victoria Bridge,
- Heuston Station,
- Health Services Executive,
- St. James's Church and Graveyard (Church of Ireland), and
- 82 James's Street.

In discussion with the Cultural Heritage specialists it was not considered that the landscape setting of the buildings will be adversely affected by the proposals. However, to understand the effects on the cultural heritage, refer to Chapter 13.

Waterways Protection (See Fig 4). (Land Use Zoning)

It is the objective of Dublin City Council:

Policy **Z11** aims, 'To protect and improve canal, coastal and river amenities. These areas generally include all the waterways and water bodies in Dublin City Council area. The purpose of the zoning is to protect the amenity of these areas including views and prospects into/out of the areas.'

The proposed brewery development of a series of new buildings within 50m of the River Liffey will alter the visual amenity of the river corridor by reducing the longer vistas provided by the relatively open brewery site therefore the proposals will be contrary to the policy. However, the Liberties LAP highlights the potential development opportunities within the northern sector of the Guinness lands adjacent to the River Liffey corridor (Liberties LAP p.178) where development proposals could provide for medium rise buildings consistent with the heights proposed for the brewery development.

Liberties Local Area Plan

No. 8, *'To promote the principles of good urban design including improving connectivity and enhancing the legibility and permeability of the Liberties in relation to the wider cityscape.'*

The scheme will use high quality design to improve the frontage of the brewery and in turn will improve the legibility of the Guinness site. Although the blocking of views will potentially be a reduction in the connectivity and permeability, the development will not be contrary to this policy.

Heritage

No demolition of key heritage buildings are proposed and the LAP also recognises the imperative to encourage contemporary interventions in order to effect the transformational change required to encourage investment in the former industrial areas. Therefore this development will comply with the policies on heritage.

Spatial & Urban Form Objectives

To 'Ensure that new buildings respect to their surroundings, particularly their impact on existing heritage buildings, spaces, landmarks and important views.'

The development will not impact on key views or cultural understanding of the St. James's Gate Brewery therefore will support this policy.

12.10 Summary of Landscape and Visual Impact

The role of the LVIA is to establish potential effects that will arise from the proposed brewery development in order to aid the determination of the planning application. The identified effects are summarised below.

The proposal is for the siting of a proposed brewery development within the sensitive landscape setting of the River Liffey corridor. As such, the development is likely to give rise to some potentially significant landscape and visual impacts and therefore it has been designed to provide an appropriate development aimed at reducing such impacts upon the surrounding area. The proposed brewery development positively presents a modern face towards the riverfront and to the N4 and establishes a scale and grain consistent with the existing urban character along the river corridor.

The proposed brewery development, due to its nature, will have a permanent effect on the landscape character of its immediate brewery setting and surrounding areas. However, the character of the receiving area is not particularly distinctive within a regional or local context and the modern design will be complementary to the existing brewery site and surrounding river frontage. The brewery site has an open setting

which will be altered by the proposed brewery development however this will not be detrimental to the appreciation of local setting.

While the development will have a limited range of visibility within the wider urban area, some receptors viewing from adjacent apartment buildings and offices will experience some alteration to the quality of their views, reducing vistas particularly where the new structures obscure views towards the River Liffey. However, the existing views for these receptors are towards an industrial brewery complex and development of an appropriate and modern form is viewed as an improvement on the existing cluttered site.

The extensive brewery perimeter consists of a 4-6 m high perimeter wall and facility buildings which screen views of ground level operations from low level buildings and pedestrian areas beyond the site. A 130 m section of St. James Gate Brewery wall along Victoria Quay will be restored and dummy gates installed. The new boundary development will allow a greater permeability of the boundary, providing some visual openness consistent with the Victoria Quay, Wolfe Tone Quay area. Overall, there is likely be a slight positive effect for receptors within the immediate area of the Quays and to residential properties north, north-east and east of the site due to the quality of the new modern brewhouse development and new boundary wall development.

Policy relating to this development is provided in the Dublin City Development Plan and Liberties Local Area Plan. In accordance with these policies it is considered the proposed brewery development contributes to the appreciation of the character and quality of the area and is consistent with the LAP aspirations that 'new buildings respect to their surroundings and particularly their impact on existing heritage buildings, spaces, landmarks and important views.' Although the proposed brewery development will be a visible element to the Key View from Heuston Station and surrounding Protected Structures, there will be only a slight negative effect overall on the quality of the Key View and views from Protected Structures. The proposal is therefore a suitable development for the location.

12.11 Landscape Guidelines, Information and Policy Reference

The assessment has regard to the information as set out in the following documents:

- Atlas of the Irish Rural Landscape, 1997; Aalen, F.H.A., Whelan, K., and Stout, M.;
- Dublin City Development Plan 2011-2017 (Interim Document);
- Liberties Local Area Plan (LAP), 2009: Dublin City Council; and
- Maximising the City's Potential: A Strategy for Intensification and Height & Recommendations for the Way Forward, September 2008.

13.0 ARCHAEOLOGY, CULTURAL HERITAGE AND ARCHITECTURAL HERITAGE

13.1 Archaeological and Cultural Heritage

13.1.1 Introduction

In its '*Framework and Principles for the Protection of the Archaeological Heritage*' (1999), the Department of Arts, Heritage, Gaeltacht and the Islands defined archaeology and its importance in the following terms:

'Archaeology is the study of past societies through the material remains left by those societies and the evidence of their environment. The archaeological heritage consists of such material remains (whether in the form of sites and monuments or artefacts in the sense of moveable objects) and environmental evidence.'

The Council of Europe, in the *Framework Convention on the Value of Cultural Heritage for Society* ('Faro' 2005) has defined Cultural Heritage as:

'a group of resources inherited from the past which people identify, independently of ownership, as a reflection and expression of their constantly evolving values, beliefs, knowledge and traditions. It includes all aspects of the environment resulting from the interaction between people and places through time.'

Cultural heritage information was used to inform the assessments of importance of sites identified in the archaeological and cultural heritage baseline. For clarity, sites where the importance of their cultural or historical associations outweighed that of their physical remains have been treated as cultural rather than archaeological heritage.

13.1.2 Methodology

A study area was defined extending 100m around the site (refer to Figure 13.1, Volume 3). The southern part of the brewery site was not included in the study area as the proposed development in this area was either situated within 20th Century made ground or did not require ground disturbance. The following sources of information were consulted for this study area:

- Record of Monuments and Places (RMP);
- The topographic files of the National Museum of Ireland. Details of artefacts recorded in the topographic files in this are provided in Appendix 13.1, Volume 4;
- Dublin City Development Plan 2011 – 2017 for information on planning policy and Zones of Archaeological Interest;
- First edition of Ordnance Survey 6" mapping (1829-1841) and first edition of the Ordnance Survey 25" mapping (1897-1913) from <http://maps.osi.ie/publicviewer>;
- Archaeological reports held in the Dublin City Archaeological Archive. Full details of these are provided in the bibliography;
- The Dublin City Industrial Heritage Record provided by the Dublin City Council Archaeology Office;

- Documentary, cartographic and literary sources held by the Dublin City Archives. Full details of these are provided in the bibliography;
- Documentary and cartographic sources held by the Guinness Archives. Full details of these are provided in the bibliography;
- The Database of Irish Excavation Reports (www.excavations.ie) and the published Excavation Bulletins; and
- A walk-over survey of the study area carried out in July 2011.

Assessment of Sensitivity

National monuments legislation does not differentiate between archaeological sites on the basis of importance apart from the special recognition of National Monuments as defined in the National Monuments Act (1930-2004). However, an assessment of the sensitivity of each archaeological or cultural heritage site within the study area to change was made on a five-point scale of Very High, High, Medium and Low. These assessments were based on professional judgment and experience guided by following criteria, as set out in Appendix 2 of the NRA Guidelines (2006a, 51):

Existing Status	The level of protection associated with a monument or complex is an important consideration.
Condition/ Preservation	The survival of a monument's archaeological potential both above and below ground is an important consideration and should be assessed in relation to its present condition and surviving features. Well-preserved sites should be highlighted; this assessment can only be based on a field inspection.
Documentation/ Historical Significance	The significance of a monument may be enhanced by the existence of records of previous investigations or contemporary documentation supported by written evidence or historic maps. Sites with a definite historical association or an example of a notable event or person should be highlighted.
Group Value	The value of a single monument may be greatly enhanced by its association with related contemporary monuments or with monuments from different periods indicating an extended time presence in any specific area. In some cases it may be preferable to protect the complete group, including associated and adjacent land, rather than to protect isolated monuments within that group.
Rarity	The rarity of some monument types can be a central factor affecting response strategies for development, whatever the condition of the individual feature. It is important to recognise sites that have a limited distribution.
Visibility in the landscape	Monuments that are highly visible in the landscape have a heightened physical presence. The inter-visibility between monuments may also be explored in this category.

Fragility/ Vulnerability	<p>It is important to assess the level of threat to archaeological monuments from erosion, natural degradation, agricultural activity, land clearance, neglect, careless treatment or development.</p> <p>The nature of the archaeological evidence cannot always be specified precisely but it may still be possible to document reasons to justify the significance of the feature. This category relates to the probability of monuments producing material of archaeological significance as a result of future investigative work.</p>
Amenity Value	<p>Regard should be taken of the existing and potential amenity value of a monument.</p>

Magnitude and Significance of Impact

The type of impact predicted to result from the scheme is considered in terms of being direct or indirect, as described below.

Direct Impacts	<p>Impacts arising as a consequence of the scheme, including physical impacts upon a site or its setting.</p>
Indirect Impacts	<p>Impacts which are caused by the interaction of effects or by associated off-site developments.</p>

Direct impacts occur where construction would cause direct physical damage to the archaeological or cultural heritage site or feature or where the archaeological or cultural heritage site or feature could be affected by a range of factors including visual intrusion on its setting, noise, vibration, changes in groundwater levels or chemistry or air pollution.

Archaeological sites are considered to have a 'setting', which can contribute significantly to our understanding. Setting may be defined as 'the surroundings in which a place is experienced, while embracing an understanding of the perceptible evidence of the past in the present landscape' (Highways Agency 2007). Impacts upon setting can therefore affect the overall archaeological and historic interest of a site.

The quality of impacts was assessed against the criteria set out in Appendix 4 of the NRA Guidelines (2006a, 54), which are:

Negative Impact	<p>A change that will detract from or permanently remove an archaeological monument from the landscape.</p>
Neutral Impact	<p>A change that does not affect the archaeological heritage.</p>
Positive Impact	<p>A change that improves or enhances the setting of an archaeological monument.</p>

The magnitude of impacts has been assessed on a scale of 'Very High', 'High', 'Medium', 'Low' and 'No change', taking into account the proportion of a site that would be affected and other potential negative outcomes, as defined below:

Very High	Removal or loss of over 75% or complete severance of important parts of a site or feature such that its archaeological or cultural heritage importance would be lost or very substantially diminished.
High	Removal or loss of a majority (approximately 50% to 75%) of a site or feature or severance of important parts of a site or feature such that its archaeological or cultural heritage importance would be lost or significantly diminished.
Medium	Partial (25% - 50%) demolition or loss of a site or feature or major effects on its setting, or major severance, increases in noise, vibration disturbance or loss of amenity potential such that its archaeological or cultural heritage importance would be diminished to a moderate degree.
Low	Up to 25% demolition or negative effects on the setting of a site or feature, or minor severance, increases in noise, vibration, disturbance or loss of amenity potential such that its archaeological or cultural heritage importance would be diminished but to a minor or negligible degree.
No Change	No change.

The significance of impacts was described on a scale of Profound, Significant, Moderate, Slight and Imperceptible as defined in Appendix 4 of the NRA Guidelines (NRA 2006a, Appendix 4, 54):

Profound	Applies where mitigation would be unlikely to remove negative effects. Reserved for adverse, negative effects only. These effects arise where an archaeological site is completely and irreversibly destroyed by a proposed development.
Significant	An impact which, by its magnitude, duration or intensity, alters an important aspect of the environment. An impact like this would be where part of a site would be permanently impacted upon, leading to a loss of character, integrity and data about the archaeological feature/site.
Moderate	A moderate direct impact arises where a change to the site is proposed which though noticeable, is not such that the archaeological integrity of the site is compromised and which is reversible. This arises where an archaeological feature can be incorporated into a modern day development without damage and that all procedures used to facilitate this are reversible.
Slight	An impact which causes changes in the character of the environment which are not significant or profound and do not directly impact or affect an archaeological feature or monument.
Imperceptible	An impact capable of measurement but without noticeable consequences.

An additional category of 'No Change' has also been used for archaeological sites that are within the study area but where no measurable impact will occur as a result of the proposed development.

Assessment of Significance of Impact

The significance of impacts was assessed using professional judgement guided by the matrix provided below.

Table 13-A: Significance of Impact Matrix

Sensitivity	Magnitude				
	Very High	High	Medium	Low	No change
Very High	Profound	Profound	Profound	Profound	No Impact
High	Profound	Profound	Profound	Profound	No Impact
Medium	Significant	Significant	Moderate	Moderate	No Impact
Low	Moderate	Slight	Slight	Imperceptible	No Impact

13.1.3 Relevant Legislation and Policy Context

All archaeological monuments are protected under the National Monuments Act 1930 – 2004. The definition of a monument used in Section 2 of the Act includes in effect all man-made structures of whatever form or date except buildings habitually used for ecclesiastical purposes (Minister for Arts, Heritage, Gaeltacht and the Islands 1999, 36).

Section 23 of the National Monuments Act 1930 also requires that a person finding an archaeological object must not remove it or otherwise interfere with it unless they have reasonable cause to believe that it was necessary to remove it to preserve it or keep it safe. It is also required that the finder of such objects reports them to the Director of the National Museum of Ireland within 96 hours. Section 2(1) of the 1994 Act provides that for any archaeological object found which has no known owner, ownership is vested in the State.

Section 12(1) of the 1994 Act provides that a Record of Monuments and Places (RMP) shall be established. This is maintained by the Department of Arts, Heritage and the Gaeltacht. Monuments listed on the RMP and marked on the accompanying map are known as Recorded Monuments. Under Section 12 of the 1994 Act any works affecting a Recorded Monument require two months notice to be given to the Department of Arts, Heritage and the Gaeltacht. This includes Zones of Archaeological Potential in urban areas.

Under Section 26 of the 1930 National Monuments Act and Section 21 of the 1994 Act and subsequent amendments, all excavations undertaken for the purpose of finding archaeological remains require a licence from the National Monuments Service acting on behalf of the Minister of Arts, Heritage and the Gaeltacht.

The Planning and Development Act 2000 also allows for the protection of the archaeological heritage. Planning applications are examined with reference to known archaeological sources and an appraisal is made as to whether the development is likely to affect archaeology and to what degree. On the basis of such an appraisal the Dublin City Archaeologist may request an archaeological assessment or make a recommendation for the attachment of planning conditions. In extreme cases, where

serious damage may not be mitigated, the recommendation can be made that planning permission is not granted.

Under the terms of the Planning and Development Act 2000, each planning authority must produce a development plan every six years. Such development plans include policies and objectives for the protection of archaeological heritage.

National heritage policy is referenced and amplified in the Dublin City Development Plan 2011 – 2017. Development Plan policies that relate specifically to Archaeological and Cultural Heritage and that are relevant to the proposed brewery development are:

- FC63 To promote awareness of, and access to, the city's archaeological inheritance.
- FC64 To promote the in situ preservation of archaeology as the preferred option where development would have an impact on buried artefacts, except where other alternatives are acceptable or exceptional circumstances are determined by the relevant statutory agencies. Where preservation in situ is not feasible, sites of archaeological interest shall be subject to archaeological investigations and recorded according to best practice, in advance of redevelopment.
- FC65 To preserve known burial grounds and disused graveyards. Where appropriate to ensure that human remains are re-interred, except where otherwise agreed with the National Museum of Ireland.
- FC66 To promote the awareness of the international significance of Viking and Medieval Dublin and to investigate key medieval sites and to conserve their character, setting and amenity through Irish Strategic Archaeological Research (INSTAR) Medieval Research Agenda and other initiatives.
- FC67 To recognise the importance of underwater/intertidal archaeology.

As well as the formal policies listed above, the Development Plan also states a number of objectives relating to archaeology, namely:

- FCO47 To promote best practice for archaeological excavation and encourage the dissemination of the findings of archaeological investigations and excavations through the publication of excavation reports thereby promoting public awareness and appreciation of the value of archaeological resources
- FCO48 To promote the development of the Dublin City Archaeological Archive
- FCO49 To continue to develop a long-term management plan to promote the conservation, enhancement, management and interpretation of archaeological sites and monuments and to identify areas for strategic research
- FCO50 To facilitate a study on the effects of foundation types on subterranean archaeological remains
- FCO51 To promote the development of a Historic Graveyard Advisory Group for Dublin city and to explore the possibility of improving accessibility and genealogical interpretation/information at these historic graveyards and to investigate the potential for the erection of Columbarian Walls.

13.1.4 Description of Existing Environment

Baseline Conditions

Within the study area a total of 31 archaeological and cultural heritage sites have been identified. These sites are listed in **Table 13-B** and are shown on Figure 13.1, Volume 3.

Table 13-B: Archaeological and Cultural Heritage Baseline Conditions

Site Number	Site Name	Designation	Designation Reference	Sensitivity
3	Croppies' Acre Memorial Garden	Recorded Monument	DU018-020-447	High
10	Usher Flour Mill (Site of)	Recorded Monument	DU018-020-264; 18-11-22; 18-11-221	Medium
13	Guinness 2 (Archaeological Monitoring)	None	None	Low
14	15-17 Island Street & 33 Watling Street	Recorded Monument	DU018-139	Medium
15	Former watercourse	None	None	Low
18	Course of River Camac and Mill Race	Recorded Monument	DU018-020-477	Medium
20	DCC Archaeological Evaluation	N/A	None	Low
21	Guinness 1 (Archaeological Monitoring)	None	None	Low
22	Mill Race (Site of)	Recorded Monument	DU018-020-373	Low
27	Chapel (Site of)	Recorded Monument	DU018-020-494	Medium
34	Revetment and Watercourse (Site of)	Recorded Monument	DU018-020-620	Medium
35	Waterhouse (Site of)	Recorded Monument	DU018-020-133	Medium
36	126-133 James's Street (Trial Trenching)	None	None	Low
39	Watercourse (Site of)	Recorded Monument	DU018-020-672	Medium
42	Bridge (Site of)	Recorded Monument	DU018-020-233	Medium
61	Conduit (Site of)	Recorded Monument	DU018-020-055	Medium

Site Number	Site Name	Designation	Designation Reference	Sensitivity
63	St. James's Church (Site of)	Recorded Monument	DU018-020-234	Medium
70	Medieval field system (site of)	Recorded Monument	DU018-140	Medium
72	Cookes Lane Malting (Site of)	None	None	Low
73	Sample Room (site of)	None	None	Low
74	Sawmill (Site of)	None	None	Low
75	Well (Site of)	None	None	Low
76	Dried Grain Store (Site of)	None	None	Low
77	Soldier's Infirmary (Site of)	None	None	Low
79	Landing stage and crane (site of)	None	18-10-068	Low
80	Victoria Quay Tramway (site of)	None	18-10-024	Low
81	Tramway Depot (site of)	None	18-10-096	Low
82	Vitriol works (site of)	None	18-10-099	Low
84	Brewery (site of)	None	18-10-100	Low
85	Flour mill (site of)	None	18-10-098	Low
86	Brewery (site of)	None	18-10-097	Low

The site is also located within the Zone of Archaeological Potential for Dublin City defined by the RMP (Reference Number DU 018-020) and the Zone of Archaeological Interest defined in the Dublin City Development Plan 2011 - 2017.

Medieval

The study area is located c.160m west of the medieval walled town, in an extramural suburb which would have extended westward along Thomas Street and part of James's Street. These streets formalised the route of the *Slí Mhór* (Great Highway), an earlier route way. While buildings are likely to have fronted onto these streets, the land within the study area would have been largely rural in character. Evidence of this in the form of a medieval field system (Site 70) was identified during excavation between James's Street and Grand Canal Place in 2003 (Giessel 2006; Cryerhall 2003).

Medieval sites within the study area include the site of the first St. James's Church (Site 63), which is believed to have been demolished during the 17th century and replaced by a second church (Site 37) in the 1750s (Costello 1989, 46).

The elevated ridge along which James's Street and Thomas Street run has long been exploited to provide a head of water for the city supply. Around 1308, the then Mayor John Decer began work on the first city water supply. Fed by the Rivers Dodder and Poddle, it used cisterns located on the ridge to create sufficient pressure to carry the

water into the city (De Courcey 1996, 132; Simms *et al* 2002). The site of one such cistern is believed to be close to the southern end of Watling Street (Site 35). Revetted watercourses possibly associated with this system have been identified at two locations within the study area south of Thomas Street (Sites 34 and 39), although the latter may be associated with Colman's Brook, a watercourse used to supply a mill (Gowan, 1994). Although not identified by any of the excavations in this area, De Courcey (1996) also identifies a north to south watercourse (Site 22) running parallel to Watling Street and possibly associated with Usher's Flour Mill (Site 10) close to the River Liffey.

The course of the Camac River (Site 18) west of the study area is believed to have been canalised or re-directed during the medieval period, although this route is first depicted in the 17th century (De Gomme, 1673). From this time onwards, it was exploited by a number of mills and other industries in the area (De Courcey 1996, 62).

Post Medieval

During the later medieval and post medieval periods, the area west of the city developed as a largely industrial area, particularly associated with brewing and distilling as well as less savoury activities such as tanning.

From the early 18th century, an artificial watercourse (Site 15) is depicted on maps branching from the Camac River to the west and flowing roughly south-eastwards before joining the River Liffey close to Rory O'More Bridge (Site 5) (Brooking 1728). This watercourse acted as a mill race for the Usher Flour Mill (Site 10) which was located close to the River Liffey at the junction of Watling Street and Usher's Island. It is also likely to have supplied water to the Breweries (Sites 84 and 86) and Tannery depicted on early Ordnance Survey mapping within what became the northern or 'lower' part of the Guinness Brewery in the late 19th century. According to a site plan held by the Guinness Archive, this watercourse was filled in around 1900 (refer to Figure 13.4, Volume 3).

In 1756, John Rocque depicted the area east of the proposed brewery development site as being occupied by a series of mounds south of 'Dunghill Lane' (now the area south of Island and Bonham Streets), and excavations carried out in this area during the late 1990s (Site 20) confirmed the presence layers of organic material up to 7m deep and believed to be the result of the clearance of cesspits and other sources. The layers identified in this area are believed to date mainly from the 17th and 18th centuries although medieval material may survive (O'Rourke, 1998; 1999 and 2000). Further evidence for tanning was identified in excavations carried out on the south side of Island Street, at its junction with Watling Street (Site 14) where the truncated remains of tanning vats, walls and cobbled floor surfaces were recorded (Walsh 1999; Walsh 2003).

The Cropper's or Croppies Memorial Garden ('The Croppies Acre'; Site 3) commemorates the United Irishmen executed following the rebellion of 1798. The site, located between Collins Barracks and the River Liffey, is believed to be a mass grave. The modern memorial was unveiled by the Taoiseach in 1998. This site is therefore of archaeological importance and also has cultural heritage associations.

The Usher (later the City of Dublin) Flour Mill (Site 10) is depicted on an Ordnance Survey 1:500 map published in 1837 (Sheet 19) although there is believed to have been a mill close to this location from at least the early post-medieval period. It was powered by water taken, through an artificial watercourse (Site 15), from the Camac River (Site 18) to the west. Excavations at this site in 2003 did not identify any remains earlier than the 19th century (McQuade 2003). A second flour mill and millpond (both

now demolished) are shown on the first edition Ordnance Survey map of 1847 to the north of James's Street (Site 85).

The site of a later St. James's Church (Site 27), is depicted to the north-east of the junction between Thomas Street and Watling Street on Rocque's map of 1756. It was a Roman Catholic church believed to have been built around 1724 but superseded in the 1850s before eventually being demolished and the site absorbed by the expanding brewery in the later 19th century (Simms *et al* 2008; Costello 1989).

Rocque depicts a building named the Soldiers' Infirmary (Site 77) on the north side of James's Street (1756). Although a building of similar dimensions is depicted at this position on the corresponding first edition six-inch Ordnance Survey map, it appears to have been demolished to make way for part of the Manders Brewery by the time the site was first surveyed for the Guinness Brewery in 1876.

Rocque also identifies Limekiln Yard (Site 87) to the northeast of the junction between Watling / James's Street, the name of which suggests former industrial uses in this area.

Sites 80, 89 and 90 are former tramways along Victoria Quay, James's Street and within the James's Gate Brewery. A tramway depot (Site 81) was formerly located within the northwest corner of the lower level which would have served these lines.

Guinness Lower Brewery (1873 – Present)

The large plot of land occupying the hillside between James's Street and the River Liffey was purchased by Guinness in 1873 to augment the existing brewery on the south side of James's Street (DCIHR reference 18-11-232) and Thomas Street and enable the company to increase its capacity to cope with the growing demand for its porter beers (Rynne 2006, 246) (DCIHR reference 18-10-065). The site was bounded to the west by Steeven's Lane and to the east by Watling Street, and was located within a suburb of Dublin already associated with brewing and distilling. At the time of the purchase, the southern edge of the site was lined by a mixture of residential and industrial properties including the existing Manders brewery, and a snuff factory. Further industrial properties were situated along either side of the east to west aligned Cooke's Lane in the centre of the site, including a tannery, quarry and vitriol works (Site 82). The land occupying the north-western third of the site at the time of the purchase seems to have been undeveloped open ground bisected by the mill race (see Site 15 in Table 13-B and Figure 13.1, Volume 3).

A short distance south of and parallel to the River Liffey was Lord Galway's Walk, a track or driveway linking the modern line of Island Street to the east with Steeven's Lane to the west. This route was depicted on Rocque's map of 1756 but by the publication of the Ordnance Survey map in 1837, it seems to have dwindled to a short stub of road servicing some of the buildings on the west side of Watling Street. It is believed to have taken its name from the original landowner and would have provided a scenic riverside route from the suburbs into the city of Dublin. This site had already disappeared by the time of the first Guinness site plan showing the lower brewery site in 1876 (Figure 13.2, Volume 3).

Between 1876 and 1924 various buildings were constructed across most of the lower brewery, however, changes in brewing technology resulted in the majority of the 19th century buildings being demolished after the Second World War. The following paragraphs describe those buildings, the sites of which are located close to the proposed brewery development. Figures 13.2 to 13.4, Volume 3, are historic site plans

from the Guinness Archive which show the development of the lower brewery and the locations and extent of the demolished buildings.

The Cooke's Lane Malting (Site 72) was built as part of the brewery expansion around 1875. Measuring c.13m by 55m and between four and six storeys high, the Cooke's Lane Malting was the largest building of its type at that time (Rynne 2006, 246).

Site 73 is the former location of the Sample Room. It was built in the late 1880s and was where porter would have been tested for quality, as well as being where visitors would have been invited to taste the brewery's products.

A sawmill (Site 74) is depicted for the first time on a Guinness site plan dated 1900, and was itself located within what had previously been a tannery operating from land rented from the brewery.

Site 75 is the site of a well, one of several sunk between the 1880s and 1920s and used to provide cooling water for the brewing process.

The Dried Grain Store (Site 76) was constructed in two stages between 1892 and 1900 and is depicted on Guinness site plans of those dates. Although it has subsequently been demolished, elements of its footprint can be seen in the terraces of the modern keg pen area.

Sites 73 to 76 were all demolished during the later 1960s due to changes in brewing technology and with the exception of Site 76, no trace of them can be seen today.

Site 79 was a landing stage and crane on the River Liffey which was used for the export of porter and stout from the Brewery until 1961.

Sites 13 and 21 are the locations of archaeological monitoring which took place during the development of new facilities at the brewery in the late 1990s (Delaney 1997; O'Connor and Doyle n.d.). In both cases no archaeological remains were recorded although demolition rubble consisting largely of brick in layers up to 1.5m deep was noted.

Potential for Unknown Archaeology

Archaeological monitoring during earlier redevelopment within the brewery site (Sites 13 and 21) did not identify any remains of archaeological interest, although they were confined to relatively shallow depths below the modern ground level where substantial deposits of modern brick demolition rubble were encountered. Investigations carried out immediately east of the brewery (Sites 10, 14 and 20), however, have identified extensive remains of post-medieval industrial activity (milling and tanning).

Examination of the records from geotechnical boreholes within the brewery site indicate a layer of demolition rubble and other made ground approximately 1m thick in the north-eastern part of the site and 2.7m thick in the north-western part which seals river deposits up to c.3m deep. These river deposits have the potential to contain palaeoenvironmental data as well as to provide conditions suitable for the anaerobic preservation of timber and other organic archaeological remains. As such they should be considered to have a high potential for the presence of unknown archaeological remains.

13.1.5 Potential Impacts

'Do Nothing' Scenario

The “do nothing” scenario is the outcome that would be achieved if the archaeological and cultural heritage sites identified were allowed to remain in their current condition without outside interference (e.g. construction work or archaeological investigation).

All of the sites identified within the study area are either underground archaeological remains believed not to have been disturbed to any large degree by previous development, or the locations of previous archaeological investigations that are likely to have removed most or all of the archaeological remains.

In the absence of ground disturbing activity and given that there are no known imminent environmental threats to their survival if left *in situ*, a “do nothing” scenario would result in the sites neither deteriorating nor improving in condition.

Impacts during Construction

Of the 31 sites identified within the study area, potential impacts have been identified on seven sites.

The Former Watercourse (Site 15) is the line of a mill race that once connected a canalised section of the Camac River (Site 18) with Usher's Mill (Site 10). According to site plans held by the Guinness Archives, Site 15 was filled in 1900 and no surface trace exists today. It is possible, however, that remains associated with the watercourse structure could be preserved beneath the modern ground surface. Construction of the proposed brewery development will affect a c.60m length of Site 15. The magnitude of impact has been assessed to be Medium and significance of this impact has been assessed as Slight.

Site 21 is the location of archaeological monitoring carried out during construction of modern buildings within the brewery site. Nothing of archaeological interest was recorded during the works, although a depth of c.1.5m of brick demolition rubble was noted. Construction of the proposed Towns Water and Recovered Water storage tanks will affect roughly 10% of the area of Site 21. No impact on this site is predicted.

Cooke's Lane Malting, Sample Room, Sawmill, Well and Dried Grain Store (Sites 72, 73, 74, 75 and 76) are the locations of structures recorded on historic site plans held by the Guinness Archive. They are all of late 19th or early 20th century date and were all demolished by the late 20th century. Subsequent re-development of the brewery site is likely to have wholly or partially removed any remains associated these sites. Construction of the proposed Fermentation Plant will affect c.14% of the total area of the site of Site 72 as depicted on historic mapping. Sites 73, 74, 75 and 76 will be partially or wholly within the footprint of the proposed brewhouse. This is likely to lead to the removal of any surviving archaeological remains relating to all five sites. The magnitude of these impacts has been assessed to be Low and the significance of these impacts has been assessed to be Imperceptible.

Ground investigations undertaken previously in the north-eastern part of the site has identified river sediments, including black silts, located under approximately 1m – 1.3m of made ground. These deposits should be considered to have a high potential for the presence of unknown archaeological remains on which construction activities, such as the excavation of piles and pile caps, could remove on any such remains that may be present. At present it is not possible to confirm the presence or absence of any such

remains or the magnitude of the impact that the scheme could have on them. The significance of this impact has been assessed to be Unknown.

Thirty-three of the sites identified within the study area are either underground archaeological remains or the locations of previous archaeological investigations that are likely to have removed most or all of the archaeological remains. The sensitivity of these sites derive from their physical remains, and setting is therefore not considered to contribute to this. As such, no impacts on the setting of these sites are predicted.

The Croppies Acre (Site 23) is traditionally believed to be the site of a mass grave of United Irishmen executed after the 1798 rebellion and the modern memorial reinforces this association. As the proposed brewery development will not impact on our understanding of either of these elements, no impact on this site has been predicted.

Impacts during Operation

The removal of archaeological remains has been assessed to be a construction phase impact and as discussed above 33 of the sites identified have settings which contribute to their sensitivity and the proposed brewery development will not impact on the archaeological potential, or the cultural associations of The Croppies Acre (Site 23). No impacts during the operation of the proposed brewery development are predicted.

13.1.6 Mitigation

Where preservation *in situ* is not feasible, preservation by record is recommended to mitigate identified impacts. This methodology is in accordance with the principles and recommendations outlined in the 'Framework and Principles for the Protection of the Archaeological Heritage' (DAHGI 1999, 25). Preservation by record consists of fully recorded investigations in the field, followed by analyses, reporting and publication. The information gained will be widely disseminated by a series of printed and internet publications for the benefit of scholars and the general public.

Archaeological testing through trial trenching is proposed ahead of development in the north-eastern part of the site to confirm the presence or absence, nature and sensitivity of any archaeological remains that may be present and assessment of the significance of impact, and allow the design of appropriate works to mitigate identified impacts, possibly including resolution excavation.

In addition to the archaeological trial trenching described above, archaeological monitoring of all ground breaking works and excavations is also proposed, followed by resolution excavation if required. This measure is also designed to mitigate the impacts on Sites 15, 72, 73, 74, 75 and 76 described above.

Archaeological monitoring involves an archaeologist being present '*in the course of the carrying out of development works in order to identify and protect or record archaeological deposits, features or objects which may be uncovered or otherwise affected by the works.*' (DAHGI 1999, 28) Where archaeological features or deposits are exposed during monitoring, construction work is suspended while they are preserved 'by record' through resolution excavation as described below.

Trial trenching, monitoring and resolution excavation (if necessary) requires a licence from the National Monuments Service of the Department of Arts Heritage and the Gaeltacht, following the provisions of the National Monuments Acts. In applying for the appropriate Licences, detailed method statements for the proposed works will need to

be approved by the National Monuments Service, the National Museum of Ireland and agreed with the Dublin City Archaeologist.

All archaeological works also require a stage of post fieldwork assessment, analysis and reporting. All archaeological reporting shall be undertaken in accordance with the 'Guidelines for Authors of Reports on Archaeological Excavations' published by the National Monuments Service of the Department of Arts, Heritage and Local Government in 2006.

13.1.7 Residual Impacts

The archaeological recording works and the dissemination of the results will mitigate the impacts predicted. The residual significance of impact is therefore assessed as No Impact.

13.1.8 Summary of Key Findings

A total of 31 sites of archaeological or cultural heritage sensitivity have been identified within the study area of the proposed brewery development. Potential impacts during construction on six sites have been identified as detailed below:

- Slight – one site (Site 15); and
- Imperceptible – five sites (Sites 72, 73, 74, 75 and 76).

While the potential for unknown archaeological remains in the north-eastern part of the site has been assessed to be high, the presence or absence of potential impacts on any such remains are Unknown.

No potential impacts during operation are predicted.

Archaeological trial trenching and monitoring (followed by resolution excavations if required) are proposed to mitigate these impacts. Following mitigation and dissemination of the information generated by them, the residual significance of impact on all known sites is predicted to be No Impact.

13.2 Architectural Heritage

13.2.1 Introduction

The Architectural Heritage (National Inventory) and Historic Monuments Act (1999) defines architectural heritage to mean all:

'(a) structures and buildings together with their settings and attendant grounds, fixtures and fittings,

(b) groups of such structures and buildings, and

(c) sites,

which are of architectural, historical, archaeological, artistic, cultural, scientific, social or technical interest' (Architectural Heritage (National Inventory) And Historic Monuments (Miscellaneous Provisions) Act, 1999, S.1).

13.2.2 Methodology

A study area was defined extending 100m around the site (refer to Figure 13.1, Volume 3). The following sources of information were consulted for this study area:

- Record of Monuments and Places (RMP);
- Dublin City Development Plan 2011 – 2017 for information on planning policy, Protected Structures, Architectural Conservation Areas and Conservation Areas;
- Pre-Ordnance Survey mapping;
- First edition of Ordnance Survey 6" mapping (1829-1841) and first edition of the Ordnance Survey 25" mapping (1897-1913) from www.irishhistoricmaps.ie;
- Information held in the Dublin City Archaeological Archives;
- The Dublin City Industrial Heritage Record provided by Dublin City Council Archaeology;
- Documentary, cartographic and literary sources held by the Dublin City Archives. Full details of these are provided in the bibliography;
- Documentary and cartographic sources held in the Guinness Archive. Full details of these are provided in the bibliography; and
- Walk-over survey of the study area carried out in July 2011.

Assessment of Importance

Using professional judgement guided by the categories of special interest defined in the NRA guidelines (2006b, 31) and the National Inventory of Architectural Heritage (NIAH) handbook (DEHLG 2006, 22), an assessment of the importance of each architectural heritage site within the study area was made on a five-point scale of International, National, Regional, Local and Record Only. These are summarised in **Table 13-C** below.

The assessment of importance was based on consideration of the criteria outlined in the Planning and Development Act 2000 for the designation of Protected Structures:

- Architectural interest;
- Historical interest;
- Archaeological interest;
- Artistic interest;
- Cultural interest;
- Scientific interest;
- Technical interest; and
- Social interest.

The NIAH Handbook provides further information on these criteria (DEHLG 2006, 16).

Table 13-C: Criteria for the assessment of importance for architectural heritage sites (based on DoEHLG 2006, 22).

Importance	Criteria
International	Structures or sites of sufficient architectural heritage importance to be considered in an international context. These are exceptional structures that can be compared to and contrasted with the finest architectural heritage in other countries.
National	Structures or sites that make a significant contribution to the architectural heritage of Ireland. These are structures and sites that are considered to be of great architectural heritage significance in an Irish context.
Regional	Structures or sites that make a significant contribution to the architectural heritage within their region or area. They also stand in comparison with similar structures or sites in other regions or areas within Ireland. Increasingly, structures that need to be protected include structures or sites that make a significant contribution to the architectural heritage within their own locality. Examples of these would include modest terraces and timber shopfronts.
Local	Structures or sites of some vintage that make a contribution to the architectural heritage. Such structures may have lost much of their original fabric.
Record Only	Structures or sites that are not deemed to have sufficient presence or inherent architectural or other importance at the time of recording to warrant a higher rating. It is acknowledged, however, that they might be considered further at a future time.

Description of Potential Impacts

Potential impacts of the proposed brewery development on architectural heritage were considered in terms of their:

- Quality;
- Duration; and
- Type.

The quality of impact was assessed based on the definitions given provided in the EPA guidelines: (EPA 2002, 33), as listed in **Table 13-D**.

Table 13-D: Quality of Impacts

Negative Impact	A change which reduces the quality of the environment.
Neutral Impact	A change which does not affect the quality of the environment.
Positive Impact	A change which improves the quality of the environment.

The requirement to define the duration of an impact is defined in the published EPA Guidelines (2002, 25). These criteria are laid out in **Table 13-E** (EPA 2002, 33) below.

Table 13-E: Duration of Impacts

Temporary	Impact lasting for one year or less
Short-Term	Impact lasting one to seven years
Medium-Term	Impact lasting seven to fifteen years
Long-Term	Impact lasting fifteen to sixty years
Permanent	Impact lasting over sixty years

The type of impact predicted to result from the scheme is considered in terms of being direct or indirect, as described in **Table 13-F**.

Table 13-F: Type of Impacts

Direct Impacts	Impacts arising as a consequence of the scheme, including physical impacts upon a site or its setting
Indirect Impacts	Impacts which are caused by the interaction of effects or by associated off-site developments.

Magnitude and Significance of Impacts

The magnitude of impact was assessed on a five point scale of Very High, High, Medium, Low and Neutral. Assessment was based on consideration of the nature of the impact (e.g. demolition, visual intrusion, enhancement of amenity etc) as well as quality, duration and type of impact.

The significance of impact was then assessed using professional judgement, guided by the matrix presented in **Table 13-G**. Five levels of significance were defined which apply equally to positive and negative impacts (NRA 2006b, 32; **Table 13-G**):

Table 13-G: Significant of Impact matrix

Importance	Magnitude				
	Very High	High	Medium	Low	Neutral
International	Profound	Profound	Significant	Significant	No Impact
National	Profound	Significant	Significant	Moderate	No Impact
Regional	Significant	Significant	Moderate	Slight	No Impact
Local	Significant	Moderate	Slight	Imperceptible	No Impact
Record Only	Slight	Slight	Imperceptible	Imperceptible	No Impact

Definitions of the levels of significance for architectural heritage impacts are described in **Table 13-H** below (NRA 2006b, 33).

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Table 13-H: Definition of Levels of Significance for Architectural Heritage

Impacts of Negative quality	<p>Profound</p> <p>An impact that obliterates the architectural heritage of a structure or feature of national or international importance. These effects arise where an architectural structure or feature is completely and irreversibly destroyed by the proposed development. Mitigation is unlikely to remove negative effects.</p>
	<p>Significant</p> <p>An impact that, by its, magnitude, duration or intensity alters the character and /or setting of the architectural heritage. These effects arise where an aspect or aspects of the architectural heritage is/are permanently impacted upon leading to a loss of character and integrity in the architectural structure or feature. Appropriate mitigation is likely to reduce the impact.</p>
	<p>Moderate</p> <p>An impact that results in a change to the architectural heritage which, although noticeable, is not such that alters the integrity of the heritage. The change is likely to be consistent with existing and emerging trends. Impacts are probably reversible and may be of relatively short duration. Appropriate mitigation is very likely to reduce the impact.</p>
	<p>Slight</p> <p>An impact that causes some minor change in the character of architectural heritage of local or regional importance without affecting its integrity or sensitivities. Although noticeable, the effects do not directly impact on the architectural structure or feature. Impacts are reversible and of relatively short duration. Appropriate mitigation will reduce the impact.</p>
	<p>Imperceptible</p> <p>An impact on architectural heritage of local importance that is capable of measurement but without noticeable consequences.</p>
	Impacts of Positive quality
<p>Moderate</p> <p>A beneficial effect that results in partial or temporary enhancement of the character and /or setting of the architectural heritage and which is noticeable and consistent with existing and emerging trends.</p>	
<p>Slight</p> <p>A beneficial effect that causes some minor or temporary enhancement of the character of architectural heritage of local or regional importance which, although positive, is unlikely to be readily noticeable.</p>	
<p>Imperceptible</p> <p>A beneficial effect on architectural heritage of local importance that is capable of measurement but without noticeable consequences.</p>	

Unless otherwise stated, all impacts described below are Negative.

13.2.3 Relevant Legislation and Policy Context

All archaeological monuments are protected under the National Monuments Act 1930 – 2004. The definition of a monument used in Section 2 of the Act includes in effect all man-made structures of whatever form or date except buildings habitually used for ecclesiastical purposes (Minister for Arts, Heritage, Gaeltacht and the Islands 1999, 36).

Section 12(1) of the National Monuments (Amendment) Act 1994 provides that a Record of Monuments and Places (RMP) shall be established. This is maintained by the Department of Arts, Heritage and the Gaeltacht. Monuments listed on the RMP and marked on the accompanying map are known as Recorded Monuments. Under Section 12 of the Act any works in relation to a Recorded Monument requires two months notice to the Department of Arts, Heritage and the Gaeltacht.

The Planning and Development Act 2000 requires that a local authority set up and maintain a Record of Protected Structures which consists of structures that are of special archaeological, historical, archaeological, artistic, cultural, scientific, social or technical interest. The special interest of Protected Structures is managed through the development control process and restriction of exempted development. Designation also confers protection on land and structures within the curtilage¹⁸ of the Protected Structure. Attendant grounds are defined as lands which lie outside the curtilage of a protected structure, but are intrinsic to its appreciation, function or setting (DEHLG 2004, 192). Features of importance within attendant grounds are not automatically protected as part of the curtilage of a Protected Structure and require specific inclusion in the Record of Protected Structures.

In this context setting is understood to comprise the surroundings of a site of architectural interest that are relevant to its importance, understanding or appreciation. Setting may include elements which make a positive, negative or neutral contribution to the importance of the site and the extent to which setting contributes to the importance of different sites also varies.

Section 81 of the Planning and Development Act 2000 also places an obligation on planning authorities to define Architectural Conservation Areas (ACA) in order to preserve “the character of a place, area, group of structures or townscape”. The act states that when considering an ACA, the planning authority should take into account any features of:

‘special architectural, historical, archaeological, artistic, cultural, scientific, social or technical interest or value; or that contributes to the appreciation of protected structures’.

National heritage policy is referenced and amplified in the Dublin City Development Plan 2011 – 2017.

In addition to statutory Architectural Conservation Areas, Dublin City Council also designates Residential Conservation Areas and Architectural and Civic Design Conservation Areas. These areas have been designated in recognition of their unique architectural character and important contribution to the heritage of the city.

Policies in the Dublin City Development Plan which are relevant to this report comprise:

¹⁸ Curtilage is not defined in legislation, however, the Architectural Heritage Protection Guidelines for Planning Authorities states that it can be taken to mean the parcel of land immediately associated with the structure which is or was used for the purposes of the structure (2004, 13.1.1).

- FC26 – To protect and conserve the city’s cultural and built heritage; sustaining its unique significance, fabric and character to ensure its survival for future generations
- FC27 – To seek the preservation of the built heritage of the city that makes a positive contribution to the character, appearance and quality of local streetscapes and the sustainable development of the city.
- FC28 – To continue to protect our built heritage, and development proposals affecting our built heritage will be assessed in accordance with the document ‘Architectural Heritage Protection Guidelines for Planning Authorities 2004’ (DoEHLG).
- FC30 – To include those structures considered to be of special architectural, historical, archaeological, artistic, cultural, scientific, social or technical interest in the Record of Protected Structures. To protect these structures, their curtilage and the setting from any works that would cause loss or damage to their special character.
- FC40 – To protect the special character of the city’s conservation areas through the application of policies, standards and guiding principles on building heights.
- FC41 – To protect and conserve the special interest and character of Architectural Conservation Areas and Conservation Areas in the development management process.
- SC17 - To protect and enhance the intrinsic quality of Dublin as a predominantly low-rise city, and to provide for taller buildings in the designated limited locations
- SC18 - To protect and enhance the skyline of the inner city, and to ensure that all proposals for mid-rise and taller buildings make a positive contribution to the urban character of the city, having regard to the criteria and site principles set out in the Development Standards Section (see Chapter 17). In particular all new proposals must demonstrate sensitivity to the historic city centre, the river Liffey and Quays, Trinity College, The cathedrals, Dublin Castle, the historic squares and the city canals, and to established residential areas, open recreation areas and civic spaces of local and citywide importance.
- SC19 - To promote a coordinated approach to the provision of taller buildings through local area plans in order to prevent visual clutter or cumulative negative visual disruption of the skyline

13.2.4 Description of Existing Environment

Baseline Conditions

Within the study area a total of 55 architectural heritage sites have been identified. Potential impacts were identified on two further designated architectural heritage sites and one undesignated site beyond this area which have been included within the baseline. The total number of sites considered in the baseline is therefore 58. These sites are listed in **Table 13-1** and are shown on Figure 13.1, Volume 3.

Table 13-I: Architectural Heritage Baseline Conditions

Site Number	Site Name	Designation	Importance	Designation Reference
1	Collins Barracks	Recorded Monument, Protected Structure	National	DU018-020306-; 712, 713, 714, 715, 716, 717, 718, 719, 720, 721, 722, 723, 724, 725, 726
2	Quays Conservation Area	Conservation Area	Local	18-10-022
4	Sean Heuston Bridge	None	Regional	
5	Rory O'More/Victoria Bridge	Recorded Monument	Local	DU018-020311-
6	Granite Piers and attached wall on Victoria Quay	Protected Structure	Local	8203
7	Guinness Building	Protected Structure	Regional	8204
8	Heuston Station	Protected Structure	Regional	7576
9	Former Noel Leonard Pub	None	Local	
11	15 Usher's Island	Protected Structure; Recorded Monument	Regional	8198; DU018-020531-
12	Barley Flaking Plant	None	Local	
16	Former cask washing shed	None	Local	
17	Dr. Steeven's Hospital	Protected Structure; Recorded Monument	Regional	7840;DU018-020341-
19	Former Distillery building	None	Regional	18-11-047
23	Saint Patrick's Hospital, including wall, gates and gatehouse	Protected Structure	Regional	856
24	Power House	None	Regional	

Site Number	Site Name	Designation	Importance	Designation Reference
25	Smock mill	Protected Structure; Recorded Monument	Regional	8332; DU018-020323-; 18-11-047
26	108 James's Street	Protected Structure	Regional	4051
28	107 James's Street	Protected Structure	Regional	4050
29	Bank of Ireland, 85 James's Street	None	Local	
30	89 James's Street	None	Local	
31	98 James's Street	Protected Structure	Regional	4049
32	101-104 James's Street	None	Local	
33	109 James's Street, Former Post Office	Protected Structure	Regional	4055
37	St. James's Church and Graveyard (Church of Ireland)	Recorded Monument	Regional	DU018-020346-
38	Gate 112, Guinness Brewery	None	Local	
40	IAWS building	None	Local	
41	84 James's Street	Protected Structure	Regional	4048
43	Gate 110, Guinness Brewery	None	Local	
44	Conservation Area, James's Street	Conservation Area	Local	
45	Entrance Gates, piers and railings to former St. James's Church	Protected Structure	Regional	4053
46	170-120 James's Street	None	Local	

Site Number	Site Name	Designation	Importance	Designation Reference
47	131 James's Street	None	Local	
48	132 James's Street	Protected Structure	Local	4055
49	133 James's Street	None	Local	
50	134 James's Street	Protected Structure	Local	4056
51	Former Luncheon Rooms, 63-68 James's Street	Protected Structure	Regional	4030; 4031; 4032; 4033; 4034; 4035
52	Offices, 69-75 James's Street	Protected Structure	Regional	4036; 4037; 4038; 4039; 4040; 4041; 4042; 4043
53	Old gateway to Brewery premises	Protected Structure	Regional	4046
54	77-81 James's Street	Protected Structure	Regional	4044
55	82 James's Street	Protected Structure	Regional	4045
56	Guinness Brewery original entrance gate to Brewery	Protected Structure	Regional	8144
57	83 James's Street	Protected Structure	Regional	4047
58	The Dwelling House, 1 Thomas Street	Protected Structure	Regional	8145
59	2-6 Thomas Street	Protected Structure	Regional	8146
60	7 Thomas Street	Protected Structure	Regional	8147
62	Fountain and sundial at James's St / Bow Lane	Protected Structure	Regional	4054
64	St. James's Parochial Hall	Protected Structure	Regional	4019
65	St. James's Roman Catholic Church	Protected Structure	Regional	4020

Site Number	Site Name	Designation	Importance	Designation Reference
66	140 James's Street	Protected Structure	Regional	4057
67	31 James's Street	Protected Structure	Local	4018
68	Vat House 1 & 2	None	Local	
69	1-4 Echlin Street	None	Local	
71	Liberties Architectural Conservation Area	Architectural Conservation Area	Regional	
78	Victoria Quay Wall	None	Regional	18-10-067
88	Paint Factory	None	Record Only	18-10-069
83	Tan yard wall	None	Local	18-11-007

Ten distinct types have been identified within the study area. These comprise:

- Historic buildings associated with the Guinness brewery;
- Industrial buildings;
- Hospitals;
- Churches;
- Residential buildings;
- Commercial buildings;
- Public realm structures;
- Infrastructure;
- Military structures; and
- Conservation Areas.

Guinness Brewery

The study area is dominated by structures associated with the Guinness Brewery, dating from the late 18th or early 19th century to the present day. Photos from around the study area can be found as Plates 1 – 36 in Appendix 13.2, Volume 4, and these are referenced in the text below.

The historic core of the brewery is located on the south of James's Street (DCIHR reference 18-11-232), and much of it is outside the study area. The earliest structures within the study area are Vat Houses 1 and 2 (Site 68) which are located to the south

of James's Street. Vat House 1 is a double gabled brick structure with later cast iron columns and beams supporting a floor carrying ten large vats, whilst Vat House 2 is constructed of calp rubble and brick, the internal structure of which was replaced with a cast iron structure in the later 19th century, supporting five vats (Casey 2005, 648). These structures are undesignated and have been assessed to be of Local importance.

To the north of this is a long terrace of brewery buildings which forms the Brewery's continuous and imposing frontage to the busy streetscape of James's Street (Sites 51 to 59). These buildings are all designated as Protected Structures and are assessed to be of Regional value due to their group value and historic and architectural interest. Now known as the Front Offices, in the following discussion the buildings are identified by individual names and street numbers to aid the identification of individual structures and the relation to the Record of Protected Structures.

The westernmost building in this terrace (Site 51) was erected in the late 19th century on the site of Numbers 63-68 James's Street, and formerly held luncheon rooms for the brewery staff (Plate 1 in Appendix 13.2, Volume 4). The building comprises a three-storey block over basement constructed in red brick with stone dressings. It is linked by a single bay to the earlier office building to the east. (Site 52), which it imitates in its design. The main block is of thirteen bays, the central three of which are slightly advanced. A small pediment is present over the central bay, with a rusticated arch extending to basement level and flanking the central door. The storeys are articulated by floor bands, and varied windows with tall rectangular openings across the ground floor, segmental headed windows to the first floor and round-headed windows with key stones to the second floor.

To the east is an imposing office building (Site 52), first shown on plans of the Brewery in 1874 (Guinness Archives, Unnamed, 1874), and constructed on the site of Numbers 69-75 James's Street. Of fifteen bays in three storeys with attic and basement, the building is constructed in red brick with stone dressings (Plate 2). The central five bays are advanced below an elaborate cornice, with a pediment over the central bay and a rusticated arch extending below to basement level to flank the central doorway, which is set below a deep stone canopy. Similar to the adjacent luncheon rooms, window design changes across the elevation, culminating in round-headed windows with keystones on the second floor. Attached to the west elevation is an archway (Site 53) with rusticated voussoirs which formerly provided entrance into the Brewery premises. A three-storey linking structure is now present to the rear (south) of this.

Numbers 77-81 James's Street (Site 54) are located to the east and were constructed by Guinness to provide offices and workshops. The building comprises a range of three-storey red brick buildings over basement which continue the eaves level from the adjacent buildings. The range is regularly fenestrated without architectural elaboration.

Abutting this building to the east, Number 82 James's Street (Site 55) was constructed as a pair of dwelling houses in the early 19th century and were later acquired by the brewery. Formed by a pair of three-storey red brick townhouses over basement, the former entrances into the houses remain visible as wide round-headed windows to the left and right of the building.

St. James's Gate (Sites 56 and 57) was erected in the 19th century to replace the original 18th century gateway into the brewery (Plate 3). The gate is formed by a rusticated basket arch with impost bands and a carved centrally placed head. A pair of pedestrian entrances with rusticated voussoirs are present to either side of the gate below date stones recording the date of the brewery's foundation in 1859 and the

current year. To either side of the gateway is a stuccoed three-storey block (Site 57), one bay in width with a tripartite sash window to each floor.

The Dwelling House (Site 58) at 1 Thomas Street was the home of Arthur Guinness (Plate 6). It is reputed to have been constructed in the 1770s, and was refronted in the 19th century (Pearson 2000, 177). It comprises a four-storey, seven-bay brick building over basement. A classical doorcase of Portland stone is centrally placed within the elevation, flanked by regularly placed sash windows. The building has been subject to considerable alteration and extension, and has variously housed the brewery counting house, the drawing and malt offices, and the registry office.

The easternmost building in the terrace is Numbers 2-6 Thomas Street (Site 59), a store building constructed for the brewery, probably in the early 19th century. This is a seven-bay building of four-storeys over basement, constructed in stock brick and entered from the brewery through the north elevation.

To the north of James's Street the brewery premises are known as the 'lower level' and continue to be used for the storage and dispatch of beer (DCIHR reference 18-10-065). The ground level within this area slopes towards the river and has been terraced for construction and operation of the brewery.

The lower level is defined to Victoria Quay to the north by a tall boundary wall constructed of rock faced stone with red brick panels between stone piers. Entrance to the site is gained through a pair of square-section gate piers of rock-faced stone (Site 6; Plate 4) which are designated as Protected Structures. The boundary wall has been rebuilt in grey brick to the west of Victoria Quay at the junction with Steeven's Lane. A second gateway is located to the east of Victoria Quay. Now blocked, it is formed by a central carriage entrance flanked by pedestrian entrances, defined by gate piers of square section (Plate 5). To the west of this gateway the wall is of brick construction and includes a wide vehicle entrance inserted in the later 20th century. Clarification over the extent of the Protected Structure has been requested from Dublin City Council, however this was not available prior to this assessment. It is assumed that the boundary wall to Victoria Quay would be considered to form a curtilage structure associated with the Protected Structure gate piers, and therefore be subject to protection as a Protected Structure. In consideration of their historic interest and contribution to the streetscene of Victoria Quay and the Quays Conservation Area, the wall and gateways have been assessed to be of Local importance.

Centrally placed between the gateways is a two-storey office building (Site 7) constructed of stock brick with stone dressings. The building is five bays in width and one room in depth (Plate 6). The central bay is faced in stone below a pediment, and contains a window at first-floor level above a carriage arch which gives access into the site. Pedestrian entrances with rusticated voussoirs are set to either side, flanked by windows in the outer bays. Two windows of similar form are present in the outer bays at first-floor level. A simple entablature runs across the top of the building above two courses of red bricks. Fronting onto Victoria Quay, this building has a busy roadside setting, characterised by its position between the brewery and the river. This building is designated as Protected Structure and has been assessed to be of Regional importance.

A boundary wall defines the lower level and Watling Street to the east. Within the wall to Watling Street, a building frontage to a former tannery has been incorporated within the wall (Site 83). Comprising a gable wall with square-headed door opening which contains steel doors, the frontage retains a smooth-render fascia with cast lettering

reading 'The Central Skin and Hide Company'. This site has been assessed to be of Local importance due to its interest as evidence of the former use of the site.

To the south of the lower level, two gateways are present providing access to and from James's Street. Gateway 112 (Site 38) is formed by a tall round-headed arch with rusticated voussoirs and a simple entablature. The gateway is flanked by a later roughcast wall. Gateway 110 (Site 43) is formed by a tall round-headed arch with keystone, moulded hoodmould and impost band, below which the masonry is rusticated (Plate 7). An open pediment supported on console brackets forms the top of the gateway, and contains a coat of arms. This gateway is flanked by a tall metal fence. The gateways are undesignated and have been assessed to be of Local importance.

Structures within the lower level area are predominantly of later 20th century date, and comprise functional structures constructed for the operation of the brewery. These buildings are of no architectural interest, comprising mainly steel-framed sheds clad in corrugated sheeting, single-storey brick buildings, concrete-framed office buildings, clad in brick, prefabricated panels or corrugated steel. Exposed pipe work and pipe bridges are present around buildings to the south of Cooke's Lane. Concrete hard-standing is present throughout the lower level, and keggings pens to the south of the site.

Three buildings of architectural heritage interest have been identified within the lower level.

The Barley Flaking Plant (Site 12) was constructed in the 1940s and comprises a tall in reinforced concrete structure which incorporates a series of concrete silos (Plate 8). The building forms a local landmark and is visible throughout much of the surrounding area. The Barley Flaking Plant has been assessed to be of Local importance due to its interest as a local landmark associated with the Guinness Brewery.

A cask washing shed (Site 16) was constructed within the lower level site in the mid-1870s, transferring the facility from the original brewery site to the south of James's Street. The shed contained mechanised facilities for cleaning casks, using water from refrigerators, heated by exhaust steam from the saw mill, malt store and cooperage (Stevens c.1960, 78). Historic maps show the cask washing shed to have been formed by a large rectangular structure open to the south and defined to the north by a mill race. This is shown on historic photos held by the Guinness Archive (Plate 9). The shed was largely demolished in the 20th century, with the exception of a single range which original formed the westernmost end of the shed (Site 16). Now clad in corrugated steel (Plate 10), this range retains a metal-framed structure internally, comprising cast iron columns supporting a metal right-angle truss roof structure with modern cladding over (Plate 11). Brick walls are retained to the north and west of the range. A pair of cast iron columns and series of I-beams are present within the west elevation which may relate to the former weigh bridge shown in this area on historic site plans (Plate 12). The former Cask Washing Shed (Site 16) is not subject to any designations and it is assessed to be of Local importance.

The setting of the Barley Flaking Plant (Site 12) and the former cask washing house remains industrial in character, now dominated by modern industrial structures associated with the brewery and open cask storage areas.

The Power House (Site 24) was erected for Guinness from 1946-1948 to the designs of F. P. M. Woodhouse and Sir Alexander Gibb and Partners (Casey 2005, 651). This is a flat-roofed brick-clad structure designed in the Art Deco style, comprising a boiler

house to the north and turbine floor to the south. The boiler house is formed by a tall central block illuminated by a tall metal-framed window. This is flanked by lower blocks to either side, both of which are lit by three narrow windows. Tall brick chimneys are present against the northeast and northwest corners of the boiler house, framing views towards the structure. The turbine floor extends to the south of the boiler house and is formed by a lower projecting block with a three-light opening in its south elevation, which is flanked by two lower blocks. Viewed from the south, the symmetrical design, and changes in height and massing, coupled with the framing role of the brick chimneys provides a strong composition, and appreciable from the adjacent James's Street (Plate 13). The Power House forms part of the complex of industrial buildings within the lower level, and is set back from James's Street behind a small garden defined from the street by metal railings. While the Power House is an undesignated structure it has been assessed to be of Regional value due to its architectural quality.

Industrial Buildings

In the 19th century, Roe's distillery was formerly located to the east of Watling Street and produced George Roe's Old Malt Whiskey. A distillery building (Site 19) of mid to late 19th century date survives on the corner of Watling Street and Bonham Street, comprising a two-storey stock brick structure formed by four ranges gabled to Bonham Street, with metal-framed windows, loading doors and blind windows in the north and west elevations (Plate 14). The building has been subject to some alteration including the insertion of a double-height loading door into the west elevation and the recladding of the roof. The building is not subject to any designations and has been assessed to be of Local importance.

A smock mill¹⁹ (Site 25) is located within the former distillery site to the south. Originally constructed in 1757, the mill was rebuilt in 1805 to grind corn for Roe's distillery. It comprises a tall conical brick tower, illuminated by a series of segmental-headed windows, with onion dome cap topped with a figure of St. Patrick carrying a mitre and a crozier, the sails having been removed around the 1860s (Pearson 2000, 175). The date of 1805 is inscribed into the lintel over the entrance to the mill, recording the date of its construction. The mill is located within the digital hub site, which is proposed for redevelopment over the next decade, and is designated as a Protected Structure. The smock mill has been assessed to be of Regional importance.

The paint factory (Site 88) is a five-bay two-storey brick building with three-bay three-storey rendered section to north, which was constructed c.1920. Whilst the current building is of limited architectural interest, it is located on a site which has been in industrial use for almost two centuries and may retain evidence of earlier structures within its fabric. The building has been assessed to be of Record Only importance.

Hospitals

Dr. Steeven's Hospital (Site 17) was established in the early 18th century. Grizel Steeven's established it as a hospital for the poor and sick of Dublin, following the death of her brother in 1701 who made it a condition of his bequest to her. She commenced construction of the hospital in 1719, and despite limited funds construction was complete by the mid-1730s (Casey 2005, 682). The hospital building is of two-storeys with an attic and is laid out around a central quadrangle. The building is rendered and painted with stone dressings and a steeply pitched roof. When built, the principal elevation looked to the east to Steeven's Lane, however recent alterations

¹⁹ A smock mill is a windmill with a stationary body which contains the grinding machinery, and a rotating cap which can be turned into the wind to keep the sails rotating.

have reorientated the building to the north. The original principal elevation comprises seventeen bays, with projecting end blocks, each of five bays, and an advanced central section of five bays below a pediment with central lantern (Plate 15). The elevation is articulated by quoins to the central and end sections, unified by a floor band running across entire elevation, and the repetitive fenestration of tall, narrow multi-pane sash windows. The entrance is placed centrally within an ashlar doorcase with Tuscan pilasters supporting a segmental pediment over a fanlight with doorway below. The setting of the hospital is defined by its position on the edge of the extensive complex of Saint Patrick's Hospital (Site 23), the presence of the industrial complex of the Guinness Brewery to the east, and the wide busy streetscape of St John's Road West. The original principal elevation fronts onto the narrow streetscape of Steeven's Lane enclosed to the east by the long stone boundary wall of the Guinness Brewery, enabling only oblique views of the building. The hospital is designated as a Protected Structure and has been assessed to be of Regional importance.

Saint Patrick's Hospital (Site 23) was constructed as an asylum, between 1749 and 1757 to the design of Michael Wills (Casey 2005, 684) on land acquired from Dr. Steeven's Hospital. The original building remains in use as part of Saint Patrick's University Hospital today. The historic element of the site comprises an entrance block with ward wings extending to the rear (north). The entrance block is formed by a two-storey building over rusticated basement, constructed in granite. The elevation is of seven bays, the central three of which break forward under a pediment, with platt band between the ground and first floors, and quoined frames to the first-floor windows. The original building is flanked by two projecting wings added in the later 18th century. The ward wings to the rear comprise long three-storey ranges, constructed in limestone rubble with tall, narrow windows. The hospital has been considerably extended to the east with extensive modern buildings. The grounds are defined by a tall stone wall, entered through the southeast corner through a gateway of later 19th century date, flanked by a single-storey stone gate lodge with porch supported on Tuscan pillars. The hospital is designated as a Protected Structure and has been assessed to be of Regional importance.

Churches

The Church of Ireland Church of St. James's (Sites 37 and 45) was erected in 1859-1860 to the designs of Joseph Welland (Casey 2005, 624). Constructed of local calp with limestone dressings, the church comprises an aisled nave, transepts, short chancel and west tower (Plate 16). The tower is formed in three stages with lancet windows to the second and third stages, below the base of the former spire, the upper portions of which were removed in the 1940s. The church is now in commercial use and has been subject to significant alteration internally. The church is set back from James's Street behind stone piers and iron railings, whilst to the north of the church is a tree-lined graveyard. The church grounds are surrounded by the Guinness Brewery to the north, and flanked by residential and commercial buildings to James's Street. The Church is a Recorded Monument, whilst the gates, walls and railings are designated as a Protected Structure. The church, railings and gates have been assessed to be of Regional importance.

The Roman Catholic Church of St. James's (Site 65) was constructed from 1844 - 1859 to the designs of Patrick Byrne (Casey 2005, 629), and is located to the south of James's Street oriented north-south. The church is designed in the Middle Pointed style (Ibid.) and comprises an undifferentiated nave and chancel with aisles and squat west tower. The north (liturgical west) elevation is gabled to the street, with pointed doorways below the tower and the aisle ends, reached by a broad flight of stairs from

James's Street (Plate 17). Three- and two-light decorated windows are present above the doors. The nave and chancel extend to the south, illuminated by two-light decorated windows to the aisles and clerestorey. A single-storey church hall (Site 64) is located to the west of the church, constructed of red brick with lancet windows. The church and church hall are located on the corner of James's Street and Echlin Street, flanked by the buildings of the Guinness Brewery to the east, and varied residential buildings to the west. The church and church hall are both designated as Protected Structures and have been assessed to be of Regional importance.

Residential Buildings

Number 15 Usher's Island (Site 11) is a four storey Georgian townhouse with basement, believed to date from c.1774 (Casey 2005, 671). Constructed of brick in Flemish bond with stone dressings, the building has a stone doorcase with ionic columns and a broad segmental fanlight over (Plate 18). Sash windows are retained across the elevation, emphasising the *piano nobile* and diminishing in size moving up the elevation. The townhouse is notable as the setting for James Joyce's short story, *The Dead* (Casey 2005, 672). The building fronts onto Usher's Quay, looking across the River Liffey and forms part of a short terrace of buildings, including two-storey Georgian townhouses to the east and modern apartments to the west. It is designated as a Protected Structure and has been assessed to be of Regional importance.

Number 108 James's Street (Site 26) is a three-storey townhouse with basement, dating from the later 19th century. Constructed in red brick with stone dressings, the principal elevation is of two bays, with canted bay windows rising from basement to first-floor level. The doorway is set below a semi-circular fan light with hood mould over, and is reached by a short flight of stairs. Stone cornices are present over the bay window and across the top of the building. Number 108 is set back from the street front behind a garden, defined by railings and stone gateposts to the street and the side elevation of Number 107 James's Street. Number 107 James's Street (Site 28), a three-storey townhouse is also of red brick construction with stone dressings. The ground floor contains a doorway to the left, set within a simple stone surround with pediment over. Two windows are present to the right, below a stone cornice dividing the ground and first floors. Above this, two windows are present on the first and second floors, below a plain frieze and moulded cornice. Together Numbers 108 and 109 James's Street form a group with the former post office (Site 33) (Plate 19). The setting of these buildings is now largely characterised by the presence of structures associated with the Guinness Brewery, including both modern and historic elements. Both buildings are designated as Protected Structures and have been assessed to be of Regional importance.

Number 89 James's Street (Site 30) is a townhouse dating from the early 19th century. The building is of four storeys over basement, constructed in stock brick with a stuccoed basement. A doorway is set to the left of the principal elevation, below a segmental overlight supported by ionic columns, flanked by two windows to the right. Three windows of 2/2 lights are present on the upper floors, diminishing in height above the first floor. Number 89 is not subject to any designations, and has been assessed to be of Local importance.

Number 98 James's Street (Site 31) is a substantial townhouse of four storeys over basement (Plate 20). Constructed in red brick, the basement and ground floor are faced with rusticated stucco. The principal elevation is formed in five bays, with a central doorway set below a pediment supported on Tuscan columns, flanked by two round-headed windows to either side. Five windows are present on the upper floors,

diminishing in size above the first floor. Number 98 is designated as a Protected Structure and has been assessed to be of Regional importance.

Number 101-104 James's Street (Site 32) was constructed as a terrace of three two-bay townhouses. The terrace was later altered to appear as a single six-bay house of similar design to Number 98 (Site 31), complete with central pedimented doorway flanked by round-headed windows, and rusticated ground floor and basement (Plate 21). The building is not subject to any designation and has been assessed to be of Local importance.

The setting of Sites 30, 31 and 32 is defined by their position on the busy thoroughfare of James's Street and surrounded by the buildings of the Guinness brewery to the north.

Number 84 James's Street (Site 41) is a three-storey townhouse over basement, constructed in stock brick which is currently vacant and poorly maintained (Plate 22). The building is of two bays in width. To the right is a doorway set below a fanlight and cornice supported on console brackets, flanked by a single 2/2 sash window. Sash windows are present across the upper floors and the west elevation, overlooking the forecourt to the Bank of Ireland. Fronting directly onto James's Street, the land to the rear of the building is currently awaiting redevelopment as part of the Digital Hub development. Number 84 is designated as a Protected Structure and has been assessed to be of Regional importance.

Numbers 117-120 James's Street (Site 46) are a terrace of four three-storey townhouses of mid to late 19th century date, which were constructed in two phases. Number 117 is the earlier structure and comprises a five bay house constructed of Flemish bonded red brick, with a modern shop front to the ground floor (Plate 32). Numbers 118-120 are of slightly later date, and constructed in orange brick with historic shop fronts on the ground floor with pilasters, stall risers and fascias retained to numbers 118 and 119. The upper floors across the terrace have windows with flat lintels decreasing in size from the first to second floors, now with modern glazing, and a parapet in front of the pitched slate roof. The terrace fronts directly onto James's Street and flanks the churchyard of St. James's Church. These buildings are not subject to any designation and have been assessed to be of Local importance.

Numbers 131-133 James's Street (Sites 47, 48 and 49) comprise a terrace of three, three-storey red brick townhouses, now with commercial premises on the ground floor, which are of mid to late 19th century date. All have two segmental-headed windows on the first and second floors, diminishing in height moving up the elevation below a dogtooth brick eaves course and shallow parapet. Number 131 (Site 48) is more ornately treated with roll moulding to the window openings, polychrome brick decoration between the first and second floors, and lettering recording the former presence of a Wine and Spirit Merchant in the premises. Number 134 James's Street (Site 50) is a four-storey townhouse, rendered with applied quoins. The building retains a fanlight with impost blocks over the doorway, however all windows and doors are modern replacements. Numbers 131-134 are located on the north side of James's Street close to the junction with Steeven's Lane, and form part of the varied historic streetscape in this area. Numbers 132 and 134 are designated as a Protected Structure, whilst 131 and 133 are not subject to any designation. All four buildings have been assessed to be of Local importance due to their modest architectural interest and contribution to the local streetscape.

Number 7 Thomas Street (Site 60) is a three-storey house of late Georgian date (Plate 23). Constructed of stock brick, a modern shop front is now present across the ground

floor, however, the original pattern of fenestration remains across the upper floors, comprising three regularly spaced sash windows. Quoins are present on the west corner of the building, and a number of blocked openings are visible in the elevation to Crane Street. Number 7 fronts directly onto Thomas Street and is designated as a Protected Structure and has been assessed to be of Regional importance.

Number 140 James's Street (Site 66) is a three-storey townhouse of three bays, with a central doorway set within a quoined surround with fanlight over. The building is rendered externally, incised to the ground floor with a floor band over and sash windows. The building forms part of a varied continuous terrace to the north of James's Street, abutted to the east by a modern three-storey building which terminates views west along James's Street. Number 140 is designated as a Protected Structure and has been assessed to be of Regional importance.

Number 31 James's Street (Site 67) is a three-storey townhouse, of brick construction, now much altered. A carriage arch with stone surround is present to the left of the ground floor, whilst, to the right, the ground floor has been rendered and the original fenestration replaced with a modern door and window. The upper floors each contain two tall windows below flat arches of gauged brick, now with unsympathetic modern UPVC glazing. The building is designated as a Protected Structure and has been assessed to be of Local importance due to its modest architectural interest.

Numbers 1-4 Echlin Street (Site 69) comprise a block of tenements dating from the later 19th century (Plate 24). Constructed of stock brick, each tenement has a central stairwell illuminated by wide segmental-arched windows, flanked by paired windows to each side which now contain modern frames. Site 69 is not subject to any designation and has been assessed to be of Local importance.

Commercial Buildings

The Former Noel Leonard Pub (Site 9) is an undesignated building located on the corner of Victoria Quay and Watling Street. Rendered externally with a pitched plain tile roof, the north elevation to Victoria Quay contains five windows within arched architraves to the ground floor, with five 6/6 sash windows in plain surrounds on the first floor (Plate 25). The elevation to Watling Street is similarly arranged, with a doorway present in the leftmost opening. The entrance to the pub is set on the corner of the building below a small clock with segmental pediment over. The former pub adjoins a contemporary residential building to the west, and small-scale industrial buildings to the south (Site 12). The quaysides to the north, east and west contain a varied continuous frontage of buildings including modern and historic residential buildings, as well as the boundary wall to the Guinness brewery. The former pub is not subject to any designations and has been assessed to be of Local importance.

The Bank of Ireland on the corner of James's Street and Watling Street (Site 29) was designed by Hugh Carmichael and opened in 1853 (Casey 2005, 663). The bank comprises a two-storey three-bay structure, rendered externally with tall *piano nobile*.²⁰ Rusticated pilaster strips articulate the ground floor and continue as plain pilaster strips to support a plain cornice and parapet. The entrance is recessed within the central bay and flanked by sash windows. The bank is set back from James's Street within a small plot defined by cast iron railings, overlooked by the side elevation of Number 84 (Site 41) to the east. The building is not subject to any designations and is assessed to be of Local importance.

²⁰ The main floor of a building designed in the classical or renaissance style containing the reception rooms. This is usually higher than the other floors, and raised to first floor level, with shallower floors above.

The former Post Office at 109 James's Street (Site 33) was designed by J Howard Pentland and opened in 1892 (Casey 2005, 663). The building comprises a single-storey red brick structure, with a raised and coped gable to James's Street, decorated with ball finials and an *oeil de boeuf* window²¹ with keystone. The entrance is set to the right of the elevation below a canopy with segmental pediment, flanked by large 3/9 stone mullioned windows to the left. A pulvinated frieze runs above this which records the name of the James's Street Post Office in English and Irish. The post office forms a group with 107 and 108 James's Street (Sites 26 and 24; Plate 19) and is designated as a Protected Structure and is assessed to be of Regional importance.

The IAWS building (Site 40) was constructed in the early 20th century for the Irish Agricultural Wholesale Society and contained showrooms for agricultural machinery to the street front and warehouses to the rear (Pearson 2000, 175). The building is constructed in Portmarnock brick (*ibid.*) and is of three storeys with attic, below a mansard roof. The elevation to Thomas Street is of eleven bays, the central three of which rise a further storey to form a tower. A series of segmental arches between pilasters run across the ground floor, and now contain modern glazing. The upper floors contain paired windows below flat lintels, all of which now contain modern glazing. The central tower is finished with rusticated render, with a central segmental pediment at attic level with *oeil de boeuf* window above. The building is undesignated and is assessed to be of Local importance.

Public Realm Structures

The fountain and sundial at the junction of James's Street and Bow Lane (Site 62) was erected in 1790 to the designs of Francis Sandys, and was refaced in the 1930s (Casey 2005, 663). The structure comprises a fluted obelisk of Portland stone with a block part way up the structure, an oval sundial towards the top, and a ball finial at the apex. The obelisk rests on a tall, black-painted plinth, with human masks around its base which formerly spouted water, and drinking fountains added in the 19th century. The fountain remains located at the junction of Bow Lane and James's Street, and is now located within a small island between the roads. The surrounding paving is of granite setts, laid in a circular pattern. Together with a number of street trees and modern benches, this forms a fitting setting for the structure which continues to form a focus in views west along James's Street (Plate 26). The fountain and sundial is designated as a Protected Structure and is assessed to be of Regional importance.

Infrastructure

Sean Heuston Bridge (Site 4), formerly King's Bridge, was erected in the 1820s to the designs of George Papwith (Casey 2005, 697). The bridge comprises a single span arch of cast iron springing from large granite abutments and rusticated walls. The spandrels of the bridge are moulded with the emblems of England, Ireland, Scotland and Wales, above an open work border. The balustrades are formed by foliated panels between tapered uprights, with a central datestone recording the date of 1821. The deck was replaced in 2003 as part of the LUAS (*ibid.*). The bridge is located to the east of Heuston Station and now carries the LUAS over the River Liffey. It is not subject to any designations and is assessed to be of Regional importance due to its architectural interest.

The Rory O'More Bridge (Site 5) dates from 1858 and comprises a single span cast iron arch with granite abutments, the spandrels of which are decorated with an arcade

²¹ Small window of round or oval shape set horizontally.

of round-headed arches (Plate 27). This motif is also mirrored in the open balustrades. A monument to the centenary of Catholic emancipation is incorporated in the south balustrade to the bridge. The bridge is recorded on the Record of Monuments and Places and is assessed to be of Local importance.

Heuston Station (Site 8) was erected as the terminus for the Great Southern and Western Railway in the 1840s and is now designated as a Protected Structure. The station comprises a train shed behind an ornate palazzo-style building fronting on to St John's Road West. The shed was erected in 1846 and is formed by five gabled ranges which retain their original cast iron columns and roof structure (Casey 2006, 668). These are enclosed by single-storey stone walls pierced by round-headed windows linked by impost bands. The station building is located to the south of the shed, fronting onto John Street West. The building comprises a two-storey palazzo, flanked by Neo-classical towers. Above the rusticated ground floor is a tall piano nobile, formed in nine bays and articulated by Corinthian columns flanking round headed windows with alternating segmental and triangular pediments, below a deep entablature. The central five bays are emphasised by swags and an attic decorated with coats of arms and date stones flanked by a balustrade to either side. Heuston Station is located to the south of the River Liffey, forming the west side of a large open space at the junction of St John's Road West and Victoria Quay, providing good views of the principal elevation and enabling its composition and architectural quality to be appreciated. The station is surrounded by a mixed townscape, including the buildings of Dr. Steeven's Hospital (Site 17), the modern industrial structures of the Guinness brewery, and modern residential buildings. Heuston Station is assessed to be of Regional importance.

Victoria Quay Wall (Site 78) was constructed c.1840 as part of a scheme to realign the River Liffey. Running along the south side of the river, the wall is constructed of Ashlar granite. It formerly extended between Sean Heuston Bridge (Site 4) and Rory O'More Bridge (Site 5), however was shortened to the west by the construction of Frank Sherwin Bridge in the early 1980s. The quay was the site of timber wharves used by the Guinness Brewery for export of porter and stout. The Quay has been assessed to be of Regional importance.

Former Military Buildings

Collins Barracks (Site 1) is an extensive complex of historic barracks originally in the early 18th century to the designs of the Surveyor General Thomas Burgh and was subject to several phases of rebuilding over the following centuries. This was the first large-scale residential barracks in Europe (Casey 2005, 247) and now holds the Decorative Arts and History section of the National Museum of Ireland. The barracks originally comprised three, three-sided squares open to the river, however the central square is now lost. The remaining squares form an imposing complex of neo-classical buildings, of austere design, large-scale and massing. The Palatine Square which now forms a courtyard within the National Museum has been suggested to be *'the most impressive formal courtyard in Ireland'* (Casey 2005, 248). The east range of Palatine Square dominates the barrack's frontage to the river, and results from rebuilding in the 1760s. This range is formed by a four storey building with pedimented centrepiece with clock and cupola over. Sited on high ground overlooking Croppies' Acre Memorial Garden, the building enjoys an imposing setting and views to and from the structure an important part of its character (Plates 28 and 29). The barracks are designated as a Protected Structure and Recorded Monument and are assessed to be of National importance.

Conservation Areas

The Quays Conservation Area (Site 2) extends along the River Liffey, taking in the river, adjacent roads, and terraces of buildings flanking the river to the north and south (Plate 30). These terraces include Georgian merchant's houses, neo-classical churches, civic buildings as well as modern office buildings and apartments. In contrast to the continuous terraces of building which characterise the conservation area to the east, within the study area, the river is flanked by the open space of Cropper's Acre Memorial Garden to the north and the walled industrial complex of the Guinness Brewery to the south. The Quays Conservation Area is assessed to be of Local importance due to its variable architectural quality.

A Conservation Area extends along Thomas Street and James's Street (Site 44) and within the study area is flanked by terraces of three and four storey buildings dating from the 18th and 19th centuries which are predominantly of brick construction (Plate 31). These buildings were largely constructed as residential buildings, and many now contain shop fronts at ground-floor level. Also present within this area are the Church of Ireland and Roman Catholic Churches of St. James's which act as focal points within the streetscape. The presence of the Guinness Brewery extending to the north and south of James's Street also forms an important element of the conservation area's character and maintains the area's historical association with brewing. The buildings of the Guinness estate range from the imposing four-storey red brick buildings fronting the south side of James's Street, to modern, functional brewery buildings, set back from the streetfront within the Lower Level. To the west the Conservation Area extends to include Saint Patrick's Hospital and Dr. Steeven's Hospital. The James's Street Conservation Area is assessed to be of Local importance.

The Liberties Architectural Conservation Area (Site 71) covers the core of the Liberties area and is based around the three main streets of Thomas Street, Francis Street and Meath Street. Whilst settlement in this area may be traced as far back as the early Christian period (Dublin City Council 2009, 3), the conservation area is dominated by structures dating from the 18th and particularly the 19th centuries. Buildings in this area include artisan's housing and planned worker's housing of the late 19th and early 20th century, industrial buildings such as the surviving structures of Power's Distillery, Georgian residential buildings, and imposing buildings of 19th century date. The westernmost end of the conservation area extends into the study area and comprises the broad, commercial thoroughfare of Thomas Street. Buildings in this area date from the 18th to 20th centuries and are of varied design and architectural treatment. Buildings are generally of three or four storeys, interspersed occasionally by taller or lower structures, and create a strong sense of enclosure within the streetscape. This area is also characterised by the survival of lanes and alleyways to the south of Thomas Street which maintain historic property boundaries. The Liberties Conservation Area is assessed to be of Regional importance.

13.2.5 Potential Impacts

“Do Nothing” Scenario

If the scheme was not constructed, all Architectural Heritage sites would remain in their current condition and use. For this scenario, no impacts on any of the identified architectural heritage sites are predicted.

Impacts during Construction

The proposed brewery development will result in the construction of a series of new industrial structures within the lower level. To facilitate construction, a small number of industrial buildings will be removed. These structures are functional structures of later 20th century date, and have been assessed to be of no architectural heritage merit (Plates 32 – 36).

During construction, impacts are predicted on six architectural heritage sites, listed in **Table 13-J** and discussed below.

Table 13-J: Predicted Impacts during Construction

Site Ref.	Site Name	Importance	Magnitude of Construction Impact	Significance of Construction Impact
1	Collins Barracks	National	Low	Slight
2	Quays Conservation Area	Local	Low	Imperceptible
5	Rory O'More / Victoria Bridge	Local	Low	Imperceptible
6	Granite Piers and attached wall on Victoria Quay	Local	Low	Imperceptible
7	Guinness Building	Regional	Low	Slight
9	Former Noel Leonard Pub	Local	Slight	Imperceptible

The construction of the proposed brewery development will introduce new industrial buildings c.190m from the east quadrangle of Collins Barracks (Site 1). Views to the south of the River Liffey form an integral part of the buildings' setting and include the existing Guinness complex to the south of Victoria Quay. The new structures will be apparent in views from the east elevation of the Barracks; however, these views will be screened to some extent by the presence of trees to the south of Croppies' Acre Memorial Garden. The proposed brewery development will maintain the existing industrial character of the townscape in this area and will not affect the character or integrity of the Barracks. However, during the construction period, temporary noise and visual intrusion may result from construction activities. The magnitude of this impact has been assessed to be Low and the significance of impact has been assessed to be Slight. While the matrix provided at Table 13-G indicates that the significance of this impact is predicted to be Moderate, based on professional judgement the significance of impact has been assessed to be Slight in consideration of:

- The existing industrial character of the Guinness site;
- The screening effect of existing trees in reducing the visual impact of the scheme; and
- The continued dominance of the barracks over their townscape setting.

The Guinness Building (Site 7) was constructed as an integral part of the Guinness Brewery and continues to be understood as part of the historic industrial complex. Construction of the proposed brewery development will result in the introduction of new buildings within currently open areas within the lower level, the closest of which will be located c.47m to the southeast. Whilst these structures will form new elements within the setting of the Guinness Building, they will maintain the industrial character and function of its setting, and will not detract from the understanding of the building. During the construction period, construction activities such as demolition works and the presence and operation of cranes will introduce temporary noise and visual intrusion into the setting of the building. The magnitude of impact on Site 7 has been assessed to be Low and the significance of impact has been assessed to be Slight.

Construction of the proposed scheme will introduce two new industrial buildings within the boundaries of the Quays Conservation Area (Site 2), comprising the WWNP tank and a substation. The brewhouse and attached structures will be located outside the conservation area boundaries, however will be visible from quaysides within the designated area. These buildings will maintain the existing industrial character of the conservation area's setting in this area. During the construction period, temporary noise and visual intrusion will result from construction activities such as the operation of cranes and the presence of formwork. The magnitude of impact on the Quays Conservation Area has been assessed to be Low, and the significance of impact has been assessed to be Imperceptible.

The construction of the brewhouse and associated structures will also introduce additional industrial structures into the setting of Rory O'More Bridge (Site 5), and will result in temporary noise and visual intrusion as a result of construction activities. In consideration of the existing industrial character of the site's setting in this area, the magnitude of this impact has been assessed to be Low, and the significance of impact has been assessed to be Imperceptible.

The brewhouse, Raw Materials Handling (RMH) Plant and Concentrated Roasted Material Extract (CRMX) Plant will be visible from the quaysides rising above the boundary wall (Site 6) but will be of similar character, scale and massing to existing buildings within the brewery complex. During the construction period, temporary noise and visual intrusion will result from construction activities such as the operation of cranes and the presence of formwork. The magnitude of the impact on Site 6 has been assessed to be Low and the Significance of impact has been assessed to be Imperceptible.

Construction of the proposed brewery development will also introduce new elements into the setting of the Former Noel Leonard Pub (Site 9). The WWNP tanks will be located c.11m to the south of the building, whilst the buildings of the brewhouse, Raw RMH and CRMX Plants will be located c.110m to the southwest. These structures will maintain the existing industrial character of the pub's setting; however, during the construction period, additional temporary noise and visual intrusion will result from construction activities. The magnitude of impact on Site 6 has been assessed to be Low and the significance of impact has been assessed to be Imperceptible.

While The Barley Flaking Plant and the Former Cask washing shed (Sites 12 and 16) are located within the brewery complex, construction of the proposed brewery development will maintain the existing character of the buildings' setting and will not impact on the understanding of these structures. Given the industrial function of these buildings, noise and visual intrusion resulting from construction activities is not considered to adversely impact on the setting of these buildings. No impact is therefore predicted on these structures.

No impacts are predicted on the remaining 48 architectural heritage sites as the settings of these structures will be maintained in their current conditions.

Potential visual impacts have been identified in the Landscape and Visual Assessment on four Protected Structures (Sites 8, 17, 37 and 55; (refer to Chapter 12), however it is not considered that views of the proposed brewery development will affect the setting or understanding of these sites. No impact is therefore predicted on these sites.

Impacts during Operation

During operation, impacts are predicted on three architectural heritage sites, listed in **Table 13-K** and discussed below.

Table 13-K: Predicted Impacts during Operation

Site Reference	Site Name	Importance	Magnitude of Operation Impact	Significance of Operation Impact
2	Quays Conservation Area	Local	Low	Imperceptible
6	Granite Piers and attached wall on Victoria Quay	Local	Low	Imperceptible
			Low	Moderate Positive
7	Guinness Building	Regional	Low	Imperceptible
			Low	Moderate Positive

During operation, the proposed brewery development will result in the presence of additional large industrial structures within the brewery complex. This area is currently characterised by the presence of varied industrial structures dating mainly from the later 20th century onwards, and the proposed buildings will be of similar scale and massing to existing surrounding structures. As a result, the magnitude of this impact on the Quays Conservation Area (Site 2), the boundary wall to Victoria Quay (Site 6) and the Guinness Building (Site 7) has been assessed as Low and the significance has been assessed as Imperceptible for all three sites.

Refurbishment of the boundary wall to Victoria Quay (Site 6), including cleaning the brickwork and replacement of the brick infill in the main gateway with dummy timber gates in the style of those seen elsewhere in the brewery, will not change the understanding of the site as the boundary between the city and the brewery within. Similar cleaning of the Guinness Building (Site 7) will not affect the understanding of its function and relationship with the brewery. These works will, however, improve their external appearance. The magnitude of this impact has been assessed as Low, and the significance as Moderate Positive.

A roof will be constructed over the extended WWNP to minimise the operational visual impact.

13.2.6 Mitigation

During development of this application, design measures have been incorporated to reduce or avoid potential impacts on architectural heritage. These measures have

included avoidance of physical impacts on architectural heritage sites and the siting of new structures to reduce impacts on the setting of historic buildings as far as possible.

It is proposed that the Conservation Officer is consulted on the methods and materials employed for the refurbishment of the boundary wall and Guinness Building (Sites 6 and 7), and also on the design and appearance of the dummy gates.

No further specific mitigation measures are proposed for architectural heritage.

13.2.7 Residual Impacts

The use of sensitive design will reduce the impact of the proposed brewery development. The residual significance of impact of the scheme on architectural heritage is summarised below.

13.2.8 Summary of Key Findings

A total of 56 sites have been identified in the architectural heritage baseline.

No impacts on the fabric of architectural heritage sites has been identified.

Impacts on the setting of six sites have been assessed during construction of the proposed brewery development:

- Slight impacts on two sites (Sites 1 and 7) and
- Imperceptible impacts on four sites (Sites 2, 5, 6, and 9).

Impacts on the setting of three sites have been assessed during operation of the proposed brewery development:

- Moderate Positive impact on two sites (Sites 6 and 7);
- Imperceptible impacts on two sites (Sites 2 and 6).

No further mitigation measures are proposed for architectural heritage.

14.0 TRANSPORTATION

14.1 Introduction

This chapter presents and describes the existing situation, including the results of traffic counts carried out in the immediate area, the expected increase in traffic associated with the proposed brewery development, and the expected impact the development will have on prevailing traffic conditions. In addition, any mitigation measures proposed as part of the proposed brewery development will be outlined.

14.2 Existing Environment

The Diageo Ireland site is located approximately 2.5 kilometres from the centre of Dublin City and occupies a number of city blocks. The Diageo Ireland site is divided in two by James's Street, the North Site with its primary access via Gate 6 on Victoria Quay and the South Site, which has a number of access points but primarily from Market Street South.

Refer to Chapter 5 and Figure 5.1 in Volume 3 for more information.

14.2.1 Local Street Network

James's Street

James's Street is a primary collector route in the vicinity of the area and connects the Inchicore/ Kilmainham districts with the south side of Dublin City. The street in the vicinity of the existing Brewery is generally four lanes wide, with one lane in each direction set aside as a bus priority lane. James's Street serves a mixture of uses along the street including retail, commercial and residential as well as serving the industrial uses associated with the existing Diageo Ireland Brewery.

The street experiences some congestion during the morning and evening peak periods; however during the off-peak periods traffic along James's Street operates well.

Victoria Quay

Victoria Quay is a primary distributor route in the vicinity of the existing Brewery and connects the western suburbs (Palmerstown, Ballyfermot) with Dublin City Centre. The street in the vicinity of the proposed brewery development is a one-way street with three lanes of which one is assigned as a bus priority lane. Victoria Quay provides direct access to Diageo Ireland's North Site and also accommodates on-street parking.

The quay operates well during most periods of the day with some occasional queuing during the evening peak period as traffic exits the city.

Echlin Street

Echlin Street is a local street and connects James's Street with Grand Canal Place and onto Marrowbone Lane and St. James's Walk. The street is a single carriageway street and supports on street parking. The street serves a combination of residential and social uses (St. James's Church). Echlin Street provides access to Diageo Ireland's South Site from James's Street and is used by the tour buses to provide access to the Guinness Storehouse Visitor Attraction.

The street generally operates well with some limited queuing approaching its junction with St. James's Street experienced during peak periods particularly during the evening peak period.

Watling Street

Watling Street is a local street and connects Victoria Quay with St. James's Street. The street is one way and is one lane wide with a flaring to two lanes at its junction with St. James's Street. Watling Street serves a mixture of residential and commercial uses and also supports some on-street parking. The street generally operates within capacity, however, during the evening peak period some delays and queues are experienced along this street due to standing queues on James's Street.

14.2.2 Existing Traffic Count Data

In order to assess the impact of the generated traffic on the surrounding street network an examination of the existing traffic flows was necessary. Traffic counts were carried out on Thursday 26th of May 2011 at the following junctions.

- Victoria Quay/ St John's Road West
- Wolfe Tone Quay/ Conyngham Road
- Victoria Quay/ Watling Street
- Entrance to Diageo (Gate 6)
- Thomas Street/ Bridge Street Lower
- Thomas Street/ Bridgefoot Street
- Watling Street/ St. James's Street
- St. James's Street/ Echlin Street

The traffic counts were carried out during a neutral weekday when schools were in operation in the vicinity and they reflect busy traffic conditions in the area. The peak periods were identified as being between the hours of 07:30 and 08:30 during the morning peak period and 16:15 and 17:15 during the evening peak period. The recorded peak hour traffic flows for the local street network are presented in **Table 14-A** below.

Table 14-A: Recorded Traffic Flows – 2011

Link	AM Peak (07:30-08:30)	PM Peak (16:15-17:15)
Victoria Quay (East of Diageo Entrance)	1118	2086
Victoria Quay (West of Diageo Entrance)	1116	2114
Wolfe Tone Quay	1679	1381
Watling Street	220	207

Link	AM Peak (07:30-08:30)	PM Peak (16:15-17:15)
Thomas Street (West of Bridge Street))	1279	1411
James's Street (West of Watling Street)	1422	1542
Echlin Street	403	465
James's Street (West of Bow Lane)	1186	1001

The two-way traffic flows presented in **Table 14-A** show that the volume of traffic on Victoria Quay is significantly greater during the evening peak period compared against the morning peak, as this road serves a primary distributor road exiting Dublin City. James's Street is equally busy during both peak periods.

14.2.3 Existing Diageo Entrance (Gate 6)

The recorded traffic counts included for traffic entering and leaving Gate 6 on Victoria Quay and the following table presents the arrival and departure profile associated with the existing uses on the North Site.

Table 14-B: Existing Gate 6 Arrival and Departure Profile

Hour	IN		OUT		TOTAL
	Total Vehicles	LGV / HGV	Total Vehicles	LGV / HGV	
07:00 - 0800	16	4	14	5	30
08:00 - 0900	29	8	23	23	52
09:00 - 1000	22	10	4	1	26
10:00 - 1100	15	10	20	15	35
11:00 - 1200	19	18	18	15	37
12:00 - 1300	16	13	20	17	36
13:00 - 1400	22	19	19	14	41
14:00 - 1500	25	22	24	16	49
15:00 - 1600	10	9	17	9	27
16:00 - 1700	8	7	28	8	36
17:00 - 1800	2	2	36	3	38
18:00 - 1900	11	4	32	2	43

From the above table it can be seen that traffic flows using Gate 6 are generally consistent throughout the day with a small increase in traffic noted during the morning, evening and lunchtime periods. It is also worth noting that there is a general reduction in HGV movements entering and exiting the site as the day progresses as the majority of deliveries are carried out during the day from 08:00 -15:00.

14.2.4 Existing HGV Management Strategy

Dublin City Council operates a HGV Management Strategy within the core of the city centre which provides for a ban on 5+ axle vehicles during the hours of 07.00-19.00 seven days a week from a designated cordon area and provides a limited permit scheme for 5+ axle vehicles that need to load/unload within the city centre area. The existing Diageo Ireland brewery lies within this designated cordon area and HGV traffic wishing to access the Diageo Ireland facility during the restricted time periods has to apply for a permit to access the cordon. The permits are applied for through Dublin City Council.

14.3 Characteristics of the Proposed Brewery Development

14.3.1 Nature of Development Proposals

The proposed brewery development primarily includes the upgrade to the brewing facilities at St. James's Gate Brewery, increasing capacity from 6,400,000 hectolitres to 8,300,000 hectolitres. Current output is around 5,000,000 m hL. In addition the fermentation capacity and other ancillary uses will be upgraded as part of the development works.

The project includes the decommissioning of the existing brewhouse on the South Site, located to the south of James's Street and relocating it to its North Site, located to the south of Victoria Quay. Access to the new brewhouse will be via Gate 6 on Victoria Quay.

The proposed brewery development works are not expected to increase staff numbers at the plant, however additional vehicular movements are expected due to the increase in production activity.

The following figure shows the current location of the various elements of the existing brewery.

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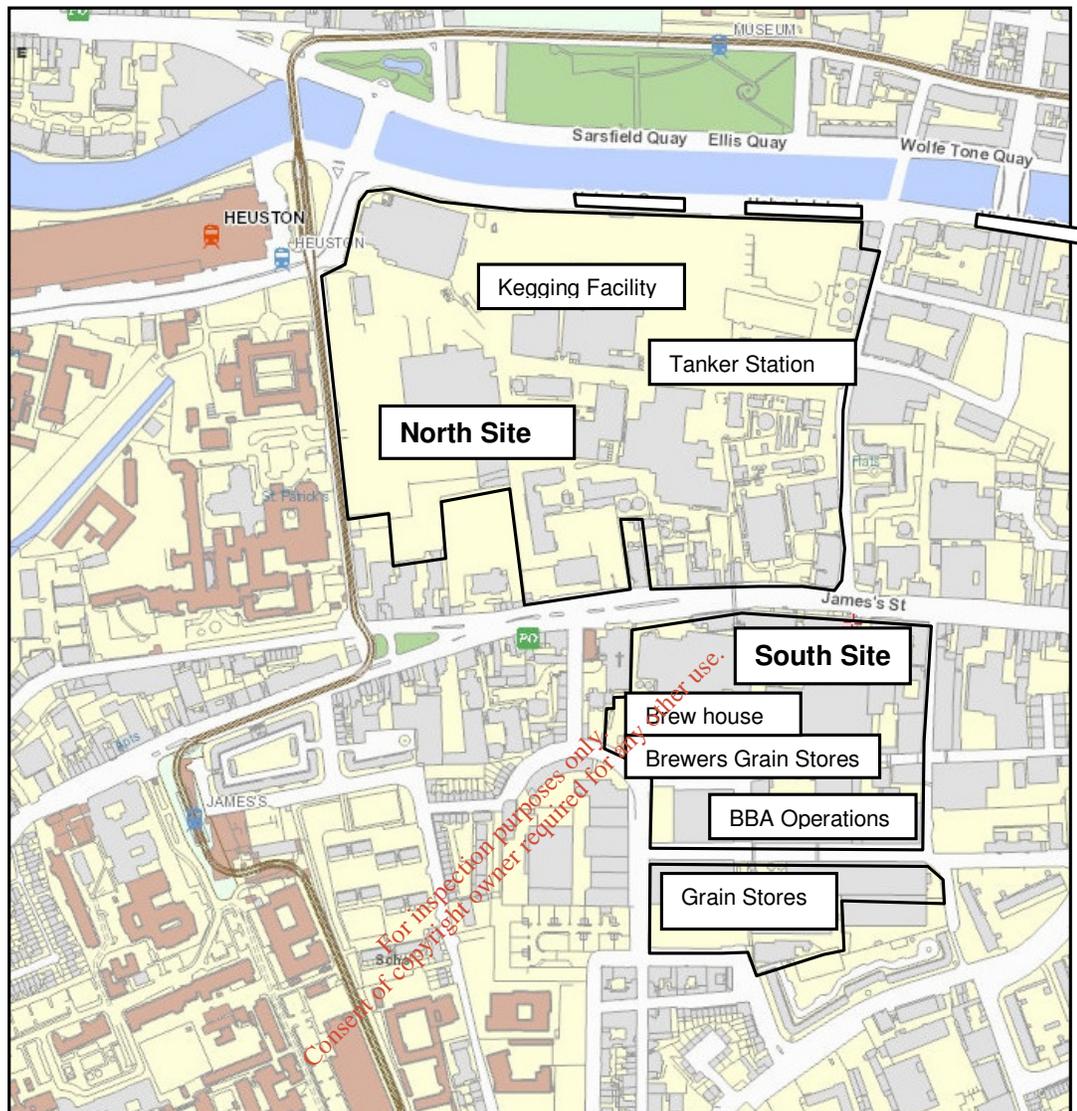


Figure 14-A: Existing Layout

14.3.2 Proposed Traffic Generation

As stated above the increase in traffic associated with the proposed brewery development will be due to the increased production levels of the brewhouse and its transfer from its existing location on the South Site to its new location on the North Site.

Table 14-C itemises the existing volume of generated traffic associated with the current operations. In summary, the South Site accommodates the grain intake facilities, the existing brewhouse and its associated collection of spent grains, the roasters and the support facilities and other activities (stores, general deliveries, etc.). The North Site accommodates the kegging operations, the tanker operations, the fermentation and beer processing and other general services. In addition, the North Site receives bulk beer imports which are kegged within the North Site.

Table 14-C: Existing Production Traffic Generation – South Site

Brewery Activity		Trucks		Daily Traffic Flow (Two-way)
		Year	Peak Week	
Malt/ Barley/Roast Grains Deliveries	90,000 tonnes	3,600	90	26
Spent Grains	90,000 tonnes	3,600	90	26
Brewing Support Operations		968	24	7
Other (Stores, Servicing, Hops, etc.)			150	30
Total South Site			336	88

Table 14-D: Existing Production Traffic Generation – North Site

Brewery Activity	Volume (hL)	Trucks		Daily Traffic Flow (Two-way)
		Year	Peak Week	
Bulk Beer Imports (Tankers)	800,000	2,667	67	19
Bulk Beer Exports (Tankers)	1,935,484	6,452	161	46
Kegged Beer Deliveries (SJG Generated)	2,000,000	11,111	278	111
Kegged Beer Deliveries (Import Generated)	1,100,000	6,111	153	61
Yeast Exports		400	10	3
Depot			180	36
Other (Stores, Servicing, etc.)			500	100
Total North Site			1,349	376

All traffic movements HGV/ LGV

The above tables were based on the following inputs:

- The majority of the site operates 7 days a week with the keggling process operating 5 days a week;
- Daily external grain deliveries of Malt/ Barley/ Roast Grains occur between 06:00 – 12:00;
- The average capacity of a truck carrying grain is 25 tonnes and the tanker capacity set at 300 hectolitres;
- The peak week calculation is based on 30% above average and accounts for busy production periods within the complex; and

- Bulk Beer to Kegged Beer Expansion Factor (average) = 150%.

The following tables, **Table 14-E** and **Table 14-F**, itemise the projected volume of generated traffic associated with the revised operations on-site. In summary, the South Site will continue to accommodate the grain intake facilities and the grain will be transferred to the North Site by trucks. The existing brewhouse facility will be decommissioned and the trucking movements associated with both these facilities will transfer to the North site.

The volume of kegged beer will remain at the same level as the current operation, however there will be an increase in bulk beer exports associated with the increased capacity of the brewhouse. The brewing support facilities will be transferred to the North Site and its capacity will also increase. The depot services and other general services will be retained at the North Site.

The following figure shows the proposed location of the various elements of the upgraded brewery facility.

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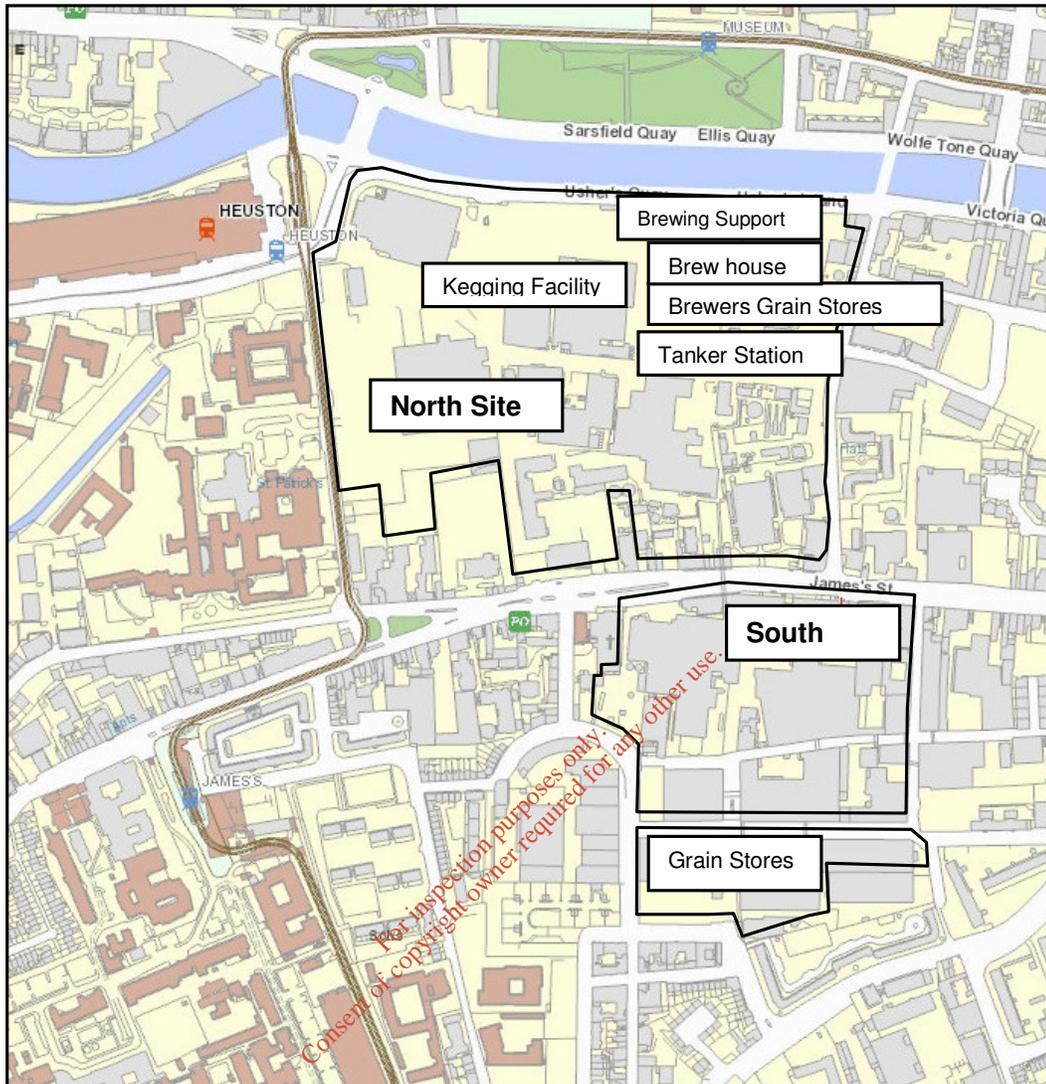


Figure 14-B: Proposed Upgraded Layout

Table 14-E: Projected Production Traffic Generation – South Site

Brewery Activity		Trucks		Daily Traffic Flow (Two-way)
		Year	Peak Week	
Malt/ Barley/Roast Grains Exports	129,470 tonnes	5,179	129	37
Grain Deliveries to North Site	123,968 tonnes	4,959	124	35
Other (Stores, Servicing, Hops, etc.)			150	30
Total South Site			403	102

All traffic movements HGV/ LGV

Table 14-F: Projected Production Traffic Generation – North Site

Brewery Activity		Trucks		Daily Traffic Flow (Two-way)
		Year	Peak Week	
Bulk Beer Exports (Tankers)	2,866,667 hL*	9,556	239	68
Kegged Beer Deliveries (SJG Generated)	3,100,000 hL	17,222	431	172
Grain Deliveries from South Site	123,968 tonnes	4,959	124	35
Grain Deliveries Direct	9,000 tonnes	360	9	3
Spent Grains	132,968 tonnes	5,319	133	38
Brewing Support Operations		1144	30	8
Yeast Exports		592	15	4
Depot			180	36
Other (Stores, Servicing, etc.)			740	148
Total North Site			1,611	513

All traffic movements HGV/ LGV

*Includes the application of the expansion factor from Kegged Beer volumes down to Bulk Beer volumes

In the vicinity of the brewery, traffic flows in and around the South Site will remain at current levels, however there will be a slight increase in HGV movements arriving and departing from the North Site.

Total Traffic Generation

Based on the above information the following table summarises the projected increase in traffic associated with the development proposals. For the purposes of this assessment it is taken that 8% of the total daily traffic flow (17% for the external grain deliveries) will be generated during the morning peak period and 4% (0% for the external grain deliveries) during the evening peak period. The following information has been calculated based on the arrival and departure pattern generated from movements at Gate 6.

Table 14-G: Projected Additional Traffic Generation

Time Period	In		Out	
	South Site	North Site	South Site	North Site
07:30 - 08:30	1 vehs	4 vehs	1 vehs	7 vehs
16:15 -17:15	1 vehs	2 vehs	0 vehs	3 vehs
Daily	10 vehs	68 vehs	10 vehs	68 vehs

14.3.3 Traffic Distribution

The distribution of trips generated by the development proposals has been based on a combination of the recorded traffic data and access to the strategic road network. In addition the truck route between the grain stores on the South Site and the new brewhouse in the North Site has been included in the distribution assessment. The distribution profile used in this assessment is included in **Table 14-H** below.

Table 14-H: Projected Increase in Traffic Flows

Link	AM Peak (07:30-08:30)	PM Peak (16:15-17:15)	Daily
Victoria Quay (East of Diageo Entrance)	4 vehs	2 vehs	68 vehs
Victoria Quay (West of Diageo Entrance)	7 vehs	3 vehs	68 vehs
Wolfe Tone Quay	5 vehs	3 vehs	68 vehs
Watling Street	1 vehs	0 vehs	10 vehs
Thomas Street (West of Bridge Street))	1 vehs	0 vehs	10 vehs
James's Street (West of Watling Street)	2 vehs	1 vehs	20 vehs
Echlin Street	2 vehs	1 vehs	20 vehs
James's Street (West of Bow Lane)	0 vehs	0 vehs	0 vehs

From the above table it can be seen that the projected increase in traffic flow is low.

14.4 Construction Traffic

It is proposed to provide a single separate entrance to the construction facility via an existing disused entrance from Victoria Quay – refer to **Figure 14-C** below, and also Figure 5.4 in Volume 3. The entrance will be controlled and any barriers provided on this entrance will be set back to ensure that no entering vehicle will block the adjacent bus lane on Victoria Quay.

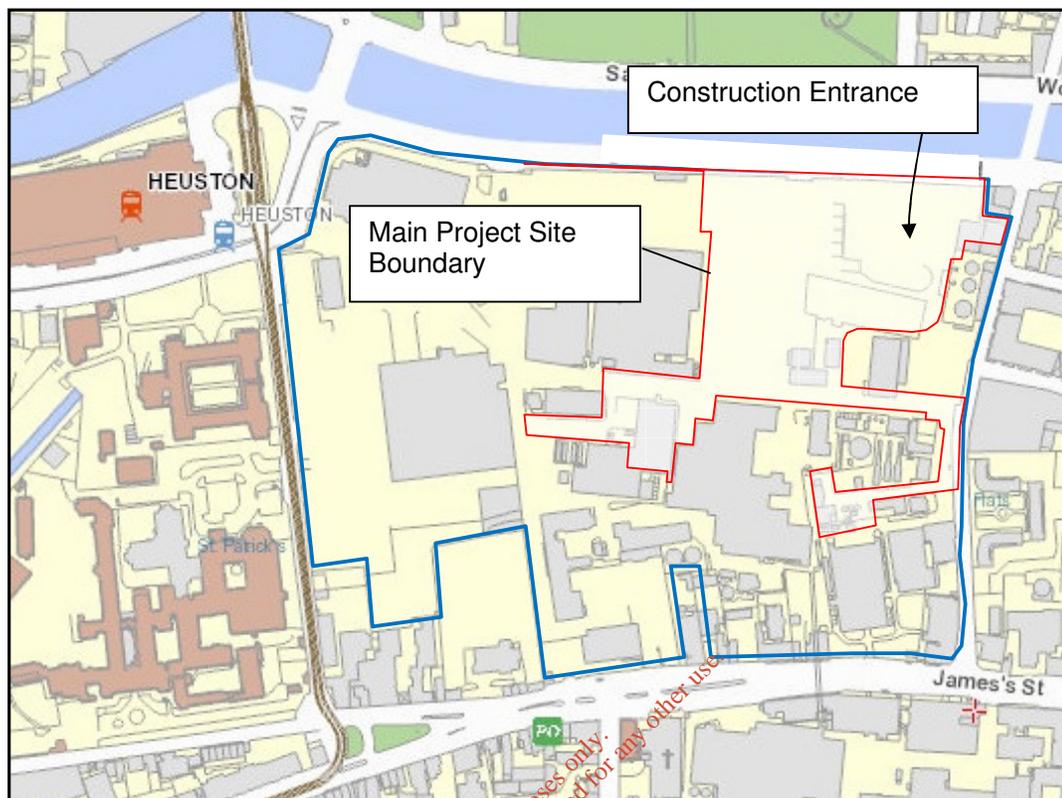


Figure 14-C: Construction Access Location

Construction staff will be encouraged to either, walk, cycle or take public transport to work, the area being well served with public transport options.

It is envisaged that the construction works will take in the region of 17 months to construct and that on average the development will generate 150 to 250 trips daily, which will be generally spread evenly throughout the day.

14.5 Predicted Impact of the Proposed Brewery Development

14.5.1 General

The impact on the local street network has been assessed by examining the projected traffic flows on the local street network both with and without the proposed brewery development.

The AM and PM peak periods have been examined in order to assess the busiest case in terms of local traffic on the street network and traffic generated by the proposed brewery development.

It is projected that the proposed brewery development will be fully operational by 2015. Traffic on the existing street network has been increased by 0.2% per annum. This is to account for the growth in background traffic and is in accordance with the NRA's Project Appraisal Guidelines Unit 5.5 Link Based Traffic Growth Forecasting.

14.5.2 Link Flows

The traffic flows for both the 'with' and 'without' development scenario in 2015 are quoted in the tables below.

Table 14-I: Projected Traffic Flows – AM Peak (07:30 -08:30)

Link	Without Development	With Development	Percentage Change
Victoria Quay (East of Diageo Entrance)	1127	1131	0.4%
Victoria Quay (West of Diageo Entrance)	1125	1132	0.6%
Wolfe Tone Quay	1692	1698	0.3%
Watling Street	222	223	0.5%
Thomas Street (West of Bridge Street))	1289	1290	0.1%
James's Street (West of Watling Street)	1433	1435	0.1%
Echlin Street	406	408	0.4%
James's Street (West of Bow Lane)	1196	1196	0.0%

From the above table it can be seen that the proposed brewery development will have no material impact on prevailing traffic conditions on the streets surrounding the proposed brewery development during the morning peak period.

Table 14-J: Projected Traffic Flows – PM Peak (16:15 – 17:15)

Link	Without Development	With Development	Percentage Change
Victoria Quay (East of Diageo Entrance)	2120	2122	0.1%
Victoria Quay (West of Diageo Entrance)	2131	2134	0.2%
Wolfe Tone Quay	1392	1395	0.2%
Watling Street	209	209	0.2%
Thomas Street (West of Bridge Street))	1422	1423	0.0%
James's Street (West of Watling Street)	1554	1555	0.1%
Echlin Street	469	470	0.2%
James's Street (West of Bow Lane)	1009	1009	0.0%

From the above table it can be seen that the proposed brewery development will have no material impact on prevailing traffic conditions on the streets surrounding the site during the evening peak period.

Table 14-K: Projected Traffic Flows – Daily Flows

Link	Without Development	With Development	Percentage Change
Victoria Quay (East of Diageo Entrance)	27394	27462	0.2%
Victoria Quay (West of Diageo Entrance)	27740	27808	0.2%
Wolfe Tone Quay	26302	26370	0.3%
Watling Street	3600	3611	0.3%
Thomas Street (West of Bridge Street))	23475	23485	0.0%
James's Street (West of Watling Street)	24979	24999	0.1%
Echlin Street	7282	7302	0.3%
James's Street (West of Bow Lane)	19142	19142	0.0%

From the above table it can be seen that the proposed brewery development will have no material impact on prevailing traffic conditions on the streets surrounding the site on a daily basis.

14.5.3 Construction Traffic

The projected level of construction traffic is envisaged to be low. It is envisaged that between 150 and 250 trips per day will be generated during the construction phase of the development and traffic flows on Victoria Quay will increase by between 0.5% and 1.0% over this temporary period. The construction works associated with the proposed brewery development will have no material impact on prevailing traffic conditions in the area.

14.6 Mitigation

Upgrade Victoria Quay Access

Diageo Ireland were recently granted planning permission (2655/11) to upgrade their existing security arrangements for the entrance from Victoria Quay. The upgraded entrance has set back the barrier location and increased the barrier capacity of the control centre and this will eliminate trucks backing up and blocking the adjacent Bus Lane along Victoria Quay. This upgrade will facilitate the increased volume of traffic associated with the proposed brewery development and will improve safety on entry to the brewery.

Upgrade to an Existing Facility

The proposed brewery development is not a standalone development; it is an integral part of a large processing complex. The new facilities will not require a significant number of additional operational staff compared to those who already serve the existing facility.

Mobility Management

The proposed brewery development is located within the centre of Dublin City and the site is very accessible by many travel means including walking, cycling and public transport. The area is well served by a mature residential catchment and there is a significant choice in accommodation located within a 20-30 minute walk of the development.

Existing staff within the Brewery are provided with high quality accesses to a multitude of public transport facilities including the Mainline Train Station at Heuston and the LUAS stops at St. James's Hospital and Heuston Station and a number of Dublin Bus routes including No. 66, No. 67, No. 25, No. 26, No 51B, No. 123. James Street which is located to the south of the North Site has bus priority measures provided for in the vicinity of the existing Brewery.

14.7 Summary

The proposed brewery development is expected to increase traffic flows in the vicinity of the proposed development by a very small amount, approximately 155 vehicles per day with 13 vehicles during the busier morning peak period and 6 vehicles during the evening peak period. This increase in traffic is expected to have little or no impact on prevailing traffic conditions in the area with the additional traffic expected to increase traffic levels during the peak periods by less than 0.6%.

Access to the existing brewing facility will be enhanced following the construction of the upgrade works to Gate 6 on Victoria Quay and this upgraded entrance will also cater for the additional traffic associated with the proposed expansion of facilities within the existing site.

15.0 WASTE MANAGEMENT

15.1 Liquid Waste

15.1.1 Introduction

Wastewater from the existing St. James's Gate facility is of three basic types:

- Sanitary Wastewater (or 'foul' discharge as referred to in Chapter 9) – wastewater from catering facilities, toilets, washrooms and other staff facilities;
- Process Wastewater – wastewater from production areas and contaminated run-off from hard-standings; and
- Surface and rain water from non-contained hard standing areas.

Currently, these wastes are managed as follows:

- As minimal sanitary wastewater is presently generated in the area to be developed, it is routed through the WWNP and discharges to the DCC Sewer via SE-1 and onwards to Ringsend Wastewater Treatment Plant; and
- Process Wastewater is collected via a dedicated underground gravity drainage system and is processed in the existing St. James's Gate Waste Water Neutralisation Plant (WWNP). The treatment consists of pH balancing and effluent is then discharged to the DCC Sewer on Victoria Quay and onwards to Ringsend Wastewater Treatment Plant.

Surface water runoff from the new development area hard standing and paved areas, will be drained through the use of proprietary drainage channels. Details of the proposed surface water and drainage management can be found in Chapter 9.

15.1.2 Sanitary Waste Water

Sanitary wastewater from the proposed brewery development will be routed through a new collection system and will gravity discharge to the DCC sewer and onwards to the Ringsend Wastewater Treatment Plant subject to agreement with the relevant agencies.

Sanitary wastewater will comprise sewage and wastewater from:

- Toilets,
- Washrooms, and
- Other staff facilities.

It is estimated that Sanitary Wastewater from the proposed brewery development will not result in any additional discharge to sewer as operational employment numbers will not change. The foul effluent flow from the proposed brewery development will have similar characteristics to existing sanitary effluent on-site i.e. 250 mg/l BOD and 400 mg/l Suspended Solids.

15.1.3 Process Waste Water

The brewing process generates large quantities of wastewater that must be disposed of or treated in the most cost-effective and environmentally robust manner to minimize the impact on the receiving environment. One of the key drivers of a modern brewery is to minimise the liquid wastes arising from all brewing steps. The proposed brewhouse is anticipated to achieve a reduction in effluent volume per hectolitre of product.

Brewery wastewater typically has a high biochemical oxygen demand (BOD) from all the organic components (sugars, soluble starch, ethanol, volatile fatty acids, etc). BOD is a measure of the organic pollution. Domestic sewage generally has a BOD concentration of ~250 mg/l, however as can be seen from **Table 15-A** the expected average concentration of the wastewater from the new facility is ~3,000 mg/l. The pH can vary between 6 and 10 pH units and is influenced by the amount and type of chemicals used in cleaning and sanitation (e.g., caustic soda, phosphoric acid, nitric acid, etc.). Nitrogen and phosphorus levels are mainly dependent on the raw material and the amount of yeast remaining in the effluent.

The Process Wastewater arising from the proposed brewery development will be generated from the activities listed below.

Production:

- **Brewhouse / Fermentation Areas** – This is the principal area of wastewater generation both in terms of wastewater flow and BOD/COD load. The wastewater derives from process activities, tank and pipework cleaning and process residuals. Where possible process residuals such as brewers grains, yeasts (etc.) are collected and reused or disposed separately, including that:
 - Brewers grains will be sent for animal feed or composting;
 - Waste kieselguhr will be disposed from the site for composting;
 - Brewers yeast will be used for animal feed (30 to 80% wet solids);
 - Stones and dust from intake of barley and malt will be collected and disposed by a licensed waste contractor;
 - Occasional waste beer will be used as animal feed; and
 - Used laboratory solvents will be retained in bunded storage and disposed by a licensed waste contractor.
- **Clean In Place Systems** – All brewery equipment including tanks, fermenters, brew kettles, pipework and lauter tuns/mash filters will contain product residue that must be removed between batches or at routine intervals in continuous operations. There are two types of cleaning detergents used: alkaline-based or acid-based detergents that are formulated with surfactants, chelating agents, and emulsifiers to enhance the effectiveness of the detergents.
- **General Cleaning** – It is critical that all process areas are maintained in keeping with a Best in Class Brewing operation. To minimise the discharge of solids to the WWNP, drains will be fitted with perforated covers and solids will be collected and disposed. Generally washing will be manual using spring controlled trigger units to

minimise water use. All wash water will be directed to process drains and cross contamination with surface water will be avoided.

Utilities:

- Additional wastewater from the Utility Plant will comprise of dilute acidic solutions used to regenerate the ion removal beds in the WWNP.

Waste Water Neutralisation Plant:

- Generally all wastewater generated by wash-down or other cleaning operations in the WWNP will be processed within the plant prior to discharge.

Flows and Characteristics

The wastewater volume arising from the proposed brewery development have been estimated as shown in **Table 15-A**.

Table 15-A: Wastewater Quantities and Characteristics

Parameter	Average	Range
Flow/day	5,800 m ³ /d	3,700 to 7,500 m ³ /d
BOD Concentration	~ 3,000 mg/l	3,000 to 6,000 mg/l
Suspended Solids	1,000 mg/l	500 – 1500 mg/l
BOD/COD Ratio	0.5	
pH		6 - 10
Temperature	15-30°C (Spikes up to 45°C)	

15.1.4 Methodology

In considering the treatment and disposal of wastewater arising from the proposed brewery development, reference has been made to the following legislation:

- S.I. 86 of 2008 - Waste Management (Waste Management (Facility Permit & Registration) (Amendment) Regulations 2008;
- SI 87 of 2008 - Waste Management (Collection Permit) (Amendment) Regulations 2008 S.I. 113 of 2008 - Waste Management (Registration of Brokers and Dealers) Regulations 2008;
- SI 382 of 2008 Environmental Protection Agency (Licensing)(Amendment) Regulations 2008;
- Water Services Act 2007;
- S.I. 106 of 2007-European Communities (Drinking Water) Regulations 2007;
- S.I. 278 of 2007- European Communities Drinking Water Regulations (No 2) 2007;

- S.I. 526 of 2007 - European Communities (Good Agricultural Practice for Protection of Waters) (Amendment) Regulations 2007;
- S.I. 820 of 2007 - Waste Management (Collection Permit) Regulations 2007;
- S.I. 821 of 2007 - Waste Management (Facility Permit and Registration) Regulations 2007;
- Environmental Protection Agency Act 1992, (Established Activities) Order 2006, S.I. No. 279 of 2006;
- S.I. 378 of 2006 - Nitrates Regulations;
- S.I. 787 of 2005 European Communities (Waste Water Treatment)(Prevention of Odours and Noise) Regulations 2005;
- S.I. 395 of 2004 Waste Management (Licensing) Regulations 2004;
- Protection of the Environment Act, 2003;
- S.I. 267 of 2001 Waste Management (Use of Sewage Sludge in Agriculture) (Amendment) Regulations 2001;
- S.I. 254 of 2001 Urban Waste Water Treatment Regulations 2001;
- S.I. 148 of 1998 Waste Management (Use of Sewage Sludge in Agriculture) Regulations 1998;
- Waste Management Act 1996;
- S.I. 294 of 1989 European Communities (Quality of Surface Water Intended for the abstraction of Drinking Water) Regulations 1989;
- S.I. 81 of 1988 European Communities (Quality of Water Intended for Human Consumption) Regulations 1988;
- S.I. 164 of 1998 Waste Management (Miscellaneous Provisions) Regulations, 1998;
- S.I. 163 of 1998 Waste Management (Hazardous Waste) Regulations, 1998; and
- Draft National Strategy on Biodegradable Waste.

15.1.5 Compliance with Legislation

It is the intention that St. James's Gate will continue to discharge Treated Process Wastewater to the collection system connected to Ringsend Wastewater Treatment Plant as provided for under the current Integrated Pollution Control No. 301-01.

Constructive engagement is ongoing with DCC to ensure that additional effluent loading (summarised in Table 15.2) can be accommodated by Ringsend Wastewater Treatment Plant. It is proposed that modifications to the St. James's Gate WWNP be carried out to ensure that the increased effluent volume can be managed such that at all times the discharge will be in accordance with the Ringsend requirements. In particular, additional Equalization Tanks will be installed to allow for enhanced blending

of collected wastes to significantly reduce pH and temperature variations in the discharge to Ringsend.

Diageo Ireland will ensure that DCC are kept fully aware of any and all changes in the quantity, nature and characteristics of discharges to the DCC sewer which is caused by changes in production, improvements or upgrading of the WWNP or as a result of the on-going programme of waste minimization which may occur and in accordance with Section 70 of the Water Services Act 2007.

In the design of the Brewery, Diageo Ireland has taken full account of the EPA *Draft BAT Guidance Note on Best Available Techniques for the Brewing, Malting & Distilling Sector*.

To minimize the quantity of effluent generated on the site, a Recovered Water System will be installed to reuse water for a potential variety of purposes within the Brewery including for the cleaning of tanks and pipework, truck and tanker washing, keg washing, floor washing and as utility water.

15.1.6 Description of Existing Environment

Diageo Ireland presently operates under Integrated Pollution Control Licence No. 301-01 There are three licensed emission points to sewer from the site: SE-1, SE-2 and SE-3 – refer to Figure 9.1 in Volume 3 for their locations.

The discharge from SE-1 consists of process effluent and surface water run-off and is screened and then pH-adjusted in the on-site Waste Water Neutralisation Plant before being discharged to the Dublin City Council sewer for final treatment in the Ringsend Wastewater Treatment Plant.

In late 2005, the process emission from SE-2 was diverted to the on-site WWNP, ultimately discharging via SE-1. The discharge of process emissions from SE-3 was also discontinued in late 2005 and only surface water run-off has been discharged from this point since then.

These emission points are regularly monitored as per Integrated Pollution Control Licence requirements.

15.1.7 Potential Impacts

The Diageo Ireland IPPC Licence No. 301-01 contains the following limits on discharge to the DCC sewer via emission point SE-1 on Watling Street as shown in **Table 15-B: IPPC Licence Limits on Effluent Discharge**.

Table 15-B: Current IPPC Licence Limits on Effluent Discharge

Parameter		Emission Limit Value	
Volume	Maximum in any one day	7500 m ³	
pH	Range	6 to 10	
Temperature	Maximum	42°C	
		Mean Concentration mg/l	Mean Loading kg/day

Parameter		Emission Limit Value	
BOD5	Daily	6,000	45,000
BOD5	Weekly	3,000	22,500
BOD5	Monthly	2,500	18,750
BOD5	Annual	2,000	15,000
COD	Daily	12,000	90,000
COD	Weekly	6,000	45,000
COD	Monthly	5,000	37,500
COD	Annual	4,000	30,000
Suspended Solids	Daily	1,400	10,500
Sulphates as SO4	Daily	400	3,000
Detergents as MBAS	Daily	100	750
Fats, Oils & Grease	Daily	100	750

There is an IPPC Licence Review Application under consideration by the EPA for an additional roaster that may result in an alteration to existing allowable WWNP discharge parameters. This possibility has not been evaluated under this EIS but will be addressed by Diageo Ireland under the application for a review of the existing IPPC licence to include a third roaster.

15.2 Solid Waste

15.2.1 Introduction

Wastes will be generated from the construction and operation phases of the proposed brewery development. This section of the EIS examines the anticipated types and quantities of wastes generated from both phases. An outline of waste management practices and policies is provided from site-specific to regional and national.

Existing legislation and the legal requirement for the licensing of waste activities, in conjunction with the public awareness of environmental issues, are the driving forces towards sustainable development, energy conservation and waste minimisation.

The approach adopted in this environmental assessment is based on the following:

- **Proximity Principle:** the treatment of wastes as close to their source as possible in order to insure that the assimilative capacity of the area is not exceeded and to minimise the indirect effects of the creation of that waste. Adopting this approach will help mitigate against the offsite impacts associated with transport; and
- **The Waste Hierarchy:** The cornerstone of all waste law is the aim of meeting, as far as is possible, a hierarchy of waste with policies and laws designed to promote measures as high up the hierarchy as possible. See **Figure 15-A**.

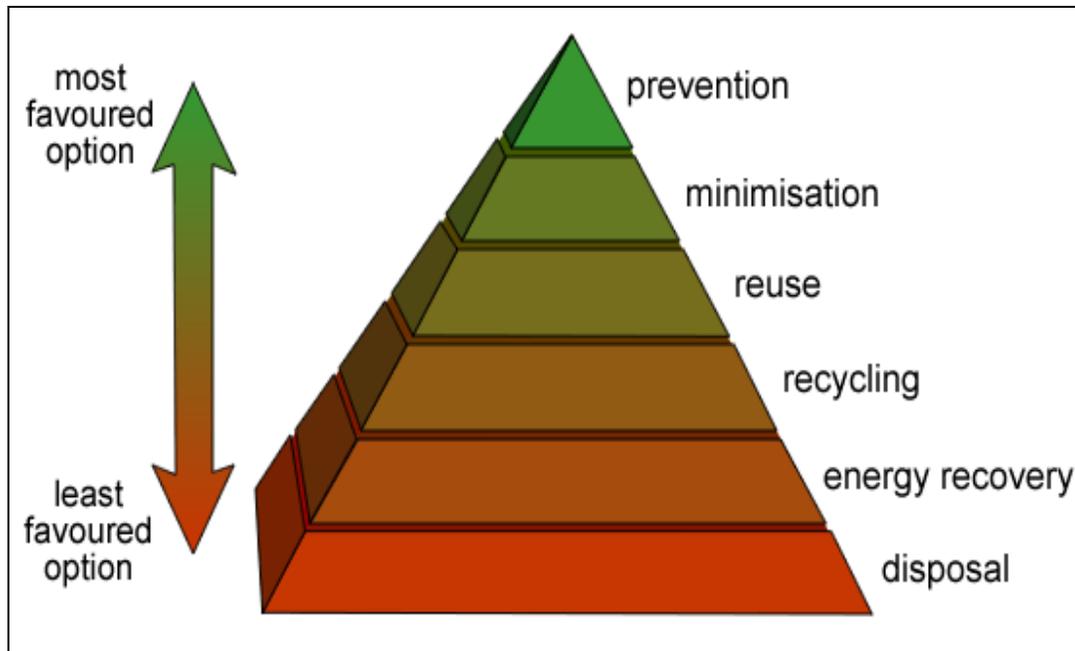


Figure 15-A: Waste Hierarchy Pyramid

15.2.2 Methodology

This section assesses the waste management effects of the proposed brewery development. This has included undertaking a desk-top study of existing documentation. Consideration has been given to the following with regards to waste management:

- Relevant waste legislation;
- EPA, National Waste Report 2006;
- EPA, Ireland's Environment 2008; and
- Waste Management Plan for Dublin Waste Management Plan 2005-2010.

Relevant Legislation and Policy Context

Waste Management is a heavily regulated activity and one on which the European Union places great emphasis. Waste regulation in Ireland has historically been dealt with as a health issue, but as awareness of the environmental impact of increased waste arisings and disposal has grown more complex, legislation has emerged. The Irish government has enacted a number of significant pieces of legislation to ensure compliance with European directives. Four pieces of legislation introduced by the European Union have formed the framework for current European policy and legislation, these are:

- The Framework Directive on Waste i.e. Directive 75/442/EEC as amended by Directive 91/156/EEC;
- The Framework Directive on Hazardous Waste i.e. Council Directive 91/689/EEC;

- Council Regulation (EEC) No. 259/93 on the supervision and control of shipments of waste within, into and out of the European Community; and
- Council Directive 1999/21/EC on the landfill of waste.

Such legislation has provided for common terminology and definitions of waste in the requirements for the preparation of waste management plans and for the permitting, control and regulation of waste disposal facilities.

The Waste Management Act of 1996 (as amended) gave effect to many EU Directives on waste management and has allowed for the publication of many Statutory Instruments on waste management.

Within the context of the proposed brewery development any waste management strategy needs to consider the implications of the Dublin Waste Management Plan 2005-2010 and its potential to impact both on the construction and operational phases of the development.

National Waste Report, EPA, 2009

The National Waste Report found that the economic downturn is having a marked influence on waste generation, particularly in the commercial waste and construction & demolition waste streams. The downturn (and consequent reduction in waste generation) has resulted in Ireland moving towards achievement of the EU Landfill Directive targets for biodegradable waste diversion.

According to the report: commercial waste generation dropped by 12% on 2008 figures, to 1,299,807 tonnes, commercial waste recovery increased from 49% in 2008 to 51% in 2009 and commercial waste disposed to landfill was 640,737 tonnes a decrease of 15% from 2008.

In relation to construction and demolition waste, there was a 62% decrease in the reported quantity of construction & demolition waste collected (5.1 million tonnes) and a 50% decrease in the reported quantity managed by recovery and disposal facilities (5.2 million tonnes), compared with 2008 data; contaminated soil (usually generated in land development/redevelopment projects) exported for treatment/disposal reduced sharply from 449,574 tonnes in 2008 to 476 tonnes in 2009.

Ireland's Environment, EPA, 2008

The EPA's 2008 report indicates the quality of Ireland's environment is relatively good, however it recognises that waste generation and resource use have increased considerably in recent years. The report emphasises the importance of the environment as a national asset and the benefit of its protection and enhancement both to the economy and to society.

As part of the EPA's 2020 Vision: Protecting and Improving Ireland's Environment, the EPA has identified six environmental goals, one of these goals is the sustainable use of resources, including the prevention and minimisation of waste, with the balance safely collected, recycled or recovered and final disposal completed in a way that does not harm the environment.

In keeping with the EU waste hierarchy the main conclusion of the report is that prevention is preferable to waste management.

National Hazardous Waste Management Plan (2008-2012)

The Environmental Protection Agency has published this National Hazardous Waste Management Plan for the period 2008 to 2012. The plan sets out the priorities to be pursued over the next five years and beyond to improve the management of hazardous waste in the Republic of Ireland. The plan is made under section 26 of the Waste Management Acts, 1996 to 2008.

The objectives of the plan are:

1. To reduce the generation of hazardous waste by industry and society generally;
2. To minimise unreported hazardous waste with a view to reducing the environmental impact of this unregulated waste stream;
3. To strive for increased self-sufficiency in the management of hazardous waste and to reduce hazardous waste export; and
4. To minimise the environmental, social and economic impacts of hazardous waste generation and management.

Dublin Waste Management Plan 2005-2010

The Waste Management Plan for the Dublin Region has been developed jointly by Dublin City Council, South Dublin County Council, Fingal County Council and Dun Laoghaire-Rathdown County Council. The Dublin Region adopted a Regional Waste Management Strategy in 1997, which set out to replace a system that over-relied on landfill disposal with a new approach based on integrated waste management over a 20 year period. The first Regional Waste Management Plan became effective in 2001.

Dublin's waste strategy goals are summarised by the EU waste hierarchy pyramid (see **Figure 15-A**), which stresses that a new approach to managing waste is required to lead to more sustainable waste management. The strategy is to place emphasis on prevention, minimisation, reuse, recycling and recovery of energy in order to end the over-reliance on landfill disposal.

The latest progress review of the plan's implementation was published in March 2011. The review summarises current waste management's achievements in the region in areas of commercial waste and construction and demolition waste among others, which are relevant to the proposed brewery development.

Table 15-C provides an estimate of the recovery rates for commercial waste for 2006, 2007, 2008 and 2009 in the Dublin region.

Table 15-C: An estimate of the Recovery Rates for Commercial Waste for 2006, 2007, 2008 and 2009 in the Dublin Region

Waste Type	2006 Tonnes	2007 Tonnes	2008 Tonnes	2009 Tonnes
Recycled	399,433	379,261	340,489	373,283
Land filled	420,428	399,034	397,704	358,644
Commercial waste arisings	819,861	778,295	738,193	731,927
Recovery rate	49%	49%	46%	51%

Construction and demolition arisings generated in the Dublin Region in 2009 were 2,698,753 tonnes, representing an overall decrease of 59% since 2008.

The construction sector has been significantly impacted by the current economic crisis in Ireland. This has been mirrored by the decrease in C & D waste arisings, which has decreased on a national scale by 62% since 2008. Total Recovery rate for Construction and Demolition waste is estimated at 98% in 2009 in the Dublin Region. Contaminated soils have been removed from the C & D waste quantities recorded for the region. This is in line with the EPA approach as this material is classified as hazardous waste.

15.2.3 The Existing Environment

Brewing operations at the facility currently generate circa 90,570 tonnes per year of waste. In the years 2004-2010 the brewery achieved the target of sending zero waste to landfill. All waste is recycled or used in waste to energy facilities.

Condition 8.3 of Diageo Ireland's IPPC licence requires the Brewery to maintain a waste register to record relevant details and these details are published in the AER.

15.2.4 Potential Impacts

"Do Nothing" Scenario

In the absence of the proposed brewery development the waste management policy for existing brewing operations will remain in force. Potentially with further implementation of the Waste Management Strategy 2006-2007, through which in line with European and Irish waste management policy Diageo Ireland is striving to introduce the prevention and reduction of waste as far as practical, further reductions in waste arisings will be achieved.

"Do Something" Scenario - Construction Waste Management

General

Despite the decrease in construction activities due to economic downturn, construction and demolition waste is one of the largest waste streams in Ireland. Generation in Ireland is estimated at approximately 5 million tonnes in 2009 of which approximately only 1% was landfilled.

The typical composition of construction and demolition waste material is given in **Table 15-D** below. The CEMP will address the management of the specific construction wastes arising from the development, however, typical construction wastes are defined under Chapter 17 of the European Waste Catalogue – Construction and Demolition Waste.

Table 15-D: Construction and Demolition Waste Composition in Ireland.

Category	Composition
Soils/Stones	45%
Concrete, bricks, tiles, ceramics	31%

Category	Composition
Metals	6%
Asphalt/Tar	1%
Wood	7%
Other	10%

Source: Construction and Demolition Waste management: A handbook for contractors and Site Managers (2002).

Material Quantities

Initial approximate estimates of materials anticipated in the construction of this development are shown in **Tables 15-E** and **15-F** below.

Table 15-E: Approximate Quantities of Waste generated during Construction

Waste Type	Volume (used)	Units	Volumes / Wastes
Earth Moving Cut & Fill	Nil	m ³	20,182
Topsoil	N/A	m ³	N/A
Imported Gravel	9,000	m ³	Nil
Drainage Materials	3,000	m	90 Lin Metres
Enclosing Wall (Demo)	Nil	m ³	2,000
Precast Concrete	N/A	m ³	N/A
Site Concrete	12,000	m ³	50
Reinforcement	1,600	tonnes	5
Steel	750	tonnes	Nil

Table 15-F: Approximate Typical Quantities of Wastes generated during Construction

Building Materials	Volume (used)	Units	Volumes / Wastes
Gross Enclosed Area	Circa 10,000	m ²	N/A
Blockwork / Cladding	9,000	m ²	300
Glass / Glazing	1,000	m ²	50
Roofing Materials	Circa 7,500	m ²	100
Mechanical Piping	10,000	Lin meters	300
Electrical Wiring	30,000	Lin meters	1,000
Insulation	Circa 5,000	m ³	150
Internal Walling	650	Lin meters	50 LM
Sample Metric Doors	50	numbers	5

Use will be made of off-site pre-cast and pre-fabrication in the construction of the proposed brewery development, allowing on-site waste production to be minimised.

Generation, Re-use and Disposal of Excavated Materials

The construction of the proposed brewery development will involve the excavation and disposal of materials and importation of construction materials for the fill below buildings (etc.).

It is estimated that approximately 20,000 m³ of material will be excavated during the construction period. The spoil generated can generally be divided into two categories, material described as construction and demolition (C & D) material and clean earth, clay and weathered rock (inert).

C & D Material

The C & D material will predominantly be generated by the removal of existing structures, buildings, road pavements and existing buried services. The C & D material will be made up of concrete and bituminous materials. It is anticipated that the amount of C & D material will be negligible and where possible will be re-used in the works.

Inert Spoil

Excavated inert material will comprise two types of excavation, (1) – that which is suitable to be re-used within the works and (2) – that which is “unsuitable” and hence needs to be removed from the site. “Unsuitable” material includes any material that due to its physical and structural properties is not suitable for use as engineering fill.

Whilst the re-use of such materials on-site will be maximised, there will invariably be some “unsuitable” material which will require disposal off site to a material recovery facility or an appropriately licensed landfill site.

Spoil Handling On-site

C & D material and “unsuitable” material will normally be removed immediately from-site. If the contractor considers that the C & D material is suitable for re-use on-site, it can be stockpiled in a suitable location, subject to appropriate conditions stipulated in the contract documents and to the acceptance of the EPA and DCC.

Waste Minimisation

The Waste Management Hierarchy (see **Figure 15-A**) outlines that waste prevention and minimisation are the first priority in managing wastes, followed by waste reuse and recycling. Disposal of waste will only be considered as a last resort.

During the design process, a number of measures will be applied to design out and therefore prevent waste arising on-site.

The Construction Waste Management Plan will identify waste streams requiring segregation for further reuse or recycling off site. This will particularly focus on opportunities to re-use or recycle excavation, demolition and construction waste. To ensure compliance with legislation, food waste will be kept in a separate skip and will be appropriately demarcated. Paints, sealants and hazardous chemicals (etc.) will be

appropriately stored and segregated and disposed accordingly off-site to appropriately facilities.

Importing Materials

The proposed brewery development will have a requirement for imported materials, primarily comprising high standard fill and stone for below the buildings, concrete for road kerbs, concrete yard areas and building and steel for the buildings.

In line with the principles of sustainable development, the scheme will seek to minimise the amount of materials brought into the construction site. This will be achieved by re-using as much of the materials generated during demolition activities as possible, provided that they satisfy the specific engineering standards.

The majority of new materials brought to site, such as earthwork materials and pipes will be used immediately or will be stored on-site within the site boundary. Other materials such as asphalt or concrete will be brought directly to the construction site from the relevant batching plant as and when required and immediately placed.

Other Construction Wastes

Other wastes produced during the construction process include; soil, ballast, concrete, asphalt, bricks, tiles, plaster, masonry, wood, metal, paper and plastics.

The Hazardous waste streams which could arise from construction activities may include the following:

- Waste electrical and electronic components,
- Batteries,
- Asbestos,
- Wood preservatives,
- Liquid fuels, and
- Contaminated soil.

Waste disposal will be in accordance with all relevant regulatory requirements.

St. James's Gate Waste Management

The existing brewery currently operates under an Environmental Management System (EMS). The EMS addresses all areas of waste management including:

- Identifying the sources of waste in the development;
- Identifying the person/s responsible for the management and monitoring of the waste;
- Providing procedures for the disposal of the different types of waste generated.

Non-Hazardous Wastes

A range of non-hazardous waste streams are expected to be generated during the operation of the proposed brewery development. This will include packaging waste, office waste, food waste, wood, textiles, plastics and glass (etc.). These will be segregated and disposed of as per the EMS.

In addition to the wastes detailed above there are a number of waste streams from the brewery which are directed for re-use. Waste beer is sent to designated owners of pig farms for incorporation into feed material if it is deemed to be of suitable quality. Brewer's grains which meet the Animal Feed quality standard are sent for animal food and trub solids are blended with spent grains as part of the Animal Feed manufacturing process. Surplus yeast is processed to manufacture an Animal Feed product.

Planned increase in production capacity in the St. James's Gate facility will be offset in terms of volumes of generated non-hazardous operational waste by ongoing implementation of Waste Strategy and achieved improvements in waste minimisation activities.

Hazardous Waste

Similar to current operations, some amounts of hazardous waste will be generated. Hazardous wastes such as waste oils, batteries, laboratory chemicals, medical waste etc will be generated and it is envisaged that they will be segregated at their source. On segregation, they will be stored in suitable containers prior to their removal offsite by an appropriate third-party waste disposal company for recovery or disposal.

15.2.5 Mitigation

Construction

A Construction Waste Management Plan (CWMP) will be developed as part of the Contractor's Construction Environmental Management Plan (CEMP) which will define a structured approach to the management, and recycling of waste on-site and identify licensed waste management contractors.

The CWMP objective will be to provide better control of the regulatory risks relating to materials and wastes generated on-site with the result that any queries from the EPA can be dealt with effectively. This will be prepared as per the *Best Practice Guidelines Projects on the Preparation of Waste Management Plans for Construction and Demolition Projects* which is available from the Department of Environment, Community and Local Government.

These guidelines outline, among other recommendations, that waste can be minimised by:

- Ensuring the correct volume of materials is ordered for the work to be undertaken and storing the materials appropriately to avoid contamination or deterioration;
- Co-ordinating with other contractors or developers in the supply of materials and services to avoid repeated deliveries or excavations; and
- Ensuring when preparing contracts for demolition and construction operations that clauses are included requiring the reuse of materials where practicable.

The CWMP will include:

- the organisation of the contractor's approach to waste management including permit details (etc.);
- the identification of disposal sites;
- the identification of quantities to be excavated and disposed of;
- the identification of measures to prevent nuisance;
- the identification of the amounts intended to be stored temporarily on-site and the location of such storage;
- the identification of intended transport means for materials;
- procedures for dealing with Waste Management including liaison with third parties, statutory bodies, undertakers and other companies;
- procedures for the provision of documentation necessary to instigate and maintain an Environmental Management System (EMS);
- procedures for the control of off-site activities associated with the Waste Management Plan; and
- procedures for the management review/audits to monitor and demonstrate control over the implementation of the CWMP

“Do Something” Scenario - Operation

The operational phase of the proposed brewery development will result in the generation of a range of wastes.

It is envisaged that the management of the recyclables, green waste and food wastes during the operation of the site will be undertaken through an EMS for the proposed brewery development, currently used to manage environmental performance. In addition the following measures will be put in place:

- In the event of spillages or contaminated material entering the surface water drainage system, appropriately located automatic TOC monitoring stations will alarm and trigger operational intervention to cease discharge. This will contain the contaminated runoff within the combined attenuation/firewater retention ponds. The surface water protection measures are discussed further in Chapter 9;
- Product will be stored in contained storage vessels or kegs which will limit spillages; and
- The on-site WWNP will adjust the pH of the process effluent prior to discharge to the sewers to comply with the IPPC Licence.

15.2.6 Residual Impacts

With the recommended mitigation measures in place, the residual impacts of the development are not considered significant.

15.2.7 Summary of Key Findings

It is anticipated that approximately 20,000 m³ of waste material will be produced during the construction phase of the proposed brewery development. Of this, it is intended to reuse as much as possible on-site.

A site Construction Waste Management Plan will be developed as part of the CEMP which will define a structured approach to the management, and recycling of waste on-site and identify licensed waste management contractors. This will give consideration to the proximity principal and the waste hierarchy.

The proposed brewery development will be aligned with the existing Environmental Management System which will be maintained during the operational phase of the proposed brewery development.

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16.0 MATERIAL ASSETS

16.1 Introduction

The purpose of this chapter is to discuss the utility services that are to be provided for the proposed brewery development, including:

- Foul water drainage;
- Process effluent;
- Power and heating supply and usage; and
- Water supply.

Relevant Legislation and Policy Context

The following standards, legislation and policy documents have been considered throughout this assessment:

- BS EN 752-4: 1997 – Drain and Sewer Systems Outside Buildings, Part 4: Hydraulic Design and Environmental Considerations;
- HR Wallingford 1981, Modified Rational Method, The Wallingford Procedure, Volume 4, HR Wallingford;
- Greater Dublin Strategic Drainage Study (GSDSDS) March 2005;
- IPC Guidance Note on Storage and Transfer of Materials for Scheduled Activities;
- Technical Guidance Document H, Building Regulations, 1997; and
- Greater Dublin Regional Code of Practice for Drainage Works.

16.2 Existing Foul Drainage

There is an existing Process & Foul drainage network for the St. James's Gate site that collects foul discharges and discharges it to the site Waste Water Neutralisation Plant (WWNP) adjacent to Watling Street. The discharge from this plant is pumped to the Dublin City Council (DCC) owned, operated and maintained foul sewer on Watling Street. This sewer discharges to the Ringsend Waste Water Treatment Plant.

16.3 Proposed Foul Drainage

The foul water drainage network for the proposed brewery development shall collect foul discharges from toilets, welfare facilities etc around the proposed development.

A separate process effluent system as described below shall be provided to intercept and convey runoff associated with the brewing process and surface water run-off from higher risk zones where brewery operation activities would have the potential to contaminate the surface water drainage system.

The foul water network shall be a piped underground gravitational system where possible (pumping may be required in some local areas) and shall be in accordance with BE EN 752-4:1997 *Drain and Sewer Systems Outside Building, Part 4: Hydraulic Design and Environmental Considerations*, Building Regulations Technical Guidance Document Part H, Dublin City Council (DCC) standards, GSDS and the Dublin City Council Code of Practice for Drainage Works.

Where pumping is required, the pump sumps shall have a minimum emergency holding capacity (in the event of pump failure) as required by DCC. The foul water shall be conveyed to an existing DCC sewer outfall subject to agreement with the relevant authorities.

The existing disconnecting manhole (final manhole within the site) shall be modified as necessary to comply with the DCC Code of Practice (maximum depth 1.5 m) and shall include an interceptor trap and fresh air inlet, as required (prevents foul air from the public sewerage entering the drainage network). A non-return valve shall be included on the inlet to the disconnecting manhole (to prevent back-up from the public sewerage system) and the access cover shall be a sealed, bolt down type.

No treatment of foul water shall be required for the foul / wastewater generation within the proposed brewery development.

16.3.1 Hydraulic Design

The foul network for the proposed brewery development has been hydraulically designed using the Microdrainage WinDES Version W11.2, software package based on the calculated flows across the facility.

The design gradients for the foul drainage system shall ensure that self cleansing velocities (above 0.75 m/s) are achieved throughout the network.

16.3.2 Grease Traps

Grease traps appropriate to the anticipated loadings and discharges shall be provided within the building, as required, where welfare facilities etc are present.

All grease traps shall comply with EN 1825-1&2 *Grease Separators* and the requirements and standards of DCC.

Grease traps will ensure that no grease, lipids, fats or other harmful matter enters the public sewer that may have a detrimental effect on the sewer systems. To ensure that licence limits are met, access, monitoring, disposal and maintenance systems will be applied.

16.4 Process Effluent Drainage

Proposed Process Effluent System

Design of the process effluent drainage network has been undertaken in conjunction with specialist input from the design team. The network of drainage shall provide an outlet for process effluent discharges from production areas and bunded areas etc. The design takes account of effluent generation diversity factors along the network as not all effluent generating activities will occur simultaneously.

Moreover, in undertaking the process effluent design, consideration has been given to the interception of solids in the process effluent drainage flows via drain gratings (etc.) at locations where solids are likely to enter the system.

The process effluent drainage design takes into account the possible additional flows that would arise from fire water associated with sprinklers and hydrants.

The main external process effluent network shall operate under gravity. Suitable cleaning and maintenance access arrangements are included at manhole/inspection chambers for testing, etc and access for manual camera inspections has been included.

A suitably resilient material has been selected for the process sewer to address chemical resistance and temperature affects within the proposed brewery development. The material proposed is single contained, stainless steel, Grade 304L. The material selection is consistent with international best in class brewery industry standards and has a proven track record of service over many years at Diageo Ireland brewing plants.

Furthermore, the stainless steel network shall be a closed system with access hatch box facilities in dry manhole chambers throughout. Joints in the stainless steel drainage pipework, between chambers, shall be through welding pipe lengths. A facility for pipework thermal expansion and contraction shall be included in the inspection chambers. Manholes and catch pits etc shall also be fully sealed thus minimising the potential for any leaks. Inspection and testing programmes shall ensure that the integrity of the process drainage is assessed and maintained on an on-going basis.

Design Flows

In terms of the anticipated hydraulic and pollution loading with regard to the process effluent flow to the on-site Waste Water Neutralisation Plant – the average flow is approximately 5,800 m³/day and the peak flow is approximately 7,300 m³/day. There will be a continuation of the existing program to reduce the effluent volume within the overall facility.

It is proposed to provide additional equalization capacity to smooth temperature and pH variations arising from the process prior to discharge. Additional suspended solids removal capacity will be installed to limit solids discharge quantities and this will also assist operating performance.

The additional WWNP equipment will be covered to minimise the off site visual impact and it is also planned to abate odours from the Equalization Tanks.

Chemical Composition of Effluent

A detailed assessment of the chemical composition of the process effluent was developed through consultation with Diageo Ireland, Ziemann and Jacobs. Consideration was given to the presence of slightly acidic and basic solutions used for cleaning operations in the brewhouse.

The assessment information has been used in the selection of the pipe conveying material for the process drainage system. Moreover, previous operating experience in similar applications in operational breweries around the world has been considered in the selection of the pipe material.

Pipe Materials

With regard to the chemicals contained in the process effluent, and in the context of the guidelines outlined in the EPA *Guidance Note on the Storage and Transfer of Materials for Scheduled Activities* (2004), it is proposed that Grade 304L stainless steel pipes shall be used for the development process effluent drainage system.

The drainage pipe lengths between inspection chambers shall be butt welded and stainless steel access or hatch boxes shall be incorporated into the dry manhole /access chambers.

The dry chamber /hatch box access facility shall provide suitable access points for testing and for CCTV inspections as required under the EPA Guidelines and regulations.

Hydraulic Sizing of Pipes

The process effluent piped systems shall be designed hydraulically to ensure that the proposed effluent generation capacity both at average and peak flows can be accommodated in the network.

On-Site Process Effluent Neutralisation

All process drainage discharges shall be conveyed to the existing pumping station which discharges into the adjacent WWNP on the site. Details of the existing WWNP are outlined in Chapters 9 and 15 of the EIS.

16.5 Evaluation of Potential Impacts of Foul / Process Effluent Drainage

Potential impacts can result from construction activities, which are broadly temporary in nature and from permanent, operational activities. Discussion below is separated into potential construction impacts and potential operational impacts.

16.5.1 Evaluation of Potential Construction Impacts

The design for the proposed brewery development discharges to the existing sewers in Victoria Quay/Watling Street. These combined sewers have overflows (CSO's – combined sewer overflows) into the river. The frequency of CSO discharge to the river is controlled by DCC and generally arises only during blockages in the downstream sewerage network and/or major storm events. The construction of the proposed foul and process effluent drainage networks for the development therefore has the potential to impact the River Liffey in the event of a discharge through the DCC overflow.

The existing neutralisation plant is capable of processing the projected effluent volumes therefore; a capacity increase is not required. It is proposed to provide additional effluent equalisation and solids removal capacity to provide enhanced control over the WWNP operations. These modifications can be developed without interrupting the WWNP operations and will only be brought into use after all construction and commissioning activities are complete. No impact on effluent discharge parameters is therefore envisaged.

Existing measures (filter screens, discharge monitoring, etc.) to protect the receiving sewerage for foul and process effluent are deemed sufficient to ensure that no

inappropriate discharges occur during modifications to the foul and process effluent drainage systems.

16.5.2 Evaluation of Potential Operational Impacts

The completion of the proposed brewery development will lead to an increase in the volume and concentration of process effluent discharges to the WWNP. This increase in discharge, if not appropriately managed, has the potential to increase the hydraulic and pollution load on the receiving sewerage system. Appropriate design, control and monitoring measures shall be in place to limit the potential for these impacts to arise.

There is an IPPC Licence Application under consideration by the EPA for an additional roaster than may result in an alteration to existing allowable WWNP discharge parameters. This possibility has not been evaluated under this EIS but will be addressed by Diageo Ireland under the Roaster Licence Application.

'Do Nothing' Impact

Should the proposed brewery development not be constructed then the surface water runoff from the existing hard standing area would continue to discharge to the combined sewerage system. There would be no increase in the potential for contamination of the Liffey.

16.6 Mitigation

Given the potential impacts for construction and operational activities the aim shall be to employ appropriate construction techniques relative to the existing environment and phased working as appropriate to minimise the sources of potential pollution from the development. The following sections outline the best practicable mitigation measures that shall be employed on the site.

16.6.1 Construction Mitigation Measures

Mitigation measures applicable to soils, surface and ground waters are provided elsewhere in the documentation and shall be referenced for construction mitigation measures relating to process and foul effluent drainage. In addition, the following mitigation measures shall be required as outlined below.

It should be noted that all construction strategies will be in accordance with the 'Construction Management Plan' and approved in advance with appropriate stakeholders. The strategies outlined shall also strictly adhere to available best practices; specific reference is made to CIRIA Reports C532 and C648.

Prior to Construction

Prior to construction commencing the Contractor shall be required to:

- Liaise with Diageo Ireland with respect to the operation of the existing WWNP and prepare method statements for the works involved in connecting to the existing 'live' pumping station at the WWNP;
- Prepare method statements for the works involved in carrying out any excavations through any existing structures (etc.);

- Prepare an Emergency Response Plan detailing the procedures to be undertaken in the event of a spill of chemicals, fuels, oils, hazardous materials and wastes, a fire or other non-compliance incident. This plan shall operate in conjunction with the Contractor's Construction/Environmental Management Plan for the site;
- Prepare a specific strategy and detail the proposed safeguards to protect the River Liffey and underlying ground water within the site development area considering the anticipated sources, pathways and impact of potential pollution; and
- Ensure staff are trained in the implementation of the Emergency Response Plan and the use of any control equipment as necessary.

The contractor's construction proposals shall be in accordance with the approved Construction Environmental Management Plan and approval for any departures from agreed procedures shall be sought and agreed prior to the commencement of the Work.

During Construction

The potential for negative impact on the operation of the existing WWNP and inappropriate discharges to the receiving sewerage system shall be controlled during the construction works by the implementation of good construction practices. These practices will include adequate bunding and containment of oil containers, fuels and hazardous liquids (etc.). Moreover, regular plant maintenance will be undertaken to ensure no leakages.

Pollution control measures shall follow the best practices outlined in the Construction Industry Research and Information Association, (CIRIA) guidance on the Control and Management of Water Pollution from Construction Sites in their publication Control of Water Pollution from Construction Sites, Guidance for Consultants and Contractors.

Contractor's Role and Responsibilities

As part of his duties and responsibilities, the Contractor shall provide comprehensive method statements planning their foul and process effluent drainage works around the site. As part of this work, pollution control measures and strategies to protect existing 'live' process drainage systems on the site shall be developed and implemented in accordance with appropriate standards and requirements.

Good construction management practices shall be employed and the Contractor shall adhere to the provisions set out in the CIRIA guidance note on the control and management of water pollution from construction site, "Control of Water Pollution from Construction Site", 2001.

Contingency and Response Plans

Furthermore, contingency plans for pollution and general process drainage emergencies shall also be developed by the appointed Contractor prior to any works commencing on-site. These plans shall be regularly updated and tailored to suit all specific conditions. The plans and method statements shall identify any actions to be taken in the event of a pollution incident or a negative impact on the existing WWNP.

In preparing the contingency plans and method statements, the Contractor shall ensure that the items listed previously for Surface Water drainage construction are addressed and adequately covered for Foul and Process water drainage construction.

Housekeeping and Inspection

The contractor shall demonstrate and implement good housekeeping measures (daily site clean-ups, use of disposal bins, etc) on the site, as set out in the previous Surface Water drainage construction section.

Bunding and Storage

Oil storage tanks shall be bunded appropriately and be sized as set out in the previous Surface Water drainage construction section.

Contaminated Soil

In the event of any evidence of soil contamination being found during work on-site, the appropriate remediation measures shall be employed as set out in the previous Surface Water drainage construction section.

Construction Site Activities and Facilities

Refuelling and minor servicing of plant and machinery shall be confined to suitably located and designated areas as set out in the previous Surface Water drainage construction section.

Control of Runoff

Any run-off entering excavations for foul and process effluent drainage works shall be collected as set out in the previous Surface Water drainage construction section.

Temporary Haul Routes

Haul routes will be set up as set out in the previous Surface Water drainage construction section.

WWNP Treated Process Effluent

The current effluent monitoring regime will continue throughout the construction of the proposed brewery development. The monitoring and testing shall ensure that the minimum parameters set for the levels of treatment within the plant are not exceeded during the construction period.

16.6.2 Mitigation Measures during Plant Operation

A range of mitigation measures have been developed to address issues connected with the discharge of process effluent from the proposed brewery development to the existing WWNP. These measures are outlined elsewhere in the EIS documentation. With respect to the operation of the process effluent drainage systems, during plant operation, the following mitigation measures shall be included in the design of the systems:

- The process effluent drainage system shall be regularly checked and monitored to ensure that the integrity of the system is maintained during plant operation. The proposed 'dry' manhole inspection chambers shall be used to facilitate safe access for inspection and confirmation of the drainage pipework condition;
- Access hatch boxes shall be included in the 'dry' manhole inspection chambers. This facility will allow easy and safe access for regular manual inspection of the internal condition of the chambers and where necessary, CCTV camera insertion into the pipework;
- Appropriate expansion and contraction couplers shall be incorporated into the 'dry' manhole inspection chambers to facilitate longitudinal thermal movement arising during different stage of flow through the pipework. The design of the fitting installation shall facilitate ease of removal and replacement where necessary; and
- Surface water run-off from specific areas, considered to be of greater risk than other surface water areas on-site shall be directed to the process sewer and WWNP.

With respect to the operation of the foul drainage systems during plant operation the following mitigation measures shall be included in the design of the systems:

- Bolt-down covers will be provided and maintained on any foul manhole chamber(s) located on the existing low yard areas immediately south of the Victoria Quay boundary wall – to prevent overspill of sewage on to the yard area during back-up of the public sewerage system;
- A non-return valve shall be provided on the inlet to the outfall/disconnecting manhole inside the site boundary to prevent backing up of the public sewerage system into the foul drainage network for the development. This valve shall be regularly inspected and maintained in working order;
- An interceptor trap shall be incorporated into the outlet from the final/disconnecting manhole to prevent sewer gases entering the foul drainage system for the development;
- The foul drainage network shall be vented to a safe level to allow for the passage of foul drainage gases to air; and
- Fats oils and grease interception shall be provided in food preparation areas to prevent outflow to the public sewerage system. Accumulated grease shall be collected and disposed in accordance with the Waste Management act and the requirements of DCC.

16.7 **Residual Impact**

The mitigation measures outlined above will be implemented to ensure that there are no significant residual impacts on the receiving sewerage systems. Moreover, the elimination of surface water run-off discharges into the existing public combined sewerage system from the development shall have a significant positive impact on the receiving public sewerage and sewage treatment systems.

Measures and details of the residual impact of the process effluent discharge to the existing WWNP are set out elsewhere in the EIS documentation.

16.8 Summary of Findings

It shall be ensured that the mitigation measures outlined are fully implemented in order that the construction and operation of the foul and process effluent drainage systems in both the temporary construction and operational stages do not adversely affect the receiving sewerage systems.

Furthermore, the redirection of proposed development surface water run-off from the existing DCC combined sewerage system, in Victoria Quay, to the existing DCC surface water sewerage system/River Liffey, shall result in a significant reduction of the hydraulic flow conditions in the Victoria Quay combined sewer. This will consequently reduce the burden of the site development area on the Ringsend WWTP.

Power and Heating Supply and Usage

The existing St. James's Gate facility is designed to be fully self sufficient in its power usage via the Combined Heat & Power (CHP) Plant where gas fired turbines are used to generate both electricity and steam. The existing CHP Plant can support the proposed brewery development by ensuring an equilibrium between the brewery's need for steam and electrical requirements. However, this electrical supply system is fully backed up by an existing external supply from the ESB and other third party power suppliers.

Water Supply

The proposed brewery development is designed to minimise use of water by selection of optimum brewing process equipment and the use of recycled water for cleaning activities and utility support throughout the facility.

Engagement between Diageo Ireland and Dublin City Council is ongoing to ensure that the requirements are met without impact to the local public water supply systems. Diageo Ireland proposes to store sufficient water on-site so as to minimise any stress on the local supply systems.

It is anticipated that the peak water usage will be 645 m³/hr (180 litres/second).

17.0 SUSTAINABILITY STATEMENT

17.1 Introduction

This sustainability statement provides an assessment of the sustainability aspects that are relevant to the proposed brewery development. The statement will identify the sustainability objectives and indicators that are established within the planning and sustainability policy frameworks and demonstrate how the project will deliver these requirements.

The statement recognises the local policy imperatives to achieve high standards of sustainability performance, both in terms of the strategic fit and the realisation of the proposed brewery development through its design and construction.

The approach underlying the design and construction of the proposed brewery development is to recognise the need for future-proofing the development, enabling high levels of energy performance, minimised resource use, efficient use of existing infrastructure and environmental impact.

The statement further demonstrates the commitment to ensure that the proposed brewery development will adopt rigorous audit systems to ensure that sustainability inclusions are both managed and verified to maximise these benefits.

The development and application of a sustainability assessment methodology can support a number of objectives that collectively embed sustainability within a project life cycle:

- Providing evidence for Environmental Impact Statements and planning applications;
- Establishing a sustainability framework for project design, construction and management, ensuring that sustainability benefits are realised;
- Promoting good practice for sustainability through a consistent management framework; and
- Providing a framework for performance reporting across other projects.

17.2 Relevant Legislation and Policy Context

Sustainable Development - A Strategy for Ireland - 1997

Ireland's first sustainable development strategy, published in 1997, aimed ... "to ensure that economy and society in Ireland can develop to their full potential within a well protected environment, without compromising the quality of that environment and with responsibility towards present and future generations and the wider international community".

The principal goals and policies defined in the 1997 publication continue to inform the development and delivery of policies and programmes in the area of environmental protection and sustainable development.

Making Ireland's Development Sustainable - 2002

"Making Ireland's Development Sustainable", a five-year review of the original 1997 Strategy, was produced by the Department of the Environment, Heritage and Local Government in 2002. It also served as Ireland's national report on sustainable development to the Johannesburg World Summit on Sustainable Development held in 2002 and reports progress made in the ten years since the Rio de Janeiro Earth Summit.

National Sustainable Development Policy (due in 2008/ON HOLD)

The Sustainable Development Unit of the Department of the Environment, Heritage and Local Government is currently co-ordinating the preparation of a new national sustainable development strategy. The renewed Strategy will replace our first National Sustainable Development Strategy, "Sustainable Development – A Strategy for Ireland", published in 1997, and "Making Ireland's Development Sustainable", published in 2002.

The National Spatial Strategy (NSS) 2002-2020

The National Spatial Strategy is the national planning framework designed to coordinate future development and planning in Ireland in a sustainable manner. Sustainable development is at the heart of the NSS which strives to make best use of natural resources, bring jobs closer to where people live, and ensure a high quality natural and built environment. The NSS, through its focus on economic, social and environmental issues and on the interlinkages between them, is a key policy instrument in the pursuit of sustainable development.

Dublin City Development Plan 2011-2017

The concept of sustainable development is a key issue within the overall context of the Dublin City Development Plan, which relates not only to economic development, but also addresses social, community and environmental aspects. The City Council, within a Framework for Sustainable Dublin, has identified six broad themes which are integral to the future growth and development of the city and constitute essential elements of a sustainable approach to future development of the city.

The six themes are:

1. Economic
2. Social
3. Cultural
4. Urban Form and Spatial
5. Movement
6. Environmental

The approach in the Dublin City Development Plan places sustainability along with the six themes listed above as the over-arching philosophy that informs the core strategy for Dublin City and all the policies and objectives of the development plan.

The Framework for Sustainable Dublin (FSD) is a long-term vision for Dublin City, based on the principles of sustainable development contained in the plan and also on the 6 themes approach utilised by Dublin City Council in the formulation and implementation of policy. The Framework is based on best international practice and is tailored to the needs of Dublin City.

Draft Liberties Local Area Plan 2009

Sustainability is a common theme that runs throughout the Liberties Local Area Plan (LAP) 2009 policy documentation. The overall objective of the LAP is to set out an inspirational vision that will guide the sustainable regeneration of the Liberties. The six themes listed above as part of the Dublin City Development Plan provide a structure for the Liberties LAP proposals and for the delivery of regeneration within the Liberties. As one of these themes, 'Sustainability' provides an ...'overarching framework for incorporating key principles, strategies and objectives in order to drive a vision of the sustainable city for the next two decades.'

17.3 Methodology

A key principle of sustainability management is the application of sustainability throughout the life cycle of a project from initial concept, to outline and detailed design, then construction and aftercare. At the planning and impact assessment stages, it is therefore appropriate and necessary to demonstrate how sustainability principles will be applied to:

- the strategic context and purpose of the proposed brewery development, reflecting the relevant sustainability objectives at the policy and planning level; and
- the translation of these principles into the proposed design, construction and management of the proposed brewery development.

To demonstrate the strategic fit of the proposed brewery development in sustainability terms, the South East England Development Agency (SEEDA) checklist has been adopted as an appropriate and comprehensive sustainability framework.

The SEEDA Sustainability Checklist, summarised in **Table 17-A** below provides a robust demonstration of sustainability inclusion for the proposed brewery development. It has been devised specifically to guide the design of new developments by making sense of current policy, looking at issues relevant to the overall development scale, helping developers, local authorities and other interested parties to deliver sustainable communities. The checklist is widely acknowledged as providing a robust means of evaluating the sustainability of new developments and has been extensively applied in an Irish context.

Table 17-B summarises the results of the sustainability appraisal for the proposed brewery development, with respect to the strategic rationale for the scheme and the proposed design and construction inclusions.

Table 17-A: The SEEDA Sustainability Checklist Framework

Category	Aspect
<p>1. Climate change and energy</p> <p><i>To ensure that new developments are appropriately adapted to the impacts of present and future climate change and to minimise their own impact on greenhouse gases, flooding, heat gain, water resources and water quality.</i></p>	<ul style="list-style-type: none"> • Flooding • Water Efficiency • Sustainable Energy • Site Infrastructure
<p>2. Community</p> <p><i>To ensure that the development supports a vibrant, diverse and inclusive community, which integrates with surrounding communities.</i></p>	<ul style="list-style-type: none"> • Promoting community networks and interaction • Supporting Public Services, social economy and community structure • Management of the development
<p>3. Place Making</p> <p><i>To ensure that the most sustainable sites are used for development and that the design process, layout structure and form provide a development that is appropriate to the local context and supports a sustainable community.</i></p>	<ul style="list-style-type: none"> • Efficient use of land • Design Process • Form of Development • Open Space • Adaptability • Crime • Street Lighting / Pollution • Security Lighting
<p>4. Transport and Movement</p> <p><i>To ensure people can reach facilities they need by appropriate transport modes, encouraging walking and public transport use and reducing the use of private cars for shorter journeys.</i></p>	<ul style="list-style-type: none"> • General policy • Public Transport • Parking • Pedestrians and Cyclists • Proximity of Local Amenities

Category	Aspect
	<ul style="list-style-type: none"> • Traffic Management
<p>5. Ecology</p> <p><i>To ensure that the ecological value of the site is conserved and enhanced maintaining biodiversity and protecting existing natural habitats which can contribute to and enhance the amenity of the area.</i></p>	<ul style="list-style-type: none"> • Conservation • Enhancement of Ecology
<p>6. Resources</p> <p><i>To promote the sustainable use of resources, including the reduction and re-use of wastes, related to both the construction and operation of new developments.</i></p>	<ul style="list-style-type: none"> • Appropriate use of land resources • Environmental impact • Locally reclaimed materials • Water Resource Planning • Noise pollution • Construction waste
<p>7. Business</p> <p><i>To ensure that the development contributes to the sustainable economic vitality of the local area and region.</i></p>	<ul style="list-style-type: none"> • Business Opportunities • Employment
<p>8. Buildings</p> <p><i>To ensure that the design of individual buildings does not undermine the sustainability of the overall development.</i></p>	<ul style="list-style-type: none"> • Specified BREEAM

Source: South East England Development Agency (SEEDA) checklist

Table 17-B: Sustainability Appraisal of the Proposed Brewery Development

NOTE: *The numbering of objectives in the below is not always consecutive, due to the removal of those which do not apply to this development type.*

Sustainability Criteria (SEEDA)	Assessment and Proposed Inclusions
<p>1. Climate change and energy <i>To ensure that the Facility is appropriately adapted to the impacts of present and future climate change and to minimise the impact of generated greenhouse gases, flooding, heat gain, water resources and water quality.</i></p>	
<p>Flooding</p>	
<p>1.1 To ensure that sites and developments take due account of flood risk, and where it is present, take appropriate measures.</p>	<p>The proposed brewery development is inherently protected from flood risk by the following key measures:</p> <ul style="list-style-type: none"> • The building floor levels are set at 4.25 mOD (Malin), which is above the 1-in-200-year flood level • Existing flood defence walls along Victoria Quay • Ireland's Electricity Supply Board (ESB) has a number of water supply reservoirs on the Liffey, upstream of the city to control flow in extreme rainfall events. • These reservoirs can store high flows in the River Liffey, and therefore largely control flooding. • Surface water drainage from hard-standing and roofed areas is designed in accordance with the Greater Dublin Strategic Drainage Study, with run-off restricted to 2 litres per second per hectare (l/s/ha). <p>The surface water combined attenuation / fire water system will be designed to accommodate up to and including the minimum 1-in-30 year storm event, with the balance of storage up to the 1-in-100 year event on the adjacent surface. In addition, in the event of a fire event, any contaminated firewater will be pumped to the on-site WWNP for neutralisation prior to agreed and permitted discharge to the DCC combined sewer.</p> <p>Silt / petrol / oil separation will reduce the potential for silt chemicals or oil pollution to natural watercourses from surface water run-off from buildings and hard surfaces.</p>
<p>1.2 To reduce the risk of flooding on proposed development sites and adjacent areas of land.</p>	
<p>Water Efficiency</p>	
<p>1.3 To reduce the overall consumption of clean water for non-potable uses.</p>	<p>Various measures will be incorporated to reduce water consumption and demand. In order to reduce the demand on potable water in the process part of the plant, water conservation measures such as the following will be assessed for inclusion in the design:</p> <ul style="list-style-type: none"> • Usage of efficient CIP system in conjunction with recovered water will reduce demand on fresh water and chemicals • Usage of recycled water will reduce demand on fresh water
<p>1.4 To ensure that roof space is used productively to minimise water demand and manage water run-off on the site.</p>	

Sustainability Criteria (SEEDA)	Assessment and Proposed Inclusions
	<ul style="list-style-type: none"> • Dedicated brewstreams will reduce requirement for intermediate cleaning which will result in lower water demand for CIP • Ability to clean big vessels hot results in lower water demand for CIP • Use of circa 4 hours water supply store / buffer on-site to minimise any stress on the local supply systems <p>The following water saving devices will be considered in the office area and staff amenities:</p> <ul style="list-style-type: none"> • Percussion water saving taps • Dual flush water saving cisterns • Electronic taps • Sanitary shut off of wet areas • Water leak detection systems • Low flow showers • Water metering
Sustainable Energy	
<p>1.5 To increase the overall efficiency of the development through energy efficient design and management.</p>	<p>By replacing the existing, less efficient brewhouse, the proposed brewery development will inherently improve energy performance at St. James's Gate (in terms of energy consumed per unit of product made). The existing Energy Management System will seek to ensure high levels of energy efficiency and minimise consumption.</p>
<p>1.6 To promote the increased use of renewable energy sources to reduce dependence on fossil fuels producing CO2 emissions.</p>	<p>A number of design principles seek to maximise the efficiency of the development, such as:</p> <ul style="list-style-type: none"> • Providing natural daylight and sunlight to partially illuminate the interior of buildings reducing the need for artificial lighting • Ensuring that buildings are adequately insulated to minimise heat loss and energy wastage. <p>In the process design ,the following energy saving measures will be assessed for inclusion:</p> <ul style="list-style-type: none"> • Maintaining a fully self-sufficient brewery in its power usage via the existing Combined Heat & Power (CHP) Plant (both power and steam) • Recovery of energy contained in the wort kettle vapours will be used for reused in the process. • Reuse of energy contained in wort to cellar will produce hot water for the process requirements

1.7 To increase the use of sustainable heating techniques.

1.8 To encourage the future use of active solar technologies where

Sustainability Criteria (SEEDA)	Assessment and Proposed Inclusions
they are not initially supplied.	<ul style="list-style-type: none"> • Dedicated brewstreams will reduce the requirement for immediate cleaning which will result in lower water demand for CIP.
1.9 To increase the use of sustainable heating techniques.	<p>The following energy saving devices/initiatives will be considered for inclusion in the building services of the development:</p>
1.10 To encourage the future use of active solar technologies where they are not initially supplied.	<ul style="list-style-type: none"> • Photocell/time clock control on external lighting • Air handling light fittings to improve heat recovery • Automated lighting control to office areas • Low energy high frequency light fittings to office areas • External lighting dimming • Daylight saving control to office area • Solar thermal hot water • High efficiency motors • Variable Frequency Drives on air handling units and extract fans • Increased energy metering (metering of substantial energy uses, high energy loads and tenancy areas) • Local heat recovery units • Natural/passive ventilation systems • Thermal modelling • Appropriate design and as built performance measures will be taken to minimise heat loss and air infiltration through the building fabric • Use of insulation on processes to reduce building services requirements to control environment (thereby minimising CO₂ emissions associated with the operational energy consumption) <p>Through application of a selection of these steps, the proposed brewery development will maximise the energy efficiency of the development.</p>

Sustainability Criteria (SEEDA)	Assessment and Proposed Inclusions
Site Infrastructure	
1.11 To provide easy access to site service and communications infrastructure, with minimal requirement disruption and need for reconstruction, and allowing for future growth in services.	The proposed brewery development is located adjacent to existing site services and will not compromise the convenient access or future expansion potential.
1.12 To ensure that the masterplan considers the site-wide distribution of on-site produced renewable energy.	The potential for energy efficiency and renewable energy has been identified as listed in sections 1.5 - 1.12 above.
2. Community	
<i>To ensure that the Facility supports a vibrant, diverse and inclusive community that integrates with surrounding communities.</i>	
Promoting community networks and interaction	
2.1 To avoid detrimental effects upon the surrounding community and highlight issues that the development must address.	<p>This EIS has assessed potential local community effects and incorporates mitigation measures to minimize impacts on the surrounding community. For the construction period, mitigation includes construction site good practice / 'housekeeping', such as dust suppression measures, keeping a tidy site, appropriate working hours and sensitive timing and duration for the noisiest activities. Also, construction traffic will be minimised by encouraging staff to walk, cycle or use public transport.</p> <p>During operation, the brewery will be using many of the same processes and arrangements as currently exist, and will avoid significant air, odour and noise impacts by design. The additional vehicle movements required will be offset by reductions in imported product (for keggings), and will not have a negative effect on existing traffic levels.</p>
Supporting Public Services, Social economy and community structure	
2.3 To encourage sustainable lifestyles and help integration into the local community.	The choice of building a new brewery at St. James's Gate allows Diageo Ireland to achieve its aims with greatest benefit to Dublin and least environmental impact. This includes assuring continuation of Guinness's historic place in Dublin.
Community Management of the development	
2.4 To ensure that community facilities are maintained and community has sense of ownership.	The proposed brewery development's construction site will remain entirely within the existing walls of St. James's Gate, not directly changing any key transport or facilities. Construction traffic will increase by a maximum of approximately 1%, and will not have any impact on prevailing traffic conditions.

Sustainability Criteria (SEEDA)	Assessment and Proposed Inclusions
3. Place Making	
<i>To ensure that the most sustainable site is used for the Facility and that the design process, layout structure and form provide a development that is appropriate to the local context and supports a sustainable community.</i>	
Efficient use of land	
3.1/2 To ensure the most effective and efficient use of land, applying a sequential approach.	The site location is inherently sustainable as the proposed brewery development is located on land that has been previously developed and contains all infrastructure to support the development.
Design Process	
3.4 To ensure that the preparation of a statement of design intent, that is informed by studies of the site and its surroundings, is discussed with the appropriate parties prior to finalisation.	After a lengthy process of consideration of options, the proposed layout, visual impact and environmental master planning represent the optimum development pattern on the site. The site proposals have been developed through discussions with all relevant parties to ensure that all design related issues have been appropriately addressed. Landscaping proposals will address the surrounding site characteristics and sensitivities to minimise visual impacts.
3.5 To ensure that the landscaping scheme is attractive and appropriate to the local environment.	There is a heavy emphasis on a high quality of design and construction considerations such as the scale, form, layout, design and materials of development and treatment of external areas in order to integrate the development with the existing setting and to fit with the local character.
Form of Development	
3.6 To achieve visual and physical connectivity that makes it easy to find the development and to navigate around.	Site layout has been considered in detail to optimise easy movement throughout the development site. On-site gradients and footpaths will be designed to provide inclusive access for site staff and visitors, as appropriate. Building design in terms of scale and layout and selection of construction materials will seek to minimise the perceived effects of the proposed brewery development.
3.7 To make pedestrian movement attractive and safe, reducing reliance upon private cars for local journeys.	The site master plan and the building form and layout clearly establish an iconic identity both for the Diageo Ireland employees and its regional neighbours.
3.8 To create a place with a clear identity that is easy to understand and navigate.	

Sustainability Criteria (SEEDA)	Assessment and Proposed Inclusions
3.11 To ensure that the development responds to local character whilst reinforcing its own identity.	
Open space	
3.12 To ensure access to high quality public green space for all.	The project involves the provision of new brewery buildings. Balancing the proposed brewery development with the surrounding existing brewery landuses is of great importance. The design of the proposed brewery development takes this into consideration and proposes improvements along Victoria Quay to improve the public space for pedestrian traffic.
Adaptability	
3.14 To ensure that new buildings can be adapted to the demands of new uses.	Although it is difficult to envisage alternative uses for the buildings, the buildings within the proposed brewery development will be suitable to allow expansion and a variety of future uses and hence opportunities for flexible use of space. This ensures a sustainable approach for future economic development and contribution from the site.
Inclusive communities	
3.15 To prevent social inequalities and foster a socially inclusive community.	The development seeks to contribute towards providing local community requirements through creating a diversity of construction employment opportunities and ensuring that the site supports and promotes high standards of social inclusion and accessibility.
Crime	
3.17 To apply design principles to increase the security of the development.	The existing standards of security are high and will be maintained for the proposed brewery development, including the gatehouse controls.
Street lighting / pollution	
3.18 To ensure that street lighting is as energy efficient as possible and to minimise light spillage.	It is proposed that energy saving lighting will be considered for site access lighting, utilising PIR sensors and time switch controls. Site access lighting will be fitted with deflectors to ensure that lights both point downwards and prevent light spillage upwards.
Security lighting	
3.19 To ensure that the security lighting is a carefully designed element, installed with due consideration of its suitability for the task and its effect on neighbours and the environment.	External and internal security lighting will be provided in accordance with best practice standards, but seeking to ensure minimised visual effects on neighbouring properties and utilising low energy installations with PIR sensors where appropriate.

Sustainability Criteria (SEEDA)	Assessment and Proposed Inclusions
4. Transport and Movement	
<i>To ensure people can reach facilities they need by appropriate transport modes, encouraging walking and public transport use and reducing the use of private cars for shorter journeys.</i>	
General policy	
4.1 To encourage and enable the use of public transport.	Construction staff will be encouraged to either, walk, cycle or take public transport to access the site, and the area is very well served with public transport options for both construction and operational staff.
4.2 To promote the use of virtual communications as an alternative to transport where possible.	The proposed brewery development is located within the centre of Dublin City and the site is very accessible by all travel means including walking, cycling and public transport. Existing staff within the Brewery are provided with high-quality accesses to a multitude of public transport facilities, including the Mainline Train Station at Heuston, the LUAS stops at St. James's Hospital and Heuston Station, and a number of Dublin Bus routes including No. 25, No. 26, No. 51, No. 66, No. 67, No. 78, No. 123.
Public transport	
4.3 To ensure the availability of frequent and convenient public transport links to train, tram or tube.	As above for 4.1 / 4.2. As an existing active brewery, the proposed brewery development will not represent a change; however Diageo Ireland will continue to implement its Travel Plan and aim to minimise the use of the car amongst staff.
4.4 To allow for easy access to public transport.	
4.5 To encourage more frequent use of public transport during the entire year, by having waiting areas which are considered safe and out of the weather.	
Parking	
4.6 To reduce levels of car parking available as an incentive to use public transport and other methods of mobility and communication.	As for 4.1 / 4.2.
4.7 To provide flexible space which can accommodate other uses outside the areas of peak parking demand.	

Sustainability Criteria (SEEDA)	Assessment and Proposed Inclusions
Pedestrians and cyclists	
4.9 To promote cycling as a real alternative to the use of private cars for shorter journeys, whilst reducing the fear of crime.	As for 4.1 / 4.2. In addition, St. James's Gate already has secure, weatherproof cycle parking within its car parking areas throughout the site.
4.10 To promote cycling as a real alternative to the use of private cars for shorter journeys, whilst reducing the fear of crime.	The site layout has been designed in accordance with best practice to ensure safe and adequate pedestrian and cycle access.
Proximity of local amenities	
4.11 To reduce any need or requirement to travel by car to essential facilities by having them within a reasonable walking distance.	There are existing various amenities on-site, such as staff canteen, kitchen facilities, shower facilities (etc.) and these will be retained for the proposed brewery development.
Traffic management	
4.12 To ensure vehicle speeds are appropriate to all road users.	Appropriate site-wide speed limits (site speed limit of 15 km/h) will be set and enforced.
5. Ecology <i>To ensure that the ecological value of the Facility is conserved and enhanced maintaining biodiversity and protecting existing natural habitats which can contribute to and enhance the amenity of the area.</i>	
Conservation	
5.1 To determine the ecological value of the habitats in and around the site in order to maintain and enhance biodiversity and protect existing natural habitats.	<p>A formal Ecological Impact Assessment has been conducted (see Chapter 7) in order to establish baseline conditions and to identify potential impacts.</p> <p>There are no existing features of ecological value within proposed brewery development area, and therefore there are no significant risks to manage in this regard.</p> <p>The River Liffey is the most important ecological feature near to the site, and there are pathways for potential impacts given an existing outfall and its proximity. A number of measures have been adopted in order to fully protect the River Liffey from any potential construction or operational impacts.</p>

Sustainability Criteria (SEEDA)	Assessment and Proposed Inclusions
Enhancement of ecology	
5.2 To improve the ecological value of the site and existing habitats.	The project will also provide some grassed landscape islands, with low-level decorative shrub and ground cover planting, however nearer to the facility, this will be mainly for amenity as its nature as a food production facility means it must do all in its power to discourage and prevent pest species from getting established.
5.3 To improve the ecological value of the site and support the viability of species by linking populations and habitats.	
Planting	
5.4 To ensure that the trees and shrubs that are specified contribute to the ecological value of the site.	As above. There will be inherent limitations as to which species may be considered due to the need to prevent pests establishing themselves at the site.
6. Resources	
<i>To promote the sustainable use of resources, including the reduction and re-use of wastes, related to both the construction and operation of the Facility.</i>	
Appropriate use of land resources	
6.1 To ensure that heritage or archaeologically important features are conserved or preserved if present.	<p>The site is central to the overall historic core of Dublin, and is also located within the Zone of Archaeological Potential for Dublin City defined by the Record of Monuments and Places and the Zone of Archaeological Interest defined by the Dublin City Development Plan. There are a number of designated features within 100 m of the North Site of St. James's Gate.</p> <p>A detailed archaeological and cultural heritage assessment has been undertaken, and concludes that there may be temporary indirect effects to the setting of historic buildings. The setting impacts will only be slightly adverse, and temporary in nature. Measures will be adopted to check for, identify and either protect or thoroughly record any buried archaeology at the construction site.</p> <p>With mitigation, there will be no significant construction or operational impacts on archaeology or cultural heritage.</p>
Environmental impact	
6.2 To increase the volume of low environmental impact materials used during the construction of developments.	<p>The development will seek opportunities to minimise use of raw materials and products throughout construction in the Construction Waste Management Plan. This will be achieved through measures such as:</p> <ul style="list-style-type: none"> ensuring the correct volume of materials is ordered for the work to be undertaken;

Sustainability Criteria (SEEDA)	Assessment and Proposed Inclusions
<p>6.3 To increase the percentage of timber used in construction sourced from sustainably managed and temperate sources. Recognised accreditations include the Forest Stewardship Council Certification Scheme and Pan European Forest Certification.</p>	<ul style="list-style-type: none"> • co-ordinating with other contractors or developers in the supply of materials and services to avoid repeated deliveries or excavations; • ensuring when preparing contracts for demolition and construction operations that clauses are included requiring the reuse of materials where practicable; • weatherproof and secure storage of materials on-site to minimise damage, contamination and losses; and • return of packaging materials to suppliers. <p>The main construction waste arising from this development is anticipated to be excavation material, concrete, steel, piping/wiring and blockwork. In order to minimise waste production, existing materials will be retained wherever possible.</p> <p>The construction will seek to adopt low environmental impact materials in all aspects of the design, including upper floor slab, roofs, external and internal walls, windows, floor coverings/finishes and hard landscaping and boundary protection. At least three of these components will be specified to achieve a BRE Green Guide to Specification rating of A. The design will further seek to avoid use of aluminium, concrete / cement and plastics where practicable. All timber used in construction will be sourced from appropriate accreditations, where possible i.e. Forestry Stewardship Council (FSC).</p> <p>Materials will be sourced taking into account responsible production practices throughout the development, including both basic construction elements and secondary building materials and finishes.</p> <p>In addition, adequate protection will be given to exposed parts of the buildings and landscape, thereby minimising the frequency of use of replacement materials.</p>
<p>Locally reclaimed materials</p>	
<p>6.4 To increase the proportion of locally reclaimed or recycled materials used in the construction of roads, pavement, public spaces and car parks.</p>	<p>There is limited opportunity to use recycled and secondary aggregates in construction.</p> <p>Opportunities to use locally sources materials will be pursued where feasible.</p>
<p>6.5 To increase the proportion of locally sourced materials used in the construction process.</p>	

Sustainability Criteria (SEEDA)	Assessment and Proposed Inclusions
Water Resource Planning	
<p>6.7 To develop a sustainable water efficiency strategy at a master planning level for the whole site.</p>	<p>The proposed brewery development is designed to minimise use of water by selection of optimum brewing process equipment and the use of recycled water for cleaning activities and utility support throughout the facility. The following measures will be assessed for the purpose of incorporating high water efficiency at the proposed brewery development:</p> <ul style="list-style-type: none"> • use of low-flow taps, • rainwater harvesting, • water metering, • major leak detection (with potential to pre-programme the water meter for additional leakage detection), • sanitary supply shut off by means of PIR, • use of grey water irrigation systems, and
<p>6.8 To ensure that any development on-site does not adversely impact upon local public or private water supply through polluting aquifers or groundwater.</p>	<p>Surface water runoff from the development site (all hard-standing) will be collected into its own system which will be directed via a silt / petrol / oil separation mechanism to an underground attenuation tank for retaining this water, and also for retaining firewater in the case of a fire occurring on-site. This water will be discharged to the River Liffey at a controlled rate; however a device which monitors water quality and triggers a valve to close will ensure significant pollution did not enter the river. This is fully consistent with the DCC strategy to divert rainwater away from the Ringsend WWTP.</p> <p>Prior to release to the River Liffey, measures will be in place to ensure it occurs during high tide. Valves will be installed which prevent back-flow from the public surface water sewerage system. Any manholes will have bolt-down covers.</p> <p>Shut-off arrangements' will ensure any contaminated water is first retained within the attenuation storage facility and then process through the Diageo Ireland WWNP before discharge to the DCC sewer.</p> <p>The proposed foul water drainage network will meet all relevant requirements, codes and standards. The foul water will be sent to an existing DCC combined drainage outfall. No additional treatment of foul water will be required.</p> <p>The effluent from the brewing process will be sent to the existing expanded on-site WWNP for the control of flow rate and pH. This will be a closed system, and require a pumped discharge to the WWNP. The system shall be fully sealed to minimise the potential for any leaks. Inspection and testing programmes shall ensure that the effluent drainage system is assessed and maintained regularly.</p>

Sustainability Criteria (SEEDA)	Assessment and Proposed Inclusions
Noise pollution	
6.10 To reduce the impact of noise upon the development.	<p>Noise attenuation measures include the following:</p> <ul style="list-style-type: none"> • air handling units have been incorporated into the interior of buildings where possible to avoid noise impact, • acoustic performance of occupied areas (e.g. control room) will be optimised, • construction-stage mitigation measures, such as appropriate working hours, using sound reduction equipment on motors / generators (and tools, exhausts, etc.), use of noise screens and good maintenance of haul roads and equipment. • acoustic screening of rooftop evaporative condensers,
Construction waste	
6.11 To minimise the waste produced from the development going to landfill.	<p>A Construction Waste Management Plan (CWMP) will be implemented to reduce the amount of waste during construction phase. All protocols for the construction of the site will consider the waste hierarchy, aiming to firstly minimise the amount of waste generated. The management of the recyclables, green waste and food wastes during the operation of the site will be addressed by the CWMP.</p> <p>A number of waste streams from the brewery are directed for re-use. This includes waste beer, brewer's grains, trub solids, spent grains and surplus yeast to be used as part of the animal feed manufacturing process. Other wastes such as packaging waste, office waste, wood, textiles, plastics, and glass (etc.) will be segregated and disposed of as per the CWMP.</p> <p>Hazardous wastes such as waste oils, batteries, laboratory chemicals, medical waste (etc.) will be segregated at their source. On segregation they will be stored in suitable container prior to their removal off-site by an appropriate third-party waste disposal company for recycling or disposal.</p>
Airborne emissions	
6.12 To minimise the impact from the development on air quality	<p>A review of available data indicates that air quality in the vicinity of the Diageo Ireland site is within the Air Quality Standards, although it is possible that the NO₂ annual mean standard is being exceeded at roadside locations due to public traffic.</p> <p>An air quality impact assessment has been conducted which concludes that emissions from construction freight and staff traffic will not be significant, whilst any construction dust will be controlled by dust prevention and suppression methods on-site. Any impact will be temporary in nature.</p> <p>The operation of the site will be unlikely to significantly affect air quality at any sensitive locations, or threaten breaches of air quality objectives in the future. Operational road traffic will lead to a maximum 0.3% increase on local roads, which</p>

Sustainability Criteria (SEEDA)	Assessment and Proposed Inclusions
	is an insignificant change. The emissions from operational traffic will thus have a negligible air quality effect.
7. Business	
<i>To ensure that the Facility contributes to the sustainable economic vitality of the local area and region.</i>	
Competitive Business Opportunities and Employment	
7.1 That new business space should complement and enhance those businesses already in the local area.	St. James's Gate is recognised for its iconic position within Dublin, and is an important centre for tourism in the area. The Guinness Storehouse in particular attracts over one million visitors each year. The proposed brewery development will rejuvenate the historic St. James's Gate brewery, and will contribute to the vibrancy of the area along the River Liffey corridor, which may enhance the attractiveness of the area to businesses and customers alike.
7.2 To promote business growth within regionally prioritised sectors.	The proposed significant brewery investment will ensure the retention of current employment levels of the existing Diageo Ireland site. During the construction phase of the project it is estimated that employment on-site will increase gradually over the first few months of construction, to a peak of several hundred persons and then fall gradually over the last few months as the project nears completion. It is envisaged that local contractors, services and materials will be utilised where possible. It is estimated that this construction stage will last approximately 17 months.
7.5 To create additional permanent jobs within the local area.	
7.6 To ensure that the development contributes to regeneration initiatives.	
8. Buildings	
<i>To ensure that the design of individual buildings does not undermine the sustainability of the overall development.</i>	
Specified BREEAM	
8.1 To ensure individual buildings underpin the sustainability of the development	A BREEAM scoring of 'Excellent' is targeted for the development.

17.4 Summary of Sustainability Inclusions

The proposed brewery development will achieve high levels of sustainability performance, both in terms of fulfilling strategic criteria and in terms of design and construction criteria. Key aspects of the proposed approach include:

- A brownfield development which is replacing existing brewing facilities, and which is able to:
 - maximise synergies with existing on-site infrastructure, including energy, water, material storage and security measures;
 - have no significant negative land use impact, such as on ecology or community access;
 - have an insignificant impact on traffic and transport;
 - take advantage of excellent public transport links which already exist;
- Building construction will utilise low-energy and environmentally friendly materials, minimising waste and adopting water conservation measures;
- The development will help rejuvenate the historic St. James's Gate brewery, and will contribute to the vibrancy of the area along the River Liffey corridor, which may enhance the local economy;
- High-quality design allows the proposals to avoid significant water environment impacts, achieve energy savings, and achieve beneficial visual impacts to a number of receptors to the north and west of the site;
- A layout which takes account of expandability, to ensure energy-efficient growth in the future, with least environmental impact; and
- Landscape proposals which will assist in achieving a strategic objective for the Liberties area to improve the public realm along Victoria Quay.

17.5 Conclusions

This sustainability statement demonstrates how sustainability considerations have been applied at the outline planning proposal stage, providing clear indications of intent to apply the required sustainability criteria through to detailed design and construction. These will also be carried through the operation of the proposed brewery development. This will ensure that the proposed brewery development is committed to sustainable and environmentally acceptable practices.

18.0 INTERACTION OF THE FOREGOING AND CUMULATIVE IMPACTS

18.1 Introduction

This chapter presents a summary of interactive environmental impacts within the scope of the proposed brewery development, and a summary of the cumulative impacts with future proposals in the vicinity.

18.2 Planning Context

Schedule 6 of the Planning and Development Regulations 2001, which reflects Article 3 of the EIA Directive, specifies that an EIS should include a description of the aspects of the environment likely to be significantly affected by the proposed brewery development, including in particular:

- Human beings, fauna and flora;
- Soil, water, air, climatic factors and the landscape;
- Material assets, including the architectural and archaeological heritage, and the cultural heritage; and
- The inter-relationships amongst the above factors.

It states: "A description is also required 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;
- the use of natural resources.

The EPA Guidelines define cumulative impacts as:

The addition of many smaller impacts to create one larger more significant impact.

The EPA Guidelines also employ the term 'synergistic impacts', which are defined as:

Where the resultant impact is greater than the sum its constituents.

The EU has also prepared guidelines for this area of EIA: Guidelines for the Assessment of Indirect and Cumulative Impacts as well as Impact Interactions (Office for Official Publications of the European Communities, May 1999). These Guidelines employ the following definitions:

- Cumulative Impacts: Impacts that result from incremental changes caused by other past, present or reasonably foreseeable actions together with the project; and

- **Impact Interactions:** The reactions between impacts whether between the impacts of just one project or between the impacts of other projects in the areas.

The potential for significant cumulative impacts and interactions has been addressed in the baseline and impact assessment sections of this EIS; this section provides a summary and overview of these effects.

18.3 Assessment Methodology

In the context of the guidance presented above, the assessment of cumulative and interactive impacts resulting from the proposed brewery development has employed the following definitions:

- **Interactive Impacts** - separate environmental impacts resulting from the brewery development may combine in space or time to create one or more larger, more significant impact; and
- **Cumulative Impacts** - separate environmental impacts resulting from proposed brewery development may combine with impacts from surrounding future development schemes (with similar environmental resources), in space or time to create one or more larger, more significant impact(s). Individually, the effects of a development may be of minor significance but when combined with the impact of any of the other developments proposed in the wider area the overall significance could be increased above the sum of the individual development effects.

As larger and smaller development proposals emerge within the surrounding area, cumulative impacts shall be considered to ensure that environmental capacity is not breached and any impacts are adequately foreseen and managed.

When assessing interactive and cumulative impacts, the significance of any identified impact is considered by assessing the predicted magnitude of the impact and the sensitivity of the receiving environment. The likelihood of significant interactive, cumulative or combined impacts occurring is also considered. Impacts which are considered to be significant are discussed below.

The results of the assessment will enable Dublin City Council to ensure that the proposed brewery development and other foreseeable developments in the surrounding local area are mutually compatible in relation to the environmental capacity of the area / resource on which they impact.

18.4 Interaction of the Impacts

There are a number of interactions of impact associated with the construction and operation phases, and these impacts have been assessed under the primary subject headings within this EIS. A summary of the main interactions is outlined as follows and summarised in **Table 18-A**.

18.4.1 Socio-Economic

Impacts on the human environment, including the people resident nearby, have been addressed throughout the EIS, while Chapter 6 (Socio-Economic) deals specifically with the impacts on population and settlement, land use, employment and other impacts of a social and economic nature. Separate assessments have also been carried out on the other fundamental aspects that can affect people living in the vicinity of the development.

Table 18-A: Summary of the Interaction of Impacts amongst EIA Topics for the Proposed Brewery Development

Topic which Influences those Below:	Socio-Economic			Ecology			Soils, Geology & Hydro-geology			Surface Water & Drainage			Air Quality & Climate			Noise & Vibration			Landscape & Visual			Archaeology, Cultural Heritage, etc.			Transportation			Waste			Material Assets			Sustainability								
	Theoretical Link	Construction	Operation	Theoretical Link	Construction	Operation	Theoretical Link	Construction	Operation	Theoretical Link	Construction	Operation	Theoretical Link	Construction	Operation	Theoretical Link	Construction	Operation	Theoretical Link	Construction	Operation	Theoretical Link	Construction	Operation	Theoretical Link	Construction	Operation	Theoretical Link	Construction	Operation	Theoretical Link	Construction	Operation									
Socio-Economic				X	NI	NI	X	NI	NI	X	NI	NI	X	-	-	X	-	+/-	X	-	NI	X	NI	NI	X	NI	NI	X	NI	NI	X	NI	NI	X	NI	NI	X	+/-	+/-			
Ecology	No	N	N				X	NI	NI	X	NI	NI	X	NI	NI	X	NI	NI	X	NI	NI	X	NI	NI	X	NI	NI	X	NI	NI	X	NI	NI	X	NI	NI	X	NI	NI			
Soils, Geology, etc.	No	N	N	No	N	N				X	NI	NI	X	NI	NI	X	NI	NI	X	NI	NI	X	NI	NI	X	NI	NI	X	NI	NI	X	NI	NI	X	NI	NI	X	NI	NI			
Surface Water etc.	No	N	N	X	NI	NI	X	NI	NI				X	NI	NI	X	NI	NI	X	NI	NI	X	NI	NI	X	NI	NI	X	NI	NI	X	NI	NI	X	NI	NI	X	NI	NI	X	NI	NI
Air Quality & Climate	No	N	N	No	N	N	X	NI	NI	No	N	N				No	N	N	No	N	N	No	N	N	No	N	N	No	N	N	No	N	N	No	N	N	No	N	N	No	N	N
Noise & Vibration	No	N	N	No	N	N	No	N	N	No	N	N				No	N	N	No	N	N	No	N	N	No	N	N	No	N	N	No	N	N	No	N	N	No	N	N	No	N	N
Landscape & Visual	No	N	N	No	N	N	X	NI	NI	X	NI	NI	X	NI	NI	No	N	N	No	N	N	No	N	N	No	N	N	No	N	N	No	N	N	No	N	N	No	N	N	No	N	N
Archaeology, etc.	X	+	+	No	N	N	X	NI	NI	X	NI	NI	X	NI	NI	X	-	NI	X	-	+/-				X	NI	NI	X	NI	NI	X	NI	NI	X	NI	NI	X	NI	NI	X	NI	NI
Transportation	X	+	+	No	N	N	No	N	N	X	NI	NI	No	N	N	No	N	N	No	N	N	No	N	N	No	N	N	No	N	N	X	NI	NI	X	NI	NI	X	NI	NI	X	NI	NI
Waste	No	N	N	No	N	N	X	NI	NI	No	N	N	No	N	N	No	N	N	No	N	N	No	N	N	No	N	N	X	NI	NI	X	NI	NI	X	NI	NI	X	NI	NI	X	NI	NI
Material Assets	X	+	+	No	N	N	No	N	N	X	NI	NI	No	N	N	No	N	N	No	N	N	No	N	N	No	N	N	X	NI	NI	X	NI	NI	X	NI	NI	X	NI	NI	X	NI	NI
Sustainability	X	+	+	X	NI	NI	X	NI	NI	X	NI	NI	X	-	-	X	-	NI	X	-	+/-	X	-	NI	X	NI	NI	X	NI	NI	X	NI	NI	X	NI	NI	X	NI	NI	X	NI	NI

KEY to table

X	Yes – a theoretical link exists	No	No theoretical link	NI	No relevant significant impact	-	Negative impact	+	Positive impact	+/-	Mixed impacts
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Specifically, these aspects are transportation, visual impact, noise and vibration and air quality. When all proposed mitigation measures are taken into consideration, the overall (cumulative) impact on the human environment is considered to be mildly negative (but temporary) during the construction phase and locally significant. As the proposed brewery development moves into the operational stage, this impact will cease.

This conclusion is primarily influenced by the outcome of the noise and visual impact assessments. Accordingly, a series of significant mitigation measures have been put forward to alleviate, as much as possible, impacts arising from the construction and operation of the proposed brewery development.

18.4.2 Flora and Fauna

Whilst there are no significant residual impacts on flora and fauna expected as a result of the proposed brewery development, it is worthwhile to highlight that the topics of 'soils, geology and hydrogeology', 'surface water and drainage', air quality, transportation and 'waste management' have been highly influential on the protection of wildlife and habitats. The following conditions have been inherent in the assessment of no significant impacts on flora and fauna:

- the protection of the River Liffey from pollution and siltation;
- the protection of the drainage network from over-loading by either volume of discharge or pollutant levels for later treatment;
- the protection of groundwater from pollution;
- the prevention of the spread of any waste or contaminated land or materials on the site; and
- the prevention of air-blown dust and other pollutants (including from traffic generation), which could affect the River Liffey or possibly other habitats further afield.

It has been concluded that both construction and operational mitigation proposals are adequate to avoid a significant negative impact on flora and fauna.

18.4.3 Air Quality and Odour

An assessment was undertaken to establish the baseline air quality at the site, and to consider the Development's likely impact on air quality.

A number of aspects have the potential to impact on the air quality, particularly during the construction phase. These aspects have been identified in the attached matrix as primarily being soils, geology and hydrogeology; transportation; material assets; and waste management.

Impact of these aspects on air quality may include

- Increased dust emissions as a result of disturbance of the ground and movement of soils and materials during the construction period, and
- increased pollutant emissions from either the construction or operational phases of proposed brewery development.

Having considered the individual mitigative measures required for each section, the resulting impact during construction is negligible. During the operational phase, it is concluded that the cumulative impact is neutral with minor increases of traffic pollutants on nearby roads.

18.5 Cumulative Impacts

This section considers the cumulative effects that the proposed brewery development could cause through interaction with existing activities in the area, as well as the construction and operation of future developments in the vicinity.

18.5.1 Cumulative Impacts – Existing Activities

The assessment under each topic has taken account of existing activities within the baseline research and surveys. Desktop studies under the topics of socio-economic; ecology; surface water and drainage; air quality and transportation inherently look at the way in which other aspects of the human environment influence the existing and future baseline. For example, transportation and air quality baseline is based on all other road traffic in the area.

Site surveys have also taken account of existing activities, whether through observation or through the noise monitoring which indiscriminately takes in all sound which contributes towards the background noise levels for the area.

The site is already an operational brewery in an urban environment, and the change in location is not likely to have any cumulative impact on existing activities in the area.

18.5.2 Cumulative Impacts – Future Projects

Other known future projects of a significant scale outside the scope of this development which will be undertaken in the vicinity of the proposed brewery development are:

1. Diageo Ireland: the upgrade of Gate 6 along Victoria Quay (planning permission granted) to set the barrier location further back and increased the barrier capacity of the control centre;
2. Diageo Ireland: proposal for the demolition of a 4,300 sq. m industrial building in the north-western corner of the North Site (planning permission granted);
3. Diageo Ireland: proposal for a third roaster at the existing roast house in the South Site (separate planning application);
4. Diageo Ireland: new control room and quality assurance laboratory (recently completed);
5. Planning permission granted for new / additional apartments, office and retail space along James's Street, Thomas Street and further south: includes 41 James's St., 43/44 James's Street, 45-47, James's Street, rebuild at 48, 48a, 49, 49a & 50 James's Street, Digital Hub on Thomas Street, 7 & 8, Thomas Street West, rear of 10-13 Thomas Street West, 1 Crane Street and Vat House No. 7, Crane Street (amongst others);

6. 29 - 31 Island Street (planning permission granted): demolition of existing warehouse, storage workshop and ancillary buildings and construction of a residential development of 33 apartments in a three-to-five storey block;
7. Hickeys Fabrics, opposite the River Liffey at the junction of Sean Heuston Bridge and Parkgate Street: mixed use development with offices, retail, restaurant, crèche facilities, 139 residential apartments, restaurant / cafe and new civic spaces;
8. the Windmill Site at Digital Hub, bounded by Thomas Street, James Street and Watling Street (planning permission granted); a mixed-use development comprising alterations, partial demolition and retention of a number of existing buildings on the site to create office space, retail floor space, commercial floorspace, financial services floor space, 103 student accommodation units (675 bedrooms) and associated ancillary areas, and a 181-bedroom hotel; and
9. DART Underground – proposal (funding currently deferred) for an underground rail system which includes a connection to Heuston Station from the east, passing beneath the St. James's Gate Brewery site and proposed brewery development site.

Aside from the above, other approved planning applications identified in the near vicinity relate to relatively minor or otherwise irrelevant modifications (e.g. changes of use with negligible environmental ramifications, building extensions in more distant locations, internal modifications, roof lights, etc.) and additional signage at the Diageo Ireland site. These are not likely to have any significant cumulative effects with the proposed brewery development.

1 – 4: Diageo Ireland Developments

The work in the northwest of the site including demolition of an unused industrial building and an upgrade to Gate 6 will assist in ensuring the proposed brewery development is implemented with minimal disruption to brewery operations or traffic outside of the brewery. The timing of these works is expected to be well in advance of the proposed brewery development. Despite this, in theory, there could be cumulative impacts caused by successive construction works and sites. This could include cumulative dust or noise nuisance which extends the period over which it is experienced by residents and others, or successive pollution events of the River Liffey from rainwater run-off and siltation. There could also be a cumulative and permanent archaeological and cultural heritage impact, as well as landscape and visual impact.

To mitigate the cumulative impacts, a range of construction 'best practice' measures will be put in place to limit nuisance and avoid any pollution issues. These measures are expected to be adequate to avoid a significant impact. Noise control measures such as appropriate hours of working and noise reduction measures should likewise limit the negative impact experienced, though noise generation cannot be avoided completely.

The cumulative landscape impact is not expected to be significant given the low height and industrial nature of the buildings to be removed in the northwest of the North Site.

In protection of the historic environment, the buildings proposed for demolition are all modern features with little industrial heritage value. However, there is a range of archaeological requirements on the approved developments and which are likely to be similar for the proposed brewery development. This includes that no construction or

site preparation work may be carried out on the site until all archaeological requirements of the City Archaeologist are complied with. It also includes the requirement for archaeological assessment by a suitably qualified archaeologist of all temporary and enabling works and geotechnical investigations before any site clearance or construction work commences.

A range of other measures aims to ensure preservation by record of any significant industrial heritage features discovered where preservation in situ is not possible. However, overall, the main impacts to the area will be largely external and due to views into and of St. James's Gate brewery, and it is felt that the proposed brewery development is the majority contributor to such impacts. Thus, cumulative impacts are not deemed significant by comparison to the main proposals.

The control room and laboratory currently under construction near the centre of the North Site is well hidden behind existing buildings, and thus unlikely to have a significant cumulative visual effect. Archaeological investigations were conducted and did not uncover any significant features being affected. Its relatively small scale and fit within the existing brewery mean that there will not be any further significant cumulative impacts.

5 - 6: Potential Developments in the General Vicinity (New Housing, Office and Retail), and General Capacity for New Development

A selection of projects is given, and whilst it has not been possible to check each individual project's progress towards construction completion and being made operational, there are number which have relatively recently been granted planning permission. These projects are relatively small-scale, and thus they have been assessed alongside general capacity for future development in the area.

General capacity for future development has been assessed throughout this EIS. This is evidenced as follows:

Traffic – The traffic impact assessment for the proposed brewery development has been based on the NRA's Project Appraisal Guidelines Unit 5.5 Link Based Traffic Growth Forecasting, which includes a conservative allowance for future traffic forecasts associated with possible future development in this area;

Air Quality – Partially based on the traffic assessment, however background pollutant levels have been modelled as unchanged for the opening year, 2015 – see Chapter 10. Given the urban nature of the area and city-wide policy on managing traffic (e.g. the 5 axle ban), it is considered a reasonable projection despite any future development; and

Surface Water – The surface water system has been conservatively sized for a 200-year storm and flow rates have been designed to be no greater than greenfield run-off rates as required by Dublin City Council.

7: Hickey's Fabrics Site

This development will be opposite the river from Heuston Station, and its construction programme is unknown. However, should there be any crossover, as for the developments identified above, 'best practice' construction methods are expected to minimise any significant cumulative temporary impacts posed by dust, pollutant emissions or noise nuisance. There may be slightly increased temporary traffic impacts if the developments are simultaneous, however this is not considered likely to cause any noticeable disruption.

As both this development and the proposed brewery development are on previously developed land, there is minimal potential for cumulative ecological impacts. Any potential impacts of surface-water runoff and siltation of the River Liffey from the brewery development site will be strongly mitigated, and no significant impact is expected.

Regarding cumulative impacts on the historic environment, as indicated above, there is a range of archaeological requirements which must be agreed with the City Archaeologist and complied with. Alongside measures already set out in this EIS to avoid and minimise impacts, a range of other measures aims to ensure preservation by record of any key features discovered where preservation in situ is not possible.

In terms of visual impact, the proposed orientation of the buildings at the Hickey's Fabrics Site restricts views of the proposed brewery development and there are not thought to be many individual potential receptors in terms of residential and business units. However, the proposals include a riverfront pedestrianised area and open air plaza.

Without this development, receptors along Parkgate Street adjacent to the site (namely Park Gate Place and Business Centre) are identified as receiving a 'slight positive' residual impact. It is likely that the Hickey's Fabrics Site development will screen most of the views assessed, leading to a neutral impact. However, views from those new units having a view of the site and from the riverfront are likely to receive a minimum 'slight positive' visual impact.

The considerations under 'general development' above also apply regarding operational traffic impact, air quality and surface water.

8: The Windmill Site

The most significant proposed development in the area is the Windmill Site east of Watling Street. The programme for construction of this development is currently unknown but it has been indicated it will be developed over a period stated as 'over the next decade' (Digital Hub website). Depending upon the precise phasing of the various buildings planned, the potential construction-time cumulative impacts can vary. For example, the Block D development is located in between the Emmet Buildings and the Maltings apartments along Watling Street. Also, various other projects within the site are adjacent to the Emmet Buildings. However, there are also components of the development further away.

If there is substantial overlap between the construction programmes, Diageo Ireland will liaise with the landowner and/or developer (as applicable) to minimise any combined disturbance impacts on receptors nearby. Again (as stated previously), a range of 'best practice' construction measures will minimise the proposed brewery development's contribution to temporary impacts.

Regarding cumulative impacts on the historic environment, as stated above, there is a range of archaeological requirements which must be agreed with the City Archaeologist and complied with. Alongside measures already set out in this EIS to avoid and minimise impacts, a range of other measures aims to ensure preservation by record of any key features discovered where preservation in situ is not possible.

In terms of visual impact, the key change in receptors will be at the Block D site along Watling Street. This will partially screen views from the Emmet Buildings, which have been assessed as receiving a 'slight negative' residual visual impact. The combined

impact of both developments is likely to be more severe; however the proposed brewery development's contribution towards that impact will be negligible given the adjacency and height of Block D. Therefore, no further mitigation is considered necessary.

New units at Block D are seen to include balconies and will thus receive a similar residual visual impact as experienced at The Maltings next door, which is 'slight negative'. New units further north between the Emmet Buildings and Thomas Street will be taller than the Emmet Buildings, but also more distant and substantially obscured by existing buildings. Therefore, again a 'slight negative' impact is considered likely.

The considerations under 'general development' above also apply regarding operational traffic impact, air quality and surface water.

9: DART Underground

There is no reason to suspect any cumulative impact with the proposed DART Underground, or that the proposed brewery development will prevent its implementation once the scheme is restarted. Land stability and impacts on hydrogeology will be purely an issue to be addressed by the railway development, as there will be no significant inter-linkage. The DART Underground's construction programme is deferred; therefore the potential for concurrent works is minimal.

18.6 Conclusions

The previous section has addressed the known and significant approved developments or other Diageo Ireland developments in the area. It is noted that works to the quality bus corridor on James's Street and Thomas Street are likely to improve access to the site by public transport; however it is not thought they will create any significant issues with regard to the proposed brewery development.

Based on the above assessment, the conclusions in relation to cumulative effects are:

- There will be a minor cumulative temporary construction impacts caused by an extended duration of nuisance from successive Diageo Ireland projects, however project-by-project mitigation will minimise such nuisance;
- The proposed brewery development's potential landscape and cultural heritage impacts are the key consideration over any other projects within the Diageo Ireland site, therefore the assessments and mitigation of Chapters 12 and 13 remain suitable to address impacts;
- It is unlikely that there will be significant negative cumulative temporary disruption or disturbance from the Hickey's Fabrics Site, and Diageo Ireland will stay abreast of proposals at the neighbouring Windmill Site development with an objective of also avoiding any significant cumulative temporary disturbance, or where not possible, minimising this;
- There is the potential for cumulative impacts on the historic environmental resources in the area of an unknown extent, however this potential will be minimised by working with the City Archaeologist and implementing all measures agreed such that Diageo Ireland's contribution to any negative effects is minimised;

- There is no reason to suspect any cumulative impact with the proposed DART Underground project, which is currently deferred; and
- The cumulative effects of the general capacity for future development in the area, when combined, are not significantly influenced by this project.

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19.0 SUMMARY OF MITIGATION MEASURES

19.1 Introduction

The following environmental commitments are an integral element of the EIS. Best practice and good construction practice when referred to in this chapter refer to measures contained in guidance documents which set out the practice and procedures for environmental protection during construction and operational phases of a development.

Where legislation, standards or guidance documents are referred to, it should be noted that at the time of construction or operation of the proposed brewery development, any amendments to these documents are applicable.

The purpose of this chapter is to provide a summary of the main environmental commitments under each of the headings listed. Full details of the various commitments should be obtained by reference to the individual chapters and to the EIS as a whole.

19.2 Summary

In the following tables, "G" refers to general environmental commitments, "C" denotes a commitment which refers mainly to the construction phase and "O" denotes a commitment which refers mainly to the operational phase.

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Table 19-A: General Commitment

Stage	General Commitment
C	<p>Construction Environment Management Plan (CEMP)</p> <p>A site and project specific Construction Environment Management Plan (CEMP) will be produced and implemented by the Contractor for all aspects of the construction phase. Refer to Appendix 20.2, Volume 4, for Guidelines on the suggested content of the CEMP.</p>

Table 19-B: Ecology Commitments.

Stage	Ecology Commitments
C	<p>Impacts to Habitats and Fauna</p> <p>Site Clearance</p> <p>The treeline, hedgerow and areas of scrub shall not be cut or removed between the first of March and the end of August. These are all outside the proposed development area. This is to avoid negative impacts to nesting bird species which are protected under the <i>Wildlife Act as amended</i>. If it is not practicable to limit the removal of hedgerows to this period, then it is recommended that they be inspected by a specialist for the presence of any nests immediately prior to removal. If any bird nests are present on-site, a licence will be required from the NPWS to permit their removal during the nesting season.</p>
C	<p>Impacts to Habitats and Fauna</p> <p>Breeding Gulls</p> <p>The protection of breeding Gull roosting and feeding sites is an action of the DCC BAP. Should demolitions occur during the breeding season (1st March-31st August); a specialist shall be commissioned prior to construction to survey the buildings from an elevated vantage point to confirm there are no recently established gull nests.</p>

Stage	Ecology Commitments
C	<p>Impacts to Habitats and Fauna</p> <p>Surface Water Runoff</p> <p>All surface water discharges will be subject to appropriate licensing from the DCC. Detailed pollution prevention guidance is outlined in Chapter 9. The management of surface waters shall follow the guidance set out in the CIRIA guidance note <i>Control of Water Pollution from Construction Sites</i> (CIRIA, 2001).</p> <p>The proposed drainage design (as described in the Chapter 9 of the EIS), includes comprehensive procedures for the management of surface water on the site during the construction process.</p> <p>These measures shall be formulated in a Construction Environmental Management Plan (CEMP) and agreed with Inland Fisheries Ireland.</p>
O	<p>Surface, Foul, and Water Management</p> <p>All measures concerned with the protection of the River Liffey from accidental spillages and malfunction of the proposed drainage network shall be contained within Diageo Ireland's Environmental Management Plan. Measures will include a requirement to consult with the Environmental Protection Agency, DCC, National Parks & Wildlife Service, and Inland Fisheries Ireland in the unlikely event of a toxic spillage to the surface water network, or failure of the on-site WWNP. Detailed mitigation measures are outlined in Chapter 9.</p> <p>Diageo Ireland shall agree to the removal of all Rhododendron plantings from the site, and their disposal to landfill. Diageo Ireland shall ensure that none of the known invasive species in Appendix 7.4, Volume 4, shall be planted in place of the Rhododendron.</p> <p>All existing and proposed effluent discharge is subject to monitoring and regulation under an existing IPPC licence, and the projected discharge volumes are within that permitted by the existing licence. It is the responsibility of the EPA and DCC to ensure that the water quality of the River Liffey is not significantly decreased by existing and/or future volumes discharged under the IPPC licence agreement through ongoing monitoring and regulation.</p>
O	<p>Removal of Rhododendron ponticum from landscaped areas</p> <p>Diageo Ireland shall liaise with the gardener/horticultural manager to agree the removal of all Rhododendron plantings from the site, and their disposal to landfill. Diageo Ireland shall ensure that none of the known invasive species in Appendix 7.4, Volume 4, shall be planted in place of the Rhododendron.</p>

Table 19-C: Soils, Geology & Hydrogeology Commitments.

Stage	Soils, Geology & Hydrogeology Commitments
C	Contingency measures will be put in place to deal with striking any unknown services such as old sewers, culverts etc to manage and repair without delay..
C	Contaminant testing will be undertaken on soil samples in the construction area. This will allow any potential contamination to be identified and a plan to be developed for their handling, storage and disposal.
C	Water pollution will be minimised by the implementation of good construction practices. Such practices will include adequate bunding for oil containers, wheel washers and dust suppression on-site roads, and regular plant maintenance. The Construction Industry Research and Information Association, (CIRIA) provides guidance on the control and management of water pollution from construction sites in their publication Control of Water Pollution from Construction Sites, Guidance for Consultants and Contractors (Masters-Williams et al, 2001). A contingency plan for pollution emergencies shall also be developed by the appointed contractor prior to work and regularly updated, which will identify the actions to be taken in the event of a pollution incident.
C	<p>The CIRIA document (2001) recommends that a contingency plan for pollution emergencies should address the following:</p> <ul style="list-style-type: none"> • Containment measures; • Emergency discharge routes; • List of appropriate equipment and clean-up materials; • Maintenance schedule for equipment; • Details of trained staff, location, and provision for 24-hour cover; • Details of staff responsibilities; • Notification procedures to inform the relevant environmental protection authority; • Audit and review schedule; • Telephone numbers of statutory water undertakers and local water company; and <p>List of specialist pollution clean-up companies and their telephone numbers.</p>
C	Appropriate foundation construction techniques will be adopted to comply with the requirements of statutory bodies in terms of noise, vibration, soil and groundwater contamination and disposal of contaminated material.

Stage	Soils, Geology & Hydrogeology Commitments
C	Negative impacts on groundwater can occur due to construction leading to increased amounts of leachate from the existing made ground if this material is contaminated locally. Causes of this may include increased exposure of the made ground material to rainwater due to removal of an existing paving surface, excavations, ponding and flooding. The mitigation measures described with regard to earthworks will also apply in this case. All ground disturbances or excavations will be completed and covered as soon as practical.
C	Good housekeeping (daily site clean-ups, use of disposal bins, etc.) on the project site, and the proper use, storage and disposal of many substances used on construction sites, such as lubricants, fuels and oils and their containers can prevent soil contamination.
C	Excavated materials will be inspected for potential contamination, so that the appropriate disposal route can be chosen.
C	Prevention measures will be taken to minimise the risk of mixing of contaminated materials with 'clean ground.'
C	Oil storage tanks will be bunded appropriately. Smaller quantities of these substances will be stored in suitable, secure buildings or enclosures with an impermeable floor surface.
C	Appropriate measures will be put in place to minimise the risk of soil/water contamination from re-fuelling of vehicles, e.g., re-fuelling to be undertaken in designated areas with drained hard standing, and spill kits in place. Storage tanks will either be double-skinned or stored in bunded areas.
O	Negative impacts on groundwater may occur due to the operation of the facility leading to increased amounts of leachate from the existing made ground if this material is contaminated locally. Causes of this may include increased exposure of the made ground material to rainwater due to removal of an existing paving surface during the operational phase. Adequate falls, profiling and drainage will be provided to promote safe run-off and prevent ponding and flooding. Run-off will be controlled through silt/sediment traps as appropriate to minimise the turbidity of water in outfall areas.

Stage	Soils, Geology & Hydrogeology Commitments
O	<p>Substances used during the operation of the proposed facilities, such as lubricants, fuels and oils, detergents and other chemicals are harmful to the environment. In most cases, good housekeeping (daily site clean-ups, use of disposal bins, etc.) and the proper use, storage and disposal of these substances and their containers can prevent soil contamination. Oil storage tanks will be sited on bunded hard standing. Smaller quantities of these substances will be stored in suitable, secure areas with an impermeable floor surface.</p>

Table 19-D: Surface Water & Drainage Commitments.

Stage	Surface Water & Drainage Commitments
C	<p>It should be noted that all mitigation measures included within this chapter will be included within the Contractor's Construction Environmental Management Plan (CEMP) and approved in advance of construction with appropriate stakeholders including the EPA.</p>
C	<p>All measures will aim to ensure that the River Liffey is not adversely affected and does not result in unacceptable deterioration in its water quality. This will contribute towards achieving the objectives of the WFD 2000/60/EC (refer to Section 9.2). Diageo Ireland will be required to:</p> <ul style="list-style-type: none"> • Prepare an Emergency Response Plan (ERP) detailing the contingency measures and procedures to be undertaken in the event of a spillage, pollution incident, a fire or other non-compliant incident. Contingency plans will be regularly updated and will detail actions to be taken in the event of pollution and general process drainage emergencies. The plans and method statements will identify any actions to be taken in the event of a pollution incident or a negative impact on the WWNP. This will be in conjunction with the Contractor's CEMP. The ERP will include a protocol for immediate consultation with the EPA, DCC, National Parks & Wildlife Service and Inland Fisheries Ireland in the event of a toxic spill to the surface water network or failure of the WWNP. • Prepare a specific strategy and detail the proposed safeguards to protect the River Liffey and underlying groundwater within the site considering the anticipated sources, pathways, volume and impact of potential pollution. • Ensure staff are trained in the implementation of the Emergency Response Plan and the use of any control equipment as necessary. • Prepare method statements for the control, treatment and disposal of potentially contaminated surface water, the works involved in connecting to the WWNP and excavation works through existing structures, as required. • Prepare a site construction drainage plan for review. The plan will include the location of all existing and proposed surface water protection measures, including for example monitoring points, sediment traps, contained settling basins, interceptors and wheel wash facilities.

Stage	Surface Water & Drainage Commitments
	<ul style="list-style-type: none"> Implement good housekeeping measures on-site such as daily site clean ups, use of disposal bins etc., though the proper use, storage and disposal of substances and chemicals used on construction sites.
C	<p>Best practice will be followed to control water pollution and avoid negative impact on the operation of the existing WWNP and inappropriate discharges to the receiving sewerage system. Pollution control measures and strategies will follow best practices outlined in:</p> <ul style="list-style-type: none"> CIRIA Reports R164 (1997) Design of Containment Systems for the Prevention of Water Pollution from Industrial Accidents; CIRIA C532 (2001) Control of water pollution from construction sites; CIRIA C648 (2006a) Control of water pollution from linear construction projects – Technical Guidance; and CIRIA C649 (2006b) Control of water pollution from linear construction projects – Site Guide.
C	<p>The location of temporary facilities will be carefully planned to minimise potential impacts, i.e. truck wash facilities, toilets and site compound, and areas of chemical and fuel storage will be carefully located, managed and bunded.</p>
C	<p>Oil, chemical and fuel storage tanks will be bunded appropriately and sized in accordance with best practices to ensure containment of the spill in the event that the tank or containment vessel bursts or leaks. Furthermore, storage will be either double skinned or more likely stored in bunded walled areas that are fully sealed.</p>
C	<p>Diesel pumps and static plant in drip trays will be located as far as practically possible away from the surface water drainage network. Refuelling and minor servicing of plant and machinery will be confined to designated areas which will comprise impermeable surfacing and be suitably bunded with spill kits in place.</p>
C	<p>Major servicing of plant and machinery shall be conducted off site where applicable or on impermeable surfacing where any pollutants can be contained.</p>
C	<p>Any contaminated/hazardous material if found will be appropriately removed from site by a specialist Contractor and tipped in the appropriate land fill depending on the nature of the material.</p>
C	<p>All stockpiled material will be constructed no more than 2 m high to limit erosion, located away from drains and will be provided with stabilisation measures, as required, to ensure runoff does not cause erosion and sediment transfer.</p>

Stage	Surface Water & Drainage Commitments
C	Surface water flowing onto the construction area will be minimised through the provision of berms and diversion channels as appropriate in order to keep the work surface dry and prevent mixing and runoff of contaminated waters. Where appropriate, surface water from surrounding yard areas will be diverted around the active works area.
C	Where feasible any permanent works that can be installed up front as part of the temporary works, e.g. services and roads, will be undertaken thereby avoiding the requirements for any re-excavation works and potential pollution from silt.
C	Open trenches will be closed and stabilised as soon as possible and the works will be phased so that open portions of the trench are closed before new trenching is started. Fill material will be placed, compacted and finished in a manner that will suppress dust.
C	All plant and equipment wash-water and wastewater, including concrete waste waters and discharge from wheel wash facilities, will be discharged to the appropriate drainage systems as described in Sections 9.4.
C	<p>Monitoring</p> <p>Site plant including pumps and compressors will be routinely monitored and their contents removed and appropriately discharged.</p> <p>Routine water quality monitoring will be conducted at the surface water outlet as soon as it is connected to the receiving surface water sewerage system. Diageo Ireland will ensure that the Licence Emission limits are not exceeded and implement appropriate measures in the event of non-compliance.</p> <p>This monitoring regime will ensure that only uncontaminated drainage and runoff is discharged to the WWNP. The parameters to be monitored are those specified within the IPPC Licence. Refer to Chapter 15 for further mitigation measures relating to discharges from the proposed brewery development to the WWNP.</p> <p>Water quality will continue to be monitored during the construction phase at emission points SE-1 and SW-1 and at the upstream and downstream monitoring locations ASW-2 and ASW-3, at the monitoring frequency specified within the IPPC Licence or as agreed with the EPA. This will help to ensure current water quality and effluent discharge concentrations / volumes are at least maintained and corrective action taken in the event of non-compliance.</p> <p>All permanent surface water drainage pipes and manholes will be appropriately tested during construction. This will include testing and routine inspection of any temporary systems by the Contractor to ensure these temporary systems are suitable and operating effectively.</p>
O	Certain mitigation has been employed through the iterative design process, as summarised in Section 9.4 and as described in the Drainage Report at Appendix 9.1, Volume 4. During operation of the proposed brewery development, additional mitigation measures will include:

Stage	Surface Water & Drainage Commitments
	<ul style="list-style-type: none"> • Restricting/controlling the rate of surface water runoff from the site and Sustainable Urban Drainage Systems (SUDS), including a silt/petrol/oil separator on the surface water disposal stream and an underground combined retention/firewater tank. • A non-return valve will be installed on the existing surface water system to ensure the River Liffey does not surcharge or contaminate the proposed site drainage during high tide or flood events.; • Compliance with relevant site drainage strategy and DCC and EPA specifications, including IPPC Licence conditions; • All areas containing and storing bulk chemicals or oils will be bunded. Runoff that is tested to be uncontaminated will be directed to the process sewer and WWNP. The surface water attenuation system will serve to alarm in the event of any contamination being detected prior to discharge. • Water quality will continue to be monitored during the operational phase at emission points SE-1 and SW-1 and at the upstream and downstream monitoring locations ASW-2 and ASW-3, at the monitoring frequency specified within the IPPC Licence or as agreed with the EPA; • Water quality monitoring equipment will be connected to a penstock shut off valve which will ensure that any contaminated runoff is detected and fully retained in the combined attenuation/firewater retention tank. As stated above, uncontaminated water will be directed to the on-site WWNP for pH balancing, otherwise will be managed through the attenuation system; • Regular inspection and maintenance of all surface water drains, petrol interceptors and attenuation tanks; • Regular inspection and maintenance of all foul and effluent drainage systems including the alarm systems; and • Testing and monitoring of the surface water and process effluent drainage systems will be carried out regularly to ensure the integrity of the system is maintained during plant operation. This procedure will be completed routinely by Diageo Ireland as well as in accordance with the testing regime and frequency outlined in EPA guidelines.

Table 19-E: Air Quality and Climate Commitments.

Stage	Air Quality and Climate Commitments
C	<p>The only likely significant air quality impact during construction will be the generation of dust. The CEMP will ensure that any potential emissions arising from dust during the construction phase will be mitigated. Typical elements of such a program are set out below and could be used during construction of this development.</p> <p>(i) Minimise Fugitive Dust Emissions from Material Storage</p> <ul style="list-style-type: none"> • The cut and fill programme can be designed to minimise internal site movement of material. All handling areas shall be maintained in a dust free state as far as is practicable. Sprinklers and hoses can be used to minimise any dust escape from site boundaries. • Stockpiles of dusty materials shall be damped down using water sprays during dry weather. • Procedures shall be established so that the site is regularly inspected for spillage of dusty or potentially dusty materials and any such spillage dealt with promptly. <p>(ii) Ensure that Dust from Vehicle Movements within the Site are Minimised</p> <ul style="list-style-type: none"> • Access to the site shall be from a single location. Roads shall be kept free of dust and cleaned as far as practicable. • Routes shall be regularly damped down using water bowsers during periods of dry weather as necessary. • Appropriate speed limits shall be established and enforced over all unmade surfaces. • Wheel washing facilities shall be installed as necessary and heavy vehicles leaving the site will be required to use the installations as appropriate. <p>(iii) Implement Appropriate Cleaning of the Public Highway</p> <ul style="list-style-type: none"> • Subject to approval from DCC, the public highway immediately outside the site entrance shall be cleaned using vacuum sweeper brushes and other specialised road cleaning equipment as necessary to maintain an appropriate state of cleanliness. <p>(iv) Monitor Compliance with this Code</p> <ul style="list-style-type: none"> • Contractors shall be required to set up their own monitoring programme to evaluate compliance with this code. <p>All policies, practices and procedures shall be periodically reviewed to ensure their appropriateness.</p>

Stage	Air Quality and Climate Commitments
O	The greatest contribution to mitigating the energy consumption of the development will rely on the building design and construction. The technologies selected to provide its energy requirements will determine the actual emissions of air pollutants. Of the possible sources of fossil fuel energy for the development, natural gas is likely to emit the smallest quantity of combustion by-products relative to other fuel options. As the Energy Centre will continue to operate under IPPC Licence 301-01, the carbon emissions of the developed development are not expected to increase significantly. However, as a result of improved processing technologies in the proposed brewery development, the carbon footprint per unit of product is expected to decrease.
O	There will be a change to the grain-handling process, which has the potential to emit dust however; this will be mitigated by appropriate design.
G	<p>Odour Mitigation</p> <p>The brewing processes proposed will represent the 'state-of-the-art' in terms of brewing technology. As such, the proposed plant will be more advanced than the existing brewery, in terms of minimising odorous emissions to atmosphere. For example, the wort kettles will vent for a much shorter time than is the case with older technology. The proposed brewhouse will be an integrated design, replacing a brewhouse which developed in vessel capacity and brew lines over a period of approximately 40 years.</p> <p>In addition, several of the new brewhouse stacks are increased in elevation to ensure that any brewing odours are diluted and dispersed.</p>

Table 19-F: Noise & Vibration Commitments.

Stage	Noise & Vibration Commitments
C	All construction work will be undertaken to the guidance in BS 5228: 2009 – <i>Code of practice for noise and vibration control on construction and open sites, Part 1: Noise and Part 2: Vibration.</i>
	The construction noise assessment has demonstrated that it is likely that the noise generated during what is considered to be worst-case construction conditions, has the potential to exceed the NRA guidance noise levels at the nearest sensitive receptors. However, it should be noted that the scenarios considered represent the worst case activities and will be in operation for a short number of weeks each, and less time still at individual locations (such as the water treatment area).
C	<p>BS 5228 gives guidance on construction best practice, which should be considered in order to mitigate potential noise impact. Mitigation measures for the construction phase may include:</p> <ul style="list-style-type: none"> • Fitting of more efficient exhaust sound reduction equipment to earth moving plant where possible;

Stage	Noise & Vibration Commitments
	<ul style="list-style-type: none"> • Fitting more efficient sound reduction equipment to compressors and generators; • Pneumatic tools to be fitted with suitably designed muffler or sound reduction equipment to reduce noise without impairing efficiency; • Ensuring that air lines to pneumatic equipment do not leak; • Enclosures or screens to minimise noise from pneumatic tools, pumps and other static plant to noise sensitive receptors; • Optimising haul roads to minimise noise emissions to noise sensitive receptors; • Switching off plant and equipment when not in use; • Machinery required during the night to be fitted with acoustic screening.
C	<p>When a construction contractor has been appointed, further construction noise predictions shall be made when the construction programme and actual plant and equipment to be used are known.</p>
O	<p>In order to mitigate the potential noise impact from the rooftop AHUs and Evaporative Condensers, a rooftop screen has been considered for the evaporative condensers on top of the VQ Plant building, which will be incorporated into the facility design. Additional mitigation has been applied including the incorporation of many Air Handling Units within the building enclosure.</p>
O	<p>Forklifts operating in the Camac Yard area will incorporate alternative reversing alarms to the standard pulsed alarm to reduce sound impact.</p>

Table 19-G: Landscape and Visual Impact Commitments.

Stage	Landscape & Visual Impact Commitments
C & O	<p>The effect of the design and layout is to propose a development that though large in scale, respects its setting by establishing what will be an aesthetically considered series of buildings of good architectural quality using modern cladding materials and colours that are consistent, i.e. simple black, white and grey. The high-quality modern architectural design proposed for the brewery development is consistent with other new buildings within the River Liffey corridor including the new Court House and Park Gate Place on Conyngham Road and the large office block on St. John's Road West.</p>

Table 19-H: Cultural Heritage Commitments.

Stage	Cultural Heritage Commitments
C	<p>Archaeological Heritage Mitigations</p> <p>Where preservation <i>in situ</i> is not feasible, preservation by record is recommended to mitigate identified impacts. This methodology is in accordance with the principles and recommendations outlined in the 'Framework and Principles for the Protection of the Archaeological Heritage' (DAHGI 1999, 25). Preservation by record consists of fully recorded investigations in the field, followed by analyses, reporting and publication. The information gained will be widely disseminated by a series of printed and internet publications for the benefit of scholars and the general public.</p>
	<p>Archaeological testing through trial trenching is proposed ahead of development in the north-eastern part of the site to confirm the presence or absence, nature and sensitivity of any archaeological remains that may be present and assessment of the significance of impact, and allow the design of appropriate works to mitigate identified impacts, possibly including resolution excavation.</p>
C	<p>In addition to the archaeological trial trenching described above, archaeological monitoring of all ground breaking works and excavations is also proposed, followed by resolution excavation if required. This measure is also designed to mitigate the impacts on Sites 15, 72, 73, 74, 75 and 76.</p>
C	<p>Archaeological monitoring involves an archaeologist being present 'in the course of the carrying out of development works in order to identify and protect or record archaeological deposits, features or objects which may be uncovered or otherwise affected by the works.' (DAHGI 1999, 28) Where archaeological features or deposits are exposed during monitoring, construction work is suspended while they are preserved 'by record' through resolution excavation.</p>
C	<p>Trial trenching, monitoring and resolution excavation (if necessary) requires a licence from the National Monuments Service of the Department of Arts Heritage and the Gaeltacht, following the provisions of the National Monuments Acts. In applying for the appropriate Licences, detailed method statements for the proposed works will need to be approved by the National Monuments Service, the National Museum of Ireland and agreed with the Dublin City Archaeologist.</p>
C	<p>All archaeological works also require a stage of post fieldwork assessment, analysis and reporting. All archaeological reporting shall be undertaken in accordance with the 'Guidelines for Authors of Reports on Archaeological Excavations' published by the National Monuments Service of the Department of Arts, Heritage and Local Government in 2006.</p>
C	<p>Architectural Heritage Mitigations</p> <p>It is proposed that the Conservation Officer is consulted on the methods and materials employed for the refurbishment of the boundary wall and Guinness Building (Sites 6 and 7), and also on the design and appearance of the dummy gates.</p>

Table 19-I: Transportation Commitments.

Stage	Transportation Commitments
C&O	<p>Upgrade Victoria Quay Access</p> <p>Diageo Ireland was recently granted planning permission (2655/11) to upgrade their existing security arrangements for the entrance from Victoria Quay. The upgraded entrance has set back the barrier location and increased the barrier capacity of the control centre and this will eliminate trucks backing up and blocking the adjacent Bus Lane along Victoria Quay. This upgrade will facilitate the increased volume of traffic associated with the proposed brewery development and will improve safety on entry to the brewery.</p>
C&O	<p>Upgrade to an Existing Facility</p> <p>The proposed brewery development is not a standalone development; it is an integral part of a large processing complex. The new facilities will not require a significant number of additional operational staff compared to those who already serve the existing facility.</p>
C&O	<p>Mobility Management</p> <p>The proposed brewery development is located within the centre of Dublin City and the site is very accessible by many travel means including walking, cycling and public transport. The area is well served by a mature residential catchment and there is a significant choice in accommodation located within a 20-30 minute walk of the development.</p> <p>Existing staff within the Brewery are provided with high quality accesses to a multitude of public transport facilities including the Mainline Train Station at Heuston and the LUAS stops at St. James's Hospital and Heuston Station and a number of Dublin Bus routes including No. 66, No. 67, No. 25, No. 26, No 51B, No. 123. James Street which is located to the south of the North Site has bus priority measures provided for in the vicinity of the existing Brewery.</p>

Table 19-J: Waste Management Commitments.

Stage	Waste Management Commitments
C	<p>A Construction Waste Management Plan (CWMP) will be developed as part of the Contractor's Construction Environmental Management Plan (CEMP) which will define a structured approach to the management, and recycling of waste on-site and identify licensed waste management contractors.</p> <p>The CWMP objective will be to provide better control of the regulatory risks relating to materials and wastes generated on-site with the result that any queries from the EPA can be dealt with effectively. This will be prepared as per the <i>Best Practice Guidelines Projects on the Preparation of Waste Management Plans for Construction and Demolition Projects</i> which is available from the Department of Environment, Community and</p>

Stage	Waste Management Commitments
	<p>Local Government.</p> <p>These guidelines outline, among other recommendations, that waste can be minimised by:</p> <ul style="list-style-type: none"> • Ensuring the correct volume of materials is ordered for the work to be undertaken and storing the materials appropriately to avoid contamination or deterioration; • Co-ordinating with other contractors or developers in the supply of materials and services to avoid repeated deliveries or excavations; and • Ensuring when preparing contracts for demolition and construction operations that clauses are included requiring the reuse of materials where practicable. <p>The CWMP will include:</p> <ul style="list-style-type: none"> • the organisation of the contractor’s approach to waste management including permit details (etc.); • the identification of disposal sites; • the identification of quantities to be excavated and disposed of; • the identification of measures to prevent nuisance; • the identification of the amounts intended to be stored temporarily on-site and the location of such storage; • the identification of intended transport means for materials; • procedures for dealing with Waste Management including liaison with third parties, statutory bodies, undertakers and other companies; • procedures for the provision of documentation necessary to instigate and maintain an Environmental Management System (EMS); • procedures for the control of off-site activities associated with the Waste Management Plan; and • procedures for the management review/audits to monitor and demonstrate control over the implementation of the CWMP.
○	<p>It is envisaged that the management of the recyclables, green waste and food wastes during the operation of the site will be undertaken through an EMS for the proposed brewery development, currently used to manage environmental performance. In addition the following measures will be put in place:</p>

Stage	Waste Management Commitments
	<ul style="list-style-type: none"> • In the event of spillages or contaminated material entering the surface water drainage system, appropriately located automatic TOC monitoring stations will alarm and trigger operational intervention to cease discharge. This will contain the contaminated runoff within the combined attenuation/firewater retention ponds. The surface water protection measures are discussed further in Chapter 9; • Product will be stored in contained storage vessels or kegs which will limit spillages; and • The on-site WWNP will adjust the pH of the process effluent prior to discharge to the sewers to comply with the IPPC Licence.

Table 19-K: Material Assets Commitments.

Stage	Material Assets Commitments
C	<p>It should be noted that all construction strategies will be in accordance with the 'Construction Management Plan' and approved in advance with appropriate stakeholders. The strategies outlined shall also strictly adhere to available best practices; specific reference is made to CIRIA Reports C532 and C648.</p>
C	<p>Prior to Construction</p> <p>Prior to construction commencing the Contractor shall be required to:</p> <ul style="list-style-type: none"> • Liaise with Diageo Ireland with respect to the operation of the existing WWNP and prepare method statements for the works involved in connecting to the existing 'live' pumping station at the WWNP; • Prepare method statements for the works involved in carrying out any excavations through any existing structures (etc.); • Prepare an Emergency Response Plan detailing the procedures to be undertaken in the event of a spill of chemicals, fuels, oils, hazardous materials and wastes, a fire or other non-compliance incident. This plan shall operate in conjunction with the Contractor's Construction/Environmental Management Plan for the site; • Prepare a specific strategy and detail the proposed safeguards to protect the River Liffey and underlying ground water within the site development area considering the anticipated sources, pathways and impact of potential pollution; and • Ensure staff are trained in the implementation of the Emergency Response Plan and the use of any control equipment as necessary.

Stage	Material Assets Commitments
	<p>The contractor's construction proposals shall be in accordance with the approved Construction Environmental Management Plan and approval for any departures from agreed procedures shall be sought and agreed prior to the commencement of the Work.</p>
C	<p>The potential for negative impact on the operation of the existing WWNP and inappropriate discharges to the receiving sewerage system shall be controlled during the construction works by the implementation of good construction practices. These practices will include adequate bunding and containment of oil containers, fuels and hazardous liquids (etc.). Moreover, regular plant maintenance will be undertaken to ensure no leakages.</p> <p>Pollution control measures shall follow the best practices outlined in the Construction Industry Research and Information Association, (CIRIA) guidance on the Control and Management of Water Pollution from Construction Sites in their publication Control of Water Pollution from Construction Sites, Guidance for Consultants and Contractors.</p>
C	<p><i>Contractor's Role and Responsibilities</i></p> <p>As part of his duties and responsibilities, the Contractor shall provide comprehensive method statements planning their foul and process effluent drainage works around the site. As part of this work, pollution control measures and strategies to protect existing 'live' process drainage systems on the site shall be developed and implemented in accordance with appropriate standards and requirements.</p> <p>Good construction management practices shall be employed and the Contractor shall adhere to the provisions set out in the CIRIA guidance note on the control and management of water pollution from construction site, "Control of Water Pollution from Construction Site", 2001.</p>
C	<p><i>Contingency and Response Plans</i></p> <p>Furthermore, contingency plans for pollution and general process drainage emergencies shall also be developed by the appointed Contractor prior to any works commencing on-site. These plans shall be regularly updated and tailored to suit all specific conditions. The plans and method statements shall identify any actions to be taken in the event of a pollution incident or a negative impact on the existing WWNP.</p> <p>In preparing the contingency plans and method statements, the Contractor shall ensure that the items listed previously for Surface Water drainage construction are addressed and adequately covered for Foul and Process water drainage construction.</p>
C	<p><i>Housekeeping and Inspection</i></p> <p>The contractor shall demonstrate and implement good housekeeping measures (daily site clean-ups, use of disposal bins, etc) on the site, as set out in the previous Surface Water drainage construction section.</p>

Stage	Material Assets Commitments
C	<p><i>Bunding and Storage</i></p> <p>Oil storage tanks shall be bunded appropriately and be sized as set out in the previous Surface Water drainage construction section.</p>
C	<p><i>Contaminated Soil</i></p> <p>In the event of any evidence of soil contamination being found during work on-site, the appropriate remediation measures shall be employed as set out in the previous Surface Water drainage construction section.</p>
C	<p><i>Construction Site Activities and Facilities</i></p> <p>Refuelling and minor servicing of plant and machinery shall be confined to suitably located and designated areas as set out in the previous Surface Water drainage construction section.</p>
C	<p><i>Control of Runoff</i></p> <p>Any run-off entering excavations for foul and process effluent drainage works shall be collected as set out in the previous Surface Water drainage construction section.</p>
C	<p><i>Temporary Haul Routes</i></p> <p>Haul routes will be set up as set out in the previous Surface Water drainage construction section.</p>
O	<ul style="list-style-type: none"> • A range of mitigation measures have been developed to address issues connected with the discharge of process effluent from the proposed brewery development to the existing WWNP. These measures are outlined elsewhere in the EIS documentation. With respect to the operation of the process effluent drainage systems, during plant operation, the following mitigation measures shall be included in the design of the systems: • The process effluent drainage system shall be regularly checked and monitored to ensure that the integrity of the system is maintained during plant operation. The proposed 'dry' manhole inspection chambers shall be used to facilitate safe access for inspection and confirmation of the drainage pipework condition; • Access hatch boxes shall be included in the 'dry' manhole inspection chambers. This facility will allow easy and safe access for regular manual inspection of the internal condition of the chambers and where necessary, CCTV camera insertion into the pipework; • Appropriate expansion and contraction couplers shall be incorporated into the 'dry' manhole inspection chambers to facilitate longitudinal thermal movement arising during different stage of flow through the pipework. The design of the fitting installation shall facilitate ease of removal and replacement where necessary; and • Surface water run-off from specific areas, considered to be of greater risk than other surface water areas on-site shall be directed to the process sewer and WWNP.

Stage	Material Assets Commitments
O	<p>With respect to the operation of the foul drainage systems during plant operation the following mitigation measures shall be included in the design of the systems:</p> <ul style="list-style-type: none"> • Bolt-down covers will be provided and maintained on any foul manhole chamber(s) located on the existing low yard areas immediately south of the Victoria Quay boundary wall – to prevent overspill of sewage on to the yard area during back-up of the public sewerage system; • A non-return valve shall be provided on the inlet to the outfall/disconnecting manhole inside the site boundary to prevent backing up of the public sewerage system into the foul drainage network for the development. This valve shall be regularly inspected and maintained in working order; • An interceptor trap shall be incorporated into the outlet from the final/disconnecting manhole to prevent sewer gases entering the foul drainage system for the development; • The foul drainage network shall be vented to a safe level to allow for the passage of foul drainage gases to air; and • Fats oils and grease interception shall be provided in food preparation areas to prevent outflow to the public sewerage system. Accumulated grease shall be collected and disposed in accordance with the Waste Management act and the requirements of DCC.

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