ARCHITECTURAL DESIGN STATEMENT

RESIDENTIAL DEVELOPMENT AT THE JUCTION OF HAWKE'S ROAD & BISHOPSTOWN ROAD, BISHOPSTOWN ROAD, BISHOPSTOWN, CORK CITY

PREPARED BY:

DEADY GAHAN ARCHITECTS

Contents

1.0 Introduction

This Architectural Design Statement has been prepared by Deady Gahan Architects for the proposed residential development at the junction of Hawke's Road & Bishopstown Road, Bishopstown Road, Bishopstown, Cork City. It is proposed that the site will accommodate a total of 67 residential units. See schedule below for a full breakdown of the unit mix.

This statement summarises the reasoning and design principles that have led to the proposed arrangement. It describes the site and its immediate and wider context and demonstrates how the design responds to its surroundings to provide an appropriate, sustainable and site-specific response.

The layout approach taken provides a mix of residential units ranging from: 1-2 bed apartments and 2-3 bed townhouses. This proposed mix will provide a good range of residential units to meet the varying requirements of the end user and satisfy housing requirements of the area.

SCHEDULE

SITE AREA | 10604 sq.m | 1.06 HA

TOTAL UNITS | No. 67

APARTMENTS | No. 27:
- No. 10 | 1 bed UNITS
- No. 17 | 2 bed UNITS

TOWNHOUSES | No. 40
- No. 34 | 2 bed UNITS
- No. 06 | 3 bed UNITS

DENSITY | 63.2 units/HA (67units/1.06HA)

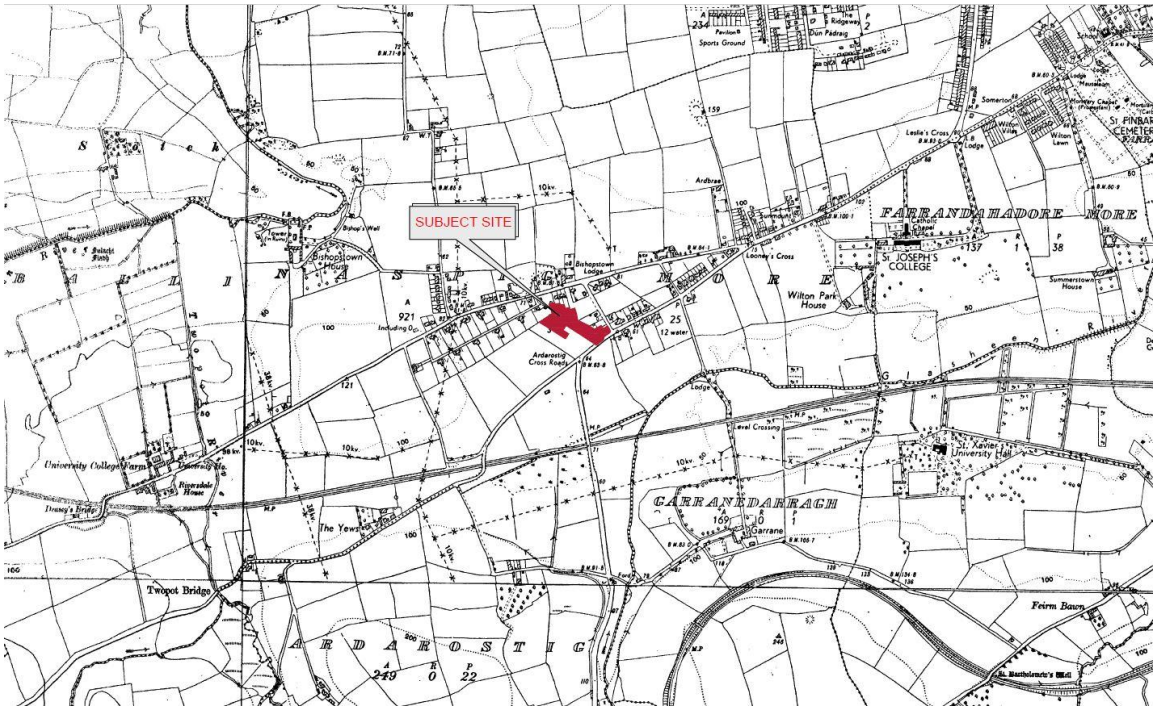
OPEN SPACES | 13.6%

car park spaces | No. 23
bike spaces | No. 34
bins | No. 16

2.0 Site

2.1 Site Location

The development site, measuring approximately 1.06 hectares, is located at the junction of Hawke's Road & Bishopstown Road, Bishopstown Road, Bishopstown, Cork City, in a medium density residential area. Bishopstown is a southwestern suburb of Cork City. The site is around 4 km from the City Centre (to the east) and 7 km from Ballincollig (to the west). The site is accessed via the Bishopstown Road to the south east of the site, with easy access to the N40 national road.



The site entrance is 200m from the nearest bus stop (with routes to Cork City Centre, Douglas, Mahon Point, CIT, Cork University Hospital, Cork Airport, Bandon, Bantry, Clonakilty and Skibbereen). It is within walking distance (1km) of a range of public amenities in Wilton and Bishopstown; including Wilton Shopping Centre, Dunnes Stores Bishopstown, Cork University Hospital, Cork Institute of Technology and various recreational sporting grounds.

2.2 Site Suitability

The site is located in close proximity to Wilton and Bishopstown which provide an abundance of local amenities that will be easily accessible for the residence of the scheme.

The location of the site promotes cycling, walking and the use of public transport which will encourage future residence towards sustainable modes of transport as an alternative to car use. The site is approximately a 20 minute walk from Wilton Shopping Centre and is located a short distance from a bus stop which provides regular services into the City Centre.

The topographical nature of the site lends itself to development with the layout a direct response to the existing natural features on site. Due to the proportions of the site the development offers a unique opportunity to create a prominent new frontage onto Bishopstown Road which will enhance the grain of the area.

2.3 Characteristics

Access to the development site is achieved from Bishopstown Road. The site is an infill development located in the middle of an urban block made up mostly of detached and semi-detached houses. The south-eastern boundary faces Bishopstown Road.

The setting influences the project with the rear amenity space of the units placed along the site boundaries providing a separation distance that prevents overlooking.

The proposed layout is designed to respond positively to the existing context of the site. The form, architecture and landscape are consistent and compatible with the area. The development will form a new identity and contribute positively to the immediate and wider context.

2.4 Aerial Photos

Aerial View – North

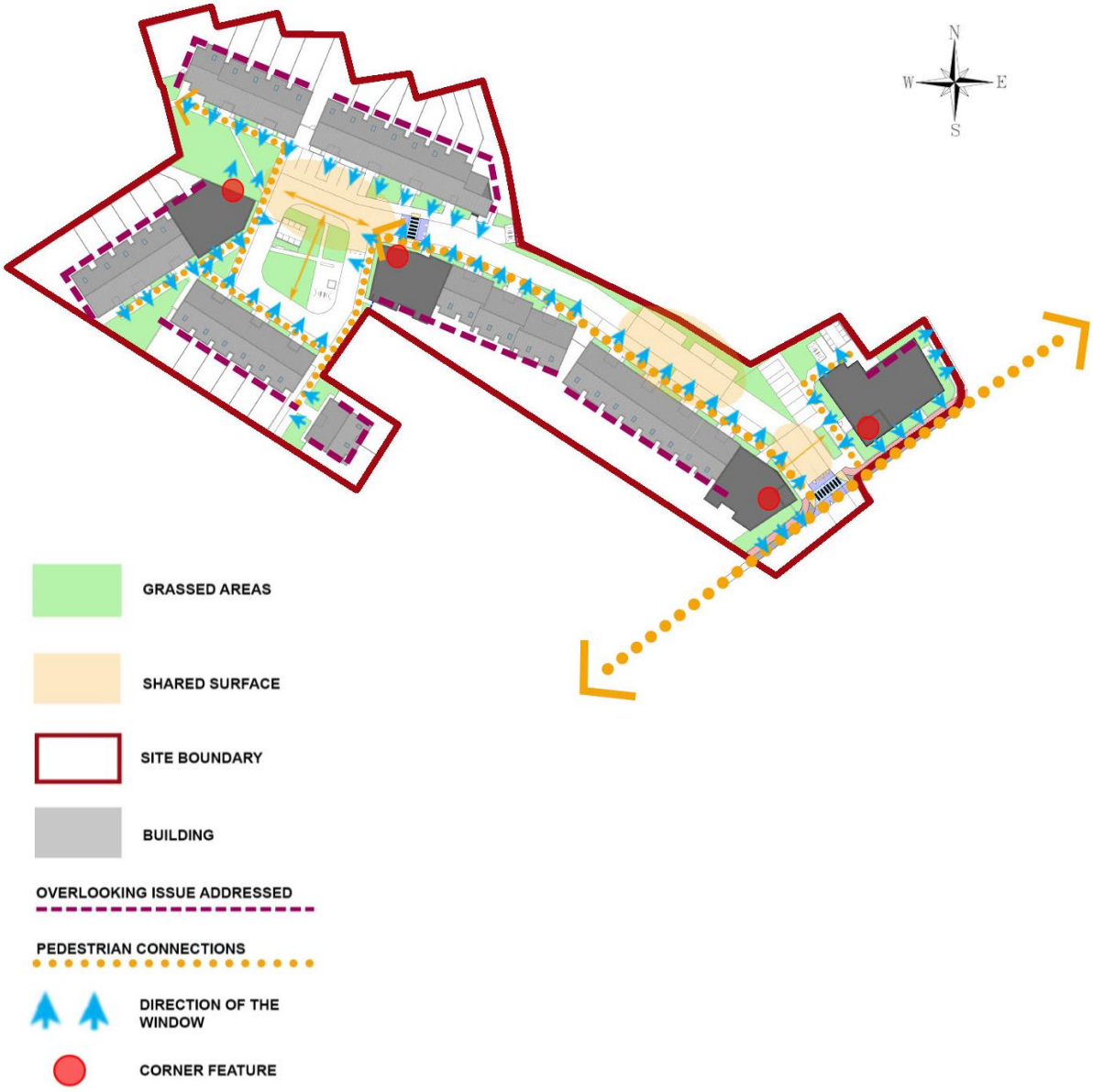
Aerial View – East

Aerial View – South

Aerial View – West

3.0 Site Strategy

The proposed layout has been designed as a direct response to the existing context and the natural features that are present on site. Pedestrian connections between the site entrance and the on-site amenities will create an inclusive development that is accessible for all. The scheme will create a new street frontage onto Bishopstown Road which will improve the visual amenity of the area. Units are positioned around the open spaces which promotes physical interaction between the residences and will create a sense of place within the development. This also allows for the passive surveillance of these amenity spaces.



4.0 Development Plan Objectives

The subject site is currently zoned for *'Residential, Local Services and Institutional Uses'* in the Cork City Development Plan (CCDP) 2015 -2021.

The CCDP outlines that housing is essential to achieving a good quality of life and makes it a key objective of the plan to achieve a diversity of housing in self-sustaining communities. The proposed scheme wholly meets the objective in terms of diversity as it is designed specifically to meet the needs of its future occupants and contains a diverse mix of unit types [apartments and townhouses] and unit sizes 1-3 bedrooms.

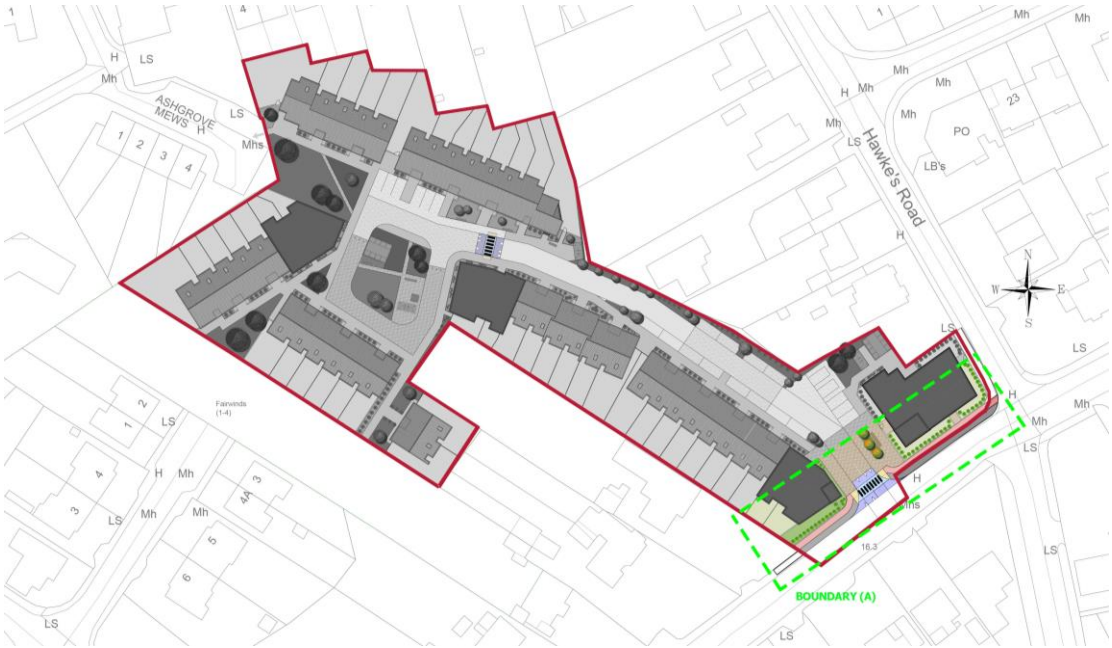
(Please note that Section 4.0 'Development Plan Objectives' contains information supplied by Total Planning Solutions. Please refer to the Planning Report for further information)

5.0 Design Considerations

The development as designed is considered under the 12 criteria as outlined in the Urban Design Manual for residential developments.

5.1 Context - Boundary conditions

To the north east, north west and south west the site is surrounded by adjoining residential dwellings. The units have been stepped back from the boundary an adequate distance to ensure that there is no impact on the private amenity space of these dwellings. Where there is an existing boundary, this will be retained and supplemented where required. In areas where there is no current boundary a 1.8m high block wall is proposed. The entrance to the site is located in the south east corner of the site from Bishopstown Road.



Boundary Key

Boundary (A) Proposed Units / Public Road– South East Boundary

A new street frontage onto Bishopstown Road is proposed which will improve the visual amenity of the area. A feature is made of the entrance by positioning 3 storey corner elements in this location. This subtle increase in scale adds an element of variety to the architectural treatment and streetscape in which they are set.

Bishopstown Road - Contiguous Elevation

5.2 Access & Connections (DMURS) - Consideration 2

The proposed development has been designed in accordance with DMURS in order to create a development with an urban feel whilst also creating a safe environment for all road users. The proposal provides attractive connections for pedestrian, cyclists and vehicles. The proposed development is easily accessible to all amenities within the area. A series of pedestrian footpaths will connect dwellings on site to the site entrances.

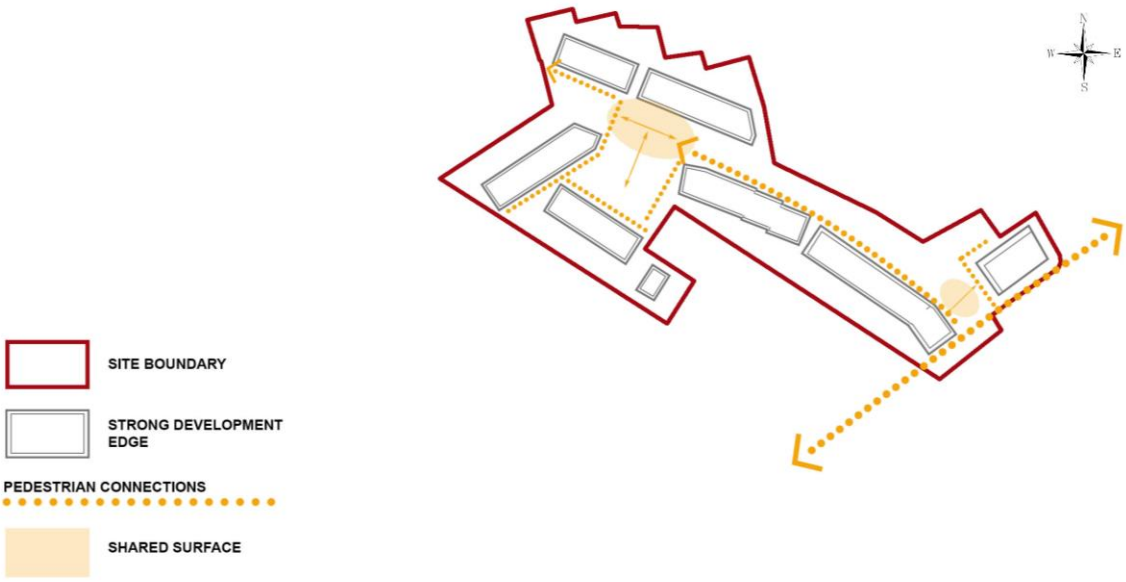


Diagram – Pedestrian Connections

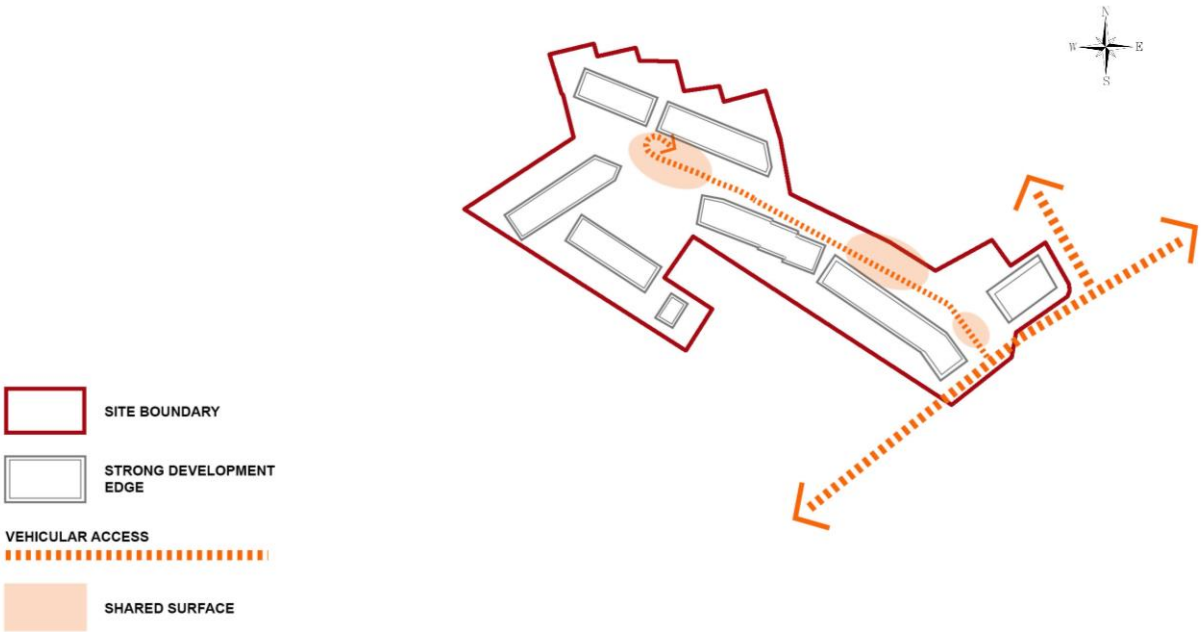


Diagram - Vehicle Access

5.3 Inclusivity, Variety & Public Realm - Consideration 3/4/8

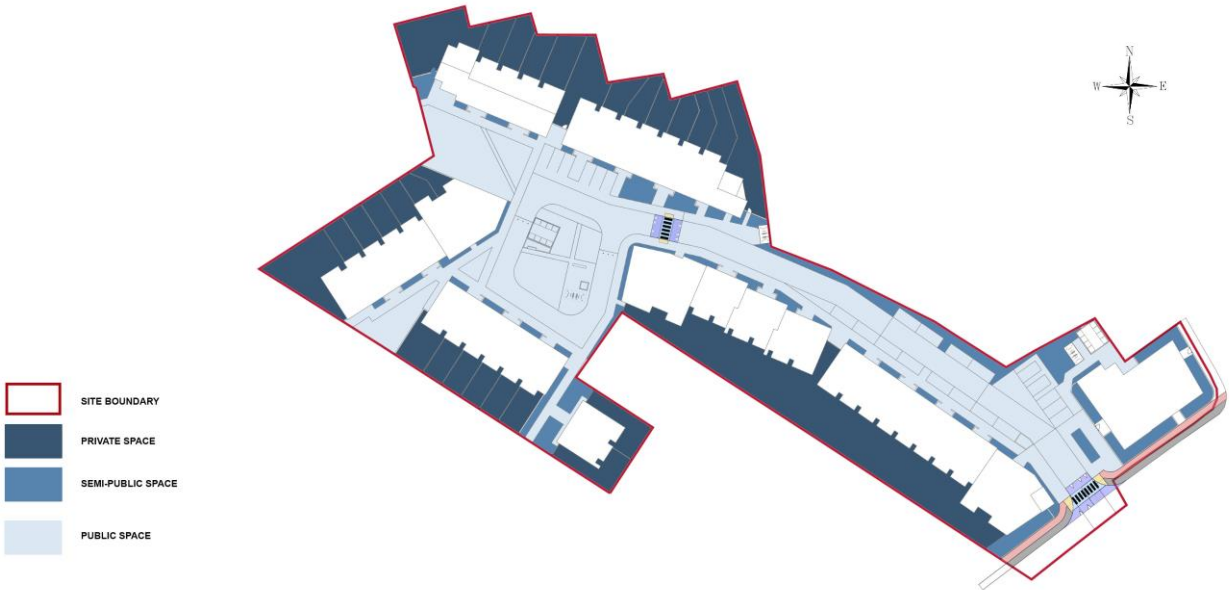
The site layout accommodates a variety of different open spaces that are suitable for different activities and usages. There are shared vehicular and pedestrian surfaces, urban open spaces supplied with benches and landscaped open spaces with seating areas.

Variety is also explored in the differing unit types creating a vibrant neighborhood with varying requirements for occupants. The scheme contains 1-2 bed apartments and 2-3 bed townhouses. This proposed mix will provide a good range of residential units to meet the varying requirements of the end user and satisfy housing requirements of the area.

The proposed development is set around a network of pathways and open spaces that are of a high quality and provides an attractive public realm for both future residents and visitors to the site.

The open spaces can be easily divided into different levels of public accessibility. There are the private spaces such as the private garden. The semi-public spaces such as the defensive spaces located at the entrance to the houses which consist of planted strips (designed to accommodate the bins storage also). Finally, the public spaces made up by the open spaces surrounded by the buildings.

These spaces area overlooked by the surrounding residents which will foster a sense of ownership amongst the community.

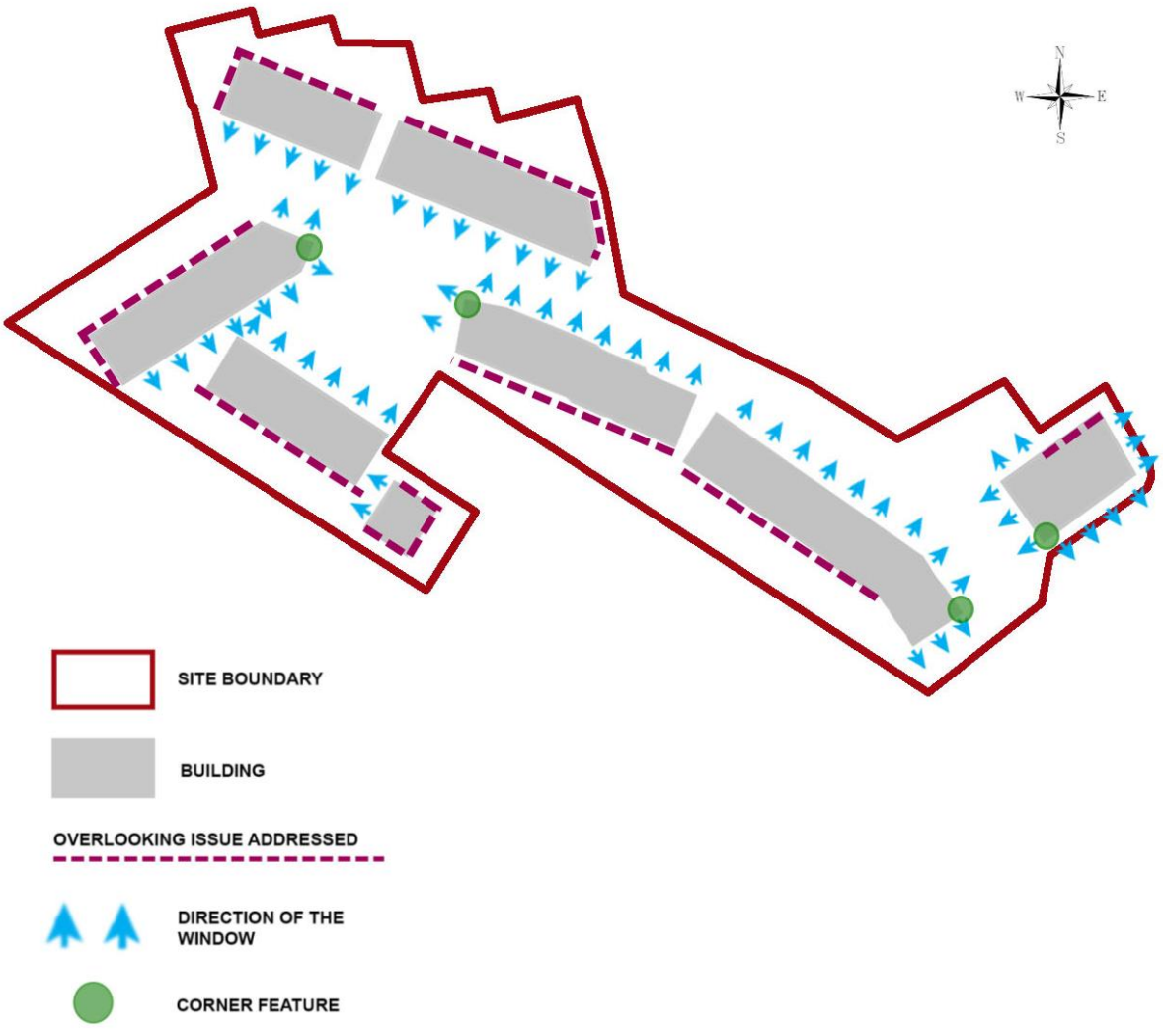


5.4 Efficiency - Consideration 5

The proposed layout considers the existing surrounding developments, the topographical nature of the site and the amenities required for the proposed dwellings. The layout is considered to allow for the most efficient use of the site. Open spaces are designed to add to the quality of life of the residents while not being excessive.

Particular attention has been made to ensure that there is no overlooking of surrounding dwellings. As this is an infill development the private amenity space of adjoining dwellings is located along the site boundaries. As a direct response to this, the main frontage of the new buildings always face the public spaces created, while their back yard is always placed along the boundaries.

An increased density is achieved by selectively integrating 3 storey apartment blocks in strategic position. These buildings address the corners along the access road and create feature elements within the site.



5.5 Distinctiveness/Layout - Consideration 6/7

The proposed housing is organized around generous public open spaces. These overlooked public spaces function as node points that orientate the occupant/visitor as they move through the site. These node points help create distinctive areas within the overall development.

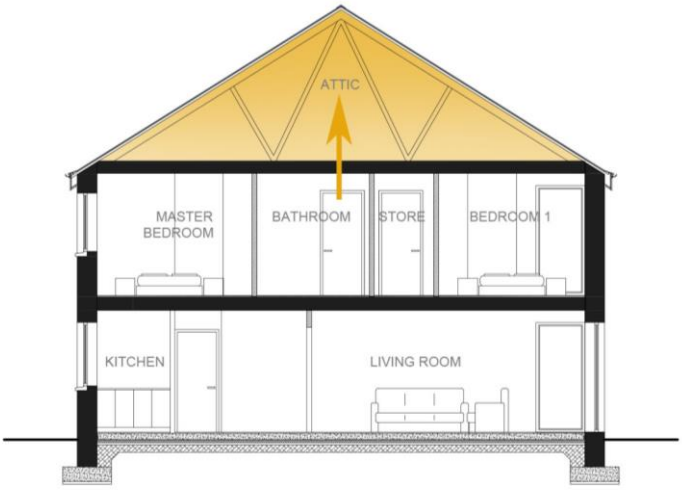
The site entrance is highlighted by taller buildings with corner features. The linkage allows views from the entrance to the end of the site. This path intersects wider public spaces along its way. The design of these spaces and the frontages of the buildings gives distinctiveness to the site.

The development is aligned along the central access road to create a permeable interconnected series of paths and open spaces that are easy and logical to navigate around. The entrance street and the paths are designed as places instead of roads for cars. Shared surfaces are introduced to prioritise pedestrian movement. The design and layout helps to control traffic speeds and improve residence safety.

5.6 Adaptability - Consideration 9

All units are designed in accordance with the 2007 document ‘Quality Housing for Sustainable communities’ and the 2018 ‘Design Standards for New Apartments’ document. Units in the development can be easily adapted to the future needs of the occupants.

The townhouses can be extended into the attic or with a sun room in the back garden.



5.7 Privacy & Amenity - Consideration 10

Each unit has access to a private amenity space such as a garden or a balcony. The design maximises the number of units enjoying dual aspect. The facades onto a public space always have a buffer zone made up by a green surface to guarantee the privacy of the inhabitants.

All homes will be constructed to prevent acoustic transfer. Windows are sited to prevent overlooking into adjacent private gardens. Townhouses will have adequate storage areas and areas for sorting of recyclables, while the apartments will have communal areas for the bin storage.

Section – Public Open Space

Section – Private Garden

5.8 Parking - Consideration 11

The site is provided with 23 no. car parking spaces which includes 2 no. disabled spaces and 3 no. Electric Vehicle spaces. The parking spaces are limited to promote the use of public transport such as buses. The nearest bus stop is approximately 200m from the entrance to the site. There are also 34 no. bike spaces provided. These are placed in 3 no. location within the site in areas that are easily accessible for the residence. They are also located in areas that are overlooked to ensure that passive surveillance is achieved.

5.9 Detail Design - Consideration 12

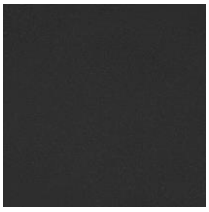
The external materials of the units were selected to have a positive contribution to the locality. A proposed mix of render, grey pressed metal, slate roof tiles and grey brick will provide for a contemporary development whilst respecting the existing buildings adjacent to the site.


Grey Brick


Grey Render


White Render


Roof Tile


Grey Pressed Metal

The buildings will be constructed of traditional construction methods, with external materials selected for their durability. The placement of materials (i.e. brick location), elevational treatment and feature treatment will differ in various locations throughout the site to emphasise the main corners and to give distinctiveness to the site.

Generous open space with landscaping will enhance the overall design of the estate. The design of the buildings and public space will facilitate easy maintenance. Care has been taken to design the location of bins and vents to prevent impact on the public amenities.

6.0 Site Services

Please refer to the accompanying report by Denis O'Sullivan & Associates (DOSA) for all information relating to site services.

1. EUROPEAN SITE DATA

Great Island Channel candidate Special Area Of Conservation (site code 001058)	
Conservation objective	To maintain or restore the favourable conservation condition of the Annex I habitat(s) and/or the Annex II species for which the SAC has been selected.
Qualifying interests	Annex I listed habitats: mudflats, sandflats not covered by seawater at low tide, estuaries, spartina swards, Atlantic salt meadows.
References and further information	*Conservation Objectives for Great Island Channel SAC [001058]* (NPWS), *Natura 2000 Standard Data Form* (NPWS), *Site Synopsis Great Island Channel Site Code 001058* (NPWS) (see www.npws.ie for further details)

Cork Harbour Special Protection Area (site code 004030)	
Conservation objective	To maintain or restore the favourable conservation condition of the bird species listed as special conservation interests for this SPA.
Qualifying interests	Annex I-listed bird species: bar-tailed godwit, common tern (breeding), golden plover, ruff, whooper swan. Other birds of special conservation interest include black-headed gull, black-tailed godwit, common gull, curlew, dunlin, great crested grebe, grey heron, grey plover, lapwing, lesser black-backed gull, little grebe, oystercatcher, pintail, red-breasted merganser, redshank, shelduck, shoveler, teal, and widgeon. This site is an internationally important wetland site supporting > 20,000 wintering waterfowl.
References and further information	*Conservation Objectives for Cork Harbour SPA [004030]* (NPWS), *Natura 2000 Standard Data Form* (NPWS), *Site Synopsis Cork Harbour SPA Site Code 004030* (NPWS) (see www.npws.ie for further details)

2. DETAILS OF PROPOSED DEVELOPMENT

Reference no.	Lot 1A Hawkes Road
Development consent type	*Part 8 Planning Application*
Development location	*Hawke's Road, Bishopstown, Cork*
Description of development	*The construction of a residential development containing 67 no. units and associated ancillary works.*
Distance from cSAC	*12.67km*
Distance from SPA	*5.93 km*
Relevant strategies or policies	*City Development Plan*
EIS submitted?	*N/A*

3. ASSESSMENT OF LIKELY DIRECT, INDIRECT AND CUMULATIVE EFFECTS

	Yes / No
1. Is the proposed development directly connected to or necessary for the conservation management of the SPA and/or cSAC? *(If yes, no further assessment required. If no, screening required.)*	*No*
2. Is the proposed development located within or partly within the SPA?	*No*
3. Is the proposed development located within 100m of the SPA?	*No*
4. Does the proposed project involve the development, extension or upgrade of a cycleway or walkway within 200m of the SPA?	*No*
5. Does the proposed development involve development in the intertidal or coastal zone within the potential impact zone of the SPA?	*No*
6. Could the proposed project increase the level of recreational or other use of marine or intertidal areas within the potential impact zone of the SPA?	*No*
7. Does the proposed development involve the excavation of previously undeveloped land within an area that has been identified to be at risk of flooding within the potential impact zone of the SPA?	*No*
8. Does the proposed development involve the removal of significant amounts of topsoil within 100m of the SPA?	*No*
9. Does the existing wastewater treatment system have the capacity to treat any additional loading?	*Yes*
10. Would the proposed development result in direct surface water or other discharge to water bodies in or feeding into the SPA or cSAC? Would it result in additional storm flows into a combined sewer and subsequently into a combined sewer overflow (CSO), resulting in increased frequency, quantity and/or duration of overflow from the CSO to watercourses feeding into the European sites?	*No*

3. ASSESSMENT OF LIKELY DIRECT, INDIRECT AND CUMULATIVE EFFECTS

	Yes / No
11. Would the proposed development involve dredging or could it result in the mobilisation of marine sediments in the Harbour area?	*No*
12. Could the proposed development give rise to increased risk of oil or chemical spillage or leaks within the marine environment or watercourse within the potential impact zone for the SPA or cSAC?	*No*
13. Are there relevant plans or projects which, in combination with the proposed development, are likely to give rise to any cumulative effects?	*No*

Comments or notes

4. SCREENING CONCLUSION STATEMENT

In view of the above it is considered that *(tick one box only)**:***

☐ **Appropriate Assessment is not required**
The proposed development is directly connected / necessary to the conservation management of a site.

☐ X **Appropriate Assessment is not required**
It can be excluded through screening that the proposed development will have significant effects on the sites.

☐ **Further information is required**
Potential impacts have been identified through initial screening and/or there is insufficient information to enable the planning authority to screen out impacts, but on balance it is determined that the issues could be resolved through minor modifications to the proposed development or by appropriate conditions. The information required is specified below.

☐ **Appropriate Assessment is required**
Significant issues have been identified and/or significant effects are certain, likely or uncertain, and the submission of a Natura Impact Statement (NIS) is required, or the proposed development must be rejected.

Further information required / Comments or Notes

The Appropriate Assessment Screening concluded that the proposed development would not be likely to have a significant effect on any Natura 2000 site.

Please refer to Appendix A for report titled; Habitats Directive Screening Report on behalf of Total Planning Solutions prepared by Dixon Brosnan, dated May 2020.

Name:	Declan Roche
Position:	A/Director of Services - Housing
Date:	27th May 2020

Appendix A

Habitats Directive Screening Report on behalf of Total Planning Solutions

Habitats Directive Screening Report on behalf of Total Planning Solutions.

Proposed Residential Development at Bishopstown Road, Bishopstown, Cork.

May 2020

Prepared by

DixonBrosnan

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environmental consultants

Project	**Habitats Directive Screening Report for a proposed residential development at Bishopstown Road, Bishopstown, Cork.**		
Client	Total Planning Solutions		
Project ref	**Report no**	**Client ref**	
1878	1878	-	

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Date	**Rev**	**Status**	**Prepared by**	
10/10/18	1	1st draft	Carl Dixon MSc.	
			Ian McDermott MSc	
10/02/2020	1	Final Draft	Carl Dixon MSc.	

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Executive Summary

DixonBrosnan has been requested to undertake an Appropriate Assessment Screening (AA Screening) on behalf of Total Planning Solutions for a proposed residential development comprising 67 residential units at Bishopstown Road, Bishopstown, Cork, in accordance with Article 6 of the Habitats Directive.

The screening process identified two Natura 2000 sites, namely the Great Island Channel SAC (site code 001058) and the Cork Harbour SPA (site code 004030) which could potentially be impacted by the proposed development

A number of potential direct, indirect and cumulative impacts associated with the development were assessed which included loss of habitat, impacts on water quality and fauna, and spread of invasive species. In particular potential impacts focused on water quality and the capacity of the Carrigrennan WWTP and Lough Mahon to accommodate the increase in flows and nutrients.

The screening report concludes that the proposed development is not directly connected with or necessary to the management of Natura 2000 sites. It can be excluded on the basis of objective scientific information, that the development, individually or in combination with other plans or projects, will not have a significant effect on the conservation objectives of the Great Island Channel SAC and the Cork Harbour SPA, and accordingly that a Natura Impact Statement (NIS) is not required.

1. Introduction

An Appropriate Assessment (AA) Screening was undertaken by DixonBrosnan Environmental Consultants to determine the potential impacts, if any, of the proposed development on nearby sites with European conservation designations (i.e. Natura 2000 sites).

1.1 Purpose of this Report

The purpose of this Appropriate Assessment Screening Report is to determine, the appropriateness, or otherwise, of the proposed development with respect to any direct or indirect impacts on nearby Natura 2000 sites in the context of their conservation status. This report identifies whether the proposed development is likely to have a significant effect on Natura 2000 site(s).

2. Background and legislative context

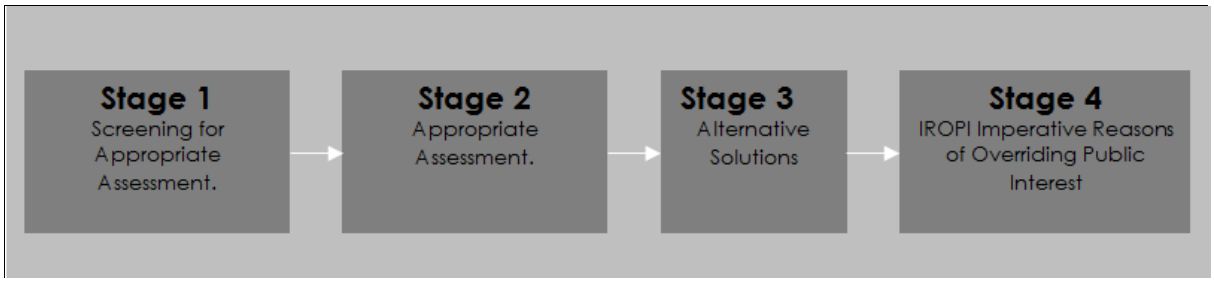
Article 6(3) of Council Directive 92/43/EEC of 21 May 1992 on the Conservation of Natural Habitats and of Wild Fauna and Flora (as amended) (hereafter 'the Habitats Directive') requires that, any plan or project not directly connected with or necessary to the management of a designated site, but likely to have a significant effect thereon, either individually or in combination with other plans or projects, shall be subject to appropriate assessment of its implications for the site in view of the site's conservation objectives. For the purposes of the application for permission in respect of the proposed project, the requirements of Article 6(3) have been transposed into Irish law by Part XAB of the Planning and Development Act 2000, as amended.

The possibility of there being a significant effect on a designated or "European" site will generate the need for an appropriate assessment to be carried out by the competent authority for the purposes of Article 6(3). As set out in Section 177U of the Planning and Development Act 2000 as amended, a screening for appropriate assessment of an application for consent for the proposed development must be carried out by the competent authority to assess, in view of best scientific knowledge, if the proposed development, individually or in combination with another plan or project is likely to have a significant effect on any European site. A Stage Two Appropriate Assessment is required if it cannot be excluded, on the basis of objective information, that the proposed development, individually or in combination with other plans or projects, will have a significant effect on a European site. The first (Screening) Stage for appropriate assessment operates merely to determine whether a (Stage Two) Appropriate Assessment must be undertaken on the implications of the plan or project for the conservation objectives of relevant European sites.

2.2 Appropriate Assessment Procedure

The assessment requirements of Article 6(3) establish a stage-by-stage approach. This assessment follows the stages outlined in the 2001 European Commission publications "Assessment of plans and projects significantly affecting Natura 2000 sites: methodological guidance on the provisions of Articles 6(3) and 6(4) of the Habitats Directive 92/43/EEC"

(2001) and Managing Natura 2000 Sites: the provisions of Article 6 of the 'Habitats' Directive 92/43/EEC (Draft) Office for Official Publications of the European Communities, Luxembourg (EC, 2015);



The stages are as follows:

Stage One: Screening — the process which identifies any appreciable impacts upon a Natura 2000 site of a project or plan, either alone or in combination with other projects or plans, and considers whether these impacts are likely to be significant;

Stage Two: Appropriate assessment — the consideration of the impact on the integrity of the Natura 2000 site of the project or plan, either alone or in combination with other projects or plans, with respect to the site's structure and function and its conservation objectives. Additionally, where there are adverse impacts, an assessment of the potential mitigation of those impacts;

Stage Three: Assessment of alternative solutions: The process which examines alternative ways of achieving the objectives of the project or plan that avoid adverse impacts on the integrity of the Natura 2000 site. It is confirmed that no reliance is placed by the developer on Stage Three in the context of this application for development consent;

Stage Four: Assessment where no alternative solutions exist and where adverse impacts remain — an assessment of compensatory measures where, in the light of an assessment of imperative reasons of overriding public interest (IROPI), it is deemed that the project or plan should proceed (it is important to note that this guidance does not deal with the assessment of imperative reasons of overriding public interest). Again, for the avoidance of doubt, it is confirmed that no reliance is placed by the developer on Stage Four in the context of this application for development consent

Documentation/guidelines of relevance to this screening report include the following:

- European Commission, 2001. Assessment of plans and projects significantly affecting Natura 2000 sites: Methodological guidance on the provisions of Articles 6(3) and (4) of the Habitats Directive 92/43/EEC. Office for Official Publications of the European Communities, Brussels (EC, 2001);
- European Commission, 2000a. Communication from the Commission on the Precautionary Principle., Office for Official Publications of the European Communities, Luxembourg (EC, 2000a);
- Managing Natura 2000 Sites: the provisions of Article 6 of the 'Habitats' Directive 92/43/EEC (Draft) Office for Official Publications of the European Communities, Luxembourg (EC, 2015);

- Managing Natura 2000 Sites: the provisions of Article 6 of the 'Habitats' Directive 92/43/EEC (EC, 2000)
- Guidance document on Article 6(4) of the 'Habitats Directive' 92/43/EEC – Clarification of the concepts of: alternative solutions, imperative reasons of overriding public interest, compensatory measures, overall coherence, opinion of the commission; (EC, 2007);
- Appropriate Assessment of Plans and Projects in Ireland. Guidance for Planning Authorities. Department of the Environment, Heritage and Local Government, Dublin (DEHLG, 2010a);
- Department of Environment Heritage and Local Government Circular NPW 1/10 and PSSP 2/10 on Appropriate Assessment under Article 6 of the Habitats Directive – Guidance for Planning Authorities (DEHLG, 2010b);
- Interpretation Manual of European Union Habitats. Version EUR 28. European Commission (EC, 2013);
- CJEU Case C 164/17 Edel Grace Peter Sweetman v An Bord Pleanála

2.3 Screening of Proposed Development

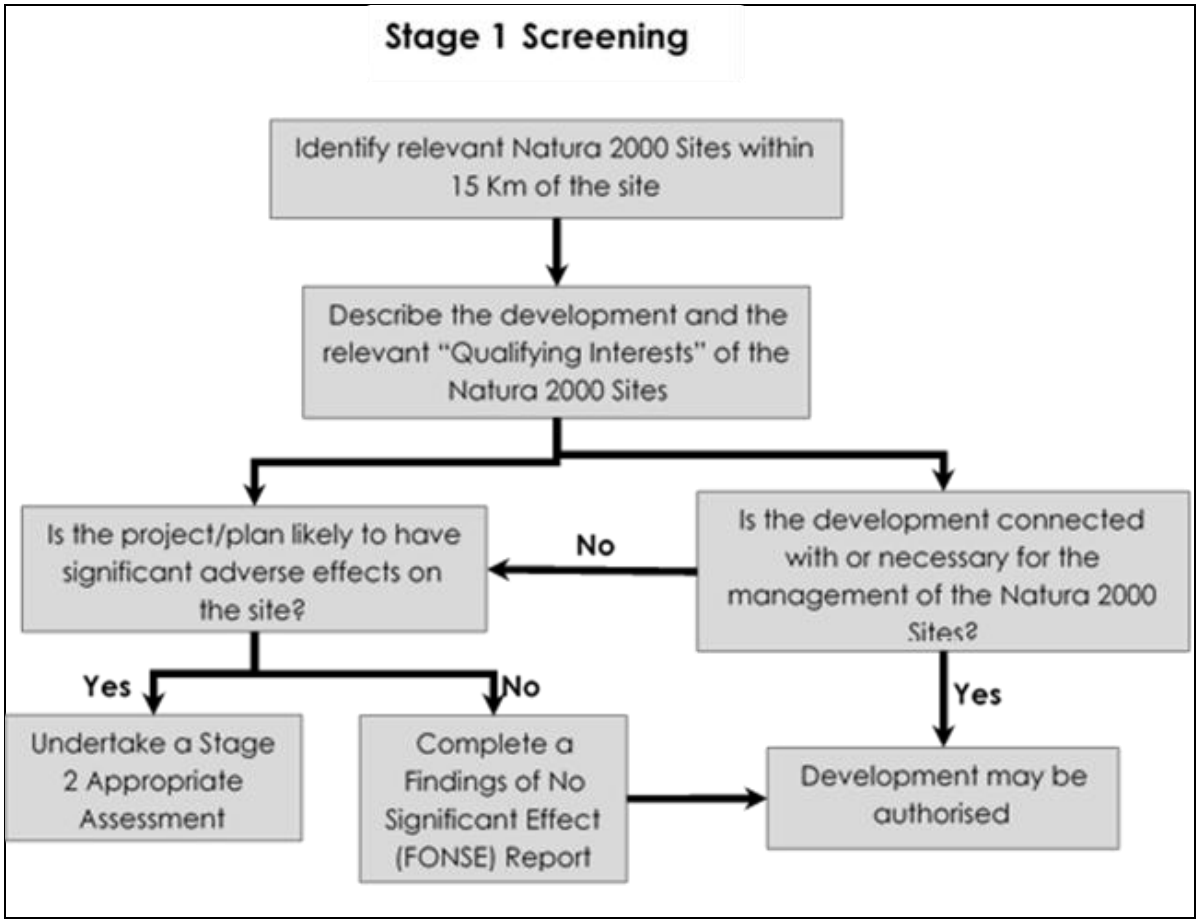
In accordance with the Department of Environment Heritage and Local Government (DoEHLG) Guidelines screening is the process that addresses two tests of Article 6(3) of the Habitats Directive:

I. *whether a plan or project is directly connected to or necessary for the management of the site, and*
II. *whether a plan or project, alone or in combination with other plans and projects, is likely to have significant effects on a Natura 2000 site in view of its conservation objectives*.

If the effects are deemed to be significant, potentially significant, or uncertain, or if the screening process becomes overly complicated, then the process must proceed to Stage 2. The screening assessment for the operations follows the following steps in accordance with the DoEHLG guidelines.

2.4 Stages of Appropriate Assessment

A flow diagram illustrating Stage 1 of the Appropriate Assessment is outlined below:



3. Methodology

3.1 Study Area and Scope of Appraisal

Natura 2000 sites (European sites) are only at risk from significant effects where a source-pathway-receptor link exists between a proposed development and a Natura 2000 site(s). This can take the form of a direct impact (e.g. where the proposed development and/or associated construction works are located within the boundary of the Natura 2000 site(s) or an indirect impact where impacts outside of the Natura 2000 site(s) affect ecological receptors within (e.g. impacts to water quality which can affect riparian habitats at a distance from the impact source).

Considering the Natura 2000 sites present in the region, their Qualifying Interests (QIs) and conservation objectives, and any potential impact pathways that could link those sites to the proposed development area, a distance of 15km was considered appropriate to encompass all Natura 2000 sites potentially within the Zone of Influence (ZoI) of the proposed development.

Thus, any appreciable direct, indirect or cumulative impacts which could arise from the proposed development in relation to the designated sites within this zone were considered.

It is noted that environmental control measures will implemented during construction in line with standard guidelines. Whilst the implementation of such measures will assist in minimising impacts on the local environment, the implementation of these measures has not

been taken into consideration in this screening report when reaching a conclusion as to the likely impact of the development on Natura 2000 sites.

3.2 Desktop Study

A desktop review facilitates the identification of the baseline ecological conditions and key ecological issues relating to Natura 2000 sites and facilitates an evaluation assessment of potential in-combination impacts. Sources of information used for this screening report include reports prepared for the Bishopstown area, information from statutory and non-statutory bodies. The sources of information and relevant documentation utilised are as follows:

- National Parks & Wildlife Service (NPWS) - www.npws.ie including qualifying interests and conservation objectives for Natura 2000 sites.
- Information on the status of EU protected habitats in Ireland (National Parks & Wildlife Service, 2013a & 2013b)
- Environmental Protection Agency (EPA) – www.epa.ie
- BirdWatch Ireland - http://www.birdwatchireland.ie/
- National Biodiversity Data Centre – www.biodiversityireland.ie
- Cork City Biodiversity Action Plan 2009-2014
- The Cork Area Strategic Plan [CASP]
- Bishopstown and Wilton Area Action Plan 2007 (Cork City Council)

3.3 Author of Report for Screening and Appropriate Assessment

This ecological screening report provides the relevant ecological information on the proposed project to assist the relevant Planning Authority to screen the project, to determine if an Appropriate Assessment is required and ultimately to make a determination in relation to the likely impact on Natura 2000 sites. This report was prepared by Carl Dixon MSc. (Ecological Monitoring) and Ian McDermott MSc. (Ecological Monitoring). Both have worked on Screening/NIS's for a range of small and large-scale projects, including assessments of aquatic impacts.

4. Screening of proposed development

4.1 Description of the project

The proposed development which is located at Bishopstown Road, Bishopstown, Cork, will consist of the construction of a residential development containing *residential development containing 67 no. units consisting of the following: comprising*

APARTMENTS | No. 27:

- No. 10 | 1 bed UNITS

- No. 17 | 2 bed UNITS

MAISONETTE | No. 40

- No. 34 | 2 bed UNITS

- No. 06 | 3 bed UNITS

The proposed development area is 1.06ha in size and site works will include removal of existing vegetation on site.

The development also includes, associated car parking comprising 57 no. car parking spaces as well as 20 no. bike parking spaces. The proposed development includes [but is not limited to] the provision of landscaping, footpaths, drainage and all associated site development works at the junction of Bishopstown Road/Hawke's Road, Bishopstown Road, Bishopstown, Cork City.

Effluent from the proposed development will be conveyed to Carrigrennan Waste Water Treatment Plant (WWTP) for treatment prior to discharging into the transitional waters of Lough Mahon. Overall, the proposed development represents a population equivalent of 202.5 persons. The foul waste within the development will be collected via an internal gravity network and will discharge to the existing public foul sewer.

A stormwater management plan is to be adopted as part of the proposed development. This will involve using an attenuation tank located in the north-eastern corner of the site. All surface water runoff arising from the proposed paved development will be drained away from the site. The attenuation tank is designed for a 100-year storm event.

Hydrocarbon treatment will also be provided as part of the development, this will consist of a Conder CSNB15s interceptor with a catchment capacity of 8333m². The proposed petrol interceptors from Conder Environmental also include a silt storage capacity in addition to the oil storage capacity that allow silt to be collected in the interceptor prior to discharge to the proposed attenuation tanks. This silt build-up can then be removed from the tanks.

Overall the proposed development will have sufficient capacity to prevent pollutants being flushed through the unit during storm conditions and ensure retention of water during storm events to allow it to slowly release in a controlled discharge to a surface water.

A detailed drawing of the proposed development is provided in **Appendix 2** of this report.

5. Designated sites

Natura 2000 sites within a 15km radius of the proposed development site are listed below in **Table 1** and shown on **Figure 1**. It is noted that use of a 15km radius is a precautionary measure, as impacts at this distance from the proposed development are highly unlikely in the absence of recognisable pathways.

The proposed development is not directly connected with, or necessary for, the management of any Natura 2000 site. No habitat loss will occur within any Natura 2000 site as a result of this proposed development. Given the limited scale of this proposed development, any adverse impacts on Natura 2000 sites are considered highly unlikely.

The proposed development is not located within any Natura 2000 site; however, a potential source-pathway-receptor link has been identified between the source (the proposed development site) and the receptor (Great Island Channel SAC (site code 001058) and the Cork Harbour SPA (site code 004030)) via potential pathways (Discharge of surface water run-off and wastewater). Wastewater discharging from the proposed development will be conveyed to the Carrigrenan WWTP for treatment prior to discharging into the waters of the

Lough Mahon Estuary/River Lee. Protected species/habitats within the Great Island Channel SAC & Cork Harbour SPA could be impacted via a reduction in water quality.

Overall, the Great Island Channel SAC and the Cork Harbour SPA are of conservation significance for the occurrence of good examples of habitats that are listed on Annex I of the E.U. Habitats Directive and being recognised under the E.U. Birds Directive as being of international importance by regularly supporting in excess of 20,000 wintering waterfowl including Annex I listed species under the E.U. Birds Directive. Further information on these sites are provided below. A full site synopsis for the Great Island Channel SAC and the Cork Harbour SPA is included **Appendix 1**.

Given the limited scale of the proposed development, the lack of a hydrological connection, the dilution provided in the estuarine environment and the distances involved, no potential impact on other designated sites has been identified.

It is noted that the proposed development site does not support any of the habitats or species listed as conservation interests for the Great Island Channel SAC and the Cork Harbour SPA. An ecological appraisal of the site indicates that it supports common habitats which are not of high value in the context of the Natura 2000 designation.

Table 1. Designated sites and their location relative to the proposed works area.

Natura 2000 Site	Code	Distance at closest point (As the crow flies)
Special Area of Conservation (SAC)		
Great Island Channel	001058	12.67km east of the proposed works area. Although improbable, a potential impact on this SAC has been identified from discharges in wastewater during operation via the Carrigrenan WWTP to the waters of Lough Mahon.
Special Protection Area (SPA)		
Cork Harbour	004030	5.93km east of the proposed works area. Although improbable, a potential impact on this SAC has been identified from discharges in wastewater during operation via the Carrigrenan WWTP to the waters of Lough Mahon.

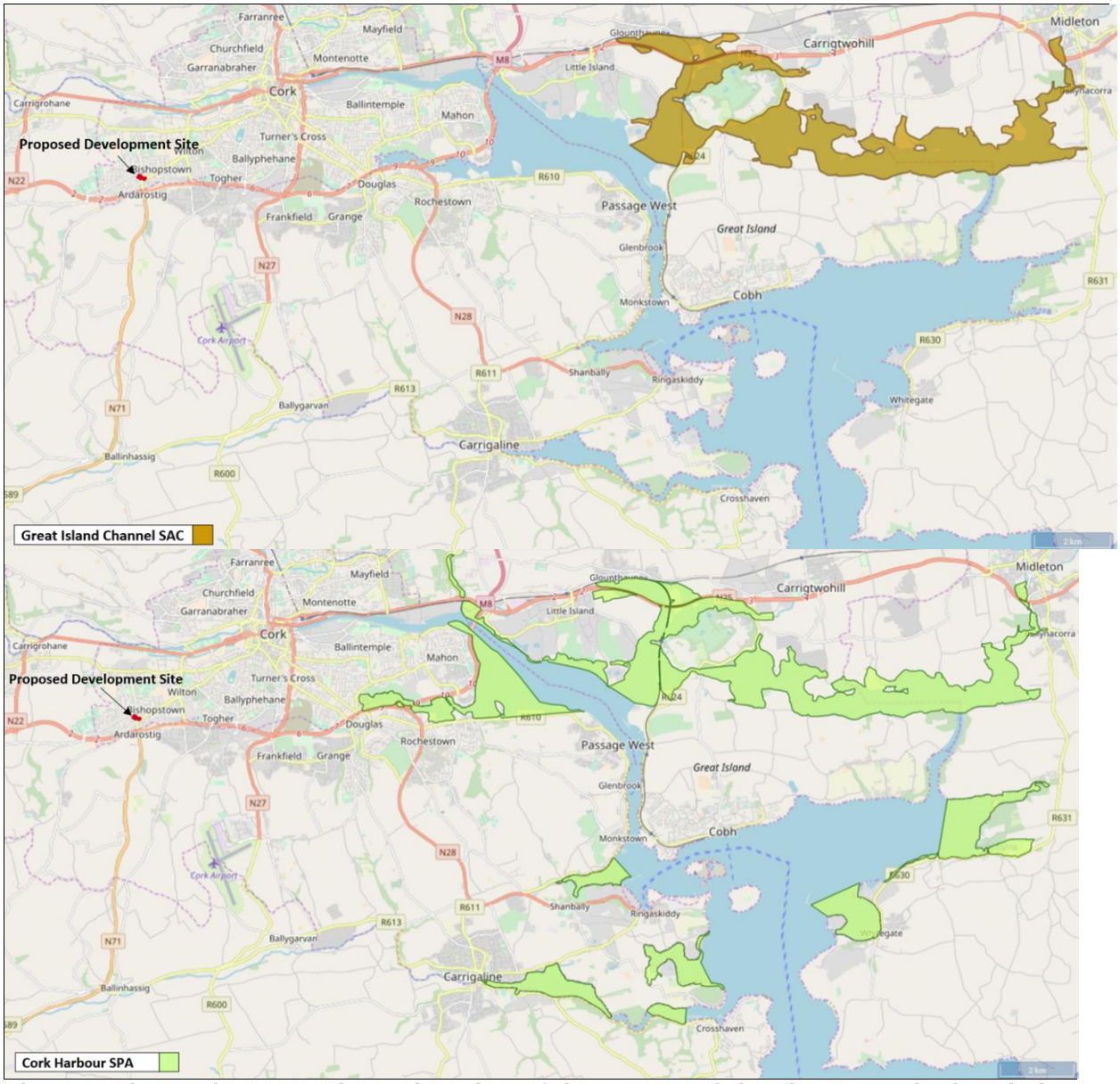


Figure 1 shows the approximate location of the proposed development site in relation to the Great Island Channel SAC and the Cork Harbour SPA.

5.1 Great Island Channel SAC

This Great Island Channel SAC comprises the north-eastern part of Cork Harbour. It includes all of the Great Island Channel, the intertidal areas between Fota Island and Little Island, and also the estuary of the Dungourney and Owennacurra Rivers as far as Midleton. The North Channel is on average 1 km wide but extends for about 9 km from east to west. The area is well sheltered and the intertidal sediments are predominantly fine muds. In addition to the estuarine habitats, the site includes some wet grassland areas which are used by roosting birds, as well as some broad-leaved woodland at Fota Island. Compared to the rest of Cork Harbour, the Great Island Channel is relatively undisturbed, with aquaculture the main activity.

The site is of ecological importance for its examples of intertidal mud and sand flats and Atlantic salt meadows of the estuarine type. Both habitats are fairly extensive in area and of

moderate to good quality. Site has high ornithological importance, supporting regularly c.50% of the wintering waterfowl of Cork Harbour. Significant proportions of the internationally important populations of *Limosa limosa* and *Tringa totanus* which winter in Cork Harbour utilise the site and it supports nationally important populations of a further 12 species, including *Pluvialis apricaria* and *Limosa lapponica*, both listed on Annex I of the EU Birds Directive.

5.2 Cork Harbour SPA

Cork Harbour is a large, sheltered bay system, with several river estuaries - principally those of the Rivers Lee, Douglas, Owenboy and Owenacurra. The site comprises the main intertidal areas of Cork Harbour, including all of the North Channel, the Douglas Estuary, inner Lough Mahon, Monkstown Creek, Lough Beg, the Owenboy Estuary, Whitegate Bay and the Rostellan inlet. Owing to the sheltered conditions, the intertidal flats are often muddy in character. Salt marshes are scattered through the site and these provide high tide roosts for the birds. Otherwise, birds roost on stony shorelines and in some areas fields adjacent to the shore. Some shallow bay water is included in the site. Cork Harbour is adjacent to a major urban centre and a major industrial centre.

Cork Harbour is an internationally important wetland site, regularly supporting in excess of 20,000 wintering waterfowl, for which it is amongst the top five sites in the country. It supports an internationally important population of *Tringa totanus*. A further 15 species have populations of national importance, with particularly notable numbers of *Tadorna tadorna* (9.6% of national total), *Anas clypeata* (4.5% of total), *Anas acuta* (4.2% of total) and *Phalacrocorax carbo* (4.1% of total) occurring. It has regionally important populations of *Pluvialis apricaria* and *Limosa lapponica*. Passage waders are regular, including *Philomachus pugnax* and *Tringa erythropus*. It is an important site for gulls in winter and autumn, especially *Larus canus* and *Larus fuscus*. The site provides both feeding and roosting areas for the waterfowl species. The quality of most of the estuarine habitats is good. The wintering birds have been well-monitored since the 1970s. The site has a breeding colony of *Sterna hirundo* which is of national importance. The colony is monitored annually and the chicks ringed.

5.3 Natura 2000 sites – Features of interests and conservation objectives.

The EU Habitats Directive contains a list of habitats (Annex I) and species (Annex II) for which SACs must be established by Member States. Similarly, the EU Birds Directive contains lists of important bird species (Annex I) and other migratory bird species for which SPAs must be established. Those that are known to occur at a site are referred to as ‘qualifying interests’ and are listed in the Natura 2000 forms which are lodged with the EU Commission by each Member State. A ‘qualifying interest’ is one of the factors (such as the species or habitat that is present) for which the site merits designation. The National Parks and Wildlife Service (NPWS) are responsible for the designation of SACs and SPAs in Ireland.

The conservation objectives for the site are detailed in: NPWS (2014) Conservation Objectives: Great Island Channel SAC 001058. Version 1. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht and NPWS (2014) Conservation Objectives: Cork Harbour SPA 004030. Version 1. National Parks and Wildlife Service,

Department of Arts, Heritage and the Gaeltacht. The overall aim of the Habitats Directive is to maintain or restore the favourable conservation status of habitats and species of community interest. These habitats and species are listed in the Habitats and Birds Directives and Special Areas of Conservation and Special Protection Areas are designated to afford protection to the most vulnerable of them. These two designations are collectively known as the Natura 2000 network. European and national legislation places a collective obligation on Ireland and its citizens to maintain at favourable conservation status sites designated as Special Areas of Conservation and Special Protection Areas. The Government and its agencies are responsible for the implementation and enforcement of regulations that will ensure the ecological integrity of these sites.

The maintenance of habitats and species within Natura 2000 sites at favourable conservation condition will contribute to the overall maintenance of favourable conservation status of those habitats and species at a national level. Favourable conservation status of a habitat is achieved when its natural range, and area it covers within that range, is stable or increasing, and the ecological factors that are necessary for its long-term maintenance exist and are likely to continue to exist for the foreseeable future, and the conservation status of its typical species is favourable.

The favourable conservation status of a species is achieved when population data on the species concerned indicate that it is maintaining itself, and the natural range of the species is neither being reduced or likely to be reduced for the foreseeable future, and there is, and will probably continue to be, a sufficiently large habitat to maintain its populations on a long-term basis. The species and habitats listed as qualifying interests for the Great Island Channel SAC and the Cork Harbour SPA and specific conservation objectives are included in **Table 2** and **3**.

Table 2. Qualifying habitats for the Great Island Channel SAC

Habitat Code	Habitat	Conservation objective
1140	Mudflats and sandflats not covered by seawater at low tide	Maintain
1330	Atlantic salt meadows (Glauco-Puccinellietalia maritimae)	Restore

Restore = Restore favourable conservation condition, Maintain = Restore favourable conservation condition

Table 3: Features of Interest for the Cork Harbour SPA

Species code	Species	Scientific name	Conservation objective
A004	Little Grebe	*Tachybaptus ruficollis*	Maintain
A005	Great Crested Grebe	*Podiceps cristatus*	Maintain
A017	Cormorant	*Phalacrocorax carbo*	Maintain
A028	Grey Heron	*Ardea cinerea*	Maintain
A048	Shelduck	*Tadorna tadorna*	Maintain
A050	Wigeon	*Anas penelope*	Maintain
A052	Teal	*Anas crecca*	Maintain
A054	Pintail	*Anas acuta*	Maintain
A056	Shoveler	*Anas clypeata*	Maintain
A069	Red-breasted Merganser	*Mergus serrator*	Maintain
A130	Oystercatcher	*Haematopus ostralegus*	Maintain
A140	Golden Plover	*Pluvialis apricaria*	Maintain

A141	Grey Plover	*Pluvialis squatarola*	Maintain
A142	Lapwing	*Vanellus vanellus*	Maintain
A149	Dunlin	*Calidris alpina*	Maintain
A156	Black-tailed Godwit	*Limosa limosa*	Maintain
A157	Bar-tailed Godwit	*Limosa lapponica*	Maintain
A160	Curlew	*Numenius arquata*	Maintain
A162	Redshank	*Tringa totanus*	Maintain
A179	Black-headed Gull	*Chroicocephalus ridibundus*	Maintain
A182	Common Gull	*Larus canus*	Maintain
A183	Lesser Black-backed Gull	*Larus fuscus*	Maintain
A193	Common Tern	*Sterna hirundo*	Maintain
A999	Wetland and Waterbirds		Maintain

Restore = Restore favourable conservation condition, Maintain = Restore favourable conservation condition

To acknowledge the importance of Ireland's wetlands to wintering waterbirds, "Wetland and Waterbirds" may be included as a Special Conservation Interest for some SPAs that have been designated for wintering waterbirds and that contain a wetland site of significant importance to one or more of the species of Special Conservation Interest. Thus, a further objective is to maintain or restore the favourable conservation condition of the wetland habitat within the Cork Harbour SPA as a resource for the regularly-occurring migratory waterbirds that utilise it.

6. Status of qualifying species and habitats for the Great Island Channel SAC & Cork Harbour SPA.

6.1 Status of qualifying interests for the Great Island Channel SAC

A number of surveys on the qualifying interests of the Great Island Channel Special Area of Conservation (SAC) (site code 001058) was conducted in 2014 on behalf of Cork County Council (F.H. O'Neill, *et. al.,* 2014). The objective of these surveys was to determine the current conservation status of these features, and to assess the likely impacts on the SAC in relation to increased waste water loadings generated by the 2022 population targets given in the draft Cork County Development Plan 2013.

It was concluded that Mudflats and sandflats are currently at an unfavourable/bad condition, however the prospects of recovery are good, if detailed recommendations are followed. The main issues relating to the conservation status of the habitat are pollution and *Spartina* invasion (F.H. O'Neill, *et. al.,* 2014).

With regard to Atlantic salt meadows, the current condition was deemed to be unfavourable to Inadequate, however, the prospects of recovery are good to fair, if the recommendations outlined are followed.; the time frame is uncertain due to complexity of processes involved and insufficient data on the physical sedimentary and tidal processes in the SAC. The main issues relating to the conservation status of the habitat are coastal squeeze, Spartina invasion and erosion (F.H. O'Neill, *et. al.,* 2014).

6.2 Status of qualifying interests for the Cork Harbour SPA

The species listed as Special Conservation Interests of the Cork Harbour SPA are shown below in **Table 4.**

Table 4. Species listed as Special Conservation Interests of the Cork Harbour SPA and their Conservation status.

Species		**Birds Directive Annex**			**BOCCI**	
		I	**II**	**III**	**Red List**	**Amber List**
Phalacrocorax carbo	Cormorant					X
Numenius arquata	Curlew		X		X	
Limosa limosa	Black-tailed Godwit					X
Limosa lapponica	Bar-tailed Godwit	X				X
Tringatotanus	Redshank				X	
Anas penelope	Wigeon		X	X	X	
Anas crecca	Teal		X	X		X
Tachybaptus ruficollis	Little Grebe					X
Larus ridibundus	Black-headed Gull				X	
Larus canus	Common Gull					X
Larus fuscus	Lesser black-backed Gull					X
Vanellus vanellus	Lapwing		X		X	
Haematopus ostralegus	Oystercatcher					X
Tadorna tadorna	Shelduck					X
Ardea cinerea	Grey Heron					
Podiceps cristatus	Great Crested Grebe					X
Anas acuta	Pintail		X	X	X	
Anas cylpeata	Shoveler		X	X	X	
Mergus serrator	Red-breasted Merganser		X			
Pluvialis apricaria	Golden Plover	X	X	X	X	
Pluvialis squatarola	Grey Plover					X
Calidris alpina	Dunlin	X			X	
Sterna hirundo	Common Tern	X				X
Symbol	**Description**					
I	**Annex 1**: species and sub-species are particularly threatened. Member States must designate Special Protection Areas (SPAs) for their survival and all migratory bird species.					
II	**Annex 2**: bird species can be hunted. However, the hunting periods are limited and hunting is forbidden when birds are at their most vulnerable: during their return migration to nesting areas, reproduction and the raising of their chicks.					
III	**Annex 3**: overall, activities that directly threaten birds, such as their deliberate killing, capture or trade, or the destruction of their nests, are banned. With certain restrictions, Member States can allow some of these activities for species listed here.					

7. Water Quality data

7.1 EPA Water Quality Data

The Environmental Protection Agency carries out a biological assessment of most river channels in the country on a regular basis. The assessments are used to derive Q values, indicators of the biological quality of the water. The biological health of a watercourse provides an indication of long-term water quality. The EPA Q value scheme is summarised in **Table 5**. The relationship between the Q-rating system and the Water Framework Directive classification as defined by the Surface Waters Regulations 2009 (S.I. 272 of 2009) is shown in **Table 6**.

The Q Value system, which is used by the Environmental Protection Agency, describes the relationship between water quality and the macro-invertebrate community in numerical terms. The presence of pollution causes changes in flora and fauna of rivers. Well documented changes occur in the macro-invertebrate community in the presence of organic pollution: sensitive species are progressively replaced by more tolerant forms as pollution increases. Q5 waters have a high diversity of macro-invertebrates and good water quality, while Q1 have little or no macro-invertebrate diversity and unsatisfactory water quality.

The intermediate ratings Q1-2, Q2-3, Q3-4 and Q4-5 are used to denote transitional conditions, while ratings within parenthesis indicate borderline values. Great importance is attached to the EPA biotic indices, and consequently it is these data that are generally used to form the basis of water quality management plans for river catchments.

There are no watercourses within or in the immediate vicinity of the proposed development site. The closest watercourses are the Glasheen River (260m south-southeast), Curragheen River (700m northwest) and the Twopot River (1.1km west). There are no monitoring results available for either the Glasheen River, Curragheen River or Twopot River. However, as part of a '*Biological Assessment of the Glasheen River in relation to proposed Cork County Council N40 supplementary works in Cork City'* conducted by DixonBrosnan, the Glasheen River was assigned a Q value of 3 which is indicative of a high level of water quality impairment.

The EPA also monitors both coastal and transitional water bodies. Transitional waters can be assigned a classification of; High, Good, Moderate, Poor or Bad. The former three are considered to be acceptable, while the latter two water quality ratings are considered as unsatisfactory.

Treated waste water from the proposed development site will ultimately be discharged to the waters of Lough Mahon via a primary discharge point from the Carrigrennan WWTP. Results indicate that the water quality within the transitional waters of the River Lee, within Lough Mahon is of an acceptable quality (EPA Transitional Water Quality 2010-2015 – moderate status) (**Figure 2**). The 2017 AER for the Carrigrennan WWTP also notes that the discharge

from the wastewater treatment plant does not have an observable negative impact on the water quality

Table 5. EPA biotic index scheme.

Q value	Water quality	Pollution	Condition
5	Good	Unpolluted	Satisfactory
4	Fair	Unpolluted	Satisfactory
3	Doubtful	Moderately polluted	Unsatisfactory
2	Poor	Seriously polluted	Unsatisfactory
1	Bad	Seriously polluted	Unsatisfactory

Source: EPA

Table 6. Correlation between the WFD classification and Q values

Ecological status WFD	Q Values
High	Q5, Q4-5
Good	Q4
Moderate	Q3-4
Poor	Q3, Q2-3
Bad	Q2, Q1

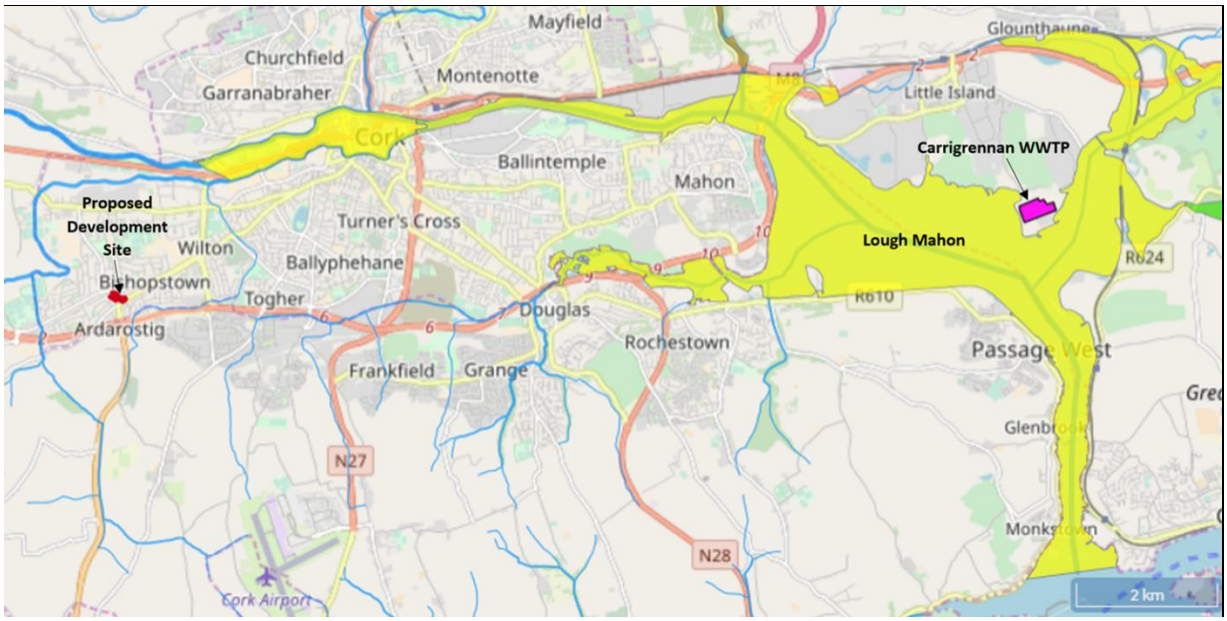


Figure 2: EPA water quality monitoring location in relation to the proposed development site.

7.2 Water Framework Directive

The Water Framework Directive (WFD) is a key initiative aimed at improving water quality throughout the EU. It applies to rivers, lakes, groundwater, and coastal waters. The Directive requires an integrated approach to managing water quality on a river basin basis; with the aim of maintaining and improving water quality. The Directive requires that management plans be prepared on a river basin basis and specifies a structured approach to developing those plans. It requires that a programme of measures for improving water quality be brought into effect.

Specifically, the WFD aims to: protect/enhance all waters (surface, ground and coastal waters); achieve "good status" for all waters by December 2015; manage water bodies based on river basins (or catchments); involve the public; and streamline legislation. The Water Framework Directive was agreed by all individual EU member states in 2000, and its first cycle ran from 2009 – 2015. The Directive runs in 6-year cycles, so the second cycle runs from 2016 – 2021.

The Water Frameworks Directive assesses the water quality of rivers and ranks their status as follows: High, Good, Moderate, Poor, Bad and Unassigned. The Water Frameworks Directive also determines the "Risk" level of a river as follows: 1a – At risk of not achieving Good Status, 1b – Probably at risk of not archiving Good Status, 2a – Expected to achieve Good Status and 2b – strongly expected to achieve Good Status. Relevant data for surface waters deemed applicable to this project are shown in **Table 7.**

Table 7. WFD Status

River Waterbody	Status	Risk	Objective
WFD – 1st Cycle			
Curragheen, Trib of Lee (Waterbody Code: IE_SW_19_1744)	Poor	1a – At risk of not achieving Good Status	Restore 2021
River Waterbody – Subcatchment: Glasheen[Corkcity]_SC_010			
GLASHEEN (Cork City)_010 (Code**:** IE_SW_19G040700)	Unassigned	At Risk	Unassigned
CURRAGHEEN (Cork City)_010 (Code**:** IE_SW_19C120740)	Unassigned	At Risk	Unassigned
TWO POT (Cork City)_010 (Code**:** IE_SW_19T050890)	Unassigned	At Risk	Unassigned

Source: wfdireland map system & www.catchments.ie

9. Site inspection

A site inspection was carried out on the 08th of October 2018 to identify the habitats, flora and fauna present at the site. The terrestrial and aquatic habitats within or adjacent to the proposed development site were classified using the classification scheme outlined in the Heritage council publication *A Guide to Habitats in Ireland* (Fossitt, 2000) and cross referenced with Annex 1/qualifying habitats, where required.

Habitats noted within the proposed works area consist primarily of;

- Recolonising bare ground (ED3)
- Scattered trees and parkland (WD5)

- Scrub (WS1)
- Dry meadows and grassy verges (GS2)
- Treelines (WL2)
- Buildings & artificial surfaces (BL3)

The proposed development site has been left derelict for a number of years and as a result has been invaded by a number of herbaceous species and immature trees. Vegetated heaps of spoil exist within the site.

A number of scattered apple trees can be found towards the northwest of the site along with a narrow band of grassy verge habitat, which is dominated by Cock's-foot (*Dactylis glomerata*).

The site is largely bound by concrete block walls and hoarding, with treelines composed of a mix of native and non-native deciduous and coniferous species noted to the northwest and east of the site.

A number of amber listed invasive species were recorded within the site, namely Travellers joy / Old man's beard (*Clematis vitalba*), Butterfly Bush / Buddleja (*Buddleja davidii*) and Montbretia (*Crocosmia* × *crocosmiflora*). No high-risk invasive species were recorded.

None of the habitats recorded within the proposed works area are listed as qualifying habitats for the Great Island Channel SAC or correspond with Annex I habitats of the Habitats Directive. The habitats noted within the works area are common in the surrounding landscape and are a low ecological value.

9.1 Mammals

A mammal survey was undertaken of the site and surrounding area during the site inspection. The main focus of the mammal survey was otter which is listed on Annex II of the Habitats Directive and is known to occur within the Great Island Channel SAC and within both the Curragheen River and the Twopot River (National Biodiversity Data Centre records). No signs of otter were recorded within the proposed development site or in proximity to it. No habitats suitable for otter were recorded within the proposed development site. No other protected mammals including bats and badger or signs of bats and badger were recorded during site survey.

9.2 Birds

During the site survey, all birds seen or heard within the development site were recorded. The majority of birds utilising the site were common in the local landscape. Certain bird species are listed by BirdWatch Ireland as Birds of Conservation Concern in Ireland (BOCCI). These are bird species suffering declines in population size. BirdWatch Ireland and the Royal Society for the Protection of Birds have identified and classified these species by the rate of decline into Red and Amber lists. Red List bird species are of high conservation concern and the Amber List species are of medium conservation. Green listed species are regularly occurring bird species whose conservation status is currently considered favourable. Birds species listed in Annex I of the Birds Directive (2009/147/EC) are considered a conservation priority. Species recorded within the site are shown in **Table 8.**

Table 8: Bird Species recorded during site survey on the 08th of October 2018

Species		Birds Directive Annex			BOCCI	
		I	II	III	Red List	Amber List
Erithacus rubecula	Robin					X
Sturnusvulgaris	Starling					X
Parus major	Great tit					
Turdus merula	Blackbird					
Troglodytes troglodytes	Wren					
Corvus frugilegus	Rook					
Anas platyrhynchos	Mallard		X	X		
Prunella modularis	Dunnock					
Regulusregulus	Goldcrest					X
Columba livia f. domestica	Feral Pigeon					
Pica pica	Magpie					
Symbol	**Description**					
I	**Annex 1**: species and sub-species are particularly threatened. Member States must designate Special Protection Areas (SPAs) for their survival and all migratory bird species.					
II	**Annex 2**: bird species can be hunted. However, the hunting periods are limited and hunting is forbidden when birds are at their most vulnerable: during their return migration to nesting areas, reproduction and the raising of their chicks.					
III	**Annex 3**: overall, activities that directly threaten birds, such as their deliberate killing, capture or trade, or the destruction of their nests, are banned. With certain restrictions, Member States can allow some of these activities for species listed here.					

Overall, the study area is of a local value for a range of terrestrial bird species that are common in the Irish countryside. There may be a short-term impact on feeding patterns during construction but the long-term impact is predicted to be negligible. It is noted that the loss of habitat associated with this project will be negligible in the context of similar habitat available in the wider landscape. The habitat affected is of minimal value for birds.

10. Assessment of Potential Impacts

All potential impacts would relate to direct and indirect impacts to relevant habitats and fauna of the Great Island Channel SAC and the Cork Harbour SPA. Impacts are based on the EC Article 6 Guidance Document (2001), professional judgement and criteria or standards where available.

The potential impacts associated with the proposed development are discussed in the following section with respect to their likelihood to have significant impacts on Natura 2000 sites. As part of the assessment direct, indirect and cumulative impacts were considered. Direct impacts refer to habitat loss or fragmentation arising from land-take requirements for development. Indirect and secondary impacts do not have a straight-line route between cause and effect, and it is potentially more challenging to ensure that all the possible indirect

impacts of the project/plan - in combination with other plans and projects have been established.

As part of the assessment the potential for impacts associated with the development were reviewed as outlined below:

- Loss of Habitat
- Impacts from noise and disturbance
- Impacts on Water Quality including Potential Increase in the Discharges from Carrigrennan WWTP
- Cumulative Impacts

10.1 Loss of habitat

The proposed works area is not located within a designated site and the habitats recorded within the works area do not correspond to habitats listed on Annex 1 of the Habitats Directive or to qualifying habitats for the Great Island Channel SAC.

The habitats within the development area may be utilised on occasions by common birds for feeding, however the area to be affected is not likely to be a critical feeding resource for these species in the context of the wider landscape.

No foraging habitat of significant value for species listed as qualifying interests for the Cork Harbour SPA will be affected. No breeding habitat for species listed as qualifying interests for the Cork Harbour SPA will be affected. Therefore, the proposed development will not result in any significant deterioration in habitat quality or loss of habitat within the Cork Harbour SPA.

The proposed development will not result in any loss of habitat within Natura 2000 sites. The recorded habitats are considered of low value at a local level and are common in the surrounding landscape. No potential for habitat fragmentation has been identified.

10.2 Impacts from noise and disturbance

Potentially increased noise and disturbance associated with the site works or with the occupancy of the completed dwellings, could cause disturbance/displacement of fauna. If of sufficient severity, there could be impacts on reproductive success. With respect to birds, the Cork Harbour SPA is located 5.9km east of the site and no impacts on birds within the SPA will occur. The habitats within the proposed development area are not considered of value for any of these bird species.

10.3 Impacts on Water Quality

Potential impacts on aquatic habitats which can arise from this type of development include increased silt levels in surface water run-off, inadvertent spillages of hydrocarbons from fuel and hydraulic fluid and increased nutrients from treated waste water. Inadvertent spillages of hydrocarbons during construction could introduce toxic chemicals into the aquatic environment via surface water run-off or groundwater contamination and have a direct toxicological impact on habitats and fauna

If of sufficient severity, adult fish could theoretically be affected by increased silt levels as gills may become damaged by exposure to elevated suspended solids levels. Aquatic plant communities may also be affected by increased siltation. Elevated silt levels could theoretically, if of sufficient magnitude, result in changes in the ecology of aquatic habitats. Given the location of the work, the absence of surface features in proximity to the proposed development and the distance of the proposed development from the estuarine environment, the robust nature of qualifying habitats (Mudflats and sandflats not covered by seawater at low tide [1140] and Atlantic salt meadows (Glauco-Puccinellietalia maritimae) [1330]) and the dilution provided in the estuarine environment, any impacts on water quality due to elevated silt levels or minor spills of hydrocarbons during construction will be negligible.

The construction stage of the proposed development will not impact surface water quality nor interfere with the conservation objectives of the Great Island Channel SAC and the Cork Harbour SPA. There are no high value habitats in proximity to the proposed works and the habitats recorded on site do not correspond to the habitats listed as qualifying interests for the Great Island Channel SAC. Therefore, no significant impacts on this Natura 2000 site is envisaged.

10.3.1 Potential Increase in the Discharges from Carrigrennan WWTP (Indirect Impact)

Once constructed, surface and wastewater from the proposed development will be conveyed for treatment to Carrigrennan Waste Water Treatment Plant (WWTP) which is located approximately 12.6km east of the proposed development site. The location of Carrigrennan WWTP relative to the proposed development and the Great Island Channel SAC and the Cork Harbour SPA is illustrated in **Figures 2 & 3.**

Figure 3: Location of Carrigrennan WWTP in relation to the Great Island Channel SAC and the Cork Harbour SPA.

The proposed development has the potential to have an indirect impact on the water quality of the River Lee (Lough Mahon Estuary) via discharges to Carrigrennan (WWTP). The WWTP obtained a discharge licence (Reg: D0033-01) from the Environmental Protection

Agency in 2009 and has assigned emission limit values (ELV's) for a range of parameters to ensure a high degree of protection to Lough Mahon.

The agglomeration (populated area consisting of a city and its suburbs) comprises of Cork City and adjacent areas in Cork County, including Tramore Valley, Bishopstown, Douglas, and Rochestown, and also includes Glanmire, Glounthaune and Little Island adjacent to the Waste Water Treatment Plant. A total pipe network of over 550Km is in place in the City network comprising approximately 40% Combined Sewers, and 30% each, separated, Foul and Surface Water Sewers. In addition, there are approximately 28 km of Rising Mains. There are 34 Pumping Stations in total on the wastewater works, (27 in the City Council Network), a number of which have pumped overflows in the event of storm events, and the majority of which have gravity overflows in the event of emergencies associated with the operation of the pumps. In addition, there are approximately fifty other stormwater overflow locations, largely associated with 62 Combined Sewer Overflows (CSO's) and including an untreated Secondary discharge into the River Lee North Channel adjacent to St. Patrick's Bridge in the City Centre. A central collection chamber, incorporating screening and grit removal, gathers the flows from the City and adjacent areas, including Tramore Valley, Douglas, and Rochestown. Twin 1200mm diameter siphons are laid from this, the Ballinure Header Chamber, under Lough Mahon to the Treatment plant at Carrigrennan, a distance of over 4.5km. Local flows from Glanmire, Glounthaune and Little Island run directly to the plant at Carrigrennan.

The agglomeration is served by a wastewater treatment plant with a Plant Capacity PE of 413,200. The Waste Water Treatment Plant (WWTP) consists of two treatment activities, namely wastewater treatment and solid treatment. The various wastewater treatment stages include the following:

- Screening (5mm) and De-gritting: Local flows only, flow from City previously screened and de-gritted at Ballinure Header Chamber.
- Inflow Measurement & Sampling
- Storm Water Treatment: 4 Tanks (storage/settlement/return/overflow)
- Pre-Aeration, with odour control treatment of removed gases
- Primary Clarification: 2 Settlement Tanks, (covered) sedimentation/ removal of settable solids
- Secondary Treatment: Sequencing Batch Reactor, 8 Rectangular basins
- Outflow Measurement & Sampling
- Effluent Discharge

The solid treatment stages include the following:

- Sludge Treatment
- Thickening
- Digestion
- Dewatering and Drying

The sludge is anaerobically digested during which Biogas is produced. This Biogas is used on site to mix the sludge in the digestors, heat the sludge as it is re-circulated, and pasteurise and dry the sludge to 90% dry solids. The sludge contains 5% Nitrogen, 5% Phosphorous and it has no significant heavy metals making it ideal for agricultural use.

The agglomeration consists of one primary discharge point (SW001) which discharges into Lough Mahon. The discharge licence assigns a number of ELV's for biochemical oxygen demand (BOD), chemical oxygen demand (COD), total suspended solids (TSS), total P, total N and pH. The ELVs are set based on the full design capacity (P.E. 413,200) and are aimed at providing a high degree of protection to the receiving water body. The design capacity of the plant was based on 53% of total load coming from industrial sources. The WWTP currently has an average population equivalent (P.E) of 325,748.

It is noted that the proposed occupancy of the housing development is 202.5 persons. This would increase the WWTP P.E. from 325,748 to 325,950.5 which is within the 413,200 P.E. design capacity. Therefore, with the addition of emissions from the proposed housing development to the WWTP, it would increase its operational load to 79% of its design capacity with a residual capacity of 21%. Thus, given the limited scale of the proposed development and the ability of the WWTP to cater for the additional loading, no impact is expected.

The Annual Environmental Report for Carrigrennan WWTP (D0033-01) 2017 was reviewed. **Table 9** provides a summary of the current operating conditions for the WWTP from the main effluent discharge (SW001) obtained from the most recent Environmental Protection Agency Annual Environment Report (2017).

Table 9: Effluent Monitoring

	BOD (mg/l) [2]	**COD (mg/l) [2]**	**TSS (mg/l) [2]**	**Total P (mg/l)**	**Total N (mg/l)**	**pH**
WWDL ELV (Schedule A1)	25	125	35	2.5	10	6-9
ELV with Condition 2 Interpretation	50	250	87.58	3	12	6-9
No. of Samples	260	260	260	27	27	260
No. sample results above WWDL ELV	9	10	10	13	27	0
No Samples above ELV with condition 2 interpretation	0	0	0	8	27	0
Annual Mean (For parameters ELV)	13.71	87.38	18.41	2.61	26.00	N/A
Overall Compliance	Pass	Pass	Pass	Fail	Fail	Pass

The AER noted that the non-compliances relating to Total Phosphorus and Total Nitrogen were due to the WWTP not being designed for nutrient removal. The EPA have identified that the limiting nutrient in the receiving waters is total phosphorus. It is expected that the ELV for total nitrogen will be amended in the licence.

Ambient monitoring results for the Carrigrennan WWTP are shown in **Table 10**.

Table 10. Ambient Water Quality Monitoring Results

Ambient Monitoring Point from WWDL (or as agreed with EPA)	**Irish Grid Reference**	**EPA Feature Coding Tool Code**	**Current WFD**

	Easting	Northing		Status
Inland Surface Water				
M01 Curraheen Road Bridge	162,843	69,176	RS19T050890	Poor
M02 Carrigrohane Bridge	162,863	71,034	RS19C120110	Poor
M03 County Hall	165,003	71,212	RS19C120740	Poor
M04 Bandon Road	164,101	68,782	RS19G040140	Poor
M05 Woodhaven Estate	164,344	69,415	RS19G04019	Poor
M06 Glasheen (Cork City) - Sandbrook Estate	165,278	69,503	RS19G040300	Poor
M07 Clashduv Road	165,697	70,336	RS19G040490	Poor
M08 Glasheen Bridge	165,401	70,768	RS19G040700	Poor
M09 Blackstone Bridge	165,691	74,463	RS19B140110	Moderate
M10 Kilnap	166,291	74,796	RS19G880990	Moderate
M11 Bride (Cork City) - Fitz's Boreen	166,925	74,246	RS19B140300	Moderate
M12 Blackpool (Bride RS19B14)	167,422	73,340	RS19B140800	Moderate
M13 Glen Rec. Park	168,942	73,453	RS19G090400	Moderate
M14 Spring Lane	167,868	73,539	RS19G090800	Moderate
M15 leitrim Street	167,496	72,342	RS19K750900	Moderate
Transitional & Coastal Waters				
C9 Tivoli	170,242	72,195	TW04003159LE2006	Moderate
C7 Blackrock Castle	172,537	72,182	TW05003157LE4004	Moderate
C8 Mid Lough Mahon	174,650	70,440	TW04003159LE2005	Moderate
C6 End Lough Mahon	177,040	69,408	TW05003157LE4005	Moderate
C5 Haulbowline	178,090	65,386	CW05003150LE8004	Moderate

As can be seen from **Table 10**, monitoring stations results within the agglomeration range from poor to moderate water quality. It is however noted that the Lough Mahon transitional waters have a large assimilative capacity and the Mid Lough Mahon monitoring point is located in close proximity to the Primary Discharge location and the water quality is of moderate status.

Overall, the discharge from the Wastewater Treatment Plant does not have an observable negative impact on receiving water quality nor a negative impact on the Water Framework Directive Status.

The addition of the effluent discharge from the proposed housing development to the Carrigrennan WWTP is within its design capacity and will not comprise the operational capability of the WWTP to treat effluent to comply with emission limit values. It is therefore considered that the impacts from the proposed development are negligible given current operating condition of the WWTP.

10.4 Cumulative Impacts

Cumulative impacts refer to a series of individually impacts that may, in combination, produce a significant impact. The underlying intention of this in combination provision is to take account of cumulative impacts from existing or proposed plans and projects and these will often only occur over time.

High negative threats, pressures and activities identified for the Great Island Channel SAC and the Cork Harbour SPA include roads, motorways, port areas, industrial or commercial areas, urbanised areas, human habitation, marine and freshwater aquaculture and reclamation of land from sea, estuary or marsh.

The surrounding landscape in proximity to the proposed development is heavily urbanised. Wastewater is also discharged from other settlements into Cork Harbour (e.g. Midleton) and from local industries. However, in the absence of any significant impact associated with this project no cumulative impacts on water quality have been identified. Similarly, no significant cumulative impacts in relation to noise and disturbance have been identified.

11. Conclusion

According to the guidance published by the NPWS (DoEHLG, 2009), Screening for Appropriate Assessment can either identify that a Natura Impact Statement (NIS) is not required where:

(1) A project/proposal is directly related to the management of the site.
(2) There is no potential for significant effects affecting the Natura 2000 network

Where the screening process identifies that significant effects are certain, likely or uncertain the project must either proceed to Stage 2 Appropriate Assessment or be rejected.

The proposed works area, does not lay within the Great Island Channel SAC and the Cork Harbour SPA and does not support the species or habitats for which these Natura 2000 sites were selected. Both surface and wastewater emissions from the site will be managed to ensure that the water quality of the nearby waters is not compromised. The proposed development will not have any significant impact on Carrigrennan WWTP and its ability to maintain with ELV's therefore no cumulative impacts on water quality have been identified.

Based on the above, the project does not present any risk of a direct adverse effect on either the habitats or species for which this Natura 2000 site was selected.

The likely impacts that will arise from the proposed works have been examined in the context of a number of factors that could potentially impact upon the integrity of the Natura 2000 network. On the basis of the findings of this Screening for Appropriate Assessment, it is concluded that the development:

(1) Is not directly connected with or necessary to the management of a Natura 2000 site and
(2) Will not have significant impacts on the Natura 2000 network.

It is concluded therefore that the proposed development will not have a significant impact on qualifying interests and conservation objectives for Natura 2000 sites, and that the integrity of these sites will not be adversely affected. No significant direct, indirect or cumulative impacts on Natura 2000 sites have been identified. A stage 2 Appropriate Assessment is not considered necessary.

The Appropriate Assessment Screening concluded that the proposed development would not be likely to have a significant effect on any Natura 2000 site.

12. Reference List

Environmental Protection Agency Ireland (http://www.epa.ie/)

Invasivespecies Ireland (http://invasivespeciesireland.com/)

National Biodiversity Data Centre (http://www.biodiversityireland.ie/)

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Appendix 1 Site synopses

Cork Harbour Special Protection Area (Site Code 004030)

Cork Harbour is a large, sheltered bay system, with several river estuaries - principally those of the Rivers Lee, Douglas, Owenboy and Owennacurra. The SPA site comprises most of the main intertidal areas of Cork Harbour, including all of the North Channel, the Douglas River Estuary, inner Lough Mahon, Monkstown Creek, Lough Beg, the Owenboy River Estuary, Whitegate Bay and the Rostellan and Poulnabibe inlets.

Owing to the sheltered conditions, the intertidal flats are often muddy in character. These muds support a range of macro-invertebrates, notably Macoma balthica, Scrobicularia plana, Hydrobia ulvae, Nepthys hombergi, Nereis diversicolor and Corophium volutator. Green algae species occur on the flats, especially Ulva lactua and Enteromorpha spp. Cordgrass (Spartina spp.) has colonised the intertidal flats in places, especially where good shelter exists, such as at Rossleague and Belvelly in the North Channel. Salt marshes are scattered through the site and these provide high tide roosts for the birds. Salt marsh species present include Sea Purslane (Halimione portulacoides), Sea Aster (Aster tripolium), Thrift (Armeria maritima), Common Saltmarsh-grass (Puccinellia maritima), Sea Plantain (Plantago maritima), Laxflowered Sea-lavender (Limonium humile) and Sea Arrowgrass (Triglochin maritima). Some shallow bay water is included in the site. Cork Harbour is adjacent to a major urban centre and a major industrial centre. Rostellan Lake is a small brackish lake that is used by swans throughout the winter. The site also includes some marginal wet grassland areas used by feeding and roosting birds.

The site is a Special Protection Area (SPA) under the E.U. Birds Directive, of special conservation interest for the following species: Little Grebe, Great Crested Grebe, Cormorant, Grey Heron, Shelduck, Wigeon, Teal, Pintail, Shoveler, Red-breasted Merganser, Oystercatcher, Golden Plover, Grey Plover, Lapwing, Dunlin, Blacktailed Godwit, Bar-tailed Godwit, Curlew, Redshank, Black-headed Gull, Common Gull, Lesser Black-

backed Gull and Common Tern. The site is also of special conservation interest for holding an assemblage of over 20,000 wintering waterbirds. The E.U. Birds Directive pays particular attention to wetlands and, as these form part of this SPA, the site and its associated waterbirds are of special conservation interest for Wetland & Waterbirds.

Cork Harbour is an internationally important wetland site, regularly supporting in excess of 20,000 wintering waterfowl, for which it is amongst the top five sites in the country. The two-year mean of summed annual peaks for the entire harbour complex was 55,401 for the period 1995/96 and 1996/97. Of particular note is that the site supports internationally important populations of Black-tailed Godwit (905) and Redshank (1,782) - all figures given are average winter means for the two winters 1995/96 and 1996/97. At least 18 other species have populations of national importance, as follows: Little Grebe (51), Great Crested Grebe (204), Cormorant (705), Grey Heron (63), Shelduck (2,093), Wigeon (1,852), Teal (922), Pintail (66), Shoveler (57), Red-breasted Merganser (88), Oystercatcher (1,404), Golden Plover (3,653), Grey Plover (84), Lapwing (7,688), Dunlin (10,373), Bartailed Godwit (417), Curlew (1,325) and Greenshank (26). The Shelduck population is the largest in the country (over 10% of national total). The site has regionally or locally important populations of a range of other species, including Whooper Swan (10), Pochard (145) and Turnstone (79). Other species using the site include Gadwall (13), Mallard (456), Tufted Duck (113), Goldeneye (31), Coot (53), Mute Swan (38), Ringed Plover (34) and Knot (38). Cork Harbour is a nationally important site for gulls in winter and autumn, especially Black-headed Gull (4,704), Common Gull (3,180) and Lesser Black-backed Gull (1,440).

A range of passage waders occurs regularly in autumn, including such species as Ruff (5-10), Spotted Redshank (1-5) and Green Sandpiper (1-5). Numbers vary between years and usually a few of each of these species over-winter.

The wintering birds in Cork Harbour have been monitored since the 1970s and are counted annually as part of the I-WeBS scheme.

Cork Harbour has a nationally important breeding colony of Common Tern (3-year mean of 69 pairs for the period 1998-2000, with a maximum of 102 pairs in 1995). The birds have nested in Cork Harbour since about 1970, and since 1983 on various artificial structures, notably derelict steel barges and the roof of a Martello Tower. The birds are monitored annually and the chicks are ringed.

Extensive areas of estuarine habitat have been reclaimed since about the 1950s for industrial, port-related and road projects, and further reclamation remains a threat. As Cork Harbour is adjacent to a major urban centre and a major industrial centre, water quality is variable, with the estuary of the River Lee and parts of the Inner Harbour being somewhat eutrophic. However, the polluted conditions may not be having significant impacts on the bird populations. Oil pollution from shipping in Cork Harbour is a general threat. Recreational activities are high in some areas of the harbour, including jet skiing which causes disturbance to roosting birds.

Cork Harbour is of major ornithological significance, being of international importance both for the total numbers of wintering birds (i.e. > 20,000) and also for its populations of Black-tailed Godwit and Redshank. In addition, there are at least 18 wintering species that have populations of national importance, as well as a nationally important breeding colony of

Common Tern. Several of the species which occur regularly are listed on Annex I of the E.U. Birds Directive, i.e. Whooper Swan, Golden Plover, Bar-tailed Godwit, Ruff and Common Tern. The site provides both feeding and roosting sites for the various bird species that use it.

Great Island Channel Special Area of Conservation (Site Code 001058)

The Great Island Channel stretches from Little Island to Midleton, with its southern boundary being formed by Great Island. It is an integral part of Cork Harbour which contains several other sites of conservation interest. Geologically, Cork Harbour consists of two large areas of open water in a limestone basin, separated from each other and the open sea by ridges of Old Red Sandstone. Within this system, Great Island Channel forms the eastern stretch of the river basin and, compared to the rest of Cork Harbour, is relatively undisturbed. Within the site is the estuary of the Owennacurra and Dungourney Rivers. These rivers, which flow through Midleton, provide the main source of freshwater to the North Channel. The site is a Special Area of Conservation (SAC) selected for the following habitats and/or species listed on Annex I / II of the E.U. Habitats Directive (* = priority; numbers in brackets are Natura 2000 codes):

- [1140] Tidal Mudflats and Sandflats
- [1330] Atlantic Salt Meadows

The main habitats of conservation interest in Great Island Channel SAC are the sheltered tidal sand and mudflats and the Atlantic salt meadows. Owing to the sheltered conditions, the intertidal flats are composed mainly of soft muds. These muds support a range of macro-invertebrates, notably Macoma balthica, Scrobicularia plana, Hydrobia ulvae, Nepthys hombergi, Nereis diversicolor and Corophium volutator. Green algal species occur on the flats, especially Ulva lactua and Enteromorpha spp. Cordgrass (Spartina spp.) has colonised the intertidal flats in places, especially at Rossleague and Belvelly.

The saltmarshes are scattered through the site and are all of the estuarine type on mud substrate. Species present include Sea Purslane (Halimione portulacoides), Sea Aster (Aster tripolium), Thrift (Armeria maritima), Common Saltmarsh-grass (Puccinellia maritima), Sea Plantain (Plantago maritima), Greater Sea-spurrey (Spergularia media), Lax-flowered Sea-lavender (Limonium humile), Sea Arrowgrass (Triglochin maritimum), Sea Mayweed (Matricaria maritima) and Red Fescue (Festuca rubra).

The site is extremely important for wintering waterfowl and is considered to contain three of the top five areas within Cork Harbour, namely North Channel, Harper's Island and Belvelly-Marino Point. Shelduck is the most frequent duck species with 800-1,000 birds centred on the Fota/Marino Point area. There are also large flocks of Teal and Wigeon, especially at the eastern end. Waders occur in the greatest density north of Rosslare, with Dunlin, Godwit, Curlew and Golden Plover the commonest species. A population of about 80 Grey Plover is a notable feature of the area. All the mudflats support feeding birds; the main roost sites are at Weir Island and Brown Island, and to the north of Fota at Killacloyne and Harper’s Island. Ahanesk supports a roost also but is subject to disturbance. The numbers of Grey Plover and Shelduck, as given above, are of national importance.

The site is an integral part of Cork Harbour which is a wetland of international importance for the birds it supports. Overall, Cork Harbour regularly holds over 20,000 waterfowl and

contains internationally important numbers of Black-tailed Godwit (1,181) and Redshank (1,896), along with nationally important numbers of nineteen other species. Furthermore, it contains large Dunlin (12,019) and Lapwing (12,528) flocks. All counts are average peaks, 1994/95 – 1996/97. Much of the site falls within Cork Harbour Special Protection Area, an important bird area designated under the E.U. Birds Directive.

While the main land use within the site is aquaculture (oyster farming), the greatest threats to its conservation significance come from road works, infilling, sewage outflows and possible marina developments.

The site is of major importance for the two habitats listed on Annex I of the E.U. Habitats Directive, as well as for its important numbers of wintering waders and wildfowl. It also supports a good invertebrate fauna.

SUB THRESHOLD EIS SCREENING REPORT
CD-2 HAWKES ROAD

Criteria for determining whether a development would or would not be likely to have significant effects on the environment as per the requirements of Article 120 of the Planning and Development Regulations 2001 as amended

1. CHARACTERISTICS OF PROPOSED DEVELOPMENT	
Size of Proposed Development	The ***CD2 – Hawkes Road*** proposed development comprises of the construction of 67 no. residential units comprising 27 no. apartments in 4 no. three-storey apartment buildings and 40 no. two-storey maisonette units. The development site area is approximately 1.06 hectares.
Cumulation with other Proposed Development	*N/A*
The nature of any associated demolition works (* see article 8 of SI 235 of 2008)	*N/A*
Use of Natural Resources	*Water will be provided by local authority supply. No significant additional use of natural resources required.*
Production of Waste	***Construction waste*** *All wastes generated as part of the construction process will be controlled and managed to ensure environmental protection. All site wastes (hazardous and non-hazardous), will be stored in designated areas and taken off site frequently to prevent large quantities accumulating. Careful ordering of materials will be undertaken to minimise quantities present on-site.* *The waste management plan shall form part of the general housekeeping of the site. Prior to commencement of works the Main Contractor and all sub-contractors shall be informed of their obligation to reduce the amount of waste material being generated on site and also to keep the site clean and segregate waste materials. Waste materials shall be segregated.* *The employment of good construction management practices will minimise the risk of pollution of soil, storm water run-off, seawater or groundwater. The Construction Industry Research and Information Association (CIRIA) in the UK has issued a guidance note on the control and management of water pollution from construction sites, Control of Water Pollution from Construction Sites, guidance for consultants and contractors (Masters-Williams et al 2001).* *All site personnel will be trained and aware of the appropriate action in the event of an emergency, such as the spillage of potentially polluting substances. Spill kits are to be kept on site.*
Pollution and Nuisances	***Air*** *As the site is located within a built-up area there are sensitive receptors (occupied dwellings) with respect to air quality in close proximity to the proposed development site. Most of the dust would be deposited close to the potential source and any impacts from dust deposition would typically be within 100 meters or so of the construction area. As part of the Environmental, Construction & Waste Management Plan dust minimisation mitigation measures will be specified. Such measures i.e. vehicles within the site shall have their speeds restricted where there is a potential for dust generation, material handling systems and site stockpiling of materials shall be designed and laid out to minimise exposure to wind etc. are effective at minimising dust levels. No impediments to the successful implementation of these measures have been identified. In this context no significant impact from dust is predicted to occur during construction or during operation.* ***Noise*** *Best practice noise and vibration control measures will be employed by the contractor. The best practice measures set out in BS 5228 (2009) Parts 1 and 2 will be complied with. This includes guidance on several aspects of construction site environmental measures, including, but not limited to the following:* • *The potential for any item of plant to generate noise will be assessed prior to the item being brought onto the site. The least noisy item should be selected.* • *If replacing a noisy item of plant is not a viable or practical option, consideration will be given to noise control "at source". This refers to the modification of an item of plant or the application of improved sound reduction methods in consultation with the supplier. For example, resonance effects in panel work or cover plates can be reduced through stiffening or application of damping compounds; rattling and grinding noises can often be controlled by fixing resilient materials in between the surfaces in contact.* • *Mobile plant will be switched off when not in use and will not be left idling.* • *All items of plant will be subject to regular maintenance. Such maintenance can prevent unnecessary increases in plant noise and can serve to prolong the effectiveness of noise control measures.* *There will be a short-term increase in noise levels during construction which will be minimised by appropriate mitigation measures. In the context of existing noise levels in the existing environment,*

	the impact from noise during construction is predicted to be minor and short-term. During occupancy the increase in noise levels will be negligible. ***Discharges of wastewater and surface water*** *The development will consist of the construction of a residential development containing 67 no. units consisting of the following: comprising* ***APARTMENTS | No. 27:*** ***- No. 10 | 1 bed UNITS*** ***- No. 17 | 2 bed UNITS*** ***MAISONETTE | No. 40*** ***- No. 34 | 2 bed UNITS*** ***- No. 06 | 3 bed UNITS*** *A stormwater management plan is to be adopted as part of the proposed development. This will involve using an attenuation tank located in the north-eastern corner of the site. All surface water runoff arising from the proposed paved development will be drained away from the site. The attenuation tank is designed for a 100-year storm event.* *The proposed development has the potential to have an indirect impact on the water quality of the River Lee (Lough Mahon Estuary) via discharges to Carrigrennan (WWTP).* *It is noted that the proposed occupancy of the housing development is 202.5 persons. This would increase the WWTP P.E. from 325,748 to 325,950.5 which is within the 413,200 P.E. design capacity. Therefore, with the addition of emissions from the proposed housing development to the WWTP, it would increase its operational load to 79% of its design capacity with a residual capacity of 21%.* *Overall, the current discharge from the Carrigrennan Wastewater Treatment Plant does not have an observable negative impact on receiving water quality and does not have a negative impact on the Water Framework Directive Status.* *The addition of the effluent discharge from the proposed development to the Carrigrennan WWTP is within its design capacity and will not comprise the operational capability of the WWTP to treat effluent to comply with emission limit values. Therefore, the impacts from the proposed development will be negligible given current operating condition of the WWTP and the residual capacity post development.*
Risk of Accidents	*No significant risk to hydrology, hydrogeology or soils has been identified.*

2. LOCATION OF PROPOSED DEVELOPMENT	
Existing Land Use	*The existing land use is a brownfield [cleared] site and has been vacant for over ten years. The likely impacts that will arise from the proposed works have been examined in the context of a number of factors that could potentially impact upon the integrity of the Natura 2000 network. On the basis of the findings of this Screening for Appropriate Assessment, it is concluded that the development:* *(1) Is not directly connected with or necessary to the management of a Natura 2000 site and* *(2) Will not have significant impacts on the Natura 2000 network.* *It is concluded therefore that the proposed development will not have a significant impact on qualifying interests and conservation objectives for Natura 2000 sites, and that the integrity of these sites will not be adversely affected. No significant direct, indirect or cumulative impacts on Natura 2000 sites have been identified. A stage 2 Appropriate Assessment is not considered necessary*
Relative Abundance, Quality and regenerative Capacity of Natural Resources in the Area	*The development will not directly impact on important habitats. Impacts from noise, air and aqueous emissions and disturbance during construction works are not predicted to be significant and no particular impediments to the successful implementation of standard mitigation measures have been identified. There has been no recorded shortages of natural resources in the area – a higher density development will constitute a more efficient use of natural resources in comparison to a lower density development. The key principal natural resources in the area are considered to be groundwater resources. The assessment has determined that the proposed development will not adversely impact on these natural resources. The fresh water requirement for the proposed development is unlikely to have a significant impact on the local groundwater resource.*

2. LOCATION OF PROPOSED DEVELOPMENT	
Absorption Capacity of the Natural Environment	*The development proposals are in keeping with commonly occurring developments in this location and the area has been zoned for the type of use proposed. Consequently it is considered that this area would generally have the ability to absorb such a development. An Appropriate Assessment Screening Report has been prepared in conjunction with the EIA Screening exercise, which demonstrates that there will be no impact on the SAC or SPA. The natural and built environment in this area has the capacity to absorb the proposed development.* *This Bishopstown and Wilton Area plan (AAP 2007) sets out to amplify the existing policy framework in order to ensure that new residential development is of a scale and density appropriate to its location and context, built to a high standard of design and is balanced in terms of dwelling size and type. The proposed development meets these criteria. The design of the development has taken into account the characteristics and architecture of the surrounding environment and will provide regeneration of this area, In this context the visual impact on the surrounding landscape will not be significant.* *The AAP notes that there are eight archaeological monuments located within the plan area. These monuments are listed in the Record of Monuments and Places (RMP) for County Cork. None of these are located within or in proximity to the proposed development.* *The AAP also identifies buildings listed a on the Record of Protected Structures and therefore benefit from protection under the Planning and Development Acts 2000- 2002, and the relevant policies contained in the City Plan, 2004. It also identifies areas of local architectural interest which are considered of local significance. The proposed development will not impact on buildings or groups of buildings within these categories. The proposed development will not impact on important views in the Bishopstown/Wilton Area as identified by the AAP 2007.* *The overall impact on cultural heritage is predicted to be negligible.*

3. CHARACTERISTICS OF POTENTIAL IMPACTS	
Extent of the Impact	*The total site area is 1.06ha. There will be no detrimental impacts on human populations.*
Transfrontier nature of the Impact	*N/A*
Magnitude and Complexity of the Impact	*The magnitude of the impacts will be minor to negligible. No significant cumulative impacts been identified.*
Probability of the Impact	*The probability of significant impacts on the environment is low.*
Duration, Frequency and Reversibility of the Impact	*There will be a net loss of low value habitat which is a non-reversible minor impact. No other significant permanent impacts have been identified.*

SCREENING CONCLUSION STATEMENT

The Environmental Impact Assessment Screening concluded that there is no real likelihood of significant effects therefore an Environmental Impact Assessment is not required.

Please refer to Appendix A for report titled; ***EIAR screening report for a proposed residential development at Bishopstown Road, Bishopstown, Cork*** *prepared by Dixon Brosnan Environmental Consultants, dated May 2020.*

Name:	*Declan Roche*
Position:	*A/ Director of Services - Housing*
Date:	*27th May 2020*

Appendix A

EIAR screening report for a proposed residential development at Bishopstown Road, Bishopstown, Cork

DixonBrosnan

environmental consultants

Project	**EIAR screening report for a proposed residential development at Bishopstown Road, Bishopstown, Cork.**
Client	Total Planning Solutions

Project ref	Report no	Client ref	
1878.1	1878.1	-	

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Date	Rev	Status	Prepared by	
10/10/18	1	1st draft	Carl Dixon M.Sc.	
10/02/20	2	Final issue	Carl Dixon M.Sc.	

v180907

1. Background

DixonBrosnan Environmental Consultants were commissioned to carry out EIAR screening to facilitate the local authority in determining if the proposed development is likely to have a significant effect on the environment thus warranting the completion of an Environmental Impact Assessment Report (formerly EIS)

This report gives due regard to the provisions outlined in the Planning and Development Regulations, 2001 (as amended) and the document "*Guidance for Consent Authorities regarding Sub-Threshold Development" (DOE, 2003).* This report takes into account the EPA document *Guidelines on the information to be contained in Environmental Impact Assessment Reports Draft August 2017.* The publication of the guidelines followed the transposition deadline of 16 May 2017 set down in Directive 2014/52/EU of the European Parliament and of the Council of 16 April 2014 amending Directive 2011/92/EU on the assessment of the effects of certain public and private projects on the environment. The amended Directive uses the term Environmental Impact Assessment Report for what was formerly referred to in Irish legislation as an Environmental Impact Statement. These Guidelines use the new term and its acronym; EIAR.

This report was prepared by Carl Dixon MSc. who has worked on EISs for a range of small and large scale infrastructural projects including housing developments, quarries, gas pipelines, industrial facilities, windfarms etc.

2. Site location and context

The proposed development which is located at the junction of Hawke's Road and Bishopstown Road, Bishopstown Road, Bishopstown, Cork City, will consist of the construction of a residential development containing 67 no. units over 8 blocks ranging in height from 1 to 3 storeys, comprising

- 10 No. 1 Bedroom Apartments
- 17 No. 2 Bedroom Apartments
- 34 No. 2 Bedroom Maisonette Units
- 6 No. 3 Bedroom Maisonette Units

The proposed development area is 1.06ha in size and site works will include removal of existing vegetation on site.

The development also includes, associated car parking comprising 23 no. car parking spaces as well as 34 no. bike parking spaces. The proposed development includes [but is not limited to] the provision of landscaping, footpaths, drainage and all associated site development works at Bishopstown Road, Bishopstown, Co Cork.

Effluent from the proposed development will be conveyed to Carrigrennan Waste Water Treatment Plant (WWTP) for treatment prior to discharging into the transitional waters of Lough Mahon. Overall, the proposed development represents a population equivalent of 202.5 persons. The foul waste within the development will be collected via an internal gravity network and will discharge to the existing public foul sewer. Water will be provided by local authority supply. No significant additional use of natural resources required.

A stormwater management plan is to be adopted as part of the proposed development. This will involve using an attenuation tank located in the north-eastern corner of the site. All surface water runoff arising from the proposed paved development will be drained away from the site. The attenuation tank is designed for a 100-year storm event.

Hydrocarbon treatment will also be provided as part of the development, this will consist of a Conder CSNB15s interceptor with a catchment capacity of 8333m². The proposed petrol

interceptors from Conder Environmental also include a silt storage capacity in addition to the oil storage capacity that allow silt to be collected in the interceptor prior to discharge to the proposed attenuation tanks. This silt build-up can then be removed from the tanks.

Overall the proposed development will have sufficient capacity to prevent pollutants being flushed through the unit during storm conditions and ensure retention of water during storm events to allow it to slowly release in a controlled discharge to a surface water.

As indicated in **Figure 1** the site is located within a suburban area and there are no high value landscapes in proximity to the proposed development. The proposed development site has been left derelict for a number of years and as a result has been invaded by a number of herbaceous species and immature trees. Vegetated heaps of spoil exist within the site. The site is largely bound by concrete block walls and hoarding, with treelines composed of a mix of native and non-native deciduous and coniferous species noted to the northwest and east of the site. No habitats of significant value exist within the site and there are no watercourses within or in immediate proximity to the site.

Figure 1 showing site location and context

2. Requirement for an EIAR

The proposed development does not exceed the threshold above which an EIAR is mandatory.

3. Requirement for sub-threshold EIAR

Where a project is of a specified type but does not meet, or exceed, the applicable threshold then the likelihood of the project having significant effects on the environment needs to be considered. Both the adverse and beneficial effects are considered. There is a requirement to carry out EIA where the competent/consent authority considers that a development would be likely to have significant effects on the environment. In particular, in the case of sub-threshold development on sites of conservation sensitivity, the competent/consent authority must formally decide whether or not a project would or would not be likely to have significant effects on the environment.

A small-scale project can have significant effects on the environment if it is in a location of particular environmental sensitivity. Consideration of "significant effects" should not therefore be determined by reference to size only. The nature and location of a project must also be taken into account. This screening assessment has been carried out in accordance with the '*Criteria for determining whether a development would or would not be likely to have significant effects on the environment' as set out in the Appendix of the Environmental Impact Assessment (EIA) Guidance for Consent Authorities regarding Sub-Threshold Development* and *Guidelines on the information to be contained in Environmental Impact Assessment Reports Draft August 2017*

The screening assessment has been carried out in relation to the Characteristics of Proposed Development, Location of Proposed Development and Characteristics of Potential Impacts as detailed below in **Table 1.**

Table 1. Assessment of potential impacts

1. Characteristics of proposed development **The characteristics of proposed development, in particular:**	
– the size of the proposed development,	The site for which the development relates has an area of 1.13ha.
– the cumulation with other proposed development	The proposed development site is located within the suburb of Bishopstown. Cumulative impacts could potentially arise with respects to air quality, visual impacts, noise and waste disposal. Noise levels from the facility will not be significant at the development site boundary in the context of normal background levels and will not cumulatively impact with pre-existing noise sources in the surrounding environment. No significant cumulative impacts or air during construction or operation will occur. The design of the development is appropriate to the location and significant cumulative impacts with respect to visual impact have been identified.
– the nature of any associated demolition works,	The development includes site clearance works including removal of vegetation and spoil and removal of boundary fences. This will be carried out in line with the provisions of a detailed Environmental, Construction & Waste Management Plan which will be prepared prior to construction and which will incorporate any planning conditions. A detailed traffic management will be implemented, and works will comply with health and safety legislation and with a specific risk assessment which will be prepared for the site.
– the use of natural resources,	Water will be provided by local authority supply. No significant additional use of natural resources required.
– the production of waste,	**Construction waste** All wastes generated as part of the construction process will be controlled and managed to ensure environmental protection. All site wastes (hazardous and non-hazardous), will be stored in designated areas and taken off site frequently to prevent large quantities accumulating. Careful ordering of materials will be undertaken to minimise quantities present on-site. The waste management plan shall form part of the general housekeeping of the site. Prior to commencement of works the Main Contractor and all sub-contractors shall be informed of their obligation to reduce the amount of waste material being generated on site and also to keep the site clean and segregate waste materials. Waste materials shall be segregated. The employment of good construction management practices will minimise the risk of pollution of soil, storm water run-off, seawater or groundwater. The Construction Industry Research and Information Association (CIRIA) in the UK has issued a guidance note on the control and management of water pollution from construction sites, Control of Water Pollution from Construction Sites, guidance for consultants and contractors (Masters-Williams et al 2001).

	All site personnel will be trained and aware of the appropriate action in the event of an emergency, such as the spillage of potentially polluting substances. Spill kits are to be kept on site.
– pollution and nuisances,	**Air** As the site is located within a built-up area there are sensitive receptors (occupied dwellings) with respect to air quality in close proximity to the proposed development site. Most of the dust would be deposited close to the potential source and any impacts from dust deposition would typically be within 100 meters or so of the construction area. As part of the Environmental, Construction & Waste Management Plan dust minimisation mitigation measures will be specified. Such measures i.e. vehicles within the site shall have their speeds restricted where there is a potential for dust generation, material handling systems and site stockpiling of materials shall be designed and laid out to minimise exposure to wind etc. are effective at minimising dust levels. No impediments to the successful implementation of these measures have been identified. In this context no significant impact from dust is predicted to occur during construction or during operation. **Noise** Best practice noise and vibration control measures will be employed by the contractor. The best practice measures set out in BS 5228 (2009) Parts 1 and 2 will be complied with. This includes guidance on several aspects of construction site environmental measures, including, but not limited to the following: • The potential for any item of plant to generate noise will be assessed prior to the item being brought onto the site. The least noisy item should be selected. • If replacing a noisy item of plant is not a viable or practical option, consideration will be given to noise control "at source". This refers to the modification of an item of plant or the application of improved sound reduction methods in consultation with the supplier. For example, resonance effects in panel work or cover plates can be reduced through stiffening or application of damping compounds; rattling and grinding noises can often be controlled by fixing resilient materials in between the surfaces in contact. • Mobile plant will be switched off when not in use and will not be left idling. • All items of plant will be subject to regular maintenance. Such maintenance can prevent unnecessary increases in plant noise and can serve to prolong the effectiveness of noise control measures. There will be a short-term increase in noise levels during construction which will be minimised by appropriate mitigation measures. In the context of existing noise levels in the existing environment, the impact from noise during construction is predicted to be minor and short-term. During occupancy the increase in noise levels will be negligible. **Discharges of wastewater and surface water** The development will consist of the construction of a residential development containing 67 no. units consisting of the following: comprising - **10 No. 1 Bedroom Apartments** - **17 No. 2 Bedroom Apartments** - **34 No. 2 Bedroom Maisonette Units** - **6 No. 3 Bedroom Maisonette Units** A stormwater management plan is to be adopted as part of the proposed development. This will involve using an attenuation tank located in the north-eastern corner of the site. All surface water runoff arising from the proposed paved development will be drained away from the site. The attenuation tank is designed for a 100-year storm event. The proposed development has the potential to have an indirect impact on the water quality of the River Lee (Lough Mahon Estuary) via discharges to Carrigrennan (WWTP). It is noted that the proposed occupancy of the housing development is 202.5 persons. This

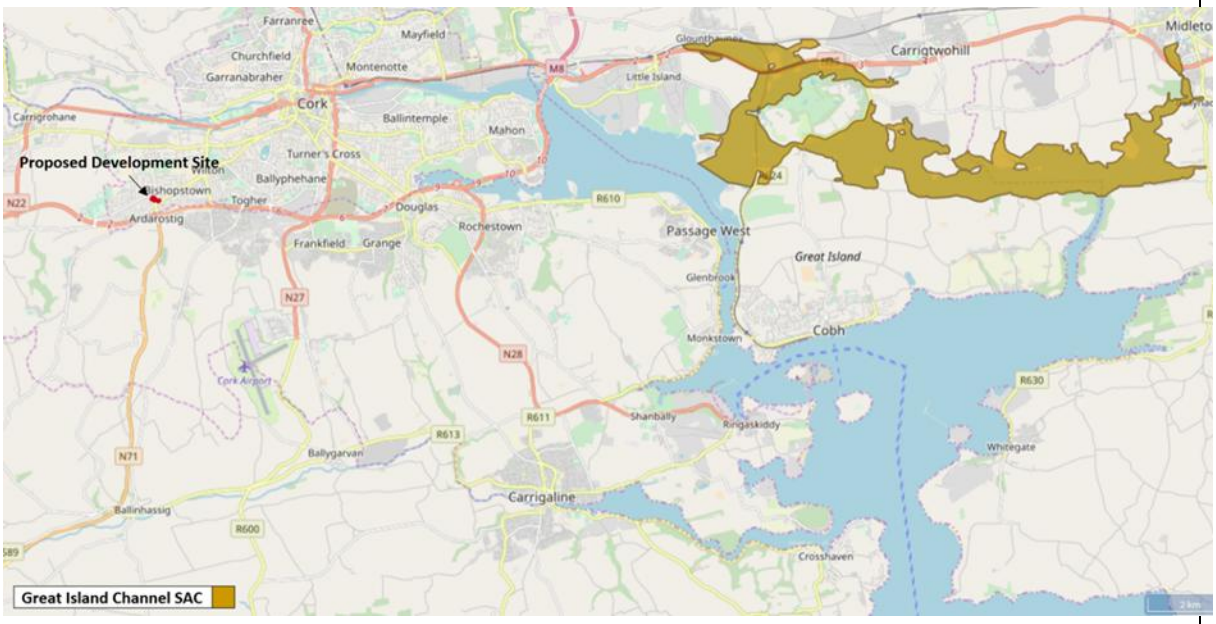
	would increase the WWTP P.E. from 325,748 to 325,950.5 which is within the 413,200 P.E. design capacity. Therefore, with the addition of emissions from the proposed housing development to the WWTP, it would increase its operational load to 79% of its design capacity with a residual capacity of 21%. Overall, the current discharge from the Carrigrennan Wastewater Treatment Plant does not have an observable negative impact on receiving water quality and does not have a negative impact on the Water Framework Directive Status. The addition of the effluent discharge from the proposed development to the Carrigrennan WWTP is within its design capacity and will not comprise the operational capability of the WWTP to treat effluent to comply with emission limit values. Therefore, the impacts from the proposed development will be negligible given current operating condition of the WWTP and the residual capacity post development.
– the risk of accidents, having regard to substances or technologies used.	No risk of accidents above those which occur on standard buildings sites have been identified. Standard mitigation measures will be specified by the detailed Environmental, Construction & Waste Management Plan including the following: All equipment will be maintained in good condition to prevent impacts on water quality. All equipment and machinery will have regular checking for leakages and quality of performance. Oil, petrol and other fuel containers will be double-skinned and bunded to be able to contain 110% volume to guard against potential accidental spills or leakages. Bund specification will conform to the current best practice for oil storage such as Enterprise Irelands Best Practice Guidelines. All construction support activities will be controlled within the site construction compound including office facilities, toilets, canteen etc. materials and waste handling. Refuelling of machinery will occur in designated areas on an impermeable surface away from any drains or watercourses. Adequate spill kits will be available in the event of an accident and staff will be made aware of how to respond to an incident. No significant risk to hydrology, hydrogeology or soils has been identified.

2. Location of proposed development. The environmental sensitivity of geographical areas likely to be affected by proposed development, having regard in particular to:	
- the existing land use,	The site was surveyed by DixonBrosnan Environmental Consultants to determine if habitats or species of ecological value occur within the development site boundary. The site in question is composed of highly modified habitats. These habitats are of low ecological value. No invasive species were recorded. The proposed development will not be located within a designated site and the habitats recorded within the proposed development boundary do not correspond to habitats listed on Annex 1 of the Habitats Directive. Natura 2000 sites within a 15km radius of the proposed development site are listed below in **Table 1**. It is noted that use of a 15km radius is a precautionary measure, as impacts at this distance from the proposed development are highly unlikely in the absence of significant emissions to the environment. The closest Natura 2000 sites are shown in **Figure 2 and** below. Of these sites, a pathway has only been identified for the Great Island Channel SAC (site code 001058) and the Cork Harbour SPA (site code 004030). Wastewater discharges from the proposed development will be conveyed to the Carrigrennan WWTP for treatment prior to discharging into the transitional waters of Lough Mahon, within which the two aforementioned Natura 2000 sites are located. Given the limited scale of the proposed development, the lack of a hydrological connection and the distances

involved no potential risk to other designated sites has been identified.

Table 1. Designated sites and their location relative to the proposed works area.

Natura 2000 Site	Code	Distance at closest point (As the crow flies)
Special Area of Conservation (SAC)		
Great Island Channel	001058	12.67km east of the proposed works area.
Special Protection Area (SPA)		
Cork Harbour	004030	5.93km east of the proposed works area.



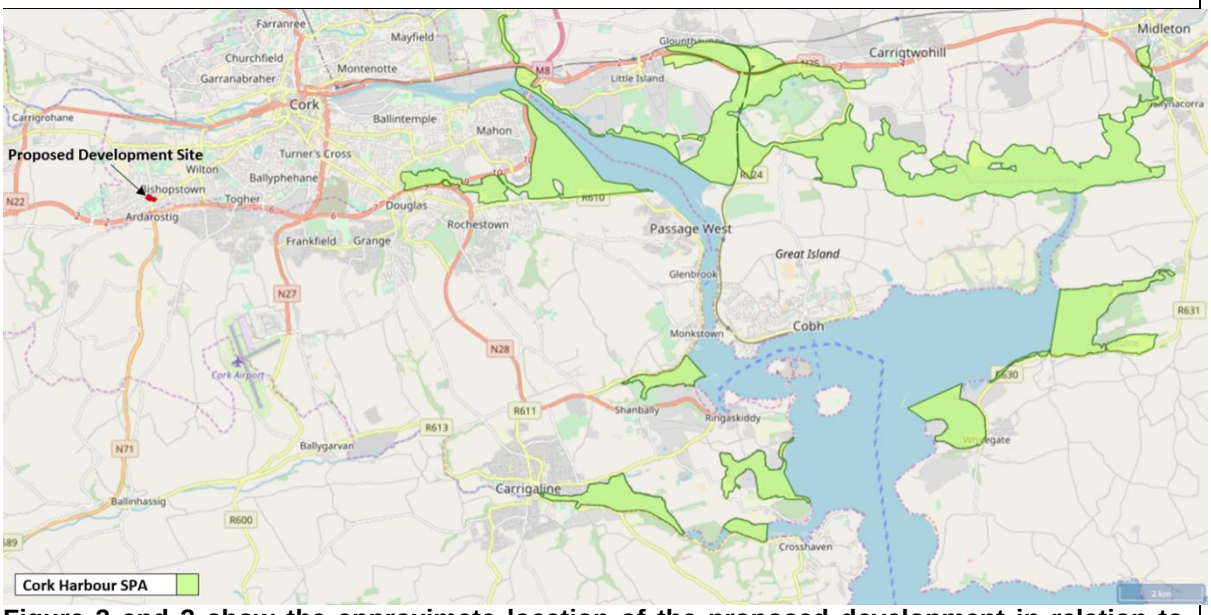


Figure 2 and 3 show the approximate location of the proposed development in relation to nearby Natura 2000 sites.

	A Habitats Directive report was prepared which specifically assessed the potential impacts on the Great Island Channel SAC (site code 001058) and the Cork Harbour SPA (site code 004030). This report concluded that: *The likely impacts that will arise from the proposed works have been examined in the context of a number of factors that could potentially impact upon the integrity of the Natura 2000 network. On the basis of the findings of this Screening for Appropriate Assessment, it is concluded that the development:* *(1) Is not directly connected with or necessary to the management of a Natura 2000 site and* *(2) Will not have significant impacts on the Natura 2000 network.* *It is concluded therefore that the proposed development will not have a significant impact on qualifying interests and conservation objectives for Natura 2000 sites, and that the integrity of these sites will not be adversely affected. No significant direct, indirect or cumulative impacts on Natura 2000 sites have been identified. A stage 2 Appropriate Assessment is not considered necessary.*
- the relative abundance, quality and regenerative capacity of natural resources in the area,	The development will not directly impact on important habitats. Impacts from noise, air and aqueous emissions and disturbance during construction works are not predicted to be significant and no particular impediments to the successful implementation of standard mitigation measures have been identified. There has been no recorded shortages of natural resources in the area – a higher density development will constitute a more efficient use of natural resources in comparison to a lower density development. The key principal natural resources in the area are considered to be groundwater resources. The assessment has determined that the proposed development will not adversely impact on these natural resources. The fresh water requirement for the proposed development is unlikely to have a significant impact on the local groundwater resource.
- the absorption capacity of the natural environment, paying particular attention to the following areas: (a) wetlands, (b) coastal zones, (c) mountain and forest areas, (d) nature reserves and parks, (e) areas classified or protected under legislation, including special protection areas designated pursuant to Directives 79/409/EEC	*The development proposals are in keeping with commonly occurring developments in this location and the area has been zoned for the type of use proposed. Consequently it is considered that this area would generally have the ability to absorb such a development.An Appropriate Assessment Screening Report has been prepared in conjunction with the EIA Screening exercise, which demonstrates that there will be no impact on the SAC or SPA. The natural and built environment in this area has the capacity to absorb the proposed development. Refer to Figures 2 and 3 on page 7.* This Bishopstown and Wilton Area plan (AAP 2007) sets out to amplify the existing policy framework in order to ensure that new residential development is of a scale and density appropriate to its location and context, built to a high standard of design and is balanced in terms of dwelling size and type. The proposed development meets these criteria. The design of the development has taken into account the characteristics and architecture of the surrounding environment and will provide regeneration of this area, In this context the visual impact on the surrounding landscape will not be significant. The AAP notes that there are eight archaeological monuments located within the plan area. These monuments are listed in the Record of Monuments and Places (RMP) for County Cork. None of these are located within or in proximity to the proposed development. The AAP also identifies buildings listed a on the Record of Protected Structures and therefore benefit from protection under the Planning and Development Acts 2000- 2002, and the relevant policies contained in the City Plan, 2004. It also identifies areas of local architectural interest which are considered of local significance. The proposed development will not impact on buildings or groups of buildings within these categories. The proposed development will not impact on important views in the Bishopstown/Wilton Area as identified by the AAP 2007. The overall impact on cultural heritage is predicted to be negligible.

and 92/43/EEC, (f) areas in which the environmental quality standards laid down in legislation of the EU have already been exceeded, (g) densely populated areas, (h) landscapes of historical, cultural or archaeological significance.	

4. Characteristics of potential impacts	
The potential significant effects of proposed development in relation to criteria set out under paragraphs 1 and 2 above, and having regard in particular to:	
- the extent of the impact (geographical area and size of the affected population),	The total site area is 1.13ha. There will be no detrimental impacts on human populations.
- the trans-frontier nature of the impact,	There will be no trans-frontier impacts
- the magnitude and complexity of the impact,	The magnitude of the impacts will be minor to negligible. No significant cumulative impacts been identified.
- the probability of the impact,	The probability of significant impacts on the environment is low.
- the duration, frequency and reversibility of the impact.	There will be a net loss of low value habitat which is a non-reversible minor impact. No other significant permanent impacts have been identified.

5. Conclusions

Potential impacts on human beings will be short-term and not significant and there will be mitigation measures in place to control traffic, noise, and dust. No significant impacts on cultural heritage or landscape will occur and no significant impacts with respect to waste or discharges or wastewater were identified. Most of the potential impacts will be mitigated by the preparation of a Construction Environmental Management Plan (CEMP) that should be agreed upon by all parties before the commencement of the works. No significant cumulative impact between this development and other elements with the surrounding landscape has been identified.

There will be net positive benefit resulting from the proposed project due to increased housing and regeneration. Overall it is concluded that an EIAR (EIS) is not required as the risk of significant impacts is negligible. **The Environmental Impact Assessment Screening**

concluded that there is no real likelihood of significant effects therefore an Environmental Impact Assessment is not required.

PLANNING STATEMENT in support of development located at:

BISHOPSTOWN ROAD

Submitted to

Cork City Council

June 2020

BON Total Planning Solutions

TABLE OF CONTENTS

Executive Summary

This development scheme is presented in partnership with Cork City Council for the development of a site located at the corner of Hawkes Road & Bishopstown Road, Cork City. The proposed scheme will be accessed off Bishopstown Road.

This development proposal is a key part of a much broader and concerted social housing provision process occurring across the city at the moment and this mechanism is a welcomed and proactive housing provision measure. Housing provision interventions were last introduced in Cork City after the recession of the early 1980's and the 'Revolving Fund' scheme was operated by Cork City Council to address the severe underprovision of housing that occurred as a result of a prolonged period of an economic downturn. We are now in a similar situation and the demand for housing across all sectors is far exceeding supply and as such coordinated efforts are needed to rectify this situation. This scheme aims to make a deliberate and high quality contribution to this process and should go some way to contributing much needed housing units, as such, the proposed development is a vital part of achieving key social, environmental and economic imperatives.

The scheme constitutes the development of one of the prime undeveloped sites within the south-western suburbs of the city and is suitable for residential development as per the current zoning and planning policy as well as having a positive planning history for residential development on site. The scheme has taken account the existing nature of the area [primarily residential] as well as the planning process associated with previous planning applications associated with the subject site. This is a strong residential area with several local services and amenities. This is one of the more aging sectors of the city and the provision of a downsizing development is viewed as an appropriate use for this 1.06ha site in Bishopstown.

This planning statement puts forth an evidence based consideration that the proposed scheme of 68 no. units represents a well considered proposal for the site in its context within an established residential area and makes the case for an appropriate scale of sustainable development which meets the development management standards set out in the governing Plans.

Introduction

This report has been prepared by Butler O'Neill Total Planning Solutions which provides an evidence based account of the planning and development contexts within which the development is being proposed and presents supporting information about the proposed scheme. The initiative to improve and reform the existing/previous approach to housing delivery is welcomed this development can be an exemplar of housing delivery for the future of social housing provision in Ireland. This represents a key opportunity for meaningful change in this established community as well as providing the context for improving the way in which housing is delivered.

This planning statement provides an overview of the site in its immediate and wider contexts as well as reviewing the relevant planning history and planning policy context within which the site is located. A key consideration upon which the development of the site was predicated was creating a scheme which is appropriate and addresses the issues with the previously granted permissions. The proposal has taken account of and been influenced by the current planning policy and development management standards governing the site.

It is considered that, from a wider contextual perspective, development of a scheme at this location, within an established residential area represents the need for integrated communities, it is acknowledged that housing needs to be provided and population targets must be achieved, however it is equally important that this is located in the right locations and appropriate densities are achieved. Greater densities must be implemented in urban settlements, such as Bishopstown, in order to achieve sustainable communities. In this case, the proposed scheme constitutes a positive addition to an already strong and established residential area.

The proposed scheme represents the best opportunity to deliver units within a well-established and successful residential area in a way which provides downsizing units which will allow for the freeing up of existing dwellings for families in Cork City and elevate the housing crisis currently being experienced, matches the market demand for housing and meets the objectives of the relevant plans.

PROPOSED SCHEME

The proposed scheme involves the construction of 67 no. units over 8 blocks ranging in height from 1 to 3 storeys, comprising

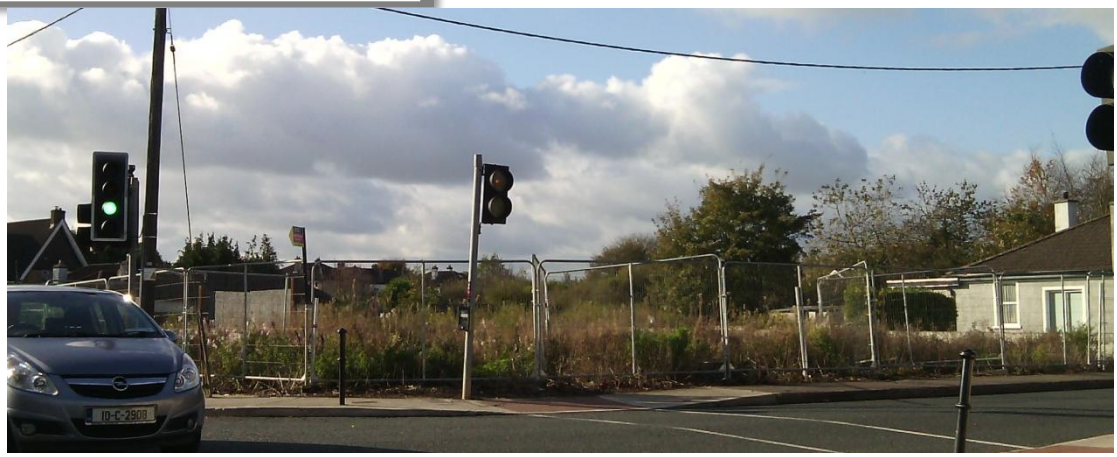
- 10 No. 1 Bedroom Apartments
- 17 No. 2 Bedroom Apartments
- 34 No. 2 Bedroom Maisonette Units
- 6 No. 3 Bedroom Maisonette Units

The development also includes, associated car parking comprising 23 no. car parking spaces as well as 34 no. bike parking spaces. The proposed development includes [but is not limited to] the provision of landscaping, footpaths, drainage and all associated site development works at a site at the junction of Hawke's Road and Bishopstown Road, Bishopstown Road, Bishopstown Cork City. The site is also adjoining Westend, St Francis, rear of Avonree, rear of Limewood, Glencar, Gayhaven and Colinsdale.

THE SITE

The subject site is located at the junction of Hawke's Road and Bishopstown Road with proposed access off Bishopstown Road, in the south western suburbs of Cork City Centre. The site comprises of a Greenfield site and whilst it benefits from a positive planning history, none of the granted planning permission have been implemented. This is one of the few remaining undeveloped site within the Bishopstown area and given its zoning and associated planning policy is suitable to accommodate a residential scheme.

Existing View of site from Hawke's Road



Existing View of site from Bishopstown Road

WIDER CONTEXT

The site is located within the Cork City functional area, about 4 kilometres south-west of the city centre within the Bishopstown area. The site is located within close proximity of Wilton District Centre and within walking distance of local services and amenities.

The site has excellent connections to roads infrastructure and connects to the N40 [South Link Road] via the Bishopstown Road. There is a high quality public bus service in this area which provides key connections to the city centre and other nearby settlements such as Curraheen and Mahon.

The main land use in this area is residential with a mix of detached, semi detached and apartment units. There is a strong employment base in this area with Cork University Hospital, Wilton District Centre and Cork Institute of Technology located in the south-western suburbs of the city. Bishopstown is considered to be a well established residential area and can be considered to be home to an aging population. Whilst generally most dwellings are occupied by owner occupiers there are also short term occupants and students due to the proximity of the hospital and the educational institutions.

Wider Context of site in relation to Wilton

IMMEDIATE CONTEXT

The subject site is located on the corner of Hawkes Road and Bishopstown Road with access provided off Bishopstown Road. It is bounded by the Waterfall Road and Bishopstown Road to the south, by Hawkes Road and existing residential development to the east and existing residential units to the north and west. As this scheme is being proposed for social housing if needed community, health and educational services currently operating in the area will be available to future occupants. The site is within very close proximity of some local services including a supermarket, local convenience store, public houses, butchers, hair salon and financial institutions. Therefore the future occupants of the site would be able to avail of these services which are within a short walk of the site.

View of Site within an Immediate Context

The site, at an area of 2.61 acrea [1.06 hectares] would be accessed from the south, off Bishopstown Road. There is a bus stop within 150 metres of the site which provides services to the city centre, Cork Institute of Technology, Boherboy Road, Curraheen Village and Mahon.

There are several health and community uses within this area including the following:

Gentle Dental Clinic – 20 metres from the scheme

O'Connor's Opticians - 150 metres from the scheme

Firgrove Pharmacy - 200 metres from the scheme

Clady Medical Practice - 200 metres from the scheme

Cork University Hospital – 1.2 km from the scheme

SMA parish Community Centre -1.1 km from the scheme

St. Josephs Church – 1.1 km from the scheme

DEVELOPMENT DESCRIPTION - [FINAL DEVELOPMENT DESCRIPTION TO BE CONFIRMED WITH CCC]

The proposed scheme involves the construction of 67 no. units over 8 blocks ranging in height from 1 to 3 storeys, comprising:

- 10 No. 1 Bedroom Apartments
- 17 No. 2 Bedroom Apartments
- 34 No. 2 Bedroom Maisonette Units
- 6 No. 3 Bedroom Maisonette Units

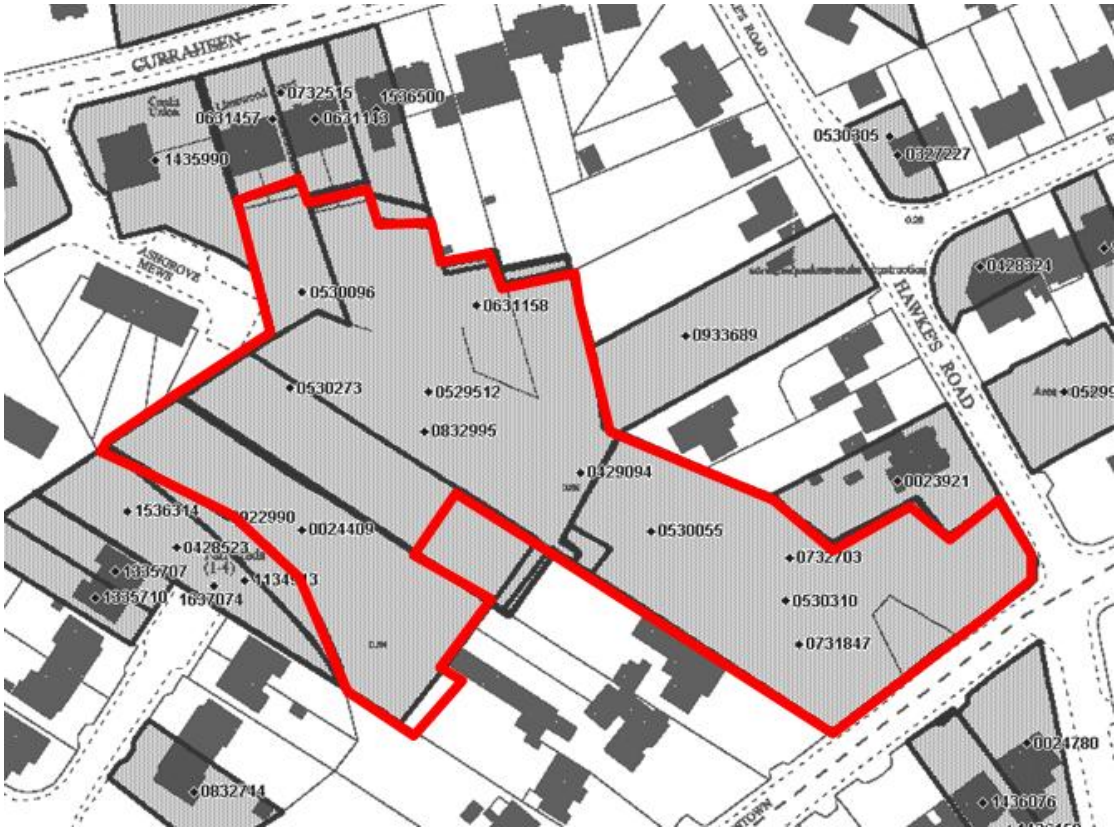
The development also includes, associated car parking comprising 23 no. car parking spaces as well as 34 no. bike parking spaces. The proposed development includes [but is not limited to] the provision of landscaping, footpaths, drainage and all associated site development works at a site at the junction of Hawke's Road and Bishopstown Road, Bishopstown Road, Bishopstown, Cork City.

Proposed Scheme at Bishopstown Road, Cork City

Site History

An investigation of the planning history associated with the site and the surrounding area indicates that several planning applications have been submitted for the site with the

majority granted planning permission [two withdrawn planning applications] by Cork City Council [see below]. The most recent planning application was submitted and granted in 2008. Even though a lower number of units was previously granted by An Bord Pleanala [see below table for more detail] these planning applications consisted mainly of townhouses and therefore a lower number of units could only be applied to the site in order to compile with development management standards. In the case of the proposed scheme it is solely apartments and therefore a higher number of units can be accommodated and still create a high quality residential scheme.



Source: Cork City Planning Enquiry System

TP Ref	Dev Description	Applicant	Address	Decision
08/32995	minor alterations to previously approved development (reg ref TP 06/31158 and TP 05/30273). The development alterations will consist of: 1. The addition of rendered gable fronted dormers to front/rear elevations in place of zinc clad flat roof dormers. 2. Re-configuration of windows/doors and addition of roof windows to bathrooms. 3. Roof pitch adjustment with raising of eaves level from 5.6 m to 7.3 m (from ground level) and 6.4m	3G Partnership	Westend, Bishopstown Road and St Francis, Bishopstown Road/Hawke's Road, rear of Avonree, Bishopstown; rear of	Conditional 63 units

	to 7.5m (from ground level) - block D, and from 6.5m to 8.4m (from ground level) - block C. 4. Replacement of zinc clad flat roof sections with slated pitched roofs. 5. Redesign of Block C, units 36, 37, 58 and 59 and associated elevational changes. 6. Redesign of central lift/stair core to basement car park. 7. Reconfiguration of access road and carparking to front of Block D		Limewood, Glencar, Gayhaven and Colinsdale, Curraheen Road	
07/32703	Minor alterations to previously approved development (reg. ref. TP05/30310 and TP07/31847). The development alterations will consist of 1. Internal layout alterations to all units. 2. The addition of rendered gable fronted dormers to front elevations in place of zinc clad flat roof dormers. 3. Re-configuration of windows and addition of roof windows to bathrooms / bedrooms. 4. Roof Pitch adjustment with raising of eaves level from +19.150 to +20.450, +21.550 to 22.200 and +18.950 to +19.800. 5. Replacement of zinc clad flat roof canopies with slated pitched roof canopies. 6. Redesign of Block B, unit 11, increasing total floor area from 125.2 sq.m to 144.77 sq.m with associated elevational alterations	3G Partnership	Westend, Bishopstown Rd. and St. Francis, Bishopstown Rd., Hawkes Rd., Bounded By Ashgrove Mews, Rear of Limewood Court, Curraheen Rd., Rear of Glencar, Gayhaven and Colinsdale, Curaheen Rd., Bishopstown, Cork	Conditional 57 units
07/31847	alterations to previously approved planning permission (Reg Ref. No. 05/30310) to provide for: 1. demolition and re-alignment of the south western boundary to provide for the reconfiguration of Unit type 1C (two bed, two storey town house located in block A) 2. provision of an ESB substation and switch room located on the south western site boundary between blocks B and C.	Mark Kelleher	Rosarie Curraheen Road Bishopstown	Conditional 57 units
06/31158	development consisting of: -Alterations to previously approved block D of T.P. 05/30273 and An Board Pleanala Reference Number: PL 28.216282 with newly configured development, consisting of the substitution of the 10 most easterly units of Block D (that is five apartments and five duplex units, required to be omitted under condition 2(a) of An Board Pleanala Reference Number: PL 28.216282) with 7 no. 3 storey, 3 bedroom town houses. (Total proposed number of residential units in	Mark Kelleher	rear of Rosarie, Curraheen Road, Bishopstown and partly on position of site previously granted planning permission, an assembled site	Conditional [63 units granted by ABP]

	Block D is 19, resulting in a net reduction of 3 units from the 22 units previously proposed)		in Bishopstown, Cork, comprising the following properties: Westend, Bishopstown Road and St. Francis, Bishopstown Road/Hawke's Road; rear of Avonree, Bishopstown Road; bounded by Ashgrove Mews (no pedestrian or vehicular access from Ashgrove Mews); rear of Shangri-La, Curraheen Road, rear of Glencar, Curraheen Road, rear of Gayhaven, Curraheen Road, rear of Colinsdale, Curraheen Road; vehicular and pedestrian access to all the above from Bishopstown Road	
05/30310	alterations to the individual house plans and elevations to Blocks A,B & E of previously approved development (TP 05/29512)	Mark Kelleher	Westend Bishopstown	Conditional 57 units
05/30273	replacement of the prev. approv. Blk D(0529512)with newly configured dev. consisting of 11#2 storey plus mansard duplex units,each with a single ground flr 2 bed unit,with a 2 storey 3 bed unit	Mark Kelleher	Rosarie Bishopstown	Conditional [57 units granted by ABP]

	above(total units in Blk D-22);New Blk C of 14#2 storey+mansard duplex units each with single level ground flr 2 bed unit,with a 2 storey 3 bed above;together with 3 units in stepped blk over to overall height of 3 flrs incorp. basement car pk access ramp underneath,comprising 1#2 bed @ ground flr & upper ground flr levels,1#2 storey 3 bed @ ground flr, upper ground flr & 1st flr levels & 1#2 storey 3 bed @ 1st & 2nd flr levels.Total units in Blk C-31,over basement car pking of 57 pking bays with assoc. storage,access ramp,stairs & lift.Omission of 2 grade level car pking bays from prev. approved app 0529512;Assoc. landscaping works to open spaces,assoc. site works incl. access rds,paths,surface car pking,bicycle pking,refuse storage,water,sewerage,public lighting works & assoc. bdry treatments			
05/29512	73 residential units consisting of:4 No. Blocks of new townhouses comprising as follows; a)Block A- 6 no. Tce Hses, 2 storey with mansard roof, comprising 2 no. 4 bed and 4 no. 2 bed units b)Block B- 6 no. tce hses, 2 storey with mansard roof, comprising 1 no. 4 bed and 5 no. 3 bed units c)Block C- 20 no. units in 2 storey with mansard roof and 3 storey with mansard roof townhouses comprising 9 no. 3 bed duplexes, 10 no. 2 bed and 1 no. 1 bed units d)Block D- 11 no. 2 bed tce hses, 2 storey with mansard roof e)Block E- 4 no. tce hses 2 storey and 2 storey with mansard roof comprising 2 no. 4 bed, 1 no. 3 bed and 1 no. 2 bed units. With associated 36 no. grade level resident and visitors car parking. New 3 storey with mansard level apt devt over basement car park. The ground, 1st, 2nd & mansard floors will consist of a total of 26 no. apts comprising 8 no. 1 bed,17 no. 2 bed & 1 no. 3 bed units. The basement will comprise of 56 no. car parking bays. Also includes anc. site devt works	Mark Kelleher	Westend, Bishopstown Rd Hawkes Rd, Curraheen Rd Bishopstown	Conditional 53 units

Summary of Planning Applications submitted for the Subject Site

PLANNING POLICY CONTEXT

The planning policy context is provided by way of the NPF and NSS at a national level, the CASP strategy at a regional level, and the Cork City Development Plan 2015 at a local level.

NATIONAL PLANNING CONTEXT: NPF & NSS

A new National Planning Framework 'Ireland 2040 Our Plan' has been developed to succeed the National Spatial Strategy. This is the superior planning document at the top of the Planning Hierarchy in Ireland. It provides guidance for national planning priorities and streamlines relevant Government policies and inform investment on national and regional development imperatives.

It is predicated on the assumption that by 2020 there will be an additional one million persons in Ireland and in order to effectively plan for and manage this growth it is important that key priorities are set out at the highest level to be implemented by all local authorities' in the pursuit of a shared vision for the planning and development landscape of the country.

The key message of the 2040 NPF is threefold:

- Growing our regions, their cities, towns and villages and rural fabric.
- Building more accessible urban centres of scale.
- Better outcomes for communities and the environment, through more effective and coordinated planning, investment and delivery.

The National Planning Framework has statutory basis. Unlike the National Spatial Strategy (NSS) 2002 which was not a legal document it was a 20-year spatial plan to direct development and investment to those locations that had the infrastructural capacity to take development. It designated a series of hubs and gateways which were earmarked for significant growth which appeared to be an unpopular choice amongst those who were not within these areas and was an ineffective attempt to counterbalance the strong growth that had occurred in the Dublin region in the years leading up to the NSS.

Two years after its publication the government announced the decentralisation strategy which completely undermined the National Spatial Strategy and the so called guidance document for future jobs and housing.

Significantly, the implementation of the NPF through the planning system will be overseen by the new Office of the Planning Regulator which is being established, this will ensure that Irelands' cities can be planned for at a scale and density that justifies spending on infrastructure and services.

The objectives of the NPF will be applied on a regional basis through Regional Spatial and Economic Strategies [RSESs] which are currently in draft form and will also be statutory and will set out regional level aspirations for our key areas and growth centres.

According to the NPF "There will be a major new policy emphasis on renewing and developing existing built-up areas rather than continual expansion and sprawl of cities and towns out into the countryside" [2017:8].

One of the key aspirations of the NPF is to address the issue of our regional cities and to ensure that all of the regional cities grow at ambitious rate. The NPF states that the regional cities of Cork, Limerick, Galway and Waterford are growing but not at the scale or pace required to operate "as realistic alternatives to Dublin" and that this needs effective and coordinated action to remedy.

The NPF makes ambitious targets for the four cities outside of Dublin stating that: "**Cork, Limerick, Galway and Waterford [need] to each grow by at least 50% to 2040 and to enhance their significant potential to become cities of scale.** This means enabling the four cities to grow by more than twice as much to 2040 as they did over the 25 years to 2016. Focusing investment to improve the collective 'offer' within each of the four cities, i.e. infrastructure, liveability and choice in terms of housing, employment and amenities." In order to do that we undoubtedly need to increase the density in our urban areas. In order to do that we undoubtedly need to increase the density in our urban areas and start of thinking of innovative ways to increase density in existing medium density areas that benefit from a good network of services and public transport and in particular those areas that are in walking distance to the city and local schools etc.

SUB-REGIONAL PLANNING CONTEXT: CORK AREA STRATEGIC PLAN

The Cork Area Strategic Plan [CASP] provides sub-regional planning guidance in relation to the proposed development. CASP is a long-term cooperative sub-regional planning framework based on the mutual co-operation of Cork City and Cork County Council for the future development of the Cork region. The Plan reinforces Cork City's status as a National Gateway and a key location for substantial growth as outlined in the NSS. CASP sets out the great development potential of Cork City and its Metropolitan area, in terms of providing for growth in population and employment terms.

CASP set out a strategy for the promotion of sustainable development patterns which suggested that development should be accommodated in areas where there was existing services and transport links, such as the cork metropolitan area. The CASP update 2008 envisaged that the population of the City-Region would grow to approximately 488,000 by 2020, an increase on 2006 levels of some 110,000 persons. The number of jobs was envisaged to expand by over 45,000 to close to 216,000, while the number of households was targeted to rise by approximately 72,000 to 202,000 by 2020.

The main aim of CASP was to direct growth and development to appropriate locations in a sustainable manner and to create a critical mass within settlements for the efficient use of services and facilities. Unfortunately, CASP has not realised many of its aims, however the key principles associated with the plan are still appropriate within the Cork region.

SUB-REGIONAL PLANNING CONTEXT: CORK CITY DEVELOPMENT PLAN 2015

The Cork City Development Plan 2015 provides further sub-regional planning context and a more local planning policy framework within which to contextualise the proposed development. The Plan outlines the population target from the city between now and 2021 within its core strategy. The Core Strategy states that there is a requirement for an additional 20,032 units in total between 2011 and 2022, which equates to the delivery of 1,821 units per year. There has been significant growth within the Cork City over the past decade; however this is small scale growth when compared to the Cork County Council Functional Area.

RELEVANT POLICIES AND OBJECTIVES

The development plan outlines that housing is essential to achieving a good quality of life and makes it a key objective of the plan to achieve **a diversity of housing in self-sustaining communities**. Providing housing support for vulnerable people is a key tenet of that objective. The proposed scheme wholly meets the objective in terms of diversity as it is designed specifically to meet the needs of its future occupants and contains a diverse mix of both unit types [apartments and buildings] and unit sizes 1-3 bedrooms. People on the social housing waiting list are often considered the most vulnerable in our society and as such the proposed scheme is designed to meet a considerable need in that regard.

Objective 6.1 'Residential Strategic Objectives' outline the specific objectives which new residential developments should seek to aspire to/achieve.

a. To encourage the development of sustainable residential neighbourhoods;

[the proposed scheme is on a site with a positive planning history within a well established residential neighbourhood on the western side of the city]

b. To provide a variety of sites for housing to meet the various needs of different sections of the population;

[the proposed scheme is varied in order to meet the various needs of different sections of the population containing APARTMENTS,TOWNHOUSES and BUNGALOWS it has a range of choice. The site is also on the south west side which is crucially important as it contributes to a more socio economically balanced community].

c. To continue to work with the Approved Housing Bodies and to actively engage with all key stakeholders in the provision of housing;

[discussions have taken place with an approved housing body in relation to the proposed development]

d. To continue to regenerate and maintain existing housing;

e. To encourage the use of derelict or underused land and buildings to assist in their regeneration;

[The subject lands have been undeveloped and underused for in excess of a decade, the proposed development will encourage its reuse]

f. To promote high standards of design, energy efficiency, estate layout and landscaping in all new housing developments;

[The proposed scheme is accompanied by a full Schedule of Accommodation as well as a Housing Quality Assessment which demonstrates compliance with both the 2018 Design Standards for New Apartments – Guidelines for Planning Authorities and the 2007 document Quality Housing for Sustainable Communities for every apartment. In all cases the minimum standards are met or exceeded. All of the units are at least dual aspect and in many cases are triple aspect.]

g. To protect and, where necessary, enhance the amenities and the environment of existing residential areas

[The proposed site is a long term vacant site which is an eyesore and currently detracts from the environment for existing residents of the area, for many years it has been a source of contention with people from the local area and anti social behaviour resulted in extensive hoarding being erected which further detracts from the quality of the environment]. The proposed scheme will be a positive addition to the area].

Furthermore **Paragraph 6.1** of the Cork City Development plan is complied with as a diversity of housing in a potentially self-sustaining community is proposed. The development is walking distance to all key local, healthcare, retail and educational services.

Paragraph 6.4 of the Cork City Development plan relates to the need for choice, fairness, equity across tenures, and on delivering quality outcomes for the resources invested. The overall strategic objective will be "to enable all households to access good quality housing appropriate to household circumstances and in their particular community of choice" the proposed scheme has a good mix one 1,2 and 3 bedroomed units across several house type variations. The proposed scheme will be a very high quality and make a positive contribution architecturally as well as address key issues pertaining to choice, fairness and in particular equity across tenures.

Objective 6.2 of the Cork City Development Plan relates to Housing Policies and states the need to have regard to National, Regional and Local housing policy documents including the Joint Housing Strategy for Cork Planning Authorities.

The four Key Principles that guide the Joint Housing Strategy according to the Development Plan are as follows:

Principle 1: To provide for a diverse range of housing needs to suit varying income levels and social circumstance; *The proposed scheme epitomises principle 1, there is a diverse range of unit types and unit sizes. The rent will be calculated on the basis of income insuring people with varying income levels and social circumstances are catered for.*

Principle 2: To promote a socially balanced and inclusive society in all housing area within Cork City and County; *As can be seen from examining the tenure of housing in the surrounding area of the scheme the prevailing tenure in this area is private in nature. A social housing scheme at this location would be an appropriate integration of tenure in this area and lead to this area becoming more inclusive in societal terms as a result.*

Principle 3: To promote high quality and sustainable communities in the Urban and Rural Environment through the implementation of the Sustainable Residential Development in Urban Areas – Guidelines for Planning Authorities and Best Practice Urban Design Manual, 2009; *the 2018 Design Standards for New Apartments – Guidelines for Planning Authorities and the 2007 document Quality Housing for Sustainable Communities as well as the Design*

Manual for Urban Roads and Streets and Best Practice Design Manual have all been reference documents for the design of the scheme – complying with all major design aspirations for successful urban schemes.

Principle 4: To monitor the Housing Strategy and to allow for consultation with those who are central to the implementation of the policies of the strategy.

Objective 6.4 Housing Provision To support and facilitate the provision of housing through various sectors including private, voluntary and cooperative housing sectors. The Local Authority will continue to implement and operate a range of housing schemes and will continue to look at viable alternatives in the delivery of suitable accommodation for all.

It is only through schemes such as this that the local authority can directly affect the ability of objective 6.4 to be realised. The location, nature and quality of this scheme will act an an exemplar for other projects of this nature.

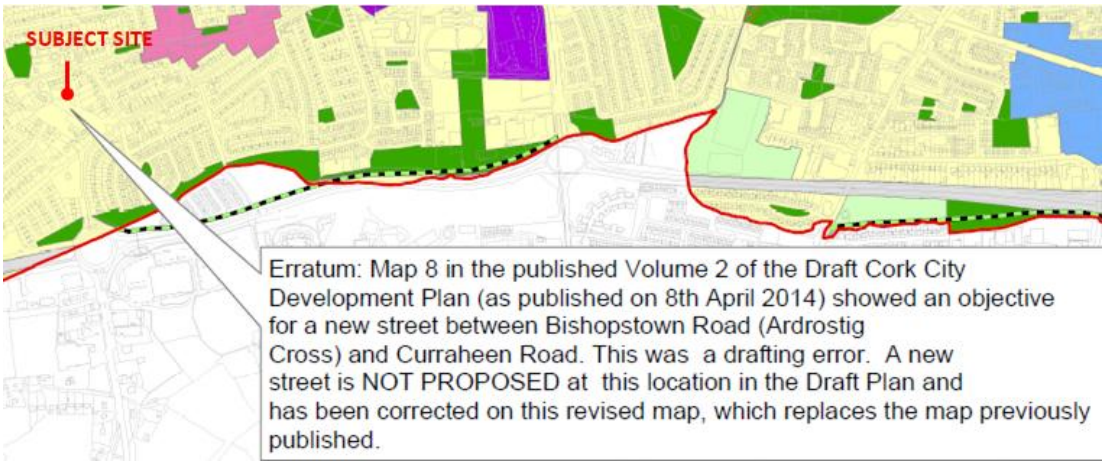
ZONING

The site is zoned for Residential Local Services and Institutional Use under the current Cork City Development Plan. The objective [4.6] for this zoning designation is to 'protect and provide for residential uses, local services, institutional uses, and civic uses, having regard to employment policies' [CCDP 2015:226]. There is a presumption in favour, in principle, of residential schemes within these locations.

The CCDP sets out more specific objectives for the development of these areas; the overarching principle is the protection of residential uses and residential amenity in all planning and development decisions. However other uses, including small scale local services, institutional uses and civic uses and provision of public infrastructure and utilities are permitted provided they do not detract from residential amenity and do not conflict with the employment use policies in other parts of the development plan or constituent LAPs. [Cork City Development Plan 2015:227]

Zoning of Subject Site as per Cork City Development Plan 2015

It should be noted that there is a note on the Zoning Map for the South-Western suburbs of the city which states that there was an error in the draft plan and a new street is not proposed between Bishopstown Rod and Curraheen Road [see below extract].



Extract from Cork City Development Plan 2015 – Zoning Map

There is only one specific extract from the Development Plan which relates to the immediate vicinity of the site, "Vehicular access to lands between Hawkes Road and The Rise at Ardrostig

Cross, fronting onto Waterfall Road / Bishopstown Road, should not be provided through The Rise in order to protect the amenity of residents, with the exception of one private dwelling house, with a permanent site boundary wall, on the land adjoining No.2 and No.3 Fairwinds, The Rise and the rear of Karridale, Bishopstown Road" [CCDP 2015:218]. This does not have an impact on the proposed scheme.

The Proposed Development

The proposed development involves the construction of 67 no. units over 8 blocks ranging in height from 1 to 3 storeys, comprising

- 10 No. 1 Bedroom Apartments
- 17 No. 2 Bedroom Apartments
- 34 No. 2 Bedroom Maisonette Units
- 6 No. 3 Bedroom Maisonette Units

The development also includes, associated car parking comprising 23 no. car parking spaces as well as 34 no. bike parking spaces. The proposed development includes [but is not limited to] the provision of landscaping, footpaths, drainage and all associated site development works at Bishopstown Road, Bishopstown, Cork City.

Indicative views from various points within the proposed scheme

OPEN SPACE

Private Open Space

The Cork City Development Plan 2015 sets out that each apartment should have direct access to its own area of private open space which has been achieved in the proposed development with the provision of a balcony for each apartment. The scheme has taken account of the minimum standards as set out in the development plan and high quality amenity private open spaces have been provided for the one and two bed units. The minimum areas are in accordance with the 'Sustainable Urban Housing: Apartments – Guidelines for Planning Authorities' guidelines. The guidelines set out the minimum requirements for one and two bed apartments are 5sqm and 7sqm respectively, and the proposed development overall adheres to these standards.

Private Open Space Standards [Table 16.7] [minimum requirements]	
Unit Type	**Area (sq. m.) per Unit**
	City Centre, Docklands & Inner Urban Areas
Apartments – 1 Bed	6sqm
Apartments – 2 Bed	8sqm
Townhosue – 3 Bed	48sqm

Private Open Space Standards [Extract from CCDP 2015]

This is complied with fully in the proposed development for apartments and the townhouses range from 48sqm to 179sqm.

Public Open Space

There is a default minimum for the provision of 10% of the overall site area for public open space, which has been achieved in the context of the proposed scheme. The scheme provides for 13.6% open space which is well in excess of the development plan standards. This public open space has been implemented throughout the site to ensure it is accessible to all residents and is well overlooked.

General Public Open Space Provision [Table 16.2]	
Area	**Provision**
Greenfield sites / areas for which a LAP is appropriate	15%
General Provision	10%
Institutional Sites / Sites forming the setting to a Building of Significance	Minimum 20% [subject to site analysis]

Public Open Space Standards [Extract from CCDP 2015]

UNIT SIZE & MIX

The Cork City Development Plan stipulates minimum gross floor areas in relation to apartment sizes, as of 2015 new guidelines on design standards for new apartments was published by the Department of Environment, which made changes to the minimum floor area required, allowing for slightly smaller apartment sizes. As per the guidelines, the minimum size of a one-bedroom apartment is set at 45 square metres and two-bedroom apartments are to have a minimum size of 73 square metres. The proposed scheme at Bishopstown Road complies with the standards set out in the new guidelines. The one bed apartments are 48.96 in size and the two bed apartments range in size from 69.73 square metres and 84.23 square metres.

The proposed scheme contains 67 no. residential units with all of the units being in excess of the minimum floor areas set out by the department guidelines. Furthermore, the floor areas and widths of all rooms [ie: kitchen/living, bedroom, storage, bathroom and entrance hall] are all over the minimum requirements set out in the department guidelines. See accompanying schedules for evidence of same.

Minimum Overall Apartment Gross Floor Areas Cork City Development Plan [Table 16.5]	
Dwelling Type	**Size**
One bedroom	55 sqm
Two bedroom / 2 person	63sqm
Two bedroom / 3 person	80 sqm
Two Three bedroom / 4 person	90 sqm
Three bedroom	100sqm

Apartment Standards [Extract from CCDP 2015]

In terms of the Unit Mix the proposed scheme consits of one and two and three bed units. It is considered that the exisitng residential developments in this area primarily consists of 3/4/5 bed units and that smaller units are required in order to provide homes for those who wish to downsize. Of the proposed 67 no. units there are 10 no. 1 bed apartments which accounts for 13% of the overall scheme. 51 no. are 2 bed units which accounts for 76% of the

proposed unit provision and 6 no. units are 3 bed accounting for 11% of the entire scheme.

Indicative Targets for Dwelling Size and Distribution [Table: 16.4]			
Existing Household Mix		**Zones**	
Household Size		Zone 1 & 2 and all Apartments /Duplex Schemes	Zone 3
1 person		Max 15%	Max 20%
2 person		Max 50%	Min 30%
3 person		Min 35%	Min 50%
Total		100%	100%

Dwelling Size and Distribution Standards [Extract from CCDP 2015]

The proposed scheme is located in Zone 3, as per the development plan management standards and therefore states that a maximum of 20% of 1 bed units should be provided and a minimum of 50% for 3+ person units. The scheme therefore complies with this standard as over half the units are capable of accomodating 3+ persons. This scheme is predominantly for those occupying larger houses who wish to downsize or because of living alone/ageing may require a more accessible home where there is a concentration of services.

DENSITY

The Cork City Development Plan sets out specific guidance in relation to applying densities for new residential schemes. The development plan is very strong in stating that developments in excess of 50 units per hectare should be applied in built up areas which have access to good quality public transport systems. As this development site is located within such close proximity of the city centre, Wilton District Centre and is serviced by a high quality public transport system it is deemed that a relatively high density should be applied to the site. Furthermore given that this is one of the few Greenfield sites within this area which is appropriate for residential development it is even more important that an appropriate density is implemented. CMATS outlines that there is a proposed BRT route for this area which further established that high densities should be implemented on development land in order to create sustainable communities.

According to the development plan, density is the measure of the relationship between the buildings in a scheme and their surrounding area [public and private space]. The Development Plan states that densities higher than the baseline level [of 35-50 units] will be appropriate in other types of location:

- Along bus routes densities should be to a **minimum density of 50 dwellings per hectare** (subject to constraints imposed by the character of the surrounding area);
- At larger development sites **(>0.5 hectares in size**, the size of a residential block) capable of generating and accommodating their own character;
- Major development areas and mixed use areas (including the central areas, District, Neighbourhood and Local centres).

Therefore, as the site at Bishopstown Road is greater than 0.5 hectares and along a bus route the development plan is clear in stating that a minimum density of 50 units per hectare should be implemented. The proposed scheme stands at a density of 63.2 units per hectare on a site of 1.06 hectares.

Given that this is such a large development site within an existing residential area, within the suburbs of cork city, it is viewed that the site can easily accommodate this level of development. The proposed scheme is in line with the development management standards set out by the development plan. The scheme is also located within walking distances of services and local amenities which make it an appropriate location for this level of residential units.

PARKING & ACCESS

The Cork City Development Plan sets out maximum car parking standards for new residential developments. In the proposed scheme provision has been made for 23 no. car parking spaces which amounts to 0.5 spaces per unit. This is considered to be an appropriate level of car parking given the location of the site in walking distance of local service, proximity to the bus stop and given the nature of the development [downsizing units] The scheme is also located within walking distances of services and local amenities which make it an appropriate location for this level of residential units. There is 34 bike parking spaces proposed also.

Car Parking Standards [Table 16.8]			
	1 City Centre	**2 Within 500m of Blackpool & Kent Station**	**3 Rest of Cork City**
Residential [1 – 2 bedrooms]	0.5	1	1 plus 0.25 visitor parking
Residential [3 – 3+ bedrooms]	1.0	2.0	2.0 plus 0.25 visitor parking

5% of car parking spaces provided should be set aside for disabled car parking. Parking bay widths for disabled persons will be a minimum of 3.0 metres wide by 4.75 metres long.

CONCLUSION

This planning statement has been completed in support of the proposed development for 67 no. units to the south-west of Cork City, within the suburbs of Bishopstown. The proposed development presents an ideal housing solution in the form of downsizing units which will provide smaller homes within a high quality residential scheme for those who may require them and will by virtue free up existing larger housing units in Cork City for couples and families.

The scheme has been designed as a site specific housing response for downsizing units with a quality residential development which integrates well with the well-established surrounding land uses in particular the existing residential in the area. It is considered that, from a wider contextual perspective, development of this density at this location, within the established residential neighbourhood would represent a sustainable addition to the housing mix within this suburb of Cork City.

A number of alternative schemes were considered and the proposed scheme represented the best opportunity to deliver units within a well-established and successful residential area in a way which matches the market demand for housing and meets the objectives of the development plan and result in a scheme which is in accordance with the principles of proper planning and sustainable development.

The proposed scheme is in line with the development management standards as set out by Cork City Council and by other relevant national policy and guidance. The proposed development is a high quality residential scheme which will assist the Local Authority in achieving its housing and population targets [by providing downsizing units] whilst also providing a development within a sustainable location.

It is put forward that the scheme in its present form represents the most appropriate solution for the site. In light of the evidence presented and, ultimately in the interest of proper planning and sustainable development the local authority is urged to grant permission for the proposed scheme.

DOSA

DENIS O'SULLIVAN & ASSOCIATES

CONSULTING ENGINEERS

RESIDENTIAL DEVELOPMENT, SITE AT THE JUNCTION OF HAWKE'S ROAD AND BISHOPSTOWN ROAD, BISHOPSTOWN ROAD, BISHOPSTOWN, CORK CITY

FIRE CONSULTANT'S REPORT

DATE 02/06/2020

REVISION 2

JOB NO. 4995

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DOCUMENT CONTROL

PROJECT NAME: Residential Development, Site at the junction of Hawke's Road and Bishopstown Road, Bishopstown Road, Bishopstown, Cork City

PROJECT NUMBER: 4995

REVISION	DATE	FILE NAME: Residential Development, Site at the junction of Hawke's Road and Bishopstown Road, Bishopstown Road, Bishopstown, Cork City			
0	28.08.2019	DESCRIPTION: Fire Consultant's Report			
			PREPARED	CHECKED	APPROVED
		INITIAL	CO'S	CO'S	CO'S
		DATE	28.08.2019	28.08.2019	28.08.2019
1	26.05.2020	FILE NAME: Residential Development, Site at the junction of Hawke's Road and Bishopstown Road, Bishopstown Road, Bishopstown, Cork City.			
		DESCRIPTION: Fire Consultant's Report			
			PREPARED	CHECKED	APPROVED
		INITIAL	SO'G	CO'S	SO'G
		DATE	26.05.2020	26.05.2020	26.05.2020
2	02.06.2020	FILE NAME: Residential Development, Site at the junction of Hawke's Road and Bishopstown Road, Bishopstown Road, Bishopstown, Cork City.			
		DESCRIPTION: Fire Consultant's Report			
			PREPARED	CHECKED	APPROVED
		INITIAL	SO'G	CO'S	SO'G
		DATE	02.06.2020	02.06.2020	02.06.2020
#	Insert Date	FILE NAME:			
		DESCRIPTION: Insert description			
			PREPARED	CHECKED	APPROVED
		INITIAL	Initials	Initials	Initials
		DATE	Insert Date	Insert Date	Insert Date
#	Insert Date	FILE NAME:			
		DESCRIPTION: Insert description			
			PREPARED	CHECKED	APPROVED
		INITIAL	Initials	Initials	Initials
		DATE	Insert Date	Insert Date	Insert Date

Contents

1 Introduction

Denis O'Sullivan & Associates were engaged as Consulting Engineers for the proposed development at the junction of Hawke's Road and Bishopstown Road, Bishopstown Road, Bishopstown, Cork City.

This response in in relation to a questionnaire issued by Cork City Council in relation to the provision of Social Housing. The following paragraphs specifically address Compliance with the Building Regulations particularly Part B (Fire).

2 Building Regulations

The Irish Building Regulations will apply in full to the proposed development as listed in the table below:

Building Regulations 1997-2014 (SI 497 of 1997 as amended – refer to www.environ.ie for latest)

Building Regulations 1997-2014 (SI 497 of 1997 as amended – refer to www.environ.ie for latest)
Part A –Structure - 2012
Part B – Fire Safety - Volume 2 – Dwelling Houses - 2017
Part C – Site preparation and resistance to moisture - 2004
Part D – Materials and workmanship - 2013
Part E – Sound - 2014
Part F –Ventilation - 2011
Part G – Hygiene - 2008
Part H – Drainage and wastewater disposal - 2016
Part J – Heat producing appliances - 2014
Part K – Stairways, ladders, ramps and guards -2014
Part L – Conservation of Fuel and Energy – Dwellings - 2017
Part M – Access and Use - 2010

For products or systems that do not fall within the scope of existing standards, or deviate from established norms, third party certification should be used to demonstrate compliance with the Irish Building Regulations.

The Contractor will comply with all relevant & applicable EN Standards & Codes of Practice. Irish Standards and British Standards (or equivalent) are applicable where no equivalent EN standard exists.

All Local Authority Codes of Practice are applicable, along with all statutory regulations appropriate to the provision of Housing will apply.

All Codes of practice, standards, and requirements of the statutory service providers (ESBN, GBN, Irish Water, Cork City Council, Eir, etc.) are applicable in full to the development.

2.1 Fire Regulations

A Fire Safety Compliance report will be developed setting out the means by which compliance with Part B (Fire Safety) of the second schedule to the Building Regulations 1997 to 2006 is to be achieved for the proposed construction of the development, particularly the apartments.

2.1.1 Design Criteria

This specification and calculations will be based on the following design guides:

- → Technical Guidance Document B- Fire (TGD 'B'), published by The Minister for the Environment under Article 7, of the Building Regulations
- → BS 9991:2015 - Fire Safety in the Design, Management and use of Residential Buildings - Code of Practice
- → BS 5588-8:1999 - Fire Precautions in the Design, Construction and use of Buildings Part 8: Code of practice for means of escape for disabled people
- → BRE 187 - External Fire Spread: Building Separation and Boundary Distances
- → I.S. 3218: 2013 - Code of Practice for Fire Detection and Alarm Systems.
- → I.S. 3217: 2013 - Code of Practice for Emergency Lighting.
- → BS 7346-8: 2013 Components for smoke control systems. Code of practice for planning, design, installation, commissioning and maintenance
- → BS 5306: Part 1: 2006 Code of practice for fire extinguishing installations and equipment on premises. Hose reels and foam inlets.

2.1.2 Building Classification

The main use of the apartments is classified as Purpose Group 1(c), Flat or Maisonette, as per Table 0.1 TGD 'B', Classification of Buildings by purpose group. Therefore, the design for horizontal and vertical escape will be assessed under BS 9991:2015 - Fire Safety in the Design, Management and use of Residential Buildings - Code of Practice

2.1.3 Outline Description of the Building

The proposed apartments are 3-storey buildings some of while are duplex apartments with own door access while the dwellings are 2 storeys. The proposed apartment buildings will be constructed with double leaf masonry walls with concrete first floors and second floors. The second floor within the duplex apartments may be constructed with either timber or concrete. The 3-storey apartment buildings will be served by a central stair core while the duplex apartments will each be serviced by a single access stair.

2.1.4 BS 9991:2015 - Fire Safety in the design, management and use of residential buildings – Code of practice

The apartment buildings will be assessed under the following sections of BS 9991:2015 – Fire safety in the design, management and use of residential buildings – Code of practice:

- Section 2: Designing means of escape
    - Clause 5 General,
    - Clause 6 Means of escape and provision for rescue from houses,
    - Clause 7 Means of escape from flats and maisonettes,
    - Clause 9 Internal planning of flats and maisonettes,
- Section 3: Active fire protection
    - Clause 14 Smoke Control
- Section 5: Stairs and final exits
    - Clause 27 Number and siting of common stairs
    - Clause 28 Width of common stairs
    - Clause 29 Enclosure of common stairs
    - Clause 30 Basement stairs
    - Clause 31 Stairs within mixed-use developments
    - Clause 32 Access lobbies and corridors to protected stairways
    - Clause 33 External stairs
    - Clause 34 Discharge from common stairs and final exits
- Section 7: Ancillary accommodation to flats and maisonettes
    - Clause 37 General recommendations for ancillary accommodation
    - Clause 45 Lift machine rooms and machinery spaces
    - Clause 46 Communal heating, ventilation and air conditioning systems
    - Clause 47 Refuse storage, disposal and incineration
- Annex D Private balconies (open or enclosed) and communal roof gardens

2.1.5 Section 2 Clause 5 General

2.1.5.1 Escape by way of doors and windows

The ground floor units will have direct access from the ground floor and as such could be treated as a house. However, the Flat corridor will be constructed with 30-minute fire resistant construction and therefore will not require the windows to be sized for escape purposes. Private balconies will be in accordance with Annex D

2.1.6 Section 2 Clause 6 Means of escape and provision for rescue from houses

2.1.6.1 Two-storey houses

The 2-storey houses will all have direct access from the ground floor and will all be treated as houses and all habitable rooms will have windows sized for escape purposes.

2.1.6.2 Inner rooms in houses

There is no habitable room which is an inner room.

2.1.7 Evacuation Considerations

2.1.7.1 General

Normal "self-help" evacuation procedures will be used in all buildings. For people with disabilities a refuge area will be provided in the escape stairs from which further evacuation can be made under less pressure of time as per BS 5588-8:1999.

2.1.7.2 Compartmentation

The buildings will be constructed so that each flat is constructed as a compartment. All floors in the building between apartments will be constructed as compartment floors. Each compartment is separated from each other by 60-minute compartment walls and floors. All dwellings will be separated by a 60-minute vertical separating wall and will be fire-stopped in accordance with TDG 'B'.

2.1.8 Section B5 – Access & Facilities for the Fire Services

2.2 Fire Mains

2.2.1 Introduction

The site receives fire-fighting water from the public mains. Fire hydrants will be located at various locations throughout the development.

2.2.2 Sources of Water for Fire Fighting

Water for firefighting purposes will be provided from the public water main (see site location map) complying with the requirements of TGD 'B'.

2.2.3 Provision of Hydrants

The location of fire hydrants will be in accordance with Diagram 30 of TGD 'B'. The water main will provide adequate flows and pressures for firefighting purposes.

2.3 Vehicle access

2.3.1 Introduction

Fire brigade vehicle access to the exterior of the building will be in accordance with TGD 'B'.

2.3.2 Provision of Vehicle Access

Fire appliances will have access to the front elevations of all building from the internal estate roads which will comply with either 'Recommendations for Site Development Works for Housing Areas' (Department of the Environment and Local Government, October 1998) or The 'Design Manual for Urban Roads and Street' (Department of Transport, Tourism and Sport and the Department of Environment, Community and Local Government) or Making Places : a design guide for residential estate development (by Melville Dunbar Associates and Cork County Council).

2.3.3 Design of Access Routes and Hardstanding's

The required minimum clear widths as shown in Diagram 32 of TGD 'B' can all be achieved for pumping appliances as the street's widths are adequate. Turning facilities for appliances will be provided in any dead-end access routes that are more than 20m long in accordance with Table 5.2 TGD 'B'.

2.3.4 Personnel access to building for fire fighting

Access to the buildings for firefighting purposes are by way of the normal exit / entrance doors.

DOSA

DENIS O'SULLIVAN & ASSOCIATES

CONSULTING ENGINEERS

RESIDENTIAL DEVELOPMENT, SITE AT THE JUNCTION OF HAWKE'S ROAD AND BISHOPSTOWN ROAD, BISHOPSTOWN ROAD, BISHOPSTOWN, CORK CITY

INFRASTRUCTURE REPORT

DATE 02/06/2020

REVISION 5

JOB NO. 4995

Joyce House, Barrack Square, Ballincollig, Co. Cork

T 021 4871781 E info@dosa.ie W www.dosa.ie

DOCUMENT CONTROL

PROJECT NAME: Residential Development, Site at the junction of Hawke's Road and Bishopstown Road, Bishopstown Road, Bishopstown, Cork City

PROJECT NUMBER: 4995

REVISION	DATE	FILE NAME: Residential Development, Site at the junction of Hawke's Road and Bishopstown Road, Bishopstown Road, Bishopstown, Cork City			
0	24.01.2018	DESCRIPTION: Infrastructure Report			
			PREPARED	CHECKED	APPROVED
		INITIAL	SO'G	SO'G	SO'G
		DATE	24.01.2018	24.01.2018	24.01.2018
1	05.10.2018	FILE NAME: Residential Development, Site at the junction of Hawke's Road and Bishopstown Road, Bishopstown Road, Bishopstown, Cork City			
		DESCRIPTION: Infrastructure Report			
			PREPARED	CHECKED	APPROVED
		INITIAL	SO'G	SO'G	SO'G
		DATE	05.10.2018	05.10.2018	05.10.2018
2	28.08.2019	FILE NAME: Residential Development, Site at the junction of Hawke's Road and Bishopstown Road, Bishopstown Road, Bishopstown, Cork City			
		DESCRIPTION: Infrastructure Report			
			PREPARED	CHECKED	APPROVED
		INITIAL	SO'G	CO'S	SO'G
		DATE	28.08.2019	28.08.2019	28.08.2019
3	04.12.2019	FILE NAME: Residential Development, Site at the junction of Hawke's Road and Bishopstown Road, Bishopstown Road, Bishopstown, Cork City			
		DESCRIPTION: Infrastructure Report			
			PREPARED	CHECKED	APPROVED
		INITIAL	SO'G	CO'S	SO'G
		DATE	04.12.2019	04.12.2019	04.12.2019
4	26.05.2020	FILE NAME: Residential Development, Site at the junction of Hawke's Road and Bishopstown Road, Bishopstown Road, Bishopstown, Cork City			
		DESCRIPTION: Infrastructure Report			
			PREPARED	CHECKED	APPROVED
		INITIAL	SO'G	SO'G	SO'G
		DATE	26.05.2020	26.05.2020	26.05.2020
5	02.06.2020	FILE NAME: Residential Development, Site at the junction of Hawke's Road and Bishopstown Road, Bishopstown Road, Bishopstown, Cork City			
		DESCRIPTION: Infrastructure Report			
			PREPARED	CHECKED	APPROVED
		INITIAL	SO'G	SO'G	SO'G

		DATE	02.06.2020	02.06.2020	02.06.2020

Contents

1 Introduction

Denis O'Sullivan & Associates were engaged as Consulting Engineers for the proposed development at the junction of Hawke's Road and Bishopstown Road, Bishopstown Road, Bishopstown, Cork City.

This Report was compiled in relation to a questionnaire issued by Cork City Council in relation to the provision of social Housing.

The proposed development area comprises of approximately 1.06 hectares in total. Denis O'Sullivan & Associates carried out a number of site investigations and their findings have been incorporated to deal with solutions to:

- Surface Water Drainage Network
- Foul Drainage Network
- Water Supply

The proposals for the foul sewer & water infrastructure associated with this development were discussed with Mr. Michael Galvin Senior Design Engineer, Southern Region, Irish Water, Mr. Brian O' Mahony, Design Engineer, Southern Region, Irish Water & Mr. Kevin Murphy, Design Engineer, Southern Region, Irish Water.

The proposals for the proposed stormwater infrastructure were discussed with Mr. Simon Lyons, Senior Executive Engineer, Cork CIty Council.

1.1 Site Location

The subject site is located at the junction of Hawke's Road and Bishopstown Road on Bishopstown Rd, Bishopstown, Co Cork, in a medium density residential area. The site is around 4 km from the City Centre (to the east) and 7 km from Ballincollig (to the west). The site is accessed via the Waterfall Rd to the southeast of the site. A snapshot of the application boundary is outlined in Figure 1 below.

Figure 1 – Context Map

1.2 Site History

The site has been the subject of a number of planning applications for various residential developments. A snapshot of the site from 2004 in indicated below.

Figure 2 – Historical Site Photo

2 Surface Water System

Prior to submitting the Services Report we consulted with Mr. Ger Roche, Executive Technician, Cork City Council in relation to the existing drainage services in the area of the proposed development. The details of the local Cork City Council Stormwater Infrastructure are included in Appendix A of this Report.

In order to reduce the effects of the surface runoff on potential flooding, a Stormwater Management Plan will be applied to surface water discharging into sewers and adjacent watercourses. The Stormwater Management Plan can be applied to control the rate of runoff from new development. The maximum permitted surface water outflow from the new development is to be restricted to that of the existing Greenfield site.

Control of runoff by attenuation methods requires a hydraulic control to restrict the magnitude of flows passing downstream, together with an upstream storage capacity to contain the volume of runoff held back by the hydraulic control. The flows are proposed to be attenuated in the surface water system by adopting a flood storage detention tank along with a restricted outlet as the control devise. The storage volume required has been designed using the computer aided design package Windes 10.4

2.1 Surface Water Drainage Network

The surface water drainage network for the proposed development was modelled using the Microdrainage software application. The surface water pipe lengths, slopes, contributing impermeable areas, upstream invert levels, upstream cover levels and pipe diameters were entered into the model using the drawings supplied.

The global variables required for the model were the M5-60 and Rainfall Ratio. These two factors may be read from maps contained in the Wallingford procedure. They enable the program to calculate the intensity, duration and frequency characteristics of storms.

M5-60 is the rainfall depth based on a 60-minute storm of 5 years return period. Ratio R is the ratio of the 60-minute storm to the 2-day storm for the 5-year return period events. These values are as follows:

- M5-60 = 18.80mm
- Ratio R = 0.25

Microdrainage generates design storms using the principles set out in the Flood Studies Report (NERC 1975).

A summer rainfall profile was used for the design of the pipework and a winter rainfall profile was used for the design of the storm water attenuation tank to give the critical design. A summer profile gives higher rainfall intensities and results in higher runoff rates and is used to determine the required capacity of the pipework. A winter rainfall profile gives a flatter more sustained profile and results in higher runoff volumes and is used to determine the attenuation/storage requirements.

The surface water drainage network was assessed for compliance with maximum and minimum velocities, pipe length etc. The network was designed to ensure velocities in the network and pipe gradients did not exceed the maximum velocity of 4.0m/s. The minimum velocity allowed was 0.75m/s.

The design of the drainage network was assessed using events with a range of different durations to determine the critical event for each return period analysed as follows:

- 1 in 2-year return period events were used to ensure that the system did not surcharge;
- 1 in 100 year return period events were used to ensure that flooding did not occur.

The layout of the proposed storm water network is shown on the Proposed Stormwater & Foul Sewer Layout Plan 4995-5020-D.

NOTE: The surcharging indicated in the design sheets is directly upstream of the restricted outlet. For design purposes the tank has been replaced with a pipe and as a result surcharging occurs. This design approach is acceptable and in reality there will be no surcharging.

2.2 Stormwater Attenuation Strategy

2.2.1 Pre-Development Conditions

The area of this proposed development is 1.06 hectares (ha). For this development, the permissible outflow is calculated using the estimation method contained in the Institute of Hydrology Report No. 124: Flood estimation for small catchments.

$$QBAR = 0.00108 \times (AREA)^{0.89} \times (SAAR)^{1.17} \times (SOIL)^{2.17}$$

QBAR = The Mean Annual Peak Flow (Permissible outflow in m3.sec

AREA = Area of the Catchment (site) in km^2

SAAR = Standard Annual Average Rainfall

SOIL = Soil index

As the development is smaller than 50 ha, the analysis for determining the permissible outflow uses 50 ha in the formula and linearly interpolates the flow rate value based on the ratio of the development to 50 ha. This is a statistical based method within the Microdrainage Software utilizing the Regional Flood Frequency by Catchment Characteristics to give the Index Flood (QBAR)

Design summary sheets for the QBAR value are contained in Appendix B.

The Mean Annual Peak Flow (permissible outflow) was calculated for the particular design development areas. .

The allowable runoff estimation method utilises IH 124 and the Soil Index value taken from the Micrcodrainage Design Package mapping system gives a Soil Index of 0.3.

2.2.2 Post-Development Conditions

The area of this proposed development is approximately 1.06 (ha). The stormwater management plan adopted for the particular development involves using an attenuation tank located in the north-eastern corner of the site.

All surface water runoff arising from the paved development will be drained away from the site. The attenuation tank is designed for a 100-year storm event. The maximum discharge from the attenuation tank will be limited to calculated permissible runoff (QBAR) for the site.

Based on the proposed development design there will be a change in the land surface. Therefore, due to this proposed change a corresponding increase in the peak rate of surface runoff from the site will arise during times of high rainfall.

Fig 2.0 Catchment Plan

Contributing Area	Permissible Outflow (l/sec)
Catchment Area	5.50 l/sec

The flood peak runoff rates from the post-development grassy permeable area (Q_p grass) and the post-development impervious area (Q_p imp.) using the Rational Method (100% impermeability of

hard surfaces) are calculated using Windes 10.4. The Sources Control Module of the Microdrainage Software was used to design the attenuation tank capacities. This module also provides the critical storm duration for the attenuation tank during the design process.

It should be noted that climate change has been accounted for in the design. As per volume 5 of the GDSDS a factor of 10% has been incorporated into the design.

The allowable runoff utilising IH 124 of 5.19 l/second combined from the Catchment Areas for the proposed development equates to 4.87 l/second/hectare.

2.3 Attenuation Tank

2.3.1 Volume of Attenuation Tank

The capacity of the attenuation tank is designed to cater for the capacity required for a 1 in 100 year ARI event. This capacity is summarised as follows:

Tank No.	Capacity (m^3)	Restricted Outlet (l/sec)
1	200.0	5.50 l/sec

2.4 Hydrocarbon Treatment

A petrol interceptor is a trap used to filter out hydrocarbon pollutants from rainwater runoff. It is used in construction to prevent fuel contamination of streams carrying away the runoff.

Petrol interceptors work on the premise that some hydrocarbons such as petroleum and diesel float on the top of water. The contaminated water enters the interceptor typically after flowing off roads or hardstanding areas before being deposited into the first tank inside the interceptor.

The first tank builds up a layer of the hydrocarbon as well as other scum. Typically petrol interceptors have 3 separate tanks each connected with a dip pipe, as more liquid enters the interceptor the water enters into the second tank leaving the majority of the hydrocarbon behind as it cannot enter the dip pipe, whose opening into the second tank is below the surface.

However some of the contaminants may by chance enter the second tank. This second tank will not build up as much of the hydrocarbon on its surface. As before, the water is pushed into the third tank and more water enters the second.

The third tank should be practically clear of any hydrocarbon floating on its surface. As a precaution, the outlet pipe is also a dip pipe. When the water leaves the third tank via the outlet pipe it should be contaminant free.

The hard-surfaced area that will be draining to the interceptor is approximately 6661m^2. A Conder CSNB15s interceptor with a catchment capacity of 8333m^2 will be provided.

A summary of the proposed interceptor is as per the Table 2.4 below.

Table 2.4 – Petrol Interceptor Details

Catchment Reference	Petrol Interceptor Make & Model	Oil Storage Capacity (l)
Catchment Area	Conder CSNB15s	225 litres

2.5 Silt Control

The proposed petrol interceptors from Conder Environmental also include a silt storage capacity in addition to the oil storage capacity that allow silt to be collected in the interceptor prior to discharge to the proposed attenuation tanks. This silt build-up can then be removed from the tanks. The amount of silt storage from the proposed petrol interceptor is outlined in Table 2.5 below.

Table 2.5 – Petrol Interceptor Silt Storage Details

Catchment Reference	Petrol Interceptor Make & Model	Silt Storage Capacity (l)
Catchment Area	Conder CSNB15s	1500 litres

3 Foul Sewer System

3.1 Foul Sewer Design

As with the stormwater network, prior to submitting the Services Report we consulted with Mr. Ger Roche, Executive Technician, Cork City Council in relation to the existing drainage services in the area of the proposed development. The details of the local Cork City Council Foul Sewer Infrastructure are included in Appendix A of this Report. A Pre-Connection Enquiry was submitted to Irish Water. The Irish Water Reference Number for this enquiry is CDS19000793. The response to this Enquiry was issued by Irish Water on 30th March 2019. This confirmed that, subject to a valid connection agreement being put in place, the proposed connection to the Irish Water network could be facilitated. The details of the Pre-Connection Enquiry response are included in Appendix A of this Report. The design proposal for the water and/or wastewater infrastructure have been submitted to Irish Water for assessment and for the purposes of obtaining a Statement of Design Acceptance. This statement is currently still pending.

The foul sewer has been designed using the System 1 and Simulation Modules of the Micro-drainage package. The foul network design addresses present day design issues and can view velocities at Full Bore, Proportional Depth and 1/3 flow.

A model of the proposed foul drainage network was built using the micro-drainage software applications. The model was analysed and amended until the results met with the design criteria specified.

The network has been designed to achieve self-cleansing velocities at 1/3 flow whilst maintaining minimum gradients.

3.1.1 Development Breakdown

67 No. Residential Units

Section 3.6 of The Irish Water Code of Practice Wastewater Infrastructure states that for the gravity sewers shall be designed to carry a minimum wastewater volume of 6 times the dry weather flow (6DWF) which is to be taken as 446 litres per dwelling

Loading = (67) (446) / (24) (60) (60) = 0.346 litres/second

6DWF = 2.076 litres/second

The layout of the proposed foul sewer network is shown on the Proposed Stormwater & Foul Sewer Layout Plan 4995-5020.

The overall quantity of wastewater for the proposed development is estimated at 29.9m³ per day.

The foul waste within the development will be collected via an internal gravity network and will discharge to the existing public foul sewer.

All works will be in accordance with Irish Water specifications and requirements.

All works will be in accordance with Irish Water Code of Practice for Wastewater Supply & the Wastewater Infrastructure Standard Details Document Number: IW-CDS-5030-01.

4 Water Supply

As with the drainage network, a Pre-Connection Enquiry was submitted to Irish Water under Reference No. CDS19000793. This confirmed that, subject to a valid connection agreement being put in place, the proposed connection to the Irish Water network could be facilitated. As with the drainage network, prior to submitting the Services Report we consulted with Mr. Leonard Goodwin, Executive Technician, Cork City Council in relation to the existing watermain services in the area of the proposed development. The details of the local Cork City Council Watermain Infrastructure are included in Appendix A of this Report. There are existing IW 100mm & 150mm cast iron watermains the Waterfall Road adjacent to the development.

It is proposed to provide a new 125mm O.D. Ø (outside diameter) HDPE connection to the public watermain with associated valves and metering requirements. Internally within the development it is proposed to have a series of 125mm O.D. branches and loops with associated hydrants, valves and metering requirements.

Water distribution supply to each building will be sized to cater for the requirements of those particular uses. Metered connections will be made to the main in accordance with Irish Water specifications and details.

The layout of the proposed watermain network is shown on the Proposed Watermain Layout Plan 4995-5030.

All works will be in accordance with Irish Water Code of Practice for Water Supply & the Water Infrastructure Standard Details Document Number: IW-CDS-5020-01.

5 Summary of Results

The storm water network was built and analysed using the Microdrainage Software application and were assessed for a 1 in 2 year storm & 1 in 100 year storm. A summary of the results is shown in Tables 5.1 below

The global variables, pipeline and manhole schedules for modelled and these show the basic pipe details such as pipe length, diameter, roughness coefficient, upstream invert, velocity, etc.

Table 5.1 Summary of Surcharge and Flooding

Attenuation Tank Reference	Storm Event	Results
Attenuation Tank No. 1	1 in 2 year	No surcharge of the stormwater network
	1 in 100 year	Surcharge

The stormwater system is designed to ensure no surcharge occurs during a 1 in 2-year return period event. The surcharging that occurs in the pipes highlighted in the summary of the design sheets are the pipes that have been replaced with tanks and hydrobrakes. For the purposes of design this is acceptable.

No flooding was predicted to occur for the 1 in 100 year return period event. Surcharging and flood risk occurred for a number of critical storm events but this is allowed and does not compromise the network.

Table 5.2 Outlet Control Summary

Attenuation Tank Reference	Hydrobrake Reference	Limiting Discharge (l/s)	Design Head (m)	Hydrobrake Diameter (mm)
Attenuation Tank No. 1	MD4	5.50 l/sec	1.00	69

Table 5.3: Storage Tank Summary

Tank No.	Storage Type	Capacity (m^3)	Invert Level (m)	Maximum Storage Level (m)
Attenuation Tank	RC Concrete	200.0	15.130	16.130

The foul water network model was built and analysed using the Micro-drainage Software application and was assessed to ensure velocities maintained a self-cleansing velocity.

The foul water network model was built and analysed using the Micro-drainage Software application and was assessed to ensure velocities maintained a self-cleansing velocity. The system will consist of an internal gravity network discharging to the existing Irish Water asset.

Appendix A –Irish Water Pre-Connection Enquiry & Records Maps

Uisce Éireann
Bosca OP 6000
Baile Átha Cliath 1
Éire

Irish Water
PO Box 6000
Dublin 1
Ireland

T: +353 1 89 25000
F: +353 1 89 25001
www.water.ie

Stephen O'Grady
Joyce House
Barrack Sq
Cork, Cork

20 March 2019

Dear Stephen O'Grady,

Re: Connection Reference No CDS19000703 pre-connection enquiry - Subject to contract | Contract denied

Connection for Housing Development of 68 unit(s) at The Quarry, Bishopstown Road, Cork City.

Irish Water has reviewed your pre-connection enquiry in relation to a water connection at The Quarry, Bishopstown Road, Cork City.

Based upon the details that you have provided with your pre-connection enquiry and on the capacity currently available in the network(s), as assessed by Irish Water, we wish to advise you that, subject to a valid connection agreement being put in place, your proposed connection to the Irish Water network(s) can be facilitated.

There is an existing Irish Water sewer running through this site (see layout map attached). To facilitate this connection, it will be necessary to provide a wayleave to the benefit of Irish Water. Appropriate separation distances shall be maintained between this sewer and buildings/infrastructure for this development.

All infrastructure should be designed and installed in accordance with the Irish Water Codes of Practice and Standard Details. A design proposal for the water and/or wastewater infrastructure should be submitted to Irish Water for assessment. Prior to submitting your planning application, you are required to submit these detailed design proposals to Irish Water for review.

You are advised that this correspondence does not constitute an offer in whole or in part to provide a connection to any Irish Water infrastructure and is provided subject to a connection agreement being signed at a later date.

A connection agreement can be applied for by completing the connection application form available at **www.water.ie/connections**. Irish Water's current charges for water and wastewater connections are set out in the Water Charges Plan as approved by the Commission for Regulation of Utilities.

If you have any further questions, please contact Brian O'Mahony from the design team on 022 52205 or email bomahony@water.ie. For further information, visit **www.water.ie/connections.**

Yours sincerely

Maria O'Dwyer

Connections and Developer Services

Drainage Records

Legend

CCC_StormNetwork
PIPE_FUNCT
LOCAL STORM

CCC_StormManholes
MANHOLE_
Manhole

THE SEWERS SHOWN ON THIS MAP ARE FOR REFERENCE ONLY. THE LOCATION AND PROPERTIES OF ALL SEWERS, LEVELS, PIPESIZES, etc. MUST BE CONFIRMED ON SITE.

N

CORK CITY COUNCIL ENVIRONMENT DIRECTORATE
Storm Network

Drawn By: G. Roche

Checked by: L.L

Date: 01/06/2016

Cork City Council
Environment Directorate
Water Distribution Section

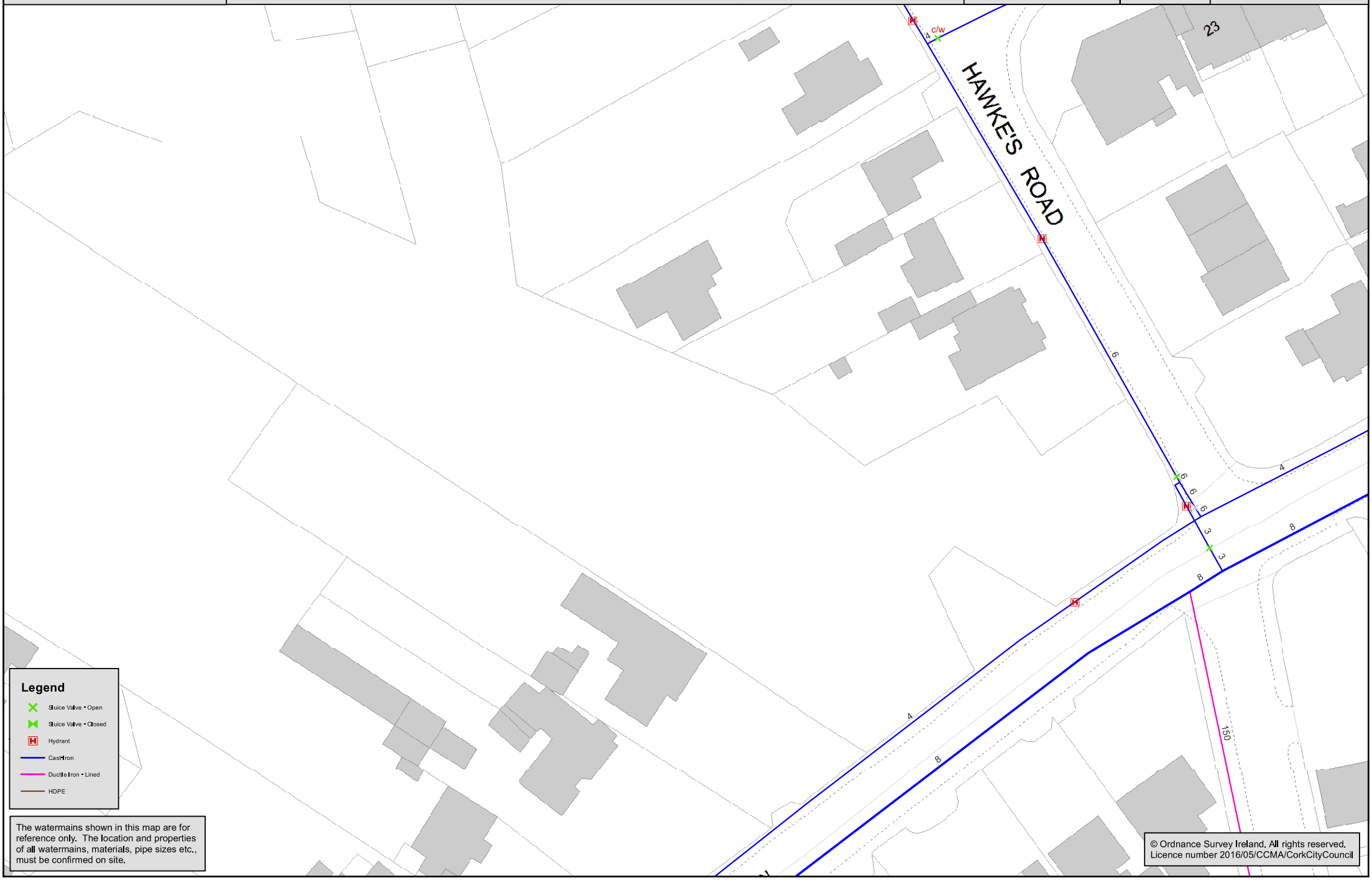
Hawkes Road - Public Watermain Records

Scale (A3):
1:500

N

Drawn: LG

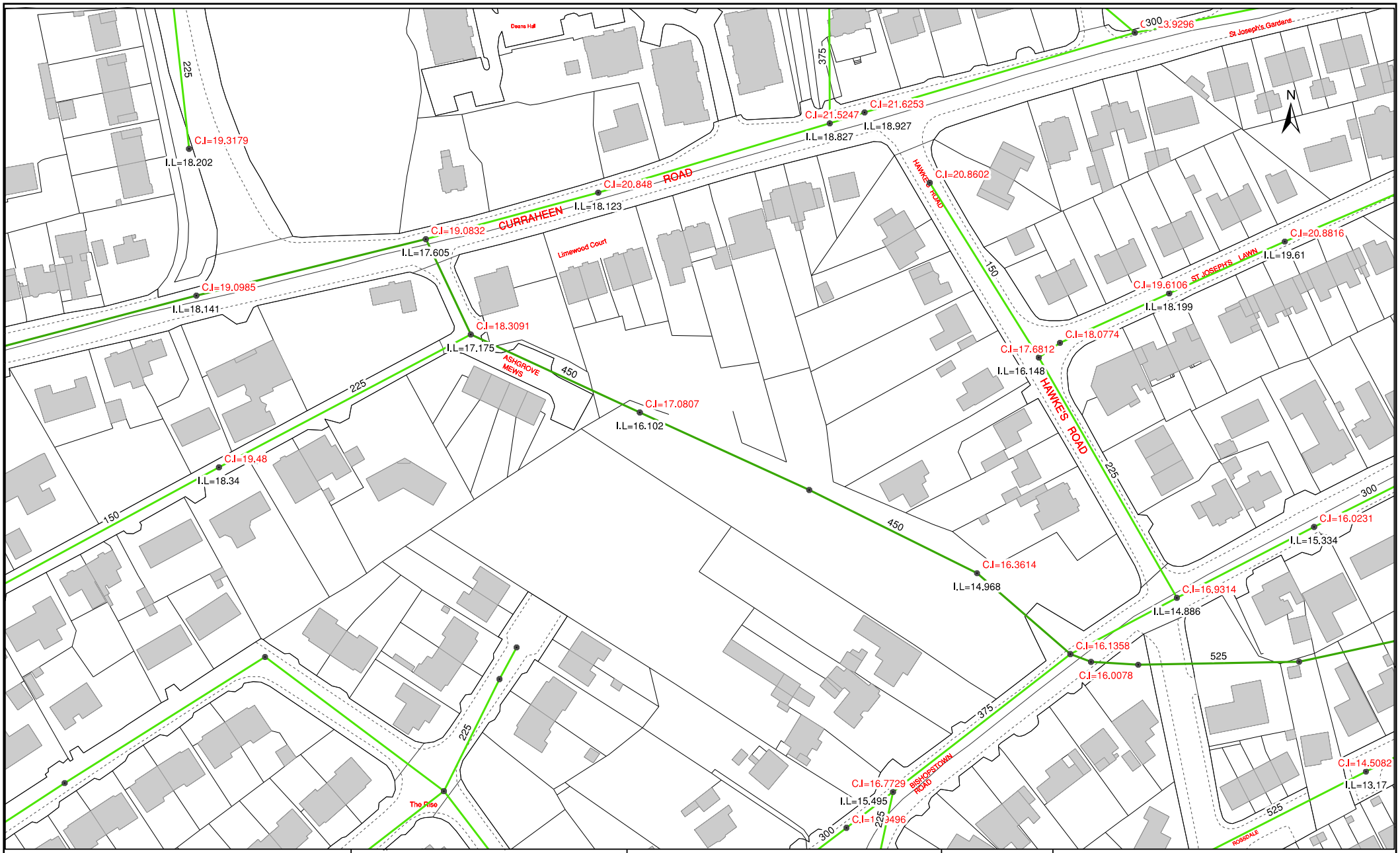
Date: 07/06/2016



Legend

- Sluice Valve - Open
- Sluice Valve - Closed
- Hydrant
- Cast Iron
- Ductile Iron - Lined
- HDPE

The watermains shown in this map are for reference only. The location and properties of all watermains, materials, pipe sizes etc., must be confirmed on site.



Drainage Records

Legend

IW_FoulNetwork

PIPE_FUNCT

- LOCAL COMBINED
- SWS

IW_FoulManholes

MANHOLE_

- Manhole

THE SEWERS SHOWN ON THIS MAP ARE FOR REFERENCE ONLY. THE LOCATION AND PROPERTIES OF ALL SEWERS, LEVELS, PIPESIZES, etc, MUST BE CONFIRMED ON SITE.

N

CORK CITY COUNCIL ENVIRONMENT DIRECTORATE
(As agents of Irish Water)

Drawn By: G. Roche

Checked by: L.L

Date: 01/06/2016

Appendix B – Allowable Runoff QBAR Values

IH 124 Mean Annual Flood

Input

Return Period (years)	100	Soil	0.300
Area (ha)	1.060	Urban	0.000
SAAR (mm)	1135	Region Number	Ireland South

Results	**l/s**
QBAR Rural	5.5
QBAR Urban	5.5
Q100 years	10.1
Q1 year	4.7
Q2 years	5.3
Q5 years	6.5
Q10 years	7.4
Q20 years	8.3
Q25 years	8.5
Q30 years	8.7
Q50 years	9.3
Q100 years	10.1
Q200 years	10.9
Q250 years	n/a
Q1000 years	n/a

WARNING: Irish growth curves are not defined above 200 years.

Appendix C – 1 in 2 Year Design Sheets

STORM SEWER DESIGN by the Modified Rational Method

Design Criteria for Storm

Pipe Sizes STANDARD Manhole Sizes STANDARD

FSR Rainfall Model - Scotland and Ireland

Return Period (years)	100	Add Flow / Climate Change (%)	0
M5-60 (mm)	18.800	Minimum Backdrop Height (m)	0.200
Ratio R	0.250	Maximum Backdrop Height (m)	1.500
Maximum Rainfall (mm/hr)	50	Min Design Depth for Optimisation (m)	1.200
Foul Sewage (l/s/ha)	0.00	Min Vel for Auto Design only (m/s)	1.00
Volumetric Runoff Coeff.	0.750	Min Slope for Optimisation (1:X)	500

Designed with Level Inverts

Time Area Diagram for Storm

Time (mins)	Area (ha)	Time (mins)	Area (ha)	Time (mins)	Area (ha)
0-4	0.065	4-8	0.408	8-12	0.059

Total Area Contributing (ha) = 0.533

Total Pipe Volume (m^3) = 17.512

Network Design Table for Storm

PN	Length (m)	Fall (m)	Slope (1:X)	Area (ha)	T.E. (mins)	DWF (l/s)	k (mm)	HYD SECT	DIA (mm)
S1.000	25.500	0.100	255.0	0.039	5.00	0.0	0.600	o	225
S2.000	40.250	0.161	250.0	0.063	5.00	0.0	0.600	o	225
S2.001	6.600	0.026	253.8	0.010	0.00	0.0	0.600	o	225
S1.001	18.850	0.205	92.0	0.071	0.00	0.0	0.600	o	225

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ Area (ha)	Σ DWF (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
S1.000	50.00	5.52	15.850	0.039	0.0	0.0	0.0	0.81	32.4	5.3
S2.000	50.00	5.82	15.950	0.063	0.0	0.0	0.0	0.82	32.7	8.5
S2.001	50.00	5.95	15.789	0.073	0.0	0.0	0.0	0.82	32.4	9.9
S1.001	50.00	6.18	15.750	0.183	0.0	0.0	0.0	1.36	54.2	24.8

Network Design Table for Storm

PN	Length (m)	Fall (m)	Slope (1:X)	Area (ha)	T.E. (mins)	DWF (l/s)	k (mm)	HYD SECT	DIA (mm)
S3.000	21.300	0.085	250.6	0.068	5.00	0.0	0.600	o	225
S4.000	17.000	0.170	100.0	0.018	5.00	0.0	0.600	o	225
S4.001	4.600	0.046	100.0	0.000	0.00	0.0	0.600	o	225
S3.001	7.200	0.029	248.3	0.010	0.00	0.0	0.600	o	225
S3.002	19.700	0.079	249.4	0.010	0.00	0.0	0.600	o	225
S1.002	16.000	0.064	250.0	0.100	0.00	0.0	0.600	o	300
S1.003	40.500	0.162	250.0	0.040	0.00	0.0	0.600	o	300
S1.004	39.750	0.159	250.0	0.050	0.00	0.0	0.600	o	300
S1.005	7.400	0.030	246.7	0.054	0.00	0.0	0.600	o	375
S1.006	2.000	0.008	250.0	0.000	0.00	0.0	0.600	o	375
S1.007	8.500	0.028	300.0	0.000	0.00	0.0	0.600	o	225
S1.008	10.000	0.033	300.0	0.000	0.00	0.0	0.600	o	225
S1.009	17.500	0.058	300.0	0.000	0.00	0.0	0.600	o	225
S1.010	26.700	0.089	300.0	0.000	0.00	0.0	0.600	o	225
S1.011	5.200	0.017	300.0	0.000	0.00	0.0	0.600	o	225
S1.012	14.300	0.048	300.0	0.000	0.00	0.0	0.600	o	225

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ Area (ha)	Σ DWF (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
S3.000	50.00	5.43	15.750	0.068	0.0	0.0	0.0	0.82	32.7	9.2
S4.000	50.00	5.22	16.325	0.018	0.0	0.0	0.0	1.31	52.0	2.4
S4.001	50.00	5.28	16.155	0.018	0.0	0.0	0.0	1.31	52.0	2.4
S3.001	50.00	5.58	15.665	0.096	0.0	0.0	0.0	0.83	32.8	13.0
S3.002	50.00	5.98	15.636	0.106	0.0	0.0	0.0	0.82	32.7	14.4
S1.002	50.00	6.45	15.545	0.389	0.0	0.0	0.0	0.99	70.0	52.7
S1.003	50.00	7.13	15.481	0.429	0.0	0.0	0.0	0.99	70.0	58.1
S1.004	50.00	7.80	15.319	0.479	0.0	0.0	0.0	0.99	70.0	64.9
S1.005	50.00	7.91	15.160	0.533	0.0	0.0	0.0	1.15	126.9	72.2
S1.006	50.00	7.94	15.130	0.533	0.0	0.0	0.0	1.14	126.1	72.2
S1.007	50.00	5.19	15.122	0.000	5.1	0.0	0.0	0.75	29.8	5.1
S1.008	50.00	5.41	15.094	0.000	5.1	0.0	0.0	0.75	29.8	5.1
S1.009	50.00	5.80	15.060	0.000	5.1	0.0	0.0	0.75	29.8	5.1
S1.010	50.00	6.39	15.002	0.000	5.1	0.0	0.0	0.75	29.8	5.1
S1.011	50.00	6.51	14.913	0.000	5.1	0.0	0.0	0.75	29.8	5.1
S1.012	50.00	6.83	14.896	0.000	5.1	0.0	0.0	0.75	29.8	5.1

Manhole Schedules for Storm

MH Name	MH CL (m)	MH Depth (m)	MH Diam.,L*W (mm)	Pipe Out PN	Pipe Out Invert Level (m)	Pipe Out Diameter (mm)	Pipes In PN	Pipes In Invert Level (m)	Pipes In Diameter (mm)	Backdrop (mm)
SSW.013	17.350	1.500	1050	S1.000	15.850	225				
SSW.020	17.250	1.300	1050	S2.000	15.950	225				
SSW.019	17.250	1.461	1050	S2.001	15.789	225	S2.000	15.789	225	
SSW.012	17.250	1.500	1050	S1.001	15.750	225	S1.000	15.750	225	
							S2.001	15.763	225	13
SSW.016	17.250	1.500	1050	S3.000	15.750	225				
SSW.018	17.050	0.725	1050	S4.000	16.325	225				
SSW.017	17.050	0.895	1050	S4.001	16.155	225	S4.000	16.155	225	
SSW.015	17.250	1.585	1050	S3.001	15.665	225	S3.000	15.665	225	
							S4.001	16.109	225	444
SSW.014	17.200	1.564	1050	S3.002	15.636	225	S3.001	15.636	225	
SSW.011	17.100	1.555	1050	S1.002	15.545	300	S1.001	15.545	225	
							S3.002	15.557	225	
SSW.010	16.900	1.419	1050	S1.003	15.481	300	S1.002	15.481	300	
SSW.009	16.500	1.181	1050	S1.004	15.319	300	S1.003	15.319	300	
SSW.008	16.400	1.240	1350	S1.005	15.160	375	S1.004	15.160	300	
SSW.007	16.300	1.170	1350	S1.006	15.130	375	S1.005	15.130	375	
SSW.006	16.300	1.178	1350	S1.007	15.122	225	S1.006	15.122	375	
SSW.005	16.300	1.206	1050	S1.008	15.094	225	S1.007	15.094	225	
SSW.004	16.250	1.190	1050	S1.009	15.060	225	S1.008	15.060	225	
SSW.003	16.150	1.148	1050	S1.010	15.002	225	S1.009	15.002	225	
SSW.002	16.300	1.387	1050	S1.011	14.913	225	S1.010	14.913	225	
SSW.001	16.300	1.404	1050	S1.012	14.896	225	S1.011	14.896	225	
SExis SWMH	15.890	1.042	0		OUTFALL		S1.012	14.848	225	

PIPELINE SCHEDULES for Storm

Upstream Manhole

PN	Hyd Sect	Diam (mm)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH DIAM., L*W (mm)
S1.000	o	225	SSW.013	17.350	15.850	1.275	1050
S2.000	o	225	SSW.020	17.250	15.950	1.075	1050
S2.001	o	225	SSW.019	17.250	15.789	1.236	1050
S1.001	o	225	SSW.012	17.250	15.750	1.275	1050
S3.000	o	225	SSW.016	17.250	15.750	1.275	1050
S4.000	o	225	SSW.018	17.050	16.325	0.500	1050
S4.001	o	225	SSW.017	17.050	16.155	0.670	1050
S3.001	o	225	SSW.015	17.250	15.665	1.360	1050
S3.002	o	225	SSW.014	17.200	15.636	1.339	1050
S1.002	o	300	SSW.011	17.100	15.545	1.255	1050
S1.003	o	300	SSW.010	16.900	15.481	1.119	1050
S1.004	o	300	SSW.009	16.500	15.319	0.881	1050
S1.005	o	375	SSW.008	16.400	15.160	0.865	1350

Downstream Manhole

PN	Length (m)	Slope (1:X)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH DIAM., L*W (mm)
S1.000	25.500	255.0	SSW.012	17.250	15.750	1.275	1050
S2.000	40.250	250.0	SSW.019	17.250	15.789	1.236	1050
S2.001	6.600	253.8	SSW.012	17.250	15.763	1.262	1050
S1.001	18.850	92.0	SSW.011	17.100	15.545	1.330	1050
S3.000	21.300	250.6	SSW.015	17.250	15.665	1.360	1050
S4.000	17.000	100.0	SSW.017	17.050	16.155	0.670	1050
S4.001	4.600	100.0	SSW.015	17.250	16.109	0.916	1050
S3.001	7.200	248.3	SSW.014	17.200	15.636	1.339	1050
S3.002	19.700	249.4	SSW.011	17.100	15.557	1.318	1050
S1.002	16.000	250.0	SSW.010	16.900	15.481	1.119	1050
S1.003	40.500	250.0	SSW.009	16.500	15.319	0.881	1050
S1.004	39.750	250.0	SSW.008	16.400	15.160	0.940	1350
S1.005	7.400	246.7	SSW.007	16.300	15.130	0.795	1350

PIPELINE SCHEDULES for Storm

Upstream Manhole

PN	Hyd Sect	Diam (mm)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH DIAM., L*W (mm)
S1.006	o	375	SSW.007	16.300	15.130	0.795	1350
S1.007	o	225	SSW.006	16.300	15.122	0.953	1350
S1.008	o	225	SSW.005	16.300	15.094	0.981	1050
S1.009	o	225	SSW.004	16.250	15.060	0.965	1050
S1.010	o	225	SSW.003	16.150	15.002	0.923	1050
S1.011	o	225	SSW.002	16.300	14.913	1.162	1050
S1.012	o	225	SSW.001	16.300	14.896	1.179	1050

Downstream Manhole

PN	Length (m)	Slope (1:X)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH DIAM., L*W (mm)
S1.006	2.000	250.0	SSW.006	16.300	15.122	0.803	1350
S1.007	8.500	300.0	SSW.005	16.300	15.094	0.981	1050
S1.008	10.000	300.0	SSW.004	16.250	15.060	0.965	1050
S1.009	17.500	300.0	SSW.003	16.150	15.002	0.923	1050
S1.010	26.700	300.0	SSW.002	16.300	14.913	1.162	1050
S1.011	5.200	300.0	SSW.001	16.300	14.896	1.179	1050
S1.012	14.300	300.0	SExis SWMH	15.890	14.848	0.817	0

Free Flowing Outfall Details for Storm

Outfall Pipe Number	Outfall Name	C. Level (m)	I. Level (m)	Min I. Level (m)	D,L (mm)	W (mm)
S1.012	SExis SWMH	15.890	14.848	14.835	0	0

Simulation Criteria for Storm

Volumetric Runoff Coeff	0.750	Foul Sewage per hectare (l/s)	0.000
PIMP (% impervious)	100	Additional Flow - % of Total Flow	0.000
Areal Reduction Factor	1.000	MADD Factor * 10m³/ha Storage	2.000
Hot Start (mins)	0	Inlet Coeffiecient	0.800
Hot Start Level (mm)	0	Run Time (mins)	60
Manhole Headloss Coeff (Global)	0.500	Output Interval (mins)	1

Number of Input Hydrographs	0	Number of Storage Structures	1
Number of Online Controls	1	Number of Time/Area Diagrams	0
Number of Offline Controls	0		

Synthetic Rainfall Details

Rainfall Model FSR Return Period (years) 100

Synthetic Rainfall Details

Region	Scotland and Ireland	Cv (Summer)	0.750
M5-60 (mm)	18.800	Cv (Winter)	0.840
Ratio R	0.250	Storm Duration (mins)	30
Profile Type	Summer		

Online Controls for Storm

Hydro-Brake® Manhole: SSW.006, DS/PN: S1.007, Volume (m³): 1.8

Design Head (m) 1.000 Hydro-Brake® Type Md4 Invert Level (m) 15.122
Design Flow (l/s) 5.1 Diameter (mm) 81

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	2.5	1.200	5.6	3.000	8.9	7.000	13.5
0.200	3.6	1.400	6.0	3.500	9.6	7.500	14.0
0.300	3.1	1.600	6.5	4.000	10.2	8.000	14.5
0.400	3.3	1.800	6.9	4.500	10.8	8.500	14.9
0.500	3.6	2.000	7.2	5.000	11.4	9.000	15.3
0.600	4.0	2.200	7.6	5.500	12.0	9.500	15.8
0.800	4.6	2.400	7.9	6.000	12.5		
1.000	5.1	2.600	8.2	6.500	13.0		

Storage Structures for Storm

Tank or Pond Manhole: SSW.006, DS/PN: S1.007

Invert Level (m) 15.122

Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	200.0	1.000	200.0

Summary of Critical Results by Maximum Level (Rank 1) for Storm

Margin for Flood Risk Warning (mm) 300.0 DVD Status OFF
Analysis Timestep Fine Inertia Status OFF
DTS Status ON

Profile(s) Summer and Winter
Duration(s) (mins) 15, 30, 60, 120, 240, 360, 480, 960, 1440
Return Period(s) (years) 2
Climate Change (%) 0

PN	Storm	Return Period	Climate Change	First X Surcharge	First Y Flood	First Z Overflow	O/F Act.	Lvl Exc.
S1.000	15 Winter	2	0%					
S2.000	15 Winter	2	0%					
S2.001	15 Winter	2	0%					
S1.001	15 Winter	2	0%					
S3.000	15 Winter	2	0%					
S4.000	15 Winter	2	0%					
S4.001	15 Winter	2	0%					
S3.001	15 Winter	2	0%					
S3.002	15 Winter	2	0%					
S1.002	15 Winter	2	0%					
S1.003	15 Winter	2	0%					
S1.004	480 Winter	2	0%					
S1.005	480 Winter	2	0%	2/240 Winter				
S1.006	480 Winter	2	0%	2/240 Winter				
S1.007	480 Winter	2	0%	2/30 Winter				
S1.008	240 Winter	2	0%					
S1.009	60 Summer	2	0%					
S1.010	360 Winter	2	0%					
S1.011	480 Summer	2	0%					
S1.012	480 Winter	2	0%					

Summary of Critical Results by Maximum Level (Rank 1) for Storm

PN	US/MH Name	Water Level (m)	Surch'ed Depth (m)	Flooded Volume (m^3)	Flow / Cap.	O'flow (l/s)	Pipe Flow (l/s)	Status
S1.000	SSW.013	15.918	-0.157	0.000	0.19	0.0	5.7	OK
S2.000	SSW.020	16.035	-0.140	0.000	0.29	0.0	9.1	OK
S2.001	SSW.019	15.889	-0.125	0.000	0.41	0.0	10.3	OK
S1.001	SSW.012	15.864	-0.111	0.000	0.51	0.0	24.7	OK
S3.000	SSW.016	15.842	-0.133	0.000	0.33	0.0	9.9	OK
S4.000	SSW.018	16.360	-0.190	0.000	0.06	0.0	2.7	OK
S4.001	SSW.017	16.201	-0.179	0.000	0.09	0.0	2.7	OK
S3.001	SSW.015	15.802	-0.088	0.000	0.51	0.0	13.2	OK
S3.002	SSW.014	15.789	-0.072	0.000	0.48	0.0	14.3	OK
S1.002	SSW.011	15.760	-0.085	0.000	0.85	0.0	50.5	OK
S1.003	SSW.010	15.693	-0.088	0.000	0.83	0.0	54.0	OK
S1.004	SSW.009	15.579	-0.040	0.000	0.19	0.0	12.3	OK
S1.005	SSW.008	15.575	0.040	0.000	0.15	0.0	13.1	SURCHARGED
S1.006	SSW.007	15.574	0.069	0.000	0.15	0.0	12.9	SURCHARGED
S1.007	SSW.006	15.573	0.226	0.000	0.15	0.0	3.6	SURCHARGED
S1.008	SSW.005	15.150	-0.168	0.000	0.14	0.0	3.6	OK
S1.009	SSW.004	15.115	-0.170	0.000	0.13	0.0	3.6	OK
S1.010	SSW.003	15.056	-0.171	0.000	0.13	0.0	3.6	OK
S1.011	SSW.002	14.971	-0.167	0.000	0.15	0.0	3.6	OK
S1.012	SSW.001	14.951	-0.170	0.000	0.14	0.0	3.6	OK

Appendix D – 1 in 100 Year Design Sheets

STORM SEWER DESIGN by the Modified Rational Method

Design Criteria for Storm

Pipe Sizes STANDARD Manhole Sizes STANDARD

FSR Rainfall Model - Scotland and Ireland

Return Period (years)	100	Add Flow / Climate Change (%)	0
M5-60 (mm)	18.800	Minimum Backdrop Height (m)	0.200
Ratio R	0.250	Maximum Backdrop Height (m)	1.500
Maximum Rainfall (mm/hr)	50	Min Design Depth for Optimisation (m)	1.200
Foul Sewage (l/s/ha)	0.00	Min Vel for Auto Design only (m/s)	1.00
Volumetric Runoff Coeff.	0.750	Min Slope for Optimisation (1:X)	500

Designed with Level Inverts

Time Area Diagram for Storm

Time (mins)	Area (ha)	Time (mins)	Area (ha)	Time (mins)	Area (ha)
0-4	0.065	4-8	0.408	8-12	0.059

Total Area Contributing (ha) = 0.533

Total Pipe Volume (m^3) = 17.512

Network Design Table for Storm

PN	Length (m)	Fall (m)	Slope (1:X)	Area (ha)	T.E. (mins)	DWF (l/s)	k (mm)	HYD SECT	DIA (mm)
S1.000	25.500	0.100	255.0	0.039	5.00	0.0	0.600	o	225
S2.000	40.250	0.161	250.0	0.063	5.00	0.0	0.600	o	225
S2.001	6.600	0.026	253.8	0.010	0.00	0.0	0.600	o	225
S1.001	18.850	0.205	92.0	0.071	0.00	0.0	0.600	o	225

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ Area (ha)	Σ DWF (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
S1.000	50.00	5.52	15.850	0.039	0.0	0.0	0.0	0.81	32.4	5.3
S2.000	50.00	5.82	15.950	0.063	0.0	0.0	0.0	0.82	32.7	8.5
S2.001	50.00	5.95	15.789	0.073	0.0	0.0	0.0	0.82	32.4	9.9
S1.001	50.00	6.18	15.750	0.183	0.0	0.0	0.0	1.36	54.2	24.8

Network Design Table for Storm

PN	Length (m)	Fall (m)	Slope (1:X)	Area (ha)	T.E. (mins)	DWF (l/s)	k (mm)	HYD SECT	DIA (mm)
S3.000	21.300	0.085	250.6	0.068	5.00	0.0	0.600	o	225
S4.000	17.000	0.170	100.0	0.018	5.00	0.0	0.600	o	225
S4.001	4.600	0.046	100.0	0.000	0.00	0.0	0.600	o	225
S3.001	7.200	0.029	248.3	0.010	0.00	0.0	0.600	o	225
S3.002	19.700	0.079	249.4	0.010	0.00	0.0	0.600	o	225
S1.002	16.000	0.064	250.0	0.100	0.00	0.0	0.600	o	300
S1.003	40.500	0.162	250.0	0.040	0.00	0.0	0.600	o	300
S1.004	39.750	0.159	250.0	0.050	0.00	0.0	0.600	o	300
S1.005	7.400	0.030	246.7	0.054	0.00	0.0	0.600	o	375
S1.006	2.000	0.008	250.0	0.000	0.00	0.0	0.600	o	375
S1.007	8.500	0.028	300.0	0.000	0.00	0.0	0.600	o	225
S1.008	10.000	0.033	300.0	0.000	0.00	0.0	0.600	o	225
S1.009	17.500	0.058	300.0	0.000	0.00	0.0	0.600	o	225
S1.010	26.700	0.089	300.0	0.000	0.00	0.0	0.600	o	225
S1.011	5.200	0.017	300.0	0.000	0.00	0.0	0.600	o	225
S1.012	14.300	0.048	300.0	0.000	0.00	0.0	0.600	o	225

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ Area (ha)	Σ DWF (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
S3.000	50.00	5.43	15.750	0.068	0.0	0.0	0.0	0.82	32.7	9.2
S4.000	50.00	5.22	16.325	0.018	0.0	0.0	0.0	1.31	52.0	2.4
S4.001	50.00	5.28	16.155	0.018	0.0	0.0	0.0	1.31	52.0	2.4
S3.001	50.00	5.58	15.665	0.096	0.0	0.0	0.0	0.83	32.8	13.0
S3.002	50.00	5.98	15.636	0.106	0.0	0.0	0.0	0.82	32.7	14.4
S1.002	50.00	6.45	15.545	0.389	0.0	0.0	0.0	0.99	70.0	52.7
S1.003	50.00	7.13	15.481	0.429	0.0	0.0	0.0	0.99	70.0	58.1
S1.004	50.00	7.80	15.319	0.479	0.0	0.0	0.0	0.99	70.0	64.9
S1.005	50.00	7.91	15.160	0.533	0.0	0.0	0.0	1.15	126.9	72.2
S1.006	50.00	7.94	15.130	0.533	0.0	0.0	0.0	1.14	126.1	72.2
S1.007	50.00	5.19	15.122	0.000	5.1	0.0	0.0	0.75	29.8	5.1
S1.008	50.00	5.41	15.094	0.000	5.1	0.0	0.0	0.75	29.8	5.1
S1.009	50.00	5.80	15.060	0.000	5.1	0.0	0.0	0.75	29.8	5.1
S1.010	50.00	6.39	15.002	0.000	5.1	0.0	0.0	0.75	29.8	5.1
S1.011	50.00	6.51	14.913	0.000	5.1	0.0	0.0	0.75	29.8	5.1
S1.012	50.00	6.83	14.896	0.000	5.1	0.0	0.0	0.75	29.8	5.1

Manhole Schedules for Storm

MH Name	MH CL (m)	MH Depth (m)	MH Diam.,L*W (mm)	Pipe Out PN	Pipe Out Invert Level (m)	Pipe Out Diameter (mm)	Pipes In PN	Pipes In Invert Level (m)	Pipes In Diameter (mm)	Backdrop (mm)
SSW.013	17.350	1.500	1050	S1.000	15.850	225				
SSW.020	17.250	1.300	1050	S2.000	15.950	225				
SSW.019	17.250	1.461	1050	S2.001	15.789	225	S2.000	15.789	225	
SSW.012	17.250	1.500	1050	S1.001	15.750	225	S1.000	15.750	225	
							S2.001	15.763	225	13
SSW.016	17.250	1.500	1050	S3.000	15.750	225				
SSW.018	17.050	0.725	1050	S4.000	16.325	225				
SSW.017	17.050	0.895	1050	S4.001	16.155	225	S4.000	16.155	225	
SSW.015	17.250	1.585	1050	S3.001	15.665	225	S3.000	15.665	225	
							S4.001	16.109	225	444
SSW.014	17.200	1.564	1050	S3.002	15.636	225	S3.001	15.636	225	
SSW.011	17.100	1.555	1050	S1.002	15.545	300	S1.001	15.545	225	
							S3.002	15.557	225	
SSW.010	16.900	1.419	1050	S1.003	15.481	300	S1.002	15.481	300	
SSW.009	16.500	1.181	1050	S1.004	15.319	300	S1.003	15.319	300	
SSW.008	16.400	1.240	1350	S1.005	15.160	375	S1.004	15.160	300	
SSW.007	16.300	1.170	1350	S1.006	15.130	375	S1.005	15.130	375	
SSW.006	16.300	1.178	1350	S1.007	15.122	225	S1.006	15.122	375	
SSW.005	16.300	1.206	1050	S1.008	15.094	225	S1.007	15.094	225	
SSW.004	16.250	1.190	1050	S1.009	15.060	225	S1.008	15.060	225	
SSW.003	16.150	1.148	1050	S1.010	15.002	225	S1.009	15.002	225	
SSW.002	16.300	1.387	1050	S1.011	14.913	225	S1.010	14.913	225	
SSW.001	16.300	1.404	1050	S1.012	14.896	225	S1.011	14.896	225	
SExis SWMH	15.890	1.042	0		OUTFALL		S1.012	14.848	225	

PIPELINE SCHEDULES for Storm

Upstream Manhole

PN	Hyd Sect	Diam (mm)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH DIAM., L*W (mm)
S1.000	o	225	SSW.013	17.350	15.850	1.275	1050
S2.000	o	225	SSW.020	17.250	15.950	1.075	1050
S2.001	o	225	SSW.019	17.250	15.789	1.236	1050
S1.001	o	225	SSW.012	17.250	15.750	1.275	1050
S3.000	o	225	SSW.016	17.250	15.750	1.275	1050
S4.000	o	225	SSW.018	17.050	16.325	0.500	1050
S4.001	o	225	SSW.017	17.050	16.155	0.670	1050
S3.001	o	225	SSW.015	17.250	15.665	1.360	1050
S3.002	o	225	SSW.014	17.200	15.636	1.339	1050
S1.002	o	300	SSW.011	17.100	15.545	1.255	1050
S1.003	o	300	SSW.010	16.900	15.481	1.119	1050
S1.004	o	300	SSW.009	16.500	15.319	0.881	1050
S1.005	o	375	SSW.008	16.400	15.160	0.865	1350

Downstream Manhole

PN	Length (m)	Slope (1:X)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH DIAM., L*W (mm)
S1.000	25.500	255.0	SSW.012	17.250	15.750	1.275	1050
S2.000	40.250	250.0	SSW.019	17.250	15.789	1.236	1050
S2.001	6.600	253.8	SSW.012	17.250	15.763	1.262	1050
S1.001	18.850	92.0	SSW.011	17.100	15.545	1.330	1050
S3.000	21.300	250.6	SSW.015	17.250	15.665	1.360	1050
S4.000	17.000	100.0	SSW.017	17.050	16.155	0.670	1050
S4.001	4.600	100.0	SSW.015	17.250	16.109	0.916	1050
S3.001	7.200	248.3	SSW.014	17.200	15.636	1.339	1050
S3.002	19.700	249.4	SSW.011	17.100	15.557	1.318	1050
S1.002	16.000	250.0	SSW.010	16.900	15.481	1.119	1050
S1.003	40.500	250.0	SSW.009	16.500	15.319	0.881	1050
S1.004	39.750	250.0	SSW.008	16.400	15.160	0.940	1350
S1.005	7.400	246.7	SSW.007	16.300	15.130	0.795	1350

PIPELINE SCHEDULES for Storm

Upstream Manhole

PN	Hyd Sect	Diam (mm)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH DIAM., L*W (mm)
S1.006	o	375	SSW.007	16.300	15.130	0.795	1350
S1.007	o	225	SSW.006	16.300	15.122	0.953	1350
S1.008	o	225	SSW.005	16.300	15.094	0.981	1050
S1.009	o	225	SSW.004	16.250	15.060	0.965	1050
S1.010	o	225	SSW.003	16.150	15.002	0.923	1050
S1.011	o	225	SSW.002	16.300	14.913	1.162	1050
S1.012	o	225	SSW.001	16.300	14.896	1.179	1050

Downstream Manhole

PN	Length (m)	Slope (1:X)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH DIAM., L*W (mm)
S1.006	2.000	250.0	SSW.006	16.300	15.122	0.803	1350
S1.007	8.500	300.0	SSW.005	16.300	15.094	0.981	1050
S1.008	10.000	300.0	SSW.004	16.250	15.060	0.965	1050
S1.009	17.500	300.0	SSW.003	16.150	15.002	0.923	1050
S1.010	26.700	300.0	SSW.002	16.300	14.913	1.162	1050
S1.011	5.200	300.0	SSW.001	16.300	14.896	1.179	1050
S1.012	14.300	300.0	SExis SWMH	15.890	14.848	0.817	0

Free Flowing Outfall Details for Storm

Outfall Pipe Number	Outfall Name	C. Level (m)	I. Level (m)	Min I. Level (m)	D,L (mm)	W (mm)
S1.012	SExis SWMH	15.890	14.848	14.835	0	0

Simulation Criteria for Storm

Volumetric Runoff Coeff	0.750	Foul Sewage per hectare (l/s)	0.000
PIMP (% impervious)	100	Additional Flow - % of Total Flow	0.000
Areal Reduction Factor	1.000	MADD Factor * 10m³/ha Storage	2.000
Hot Start (mins)	0	Inlet Coeffiecient	0.800
Hot Start Level (mm)	0	Run Time (mins)	60
Manhole Headloss Coeff (Global)	0.500	Output Interval (mins)	1

Number of Input Hydrographs	0	Number of Storage Structures	1
Number of Online Controls	1	Number of Time/Area Diagrams	0
Number of Offline Controls	0		

Synthetic Rainfall Details

Rainfall Model FSR Return Period (years) 100

Synthetic Rainfall Details

Region	Scotland and Ireland	Cv (Summer)	0.750
M5-60 (mm)	18.800	Cv (Winter)	0.840
Ratio R	0.250	Storm Duration (mins)	30
Profile Type	Summer		

Online Controls for Storm

Hydro-Brake® Manhole: SSW.006, DS/PN: S1.007, Volume (m³): 1.8

Design Head (m) 1.000 Hydro-Brake® Type Md4 Invert Level (m) 15.122
Design Flow (l/s) 5.1 Diameter (mm) 81

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	2.5	1.200	5.6	3.000	8.9	7.000	13.5
0.200	3.6	1.400	6.0	3.500	9.6	7.500	14.0
0.300	3.1	1.600	6.5	4.000	10.2	8.000	14.5
0.400	3.3	1.800	6.9	4.500	10.8	8.500	14.9
0.500	3.6	2.000	7.2	5.000	11.4	9.000	15.3
0.600	4.0	2.200	7.6	5.500	12.0	9.500	15.8
0.800	4.6	2.400	7.9	6.000	12.5		
1.000	5.1	2.600	8.2	6.500	13.0		

Storage Structures for Storm

Tank or Pond Manhole: SSW.006, DS/PN: S1.007

Invert Level (m) 15.122

Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	200.0	1.000	200.0

Summary of Critical Results by Maximum Level (Rank 1) for Storm

Margin for Flood Risk Warning (mm) 300.0 DVD Status OFF
Analysis Timestep Fine Inertia Status OFF
DTS Status ON

Profile(s) Summer and Winter
Duration(s) (mins) 15, 30, 60, 120, 240, 360, 480, 960, 1440
Return Period(s) (years) 100
Climate Change (%) 0

PN	Storm	Return Period	Climate Change	First X Surcharge	First Y Flood	First Z Overflow	O/F Act.	Lvl Exc.
S1.000	15 Winter	100	0%	100/15 Summer				
S2.000	15 Winter	100	0%	100/15 Summer				
S2.001	15 Winter	100	0%	100/15 Summer				
S1.001	15 Winter	100	0%	100/15 Summer				
S3.000	15 Winter	100	0%	100/15 Summer				
S4.000	15 Winter	100	0%	100/15 Winter				
S4.001	15 Winter	100	0%	100/15 Summer				
S3.001	15 Winter	100	0%	100/15 Summer				
S3.002	15 Winter	100	0%	100/15 Summer				
S1.002	15 Winter	100	0%	100/15 Summer				
S1.003	15 Winter	100	0%	100/15 Summer				
S1.004	960 Winter	100	0%	100/15 Summer				
S1.005	960 Winter	100	0%	100/15 Summer				
S1.006	960 Winter	100	0%	100/15 Summer				
S1.007	960 Winter	100	0%	100/15 Summer				
S1.008	960 Winter	100	0%					
S1.009	960 Winter	100	0%					
S1.010	960 Winter	100	0%					
S1.011	960 Winter	100	0%					
S1.012	960 Winter	100	0%					

Summary of Critical Results by Maximum Level (Rank 1) for Storm

PN	US/MH Name	Water Level (m)	Surch'ed Depth (m)	Flooded Volume (m^3)	Flow / Cap.	O'flow (l/s)	Pipe Flow (l/s)	Status
S1.000	SSW.013	16.710	0.635	0.000	0.33	0.0	9.9	SURCHARGED
S2.000	SSW.020	16.750	0.575	0.000	0.53	0.0	16.5	SURCHARGED
S2.001	SSW.019	16.704	0.690	0.000	0.74	0.0	18.7	SURCHARGED
S1.001	SSW.012	16.687	0.712	0.000	0.88	0.0	42.9	SURCHARGED
S3.000	SSW.016	16.638	0.663	0.000	0.61	0.0	18.3	SURCHARGED
S4.000	SSW.018	16.610	0.060	0.000	0.14	0.0	6.5	SURCHARGED
S4.001	SSW.017	16.603	0.223	0.000	0.34	0.0	10.2	SURCHARGED
S3.001	SSW.015	16.601	0.711	0.000	0.99	0.0	25.5	SURCHARGED
S3.002	SSW.014	16.579	0.718	0.000	0.97	0.0	28.6	SURCHARGED
S1.002	SSW.011	16.531	0.686	0.000	1.44	0.0	85.4	SURCHARGED
S1.003	SSW.010	16.394	0.613	0.000	1.43	0.0	92.9	SURCHARGED
S1.004	SSW.009	16.172	0.553	0.000	0.22	0.0	14.4	SURCHARGED
S1.005	SSW.008	16.166	0.631	0.000	0.19	0.0	16.1	FLOOD RISK
S1.006	SSW.007	16.165	0.660	0.000	0.18	0.0	16.0	FLOOD RISK
S1.007	SSW.006	16.164	0.817	0.000	0.21	0.0	5.1	FLOOD RISK
S1.008	SSW.005	15.163	-0.156	0.000	0.21	0.0	5.1	OK
S1.009	SSW.004	15.127	-0.159	0.000	0.19	0.0	5.1	OK
S1.010	SSW.003	15.067	-0.160	0.000	0.19	0.0	5.1	OK
S1.011	SSW.002	14.984	-0.154	0.000	0.22	0.0	5.1	OK
S1.012	SSW.001	14.963	-0.158	0.000	0.20	0.0	5.1	OK

Appendix E – Foul Sewer Design Sheets

FOUL SEWERAGE DESIGN

Design Criteria for Foul - Main

Pipe Sizes STANDARD Manhole Sizes STANDARD

Industrial Flow (l/s/ha)	0.00	Add Flow / Climate Change (%)	0
Industrial Peak Flow Factor	0.00	Minimum Backdrop Height (m)	0.200
Flow Per Person (l/per/day)	446.00	Maximum Backdrop Height (m)	1.500
Persons per House	1.00	Min Design Depth for Optimisation (m)	1.200
Domestic (l/s/ha)	0.00	Min Vel for Auto Design only (m/s)	0.75
Domestic Peak Flow Factor	6.00	Min Slope for Optimisation (1:X)	500

Designed with Level Inverts

Network Design Table for Foul - Main

PN	Length (m)	Fall (m)	Slope (1:X)	Area (ha)	Houses	DWF (l/s)	k (mm)	HYD SECT	DIA (mm)
F1.000	25.500	0.127	200.8	0.000	5	0.0	1.500	o	225
F2.000	40.900	0.205	199.5	0.000	11	0.0	1.500	o	225
F2.001	9.000	0.045	200.0	0.000	0	0.0	1.500	o	225
F1.001	18.000	0.090	200.0	0.000	4	0.0	1.500	o	225
F3.000	21.050	0.140	150.4	0.000	6	0.0	1.500	o	225
F4.000	25.000	0.417	60.0	0.000	2	0.0	1.500	o	150
F4.001	4.200	0.070	60.0	0.000	0	0.0	1.500	o	150

Network Results Table

PN	US/IL (m)	Σ Area (ha)	Σ DWF (l/s)	Σ Hse	Add Flow (l/s)	P.Dep (mm)	P.Vel (m/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
F1.000	15.650	0.000	0.0	5	0.0	12	0.20	0.81	32.1	0.2
F2.000	16.100	0.000	0.0	11	0.0	17	0.26	0.81	32.3	0.3
F2.001	15.895	0.000	0.0	11	0.0	17	0.26	0.81	32.2	0.3
F1.001	15.523	0.000	0.0	20	0.0	22	0.31	0.81	32.2	0.6
F3.000	15.800	0.000	0.0	6	0.0	12	0.23	0.94	37.2	0.2
F4.000	16.400	0.000	0.0	2	0.0	6	0.24	1.13	20.0	0.1
F4.001	15.983	0.000	0.0	2	0.0	6	0.24	1.13	20.0	0.1

Network Design Table for Foul - Main

PN	Length (m)	Fall (m)	Slope (1:X)	Area (ha)	Houses	DWF (l/s)	k (mm)	HYD SECT	DIA (mm)
F3.001	5.500	0.037	148.6	0.000	0	0.0	1.500	o	225
F3.002	21.200	0.141	150.4	0.000	0	0.0	1.500	o	225
F1.002	20.500	0.103	199.0	0.000	10	0.0	1.500	o	225
F1.003	40.000	0.200	200.0	0.000	6	0.0	1.500	o	225
F1.004	49.500	0.248	199.6	0.000	8	0.0	1.500	o	225
F1.005	10.000	0.050	200.0	0.000	5	0.0	1.500	o	225

Network Results Table

PN	US/IL (m)	Σ Area (ha)	Σ DWF (l/s)	Σ Hse	Add Flow (l/s)	P.Dep (mm)	P.Vel (m/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
F3.001	15.660	0.000	0.0	8	0.0	13	0.26	0.94	37.4	0.2
F3.002	15.623	0.000	0.0	8	0.0	13	0.26	0.94	37.2	0.2
F1.002	15.433	0.000	0.0	38	0.0	30	0.38	0.81	32.3	1.2
F1.003	15.330	0.000	0.0	44	0.0	32	0.40	0.81	32.2	1.4
F1.004	15.130	0.000	0.0	52	0.0	34	0.42	0.81	32.2	1.6
F1.005	14.882	0.000	0.0	57	0.0	36	0.43	0.81	32.2	1.8

Manhole Schedules for Foul - Main

MH Name	MH CL (m)	MH Depth (m)	MH Diam.,L*W (mm)	PN	Pipe Out Invert Level (m)	Diameter (mm)	PN	Pipes In Invert Level (m)	Diameter (mm)	Backdrop (mm)
FFS.007	17.500	1.850	1200	F1.000	15.650	225				
FFS.014	17.250	1.150	1050	F2.000	16.100	225				
FFS.013	17.500	1.605	1050	F2.001	15.895	225	F2.000	15.895	225	
FFS.006	17.300	1.777	1200	F1.001	15.523	225	F1.000	15.523	225	
							F2.001	15.850	225	327
FFS.010	17.250	1.450	1050	F3.000	15.800	225				
FFS.012	17.050	0.650	1050	F4.000	16.400	150				
FFS.011	17.050	1.067	1050	F4.001	15.983	150	F4.000	15.983	150	
FFS.009	17.250	1.590	1050	F3.001	15.660	225	F3.000	15.660	225	
							F4.001	15.913	150	178
FFS.008	17.200	1.577	1050	F3.002	15.623	225	F3.001	15.623	225	
FFS.005	17.100	1.667	1050	F1.002	15.433	225	F1.001	15.433	225	
							F3.002	15.482	225	49
FFS.004	16.900	1.570	1050	F1.003	15.330	225	F1.002	15.330	225	
FFS.003	16.550	1.420	1050	F1.004	15.130	225	F1.003	15.130	225	
FFS.002	16.250	1.368	1050	F1.005	14.882	225	F1.004	14.882	225	
FFS.001	16.250	1.418	0		OUTFALL		F1.005	14.832	225	

PIPELINE SCHEDULES for Foul - Main

Upstream Manhole

PN	Hyd Sect	Diam (mm)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH DIAM., L*W (mm)
F1.000	o	225	FFS.007	17.500	15.650	1.625	1200
F2.000	o	225	FFS.014	17.250	16.100	0.925	1050
F2.001	o	225	FFS.013	17.500	15.895	1.380	1050
F1.001	o	225	FFS.006	17.300	15.523	1.552	1200
F3.000	o	225	FFS.010	17.250	15.800	1.225	1050
F4.000	o	150	FFS.012	17.050	16.400	0.500	1050
F4.001	o	150	FFS.011	17.050	15.983	0.917	1050
F3.001	o	225	FFS.009	17.250	15.660	1.365	1050
F3.002	o	225	FFS.008	17.200	15.623	1.352	1050
F1.002	o	225	FFS.005	17.100	15.433	1.442	1050
F1.003	o	225	FFS.004	16.900	15.330	1.345	1050
F1.004	o	225	FFS.003	16.550	15.130	1.195	1050
F1.005	o	225	FFS.002	16.250	14.882	1.143	1050

Downstream Manhole

PN	Length (m)	Slope (1:X)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH DIAM., L*W (mm)
F1.000	25.500	200.8	FFS.006	17.300	15.523	1.552	1200
F2.000	40.900	199.5	FFS.013	17.500	15.895	1.380	1050
F2.001	9.000	200.0	FFS.006	17.300	15.850	1.225	1200
F1.001	18.000	200.0	FFS.005	17.100	15.433	1.442	1050
F3.000	21.050	150.4	FFS.009	17.250	15.660	1.365	1050
F4.000	25.000	60.0	FFS.011	17.050	15.983	0.917	1050
F4.001	4.200	60.0	FFS.009	17.250	15.913	1.187	1050
F3.001	5.500	148.6	FFS.008	17.200	15.623	1.352	1050
F3.002	21.200	150.4	FFS.005	17.100	15.482	1.393	1050
F1.002	20.500	199.0	FFS.004	16.900	15.330	1.345	1050
F1.003	40.000	200.0	FFS.003	16.550	15.130	1.195	1050
F1.004	49.500	199.6	FFS.002	16.250	14.882	1.143	1050
F1.005	10.000	200.0	FFS.001	16.250	14.832	1.193	0

Free Flowing Outfall Details for Foul - Main

Outfall Pipe Number	Outfall Name	C. Level (m)	I. Level (m)	Min I. Level (m)	D,L (mm)	W (mm)
F1.005	FFS.001	16.250	14.832	14.700	0	0

Simulation Criteria for Foul - Main

Volumetric Runoff Coeff	0.750	Foul Sewage per hectare (l/s)	0.000
PIMP (% impervious)	100	Additional Flow - % of Total Flow	0.000
Areal Reduction Factor	1.000	MADD Factor * 10m³/ha Storage	2.000
Hot Start (mins)	0	Inlet Coeffiecient	0.800
Hot Start Level (mm)	0	Run Time (mins)	60
Manhole Headloss Coeff (Global)	0.500	Output Interval (mins)	1

Number of Input Hydrographs	0	Number of Storage Structures	0
Number of Online Controls	0	Number of Time/Area Diagrams	0
Number of Offline Controls	0		

Appendix F – Storm Water Longitudinal Sections

MH Name	SSW.011	SSW.012	SSW.013	
Hor Scale 500 Ver Scale 500 Datum (m) 5.000		3.002	2.001	
PN		S1.001	S1.000	
Dia (mm)		225	225	
Slope (1:X)		92.0	255.0	
Cover Level (m)	17.100	17.250	17.350	
Invert Level (m)		15.545	15.750 / 15.750	15.850
Length (m)		18.850	25.500	

MH Name	SSW.010	SSW.011	
Hor Scale 500 Ver Scale 500 Datum (m) 5.000			3.002
PN		S1.002	
Dia (mm)		300	
Slope (1:X)		250.0	
Cover Level (m)	16.900	17.100	
Invert Level (m)		15.481	15.545
Length (m)		16.000	

MH Name	SSW.009	SSW.010	
Hor Scale 500 Ver Scale 500 Datum (m) 5.000			
PN		S1.003	
Dia (mm)		300	
Slope (1:X)		250.0	
Cover Level (m)	16.500	16.900	
Invert Level (m)	15.319	15.481	
Length (m)		40.500	

MH Name	SSW.008	SSW.009	
Hor Scale 500 Ver Scale 500 Datum (m) 4.000			
PN		S1.004	
Dia (mm)		300	
Slope (1:X)		250.0	
Cover Level (m)	16.400	16.500	
Invert Level (m)	15.160	15.319	
Length (m)		39.750	

MH Name	SSW.003	SSW.004	SSW.005	SSW.006		SSW.008	
Hor Scale 500 Ver Scale 500 Datum (m) 4.000							
PN		S1.009	S1.008	S1.007		S1.005	
Dia (mm)		225	225	225		375	
Slope (1:X)		300.0	300.0	300.0		246.7	
Cover Level (m)	16.150	16.250	16.300	16.300	16.300	16.400	
Invert Level (m)		15.002	15.060	15.060	15.094	15.094	15.122	15.130	15.130	15.160	
Length (m)		17.500	10.000	8.500		7.400	

MH Name	SSW.001		SSW.003	
Hor Scale 500 Ver Scale 500 Datum (m) 4.000				
PN			S1.010	
Dia (mm)			225	
Slope (1:X)			300.0	
Cover Level (m)	16.300	16.300	16.150	
Invert Level (m)		14.896	14.913	14.913	15.002	
Length (m)			26.700	

MH Name	SExis SWMH	SSW.001	
Hor Scale 500 Ver Scale 500 Datum (m) 4.000			
PN		S1.012	
Dia (mm)		225	
Slope (1:X)		300.0	
Cover Level (m)	15.890	16.300	
Invert Level (m)		14.848	14.896
Length (m)		14.300	

MH Name	SSW.019	SSW.020	
Hor Scale 500 Ver Scale 500 Datum (m) 5.000			
PN		S2.000	
Dia (mm)		225	
Slope (1:X)		250.0	
Cover Level (m)	17.250	17.250	
Invert Level (m)		15.789	15.950
Length (m)		40.250	

MH Name	SSW.012	SSW.019	
Hor Scale 500 Ver Scale 500 Datum (m) 5.000		1.000	
PN		S2.001	
Dia (mm)		225	
Slope (1:X)		253.8	
Cover Level (m)	17.250	17.250	
Invert Level (m)		15.763 15.789	
Length (m)		6.600	

MH Name	SSW.014	SSW.015	SSW.016	
Hor Scale 500 Ver Scale 500 Datum (m) 5.000		4.001		
PN		S3.001	S3.000	
Dia (mm)		225	225	
Slope (1:X)		248.3	250.6	
Cover Level (m)	17.200	17.250	17.250	
Invert Level (m)		15.636 15.665	15.665 15.750	
Length (m)		7.200	21.300	

MH Name	SSW.011	SSW.014	
Hor Scale 500 Ver Scale 500 Datum (m) 5.000		1.001	
PN		S3.002	
Dia (mm)		225	
Slope (1:X)		249.4	
Cover Level (m)	17.100	17.200	
Invert Level (m)		15.557	15.636
Length (m)		19.700	

MH Name	SSW.015		SSW.018	
Hor Scale 500 Ver Scale 500 Datum (m) 5.000		3.000		
PN			S4.000	
Dia (mm)			225	
Slope (1:X)			100.0	
Cover Level (m)	17.250	17.050	17.050	
Invert Level (m)		16.109 16.155	16.155	16.325
Length (m)			17.000	

Appendix G – Foul Sewer Longitudinal Sections

Denis O'Sullivan & Associates		Page 1
Unit 5, Joyce House Barrack Square Ballincollig, Co. Cork	Site at the junction of Hawke's Road and Bishopstown Road, Bishopstown Road, Bishopstown, Cork City.	
Date 03/12/2019 File Foul Sewer Model.MDX	Designed By S.O.'Grady Checked By	
Micro Drainage	Network W.12.4	

MH Name	FFS.005	FFS.006	FFS.007	
Hor Scale 550 Ver Scale 500 Datum (m) 5.000		3.002	2.001	
PN		F1.001	F1.000	
Dia (mm)		225	225	
Slope (1:X)		200.0	200.8	
Cover Level (m)	17.100	17.300	17.500	
Invert Level (m)		15.433	15.523 / 15.523	15.650
Length (m)		18.000	25.500	

MH Name	FFS.004	FFS.005	
Hor Scale 550 Ver Scale 500 Datum (m) 5.000			3.002
PN		F1.002	
Dia (mm)		225	
Slope (1:X)		199.0	
Cover Level (m)	16.900	17.100	
Invert Level (m)		15.330	15.433
Length (m)		20.500	

MH Name	FFS.003	FFS.004	
Hor Scale 550 Ver Scale 500 Datum (m) 5.000			
PN		F1.003	
Dia (mm)		225	
Slope (1:X)		200.0	
Cover Level (m)	16.550	16.900	
Invert Level (m)	15.130	15.330	
Length (m)		40.000	

MH Name	FFS.002	FFS.003	
Hor Scale 550 Ver Scale 500 Datum (m) 4.000			
PN		F1.004	
Dia (mm)		225	
Slope (1:X)		199.6	
Cover Level (m)	16.250	16.550	
Invert Level (m)	14.882	15.130	
Length (m)		49.500	

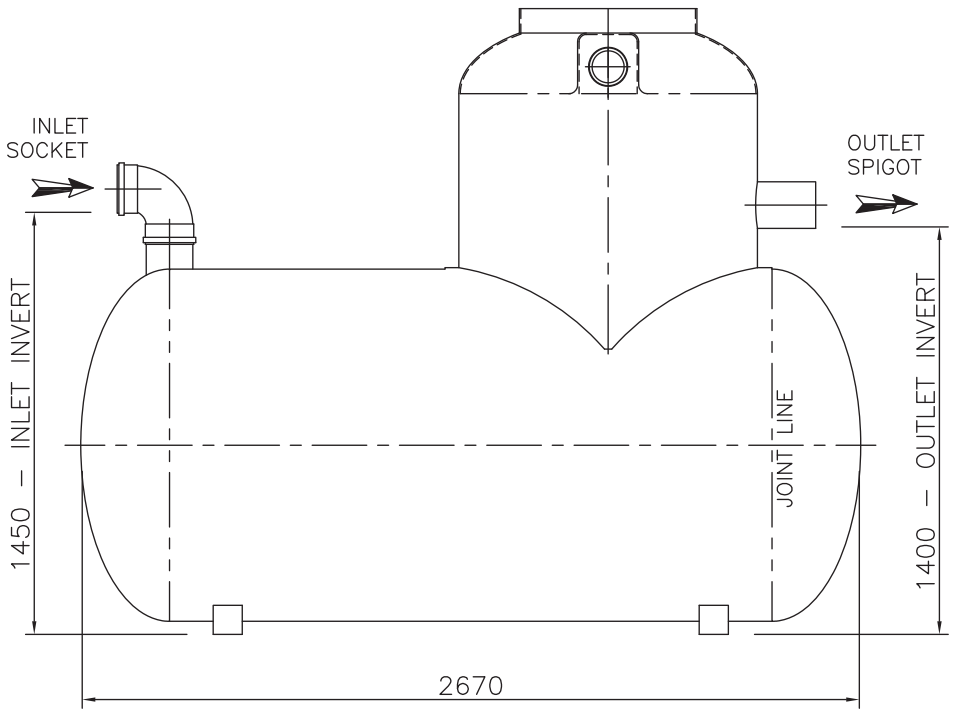
MH Name	FFS.001	FFS.002	
Hor Scale 550 Ver Scale 500 Datum (m) 4.000			
PN		F1.005	
Dia (mm)		225	
Slope (1:X)		200.0	
Cover Level (m)	16.250	16.250	
Invert Level (m)		14.832	14.882
Length (m)		10.000	

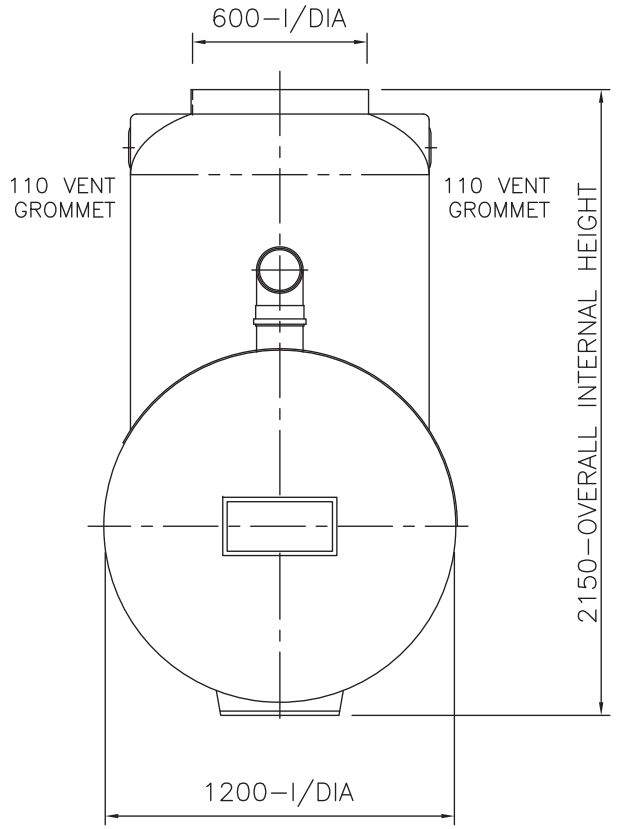
MH Name	FFS.006	FFS.013	FFS.014	
Hor Scale 550 Ver Scale 500 Datum (m) 5.000		1.000		
PN		F2.001	F2.000	
Dia (mm)		225	225	
Slope (1:X)		200.0	199.5	
Cover Level (m)	17.300	17.500	17.250	
Invert Level (m)		15.850	15.895	15.895 16.100
Length (m)		9.000	40.900	

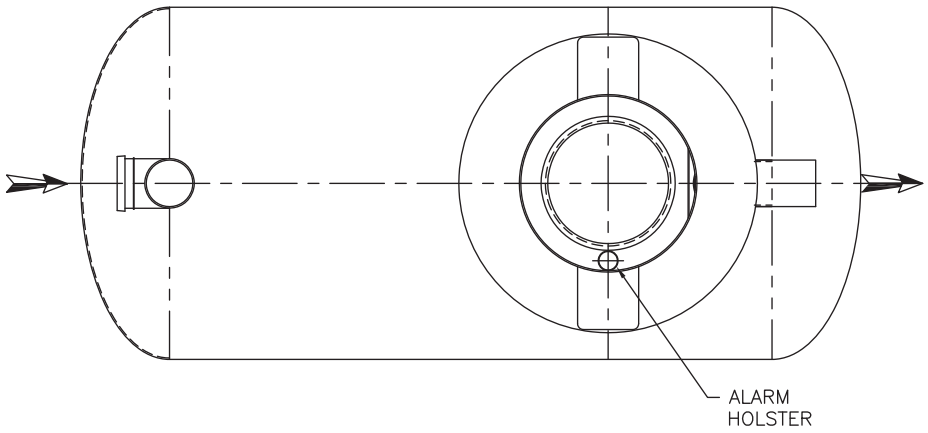
MH Name	FFS.005	FFS.008		FFS.010	
Hor Scale 550 Ver Scale 500 Datum (m) 5.000		1.001		4.001	
PN		F3.002		F3.000	
Dia (mm)		225		225	
Slope (1:X)		150.4		150.4	
Cover Level (m)	17.100	17.200	17.250	17.250	
Invert Level (m)		15.482	15.623 15.623	15.660 15.660	15.800
Length (m)		21.200		21.050	

MH Name	FFS.009		FFS.012	
Hor Scale 550 Ver Scale 500 Datum (m) 5.000		3.000		
PN			F4.000	
Dia (mm)			150	
Slope (1:X)			60.0	
Cover Level (m)	17.250	17.050	17.050	
Invert Level (m)		15.913 15.983	15.983	16.400
Length (m)			25.000	

Appendix H – Petrol Interceptor Details







IMPORTANT NOTE

DUE TO THE COMPACT DESIGN AND EASE OF INSTALLATION, CONDER SEPARATORS ARE NOW SUPPLIED AS STANDARD WITH AN IN LINE CONFIGURATION.

PIPE SIZE VARIANTS

100, 150, 225 PVC

300, 375 GRP

NOTES:

1. PRODUCT INFORMATION

The Conder range of light liquid separators is produced from high grade GRP. Inlets are provided as sockets and outlets as spigots, Connections may be made by steel-banded flexible couplings, nitrile seal joints, rope-seal and mortar or any other appropriate jointing method.

Ventilation specifications should be in accordance with Local Authority requirements. Vent pipework from multiple chambers must never be manifolded below ground level.

2. PERFORMANCE CHARACTERISTICS

Separators are based on the requirements stated in European Standard EN858-1 and Environment Agency guideline PPG3, in particular:-

a. The nominal size has been established from performance tests where the residual oil at the outlet is less than 5mg/l for class 1 separators and less than 100mg/l for class 2 separators.

3. MAINTENANCE AND USE

It is important to recognise that light liquid separators require regular maintenance. The period between maintenance operations can vary depending on the location and use of the separator, therefore routine inspections shall be undertaken at least every six months and a log maintained of inspection date, depth of oil, depth of silt and any cleaning that is undertaken.

A Conder Alarm should be fitted to every separator to give automatic warning that the light liquid capacity has been reached.

Access to the separator should be kept clear and not used for storage.

4. PRODUCT DEVELOPMENT

In line with our policy of constant improvement and development, we reserve the right to change specification without prior notice.

IMPORTANT INVERT LEVEL NOTE (RIBBED TANKS ONLY!):

The inlet and outlet Invert Level(IL) shown on this drawing is to internals of the shell unless otherwise stated.

For Invert level to the outside of the shell ribs, see the conversion below:

Ø1.0m, 1.2m, 1.5m, 1.8m, 2.5m IL+50mm ('X')

Ø3.0m,4.0m IL+75mm ('X')

TANKS SUPPLIED WITH LOOSE SHAFTS DO NOT COME SUPPLIED WITH A FIXING KIT.
THIS IS THE RESPONSIBILITY OF THE SITE CONTRACTOR.

PREMIER TECH AQUA

1ST ANGLE PROJECTION

TITLE

CNSB15S/21/SALES BYPASS SEPARATOR

REV.	DATE	BY	CHKD.	APPD.	DESCRIPTION
7	11.04.13	DG	KB	RP	PIPE SIZE VARIANTS AMENDED

DRAWN BY	CHKD.	APPD.	SCALE	DRAWING No.	REVISION
RU	PB	RP	NTS	CNSB15S/21 SALES	7
DATE 23.03.09	DATE 23.03.09	DATE 23.03.09			

A3

DO NOT SCALE
IF IN DOUBT ASK
ALL DIMENSIONS IN MM

GENERAL TOLERANCES (unless noted otherwise)

GRP FABRICATED MACHINED	LINEAR	± 5mm ± 2mm ± 0.5mm	ANGLE	±0.5° ±0.2° ±0.1°

Appendix J – Hydrobrake Details

Hydro-Brake® Flow Control

Modelling Guide

Unit Selection Design Guide

Overview

Hydro-Brake® Flow Controls restrict the flow in surface/storm water or foul/combined sewer systems by inducing a vortex flow pattern in the water passing through the device, having the effect of increasing back-pressure.

Their 'hydrodynamic' rather than 'physical restriction' based operation provides flow regulation whilst maintaining larger clearances than most other types of flow control, making them less susceptible to blockage. Their unique "S"-shaped head-flow characteristic also enables them to pass greater flows at lower heads, which can enable more efficient use of upstream storage facilities.

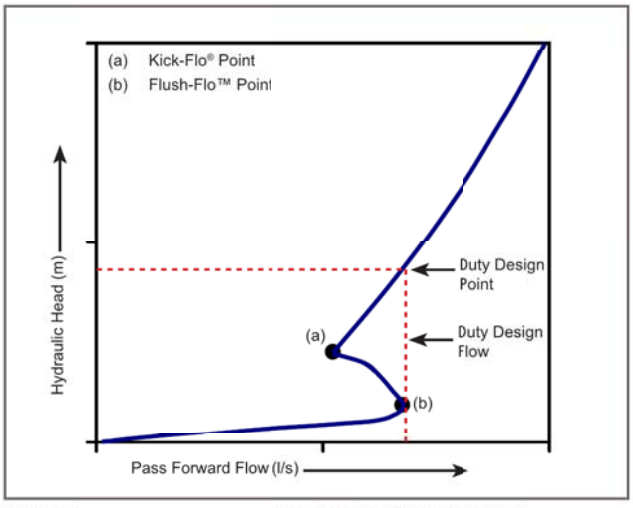
This document provides guidance relating to the selection and use of Hydro-Brake® Flow Controls for use in surface/storm water and foul/combined sewer systems.

The information provided here is intended for the purposes of general guidance only - individual application requirements may differ. If in doubt, or to enquire about new product additions, please contact HRD Technologies Ltd.

Hydraulic Characteristics and Specification

Hydro-Brake® Flow Controls should be selected such that the duty/design flow is not exceeded at any point on the head-flow curve, see illustration right. If this is not achievable using the initially selected unit, it may be appropriate to select an alternative option (see selection guidance overleaf).

While the primary aim of a flow control is to provide a particular flow rate at a given upstream head (giving a design/duty point), it is important to note that secondary opportunities, such as potential for optimised storage use, derive from consideration of the full hydraulic characteristic. It is therefore important to ensure that the same flow control, or one confirmed to provide equivalent hydraulic performance, is implemented in any final installation.



Typical Hydro-Brake® Head Versus Flow Characteristics

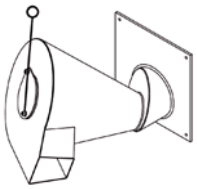
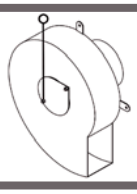
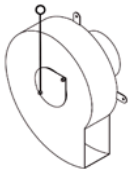
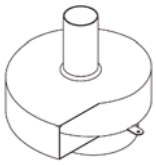
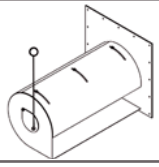
To ensure correct implementation a multiple design-point specification, defining the main hydraulic features of the selected flow control, can be provided by HRD Technologies Ltd. This should include at least the following information:

- outlet size and model of Hydro-Brake® Flow Control
- definition of the duty/design point (head and flow)
- definition of the Flush-Flo™ point (head and flow)
- definition of the Kick-Flo® point (head and flow)

To ensure that a drainage system performs as designed, it is strongly recommended that this information is reproduced on any technical specifications.

Hydro-Brake® Flow Control Models Supported in Micro Drainage

The Table below provides a summary of the Hydro-Brake® Flow Control models currently supported by the Micro Drainage programs, including details of unit styles, applications and design/installation considerations. Advice regarding unit selection is provided in subsequent sections.

WinDes® Reference Code	Style / Typical Shape	Application	Design / Installation Notes
Md1 Md2 Md4 Md14	**Conical** 	Foul / combined and surface / storm water.	With the exception of the Md14, conical units require benching into the intake (the Md14 has a piped intake). They generally require larger manholes than equivalent sump-type units.
Md5 Md6 Md7 Md12	**Sump-Type** 	Surface / storm water only.	Sump-type units require the provision of a sump to accommodate the flow control. As this will always be full of water, sump-type units are unsuitable for use in foul / combined systems.
Md13	**Sump-Type** BBA APPROVAL INSPECTION TESTING CERTIFICATION CERTIFICATE No 08/4599 STH Range of Hydro-Brake® Flow Controls 	Surface / storm water only.	The Md13 (STH) unit will always have an outlet size in excess of 75 mm and can always be fitted to a 225 mm diameter outlet pipe or larger.
Md8 Md9 Md11	**Vertical Discharge** 	Foul / combined and surface / storm water.	Vertical discharge units require a chamber design to accommodate the vertically directed outlet. They do not have S-shaped head / discharge curves and are for special applications only - please refer to HRD Technologies Ltd for advice.
Md10	**Tubular** 	Foul / combined and surface / storm water.	Tubular units require benching into the intake. They do not have S-shaped head / discharge curves and are for special applications only - please refer to HRD Technologies Ltd for advice.

Note: For system modelling using other software packages, HRD Technologies Ltd can provide individual unit head / flow characteristics in an appropriate format.

General Advice

Selection of the most appropriate Hydro-Brake® Flow Control for a particular application depends on a number of considerations, including the type of sewer system, the hydraulic characteristic of the device, device clearances and overall physical dimensions. The Micro Drainage programs provide outputs for hydraulic characteristic and outlet size.

The table opposite provides general selection guidance taking into account the considerations of type of sewer system, device clearances and overall physical dimensions. This should be considered along with other information provided here and in conjunction with the advice contained within the software design program that is being used.

The Table should be followed from the top, using the left hand column for surface/storm water applications and the right hand column for foul/combined applications. The 'general comments' provided are relevant to both applications.

HRD Technologies Ltd offer a free design service and can assist with unit selection.

General Guidance on Unit Selection

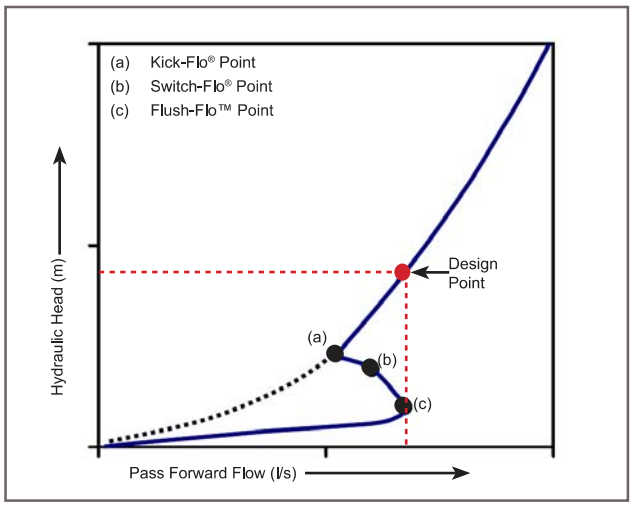
Surface / Storm Water Applications	Foul / Combined Applications
1) Select sump-type Md13 (STH) initially. This is a British Board of Agrément (BBA) approved product that is currently only available in certain sizes – if a size is not available for the specified duty/ design point go to 2) otherwise use Md13 (STH). The Md13 (STH) has a minimum outlet size in excess of 75 mm and can always be fitted to a 225 mm diameter outlet pipe (or greater).	1) Select conical-type Md4 (CX) initially provided the required outlet >150 mm. If the required manhole/ chamber size is too large go to 2) otherwise use Md4 (CX).
2) Select sump-type Md6 (SXH) initially provided the required outlet >75 mm (please seek advice if outlet <75 mm). If required outlet >200 mm go to 3) otherwise use Md6 (SXH).	2) Select conical-type Md2 (CH) provided the required outlet >150 mm. If the required manhole/chamber size is too large go to 3) otherwise use Md2 (CH).
3) Select sump-type Md5 (SH) or Md12 (SMXH) provided the required outlet >75 mm (please seek advice if outlet <75 mm). If required outlet >250 mm (Md5 - SH) or >300 mm (Md12 - SMXH) go to 4) otherwise use Md5 (SH) /Md12 (SMXH).	3) Select conical-type Md1 (C) provided the required outlet >429 mm. If the required manhole/chamber size is too large go to 4) otherwise use Md1 (C).
4) Select conical-type Md4 (CX) provided the required outlet >100 mm. This unit does not require a sump arrangement but requires benching into the intake. If the required manhole/ chamber size is too large go to 5), otherwise use Md4 (CX).	4) Vertical discharge units Md8 (SV), Md9 (SMV) and Md11 (SXV) can be considered if their outlets are >150 mm. Their physical dimensions should be considered - the Md9 (SMV) is typically used when the diameter of the Md8 (SV) and Md11 (SXV) >200 to 250 mm. If none of these units are suitable go to 5).
5) Select conical-type Md2 (CH) unit provided the required outlet >100 mm. This unit does not require a sump arrangement but requires benching into the intake. If the required manhole/ chamber size is too large go to 6), otherwise use Md2 (CH).	5) Select tubular-type Md10 (TH) provided the required outlet >333 mm. This is sometimes the only option that will meet a certain head/discharge relationship (eg. low head, low flow situations). It should only be used when there is no other alternative.
6) Select conical-type Md1 (C) provided the required outlet >285 mm. This unit does not require a sump arrangement but requires benching into the intake. If the required manhole/chamber size is too large go to 7), otherwise use Md1 (C).	For design assistance for any Hydro-Brake® Flow Control please call: **01-4013964** or **e-mail: enquiries@hrdtec.com**
7) Select sump-type Md7 (SMH) provided the required outlet >75 mm. If the required outlet >300 mm then go to 8), otherwise use Md7 (SMH).	
8) Vertical discharge units Md8 (SV), Md9 (SMV) and Md11 (SXV) can be considered provided the required outlet >75 mm. Their physical dimensions should be considered - the Md9 (SMV) is typically used when the diameter of the Md8 (SV) and Md11 (SXV) >200 to 250 mm. If none of these units are suitable go to 9).	
9) Select tubular-type Md10 (TH) provided the required outlet >222 mm. This is sometimes the only option that will meet a certain head/discharge relationship (eg. low head, low flow situations). It should only be used when there is no other alternative.	
General Comments: The minimum sizes quoted for Hydro-Brake® Flow Controls represent sizes based on experience as offering significant reduction in risk of blockage and hence maintenance and derive from general practice in flow control selection in the UK and Ireland. Sizes below the minimum recommended can be specified though it should be recognised these might incur increased risks of blockage and associated maintenance. Sizes above the maximum recommended can also be specified though may require oversized manholes/chambers. For the larger units, refer to HRD Technologies Ltd for advice.	

The information provided here is intended for the purposes of general guidance only - individual application requirements may differ. **If in doubt, please contact HRD Technologies Ltd.**

STH Type Hydro-Brake® Flow Control with BBA Approval

Now included in Win*Des*® W.12.6!

The new STH type Hydro-Brake® Flow Control range has a unique head / discharge performance curve which introduces a very important feature - the Switch-Flo® Point. This point illustrates the unique performance feature of the STH range which can lead to further savings in upstream storage, whilst also enabling increased inlet / outlet size to further reduce the risk of blockage.



Typical STH Head Versus Flow Characteristics

Kick-Flo® (a) - the point at which the vortex has initiated and at which the curve begins to return back to follow the orifice curve and reach the same design point or desired head / flow condition.

NEW Switch-Flo® (b) - marks the transition between the Kick-Flo® and Flush-Flo™, from vortex initiation to stabilisation. This point adds a new layer of resolution to the Hydro-Brake® curve that has implications to upstream storage savings.

Flush-Flo™ (c) - the point at which the vortex begins to initiate and have a throttling effect. This point on the Hydro-Brake® curve is usually much nearer to the maximum design flow (Design Point), than other vortex flow controls leading to more water passing through the unit during the earlier stages of a storm, thus reducing the amount of water that needs to be stored upstream.

BBA APPROVAL INSPECTION TESTING CERTIFICATION
CERTIFICATE No 08/4599

STH Range of
Hydro-Brake® Flow Controls

The STH Hydro-Brake® Flow Control is the only vortex flow control available today that has been given the prestigious BBA Approval Certificate. The BBA assessment procedure entails rigorous assessment of production and manufacturing standards, and confirms that the hydraulic performance of the Hydro-Brake® Flow Control matches the data given to designers by HRD Technologies with their head / discharge curves.

A worked example showing the steps to model a Hydro-Brake® Flow Control and associated Stormcell® Storage System within Micro Drainage Win*Des*® is available on our website:

www.hrdtec.com

Take a Look at Our New Stormwater Web Resource

Engineering Nature's Way™

www.engineeringnaturesway.co.uk

Engineering Nature's Way is a brand new resource for people working with Sustainable Drainage and flood management in the UK.

The site provides an opportunity to share news, opinion, information and best practice for people working in local and central Government; developers, consulting engineers and contractors. Do you have something to share? We would be delighted to receive your contributions.

turning water around ...®

HRD Technologies Ltd

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HRD Technologies Ltd is a subsidiary of Hydro International plc

DATE:	**2 June 2020**
DESIGNER:	**Declan Doyle**
PROJECT No:	**KE/RE/HRC/01 rev 3**
PROJECT NAME:	**Hawkes rd & Bishopstown rd Cork lighting**

Residential Lighting To Class P3, Main road lighting to class P2,
Entrance (conflict zone) lighting to class C3
Dimming to 2A Regime, S/P Ratio 1.47

A) CREE XSPME B Type 210 DY1, 3.32klm, 21w CLO
B) CREE XSPME B Type 2SH DY1, 3.32klm, 21w CLO
C) CREE XSPME B Type 4ME DY1, 3.32klm, 21w CLO
D) CREE XSPME B Type 2SH DY5, 5.35klm, 37w CLO

C/W Nema 7 Pin Socket & Field Adjuster (DQ-N/Y-N)
6m Columns - Estate, 8m columns main road

Results: Estate: Eav 7.08lux, Emin 1.48, Uo 0.21
Main road: Eav 11.80lux, Emin 2.59, Uo 0.22
Entrance (conflict zone): Eav 15.48lux, Emin 9.17, Uo 0.59

Outdoor Lighting Report

PREPARED BY: Declan Doyle,
Astrotek Ltd.,
M50 Business park,
Ballymount Avenue,
Dublin 12

Tel: 01 4568009
www.astrotek.ie

Layout Report

General Data

Dimensions in Metres Angles in Degrees

Calculation Grids

ID	Grid Name	X	Y	X' Length	Y' Length	X' Spacing	Y' Spacing
1	Grid 1	332.38	195.75	239.14	149.84	1.49	1.50
2	Grid 2	510.04	199.32	72.14	20.77	1.47	1.48
3	Grid 3	524.78	215.69	19.29	16.23	1.48	1.48

Luminaires

Luminaire A Data

Supplier	
Type	XSPME - B - Type 210 - DY1 4K
Lamp(s)	3MD-SA1400 M DY1 4K
LampFlux(klm)/Colour	3.32 4000/70
File Name	XSPME02210B40K_24DY1-PL12371-001A .LDT
Maintenance Factor	0.76
Imax70,80,90(cd/klm)	616.7, 15.1, 0.0
Lamp S/P Ratio	1.47
No. in Project	6

Luminaire C Data

Supplier	
Type	XSPME - B - Type 4ME - DY1 4K
Lamp(s)	3MD-SA1400 M DY1 4K
LampFlux(klm)/Colour	3.32 4000/70
File Name	XSPME024MEB40K_24DY1-PL12371-014 A.LDT
Maintenance Factor	0.76
Imax70,80,90(cd/klm)	370.1, 147.1, 0.0
Lamp S/P Ratio	1.47
No. in Project	10

Luminaire D Data

Supplier	
Type	XSPME - B - Type 2SH - DY5 4K
Lamp(s)	3MD-SA1400 M DY5 4K
LampFlux(klm)/Colour	5.35 4000/70
File Name	XSPME022SHB40K_24DY5-PL12371-011 A.LDT
Maintenance Factor	0.84
Lum. Int. Class	G4
Lamp S/P Ratio	1.47
No. in Project	3

Layout

ID	Type	X	Y	Height	Angle	Tilt	Cant	Out-reach	Target X	Target Y	Target Z
1	A	383.57	315.99	6.00	70.00	0.00	0.00	0.00			
2	A	372.82	276.41	6.00	116.00	0.00	0.00	0.00			
3	A	395.65	284.28	6.00	156.00	5.00	0.00	0.00			
4	A	404.38	275.13	6.00	241.00	5.00	0.00	0.00			
5	A	405.91	254.24	6.00	149.00	0.00	0.00	0.00			
6	C	418.13	280.07	6.00	168.00	0.00	0.00	0.00			
7	C	397.04	304.84	6.00	337.00	0.00	0.00	0.00			
8	C	411.61	293.26	6.00	68.00	0.00	0.00	0.00			

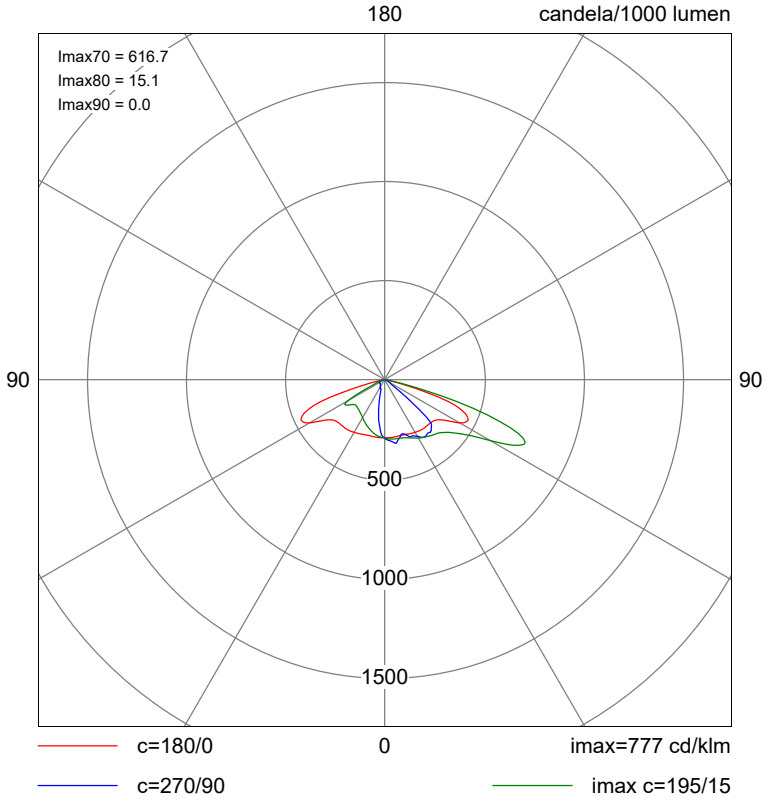
794536512

Layout Continued

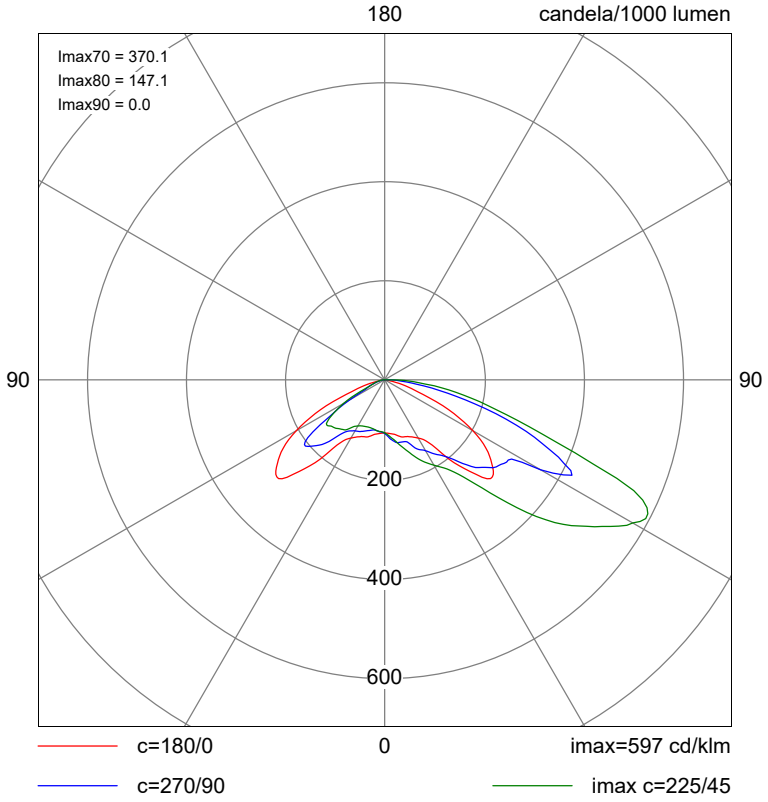
ID	Type	X	Y	Height	Angle	Tilt	Cant	Out-reach	Target X	Target Y	Target Z
9	A	453.48	287.33	6.00	239.00	5.00	0.00	0.00			
10	C	433.26	287.46	6.00	79.00	0.00	0.00	0.00			
11	C	520.73	270.64	6.00	299.00	5.00	0.00	0.00			
12	C	519.55	254.91	6.00	213.00	5.00	0.00	0.00			
13	C	514.69	232.98	6.00	24.00	0.00	0.00	0.00			
14	C	529.94	241.54	6.00	244.00	0.00	0.00	0.00			
15	C	497.61	263.95	6.00	239.00	5.00	0.00	0.00			
16	C	475.61	276.19	6.00	238.00	0.00	0.00	0.00			
17	D	532.55	223.94	8.00	129.00	5.00	0.00	1.00			
18	D	510.66	222.55	8.00	306.00	5.00	0.00	1.00			
19	D	545.17	248.64	8.00	303.00	5.00	0.00	1.00			

Polar Diagrams

Luminaire A XSPME - B - Type 210 - DY1 4K

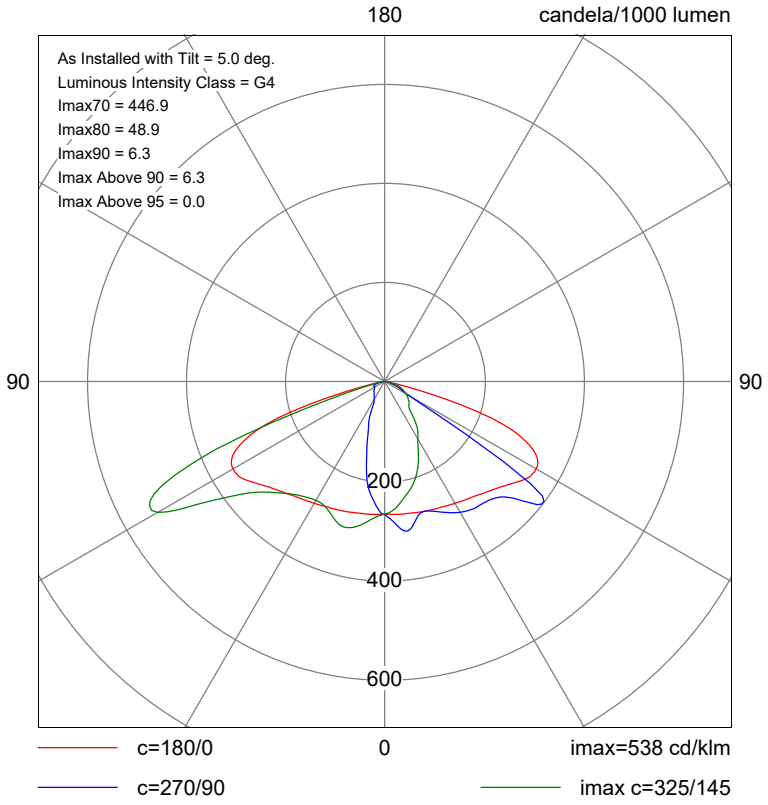


Luminaire C XSPME - B - Type 4ME - DY1 4K



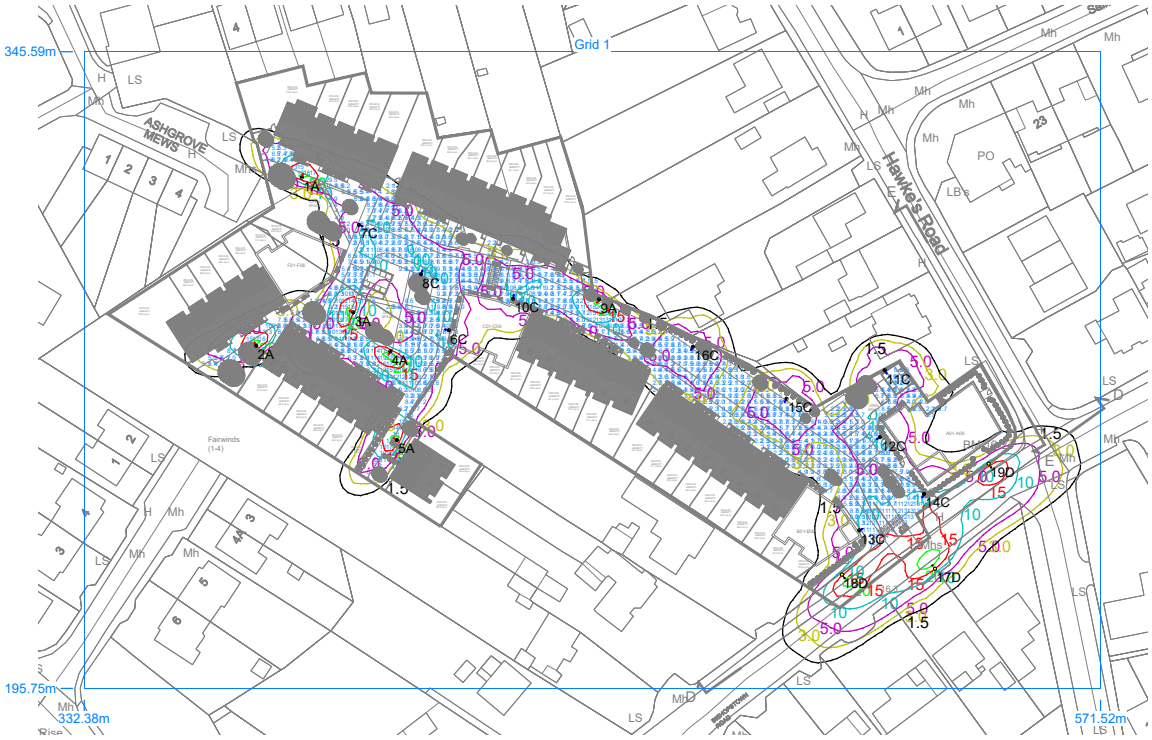
Polar Diagrams Continued

Luminaire D XSPME - B - Type 2SH - DY5 4K



Horizontal Illuminance (lux)

Grid 1

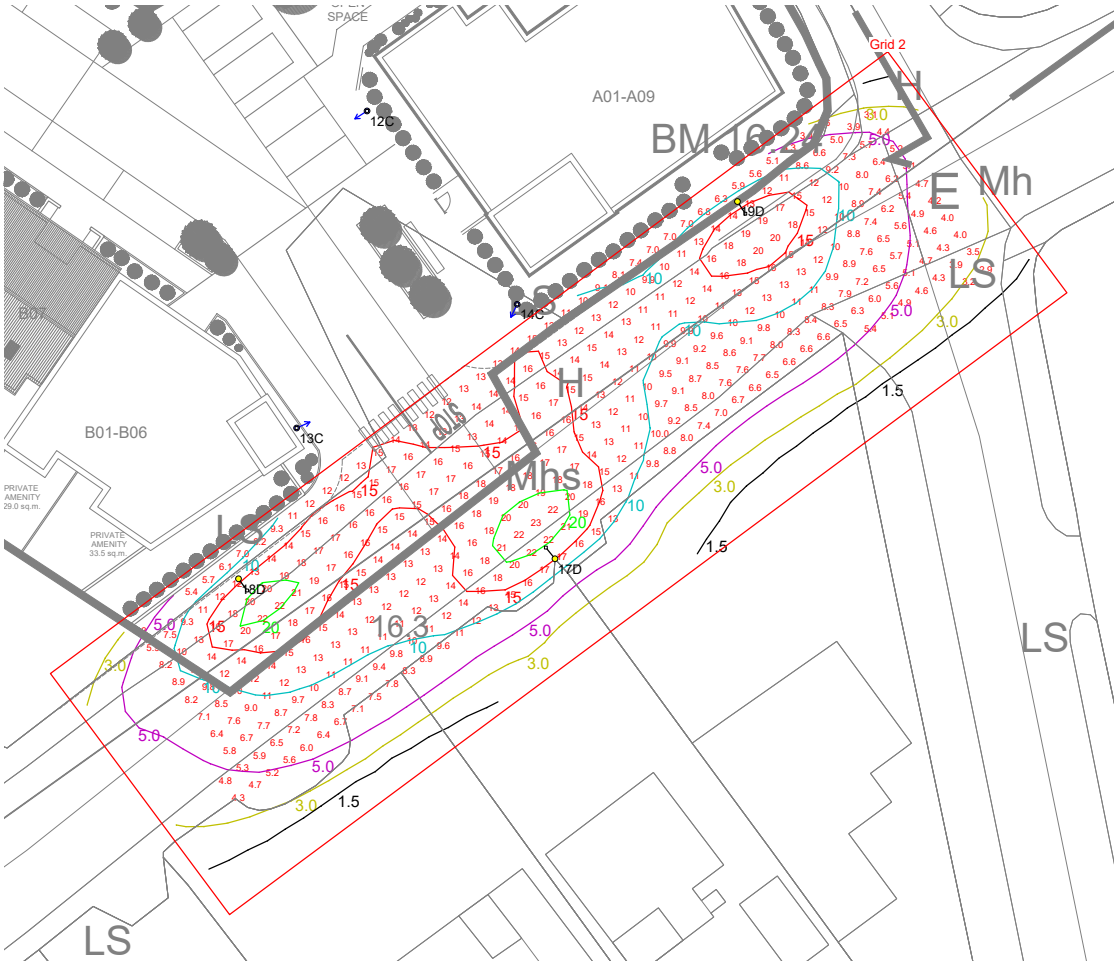


Results

Eav	7.08
Emin	1.48
Emax	21.61
Emin/Emax	0.07
Emin/Eav	0.21

Horizontal Illuminance (lux)

Grid 2



Results

Eav	11.80
Emin	2.59
Emax	22.83
Emin/Emax	0.11
Emin/Eav	0.22

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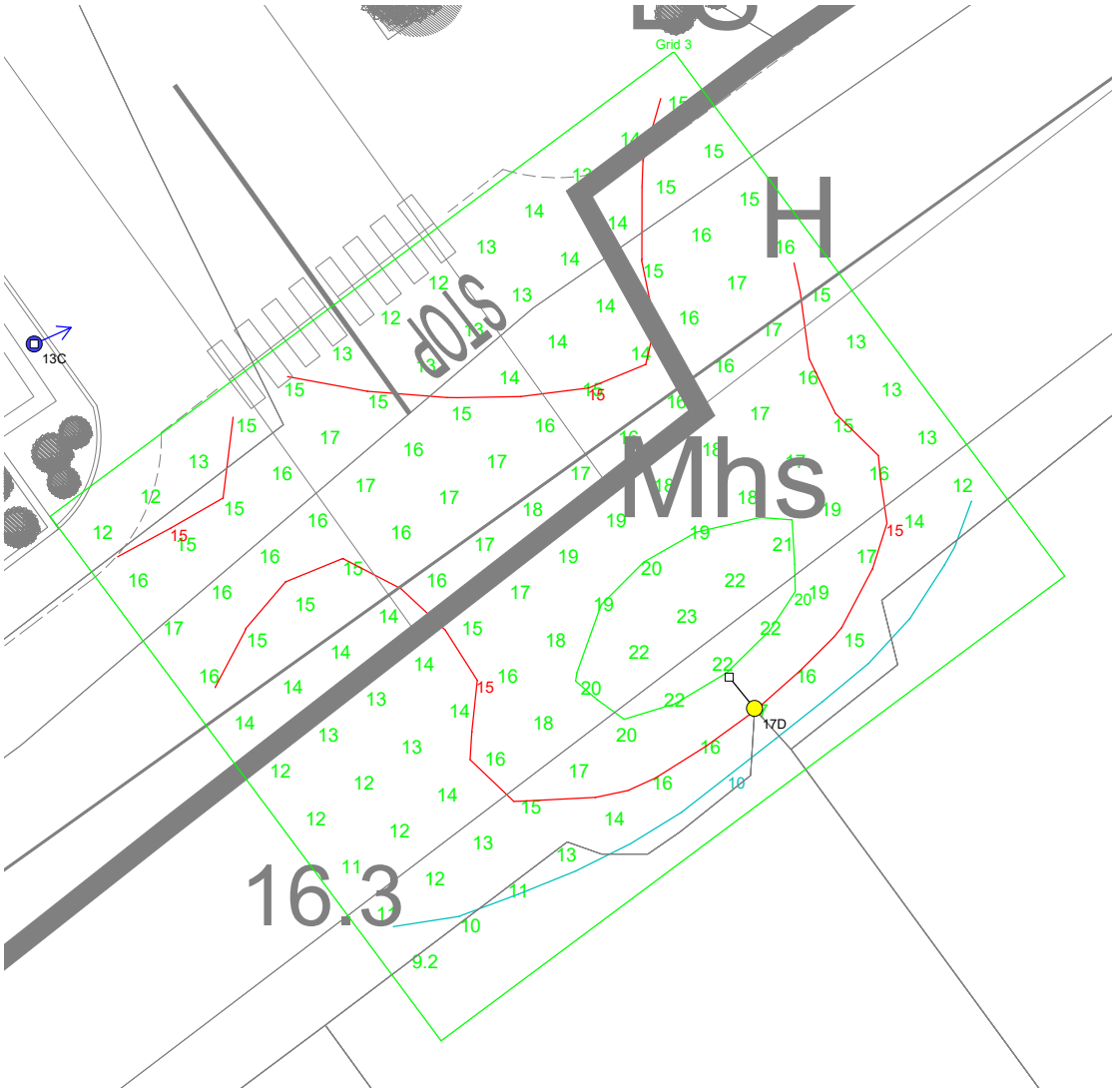
Horizontal Illuminance (lux)

Grid 3



Results

Eav	15.48
Emin	9.17
Emax	23.10
Emin/Emax	0.40
Emin/Eav	0.59