BARRETT **MAHONY**
CONSULTING ENGINEERS
CIVIL & STRUCTURAL

CIVIL ENGINEERING INFRASTRUCTURE REPORT

STRATEGIC HOUSING DEVELOPMENT AT ST. JOSEPH'S HOUSE AND ADJOINING PROPERTIES, LEOPARDSTOWN

Contact Information

Barrett Mahony Consulting Engineers Ltd
52-54 Lower Sandwith Street, Dublin 2
D02 WR26

Telephone: 01 677 3200
Email: bmce@bmce.ie

www.bmce.ie

BM BARRETT MAHONY CONSULTING ENGINEERS CIVIL & STRUCTURAL

Document Information

Project
STRATEGIC HOUSING DEVELOPMENT AT ST. JOSEPH'S HOUSE AND ADJOINING PROPERTIES,
LEOPARDSTOWN

Project No.
19.236

Document Title
CIVIL ENGINEERING INFRASTRUCTURE REPORT FOR PLANNING

Document No.
19.236-IR-01

Document History

Issue	Date	Description	Orig.	PE	Issue Check
PL1	12/05/2020	DRAFT ISSUED FOR PLANNING	PR	PS	JC
PL2	15/06/2020	ISSUED FOR PRE-APP SUBMISSION	PR	PS	JC
PL3	29/04/2021	ISSUED FOR SW AUDIT	PS	PS	JC
PL4	01/06/2021	UPDATE FOR SW AUDIT	PS	PS	JC
PL5	20/09/2021	FOR PLANNING SUBMISSION	PS	PS	JC

TABLE OF CONTENTS

APPENDICES

1.0 INTRODUCTION

1.1 General Description

Homeland Silverpines Limited has commissioned Barrett Mahony Consulting Engineers to prepare a Civil Engineering Infrastructure Report for a proposed site at Leopardstown Road, Dublin 18 as part of the Planning Application for a residential development on the site.

Figure 1.1 – Site Location

Figure 1.2 – Aerial View (with approximate boundary shown)

The development will consist of a new residential and mixed use scheme to include apartments, residential amenity space, a café and a childcare facility as follows:

- The demolition of 10 no. properties and associated outbuildings at 'Madona House' (single storey), 'Woodleigh' (2 storeys), 'Cloonagh' (2 storeys), 'Souk El Raab (2 storeys), 'Wellbrook' (2 storeys), 'Calador' (2 storeys), 'Alhambra' (2 storeys), 'Dalwhinnie' (2 storeys), 'Annaghkeen' (1-2 storeys) and 'The Crossing' (single storey) (combined demolition approx. 2,291.3 sq m GFA)
- The refurbishment, separation and material change of use of Saint Joseph's House (a Protected Structure, RPS No. 1548) from residential care facility to residential use and a childcare facility; and the construction of a new build element to provide for an overall total of 463 no. residential units, residential amenity space and a café as follows:
    - Block A (5 storeys) comprising 49 no. apartments (13 no. 1 bed units, 33 no. 2 bed units and 3 no. 3 bed units);
    - Block B (4 - 7 storeys) comprising 88 no. apartments (28 no. 1 bed units, 57 no. 2 bed units and 3 no. 3 bed units);
    - Block C (5 - 7 storeys) comprising 115 no. apartments (26 no. studio units, 26 no. 1 bed units and 57 no. 2 bed units and 6 no. 3 bed units);
    - Block D (5 - 10 storeys) comprising 157 no. apartments (36 no. studio unit, 40 no. 1 bed units and 81 no. 2 bed units), residential amenity areas of approx. 636 sq m and a café of approx. 49 sq m;
    - Block E (St. Joseph's House) (2 storeys) comprising 9 no. apartments (8 no. 2 bed units and 1 no. 3 bed units) and a childcare facility of 282 sq m with associated outdoor play areas of approx. 130 sq m;
    - Block F (3 - 6 storeys) comprising 45 no. apartments (23 no. studio units, 10 no. 1 bed units; and 12 no. 2 bed units);
- Open Space (approx. 9,885 sq m)
- 259 no. car parking spaces (232 no. at basement level and 27 no. at surface level)
- 968 no. bicycle spaces (816 no. at basement level and 152 no. at surface level)
- 10 no. motorcycle spaces (all at basement level)
- Vehicular Access
- Basement Areas
- Substations and Switch Rooms
- All associated site development works

Planning permission was granted for a residential development consisting of 122 no. units by An Bord Pleanala on 28th August 2017 (Ref: PL 06D.249248) on part of the planning application site.

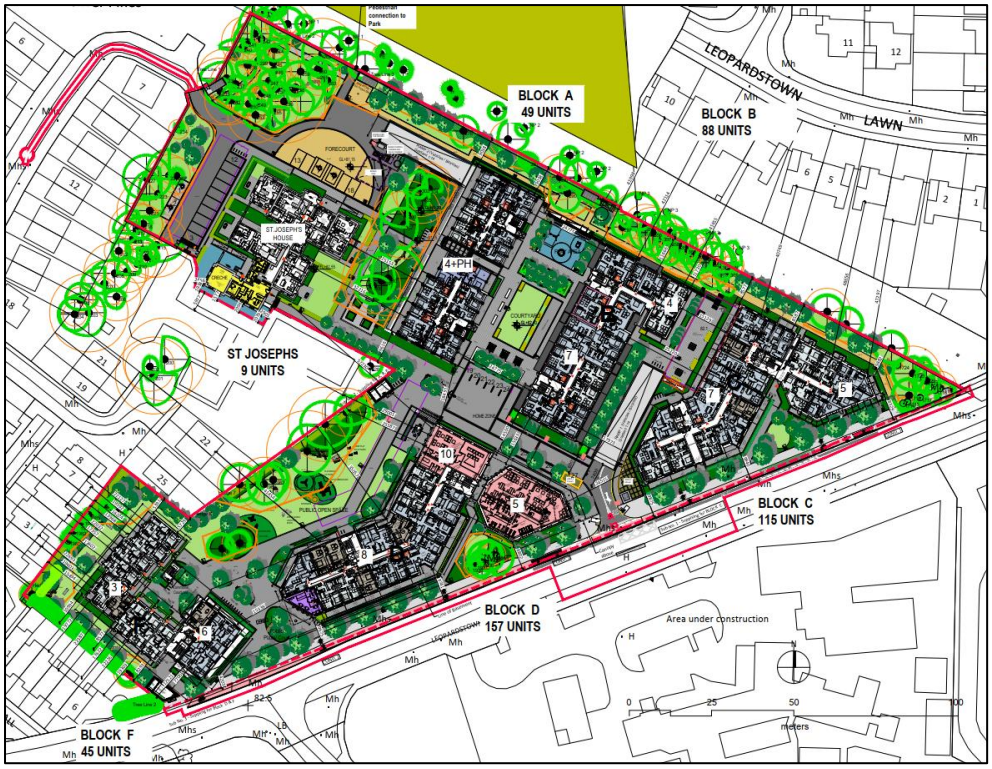


Figure 1.3 – Proposed Development

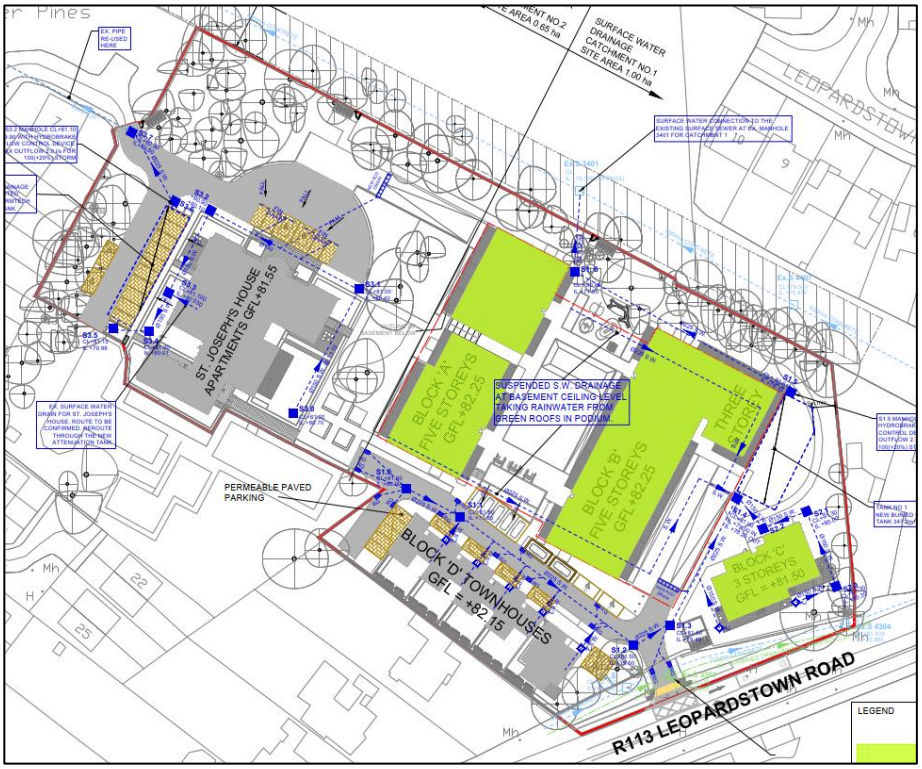


Figure 1.4 – Phase 1 (permitted scheme) drainage layout

1.2 Scope of this Report

This report considers the proposed development's main infrastructural elements and how they connect to the public infrastructure in the area.

In particular, foul and surface water drainage, water supply and road engineering aspects are addressed. Refer to the Flood Risk Assessment Report which also forms part of this planning application. This report should be read in conjunction with the following drawings submitted with the planning application:

- BPR-BMD-00-00-DR-C-1000 – Buried Foul & Surface Water Drainage Layout
- BPR-BMD-00-B1-DR-C-1001 – Basement Drainage Layout
- BPR-BMD-00-00-DR-C-1005 – Schematic SuDS Plan Layout
- BPR-BMD-00-00-DR-C-1006 – Catchments and Positively Drained Areas
- BPR-BMD-00-00-DR-C-1007 – Soakaway Flow Routing Plan under the Basement
- BPR-BMD-00-00-DR-C-1010 – Road Layout
- BPR-BMD-00-00-DR-C-1015 – Surface Water Overland Flow Routes
- BPR-BMD-00-00-DR-C-1020 – Buried Watermain Layout
- BPR-BMD-00-00-DR-C-1050 – Swept Path Analysis – Fire Tender Access
- BPR-BMD-00-00-DR-C-1051 – Swept Path Analysis – Refuse Vehicle
- BPR-BMD-00-00-DR-C-1060 – Sightlines at Leopardstown Road Junction
- BPR-BMD-00-XX-DR-C-1100 – Surface Water Longitudinal Drainage Sections
- BPR-BMD-00-XX-DR-C-1101 – Foul Water Longitudinal Drainage Sections
- BPR-BMD-00-00-DR-C-1200 – Surface Water Drainage Details
- BPR-BMD-00-B1-DR-C-1202 – Basement Drainage Details
- BPR-BMD-00-ZZ-DR-C-1205 – SuDS Details Sheet 1 of 4
- BPR-BMD-00-ZZ-DR-C-1206 – SuDS Details Sheet 2 of 4
- BPR-BMD-00-ZZ-DR-C-1207 – SuDS Details Sheet 3 of 4
- BPR-BMD-00-ZZ-DR-C-1208 – SuDS Details Typical Green Roof Details Sheet 4 of 4
- BPR-BMD-00-ZZ-DR-C-1209 – Wastewater Pumping Station Plan
- BPR-BMD-00-ZZ-DR-C-1209A – Wastewater Pumping Details Sheet 1 of 2
- BPR-BMD-00-ZZ-DR-C-1209B – Wastewater Pumping Details Sheet 2 of 2
- BPR-BMD-00-ZZ-DR-C-1209C – Suction Tanker Vehicle Tracking Study
- BPR-BMD-00-00-DR-C-1210 – Road and Paving Details
- BPR-BMD-00-ZZ-DR-S-1080 – Foundation Sections Location Plan
- BPR-BMD-00-ZZ-DR-S-1081 – Foundation Sections Sheet 1 of 3
- BPR-BMD-00-ZZ-DR-S-1082 – Foundation Sections Sheet 2 of 3
- BPR-BMD-00-ZZ-DR-S-1083 – Foundation Sections Sheet 3 of 3

1.3 Previous Planning Decision

Planning permission was granted by An Bord Pleanala in 2017 for a previous planning application with DLRCC register reference D17A/0337 and An Bord Pleanala reference PL 06D.249248. Refer to Appendix I for further information on that development.

1.4 Engagement with Authorities

1.4.1 Irish Water

The initial Pre-Connection Enquiry was submitted to Irish Water in November 2019 in relation to this application. The Confirmation of Feasibility letter was received in February 2020.

It should be noted that this Confirmation of Feasibility was based on a proposed new connection to the foul sewer on the Leopardstown Road, but subsequent engagement with Irish Water at design stage in respect of the permission granted for part of the application site has unearthed problems with this network. Following extensive remodelling an alternative to collect and pump the wastewater at a maximum rate of 5l/s to the sewer in Silver Pines. This sewer drains into the Sandyford system rather than the more heavily loaded Leopardstown System.

The bespoke confirmation of feasibility was received for this in July 2021 and is contained in Appendix II.

1.4.1.1 Statement of Design Acceptance

A statement of design acceptance was initially obtained from Irish Water for the proposed drainage and mains water networks on 10th October 2020. Following the updated proposals described above, a new statement of design acceptance was issued in September 2021, and is contained in Appendix II.

1.4.1.2 Pre-Application Consultation 2

The PAC2 meeting was held on the MS Teams platform on 29th September 2020, and some concern was raised by the DLRCC drainage engineer in relation to the proposed foul connection which would flow into the system serving Leopardstown Lawn downstream, which is a known area of foul surcharge and flooding during storm events.

RPS were engaged by our client to investigate this historical flooding. They modelled the system and prepared a report which outlined solutions. A solution was agreed with IW whereby wastewater from the site would be discharged into the Sandyford sewer system instead of the Leopardstown system to eliminate the risk of flooding. Dun Laoghaire Rathdown County Council

1.4.1.3 Pre-Application Consultation 1 (Section 247)

Pre-application consultation meetings were held at the offices of Dún Laoghaire-Rathdown County Council on the 5th November 2019, the 27th February 2020, and the 29th September 2020. Johanne Codd and Bernard Egan of DLRCC Drainage were present.

1.4.1.4 An Bord Pleanala - Pre-Application Consultation & DLRCC Chief Executive Report

The surface water drainage scheme issued by Barrett Mahony in advance of the PAC2 meeting with An Bord Pleanala was largely the same as that detailed in this final submission. The PAC2 meeting was held on the MS Teams platform on 29th September 2020, and DLRCC Drainage was represented by Johanne Codd.

The DLRCC Chief Executive's Report issued on 19th August 2020 contained commentary on the drainage proposals. These comments are reproduced below in italics, along with BMCE's response:

1. *The applicant has split the catchment into three areas and calculated the allowable outflow on a reduced site area, with an element of landscaping removed. The applicant is requested to clearly identify on a map the area of landscape removed. The allowable outflow, for each sub catchment should be based on the positively drained area only.*

BMCE: The areas taken as positively drained for each catchment is shown on drawing C1006. The total drained area is used in the calculation of the greenfield runoff rate using the appropriate run-off factors, and the drained areas are used in the surface water drainage network model in Causeway Flow presented in this report.

2. *The Civil Engineering Infrastructure Report proposes runoff rates, some of which the Council does not consider to be appropriate. In particular, the green roof, playground pavement, and the landscape area should be reflective of the Soil Type for this site. In the case of sub-catchment 2 and 3, the area has been reduced to less than half the actual site area. The applicant shall review and agree with Drainage Planning the proposed run-off rates and, if required, calculations should be updated. It is noted the reduced area has been used in the Microdrainage calculations for sub-catchment 2 and 3, while the full site area has been used in sub-catchment 1.*

BMCE: All catchments have now been revised to use the appropriate areas draining to the proposed drainage system. Mostly untouched existing landscaping has been omitted. See drawing C1006. Runoff rates have been increased in accordance with those previously agreed with DLRCC Drainage, as outlined in Section 2 of this report. The surface water drainage is now modelled using Causeway Flow software.

3. *The volume of storage provided in sub catchment 2 is lower than expected for the site area given, however it is noted the applicant has stated that permeable paving from sub catchment 2 will overflow into the soakpit in sub catchment 3. The applicant is requested to provide details of the area removed and note any impact on the allowable outflow at this location as well as the storage requirements in sub catchment 3. The applicant is requested to identify on a colour coded drawing the various catchments/sub-catchments and the elements of interception, storage, conveyance, flow control and discharge connection for each.*

BMCE: This discrepancy has been rectified and the permeable paving no longer overflows from catchment 2 into catchment 3. The volume of the concrete tank has been increased to accommodate the additional drained area. The SuDS measures selected and the corresponding areas can be found on Drawing C1005 and in the tables within Section 2 of this report and the Causeway Flow output appended.

4. *The applicant has proposed a concrete tank as the storage system for surface water within sub catchment 2. Within the Civil Engineering Infrastructure Report, a soil type 2 has been used in the calculation of Q Bar and storage volumes, suggesting a soil with good infiltration values. Given the favourable soil conditions, the applicant is requested to provide a storage system that supports infiltration.*

BMCE: The concrete tank was permitted under previous application reference PL 06D.249248, and due to the constrained location with basements on each side i.e., less than the 5m from the buildings on each side: recommended for infiltration.

5. *An overflow has been proposed from the soakpit to the attenuation tank in sub catchment 1. The applicant is requested to comment on the provision of additional capacity in the storage tank to accommodate any such overflow or the impact on a surcharged soakpit on sub catchment 1.*

BMCE: The overflow should not have been flowing into the attenuation tank. It has now been piped separately directly to the outfall manhole to Silverpines. It is noted that this is an emergency overflow only and that the soakaway has been conservatively designed in accordance with local site investigations and industry standard guidance Ciria SuDS Manual C753. See drawing C1000.

6. *The applicant is requested to clarify the provision of the fin drain to the north of Block B and whether it is discharging into the soakpit or tank 2 in sub-catchment 2.*

BMCE: The fin drain has been removed. Permeable paving/compacted gravel in the courtyard in front of St. Josephs House in sub-catchment 1 will have additional storage above the overflow pipe to the network, which will supplement the attenuation provided in the tank.

7. *As standard, the applicant is required to submit long-sections of the surface water drainage system, clearly labelling cover levels, invert levels, pipe gradients and pipe diameters.*

BMCE: Included in the application pack.

8. *As standard, the applicant is required to demonstrate by calculation in the report and by representation on a drawing that the proposed green roof extents are in accordance with the Council's Green Roof Policy such that the minimum coverage requirement of 60% is achieved. The applicant shall also provide details of maintenance access to the green roofs and should note that, in the absence of a stairwell type access to the roof, provision should be made for alternative maintenance and access arrangements such as external mobile access that will be centrally managed. The applicant should comment on the compatibility of the green roof with PV panels if they are to be incorporated into the design.*

BMCE: See Section 2.3.11 which outlines full roof availability and estimated coverage well in excess of 60% green roof proposed on new buildings. Also refer to C1005 for the proposed green roof locations. Please see the architectural drawings for access details to the roof areas. All

maintenance access to green roofs will be accessed from AOVs within top storey stair core, with the exception of the roof of the 4 storey element of Block B, can be accessed by a hatch in the corridor. PV panels are not proposed on this project.

9. *As standard, the applicant is required to provide a penstock in the flow control device chamber. The applicant shall also clarify whether a silt trap is being provided in the flow control device chamber and if not to make provision for same.*

BMCE: A silt trap is provided on the last manhole discharging into the attenuation tank. A penstock is provided on the flow control device as required.

10. *As standard, the applicant shall ensure that other disciplines' drawings, including landscape drawings, are compatible with engineering drawings.*

BMCE: Coordination with all other consultants has been undertaken to ensure compatibility of proposals.

11. *As standard, the applicant is required to submit supporting standard details, including cross-sections and long-sections, and commentary that demonstrates that all proposed SuDS measures, i.e. permeable paving, green roofs, have been designed in accordance with the recommendations of CIRIA C753 (The SuDS manual). The applicant is also required to submit detailed construction and maintenance protocols for same.*

BMCE: Please see detail drawings submitted as part of this application, which includes maintenance details.

12. *As standard, the applicant is required to confirm that a utilities clash check has been carried out ensuring all utilities' vertical and horizontal separation distances can be provided throughout the scheme. The applicant should demonstrate this with cross-sections at critical locations such as junctions, site thresholds and connection points to public utilities. Minimum separation distances shall be in accordance with applicable Codes of Practice.*

BMCE: Clash detection has been carried out and sections are included in the drawings where deemed necessary in areas of congested below ground infrastructure.

13. *A Stormwater Audit will be required for this application. In accordance with the Stormwater Audit policy, the audit shall be forwarded to DLRCC prior to lodging the planning application. All recommendations shall be complied with, unless agreed in writing otherwise with DLRCC.*

BMCE: A stormwater audit has been carried out by JBA Consulting and recommendations incorporated into the final design and submission documents. Refer to Appendix VIII

1.4.2 Final Engagement with DLRCC Drainage

Prior to issue of the final planning documents and post SW Audit, the findings of the audit, and updates to the design were discussed and approved by DLRCC Drainage, as required by point 13 above.

1.5 Surface Water Audit

As noted above and as required by DLRCC policy, a Stage 1 Surface Water Audit of the design was carried out by JBA Consulting. All findings have been complied with to the satisfaction of the auditors, and the signed off report is included separately within the planning application.

2.0 SURFACE WATER DRAINAGE SYSTEM

2.1 Introduction

This chapter will follow the guidelines set out in Greater Dublin Strategic Drainage Study (GDSDS) and the CIRIA 2015 SuDS Manual.

The aim of any SuDS strategy is to ensure that a new development does not negatively affect the surrounding watercourse system, existing surface water network and groundwater system. This SuDS strategy will aim to achieve this by using a variety of SuDS measures within the site. These measures include water interception, water treatment and water attenuation.

The SuDS strategy will be developed with the following steps:

- The existing greenfield run-off of the development area will be calculated and used as the minimum benchmark for the SuDS design.
- A set of SuDS measures will be chosen based on their applicability and usage for the site.
- A "CAUSEWAY FLOW" model will be created to analyse the rainfall on the site and the effectiveness of the proposed SuDS measures.
- If effective, these SuDS measures will be implemented on the site.

2.2 Existing Surface Water Infrastructure

The lands/roads surrounding the site contain a number of surface water sewers and a combined sewer. In summary:

- 600mm diameter concrete surface water sewer along the edge of the park to the north of the site;
- 225mm diameter concrete surface water sewer along the Leopardstown Road to the south of the site;
- The existing surface water connection for St. Joseph's House is via a 225mm concrete pipe to the surface water sewer serving the Silverpines development.

Refer to Appendix III for the existing services layout and drawing C1000 for the proposed buried SW drainage layout.

2.3 Proposed Site Surface Water Drainage System

The proposed surface water drainage system is designed to comply with the 'Greater Dublin Strategic Drainage Study (GDSDS) Regional Drainage Policies Technical Document – Volume 2, New Developments, 2005' and the 'Greater Dublin Regional Code of Practice for Drainage Works, V6.0 2005'. CIRIA Design Manuals C753, C697 and C609 have also been used to design the surface water drainage system within the site.

2.3.1.1 Catchment Area

The site is divided into a number of surface water drainage catchments. The catchment areas have different SuDS measures which will have an influence on the runoff coefficient. The more

porous the material, the lower the runoff coefficient. Materials in the area will consist of, but not limited to, Permeable Paving, Green roof structures, solid roofs, impermeable areas and landscaped grass areas.

2.3.2 Catchment strategy

The development will be served by 3no separated surface water drainage sub catchment areas, Each sub catchment will be served by a gravity drainage network, with run-off attenuated in each catchment prior to discharging to the–sw sewer on the Leopardstown Road or the sw sewer in Silver Pines. The proposed catchment division is as follows:

Location	Total Area (ha)	Total Drained Area (ha)
Existing St. Joseph's House and surrounds (green)	0.65	0.59
Blocks A, B & C and surrounds (magenta)	0.99	0.79
Blocks D & F and surrounds (yellow)	0.95	0.77

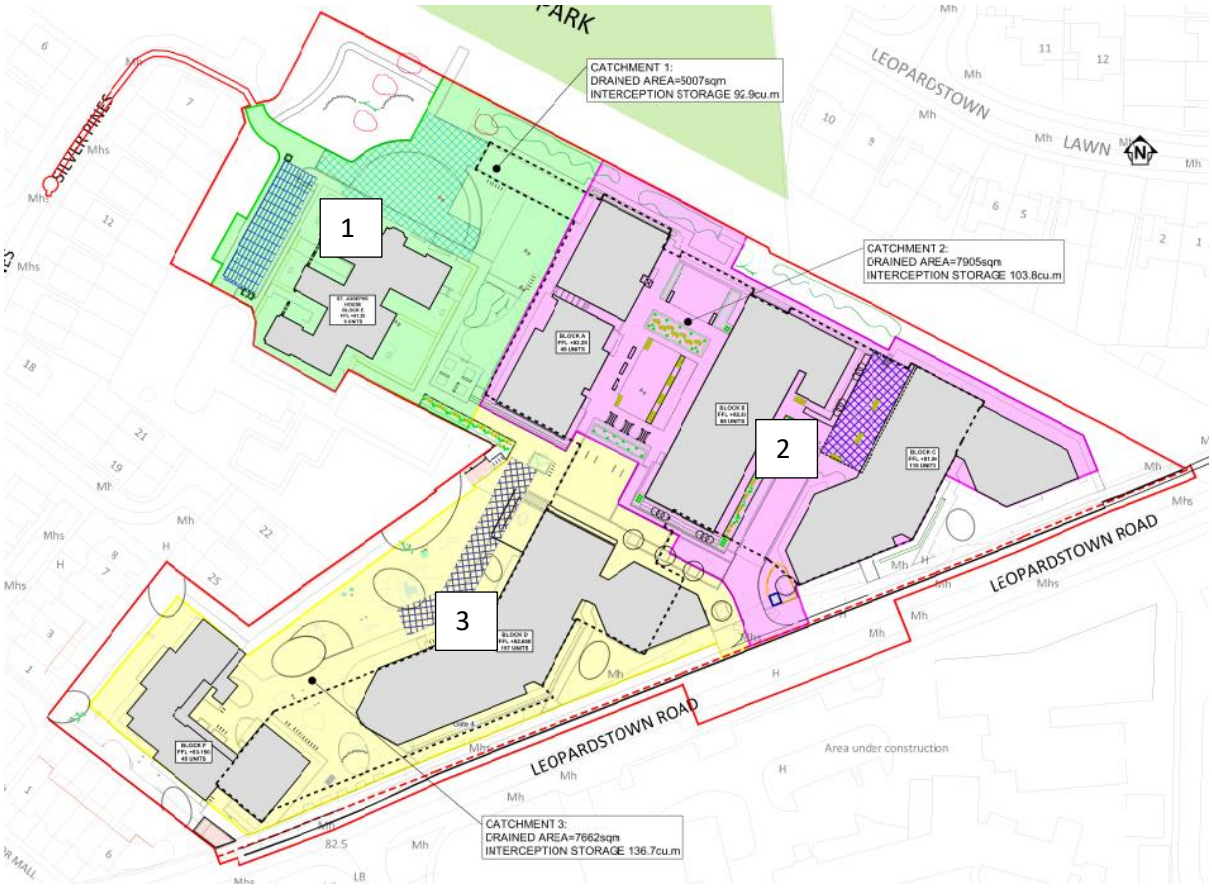


Figure 2.1 – Catchment Strategy

2.3.2.1 Sub-Catchment 1: St. Joseph House

The existing connection for St. Joseph's House to the surface water sewer in Silver Pines will be retained. The surface water from this area will go through a new buried Stormtech attenuation tank fitted with a hydrobrake flow control per GDSDS requirements.
Supplemental attenuation will be provided by including an additional depth of permeable stone within the permeable paving build up in the courtyard in front of St Josephs House. This is required to be above the permeable paving overflow pipe level in order to function hydraulically.

2.3.2.2 Sub-Catchment 2: Block A, B & C

This catchment consists of Blocks A, B & C. The flow from these will be discharged via gravity to the existing 225mm surface water sewer located along Leopardstown Road via a concrete attenuation tank with a hydrobrake flow control device as per GDSDS requirements. The attenuation tank details are described in Section 2.3.8 below.

2.3.2.3 Sub-Catchment 3: Block D & F

It is proposed to build a new soakaway under the landscaped area west of Block D. Ground conditions on site show good infiltration characteristics which supports the use of this proposed infiltration system. Refer to Site Investigation report in Appendix IV for information regarding the infiltration parameters. An emergency overflow manhole will be constructed to connect into the existing surface water network in Silverpines. In addition, a third party hydrogeological review of the soakaway has been undertaken, and the report is contained in Appendix VII.

Refer to drawing C1000 for further information on the drainage layout.

2.3.3 Estimation of greenfield runoff rate

In accordance with the IH124 method, the greenfield runoff for existing undeveloped sites measuring less than 50ha can be estimated using the following formula:
$Qbar_{rural}$ (in m^3/s) = $0.00108 \times (0.01 \times AREA)^{0.89} \times SAAR^{1.17} \times SPR^{2.17}$
where:

- $Qbar_{rural}$ is the mean annual flood flow from a catchment
- AREA is the area of the catchment in ha.
- SAAR is the standard average annual rainfall for the period 1981-2010 Annual Average Rainfall Grid produced by Met Éireann.
- SPR is Standard Percentage Runoff coefficient for the SOIL category.

Rainfall data for the site was sourced from an Annual Average Rainfall (AAR) Grid (1981-2010) produced by Met Éireann (Available from: http://www.met.ie/climate/products03.asp). The rainfall data for the Irish Grid Coordinates closest to the site indicates a SAAR value of 897mm is appropriate. Irish Grids reference for this site area: 320315 (Easting) and 226341 (Northing).

east	north	Annual Average Rainfall (mm)
320000	223000	1004
320000	224000	973

320000	225000	945
320000	**226000**	**897**
320000	227000	835
320000	228000	787
320000	229000	757

Table 2.1: Met Éireann Annual Average Rainfall (AAR) Grid (1981-2010) Extract

2.3.3.1 Soakaway Testing

A Soil Infiltration Test was carried out by Trinity Green in July 2019, which excavated 2no test pits. First trial pit excavated to 2.1mbgl. The topsoil consisted of a 400mm layer of gravely clay. The subsoil was a brown Gravely Clay but with increasing gravel content down to 1.8m bgl where the subsoil is a gravel with high clay content.

A second test pit (in the location of the proposed soakaway) was excavated to 2.0 mbgl. The topsoil consisted of a 300mm layer of gravely clay. The subsoil was a reddish-brown Clay down to 1m. From 1m to pit base the subsoil was a compacted granite derived gravel with low clay content. These tests resulted in infiltration rates of 4.3 E-06m/s and 5.7 E-06m/s respectively.

A new Soakaway test was carried out in May 2020 in the proposed area for the Soakaway, to the depth of 2.25m as requested by DLRCC drainage at the PAC1 meeting in February. It shows similar results to the previous one, with an infiltration rate of 5.682 E-06 m/s.

The ground conditions revealed in the trial pit were topsoil, brown very sandy gravelly Clay to a depth of 1.8m and golden gravelly granitic Sand as the deepest ground layer. This highlights the increasing permeability with depth.

Refer to Appendix IV for further information.

Figure 2.2 – Initial Site Investigation Layout

The material excavated has a good infiltration value. On this basis, it is appropriate to use a SOIL Type 2, with a soil value of 0.30.

Therefore, $Qbar_{rural}$ for a 50ha site has been calculated as follows:

$Qbar_{rural}$ (for a50ha site) $= 0.00108 \times (0.01 \times 50)^{0.89} \times 897^{1.17} \times 0.30^{2.17}$
$Qbar_{rural}$ (for a 50ha site) $= 0.121794\ m^3/s$
$= 121.794\ l/s$

The greenfield runoff rate taken in design is based on the proposed positively drained areas as set out in design details below and on drawing C1006. The area of the positively drained footprint is 2.081ha.

Interpolating linearly, this corresponds to a Qbar figure = 5.07 l/s. This figure has further been split between the sub-catchments for the purpose of discharge to sewer as follows:

Sub-Catchment 1 = 1.07 l/s
Sub-Catchment 2 = 4.0 l/s (remainder)
Sub-Catchment 3 = infiltration only

2.3.3.2 Flow network model inputs

In addition to the SAAR value given in 2.3.3, the Causeway Flow software requires inputs to accurately model the design rainfall events for the site. The following process is used to obtain the data;

- A request was submitted to Met Eireann for the Rainfall Return Period table relating to the the Irish Grid Coordinates of the subject site.
- The value in the table that corresponded with 5 year return period and 60 minute storm duration was taken as the M5-60, which is 17.4 for the subject site.
- The value in the table that corresponded with 5 year return period and 2 day storm duration was taken as the M5-2D, which is 63.5 for the subject site.
- Dividing M5-60 by M5-2D, the Ratio-R was calculated as 0.247

The outputs were all of the above is calculated is provided in Appendix V.

2.3.4 Compliance with the Principles of SuDS

2.3.4.1 Compliance with the principles of the GDSDS

The proposed development will be designed in accordance with the principles of Sustainable Drainage Systems (SuDS) as embodied in the recommendations of the Greater Dublin Strategic Drainage Study (GDSDS) and will significantly reduce run-off rates and improve storm water quality discharging to the public storm water system. The GDSDS addresses the issue of sustainability by requiring designs to comply with a set of drainage criteria which aim to minimize the impact of urbanization by replicating the run-off characteristics of the greenfield

site. The criteria provide a consistent approach to addressing the increase in both rate and volume of run-off, as well as ensuring the environment is protected from any pollution from roads and buildings. These drainage design criteria are as follows:

- Criterion 1 – River Water Quality Protection
- Criterion 2 – River Regime Protection
- Criterion 3 – Flood Risk Assessment
- Criterion 4 – River Flood Protection

The requirements of SuDS are typically addressed by provision of the following:

- Interception storage
- Treatment storage (commonly addressed in interception storage)
- Attenuation storage
- Long term storage (not applicable if growth factors are not applied to Qbar when designing attenuation storage)

2.3.4.2 Compliance with the principles of the CIRIA C753 SuDS Manual

The C753 SuDS Manual explains that the primary function of SuDS measures is to protect watercourses from any impact due to the new development. However, SuDS can also improve the quality of life in a new development and urban spaces by making them more vibrant, visually attractive, sustainable and more resilient to change. This document explains the wider social context of SuDS and how SuDS can deliver high quality drainage while supporting urban areas to cope better with sever rainfall both now and in the future.

There are four main categories of benefits that can be achieved by SuDS:

1. Water Quantity (mitigate flood risk & protect natural water cycle)
2. Water Quality (manage the quality of the runoff to prevent pollution)
3. Amenity (create and sustain better places for people)
4. Biodiversity (create and sustain better places for nature)

2.3.5 SuDS Measure Selection

Below are the applicable SuDS measures which have been chosen for the site. The proposed site has been divided into 3no. sub-catchment areas as explained previously.

The total runoff will be controlled with hydrobrake flow controls. The proposed attenuation system is explained in section 2.3.8

Green Roofs – General

Green roofs are areas of living vegetation, installed on the top of buildings. They provide water quality, water quantity, amenity and provide biodiversity benefits. Green roofs also intercept rainfall at source reducing the reliance on attenuation storage structures.

Green Roof – Extensive:

Extensive roofs have low substrate depths and therefore low loadings on the building structure, they are lightweight and have a low cost to maintain. These systems cover the entire roof area with hardy, slow growing, drought resistance, low maintenance plants and vegetation, such as sedums. The planting usually matures slowly, with the long-term biodiverse benefits being the sought-after results. These roofs are typically only accessed for maintenance and are usually comprised of between 20mm – 150mm overall total depth.

Extensive green roofs have the effect of providing some initial storage of rainwater, while also reducing the rate at which rainwater from heavier rainfall events will discharge to the main attenuation tank. It can also help to filter the run-off, removing any pollutants and resulting in a higher quality of water discharging to the drainage system. A typical extensive green roof system can intercept and retain over 30 litres/m² (i.e. 30 mm) depending on the build up. Since these roofs are exposed to the Irish climate, there is a high probability that the roof will not be completely dry, and the storage capacity will be compromised on any given rainfall event. Thus, the more conservative estimate of 12 litres/m² (12mm) interception storage will be assumed.

Green Roof – Intensive

Intensive green roofs are designed to sustain more complex landscaped environments that can provide high amenity and biodiverse benefits. They are planted with a range of plants, including grasses, shrubs, trees and may also include water features, as well as hard landscape paved areas. They are designed to be accessible and normally require regular maintenance.

Intensive paved roofs are proposed in lower roofs on Blocks C and E, and in all podium areas over the basement car parking. The use of intensive green roofs will also allow the planting of large shrubs, small trees, and small water features within the podium area. These features will provide amenities for the residents. The build-up selected for the Intensive Green Roof on the top of the roofs will include an interception tray to capture the first 12mm of rainfall falling on each roof, providing an intercept and retain capacity of 12 litres/m² (minimum).

Refer to Landscape Architects drawings for Intensive Green Roof in paving.

Permeable Paving

Permeable paving provides a surface suitable for pedestrian and/or vehicular traffic, while also allowing rainwater to infiltrate through the surface and into the underlying structural layers. The water is temporarily stored beneath the overlying surface before slowly infiltrating. Permeable paving systems are an effective way of managing surface water runoff close to its source.

The car parking spaces, courtyards and footpaths throughout the site will be made up of permeable paving. The larger open spaces and car parking in Catchment 1 and 2 will be linked with the overall management train used in each respective catchment.

By providing a raised drainage outlet above the base of the coarse graded gravel bed it is possible to achieve interception storage. Raising the invert of the drainage pipe to 100mm above the gravel bed gives 40mm interception storage @ 30% voids in the gravel.

In addition, by providing a depth of 30% voids open graded gravel above the invert of the drainage pipe, the permeable paving can function as supplemental attenuation volume which fills when the system surcharges, and is effective once it is below the top level of the tank. This is used in Catchment 1.

Permeable Compacted Gravel

Compacted gravel is made up of small stones or rocks (the gravel) that is mechanically compacted in some way so that the gravel holds together and creates a strong, stable surface. Compacted Gravel has permeability and allows water to infiltrate across its entire surface material.

Gravel areas reduce stormwater runoff by allowing water to move through them into the ground. Soil compaction changes soil structure by rearranging and consolidating the particles, reducing the permeability of the soil. Where shallow permeability is reduced, the surface water will run over the edge and infiltrate naturally into the soft landscaping adjacent. All such paths are less than 4m wide so this is an appropriate assumption.

For any larger areas such as the court yard in front of St Josephs House, gullies or channels will be provided to pick up overflow and prevent ponding. Such areas have been included within the drainage design model.

Compacted gravel is proposed on the pedestrian circulation paths around the development.

Attenuation Tanks

Attenuation tanks are used to create below-ground void space for the temporary storage of surface water before infiltration, controlled release, or use. Attenuation tanks can be constructed up using geocellular crates, which offer flexibility in size, shape and constructability of the tank meaning that they can be tailored to suit specific site characteristics.

It is proposed to provide 2no. attenuation tanks within the site. These will be designed for 1 in 100-year storm + 20% climate change. They will be the last part of the SuDS management train. A Hydrobrake will be fitted downstream of each tank in order to restrict the flow to Qbar for each sub-catchment.

Please refer to BMCE drawing C-1005 for a full list of SuDS measures.

Infiltration Soakaway

Where ground conditions are suitable, sustainable drainage systems (SuDS) can be used to manage and promote soakaway applications, which allow surface water to infiltrate into the ground, replenishing natural water courses and aquifers. The infiltration rate on this site has been tested in the site investigation with soakaway tests in accordance with BRE365 guidance. An infiltration rate of $5.68x10^{-6}$m/s was obtained in a soakaway test at a depth of 2.25m.

Although seepage was noted at 2.2mBGL in the soakaway pit, IGSL have confirmed that this a localised perched flow, and not the groundwater table. They allowed the pit to stand for 30 minutes prior to filling, and the flow quickly dissipated, leaving the bottom of the hole dry.

A soakaway solution will be provided as part of the system (proprietary cellular crates), allowing surface water run-off to infiltrate into the ground, which would otherwise have been prevented by impermeable surfaces.

This infiltration process also helps to maintain the groundwater recharge which would otherwise be reduced by the development. It prevents shallow soils from drying out, and thereby protects local biodiversity and amenity.

An emergency overflow from the soakaway will be connected into Silverpines. For further information about design and layout please refer to drawings C1000, C1205 & Appendix V for Flow calculations.

2.3.6 Hydrogeology

The soakaway proposed is on the upslope side of the basement and due to concerns relating to surface water flow paths, and the potential restriction of the natural flow path caused by the new basement, a third party Hydrogeological review was commissioned. This was carried out by IE Consulting, and resulted in the following outcome:

- The primary groundwater flow is in the granular weathered layer overlying the granite bedrock.
- Due to potential for the basement to be founded in rock, the groundwater flow may be cut off, and so an alternative solution should be provided to maintain the flow path.
- Drainage trenches outside the basement walls, connected by a network of pipes crossing under the basement were used to facilitate the natural flow.

See proposals on drawings C1007 and C1206 for the groundwater flow below basement. The IE Consulting report is contained in Appendix VI.

2.3.7 SuDS Management Train

The SuDS measures proposed are linked in series, and this is commonly known as a SuDS Management Train, (SMT). The SMT ensures that rainwater falling on a site is captured,

conveyed, stored, intercepted and removed of pollutant correctly and efficiently before it is discharged back into the surrounding water course of network.

A robust SMT will ensure that the most effective measures are utilised in the correct sequence throughout the site. Table 26.7 (Figure 2.2 below) in *(CIRIA, SuDS Manual 2015)* illustrates the effectiveness of each SuDS measure along the SMT.

Proposed SuDS management trains on this site are as follows:

- Type 1: Extensive Green Roof — Silt Trap — Attenuation Tank — SW Sewer
- Type 2: Intensive Green Roof — Silt Trap — Attenuation Tank — SW Sewer
- Type 3: Hardstanding — P. Paving (direct infiltration) / overflow — Silt Trap — Attenuation Tank — SW Sewer
- Type 4: Hardstanding — Aco Chanel/Gully — Silt Trap — Attenuation Tank — SW Sewer
- Type 5: Roofs/Paving — Silt Trap — Infiltration/Soakaway

TABLE 26.7 Indicative suitability of SuDS components within the Management Train

SuDS component	Interception[1]	Close to source/ primary treatment	Secondary treatment	Tertiary treatment
Rainwater harvesting	Y			
Filter strip	Y	Y		
Swale	Y	Y	Y	
Filter drain	Y		Y	
Permeable pavement	Y	Y		
Bioretention	Y	Y	Y	
Green roof	Y	Y		
Detention basin	Y	Y	Y	
Pond	[3]	Y[2]	Y	Y
Wetland	[3]	Y[2]	Y	Y
Infiltration system (soakaways/ trenches/ blankets/basins)	Y	Y	Y	Y
Attenuation storage tanks	Y[4]			
Catchpits and gullies		Y		
Proprietary treatment systems		Y[5]	Y[5]	Y[5]

Figure 2.2 - C753 SuDS Manual Table 26.7

As it is shown on the above table, the proposed SuDS strategy in Catchments 1 and 2 complies with a two-stage scenario and in Catchment 3 tertiary treatment due to the infiltration system. On this basis, extra treatment storage in the site will not be necessary.

Figure 2.3 - SuDS Layout

2.3.8 SuDS Pollutant Analysis

To ensure that the SuDS measures proposed are sufficient in removing pollutants from the generated run-off, a SuDS pollutant analysis has been carried out. This is performed in conjunction with the guidelines and steps set out in Section 26.7 of CIRIA SuDS Manual (2015).

The main form of pollutant is from surface water run-off from the entrances to the basement car park. Table 26.2 of CIRIA SuDS Manual 2015 highlights the pollution hazards for different land uses (extract below Figure 2.4). The pollution hazards on site are generally ‘very low” from roofs. The road entrances to the basement car parking is classed as ‘Low’.

The entrance at the north of St. Joseph’s House will be treated using compacted gravel, i.e. full infiltration. The entrance beside Block C will be treated by the Hydrocarbon Interceptor before the water discharges into the tank, as it is not possible to install a natural SuDS device of the requisite size in this area.

TABLE 26.2 Pollution hazard indices for different land use classifications

Land use	Pollution hazard level	Total suspended solids (TSS)	Metals	Hydro-carbons
Residential roofs	Very low	0.2	0.2	0.05
Other roofs (typically commercial/ industrial roofs)	Low	0.3	0.2 (up to 0.8 where there is potential for metals to leach from the roof)	0.05
Individual property driveways, residential car parks, low traffic roads (eg cul de sacs, homezones and general access roads) and non-residential car parking with infrequent change (eg schools, offices) ie < 300 traffic movements/day	Low	0.5	0.4	0.4

Figure 2.4 – C753 SuDS Manual Table 26.2 Extract

Giving the very low to low pollution index the 'Simple Index Approach,' is applied and can be summarised below.

Total SuDS Mitigation Index ≥ Pollution Hazard Index

By inspection the extensive use of SuDS measures throughout the site ensures that criterion is met, for example, considering the entrances to the basement car parking referred to above. Using Table 26.2 and Table 26.3, from the SuDS manual we can compare the mitigation index for permeable paving with the hazard index for the residential car park entrances*:

Table 2-2 - Pollution Hazard Assessment

	Total SuDS Mitigation Index (Table 26.3)		Pollution Hazard Index (Table 26.2)	Status
Total Suspended Solids	0.7	>	0.5	O.K.
Metals	0.6	>	0.4	O.K.
Hydrocarbons	0.7	>	0.4	O.K.

From Table 2-2 above it is clear that the SuDS strategy for the site is effective in removing pollutants from the surface water and therefore protecting the downstream water body.

* Note: the paved entrance to the basement near the Leopardstown road is treated by a Hydrocarbon Interceptor/silt trap.

2.3.9 Surface Water Attenuation Storage

The GDSDS requires that flood waters be managed within the site for a 1 in 100 year flood.
The surface water from each sub-catchment will flow into an attenuation tank or soakaway which has been designed for that drained area.

The surface water system within each catchment has been hydraulically modelled in CAUSEWAY FLOW software. Please see Appendix V for full breakdown of calculations.

2.3.9.1 Attenuation Storage – Sub-Catchment 1

It is proposed to upgrade the existing connection for St. Joseph's House and to route surface water from this end of the site through a new buried Stormtech attenuation tank with a total volume of 158m³ with a hydrobrake flow control limited to 1.07 l/s. Supplementary attenuation volume of 84m^3 was shown to be required in the Flow model, and this has been provided in a 400mm depth of 30% voids permeable stone above the overflow pipe in the permeable paving beneath the courtyard in front of St. Josephs House (80.300-80.775mOD). This area is hydraulically connected to the attenuation tank via a dedicated 225mm perforated drain and the stone volume in question is wholly below the top level of the attenuation tank.

Therefore, the required attenuation storage is provided. When the Stormtech tank fills the system surcharges and the water will backfill into the granular layer via the overflow pipe,

thereby ensuring that this supplemental attenuation will fill in conjunction with the Stormtech tank.

Details of the inputs to the Flow model are given in the table below.

Table 2-3 – Sub-catchment 1

Type of areas	Areas (Hectares)	Run-off Factor Applied*	Drained Area with run-off applied
Landscaping (Grass / Soft)	0.171	0.3	0.0513
Intensive Green Roof / Podium	0	0.75	0.0000
Permeable Paving	0.1682	0.75	0.1262
Impermeable Paving	0.0764	0.9	0.0688
Standard Roof (impermeable)	0.0851	0.9	0.0766
Total Drained Area to Tank 1	**0.5007**		
Total Drained Area to Tank 1 with run-off applied			**0.3228**

*Run-off factors agreed with DLRCC

2.3.9.2 Attenuation Storage – Sub-Catchment 2

Sub-Catchment 2 within the development consists of blocks A-C , the podium area between, and the access road and limited walkways and landscaping. The attenuation tank will be located between Block B and C basements.

Despite being impermeable, it is considered that the surface water falling on the public footpath along Leopardstown Rd will drain into the road, and is therefore not included within the positively drained area for the catchment.

The attenuation storage for this Sub-catchment 2 will be a concrete attenuation tank located in the basement between Block B and C, with a total volume of 403m³, with a hydrobrake flow control device limited to 4.0 l/s.

Details of the inputs to the Flow model are given in the table below.

Table 2-4 – Catchment 2 Attenuation Storage

Type of areas	Areas (Hectares)	Run-off Factor Applied	Drained Area with run-off applied
Landscaping (Grass / Soft)	0.0405	0.3	0.0122
Intensive Green Roof / Podium	0.2554	0.75	0.1916
Extensive Green Roof - Sedum	0.3307	0.875	0.2894
Permeable Paving	0.067	0.75	0.0503
Impermeable Paving	0.0375	0.9	0.0338

Standard Roof (impermeable)	0.0594	0.9	0.0535
Total Drained Area to Tank 2	**0.7905**		
Total Drained Area to Tank 2 with run-off applied			**0.6305**

2.3.9.3 Infiltration – Sub-Catchment 3

Sub-Catchment 3 within the development consists of blocks D and F, the podium area between, and limited walkways and landscaping. The Infiltration will be a proprietary cellular soakaway with a total volume of 519m³ (364m² x 1.5 depth with 95% porosity) which will be placed in the open area west of Block D. It is situated at least at 5m from the Block foundations and basement walls and 5m from the site boundary with Silverpines.

Table 25.2 in the Ciria SuDS Manual suggests factors of safety for large scale infiltration devices. Due to the inclusion of a high-level overflow, there is no damage or inconvenience due to failure. The soakaway has been designed with a factor of safety of 2.0; a slight increase on the 1.5 recommended.

TABLE 25.2 Suggested factors of safety, F, for use in hydraulic design of infiltration systems (designed using Bettess (1996). Note: not relevant for BRE method)

Size of area to be drained	Consequences of failure		
	No damage or inconvenience	Minor damage to external areas or inconvenience (eg surface water on car parking)	Damage to buildings or structures, or major inconvenience (eg flooding of roads)
< 100 m²	1.5	2	10
100–1000 m²	1.5	3	10
> 1000 m²	1.5	5	10

Figure 2.5 – C753 SuDS Manual Table 25.2 Extract

Material	Porosity, *n*
geocellular systems	0.9–0.95
uniform gravel	0.3–0.4
graded sand or gravel	0.2–0.3

Refer to drawing C1000 for location of the tank, C1207 for further details and section and Appendix V for Flow calculations.

The Ciria SuDS Manual C753, suggests the design storm (100 years plus 20% of Climate Change) be used for the design of soakaways, and this has been applied to size the soakaway in this case. It has also been modelled for 5, 10 and 30 year events. This shows that the overflow to Silverpines is not engaged for the design event.

The infiltration value given in the Site Investigation report (5.68×10^{-6}m/s) has been used in the Flow model.

Details of the inputs to the Flow model are given in the table below.

Table 2-5 – Catchment 3 Attenuation Storage

Type of areas	Areas (Hectares)	Run-off Factor Applied	Drained Area with run-off applied
Landscaping (Grass / Soft)	0.2038	0.3	0.0611
Intensive Green Roof / Podium	0.1689	0.75	0.1267
Extensive Green Roof - Sedum	0.234	0.875	0.2048
Permeable Paving	0.1441	0.75	0.1081
Impermeable Paving	0.004	0.9	0.0036
Standard Roof (impermeable)	0.0114	0.9	0.0103
Total Drained Area to Tank 3	**0.7662**		
Total Drained Area to Tank 3 with run-off applied			**0.5145**

2.3.10 Interception Storage

The GDSDS requires that Interception storage, where provided, should ensure that at a minimum the first 5mm and preferably the first 10mm of rainfall is intercepted on site and does not directly pass to the receiving watercourse.

Interception storage can be attained using SuDS features which allow the rainwater to infiltrate into the ground, evaporate into the atmosphere or transpire through vegetation. Soft landscaping and planted areas are conservatively taken as providing natural interception storage of 15mm.

Interception storage volumes for sub-catchments 1 and 2 are shown below. As catchment 3 discharges directly to the ground, it is not relevant.

2.3.10.1 Interception Storage - Catchment 1

Interception storage required m^3 = Total drained area (m^2) x minimum rainfall (mm)
Interception storage required = 5,007m^2 x 10mm = 50.07m^3

Table 2-1 – Interception Storage Catchment 1

Type of areas	Areas (m^2)	Storage (l/m^2)	Capacity (m^3)
Landscaping (Grass / Soft)	1710	15	25.7
Intensive Green Roof / Podium	0	12	0.0
Permeable Paving	1682	40	67.3
Impermeable Paving	764	0	0.0
Standard Roof (impermeable)	851	0	0.0
Total	-	-	**92.9**

The proposed Interception storage meets the preferred 10mm storage criteria

2.3.10.2 Interception Storage - Catchment 2

Interception storage required m^3 = Total area (m^2) x minimum rainfall (mm)
Interception storage required = 7,905m^2 x 10mm = 79.05m^3

Table 2-2 – Interception Storage Catchment 2

Type of areas	Areas (m^2)	Storage (l/m^2)	Capacity (m^3)
Landscaping (Grass / Soft)	405	15	6.1
Intensive Green Roof / Podium	2554	12	30.6
Extensive Green Roof - Sedum	3307	12	39.7
Permeable Paving	670	40	26.8
Impermeable Paving	375	0	0.0
Standard Roof (impermeable)	594	1	0.6
Total	-	-	**103.8**

The proposed Interception storage meets the preferred 10mm storage criteria.

2.3.11 Green Roof Provision

As shown on the architects' drawings there are no rooflight, lift overruns, plant areas or PV panels at roof level. This leaves most of the space for use as green roof, and the design aims to maximise the application of both extensive and intensive green roof.

Therefore, it can be taken that more than **90% coverage** will be achieved, which is in compliance with the DLRCC policy of minimum 60% coverage. See drawing C1005 for the location of the extensive and intensive roof areas.

2.3.12 GSDS Criterion Compliance

2.3.12.1 Criterion 1 GDSDS – River Water Quality Protection

Run-off from natural greenfield areas contributes very little pollution and sediment to rivers and for most rainfall events direct run-off from greenfield sites to rivers does not take place as rainfall percolates into the ground. By contrast, urban run-off, when drained by pipe systems, results in run-off from virtually every rainfall event with high levels of pollution, particularly in the first phase of run-off, with little rainfall percolating to the ground. To prevent this happening, Criterion 1 requires that interception storage and/or treatment storage is provided, thereby replicating the run-off characteristics of the pre-development greenfield site.

As discussed in section 2.3.10 interception storage is provided for the site by a variety of measures so there is no need for extra treatment storage and even the infiltration provided in the soakaway will provide some tertiary treatment for this site.

2.3.12.2 Criterion 3 GDSDS – Site Flooding

The GDSDS requires that no flooding should occur on site for storms up to and including the 1 in 30-year event. The pipe network and the attenuation storage volumes should, therefore, be checked for such storms to ensure that no site flooding occurs although partial surcharging of the system is allowed if it does not threaten to flood.

For the 1 in 100-year event, the pipe network can fully surcharge and cause site flooding, but the top water level due to any such flooding must be at least 500mm below any vulnerable internal floor levels, and the flood waters should be contained within the site. In addition, the top water level in any attenuation device during the 100-year storm must be at least 500mm below any vulnerable internal floor levels.

The pipe network is limited in extent due to the medium-rise nature of the proposed development. Therefore, the pipes have been oversized to ensure the following:

- The system does not surcharge for the 1-year event
- The system surcharges but does not flood for the 30-year event.
- The system surcharges but does not flood for the 100-year event.

The surcharging of the system is based on the system being allowed to fill as the attenuation tank fills, because the invert of the incoming pipes is below the top of the attenuation tank. This is not a function of the pipe size.

Detailed modelling of the sewer network has been carried out using Causeway Flow software to confirm the above criteria is adequately met. The outputs are appended to this report.

The basement car park is covered by podium slabs and do not receive direct rainfall. There will be limited outflow from these areas. (Rainfall coming off cars & rain water coming in through car park vents) They are drained by a separate system that outfalls to a petrol interceptor buried below the ground floor slab. From there, the car park drainage is pumped to the nearest foul manhole and is not at risk of any backflow from the surface water system during storm conditions. GDSDS Criterion 3 is therefore complied with.

Refer to drawing C1001 for further information about basement drainage layout.

2.3.12.3 Criterion 2 & Criterion 4 GDSDS – River Regime and Flood Protection

Regardless of the rainfall event, unchecked run-off from the developed site through traditional pipe networks will discharge into receiving waters at rates that are an order of magnitude greater than that prior to development. This can cause flash flow in the outfall river / stream that can cause scour, erosion & downstream flooding. Attenuation storage is provided to

prevent this occurring by limiting the rate of run-off to that which took place from the pre-development greenfield site. In practice, the rate of run-off needs to be appropriately low for most rainfall events, and attenuation storage volumes should be provided for the 1 and 100-year storm event + 20% for climate change. The rate of outflow from such storage should be controlled so that it does not exceed the greenfield run-off rate of QBAR, which can be factored upwards by factors appropriate to the various return periods (given in the Flood Studies Report) if long term storage is provided. Notwithstanding that significant long-term storage will be provided in the form of interception storage, this does not equate to full long-term storage volume provision and so growth factors will not be applied to QBAR when calculating the attenuation storage volume required.

Qbar for the site has been calculated in accordance with the IH124 method as 5.07 l/s. As the surface runoff flow rate discharged from the site does not exceed Qbar, there is no requirement for long-term storage to limit the impact on the receiving watercourse.

Criterion 4 is intended to prevent flooding of the receiving system / watercourse by either.

a) limiting the volume of run-off to the pre-development greenfield volume using 'long-term storage' (Option 1) or by

b) limiting the rate of run-off for the 1 in 100-year storm to QBAR without applying growth factors using 'extended attenuation storage' (Option 2).

Option (B) has therefore been used to comply with Criterion 4 and an attenuation volume will be provided in the proposed attenuation tank to limit the rate of discharge in the 1 in 100-year storm +20% event to QBAR without growth factors applied.

Refer to Appendix VI for surface water network design calculations.

2.3.13 SuDS CIRIA Pillars of Design

2.3.13.1 Water Quantity

The "Water Quantity" design objective is to ensure that the surface water runoff from a developed site does not have a detrimental impact on people, property or the environment, it is important to control:

- How fast the runoff is discharged from the site (ie the peak runoff rate) and
- How much runoff is discharged from the site (ie the runoff volume)

Per section 2.3.9, the attenuation tank has been designed to ensure that the new peak flow does not exceed the existing peak runoff rate. The various other SuDS measures have been implemented to limit the amount of runoff volume in accordance with the guidelines within the site boundary, using interception storage.

2.3.13.2 Water Quality

The “Water Quality” design objective seeks to ensure the surface water runoff from the site does not compromise the groundwater or surrounding water courses relating to the site.

A pollutant analysis was performed in 2.3.8 of this report. In that section, the only applicable area within the site capable of providing surface water runoff is the entrances to the car park. This was resolved with permeable pavement treating the potential pollutants prior to them entering the attenuation tank and ultimately the surrounding watercourse.

2.3.13.3 Amenity

The “Amenity” design objective aims to deliver attractive, pleasant, useful and above all liveable urban environments. SuDS measures should be designed to replicate the existing natural environment and blend in with the urban development.

BMCE have worked closely with the landscaping architect throughout the SuDS strategy design process to ensure that the measures which have been suggested and incorporated have a high sense of public use. Throughout the site, there is podium green roofs, permeable paving, and infiltration in terms of a soakaway.

2.3.13.4 Biodiversity

The encouragement of biodiverse environments within urban environments is incredibly important. The SuDS measures must not only replicate the pre-development surface water runoff systems and treatment for rainfall, but they must only replicate the existing habitats pre-development.

By incorporating large landscaped areas in all areas, green roofs throughout the site and the soakaway biodiversity on site is promoted. In addition the Landscape Architect has aimed to implement the All Ireland Pollinator Plan within the planting.

2.3.14 Maintenance of SuDS Devices

The owner operator of the development will be responsible for maintaining the proposed SuDS devices in accordance with the schedules set out below, and the notes on drawing C-1205 for Green Roof and Permeable Paving. This will be agreed in the operation and maintenance manual at detailed design stage, and will incorporate proprietary information as required, based on the chosen products where relevant.

2.3.14.1 Soakaway Maintenance

Maintenance Schedule	Required Action	Typical Frequency
Regular Maintenance	Inspect for sediment and debris in pretreatment components and the	Annually.

	floor of inspection tube or chamber and inside of concrete manhole rings.	
	Cleaning of gutters and gutters on all down pipes.	Annually (or as required based on inspections).
	Trimming any roots which may be causing blockages	Annually.
Occasional Maintenance	Remove sediment and debris from the pre-treatment components and floor of inspection tube or chamber and inside of concrete manhole rings	As required, based on inspections
Remedial Actions	Reconstruct soakaway and/ or clean void fill, if performance deteriorates or failure occurs.	As required
	Replacement of clogged geotextile (will require reconstruction of soakaway)	As required
Monitoring	Inspect silt traps and note rate of sediment accumulation.	Monthly in the first year and then annually.
	Check soakaway to ensure emptying is occurring	Annually

2.3.14.2 Attenuation System Maintenance

Maintenance Schedule	Required Action	Typical Frequency
Regular Maintenance	Inspect and identify any areas which are not operating correctly (eg inflows, outflow controls etc). If required, take remedial action.	Monthly for 1st 3 months of operation, then annually thereafter.
	Remove debris from the catchment surface and inlets (where it may cause risks to performance) such as leaves blocking gulley's or gutters.	Monthly.
	Remove sediment from pre-treatment structures (such as silt	Annual or as required.

	traps on inlets) and/or internal forebays.	
	Inspect vegetation coverage	Monthly for 6 months, quarterly for 2 years than half yearly
Remedial Actions	Repair/rehabilitate inlets/outlets/vents etc	As required
Monitoring	Inspect/check all inlets/outlets/vents etc. to ensure that they are in good condition and operating as designed. If required, take remedial action.	Annually
	Survey inside of tank for sediment build-up and remove if necessary	Every 5 years or as required

2.3.15 SuDS Conclusion

This section of the report has comprehensively discussed the various SuDS measures which can be applied to the site and then selected them based on the site layout. A pollutant analysis and a series of SuDS management trains have then been developed based upon these SuDS measures.

Finally, the chosen SuDS measures have been analysed for various rainfall scenarios to ensure that all the SuDS design criteria are met an extensive range of SuDS measures are proposed with almost total coverage of the developed area of the site.

In conclusion, SuDS measures are the most effective measures which can be applied to the site and these measures are effective in treating rainfall on the site to GDSDS and CIRIA criterion.

3.0 FOUL DRAINAGE SYSTEM

3.1 Existing Foul Sewer Infrastructure

The site is served by a 225mm diameter foul sewer system along Leopardstown Road. There is a separate 225mm concrete foul sewer network serving the Silverpines to the West of the proposed development. The houses fronting onto the Leopardstown Road & St. Joseph's House both discharge to the foul sewer.

3.2 Proposed Foul Drainage System

A new system will serve the development. It is proposed to provide 1 connection point which will accommodate the whole site and will connect into the sewer network in the Silverpines Estate via a pumping station which limits the flow rate to 5l/s. See C1000 for the proposed connection location.

The proposed development will consist of a combination of one-, two- and three-bedroom apartments along with some amenities (creche and coffee shop among others). The total proposed number of dwellings is 463.
For a full breakdown of the schedule and calculations see Appendix V.

The flow table below are calculated using Irish Water flow rates of 150 l/hd/person per day for residential use and the I.W. recommended occupancy rate of 2.7 per unit. A 10% of infiltration rate is also applied.

TOTAL FOUL WASTEWATER CALCULATION
DOMESTIC:
TOTAL AVERAGE FLOW = 2.17 l/s TOTAL PEAK FLOW = 13.239 l/s
DTHERS:
TOTAL AVERAGE FLOW = 0.225 l/s TOTAL PEAK FLOW = 0.99 l/s
EXISTING:
TOTAL AVERAGE FLOW = 0.0474 l/s TOTAL PEAK FLOW = 0.2891 l/s
TOTAL WASTEWATER
TOTAL AVERAGE FLOW = 2.217 l/s **TOTAL PEAK FLOW = 14.229 l/s**

Table 3-1 – Foul Network Summary

Basement car park drainage will be pumped up from basement level via a petrol interceptor as indicated on drawing C1001.

3.2.1 Foul Network Design

The proposed pipe network has been designed in accordance with the relevant requirements of the Irish Water Code of Practice for Wastewater Infrastructure.

The proposed foul drainage network comprises of a series of 225mm diameter pipes, designed for a minimum velocity of 0.75m/s (self-cleansing) and maximum velocity of 3.0m/s. A pipe friction coefficient of 1.5mm has been assumed.

Refer to Appendix V and drawing C1000 for further information relating to the foul drainage layout.

3.2.2 Irish Water

As has been explained in section 1.4 the bespoke Confirmation of feasibility was issued by Irish Water in July 2021. Please refer to Appendix II for further information.

It should be noted that the bespoke Confirmation of Feasibility is the outcome of a lengthy engagement and network modelling process where connections to the foul Silverpines Estate, and Leopardstown Road networks were investigated. The best solution was found to be a pumping station to collect and limit the discharge to a maximum of 5l/s into the silver pines sewer, as shown on drawings C1000, and C1209 series.

The Statement of Design Acceptance has also been received for the proposed layout and is included in Appendix II.

4.0 WATER SUPPLY

4.1 Existing Water Supply Infrastructure

There is an existing connection to the 160mm diameter MOPVC public watermain (1996) on the Leopardstown Road. This consists of a sewer pipe that supplies St. Joseph's House.

4.2 Proposed Watermain supply

The water supply proposal for the development is to provide a new Ø220mm connection to the bridging section between the Ø160mm MoPVCV public watermains on the Leopardstown Road (a Ø160mm watermain runs on each side of the road).

The proposed new connection to the existing watermain on Leopardstown Road will be 200mm diameter as required for more than 300 units.

It is anticipated that the daily water demand for the overall development would be more than 220,000 litres per day based on Irish Water Guidelines as per the calculations below. In addition, water storage with the capacity of 24-hour water demand will be provided to the apartment blocks.

The Irish Water 'Code of Practice for Water Supply' indicates that for design purposes, the average daily domestic demand shall be based on a per-capita consumption of 150 l/person/day and an average occupancy ratio of 2.7 persons per dwelling.

TOTAL WATER SUPPLY CALCULATION
DOMESTIC: TOTAL AVERAGE FLOW = 2.713 l/s TOTAL PEAK FLOW = 13.563 l/s
DTHERS: TOTAL AVERAGE FLOW = 0.281 l/s TOTAL PEAK FLOW = 1.405 l/s
EXISTING: TOTAL AVERAGE FLOW = 0.0586 l/s TOTAL PEAK FLOW = 0.293 l/s
TOTAL WATER SUPPLY **TOTAL AVERAGE FLOW = 2.994 l/s** **TOTAL PEAK FLOW = 14.968 l/s**

Table 4-1 – Watermain Summary

For a full breakdown of the calculations see Appendix V.

4.2.1 Watermain Network Design

All proposed water mains will be HDPE 100 SDR17 in accordance with Irish Water Standards. Apartment blocks will have their own metered connections (80mm O.D. PE pipe MDPE 80 SDR11).

The proposed water main layout is arranged such that all buildings are a maximum of 46m from a hydrant in accordance with the Department of the Environment's Building Regulations "Technical Guidance Document Part B Fire Safety". Hydrants are to be installed in accordance with Irish Water's Code of Practice and Standard Details. Final positions of hydrants will be agreed as part of the Fire Safety Certificate requirements.

Sluice valves are provided at intersections and at appropriate locations to facilitate isolation and purging of the system. Every block will accommodate minimum 24-hour water storage (in accordance with the requirements of Irish Water's Code of Practice) and include provision of water conservation measures such as dual flush water cisterns and low flow taps.

4.2.2 Irish Water

A Statement of Design Acceptance has been obtained from Irish Water for the proposed development and is included in Appendix II.

5.0 ROAD & TRAFFIC ENGINEERING

Please refer to BMCE road layout drawings and ILTP documentations for the traffic report and a DMURS Statement.

BARRETT **MAHONY**
CONSULTING ENGINEERS
CIVIL & STRUCTURAL

APPENDIX

I

PREVIOUS APPLICATION INFORMATION

Comhairle Contae County Council

Comhairle Contae Dhún Laoghaire-Ráth an Dúin, Halla an Chontae, Dún Laoghaire, Co. Átha Cliath, Éire. A96 K6C9
Dún Laoghaire-Rathdown County Council, County Hall, Dún Laoghaire, Co. Dublin, Ireland. A96 K6C9
T: 01 205 4700 F: 01 280 6969 www.dlrcoco.ie

Linda McEllin, Brock McClure Consultants
63, York Road
Dun Laoghaire
Co Dublin

25-Aug-2017

NOTIFICATION OF DECISION TO GRANT PERMISSION
Planning & Development Act 2000, as amended

Order Number P/2044/17	**Date of Order** 24-Aug-2017
Register Reference D17A/0337	**Date Received** 11-Apr-2017

Applicant: Neil Collins, Homeland Silverpines Limited

Development: Permission for a 7 year permission for the demolition of 3 no. existing residential dwellings known as 'Annaghkeen', Dalwhinnie' and 'Marian Villa' and associated outbuildings (combined demolition c.662.2 sqm GFA) and the material change of use of St Joseph's House from residential care facility to residential use to provide for an overall development of 139 no. residential units (133 no. apartments and 6 no. houses) all in a scheme of 2-5 storeys partly over dual access basement level. The proposal shall provide for a new residential scheme (Blocks A-E) including: A. The construction of Blocks A-c (3-5 storeys) over dual access basement level (c.4,311 sqm) comprising 122 no. apartment units. B. The Construction of 6 no. townhouses in the form of Block D. C. The refurbishment and separation of St Joseph's House (2 storeys) into 11 no. residential units to form Block E, which shall include the demolition of a single storey extension and associated outbuildings (demolition total c.172.82 sqm GFA), the removal of external gates, modifications to elevations including new windows, doors and glazed balcony, new external steps and ramps, modifications to internal layout including the removal of walls and partitions and the addition of new dividing walls and part new roof. Block A (5 storeys) shall provide for 53 no. apartment units (13 no. 1 beds, 37 no. 2 beds and 3 no. 3 beds); Block B (5 storeys) shall provide for 58

Comhairle Contae County Council

Comhairle Contae Dhún Laoghaire-Ráth an Dúin, Halla an Chontae, Dún Laoghaire, Co. Átha Cliath, Éire. A96 K6C9
Dún Laoghaire-Rathdown County Council, County Hall, Dún Laoghaire, Co. Dublin, Ireland. A96 K6C9
T: 01 205 4700 F: 01 280 6969 www.dlrcoco.ie

no. apartment units (7 no. 1 beds, 49 no. 2 beds and 2 no. 3 beds); Block C (3 storeys) shall provide for 11 no. apartment units (7 no. 1 beds, 3 no. 2 beds and 1 no. 3 beds); Block D (2-3 storeys) shall provide for 6 no. townhouses (5 no. 3 bed terrace houses - Type T1 and 1 no. 4 bed detached house - Type T2) and Block E (2 storeys) shall provide for 11 no. apartment units (8 no. 2 beds and 3 no. 3 beds) in the former St Joseph's House building all with associated balcony/terrace/private garden areas. The development shall also consist of the amalgamation of 3 no. existing access points along Leopardstown Road (R113) to provide for 1 no. vehicular and pedestrian access point. The existing access point from Brewery Road (N31) to St Joseph's House via Silverpines will be maintained and the existing access serving the Anne Sullivan Centre for the Deaf Blind will be maintained with minor revisions to the point of access. Permission is also sought for 166 no. car parking spaces (139 no. at basement level, 27 no. at surface level), 200 no. bicycle parking spaces, bike stores (at basement and surface level), bin storage areas (at basement and surface level), plant areas, c.5,960 sqm of public open space (including new tree walk, courtyard spaces and new play area), new boundary treatment, green roofs associated with Blocks A-C, provision for pedestrian connections to the adjoining park, site services and all associated site development service connections and landscape works. A protected structure.

Location: Site of c.1.65 ha at Annaghkeen & Dalwhinnie, Leopardstown Road (R113), Dublin 18 & St Joseph's House for the Adult Deaf & Deaf Blind (a Protected Structure) & adjoining lands including Marian Villa, Brewery Road N31), Stillorgan, Co Dublin.

Site Area: sq.m

Time Extension up to and including:

Additional Info. Requested/Received: 01-Jun-201728-Jul-2017

Dear Sir / Madam

Comhairle Contae County Council

Comhairle Contae Dhún Laoghaire-Ráth an Dúin, Halla an Chontae, Dún Laoghaire, Co. Átha Cliath, Éire. A96 K6C9
Dún Laoghaire-Rathdown County Council, County Hall, Dún Laoghaire, Co. Dublin, Ireland. A96 K6C9
T: 01 205 4700 F: 01 280 6969 www.dlrcoco.ie

In pursuance of its functions under the above mentioned Act, Dún Laoghaire-Rathdown County Council, being the Planning Authority, did by Order dated as above make a decision to **GRANT PERMISSION** in respect of the above proposal.

Subject to the **43** conditions on the attached numbered pages.

Please note that, in accordance with Section 251 of the Planning and Development Act 2000, as amended, "where calculating any appropriate period or other time limit referred to in this Act or in any regulations made under this Act, **the period between the 24th Day of December and the first day of January, both days inclusive, shall be disregarded**".

Signed on behalf of Dún Laoghaire-Rathdown County Council.

for Senior Executive Officer

CONDITIONS AND REASONS

1. The development shall be carried out in its entirety in accordance with the plans, particulars and specifications lodged with the application, as amended by Further Information received on 28th July, 2017, save as may be required by the other conditions attached hereto.
REASON: To ensure that the development shall be in accordance with the permission and that effective control be maintained.

2. Proposed Block D (House types T1 and T2) which comprises 5 houses in total shall be omitted. Any future application on this portion of the site shall ensure adequate protection of the residential amenities of the existing dwelling to the south west at Alhambra on Leopardstown Road and shall provide for further visitor car parking on the site.
REASON: In the interests of residential amenity.

3. The vehicular access to the scheme shall be provided via both Brewery Road and Leopardstown Road with double ramped basement car parking. Ramp access A and Ramp Access B to the basement car park shall be operational and available for use prior to occupation of any of the proposed Blocks (A-C). Only left in/left out movements shall be permitted at the Leopardstown Road Access.
REASON: In the interest of traffic safety.

4. The works to the protected structure at St. Joseph's shall be completed prior to the occupation of Blocks A-C.
REASON: In the interest of the protection of the Built Heritage of the County.

5. The applicant shall relocate the direct pedestrian accesses to the existing open space

along the northern boundary so that they are located away from the existing trees. The applicant shall submit revised plans for the written agreement of the Planning Authority that address this matter.
REASON: To ensure the protection, safety, prudent retention and long-term viability of trees to be retained on site and immediately adjacent to the site.

6. Each apartment shall be used as a single dwelling unit only and shall not be sub-divided in any manner or used as two or more separate habitable units.
REASON: To prevent unauthorised development.

7. An acceptable street naming and house numbering scheme (in both Irish and English) shall be submitted for the written agreement of the Planning Authority prior to the commencement of development or the erection of any advertising hoardings on site. In this regard, the use of street names reflecting local place names or local history would be acceptable.
REASON: In the interest of orderly development.

8. Details of all external finishes including materials, colours and textures shall be submitted prior to the commencement of development for the written agreement of the Planning Authority.
REASON: In the interest of visual amenity.

9. Prior to commencement of development, the developer shall comply with the Dún Laoghaire-Rathdown County Council Housing Strategy drawn up in accordance with Part V, Section 96(4) of the Planning & Development Act, 2000, as amended, and in accordance with agreement to be reached with the County Council's Housing and Community Department unless the developer shall have applied for and been granted an exemption certificate under Section 97 of the Planning & Development Act, 2000, as amended.
REASON: To comply with the County Council Housing Strategy & Part V of the Planning & Development Act, 2000, as amended.

10. All public services to the proposed development, including electrical, telephone cables and equipment shall be located underground throughout the entire site. Provision shall be made for broadband connectivity in the development.
REASON: In the interest of amenity.

11. Prior to the commencement of development on site, the applicant shall submit:
a. A Construction Waste Management Plan, having regard to Circular WPR 07/06 - Best Practice Guidelines on the Preparation of Waste Management Plans for Construction and Demolition Projects - published by the DECLG, July, 2006 shall be submitted to the Planning Authority for written agreement. This plan shall provide details including intended construction practice for the management of waste arising from the construction process and in particular recyclable materials.
b. A Waste Management Plan shall be submitted for the written agreement of the Planning Authority. This plan shall contain details for the management of waste and in particular,

recyclable materials and food waste arising within the development including the provision of facilities for the separation, storage and collection of the waste and the provision of adequate signage and lighting to facilitate the ongoing operation of these facilities.
REASON: In the interests of the proper planning and sustainable development of the area.

12. Prior to the commencement of any permitted development or any related construction activity or tree felling on the site, the applicant shall lodge a Tree and Hedgerow Bond to the value of €100,000.00 with the Planning Authority. This is to ensure the protection of trees on and immediately adjacent to the site to make good any damage caused during the construction period.
The bond lodgment shall be coupled with an Arboricultural Agreement with the developer empowering the planning authority to apply such security (or part thereof) to the satisfactory protection of any tree/hedgerow or trees/hedgerows on or immediately adjoining the site or the appropriate and reasonable replacement of any such trees/hedgerows which die, are removed or become seriously damaged or diseased within a period of three years from the substantial completion of the development. Any replacement planting shall use large semi-mature tree size(s) and species or similar as may be stipulated by the planning authority.
An Arboricultural Assessment Report and Certificate is to be signed off by a qualified Arborist after a period of 3 years of completion of the works. Any remedial tree surgery, tree felling works recommended in that report and certificate shall be undertaken by the developer under the supervision of the Arborist. The bond will only be refunded upon receipt by Dun Laoghaire-Rathdown's Parks and Landscape Services of a satisfactory post-construction arboricultural assessment carried out by a qualified arborist and provided that the hedges/trees proposed for retention are alive, in good condition with a useful life expectancy.
REASON: to ensure the protection, safety, prudent retention and long-term viability of trees to be retained on and immediately adjacent to the site.

13. Prior to the commencement of any permitted development, the developer shall engage the services of a qualified arborist as an arboricultural consultant for the entire period of construction activity. The applicant shall inform the planning authority in writing of the appointment and name of the consultant prior to commencement of development. The consultant shall visit the site at minimum on a monthly basis to ensure the implementation of all of the recommendations in the tree reports and plans.
The arborist shall include secondary tree protection fencing around all root protection areas of trees to be retained. All works within these areas to be supervised at all times by the project arborist and the fencing can only be temporarily removed to undertake works under the supervision of the arborist. The arborist shall agree the exact location and detail of the secondary fencing in writing with the Parks & Landscape Services prior to the commencement of any permitted development.
To ensure the protection of trees to be retained within the site, the applicant shall implement all the recommendations pertaining to tree retention, tree protection and tree works, as detailed in the Arboricultural Method Statement and Tree Protection Plan in the submitted tree report. All tree felling, surgery and remedial works shall be completed upon

completion of the works. All works on retained trees shall comply with proper arboricultural techniques conforming to BS 3998: 2010 Tree Work - Recommendations. The clearance of any vegetation including trees and scrub should be carried out outside the bird-breeding season (1st March - 31st August inclusive) or as stipulated under the Wildlife Acts, 1976 and 2000.
The arborist shall carry out a post construction tree survey and assessment on the condition of the retained trees. A completion certificate is to be signed off by the arborist when all permitted development works are completed and in line with the recommendations of the tree report. The certificate shall be submitted to Dun Laoghaire-Rathdown's Parks and Landscape Services for written agreement upon completion of the works. The applicant shall also be made aware of their obligations to constantly assess and survey the trees after construction because of the potential impact and the age/condition of these trees as outlined in the tree and hedgerow survey.
REASON: To ensure and give practical effect to the retention, protection and sustainability of trees during and after construction of the permitted development.

14. Prior to commencement of any relevant aspect of the works, the applicant shall submit and agree details of all foundations/works within the root protection areas of trees to be retained. The applicant shall use sheet pile foundations where they will help with the retention of the trees. The applicant shall also employ hand digging techniques within the RPAs of all trees to be retained - as advised by the project Arborist.
REASON: To ensure and give practical effect to the retention, protection and sustainability of trees during and after construction of the permitted development.

15. Prior to the commencement of any permitted development, the developer shall appoint and retain the services of a qualified Landscape Architect (or qualified Landscape Designer) as a Landscape Consultant, throughout the life of the construction works and shall notify the Planning Authority of that appointment in writing prior to commencement. A Practical Completion Certificate is to be signed off by the Landscape Architect when all landscape works are fully completed to the satisfaction of Dun Laoghaire-Rathdown's Parks and Landscape Services and in accordance with the permitted landscape proposals.
REASON: To ensure full and verifiable implementation of the approved landscape design.

16. For dual vehicular access (Preferred Vehicular Access Strategy of ILTP Consulting Report) only left in left out movements shall be permitted at the Leopardstown Road access.
REASON: In the interest of traffic safety

17. Prior to commencement of development full details of the proposed works to be carried out at the Applicant's expense at Leopardstown Road shall be submitted for written agreement of the Planning Authority. Works to include:
a. Left in/left out only vehicular access at Leopardstown Road;
b. 2 metres minimum width footpath on both sides of vehicular entrance to proposed development;
c. Relocated Bus Stop with kassel kerbs and provision for future bus shelter for proposed

bus priority route;
d. Close off of other existing access points at Leopardstown Road Development frontage;
e. Reinstatement of grass verge, footpath and cycle track;
f. Bollards, road marking, signage, public lighting.
REASON: In the interest of traffic safety

18. All works to be carried out on the public road (including on footpaths and verge areas) shall be at the Applicant's expense to meet the Dun Laoghaire-Rathdown County Council's 'Taking-in-Charge' requirements and all to the satisfaction of the Planning Authority.
REASON: In the interest of proper planning and sustainable development of the area.

19. The Applicant shall ensure, prior to undertaking works to be carried out on the public road, that they shall obtain a Road Opening Licence from the Road Maintenance and the Roads Control Sections.
REASON: In the interest of traffic safety

20. Prior to commencement of development, the applicant shall submit a detailed drawing showing which car parking spaces within the proposed development are to be designated for the relevant dwelling units, crèche drop off and visitor spaces as well as specific uses (Electric Charging, Disabled, Car Club etc) in accordance with Dun Laoghaire-Rathdown County Development Plan, 2016-2022, Table 8.2.3 and Table 8.2.4 standards ensuring allocation of at least 1 car parking space per residential unit. A minimum of 10% of car parking spaces shall be designated for visitor parking so as to avoid future visitors to the proposed residential development from parking in the nearby residential areas. In accordance with County Development Plan, 2016-2022, Section 8.2.4.5, the car parking spaces must be sold off with the units and not sold separately or let to avoid non-take up by residents.
REASON: In the interest of clarity.

21. The applicant shall ensure provision of all required cycle parking facilities and access routes correctly designed and constructed in accordance with Dun Laoghaire Rathdown County Council Cycling Policy July, 2017 - 'Standards for Cycle Parking and associated Cycling Facilities for New Developments'.
REASON: In the interests of proper planning and sustainable development of the area.

22. The proposed underground car park shall be in accordance with CDP Section 8.2.4.10 and comply with requirements of the Institution of Structural Engineers booklet entitled 'Design Recommendations for Multi Storey and Underground Car Park Fourth Edition' (2011).
REASON: In the interest of proper planning and sustainable development of the area.

23. The Applicant shall ensure provision of electric vehicle charging points for minimum number of car parking spaces in accordance with Section 8.2.4.12 of the Dun Laoghaire-Rathdown County Development Plan, 2016-2022. The following weblink is recommended http://www.esb.ie/electric-cars/index.jsp.

Comhairle Contae Dhún Laoghaire-Ráth an Dúin, Halla an Chontae, Dún Laoghaire, Co. Átha Cliath, Éire. A96 K6C9
Dún Laoghaire-Rathdown County Council, County Hall, Dún Laoghaire, Co. Dublin, Ireland. A96 K6C9
T: 01 205 4700 F: 01 280 6969 www.dlrcoco.ie

REASON: In the interest of proper planning and sustainable development of the area.

24. The Applicant shall carry out at their own expense the recommendations and measures as accepted and noted in the Feedback forms for the submitted Quality Audit (dated April, 2017) and Road Safety Audit (dated March, 2017) prepared by ILTP Consulting unless otherwise agreed with Dun Laoghaire-Rathdown County Council. A Stage 2 detailed design Quality Audit is recommended prior to commencement of construction. Post construction/prior to occupation, a Stage 3 Road Safety Audit and a post completion Quality Audit shall be carried out at the Applicant's expense in accordance with the Design Manual for Urban Roads & Streets (DMURS) and TII (Transport Infrastructure Ireland) standards. All measures recommended by the Auditor shall be undertaken unless the Planning Authority approves a departure in writing. A feedback report shall also be submitted providing a response to each of the items.
REASON: In the interest of traffic safety

25. The Applicant shall ensure that the Stage 2 detailed design Quality Audit and post completion Quality Audit includes a full cycle audit of the basement car park and linkage to external pedestrian/cycle routes.
REASON: In the interest of traffic safety

26. Prior to commencement of development in accordance with the Dun Laoghaire-Rathdown County Development Plan, 2016-2022, Section 8.2.4.3, details of an appointed Travel Plan (Mobility Management Plan) Manager shall be provided to the Planning Authority. The Applicant/Developer shall ensure in accordance with CDP, 2016-2022, Section 8.2.4.3 that the recommended initiatives and monitoring of a Travel Plan (Mobility Management Plan) are implemented as outlined in the submitted Mobility Management Plan by ILTP Consulting dated July, 2017.

27. The Applicant shall comply with the recommendations of the submitted Construction Management Plan prepared by Barrett Mahoney Consulting Engineers dated 7th April, 2017. Prior to the commencement of development, the Applicant shall submit for the written agreement of the Planning Authority, a construction traffic management plan to be implemented during the construction of the works.
REASON: In the interest of traffic safety

28. The Applicant shall ensure that the Contractor shall provide parking for construction staff in order to avoid overspill onto public roads/local residential areas.
REASON: In the interest of traffic safety

29. Prior to commencement of development, the Applicant shall submit to DLRCoCo's Public Lighting Section, details for agreement of the proposed street lighting within the proposed development. Details shall include lantern type, lighting column height and type and light intensity/lux levels. The proposed street lighting shall be shown to be designed in accordance with Dun Laoghaire-Rathdown County Council's February, 2015 guidance document for, 'Public Lighting Installations in Residential and Industrial Areas'. For bollard

lighting, the use of only low voltage LED type bollard lighting is recommended.
REASON: In the interest of traffic safety

30. Before any building works take place, the applicant shall construct the connection to the 600mm diameter surface water sewer on the north side of the site.
REASON: In the interest of public health.

31. Following the installation of the two hydrobrakes, the applicant shall give notice to the Planning Authority that the hydrobrakes have been installed and set to the maximum limits shown on the drainage drawing and shall facilitate an inspection of these by the planning authority (Drainage Planning section), if required to do so.
REASON: In the interest of public health.

32. The mitigation measures in relation to bats set out in the Ecological Impact Assessment by Scott Cawley submitted in support of the application shall be followed. Bat activity surveys consisting of dusk emergence and dawn re-entry surveys of the existing tees and building identified as having potential features suitable as bat roosts shall be carried out in the May-August Period. If a bat roost is identified then a derogation licence shall be applied for to NPWS it is intended to remove or otherwise interfere with it.
REASON: To prevent any injury occurring to bats or their breeding or resting places which are afforded protection under the Habitats Directive., 1992.

33. Clearance of vegetation including trees from the development site shall only take place outside the period from the 1st March to the 31st August in any year.
REASON: To prevent the destruction of the nests, eggs and young of any bird which may breed in the numerous trees and shrubs suitable for nesting present on this site.

34. The applicant shall complete, within a period to be specified in writing to the Applicant by the Planning Authority, all infrastructural works (including Roads, Footpaths, Car Parks, Open Spaces, Sewers, Watermains, Drains & Public Lighting) to current Council standards for Residential Developments. The specified period for completion of the infrastructural works shall be a period of not less than 2 years from the commencement of such works.
REASON: To ensure the development is carried out in accordance with Council Standards for Residential Development in the interests of the proper planning and sustainable development of the area in which the development is located.

35. Prior to commencement of development, the applicant shall submit full details of a properly constituted Private Management Company for the written agreement of the Planning Authority. This shall include a layout map of the development showing any areas to be taken in charge and those areas to be maintained by the Private Management Company. Membership of this Company shall be compulsory for all purchasers of property in the development. Confirmation that this Company has been set up shall be submitted to the Planning Authority prior to the occupation of the first residential unit. All roads and services within the privately managed areas are to be completed to the Council's taking in charge standards. Details shall also include management details of the community room.

Comhairle Contae Dhún Laoghaire-Ráth an Dúin, Halla an Chontae, Dún Laoghaire, Co. Átha Cliath, Éire. A96 K6C9
Dún Laoghaire-Rathdown County Council, County Hall, Dún Laoghaire, Co. Dublin, Ireland. A96 K6C9
T: 01 205 4700 F: 01 280 6969 www.dlrcoco.ie

REASON: To provide for the satisfactory completion and maintenance of the development in the interest of residential amenity.

36. Construction work shall be restricted to between the hours of 0800hrs - 1900hrs Monday to Friday and 0800hrs - 1300hrs on Saturdays. No construction works to be carried out on Sundays and Public Holidays. The use of compressors/generators or any such equipment shall not be used outside the specified construction hours.
REASON: To reduce the impact of noise emanating from the site in the interests of the amenities of the adjoining residences.

37. The Developer shall, prior to commencement or as otherwise agreed in writing with the Planning Authority, pay the sum of €26,271.65 to the Planning Authority as a contribution towards expenditure that was/or is proposed to be incurred by the Planning Authority in respect of the provision of Surface Water Public Infrastructure and Facilities benefiting development in the area of the Authority, as provided for in the Development Contribution Scheme made by Dún Laoghaire-Rathdown County Council on the 14th December, 2015. These rates of contribution shall be updated effective from 1 January each year during the life of the Scheme in accordance with the SCSI Tender Price Index (See Article 12 of the Scheme) commencing from 1st January, 2018. Contributions shall be payable at the index adjusted rate pertaining to the year in which implementation of the planning permission is commenced, as provided for in Note 1 to the Table at Article 9 of the Scheme. Outstanding balances may be subject to interest charges.
REASON: It is considered reasonable that the payment of a contribution be required in respect of the provision of the Surface Water Public Infrastructure and Facilities benefiting development in the area of the Planning Authority and that is provided, or that is intended will be provided, by or on behalf of the Local Authority.

Note on above Condition:
Please note that with effect from 1st January, 2014 Irish Water are now the statutory body responsible for both water and waste water services. Accordingly, the contribution payable has been reduced by the amount of the contribution associated with these services. Further details/clarification can be obtained from Irish Water at Tel. 1 850 278 278 .

38. The Developer shall, prior to commencement or as otherwise agreed in writing with the Planning Authority, pay the sum of €601,635.08 to the Planning Authority as a contribution towards expenditure that was/or is proposed to be incurred by the Planning Authority in respect of the provision of the Roads Public Infrastructure and Facilities benefiting development in the area of the Authority, as provided for in the Development Contribution Scheme made by Dún Laoghaire-Rathdown County Council on the 14th December, 2015. These rates of contribution shall be updated effective from 1 January each year during the life of the Scheme in accordance with the SCSI Tender Price Index (See Article 12 of the Scheme) commencing from 1st January, 2018. Contributions shall be payable at the index adjusted rate pertaining to the year in which implementation of the planning permission is commenced, as provided for in Note 1 to the Table at Article 9 of the Scheme. Outstanding balances may be subject to interest charges.

REASON: It is considered reasonable that the payment of a contribution be required in respect of the provision of the Roads Public Infrastructure and Facilities benefiting development in the area of the Planning Authority and that is provided, or that is intended will be provided, by or on behalf of the Local Authority.

39. The Developer shall, prior to commencement or as otherwise agreed in writing with the Planning Authority, pay the sum of €390,535.37 to the Planning Authority as a contribution towards expenditure that was/or is proposed to be incurred by the Planning Authority in respect of the provision of the Community & Parks Public Infrastructure, Facilities and Amenities benefiting development in the area of the Authority, as provided for in the Development Contribution Scheme made by Dún Laoghaire-Rathdown County Council on the 14th December, 2015. These rates of contribution shall be updated effective from 1 January each year during the life of the Scheme in accordance with the SCSI Tender Price Index (See Article 12 of the Scheme) commencing from 1st January, 2018. Contributions shall be payable at the index adjusted rate pertaining to the year in which implementation of the planning permission is commenced, as provided for in Note 1 to the Table at Article 9 of the Scheme. Outstanding balances may be subject to interest charges.
REASON: It is considered reasonable that the payment of a contribution be required in respect of the provision of the Community & Parks Public Infrastructure, Facilities and Amenities benefiting development in the area of the Planning Authority and that is provided, or that is intended will be provided, by or on behalf of the Local Authority.

40. No development on foot of this permission shall commence until security for the provision and satisfactory completion of services (including roads, footpaths, open spaces, public lighting, sewers, watermains and drains) in accordance with the Plans and particulars lodged with the application, has been given by:-
a) Lodgement with the Council of an approved Insurance Company Bond in the sum of €486,100.00 which shall be kept in force by the Developer until such time as Roads, Open Spaces, Car Parks, Sewers, Watermains and Drains are completed to the satisfaction of the Council OR/...
b) Lodgement with the Council of a Cash Sum of €296,100.00 to be applied by the Council at its absolute discretion if such services are not duly provided to its satisfaction on the provision and completion of such services to standard specifications.
REASON: To ensure that a ready sanction may be available to the Council to induce the provision of services and prevent disamenity in the development.

41. That a financial contribution shall be paid by the proposer to the Council towards the cost of the extension of Luas Line B from the Sandyford Depot to Cherrywood, namely Luas Line B1. This contribution to be paid prior to the commencement of the development or in such other manner as may otherwise be agreed with the Planning Authority. The rate of contribution payable shall be that pertaining to the particular year in which implementation of the Planning Permission is commenced. The Supplementary Development Contribution Scheme provides for an annual increase in the levels of contribution payable, as outlined in the scheme, by a factor of 5% compound interest per

annum. The levels of contribution will be reviewed annually on the 13th of January of each year during which the scheme is in force to take account of the aforementioned increase. The rate of contribution payable in respect of this development, at current contribution rates, is €580,427.10 and is subject to increase as outlined above.
It should be noted that contributions assessed in accordance with the Supplementary Development Contribution Scheme cannot be appealed to An Bord Pleanala unless the applicant considers the levy referred to in this condition has not been properly applied in accordance with the terms of the Scheme.
REASONS FOR CONTRIBUTIONS: To part finance the extension of the Luas Line B1 from Sandyford Depot to Cherrywood, as provided for in the Supplementary Development Contribution Scheme adopted by the Council of Dunlaoghaire-Rathdown on the 13th of January, 2003. (incorporating amendments to Clause 13 as adopted by the County Council at it's meeting on 13th May, 2013 – to be effective for all decisions from 14th May, 2013).

42. This development shall not be carried out without prior agreement, in writing, between the Applicant and the Planning Authority relating to the payment of development contributions.
REASON: Investment by Dún Laoghaire-Rathdown County Council in Local Authority works has facilitated and will facilitate the proposed development. It is considered appropriate and reasonable that the developer should contribute to the cost of same.

43. A conservation acredited architect shall be retained to oversee the work to St. Josephs House.
REASON: In the interest of preservation of a protected structure.

NOTE 1: Where the applicant proposes to connect directly or indirectly to a public water/wastewater network operated by Irish Water, the applicant must sign a connection agreement with Irish Water prior to the commencement of the development and adhere to the standards and conditions set out in that agreement.

NOTE 2: In the interests of Public Health and Environmental Sustainability, Irish Water Infrastructure capacity requirements and proposed connections to the Water and Waste Water Infrastructure will be subject to the constraints of the Irish Water Capital Investment Programme.

NOTE 3: In advance of making the connections to the public foul/combined sewers, the applicant shall contact the Drainage Area Engineer of the County Council.

NOTE 4: When constructing the surface water discharge pipe from manhole S1.6 to the surface water public sewer, the applicant shall exercise maximum caution not to disturb other public utilities in the way (see the water services drawing). In advance of this work, the applicant shall forward to the Dublin City Extra Municipal Area Engineer and present to this person a plan to approach and reinstate the excavation.

NOTE 5: The attention of the applicant is drawn to Section 34(13) of the Planning and Development Act 2000, which relates as follows, 'A person shall not be entitled solely by reason of a permission under this section to carry out any development'.

(1) Submissions / Observations

NOTE: In deciding this planning application, the planning authority, in accordance with Section 34 (3) of the Planning and Development Act 2000, as amended, has had regard to any submissions or observations received, in accordance with the Planning and Development Regulations 2001 to 2012 pertaining to the application.

(2) Removal of Site Notice

NOTE: The applicant is reminded that in accordance with Article 20 of the Planning and Development Regulations 2001 to 2012, any site notice erected or fixed pertaining to this application shall be removed (if not already done so) following receipt of this notification.

FURTHER NOTES

APPEALS

This decision of the Planning Authority does not authorise works to commence and may be appealed to An Bord Pleanala by an Applicant or any person who made submissions or observations in writing in relation to this application to the Planning Authority.

A person who has an interest in adjoining lands in respect of which permission has been granted and who did not make a submission or observation under Section 37(6)(a) of the Planning and Development Act, 2000, as amended may apply to the Board for leave to appeal the decision of the Planning Authority. Appeals should be sent to:

The Secretary,
An Bord Pleanala,
64 Marlborough Street,
Dublin 1.

Tel: 01-8588100

Every appeal must be made in writing and must state the subject matter and full grounds of appeal. It must be fully complete from the start.

The Board must receive an appeal within four weeks, beginning on the date of the decision set out above. A Third Party appeal will be invalid unless accompanied by the prescribed fee and a copy of the acknowledgement of receipt from the Planning Authority in respect of a submission/observation.

GRANT OF PERMISSION

In the case of a notification of a decision to Grant Permission, where no appeal is received by An Bord Pleanala against the decision, a PERMISSION will be granted by the Council as soon as may be after the expiration of the period for the making of an appeal.

REFUND OF FEES – REPEAT PLANNING APPLICATION

Provision is made for a partial refund of fees in the case of certain repeat applications submitted within a period of twelve months where the full standard fee was paid in respect of the first application where both application relate to developments of the same character or description and to the same site. An application for a refund must be made in writing to the Planning Authority and received by them within a period of 8 weeks beginning on the date of Planning Authority's decision on the second application. Please consult the Planning & Development Regulations, 2001 to 2010, for full details of fees, refunds and exemptions.

No. P/2044/17

Dún Laoghaire-Rathdown County Council

LOCAL GOVERNMENT ACTS 1925 - 2014

RECORD OF EXECUTIVE BUSINESS CHIEF EXECUTIVE'S ORDERS

Reg. Ref.: D17A/0337 **Date Received:** 11-Apr-2017
Add. Info Req'd: 01-Jun-2017 **Add. Info Rec'd:** 28-Jul-2017
Name & Address: Linda McEllin, Brock McClure Consultants, 63, York Road, Dun Laoghaire, Co Dublin

Development: Permission for a 7 year permission for the demolition of 3 no. existing residential dwellings known as 'Annaghkeen', Dalwhinnie' and 'Marian Villa' and associated outbuildings (combined demolition c.662.2 sqm GFA) and the material change of use of St Joseph's House from residential care facility to residential use to provide for an overall development of 139 no. residential units (133 no. apartments and 6 no. houses) all in a scheme of 2-5 storeys partly over dual access basement level. The proposal shall provide for a new residential scheme (Blocks A-E) including: A. The construction of Blocks A-c (3-5 storeys) over dual access basement level (c.4,311 sqm) comprising 122 no. apartment units. B. The Construction of 6 no. townhouses in the form of Block D. C. The refurbishment and separation of St Joseph's House (2 storeys) into 11 no. residential units to form Block E, which shall include the demolition of a single storey extension and associated outbuildings (demolition total c.172.82 sqm GFA), the removal of external gates, modifications to elevations including new windows, doors and glazed balcony, new external steps and ramps, modifications to internal layout including the removal of walls and partitions and the addition of new dividing walls and part new roof. Block A (5 storeys) shall provide for 53 no. apartment units (13 no. 1 beds, 37 no. 2 beds and 3 no. 3 beds); Block B (5 storeys) shall provide for 58 no. apartment units (7 no. 1 beds, 49 no. 2 beds and 2 no. 3 beds); Block C (3 storeys) shall provide for 11 no. apartment units (7 no. 1 beds, 3 no. 2 beds and 1 no. 3 beds); Block D (2-3 storeys) shall provide for 6 no. townhouses (5 no. 3 bed terrace houses - Type T1 and 1 no. 4 bed detached house - Type T2) and Block E (2 storeys) shall provide for 11 no. apartment units (8 no. 2 beds and 3 no. 3 beds) in the former St Joseph's House building all with associated balcony/terrace/private garden areas. The development shall also consist of the amalgamation of 3 no. existing access points along Leopardstown Road (R113) to provide for 1 no. vehicular and pedestrian access point. The existing access point from Brewery Road (N31) to St Joseph's House via Silverpines will be maintained and the existing access serving the Anne Sullivan Centre for the Deaf Blind will be maintained with minor revisions to the point of access. Permission is also sought for 166 no. car parking spaces (139 no. at basement level, 27 no. at surface level), 200 no. bicycle parking spaces, bike stores (at basement and surface level), bin storage areas (at basement and surface level), plant areas, c.5,960 sqm of public open space (including new tree walk, courtyard spaces and new play area), new boundary treatment, green roofs associated with Blocks A-C, provision for pedestrian connections to the adjoining park, site services and all associated site development service connections and landscape works. A protected structure.

CONTRIBUTION

S.48 Surface Water €26,271.65 ✓
S.48 Roads €601,635.08 ✓
S.48 Community & Parks €390,535.37 ✓
S.48 Special Contributations ✓
S.49 Luas Line B1 €580,427.10
S.49 Glenamuck/Kilternan Scheme

SECURITY
BOND/CIF: €486,100.00 ✓
CASH: €296,100.00 ✓
REE BOND: €100,000.00 ✓

Location: Site of c.1.65 ha at Annaghkeen & Dalwhinnie, Leopardstown Road (R113), Dublin 18 & St Joseph's House for the Adult Deaf & Deaf Blind (a Protected Structure) & adjoining lands including Marian Villa, Brewery Road N31), Stillorgan, Co Dublin.
Applicant: Neil Collins, Homeland Silverpines Limited
App. Type: Permission
Level of Decision: Director of Planning

Report: Marguerite Cahill

Signed: _____ **Case Planner** **Dated:** 24/8/17

No. P/2044/17

Dún Laoghaire-Rathdown County Council

LOCAL GOVERNMENT ACTS 1925 - 2014

RECORD OF EXECUTIVE BUSINESS CHIEF EXECUTIVE'S ORDERS

Permission is sought for a 7-year permission for the following works:

- Demolition of 3 no. existing residential dwellings known as 'Annaghkeen', Dalwhinnie' and 'Marian Villa' and associated outbuildings (combined demolition c.662.2sqm GFA)
- Material change of use of St Joseph's House from residential care facility to residential use ;
- An overall development of 139 no. residential units (133 no. apartments and 6 no. houses) all in a scheme of 2-5 storeys partly over dual access basement level.
- The proposal shall provide for a new residential scheme (Blocks A-E) including:
    - The construction of Blocks A-C (3-5 storeys) over dual access basement level (c. 4,311sqm) comprising 122 no. apartment units.
    - The Construction of 6 no. townhouses in the form of Block D.
    - Block E : The refurbishment and separation of St Joseph's House (2 storeys) into 11 no. residential units which shall include:
        - Demolition of a single storey extension and associated outbuildings (demolition total c.172.82sqm GFA),
        - the removal of external gates,
        - modifications to elevations including new windows, doors and glazed balcony,
        - new external steps and ramps,
        - modifications to internal layout including the removal of walls and partitions and
        - the addition of new dividing walls and part new roof.
    - Block A (5 storeys) shall provide for 53 no. apartment units
        - (13 no. 1 beds, 37 no. 2 beds and 3 no. 3 beds);
    - Block B (5 storeys) shall provide for 58 no. apartment units
        - (7 no. 1 beds, 49 no. 2 beds and 2 no. 3 beds);
    - Block C (3 storeys) shall provide for 11 no. apartment units
        - (7 no. 1 beds, 3 no. 2 beds and 1 no. 3 beds);
    - Block D (2-3 storeys) shall provide for 6 no. townhouses (5 no. 3 bed terrace houses - Type T1 and 1 no. 4 bed detached house - Type T2)
    - Block E (2 storeys) shall provide for 11 no. apartment units (8 no. 2 beds and 3 no. 3 beds) in the former St Joseph's House building all with associated balcony/terrace/private garden areas.

Dún Laoghaire-Rathdown County Council

LOCAL GOVERNMENT ACTS 1925 - 2014

RECORD OF EXECUTIVE BUSINESS CHIEF EXECUTIVE'S ORDERS

- The development shall also consist of the amalgamation of 3 no. existing access points along Leopardstown Road (R113) to provide for 1 no. vehicular and pedestrian access point.
- The existing access point from Brewery Road (N31) to St Joseph's House via Silverpines will be maintained and the existing access serving the Anne Sullivan Centre for the Deaf Blind will be maintained with minor revisions to the point of access.
- Permission is also sought for 166 no. car parking spaces (139 no. at basement level, 27 no. at surface level), 200 no. bicycle parking spaces, bike stores (ate basement and surface level), bin storage areas (at basement and surface level), plant areas,
- c. 5,960sqm of public open space (including new tree walk, courtyard spaces and new play area), new boundary treatment, green roofs associated with Blocks A-C, provision for pedestrian connections to the adjoining park, site services and all associated site development service connections and landscape works.

The development is proposed to be constructed in two phases with Blocks A-D (including dual access to basement) and vehicular access from Leopardstown Road forming Phase 1 (128 residential units) and Phase 2 including St Joseph's House (Block E – 11 no. units) and provision for second access to basement to become operational post February, 2021.

Detail of materials comprise of a county manor brick, Tegral panels and zinc cladding.

Zoning of Site
In the 2016-2022 Dun Laoghaire Rathdown County Development Plan, the site is zoned Objective 'A' with a stated objective: "To protect and/or improve residential amenity".

There is a Protected Structure on the site Saint Joseph's House - included on the Record of Protected Structures (RPS No. 1548).

There is an objective on the site "To protect and preserve Trees and Woodlands"

The site is adjoined to the north by an open space area comprising of a football pitch which is zoned Objective F "To preserve and provide for open space with ancillary active recreational amenities"

The R113 is identified on Map T2 and Table 2.2.3 of the County Development Plan, 2016-2022, as a proposed bus priority scheme.

The site falls within an area subject to a Section 49 Supplementary Development Contribution Scheme for Luas Line B1.

Site Notice
The site was inspected on the 25th April, 2017 and the site notices were considered to be in place and acceptable.

Dún Laoghaire-Rathdown County Council

LOCAL GOVERNMENT ACTS 1925 - 2014

RECORD OF EXECUTIVE BUSINESS CHIEF EXECUTIVE'S ORDERS

Site Location and Description
The site is strategically located between the M50 motorway and N11 Dual Carriageway. The site is bounded by 2 no. access roads, the N31 Brewery Road signalised junction via Silver Pines to the north and the R113 Leopardstown Road to the south which connect the N11 and M50.

The R113 Leopardstown Road/N31 Brewery Road junction is in close proximity to the proposed development. This junction was recently upgraded from roundabout to full signalised intersection and incorporates cycle paths and pedestrian crossing facilities. The subject site is located to the east of the Luas Green line running from Cherrywood to the city centre.

The overall site area totals 1.65ha and is broadly rectangular.

The majority of the site is currently occupied by St. Josephs House for Adult Deaf and Deaf-blind and its grounds with a mature parkland setting. Though supporting a substantial number of trees, the site also supports several open lawns with many of the site trees being positioned in belts adjoining either the site perimeter of the garden boundaries. The tree population is dominated by Austrian Pine. The R113 Leopardstown Road to the south serves Annaghkeen and Dalwhinnie house and a gated laneway access.

The site is bounded to the west by Silverpines residential development and south west by The Chase, to the north by Leopardstown Park and to the east by a detached single storey dwelling house, "The Crossing" and to the south west by a detached two storey house, Alhambra

Dún Laoghaire-Rathdown County Council

LOCAL GOVERNMENT ACTS 1925 - 2014

RECORD OF EXECUTIVE BUSINESS CHIEF EXECUTIVE'S ORDERS

There is an existing greenway adjoining the subject site to the immediate northeast which facilitates pedestrian access and provides a link to the Sandyford Luas stop (see photo below).

Background Information
St Joseph's House is currently in use as a residential care facility for the Adult Deaf and Deaf-Blind. A letter was summited from the Catholic Institute for Deaf people who occupy the house and operate under the name St Joseph's House for Adult Deaf and Deaf Blind at present. The institute is currently leasing the premises from Home land Silverpines Ltd for a period of five years which commence in February 2016 and will expire in February 2021. St Josephs is currently a home to residents and care support is provided for residents. St Joseph's operates a 24 hours a day.

Recent Planning History:

D98A/0349: Refusal for the provision of a new entrance off Leopardstown Road to serve the existing house and for the erection of a 2.4 metre high fence to divide the property internally at Annaghkeen, Leopardstown Road, Foxrock, Dublin 18. Reason for refusal is as follows:

1. In the absence of information as to the future use of the sub-divided area the proposed sub-division would lead to a site with no obvious use or access which could become an eyesore and therefore would be contrary to the proper planning and development of the area.

2. The provision of an additional access to the Leoapardstown Road would be contrary to good planning as it would tend to reduce the capacity and safety characteristics of the new Leopardstown Road.

Dún Laoghaire-Rathdown County Council

LOCAL GOVERNMENT ACTS 1925 - 2014

RECORD OF EXECUTIVE BUSINESS CHIEF EXECUTIVE'S ORDERS

PC/02/11: Refers to a Part 8 for a proposed pedestrian and cycle way scheme from Brewery Road to Leopardstown Road.

Enforcement
There is no record of any enforcement history to date.

Pre-Planning
PAC/487/16: Refers to three pre-planning meetings held dated 18th October 2016, 17th November, 2016 and 15th February, 2017

Objections
168 letters of objection/submissions were received within the prescribed period of time, which included a letter of observation from An Taisce.

Summary of the Issues Raised:

Scale and Impact on Amenities:

- The proposed development will block light into existing homes;
- Overlooking of neighbouring properties from the proposed balconies on the apartments;
- Scale, height, design and proximity of the proposed apartment to adjoining property will seriously injure the residential amenity and would be visually obtrusive;
- Scale of Blocks B and C will be overbearing and will result in overshadowing and loss of privacy to adjoining properties most notably "The Crossing. Submitted daylight and sunlight analysis is not acceptable. Should request a full shadow assessment to include Sept and Dec;
- Size of development is out of keeping with surrounding area- ;
- Height of adjoining dwelling, "The Crossing" is not indicated on contiguous elevation drawings;
- Proximity of Block B and C is inappropriate and out of context with dormer bungalow "The Crossing". Block C is located just 17m from, "The Crossing" and c.28m from Block B- direct overlooking into the property;
- Proposal contravenes the zoning objective of the area "To protect and improve the amenity of residents";
- Skyline disrupted;
- Proposed density is too high- Policy RES3 of the County Development Plan advises that higher densities may not be encouraged where there is infrastructural shortcomings- existing traffic congestion is at several levels;
- Contravenes Policy RES4 : existing housing stock and densification, of the County Development Plan as the density of the proposed development would not be tolerated amid the surrounding low density development;
- Overlooking of property Alhambra- (adjoining property to the south west) from House 2 and proposed dwellings to the western boundary are located c. 7m from the boundary itself- deficient in Development Plan Standards;

- Proposal includes a terrace of five houses and a sixth detached running along the full length of the north west boundary of the site which adjoins a residential property, Alhambra- densely developed footprint, close proximity to adjoining boundary (7 metres), proposed terraces at first floor level unacceptable, configuration of these house are more in keeping with an inner urban site at this location and would have a seriously detrimental impact on the amenity of the adjoining house;
- Proposed three storey house to the front of the site is less than 6 metres from the adjoining boundary and will have an overbearing impact on the adjoining property;
- Ratio of dual apartments do not comply with the Department Guidelines which require that 50% of apartments to be dual aspect.;
- Site sections do not give a fair assessment of the proximity and scale of the proposed houses along the north western boundary.

Height:

- The maximum height allowance outlined in the 2016-2022 County Development Plan is three storey which makes it in direct contradiction of the County Development Plan;
- Noncompliance with Building Height Strategy;
- There are primarily 2 storey semi-detached houses in the area - A five storey development is out of character for this area.

Transport /Traffic:

- Leopardstown Road and Brewery Road are currently operating beyond capacity and no further intensification of use on these roads can be facilitated.
- Alternative Access 1 would be more appropriate vehicular access strategy- Traffic only from St Josephs.
- Proposal should be revised and all access should be from Leopardstown Road;
- Transport Infrastructure Ireland should be contacted in relation to potential knock on effect of the extra traffic on the local regional road;
- There is currently no right turn onto Brewery Road;
- Traffic assessment done by ILPT- little consideration given to the Silver Pines Access to the site and the impact this would have. Report lacks a logical and unbiased approach; Assessment appeared to focus solely on Leopardstown Road with passing commentary given to impacts to Silver Pines/The chase, Woodford and Brewery Road residents;
- The Traffic Impact assessment refers to Leopardstown Road as having a QBC- bus service is infrequent with no corridor on the road dedicated to it,
- Traffic will increase significantly when the new Microsoft Head office (capacity 1500 people), the new Iinternational school and the new front office block all come on stream;
- Access into the development through Brewery Road, Silverpines or Leopardstown Road and Leopardstown Park will be further exacerbated;
- Silver Pines is a narrow road;
- Safety of children playing;

- Already limited access for ambulances on silver pines as cars parked on the road don't leave much space,
- Proposed entrance off Leopardstown Road would endanger public safety by reason of a traffic hazard and would have a seriously adverse impact on the safety and free flow of traffic on Leopardstown Road,
- Presuming that there will be no right turn onto Leopardstown Road it will push the volume of traffic through Silver Pines estate,
- The scope of the road safety audit does not include the existing access arrangements via Silver Pines and should be extended to do so;
- Construction traffic to enter Leopardstown Road only- Construction Management Plan should be made available.
- Traffic problems on both Leopardstown Road and Brewery Road, Current conditions are already overburdened and residents cannot access their homes;
- Previous refusal Ref. No. D98A/0349 at Annagkeen, Leopardstown Road.
- There is no room for a cycle path in Silver pines; Proposed shared pedestrian/cycleway would constitute a safety hazard;
- Existing problems at the entrance to Tudor Lawns.

Parking Provision:

- The proposed number of parking spaces of 116 parking spaces for 139 units is not realistic; already a problem with residents parking in the area;
- Proposal includes a pedestrian access ono the greenway lane with direct access to Leopardstown Park and Leopardstown Court street parking which is where the overspill for parking spaces can be and would be witnessed. This overspill will also affect Silver Pines, Leopardstown Lawn and Leopardstown Avenue;
- Lack of adequate visitor parking.

Protected Structure:

- Proposed development constitutes a risk of adverse impact on a Protected Structure (RPS No 1548);
- Interventions proposed to St. Josephs are excessive having regard to the removal of external walls. Stairs and roof in particular;
- Phasing of development- there is no guarantee that works to the protected structure will be carried out by the applicant. Duration of permission the applicant requested- 7 years is excessive.

Drainage:

- Infrastructure currently in place (water sewerage roads) will not support the extra residents;
- Water shortage in the area due to the existing facilities in Stillorgan not being capable of supplying existing residents;
- Surface water from new development- where is it discharged to? We have regular flooding on Leopardstown Avenue near Leopardstown Inn.

Dún Laoghaire-Rathdown County Council

LOCAL GOVERNMENT ACTS 1925 - 2014

RECORD OF EXECUTIVE BUSINESS CHIEF EXECUTIVE'S ORDERS

Landscape and Open Space:

- Loss of trees, Objective on the Development Plan "to protect and preserve trees and woodlands";
- Wildlife affected;
- Public open space is inadequate;
- Proposed boundary treatment is inadequate- existing block wall with proposed intermittent tree planting is inadequate. A more robust treatment is required at this location given the proposed location of the public open space and tree walk adjoining the property "The Crossing";
- Current boundary wall of the greenway is not substantial for the increase in traffic on this lane.

Miscellaneous:

- Non-compliance with Sustainable Residential Development in Urban Areas Guidelines, 2009 and Urban Design Manual 2009;
- Structural Impact of excavation on adjoining properties due to the excavation works for proposed basement parking;
- Noise pollution during construction;
- Light pollution from apartments;
- Greenway security issues;
- Lack of amenities in the area- nearest playground is 15-20 mins walk, a small football pitch close by;
- Error in address given for Marion Villa;
- Devaluation of properties;
- There are unfinished residential apartments in Sandyford that should be finished first;
- Red line of the application site goes to the edge of the R113 and includes grassland and is owned and maintained by DLRCC;
- Application site and public notices say that a total of 139 units are proposed, the drawings lodged appear to show 141 units with 60 units proposed in Block B .

The above concerns have been taken into account in the assessment of this planning application.

A letter of observation was received from An Taisce dated 8th May, 2017. The letter states that "We feel it is important that the proposed work on the protected structure should at all times be under the supervisions of a conservation architect. The retention of the trees in much of the boundary area is to be welcomed.

Reports

Transportation Planning:	Report received dated 25th May, 2017. No objections are raised, subject to conditions.

No P / 2044 / 17

Dún Laoghaire-Rathdown County Council

LOCAL GOVERNMENT ACTS 1925 - 2014

RECORD OF EXECUTIVE BUSINESS CHIEF EXECUTIVE'S ORDERS

Municipal Services:	Report received dated 25th May 2017. Further information requested.
Parks & Landscape Services:	Report received dated 24th May 2017. No objections are raised, subject to conditions.
Conservation Officer:	Report received dated 11/05/2017. No objections are raised, subject to conditions.
Biodiversity Officer:	Report received dated 24th May 2017. No objections are raised, subject to conditions.
Irish Water:	Report received dated 24th May 2017. No objections, subject to conditions.
Housing Department:	Report received 3rd May 2017. No objection, subject to conditions.
Department of Arts Heritage, Regional, Rural and Gaeltacht Affairs:	A report was received dated 22nd May 2017. The following conditions are recommended to be attached should permission be granted:

1. The mitigation measures in relation to bats set out in the Ecological Impact Assessment by Scott Cawley submitted in support of the current application should be followed; bat activity surveys consisting of dusk emergence and dawn re-entry surveys of the existing tees and building identified as having potential features suitable as bat roosts should be carried out in the May-August Period, if a bat roost is identified then a derogation licence should be applied for to NPWS it is intended to remove or otherwise interfere with it.
   Reason: To prevent any injury occurring to bats or their breeding or resting places which are afforded protection under the Habitats Directive, 1992.

2. Clearance of vegetation including trees from the development site should only take place outside the period from the 1st March to the 31st August in any year.
   Reason: To prevent the destruction of the nests, eggs and young of any bird which may breed in the numerous trees and shrubs suitable for nesting present on this site.

No reports received from The Heritage Council, Failte Eireann, An Chomhairle Ealaion, National Transport Authority, OPW, Building Control, Transport Infrastructure Ireland.

PLANNING CONTEXT

Dún Laoghaire-Rathdown County Council

LOCAL GOVERNMENT ACTS 1925 - 2014

RECORD OF EXECUTIVE BUSINESS CHIEF EXECUTIVE'S ORDERS

Guidelines for Planning Authorities on Sustainable Residential Development in Urban Areas and accompanying Urban Design Manual (DoEHLG May 2009).

Sustainable Urban Housing: Design Standards for New Apartments Guidelines for Planning Authorities (Department of Environment, Community and Local Government December 2015).

Relevant Dun Laoghaire Rathdown County Development Plan, 2016–2022, policies:

a.	Policy RES3:	Residential Density
b.	Policy RES4:	Existing Housing Stock and Densification
c.	Policy RES7:	Overall Housing Mix
d.	Policy AR1:	Record of Protected Structures
e.	Policy AR2:	Protected Structures Applications and Documentation
f.	Section 8.2.11.2	Architectural Heritage – Protected Structures
g.	Section 4.1.1.2	Appropriate Assessment
h.	Policy OSR5:	Public Open Space Standards
i.	Policy OSR14:	Play Facilities
j.	Policy CC7:	Energy Performance in New Buildings
k.	Policy CC9:	Sustainability in Adaptable Design
l.	Policy UD1:	Urban Design Principles
m.	Policy UD2:	Design Statements
n.	Policy UD3:	Public Realm Design
o.	Section 8.2.3.1	Quality Residential Design
p.	Section 8.2.3.2	Quantitative Standards
q.	Section 8.2.3.3	Apartment Development
r.	Section 8.2.3.5	Residential Development – General Requirements
s.	Section 8.2.4.5	Car parking Standards
t.	Section 8.2.4.12	Electrically Operated Vehicles
u.	Section 8.2.8.1	Landscape Plans
v.	Section 8.2.8.2	Public/Communal Open Space Quantity
w.	Section 8.2.8.3	Public/ Communal Open Space Quality
x.	Section 8.2.8.4	Private Open Space – Quantity
y.	Section 8.2.8.5	Apartment – Play Facilities
z.	Section 8.2.8.6	Trees and Hedgerows
aa.	Appendix 9:	Building Height Strategy

PLANNING ASSESSMENT
The proposed development is assessed under the following headings:

- Principle of the Development
- Density
- Residential Mix
- Quality of the Residential Units
- Height, Scale and Design

- Impact on Architectural Heritage
- Impact on adjoining residential amenities
- Public Open Space and Landscaping
- Trees
- Proposed vehicular access arrangement
- Parking
- Childcare facilities
- Drainage
- Part V
- Appropriate Assessment

The following documents have been submitted with the planning application:

- Planning Report;
- Design Statement;
- Architectural Heritage Impact Assessment;
- Appropriate Assessment Screening;
- Arboricultural Report;
- Stage 1 Road Safety Audit;
- Daylight and Sunlight Assessment;
- Waste Management Plan;
- Civil Engineering Infrastructure Report and Flood risk Assessment Sustainability and Energy Statement.

Principle of the Development:

Section 1.2.2.2 of the County Development Plan states 'the RPGs recommend in relation to Dun Laoghaire-Rathdown that, as a mostly Metropolitan County, housing delivery should focus on strengthening the urban form of the County through building up major town and district centres at public transport nodes, continuing sensitive infill to counteract falling population and declining services...'.

The subject site, zoned for residential development, is an infill site located close to two Luas Stops. The proposed development comprises 139 residential units including 133 apartments and 6 dwelling houses.

The site forms part of the lands associated with St Josephs, a Protected Structure, and therefore requires a high quality and sensitive design response.

Having regard to the site's zoning, the site's accessibility in terms of road infrastructure and public transport it is considered that the principle of a residential development is acceptable on the site.

Demolition:

No. P/2044/17

Dún Laoghaire-Rathdown County Council

LOCAL GOVERNMENT ACTS 1925 - 2014

RECORD OF EXECUTIVE BUSINESS CHIEF EXECUTIVE'S ORDERS

Permission is sought to demolish 3 no. existing residential dwellings known as 'Annaghkeen', Dalwhinnie' and 'Marian Villa' and associated outbuildings (combined demolition c.662.2sqm GFA – see photos below)

A report from the Conservation Officer dated 11th May 2017 raises no objections to the proposed demolition of existing structures on the site and later additions to the Protected Structure as they, "do not pose any built heritage concerns"

Dún Laoghaire-Rathdown County Council

LOCAL GOVERNMENT ACTS 1925 - 2014

RECORD OF EXECUTIVE BUSINESS CHIEF EXECUTIVE'S ORDERS

Density:

The proposed development includes the development of 139 units on a site with an area of c. 1.65 hectares. This represents a density equivalent of 84 units per hectare.

Section 2.1.3.3 of the County Development Plan 2016-2022 states 'where a site is located within circa 1 kilometre pedestrian catchment of a rail station, Luas line, BRT, Priority 1 Quality Bus Corridor and/or 500 metres of a Bus Priority Route, and/or 1 kilometre of a Town or District Centre, higher densities at a minimum of 50 units per hectare will be encouraged'. The site is located within 1 km of a Luas Line (Sandyford and Central Park stops are circa 600-620m away).

The third party submissions received raise concern with regard to the density proposed and consider it excessive having regard to the site's location and context. However, it is considered that the density proposed is not excessive in principle having regard to the size of the site, its proximity to the Luas and a neighbourhood centre (Leopardstown Inn)

Section 2.1.3.3 of the County Development Plan states, 'consolidation through sustainable higher densities allows for a more compact urban form that more readily supports an integrated public transport system'. It is further stated that 'widespread endorsement of lower density standards would undermine the very development imperatives that are required to provide and support high capacity public transport modes and the promotion of sustainable residential communities'.

The proposed density is therefore in accordance with development plan policy and the proper planning and sustainable development of the area.

Residential Mix:

Dún Laoghaire-Rathdown County Council

LOCAL GOVERNMENT ACTS 1925 - 2014

RECORD OF EXECUTIVE BUSINESS CHIEF EXECUTIVE'S ORDERS

Section 8.2.3.3 of the County Development Plan requires that larger apartment schemes over 30 units should provide no more than 20% one-bed units and a minimum of 20% of units over 80 square metres.

The proposed residential mix for the overall development is as follows:

Type of Unit	No. of Units (%)
One-bedroom	27 (20.3%)
Two-bedroom	98 (73.7%)
Three-bedroom plus	8 (6%)

It is considered that the proposed residential mix is acceptable

Quality of the Residential Units:

The quality of the residential environment for the future occupants is paramount in the assessment of developments. The standard of amenity is assessed on a number of factors including the size of the proposed units, the amount of natural light that will be able to reach the units and the availability of public and private open space. Section 8.2.3.1 of the County Development Plan states 'a core aim of land-use planning is to ensure that new residential developments offer a high quality living environment for residents, both in terms of the standard individual dwelling units and in terms of the overall layout and appearance of schemes'.

The Sustainable Urban Housing – Design Standards for New Apartments (DoECLG 2015) set out a range of specific planning policy requirements that must be adhered to. The relevant policy requirements are identified in the following table:

Section	Specific Planning Policy Requirement
3.1	Minimum Floor Area: 1 bedroom unit – 45 square metres 2 bedroom unit – 73 square metres 3 bedroom unit – 90 square metres
3.11	Dual Aspect Apartments Minimum number shall be 50%
3.14	Floor to Ceiling Height Ground Floor – 2.7 metres
3.18	Individual Stair / Lift Core – up to 8 apartments per floor
3.23	Basement level storage may be used to satisfy up to half the minimum storage requirement for individual apartment but shall not serve to reduce the minimum floor area
5.1	A schedule that details the number and type of apartments,

Dún Laoghaire-Rathdown County Council

LOCAL GOVERNMENT ACTS 1925 - 2014

RECORD OF EXECUTIVE BUSINESS CHIEF EXECUTIVE'S ORDERS

	associated individual unit floor areas, the private amenity space, storage space, the aspect and possibly orientation (if single aspect) of each apartment,
Appendix	Storage 1 bedroom unit – 3 square metres 2 bedroom unit – 6 square metres 3 bedroom unit – 9 square metres Private Amenity Space 1 bedroom unit – 5 square metres 2 bedroom unit – 7 square metres 3 bedroom unit – 9 square metres (Balcony Depth – 1.5 metres)

The minimum standards for apartments set out in the Sustainable Urban Housing – Design Standards for New Apartments (DoECLG 2015) supersede the standards set out in Section 8.2.3.3 of the County Development Plan, 2016-2022.

51% of the units are over the 10% extra floor requirement and are therefore considered acceptable.

Storage facilities are provided for within each of the apartments and within the dwelling houses. A schedule of storage areas has been provided. With regard to storage within apartment, the Guideline state as a rule no individual storage room within an apartment shall exceed 3.5 square metres. It is noted that a number of the storage units exceed 3.5m and are therefore unacceptable. The applicant should be requested to clarify.

It is a specific planning policy requirement of the Design Standards for New Apartments (DoECLG 2015) that the minimum number of dual aspect apartments that may be provided in any single apartment scheme shall be 50% in urban locations. The guidelines states that, "In certain circumstance, usually on inner urban sites, near to city or town centres, including SDZ areas, where it is necessary to ensure good street frontage and subject to high quality design, this may be further reduced to an absolute minimum of 33%"

The submitted design statement submitted from OMP appears to be incorrect as it calculates that of the 133 apartments units proposed 66 are dual aspect. It is considered that of the 133 apartments units proposed only 50 are dual aspect (38%). This includes counting the 11 dual aspect units to be provided in the converted Protected Structure. It is considered that the above site is not accepted as an inner urban site and therefore the number of dual aspect apartments provided should be at a minimum of 50%. In this regard the applicant is requested to submit revised proposal to address this issue.

Dún Laoghaire-Rathdown County Council

LOCAL GOVERNMENT ACTS 1925 - 2014

RECORD OF EXECUTIVE BUSINESS CHIEF EXECUTIVE'S ORDERS

It is a specific planning policy requirement that ground level apartment floor to ceiling heights shall be a minimum of 2.7 metres. The details submitted with the application indicate that all of the proposed apartments will have floor to ceiling heights of 2.7 metres.

Height, Scale, Design:

In determining planning applications for multi-unit residential development the Planning Authority is required to balance the strategic planning need to make the most efficient use of each site with the visual impact of the proposal and its effect on existing amenities, particularly residential amenities. The Guidelines on Sustainable Residential Development in Urban Areas (DEHLG May 2009) state, 'the objective should be the achievement of an efficient use of land appropriate to its context, while avoiding the problems of overdevelopment' (Section 5.1). With regard to infill residential development the Guidelines state 'in residential areas whose character is established by their density or architectural form, a balance has to be struck between the reasonable protection of the amenities and privacy of adjoining dwellings, the protection of established character and the need to provide residential infill'.

The subject landholding is triangular in shape. The proposed development comprises two five-storey apartment blocks (Block A and B) and one 3 storey block (Block C) and 6 townhouses (Block D - 2/3 storey).

The layout has been influenced by the mature trees on site and the proximity to the Protected Structure.

The Building Height Strategy for the County (Appendix 9 to the County Development Plan 2016-2022) recommends a general height of two-storeys for residual suburban areas. An additional floor of occupied roofspace above this height may also be acceptable in certain circumstances. Heights of 3-4 storeys may be permitted in appropriate locations for example on large redevelopment sites providing they have no detrimental effect on existing character and residential amenity. Upward and downward modifiers are set out. A development proposal would have to meet more than one upward modifier to justify additional height. The subject site meets two upward modifiers including its ability to contribute to higher densities in an area with exceptional public transport accessibility and the size of the site exceeds 0.5ha and therefore can set its own context for development. Section 4.8.2 of the Height Strategy also details where downward modifiers would apply and lists "where a proposed development would adversely affect the setting of a Protected Structure" and/or where a proposed development would adversely affect "residential living conditions through overlooking overshadowing or excessive bulk and scale"

With regard to height on infill sites, the Building Height Strategy states 'any consideration should focus whether such an alteration to the prevailing character is desirable and/or can be satisfactorily, 'absorbed' into the local context'. Section 5 states, 'increased densities and heights should not detract from residents living conditions, should avoid significant loss of privacy and light, and the scale and bulk of new development should have regard to its setting'.

Dún Laoghaire-Rathdown County Council

LOCAL GOVERNMENT ACTS 1925 - 2014

RECORD OF EXECUTIVE BUSINESS CHIEF EXECUTIVE'S ORDERS

It is considered that the site has the capacity to absorb the proposed development without unduly detracting from the character of the area or impacting on the residential amenity of the neighbouring properties. The heights proposed are considered acceptable. There are generous separation distances between the proposed development and neighbouring properties. Separation distances between Apartment Block B and Leopardstown Lawn exceed 40 metres.

The main area of concern relates to the height of Block A and its impact on the setting and amenity of the Protected Structure. It is considered that the height of Block A is excessive and should be reduced. This is discussed further in the section below.

Concern is also raised to the massing of Block B particularly from the side elevations (south west and northwest). It is noted that at fourth floor level it is set in from the sides by 0.45m. In the interest of minimising the visual impact of Block B it is considered that the proposal would benefit from a further set back of the fourth floor on either side thereby reducing the length of Block B at fourth floor level from 55.95 to 54.4m in order to provide a 2.0m setback on either side. The applicant should be afforded the opportunity to address this issue by way of further information. Impacts on the residential amenity will be considered further below.

It is also worth noting that the submitted third floor plan of Block B is incorrect as it includes two additional units (Units 60 and 61) which does not correspond with the submitted elevation drawings for Block B and the submitted housing quality assessment which indicates 13 units. The applicant is requested to clarify and submit revised drawings were appropriate.

It is worth noting that many of the trees are of significant height above the ground ranging from 19m to 27m in height which will provide a high landscape value to the overall development as well as significant 'green screening' around the perimeter of the site

Impact on Architectural Heritage:

In terms of works to the protected Structure, which involves the provision of 11 residential units, the report received from the Conservation Officer dated 11th May, 2017 states the following:

> "the Conservation Division are satisfied with the manner of the proposed sub-division of the building however while having an impact on the Protected Structure and its original layout/plan form, the proposed works will allow the building to remain in a suitable use. The majority of the works will not result in the loss of significant architectural detailing and fabric of interest. Externally, there are some changes mostly relating to the switching of door/window opes and the creation/blocking up of others. On balance, the treatment of the openings subject to change will not impact the composition and rhythm of the building, and the modification is reversible. It is acknowledged that the nature of the conversion of the building into multiple units will effectively result in some material

change, however taking account of the fact the building will remain in use together with a number of enhancements such as the tidying of the external pipework and repair of the fabric of the building, it is deemed a reasonable compromise".

In terms of addressing the further development within the site, the Conservation Officer makes the following assessment:

"It is proposed to construct 133 no. apartments and 6 no. houses within the site. The Conservation Division are not opposed to development within the site should the setting, amenity and contextual legibility of the Protected Structure remain unharmed by same. In this instance, it is our opinion that a sufficient setting and landscaping has been afforded to the Protected Structure. There is also an acceptable separation distance between St Joseph's House and Block A, and the space between the two is proposed to be landscaped providing an appropriate screening and softening of the development when viewed within the context of the site. However, in the interests of minimising visual impact on the setting and amenity of the Protected Structure, and allowing the building to retain a greater dominance within the context of the site, we would suggest that Block A would benefit from a reduction in height in an effort to mitigate any potential over-bearing/over-powering impact.

Overall, we are favourable to the nature of the residential development proposed and the integration of the Protected Structure within same".

Having regard to the report from the Conservation Officer and Section 4.8.2 of the Height Strategy, which details where downward modifiers would apply and lists, "where a proposed development would adversely affect the setting of a Protected Structure" it is considered appropriate that further information be requested to allow the application to consider the omission of a floor from Block A in order to reduce its visual impact.

The Conservation Officer states that in the event of a grant of permission it should be made a condition that the Works to the Protected Structure be carried out in tandem with the development i.e. not commenced after the new build element of the development to secure the long term future of the building. Having regard to the current leasing arrangement, it is considered that in the event of a grant of permission a condition is recommended to be attached that the works to the Protected Structure be carried out in tandem with the development and completed prior to the occupation of the new apartments.

Impact on Adjoining Residential Amenities:

Block D, which comprises of 5 terraced houses and an end, detached townhouse are 2-3 story dwelling houses and shall provide for 5 no. 3-bed terrace houses and 1 no. 4-bed detached house.

With regard to private open space Section 8.2.8.4 of the Dun Laoghaire-Rathdown County Development Plan, 2016-2022, requires one and two bedroom dwelling houses to have a

minimum 48 square metres, three bedrooms require a minimum 60 square metres and four bedroom (or more) houses to have 75 square metres to the rear of the front building line. The County Development Plan states 'a minimum standard of 22 metres separation between directly opposing rear first floor windows should usually be observed, normally resulting in a minimum rear garden depth of 11 metres'.

The size of the rear gardens serving the 6 townhouses (Block D) inclusive are 72-154 square metres.

The garden depths range from 5 metres - 8 metres are considered to be inadequate taking into account the orientation and the height of the proposed dwelling houses. All of the rear garden depths are considered to be particularly shallow with three of the houses backing onto the side garden of the adjoining property, "Alhambra".

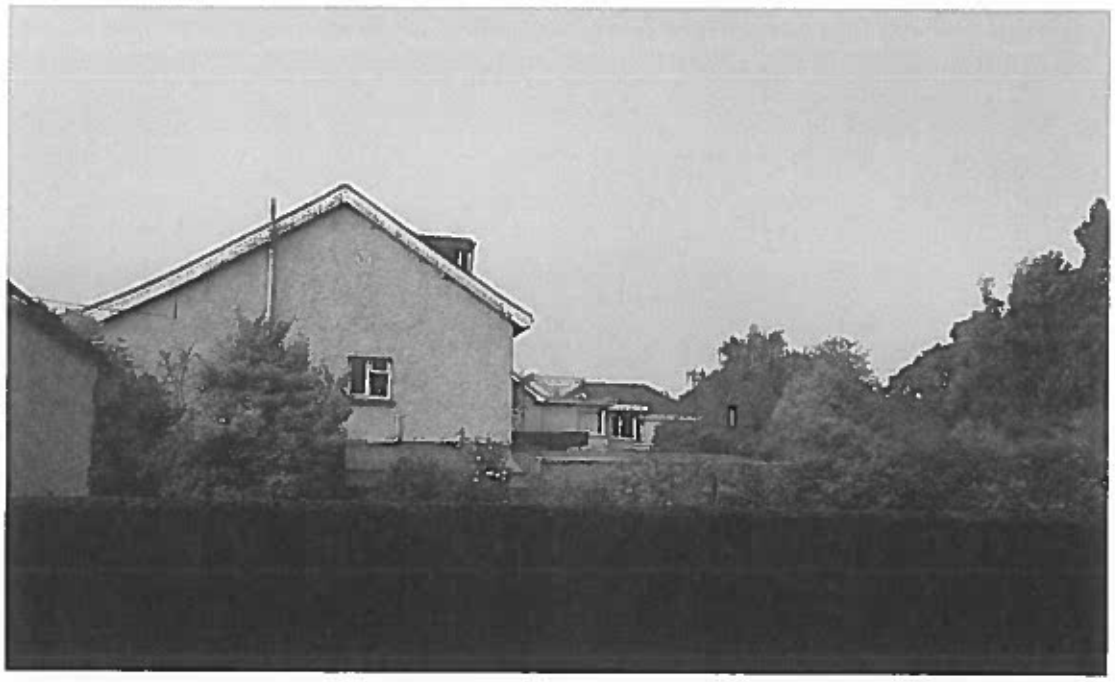
Serious concerns are raised to the location, scale and height of the proposed houses (Block D) and the impact the proposed houses would have on the residential amenity of the adjoining property, "Alhambra". The applicant has summited photomontage views prepared by Modelworks and specifically views 3 and 9 which indicate the proposed Block D on the adjoining property, "Alhambra". It is also noted that there are no rear windows from the townhouses at first floor level. A first floor terrace garden with 2.1m high lattice screen to the rear is also proposed. However having regard to the massing of the townhouse units it is considered that there would be a significant overbearing impact on the adjoining residence "Alhambra" (photo below). It is considered that the applicant should be given the opportunity to revise this area of the site and submit a revised design to incorporate two houses and surface parking provided to the rear. Further information should be requested in this regard.

In terms of addressing the adjoining property, "The Crossing" located to the east of the site, regard is had to the height, design and scale of Block C and its distance to boundaries and it is considered that Block C would not significantly impact the adjoining residential amenity of "The Crossing". Regard is also had to the location and height of Block B and its distances to adjoining boundaries and it is considered acceptable.

Dún Laoghaire-Rathdown County Council

LOCAL GOVERNMENT ACTS 1925 - 2014

RECORD OF EXECUTIVE BUSINESS CHIEF EXECUTIVE'S ORDERS



Public Open Space and Landscaping:

The Guidelines on Sustainable Residential Development in Urban Areas note that public open space can have a positive impact on physical and mental well-being and is one of the key elements in defining the quality of the residential environment. In addition to the functional requirements of open space it also adds to the character and visual appeal of a development.

Section 8.2.8.2 of the County Development Plan requires 15sqm – 20sqm of open space per person based on the number of residential/housing units. Based on a potential population of 236.5, this would equate to between 3547-4730 square metres public open space.

A report from Park's and Landscape Services dated 24th May 2017 comments on the quantity of open space in their report and states the following:-

> "I have reviewed the provision of public open space and calculate the actual quantity of useable public open space at 1,500sqm which consist of the central courtyard space. The remaining open space is considered to be incidental as it is retained as a general buffer to the proposed development only. I calculate the required quantity of public open space as outlined in the CDP 2016-2022 at 3,548sqm"

Dún Laoghaire-Rathdown County Council

LOCAL GOVERNMENT ACTS 1925 - 2014

RECORD OF EXECUTIVE BUSINESS CHIEF EXECUTIVE'S ORDERS

The Design Statement submitted indicates that 5,960 square metres public open space will be provided in the form of two central garden areas (1815sqm) and the perimeter woodland area (4145sqm).

It is considered that the site currently benefits from a mature parkland setting. The proposed open space provision is acceptable and the area of open space located between the Protected Structure and Block A and the proposed woodland area located to the north west of the site is not considered to be incidental and unusable. The retention of the trees is the preferred solution. It is also worth noting that the site is located alongside a football pitch. The applicant has made a good attempt to design around the existing mature trees and the layout has been informed by the tree survey findings and it is therefore considered that a contribution in lieu of public open space is not justified in this instance.

The Design Standards for New Apartments (DoECLG 2015) state that children's play needs around the apartment building should be catered for within small play spaces (about 85 – 100 square metres) for the specific needs of toddlers and children up to the age of six, with suitable play equipment, seating for parents / guardians and within sight of the apartment building in a scheme of 25 units or more. A play area is identified within the central area of open space but further information is requested for further details.

In terms of landscape proposals, a report from Parks and Landscape Services Department dated 24th May 2017 states the following:

> "The landscape proposals appear to be well considered throughout. However, it is difficult to assess some of the features at 1/500 scale in particular in the central courtyard space. There are a few minor amendments that I would like to see incorporated in the landscape proposals to improve the overall amenity offered by the proposed development. There is currently a pedestrian route from Silver Pines to the adjacent open space which would provide easy access from the proposed development. Details of proposed boundaries are not provided and therefore it is assumed that all existing boundaries are being retained as is. There is currently a poor quality boundary detail provided along the northern boundary with the open space. This should be upgraded as part of the proposed development."

Further information will therefore requested in this regard.

Trees
There is an objective on the site "To protect and preserve trees and woodlands"
Much of the St. Josephs site is dominated by Austrian Pine particularly to the north, north west and south east. There is a more diverse and substantive tree belt along the sites north eastern boundary with the adjoining public open space.

As part of the proposal, an arboricultural report and tree survey was submitted.

A report from Parks and Landscape Services Department dated 24th May, 2017 states the following in relation to the Trees.

Dún Laoghaire-Rathdown County Council

LOCAL GOVERNMENT ACTS 1925 - 2014

RECORD OF EXECUTIVE BUSINESS CHIEF EXECUTIVE'S ORDERS

1. Trees:

There is a large quantity of good quality mature trees on this site, some of which form significant features in the landscape. As a result, the site has a sylvan character which should be respected. There is also an objective in the CDP 2016-2022 to protect and preserve trees on this site. The applicant has provided a comprehensive tree and hedgerow survey and the arborist has clearly considered the impact of the proposed development. However, there are substantial works within the RPA of many of the trees which is likely to result in further loss unless there is very close supervision by the project arborist. In particular, details of foundations need to be well considered and agreed with the project arborist including the use of sheet piles. The use of a two layer tree protection fencing system should also be put in place during the works. The applicant shall also be made aware of their obligations to constantly assess and survey the trees after construction because of the potential impact and the age/condition of these trees as outlined in the tree and hedgerow survey. Furthermore the access to the underground car park in front of St. Josephs house is leading to the removal of further trees.

The Tree survey accounts for circa 186 trees on the overall site. The Arboricualtural report states that a total of 14 Category U trees, 25 Category B Trees and 39 Category C trees are proposed for removal. There are no Category A Trees proposed for removal and it is noted that there is a total of 116 new trees proposed for planting. It is noted that most trees to be lost are centrally located and to the front of Block A within the site thereby affording only minimal loss of visual amenity to adjoining lands. The open space which is proposed adjoining the northern boundary of the site and to the front of Block A affords the retention of the sylvan character of the site and this is welcomed.

Proposed Vehicular Access Arrangement:

The applicant submitted a Traffic Impact Assessment Report by ILTP Consulting. Section 4 titled 'Proposed Vehicular Access Arrangement' states that the Preferred Vehicular Access Strategy comprises a dual access from both Brewery Road and Leopardstown Road with a double ramp to the proposed basement car park.

Possible alternative options for vehicular access were also presented and include:

- Alternative Access Option 1 : Single Ramp access to basement car park from Leopardstown Road. Access to apartments in redeveloped St Joseph's House only.
- Alternative Access Option 2 : Single ramp access to ~~basement~~ car park from Brewery Road- only traffic proposed via Leopardstown Road would be the 6 no. townhouses

The report from Transportation Department dated 25th May, 2017 states the following:

"This scheme delivery phasing relies on Alternative Access Option 1 with 100% of basement traffic via Leopardstown Road".

Dún Laoghaire-Rathdown County Council

LOCAL GOVERNMENT ACTS 1925 - 2014

RECORD OF EXECUTIVE BUSINESS CHIEF EXECUTIVE'S ORDERS

An alternative Access Option 2 is also presented with 100% of basement traffic via Silverpines/Brewery Road. This Option 2 with majority of residential vehicular traffic via the signalised Brewery Road access is the preferred access/egress arrangement for this development from a traffic and Transportation perspective. The provision with Option 2 of second ramp access for emergency access to Leopardstown Road would be welcomed.

Transportation consider that additional traffic right turning movements generated by the proposed development priority junction on the heavily trafficked Leopardstown Road, which provides an important part of the link road between the N11 and the South County Business Park/Sandyford Industrial Estate may endanger public safety by reason of traffic hazard and may have an adverse impact on the safety and free flow of traffic on Leopardstown Road.

Transportation consider the Preferred Access Strategy arrangement for two access points to the development, via an upgraded access off Leopardstown Road (replacing the two existing residential entrances and the existing St Joseph's pedestrian/cyclist entrance) and via the existing Silverpines Residential Estate off Brewery Road may be acceptable providing left-in left-out only movements are permitted at the Leopardstown Road access and conditional on provision of Ramp A access from first occupation of any units.

The proposed basement car park can be accessed via two separate ramps (A and B) allowing vehicles to enter and egress the underground car park from either Leopardstown Road or Brewery Road. The redeveloped St Joseph's House including service vehicle access would be accessed off Silverpines/Brewery Road as occurs at present. The proposed new houses (Block D) and the service and emergency vehicles for the Blocks A-D would be accessed via Leopardstown Road.

As reflected in figures contained within the Applicant's submitted Traffic Impact Assessment, the traffic flow volumes on Brewery Road are lower than traffic flow volumes on Leopardstown Road. Although Brewery Road is a national road the nature of Leopardstown Road R113, required carrying capacity, speed and volumes of traffic mean an all movement priority junction at the development location on Leopardstown road is not welcome compared to controlled access via existing signalised junction on N31 (Brewery Road) which will not significantly impact traffic on Brewery Road. There are already issues with capacity, right-turning and requests for signals at existing accesses onto Leopardstown Road. Signalisation of the proposed development Leopardstown Road access is not an acceptable or appropriate.

If development is to be permitted Transportation Planning recommend amendment to the proposed development phasing to ensure that ramp access A to the basement car park (via Silverpines) is operational and available for use prior to occupation of any of the proposed Blocks (A-D)."

Transportation recommend refusal if the proposed development is to rely on sole vehicular access to the proposed apartments via Leopardstown Road. Without dual access availability

Dún Laoghaire-Rathdown County Council

LOCAL GOVERNMENT ACTS 1925 - 2014

RECORD OF EXECUTIVE BUSINESS CHIEF EXECUTIVE'S ORDERS

the proposed development would endanger public safety by reason of traffic hazard and obstruction of road users adversely impacting on the safety and free flow of traffic on Leopardstown Road.

If permitted Transportation recommend the following conditions:

1. Ramp access A to the basement car park (via Silverpines) shall be operational and available for use prior to occupation of any of the proposed Blocks (A-D).

It is noted that the report from the Conservation officer dated 11/05/2017 comments on the proposed access arrangements and states:

> "that from a built heritage perspective, accessing the site via the Leopardstown Road has the least impact on the setting of the Protected Structure. Should an alternative access be sought via Brewery Road, it is our opinion that this would be an inferior scheme and have negative repercussions on the setting and curtilage afforded to the Protected Structure".
>
> The report from Parks dated 24th May, 2017 states that, "the access to the underground car park in front of St. Joseph's House is leading to the removal of further trees. We recommend that the current access from Silver Pines to the underground car park be removed in the interests of retaining and protecting existing trees".

It is also worth noting that circa 8 trees are proposed to be removed due to the location of the proposed Ramp A.

On balance and having regard to the above, it is considered that the preferred access option affords a reasonable compromise between competing Transportation, Building Conservation and tree protection issues while delivering a residential development of an appropriate density and in accordance with planning policy. It is therefore considered that the dual access arrangement is the preferred solution along with the condition with regard to the silver pines ramp access A being operation prior to the occupation of prospered Block A-D. The leasing arrangement of the existing Protected Structure (St. Josephs) is noted. This condition would allow the construction of Blocks A-D to go ahead with occupation tied to post 2021.

Parking:

A total of 166 car parking spaces are proposed to service the proposed development comprising 139 basement parking and 27 surface level. A report from Transportation dated 25/05/2017 states:

> The proposed development car parking provision of 166 spaces (139 basement level and 27 surface level) leaves a shortfall of at least 36 car parking spaces based on the current DLR County Development Plan (2016 – 2022) Table 8.2.3 residential car parking standards which include for both residents and visitors. The proposed reduced car

parking provision for the mainly apartment development is not deemed acceptable by the Transportation Planning Section based on the proposed development type and location where car ownership/use is likely to remain a necessity for the majority of future occupiers. This proposed residential development is in a suburban location and not within or near a Major Town Centre. Lack of provision of car parking spaces for car storage and visitors is likely to adversely impact on nearby residential areas already impacted by uncontrolled commuter parking.

Transportation Planning however note the Applicant's reliance on Department of the Environment, Community and Local Government December 2015 Sustainable Urban Housing: Design Standards for New Apartments Guidelines for Planning Authorities of section 4.14. Transportation Planning consider for this residential location that at least one car parking space should be allocated for each apartment unit and a minimum of 10% of car parking spaces designated for visitor parking so as to avoid future visitors parking in the nearby residential areas.

Transportation Planning remain concerned that the off street car parking provision is not adequately provided for within the proposed development (CDP Section 8.2.3.2 (iii)) and recommend that the standard required number of spaces in accordance with CDP Table 8.2.3 should not be reduced for this residential development. Reduction of car parking at destinations is a key measure in influencing travel mode choice for journeys however this is more appropriate for non-residential units. The Applicant states the Mobility Management Plan initiatives will promote greater use of sustainable travel modes. Other than reduced parking provision the applicant has not submitted any specific proposals for discouraging car ownership at origin and supporting lack of car ownership for future residents of the proposed development.

Transportation Planning recommend a minimum of 10% of car parking spaces for Visitor parking. The Applicant has only proposed 4 surface level visitor spaces. 4 no disabled car parking spaces are indicated at surface level on the submitted OMP Site Plan and 3 no disabled car parking spaces are indicated at basement level on OMP Drawing NO. 11099.

Regard is had to the fact that 8 units from Block A (8 units) have been requested to be omitted and the 6 townhouses (Block D) replaced with 2 houses from the proposed development which would reduce the number of units from 139 to 127. It is considered that additional parking could be provided at the location of the 6 townhouses. Further information is requested to address the car parking provision.

In terms of cycle parking and motor cycle provision the report from Transportation Department dated 25/05/2017 states:

"A total of 200 no cycle parking spaces are proposed. The submitted OMP Bin Store/Bike Store drawing No. 5100 showing detail and location of 4 no Bike Stores providing up to 40 covered/sheltered cycle parking spaces at surface level is noted. Recommended cycle stand spacing is 1m centres minimum as opposed to 850mm.!46 no bicycle spaces are indicated in 3 locations serving Blocks A & B on the submitted OMP basement Drawing

Dún Laoghaire-Rathdown County Council

LOCAL GOVERNMENT ACTS 1925 - 2014

RECORD OF EXECUTIVE BUSINESS CHIEF EXECUTIVE'S ORDERS

No motorcycle parking spaces have been indicated. Provision of at least 6 motorcycle parking spaces are recommended in accordance with Section 8.2.4.8 of the current County Development Plan (2016-2022).

This proposed quantity of cycle parking complies with the DLRCC Cycling Policy June 2010 Standards for new developments. Department of the Environment, Community and Local Government December 2015 Sustainable Urban Housing: Design Standards for New Apartments Guidelines for Planning Authorities Section 4.18 recommends increased provision in line with National Cycle Manual (NTA, 2011) requirements and section 4.20 recommends additional cycle parking provision where reduced car parking is proposed.

Any access ramp used by cyclists should not exceed a gradient of 7% (1 in 14). The proposed access ramps have an indicated ramp gradient of 1 in 6 (16.6%) which is not acceptable. It is recommended that the Applicant ensure and demonstrate that the underground car park and access is in accordance with CDP Section 8.2.4.10 and the DLRCC Cycling Policy Guidance and Standards for new developments.

It is considered some of these points should be addressed by way of further information.

Childcare Facilities:

An assessment on the provision of childcare facilities within the surrounding area was carried out and submitted as part of the planning application documents and it is submitted that there will be no demand for such facility within the proposed development. Appendix A lists that there are 52 no. crèche facilities within a 5km radius of the development site. In addition, there are 6 additional crèche facilities either in planning process or granted permission in the recent past (Outlined in the graphic design).

Regard is had to Policy SIC11: Childcare Facilities of the County Development Plan which seeks to encourage the provision of affordable and appropriate facilities as a integral part of proposals for new developments and states that "In general, at least one childcare facility should be provided for all new residential developments subject to demographic and geographic needs". The Childcare Facilities Guidelines for Planning Authorities (DoEHLG 2001) seeks to provide a childcare facility where a new residential development is proposed with 75 + dwellings.

In assessing this proposal, regard is had to the fact that there are only 4 childcare services identified within a 1km radius of the subject site and include the following:

- Leopardstown Montessori School;
- Beechwood Childcare - Galloping Green;
- Giraffe Central Park;
- Giraffe Leopardstown.

Dún Laoghaire-Rathdown County Council

LOCAL GOVERNMENT ACTS 1925 - 2014

RECORD OF EXECUTIVE BUSINESS CHIEF EXECUTIVE'S ORDERS

It is considered that there is an under provision of childcare facilities in the immediate area. The Childcare Facilities Guidelines for Planning Authorities (DoEHLG 2001) seeks to provide a childcare facility where a new residential development is proposed with 75+ dwellings. It is considered that the above site in an appropriate location for the provision of childcare facilities and therefore it is considered appropriate that further information be requested for the applicant to provide a childcare facility

Drainage
A Civil Engineering Infrastructure Report and Flood Risk Report was prepared by Barrett Mahony Consulting Engineers and submitted as part of the planning application which details the following:

- Surface water strategy and servicing;
- Foul sewer Strategy and servicing;
- Water supply and servicing;
- Preliminary floor risk assessment.

A report from Municipal Services Department (Drainage Planning) dated 25th May 2017 requests further information in relation to surface water drainage proposals for the following:

"The applicant shall provide a Q bar calculation, to show what the allowable total discharge is (that is the maximum of 2 litres per second per hectare or the calculated Qbar). A calculation of the permeable and impermeable areas should also be included.

The applicant shall explain why Tank no. 1 cannot be of a type that allows some infiltration (for example, Stormtech type - the same as Tank no. 2). If there are reasons to insist on a concrete tank, than this shall have a (longitudinal) channel along its length, to allow for clean drainage, and another access way placed in the middle and above the channel.

The tank(s) made with the Stormtech system shall be detailed to show the isolator row(s) and access chamber(s). The proposed inlet location for the Tank no. 2 shall be explained.

The green roofs shall be all shown on a drawing (either the roof drawing or the drainage drawing), with the clear indication that they will be min. 60% of the roof area. A cross-section of the green roof specification shall also be included.

The applicant shall show where the interception storage in both catchments will be provided, quantifying the volumes.

The applicant shall show that, in the context of the invert level of manhole S1.6, it will be possible to discharge gravitationally to the surface water public sewer, considering that a certain separation distance (cover) to the existing 33" watermain may be imposed by Irish Water"

Dún Laoghaire-Rathdown County Council

LOCAL GOVERNMENT ACTS 1925 - 2014

RECORD OF EXECUTIVE BUSINESS CHIEF EXECUTIVE'S ORDERS

It is therefore considered that further information be requested for the above.
It is noted that a report from Irish Water dated 24th May 2017 and raises no objections subject to conditions.

Part V:

It is proposed to provide 13 units on site for transfer to the Council in order to comply with the Part V requirements. The Housing Department have no objection subject to compliance conditions.

Appropriate Assessment:

A desk top study was carried out to screen for appropriate assessment. The assessment found that there are no hydrological connections or pathway between the site and the Natura 2000 Habitats located within 15km of the site. It is therefore determined that the proposed development will not have significant effects on a Natura 2000 site and is not required to proceed to Stage 2 Appropriate Assessment.

An Ecological Impact Assessment, prepared by Scott Cawley, was also submitted and concludes that the "The overall ecological implications of the project are limited. This is mainly owing to the retention of a large number of mature trees which will maintain nesting opportunities and ecological connectivity for birds and potentially bats that utilise the site. No significant impacts are considered likely to result from the proposed development, however mitigation measures have been applied in line with beast practice to comply with legislation that protects bats and their roosts and their nests".

Regard had to the report from Department of Arts, Heritage, Regional, Rural and Gaeltacht Affairs dated 22md May 2017 as detailed above and it the conditions that are recommended to be attached should permission be granted.

Conclusion:

The subject site is well located in terms of public transport, road accessibility, proximity to a neighbourhood centre and benefits from mature planting. In principle, the site is considered highly suitable for residential development.

The site's unique characteristics including the Protected Structure, and mature trees could have limited the site's potential. However, the layout for the most part works with the site's characteristics and uses it to the advantage of the development. The only significant issues are the lack of dual aspect apartments, the scale and height of Block A the bulk of Block B and the provision of the 6 units adjoining 'Alhambra' needs addressing.

Dún Laoghaire-Rathdown County Council

LOCAL GOVERNMENT ACTS 1925 - 2014

RECORD OF EXECUTIVE BUSINESS CHIEF EXECUTIVE'S ORDERS

There are a number of additional issues which require further attention. In conclusion, it is considered that further information should be requested.

FURTHER INFORMATION
Assessment of Response to Further Information Request (received 28th July, 2017).

The applicant has responded to a request for Further Information (dated on June 1st 2017) accompanies with details and plans.

Key Changes

The applicant has outlined the key amendments to the proposed development in the form of a table:

	Original scheme	Further Information revisions
Residential Units	139 units (133 apts & 6 townhouse)	131 units (126 apts & 5 townhouses)
Community Facilities	None	Addition of a crèche on site Residential Club House
Car Parking Spaces	166	177
Bicycle spaces	174	174
Motorcycle Spaces	0 motorcycle spaces	8 new motorcycle spaces
Public Open Space	5,960sqm of Public Open Space	As proposed
Density dph	84dph	79dph
Dual Aspect	37.7%	52.4%

Consultee Responses on Further Information Submission

Parks Dept. - Comments received 21/08/2017:

"In relation to the above proposed development, this section has reviewed the application and has the following comments;

1. Trees:

There is a large quantity of good quality mature trees on this site, some of which form significant features in the landscape. As a result, the site has a sylvan character which should be respected. There is also an objective in the CDP 2016-2022 to protect and preserve trees on this site. The applicant has provided a comprehensive tree and hedgerow survey and the arborist has clearly considered the impact of the proposed development. However, there are substantial works within the RPA of many of the trees which is likely to result in further loss unless there is very close supervision by the project arborist. Furthermore the access to the underground car park in front of St. Josephs house is leading to the removal of further trees.

Dún Laoghaire-Rathdown County Council

LOCAL GOVERNMENT ACTS 1925 - 2014

RECORD OF EXECUTIVE BUSINESS CHIEF EXECUTIVE'S ORDERS

2. Landscape Proposals:

The landscape proposals are generally well considered and detailed throughout. The direct access out to the public open space adjacent to the site should be removed.

3. Quantity of Open Space:

I have reviewed the provision of public open space and calculate the actual quantity of useable public open space at 1,500sqm which consist of the central courtyard space. The remaining open space is considered to be incidental as it is retained as a general buffer to the proposed development only. I calculate the required quantity of public open space as outlined in the CDP 2016-2022 at 3,278sqm.

Recommendation:

We recommend the following conditions be included as part of any grant of permission:

1. Tree Bond and Arboricultural Agreement:

Prior to the commencement of any permitted development or any related construction activity or tree felling on the site, the applicant shall lodge a Tree and Hedgerow Bond to the value of €100,000 with the Planning Authority. This is to ensure the protection of trees on and immediately adjacent to the site to make good any damage caused during the construction period.

-

The bond lodgement shall be coupled with an Arboricultural Agreement, with the developer, empowering the planning authority to apply such security, or part thereof, to the satisfactory protection of any tree/hedgerow or trees/hedgerows on or immediately adjoining the site, or the appropriate and reasonable replacement of any such trees/hedgerows which die, are removed or become seriously damaged or diseased within a period of three years from the substantial completion of the development. Any replacement planting shall use large semi-mature tree size(s) and species or similar as may be stipulated by the planning authority.

-

An Arboricultural Assessment Report and Certificate is to be signed off by a qualified Arborist after the period of 3 years of completion of the works. Any remedial tree surgery, tree felling works recommended in that Report and Certificate shall be undertaken by the developer, under the supervision of the Arborist. The bond will only be refunded upon receipt by Dlr Parks and Landscape Services of a satisfactory post-construction arboricultural assessment, carried out by a qualified arborist and provided that the hedges/trees proposed for retention are alive, in good condition with a useful life expectancy.

Reason: to ensure the protection, safety, prudent retention and long-term viability of trees to be retained on and immediately adjacent to the site.

Dún Laoghaire-Rathdown County Council

LOCAL GOVERNMENT ACTS 1925 - 2014

RECORD OF EXECUTIVE BUSINESS CHIEF EXECUTIVE'S ORDERS

2. Retention of Qualified Arborist/Tree Works:

Prior to the commencement of any permitted development, the developer shall engage the services of a qualified arborist as an arboricultural consultant, for the entire period of construction activity. The applicant shall inform the planning authority in writing of the appointment and name of the consultant, prior to commencement of development. The consultant shall visit the site at a minimum on a monthly basis, to ensure the implementation of all of the recommendations in the tree reports and plans.

The arborist shall include secondary tree protection fencing around all root protection areas of trees to be retained. All works within these areas to be supervised at all times by the project arborist and the fencing can only be temporarily removed to undertake works under the supervision of the arborist. The arborist shall agree the exact location and detail of the secondary fencing in writing with the Parks & Landscape Services prior to the commencement of any permitted development.

To ensure the protection of trees to be retained within the site, the applicant shall implement all the recommendations pertaining to tree retention, tree protection and tree works, as detailed in the Arboricultural Method Statement and Tree Protection Plan in the submitted tree report. All tree felling, surgery and remedial works shall be completed upon completion of the works. All works on retained trees shall comply with proper arboricultural techniques conforming to BS 3998: 2010 Tree Work – Recommendations. The clearance of any vegetation including trees and scrub should be carried out outside the bird-breeding season (1 March – 31 August inclusive) or as stipulated under the Wildlife Acts 1976 and 2000.

The arborist shall carry out a post construction tree survey and assessment on the condition of the retained trees. A completion certificate is to be signed off by the arborist when all permitted development works are completed and in line with the recommendations of the tree report. The certificate shall be submitted to Dlr Parks and Landscape Services for written agreement upon completion of the works. The applicant shall also be made aware of their obligations to constantly assess and survey the trees after construction because of the potential impact and the age/condition of these trees as outlined in the tree and hedgerow survey.

We recommend that the current access from Silver Pines to the underground car park be removed in the interests of retaining and protecting existing trees.
Reason: To ensure and give practical effect to the retention, protection and sustainability of trees during and after construction of the permitted development.

Further Details within RPA of Trees:

Prior to commencement of any relevant aspect of the works, the applicant shall submit and agree details of all foundations/works within the Root protection Areas of trees to be retained. The applicant shall use sheet pile foundations where they will help with the

retention of the trees. The applicant shall also employ hand digging techniques within the RPAs of all trees to be retained – as advised by the project Arborist.

Retention of the Landscape Architect:

Prior to the commencement of any permitted development - the developer shall appoint and retain the services of a qualified Landscape Architect (or qualified Landscape Designer) as a Landscape Consultant, throughout the life of the construction works and shall notify the planning authority of that appointment in writing prior to commencement. A Practical Completion Certificate is to be signed off by the Landscape Architect when all landscape works are fully completed to the satisfaction of Dlr Parks and Landscape Services and in accordance with the permitted landscape proposals.
Reason: To ensure full and verifiable implementation of the approved landscape design

Access to Existing Open Space Adjacent:
The applicant shall omit the two direct access points to the existing public open spaces shown along the northern boundary. If implemented, it is likely to lead to the removal of existing trees.
Reason: to ensure the protection, safety, prudent retention and long-term viability of trees to be retained on and immediately adjacent to the site.

Contribution in Lieu of Public Open Space:

The applicant has calculated the public open space provision at 5960 square meters. This clearly includes the incidental and buffer open space which should not be used in the calculation of the public open space. As outlined in Section 8.2.8 of the CDP, 2016-2022, "Fragmented open spaces within a development layout, which result specifically from the necessity to protect existing site features (for example a stand of mature trees) may not be included in the calculation of open space requirements, as they are necessary to ensure the protection of existing amenities". I calculate the quantity of open space being provided at 1500 square meters. I have calculated the quantity of public open space requirement to be provided as part of this development to be 3278sqm. The applicant has not provided adequate provision for public open space as per section 8.2.8.2 of the CDP, 2016-2022. Therefore, the applicant shall make a payment of €2,000 per dwelling unit (calculated on units deficient in open space), as a special levy, in addition to the Development Levy Contribution as a special contribution, as per Section 48.2(c) of the Planning & Development Act, 2000, in lieu of the provision of public open space. This contribution is to cover specific exceptional costs in respect of the provision of open space and landscaping works which benefit the proposed development. The contribution will be used to fund improvements to Leopardstown Park and the linear public open space at Silver Pines which is within walking distance of this proposed development. This is in accordance with policy 8.2.8.2 of the CDP 2016 – 2022. The contribution is levied on 47 of these units which is amounts to a special contribution amount of €94,000.00."

Conservation Comments received 21/08/2017:

Dún Laoghaire-Rathdown County Council

LOCAL GOVERNMENT ACTS 1925 - 2014

RECORD OF EXECUTIVE BUSINESS CHIEF EXECUTIVE'S ORDERS

"The Conservation Division has reviewed the revisions proposed to Block A, notably the set back of the upper floor in response to Point 3 of the FI Request. We are satisfied that this adjustment will adequately reduce visual impact on the Protected Structure and in doing so has addressed our earlier concerns.

We also note the revisions to St Joseph's House which now proposes to reduce the number of apartments from 11 no. to 8 no. with the additional provision of a crèche and club house. The amendments do not pose any further built heritage concerns. Overall and on balance, the Conservation Division are satisfied that all previous issues raised have been resolved and as a whole the development is sympathetic to the setting and amenity of the Protected Structure."

Drainage Comments – Received August 8th, 2017:

"No objection on the following conditions:

Before any building works take place, the applicant shall construct the connection to the 600mm diam. surface water sewer on the north side of the site.

Following the installation of the two hydrobrakes, the applicant shall give notice to the planning authority that the hydrobrakes have been installed and set to the maximum limits shown on the drainage drawing, and shall facilitate an inspection of these by the planning authority (Drainage Planning section), if required to do so."

Item 1 – Block B Massing:

In relation to Block B, the applicant is advised that the proposed massing of Block B is considered excessive and in the interest of minimising the visual impact from the side elevations (southwest and northwest) the applicant is requested to reduce the length of the penthouse of Block B from 55.95 to 51.95m in order to provide an adequate set back of 2.0m from either side.

Response to Item 1:

In response to Item 1, the applicant has submitted revised plans of Block B, that illustrate that the top floor of Block B has been reduced in overall length by 4metres (set in 2 metres from either end. This is evident on Drawing number 1611-OMP-AB02-ZZ-DRA-XX-11001, Fourth Floor Plan and also on the elevations 1611-OMP-AB02-ZZ-DRA-XX-21000.
The revisions to the fourth floor plans have led to the following revisions in the layout:

- The fourth floor of Block B will now provide 7 x 2 bed units replacing the previous layout of 2 x 3 beds and 6 x 2 beds.
- The revised layout has reduced the number of units on this floor by 1 unit omitting the three bed units entirely.
- The two "end" apartments will have enlarged private terraces of 54sqm.

Dún Laoghaire-Rathdown County Council

LOCAL GOVERNMENT ACTS 1925 - 2014

RECORD OF EXECUTIVE BUSINESS CHIEF EXECUTIVE'S ORDERS

The detailing of the revisions is clearly contained within the highlighted revision bubble on the plans.

The revisions to the plans have resulted in a satisfactory reduction in the massing of Block B that reduces the overall visual impact. The penthouse level is reduced in length to 51.50 metres. There are no further concerns in respect of the massing of Block B.

Item 2 – Floor Plans Block B:

The applicant is advised that the submitted third floor plan of Block B is incorrect, as it includes two additional units (Units 60 and 61), which does not correspond with the submitted elevation drawings for Block B and the submitted housing quality assessment, which indicates 13 units. The applicant is requested to clarify and submit revised drawings, where appropriate.

The applicant has submitted revised floor plans and elevations of Block, (for consideration of Item 1 & Item of FI request). The concerns raised within Item 2 in respect of the discrepancy between the third floor plans and elevations have been clarified.

This is evident on Drawing number 1611-OMP-AB02-ZZ-DRA-XX-11001, Third Floor Plan and also on the elevations 1611-OMP-AB02-ZZ-DRA-XX-21000, Section A-A, South West Elevation and North East Elevation. There are no further concerns on this matter.
Item 3 – Height of Block A

In relation to conservation, the applicant is advised that the proposed height of Block A is considered excessive and overbearing. In the interest of minimising the visual impact on the setting and amenity of the Protected Structure and in order to allow the building to retain a greater dominance within the context of the site, the applicant is requested to consider omitting a floor from Block A

Applicant's Response to Item 3:

The plans submitted illustrate that rather than omitting the top floor of Block A as suggested within the request for Further Information, the applicant has revised the layout of the top floor of Block A.

Block A now shows the north western side of the top floor has been set in 8.5m from the edge of the building, resulting in separation distance of 27m to 32m from the Protected Structure at St. Joseph's House.

In addition to this, a setback of 2m off the Northeast and Southwest ends similar to that amended as part of the revisions of Block B (Item 1) have been introduced. As a result of the revisions in the layout of the fourth floor, the number of units has been reduced by 4 units.

Dún Laoghaire-Rathdown County Council

LOCAL GOVERNMENT ACTS 1925 - 2014

RECORD OF EXECUTIVE BUSINESS CHIEF EXECUTIVE'S ORDERS

Those amendments to the plans and elevations are evident on the following drawings, Block A Elevations and Sections Drawing number 1611-OMP-AB01-ZZ-DR-A-XX 21000 plans 11001. From the plans submitted it is clear that the scaling back of the fourth floor element, benefits the setting of the Protected Structure at St. Josephs.

It is considered that the revisions to top floor of Block A have addressed the Conservation Officer's concerns raised in respect of minimising the visual impact on the Protected Structure at St Josephs. The revisions to Block A are considered to have addressed the Conservation Officer's concerns and are in accordance with Section 4.8.2 of the Height Strategy that seeks to enhance and protect Protected Structures. It is therefore considered that the revisions to Block A will not have an adverse impact on St Josephs as the scale, height and massing have been reduced.

There are no further concerns in respect of the overall height of Block A and its impact on the Protected Structure at St Josephs. In addition, The Conservation Officer has stated within comments made that "the amendments do not any further built heritage problems. Overall and on balance, the Conservation Division are satisfied that all previous issues raised have been resolved and a whole the development is sympathetic to the setting and amenity of the Protected Structure".

Item 4 – Townhouses:

In order to protect the residential amenities of the property, "Alhambra", which bounds the site, it is considered that the number, location, scale and height of the houses are too close to the northwestern boundary with the adjacent dwelling. The applicant is requested to address this concern and submit a revised design for 1-2 house(s). The applicant is requested to consider the provision of additional visitor parking in this area.

Applicant's response to Item 4:

In response to Item 4, the applicant has submitted revised plans and details of Block D. Block D shall be reduced by one unit to the front of the site. The proposed amendments include the addition of a "Detached Gatehouse" unit and 4 terraced townhouses along within an area of parking (parking spaces 16-20) to the west of the terraces. The Gatehouse is higher than the terraces of 4 units.

House Type T1 (Terraced Dwellings):

There are no windows at first floor level that would overlook the rear garden of "Alhambra". The rear garden depths vary from 7 metres (ground floor level single storey element) in length to 11 metres at first floor level. The height has been reduced.

Photomontages submitted within the Further Information Submission Pack, View 09 (as original) and View 09 (amended by FI) illustrate that the overall redesign, has somewhat reduced the overall impact upon Alhambra. However, the photomontages do not show Type T2 which is taller than the terrace of 4 terraced units.

Dún Laoghaire-Rathdown County Council

LOCAL GOVERNMENT ACTS 1925 - 2014

RECORD OF EXECUTIVE BUSINESS CHIEF EXECUTIVE'S ORDERS

House Type T2 (Detached Dwellings):

There are concerns that the overall scale and massing, including the height of the Detached Gatelodge (House Type T2), would have a negative impact on the residential amenity of Alhambra", by way of its dominance and overbearing impact.

The applicant has reduced the overall scale and height of the terraced houses. The first floor roof terrace area has also been removed. Notwithstanding these changes, it is considered that the proposed dwellings would have an overbearing impact upon the residential of the neighbouring property at "Alhambra", as there would be a total of 5 rear gardens and dwellings to the front and rear of the existing property. There are serious concerns that siting 5 dwellings within close proximity the side boundary of Alhambra, both to the front and to the rear, would cause significant harm to the residential amenity to the existing dwelling.

LMC

In order to protect the residential impact of that property, it is considered that the Gate Lodge, and 4 terraced properties should be removed by way of condition. The applicant should note that there is scope for some form of development on this part of the site, but careful consideration should be given to the impact any new redevelopment is likely to have on the residential amenity on Alhambra.

Item 5 – Dual Aspect Units:

In relation to the Sustainable Urban Housing - Design Standards for New Apartments (DoECLG, 2015) and in terms of providing satisfactory accommodation for a variety of household types and sizes over the medium to long term, the Planning Authority is concerned that the proposed dual aspect ratios within the scheme do not meet the minimum requirements in this document, which requires that it is a specific planning policy requirement that the minimum number of dual aspect apartments that may be provided in any single apartment shall be 50%. It is not considered that the 33% minimum applies to this site. The applicant is advised that the submitted design statement submitted from OMP is incorrect, which calculates that of the 133 apartments units proposed 66 are dual aspect. The Planning Authority advises the applicant that of the 133 apartments units proposed only 50 are dual aspect. In this regard, the applicant is requested to submit revised proposal to address this issue. NOTE: A dual aspect flat is an apartment that has windows on two or more sides and whilst corner units can be counted, they need windows on 2 sides.

Applicant's Response to Item 5:

In respect of providing Dual Aspect units, the applicant has submitted a series of revised plans that illustrate the following; (it should be noted that Block D Townhouses are not included in the calculation).

Block	Total Units (125 apts)	Dual Aspect

Dún Laoghaire-Rathdown County Council

LOCAL GOVERNMENT ACTS 1925 - 2014

RECORD OF EXECUTIVE BUSINESS CHIEF EXECUTIVE'S ORDERS

A – apartments	48	24
B- apartments	58	23
C – apartments	11	11
E - conversions	8	8
	125	66
	Total %	52.8

The development now provides 52.8% of dual aspect units on the site. The development is now is accordance with the specific planning policy requirement of the Design Standards for New Apartments (DoECLG 2015) that seeks 50% of units within an apartments scheme are dual aspect in urban areas. The applicant has addressed the issues raised and there are no further concerns in relation to dual aspect units.

Item 6 – Drainage:

"In terms of the proposed surface water drainage proposals, the applicant is requested to submit the following further information:

i. The applicant shall provide a Q bar calculation, to show what the allowable total discharge is (that is the maximum of 2 litres per second per hectare or the calculated Qbar). A calculation of the permeable and impermeable areas should also be included.
i. The applicant shall explain why Tank No. 1 cannot be of a type that allows some infiltration (for example, Stormtech type - the same as Tank no. 2). If there are reasons to insist on a concrete tank, than this shall have a (longitudinal) channel along its length, to allow for clean drainage, and another access way placed in the middle and above the channel.
ii. The tank(s) made with the Stormtech system shall be detailed to show the isolator row(s) and access chamber(s). The proposed inlet location for the Tank no. 2 shall be explained.
iii. The green roofs shall be all shown on a drawing (either the roof drawing or the drainage drawing), with the clear indication that they will be min. 60% of the roof area. A cross-section of the green roof specification shall also be included.
iv. The applicant shall show where the interception storage in both catchments will be provided, quantifying the volumes.
v. The applicant shall show that, in the context of the invert level of manhole S1.6, it will be possible to discharge gravitationally to the surface water public sewer, considering that a certain separation distance (cover) to the existing 33" watermain may be imposed by Irish Water."

Applicant's response to Item 6:

In response to Item 6, the applicant has submitted details and plans prepared by Barrett Mahoney Consulting Engineers.

Dún Laoghaire-Rathdown County Council

LOCAL GOVERNMENT ACTS 1925 - 2014

RECORD OF EXECUTIVE BUSINESS CHIEF EXECUTIVE'S ORDERS

The Council's Drainage Engineer has commented on the plans and details (August 8th 2017) received and raises no further concerns and recommends conditions should permission be granted. Those conditions are as follows:

"Before any building works take place, the applicant shall construct the connection to the 600mm diam. surface water sewer on the north side of the site.

Following the installation of the two hydrobrakes, the applicant shall give notice to the planning authority that the hydrobrakes have been installed and set to the maximum limits shown on the drainage drawing, and shall facilitate an inspection of these by the planning authority (Drainage Planning section), if required to do so."

Item 7 – Landscaping:

In order to improve the overall amenity of the proposed development, the applicant is requested to submit revised landscape proposals to show the following amendments to the landscape design:

a. The path along the northern boundary shall continue to provide a looped network out towards Silver Pines.
b. Additional tree planting shall be proposed along the eastern boundary.
c. Areas under the existing trees to be retained shall be filled with spring bulbs.
d. The existing northern boundary shall be removed and a new steel powder coated railing installed at a height of 1.8m.
e. The applicant shall provide a detailed layout drawing of the courtyard space at a scale of 1/200.

Response to Item 7:

The applicant has submitted a Landscape Master plan (prepared by Mitchell Associates Landscape Architects). The revised landscape master plan highlights the following:

- A path along the northern boundary has been extended to provide a looped network within the site.
- Additional Tree Planting along the eastern boundary.
- Existing northern boundary has been removed and replaced with a new steel powder coated railing of 1.8m.
- Detail of the central courtyard area (drawing number LANA002 rev E.

amica

In respect of the landscaping detail submitted, there are no further raised by the Parks Department.

in relation to the issue of a special contribution

While the report of the Parks Department is noted, the Planning Authority considers that the woodland area is useable and also contributes in landscape terms to the setting of adjoining open space to the North (see earlier reference in this report). As such the proposed special contribution is not justified and should not be conditioned. Additional conditions should be

attached.

Item 8 – Play Area:
In line with the national's children's play policy, 'Ready Steady Play', the applicant shall provide suitable play opportunities for the future child population within the proposed development. The applicant is requested to submit an indicate play map showing type of play, age groups catered for and the areas these are to be located. Also, a comprehensive and detailed layout plan including play design rationale shall be submitted by way of further information. Details of all play equipment and safety surface, along with specifications and proof that all equipment conforms to European Standards EN 1176-1-11 and EN 1177 Playground equipment and surfacing. Post installation certification by the Royal Society for the Prevention of Accidents will also be a requirement.

Response to Item 8:

The applicant has submitted plans and details (Drawing number 105 Rev E and Play Equipment Data Sheets as prepared by Mitchell & Associates) of the proposed play area. The plans submitted identifies area of play between Block A and Block B that is aimed at children ages 0-6 years.

The Parks Department have raised no further issues in respect of this matter.

Item 9 – Car Parking:

"In terms of car parking provision, the applicant is requested to submit details to show how the proposed development complies with the current DLR County Development Plan (2016-2022) Table 8.2.3 residential parking standards which include for both residents and visitors. In terms of visitor parking provision the applicant is advised that a minimum of 10% of car parking shall be designated for visitor parking.

The proposed development is revised, resulting in a reduction of 8 residential units, from 139 to 131 and an increase in the number of car parking spaces from 166 to 177 (139 basement and 38 surface). The 11 no. additional car parking spaces are proposed at surface level."

Comments on Item 9 (Transportation):

The new proposal adds a crèche facility to the original scheme. In accordance with CDP Table 8.2.4 maximum parking standards for childcare the requirement is 1 space per staff member (including set down). Therefore crèche parking spaces should be designated for crèche use but not solely reserved for staff. The applicant is recommended to ensure adequate provision for drop off. In accordance with mode share targets a maximum of 2 car parking spaces are recommended for the proposed crèche staff and 4 car parking spaces for drop off and collection.

Dún Laoghaire-Rathdown County Council

LOCAL GOVERNMENT ACTS 1925 - 2014

RECORD OF EXECUTIVE BUSINESS CHIEF EXECUTIVE'S ORDERS

The reduction in the number of units and the gain in parking spaces providing a reduced shortfall of 20 parking spaces is welcomed however Transportation Planning remain concerned that the off street car parking provision is not adequately provided for within the proposed development (CDP Section 8.2.3.2 (iii)) and recommend that the standard required number of spaces in accordance with CDP Table 8.2.3 should not be reduced for this residential development.

The concerns of the Transport Section are noted. Given that it is proposed to omit Block D by way of condition, any future application on the site of Block D should provide additional visitor parking.

Item 10 - Motorcycle Parking Provision:

In terms of motorcycle provision, the applicant is requested to submit revised drawings to indicate the provision of at least 6 motorcycle parking spaces in accordance with Section 8.2.4.8 of the current County Development Plan (2016-2022).

Response to Item 10:

AMC

The applicant has submitted revised plans that illustrate provision of 8 motorcycle spaces within the basement car parking area. This is evident on the revised Basement Plan (drawing number 11099). The plans show that each motor cycle space measures 1 metre in width, this is in accordance with the Section 8.2.4.8 of the County Development Plan (2016-2022) and therefore the concerns raised have now been addressed. Transportation have raised no further concerns.

Item 11 – Transportation Detailing:
"The applicant is advised that the proposed access ramps have an indicated ramp gradient of 1 in 6 (16.6%) which is not acceptable as it does not comply with Section 8.2.4.10 of the County Development Plan and the DLRCC Cycling Policy Guidance and Standards for new developments which states that any access ramp used by cyclists should not exceed a gradient of 7% (1 in 14). The applicant is requested to address this issue and submit revised drawings were appropriate."

Comments on Submitted Details (Transportation):

The application has revised the gradient of the cark park access ramp on the Leopardstown Road to a suitable gradient of 1 in 14 (7%). However, the access ramp A to, "Silverpines Estate/Brewery Road" has not been amended and submitted OMP Basement Plan Drawing No. B1-DR-A-XX-11099 shows the gradient of 1 in 6 (16.6%) which does not comply with the section 8.2.4.10 of the current development plan and DLRCC Cycling Policy Guidance including recently adopted July 2017 DLRCC 'Standards for Cycle Parking and associated Cycling Facilities for New Developments'.

As previously discussed above the preferred access arrangement is the dual access proposal but both available prior to occupation of the residential units.

Dún Laoghaire-Rathdown County Council

LOCAL GOVERNMENT ACTS 1925 - 2014

RECORD OF EXECUTIVE BUSINESS CHIEF EXECUTIVE'S ORDERS

This issue can be dealt with by condition.

Item 12 – Childcare Facilities on Site:

"In terms of childcare provision, the applicant is advised that Policy SIC11 of the County Development Plan 2016-20122 seeks to encourage the provision of affordable and appropriate facilities as in integral part of proposal for new developments whilst the Childcare Facilities Guidelines for Planning Authorities (DoEHLG 2001) seeks to provide a childcare facility providing for a minimum 20 childcare places per approximately 75 dwellings. It is considered that there is an under provision of childcare facilities in the immediate area and the applicant is therefore requested to reconsider the provision of a childcare facility within the proposed development."

Applicant's response to Item 12:

The applicant has submitted revised plans of St Joseph's House that essentially replaces two of the residential units (J10 & J11) on the ground and first floor with a crèche facility. The crèche facility proposed would provide an outdoor area for play and would cater for 38 children. The proposed crèche facility will have a floor area of 267sqm with an outdoor secure play area of 112m2.

The crèche will cater for children from 1-6 years over three rooms that are split over three floors.

Staffing and Parking:

The crèche will require 6 members of staff and will provide 1 car parking space per member of staff.

The County Development Plan Table 8.2.4 Non Residential Land Use (Maximum Car Parking Standards) requires 1 space per 1 staff member including an area for set down for childcare a facilities. The plans submitted illustrates that there are 6 car parking spaces designated for the crèche facility.

Further to the crèche facility the applicant also includes a further social/community use in the form of a Residents Clubhouse that measures an area of 112sqm.

The proposed social and community uses would reduce the number of residential units by 3 in St. Josephs House.

The proposed crèche and resident's clubhouse are a welcome addition to the development offering a community benefit to future residents of the site and those that surround it. In addition to this, as well as providing a community benefit, the addition of a crèche facility on site would provide an element of employment within the development.

Dún Laoghaire-Rathdown County Council

LOCAL GOVERNMENT ACTS 1925 - 2014

RECORD OF EXECUTIVE BUSINESS CHIEF EXECUTIVE'S ORDERS

There is no detail on the hours of operation for the crèche facility; this can be dealt with by way of condition. The detail of the use of resident's clubhouse had not been outlined. Again a management company condition can address this issue.

The addition of the crèche facility to this residential development, is accordance with The County Development Plan (2016-2022) in particular Policy SIC11 that seeks to encourage the provision of affordable and appropriate facilities within new residential schemes. Further to this, the works would be in accordance with National Policy specifically, The Childcare Facilities Guidelines for Planning Authorities (DoEHLG 2001) seeks to provide a childcare facility where a new residential development is proposed with 75 + dwellings.

Transportation have stated that there is a requirement for adequate drop off to serve the crèche as well as 1 space per staff member including set down. For clarity, this can be dealt with by condition.

Item 13 – Boundary Treatments:

"The applicant is requested to submit full details of the proposed boundary treatments." In response to Item 13, the applicant has submitted detail of the proposed boundary treatments that is illustrated on Drawing number 102 (Boundary Treatments). That provides a layout of the site and detailing of the proposed boundary treatments that include:

- Type 1 – a 1.5m High Boundary Railing to the crèche building (Protected Structure) within hedge planting
- Type 2 – A 1.8 metre high railing galvanized powder coated fence finished black. This fence will bound the northern side of the site that adjoins with the area of public open space to the north.
- Type 3 – An existing boundary wall (blockwork) along the eastern boundary will be retained and enhanced where appropriate.
- Type 4 – To bound the Leopardstown Road, the existing high rubble wall in place will remain in place incorporating new pedestrian access to the site and the closure of redundant openings.
- Type 5 – located along the southern boundary, a 2 metre high concrete block wall with a rendered finish.
- Type 6 – Located at Block D, that will segregate the rear gardens of the proposed townhouses will be finished in 2 metre high walls with brick that will match the proposed finish of the dwellings.
- Type 7 – Located at Block A, B, C that will bound the private terraces, finished in a 1.1m high horizontal railing.

There are no concerns in respect of the boundary treatments as presented.

Item 14 – Storage Rooms:

Dún Laoghaire-Rathdown County Council

LOCAL GOVERNMENT ACTS 1925 - 2014

RECORD OF EXECUTIVE BUSINESS CHIEF EXECUTIVE'S ORDERS

"In terms of storage facilities within the apartments, the Sustainable Urban Housing Design Standards for New Apartments (DoECLG, 2015) states that, as a rule, no individual storage room within an apartment shall exceed 3.5sqm. The applicant is advised that a number of storage units exceed the 3.5sqm requirement. The applicant is requested to address this issue and submit revised drawings, where appropriate".

Response to Item 14:

The applicant has submitted revised plans; the storage areas that exceeded 3.5sqm have been reduced to less than 3.5sqm, and this is reflected and highlighted on the plans submitted. In addition, there are no changes proposed to storage of any other units within the development. There are no further concerns in respect of storage areas and the proposed development is considered to be in accordance with the requirements of the Sustainable Urban Housing Design Standards for New Apartments (DoECLG, 2015).

There are no further issues on this matter.

Impact on the Density for the Site:

As a result of the amendments to the scheme that have been submitted as part of the request for Further Information, the overall number of units on the site has reduced from 139 units to 131 units. The site area of 1.65ha remains the same, providing a density of 79 dwellings per hectare. The new density of the site is considered to be accordance with the Section 2.1.3.3 of the County Development Plan (2016-2022). As mentioned under the original assessment, the site is located within areas that is well served by good public transport links, and is within an area that is identified in the County Development Plan where higher densities of 50dph or more are considered to be acceptable.

The overall reduction in density is acceptable in this instance as the reduction in units results in a high quality residential development, that enhances and protects the Protected Structure on site by scaling back the roof element of Block A(reducing the units by 4), provides two good quality community and social uses on the site within the Protected Structure(reducing the units by 3) and protecting the residential of existing neighbouring properties by omitting 5 units at Block D.

Block D contains 5 dwellings and will be omitted by condition due to concerns raised in respect of the impact on the neighbouring property at "Alhambra". This would reduce the overall density, to 126 dwellings, reducing the density to 76DPH.

The density at 76dph is still well in excess of the 50dph encouraged by both the County Development Plan and Sustainable Urban Housing Design Standards for New Apartments (DoECLG) standards and would make efficient use of well serviced zoned lands.

Impact on the Overall Housing Mix:

Dún Laoghaire-Rathdown County Council

LOCAL GOVERNMENT ACTS 1925 - 2014

RECORD OF EXECUTIVE BUSINESS CHIEF EXECUTIVE'S ORDERS

As a result of the amendments submitted, the overall mix for development is now as follows:

Type of Unit	No. of Units
One-bedroom	27 (20.6%)
Two-bedroom	93 (71%)
Three bedroom plus	11 (8.3%)
Total	131

Section 8.2.3.3 of the County Development Plan requires that larger apartment developments of 30 units and above should provide no more than 20% of one-bed units. The overall mix proposed is considered to be acceptable and demonstrates that the development mix proposed is in accordance with Section 8.2.3.3 of the County Development Plan.

Additional Third Party Observations/Objections received:
An additional 36 observations have been received and are summarised as follows:

General:

- Developer has not responded to the Council's request for additional information nor did it reduce the density and size of the development.
- Further Information does not address the issues raised within the original letters of objection.
- Introduction of a crèche on lands Zoned A is a conflict with the Zoning Objective.
- Built form not in keeping with surrounding area even with amendments.
- Reduction in units by 8 is not sufficient to address the residents' concerns.
- Crèche would introduce a commercial element to the development; overall size of crèche for 35 children is too small.

Appearance:

- Plans not modified as requested by the Council – Block A have not been reduced to 4 stories remaining at 5 stories.
- Development continues to contravene the Building Height Strategy – Block A has not been reduced.
- Recessing 5th floor of Block A is not sufficient to deal with the concerns regarding the overall height and massing.
- Entire 5th floor of Block should be removed.

Residential Amenity:

- Modifications presented make no change to overlooking and impact on privacy of neighbouring properties.
- Amendments will make no change to loss of light to surrounding properties.
- Entrance to car park would affect the residential amenity of surrounding properties in terms of noise generated.

Dún Laoghaire-Rathdown County Council

LOCAL GOVERNMENT ACTS 1925 - 2014

RECORD OF EXECUTIVE BUSINESS CHIEF EXECUTIVE'S ORDERS

- There is a lack of amenities in the local area, the development would exacerbate this issue.
- With regards to the Houses within Block D the applicant has disregarded the requested for a revised design.
- Block D Houses pushed the building line forward – Detached house of Block D is 27 Metres forward of the front of Alhambra and is three storey resulting in overlooking.

Environmental Impact/Noise and Light Pollution:

- Development would reduce the number of trees on the site and harm the wildlife habitat.
- Light and noise pollution.
- Lack of infrastructure
- In respect of flooding and drainage, the applicant has failed to demonstrate that the will not create a flood risk. Development will remove a large area of grass on the NW side of the side that could result in flooding.
- A contribution in lieu of private amenity space on site would not mitigate for the need for open space and the negative impact it would have on residents.

Protected Structure:

- No modifications should be made to the Protected Structure.

Traffic/Parking:

- Under provision of parking on the site.
- Concerns regarding the access to the development from Silver Pines, concerns of residents of Silver Pines have been ignored.
- No proper traffic management report has been submitted, both access roads are at capacity.
- Gradient of the ramps to the underground car park remains too steep.
- The reduction in units by 8 will make no impact on the traffic congestion in the area.
- Development should only have a single access off Leopardstown Road.

Other Matters:

- Site Notices – were not erected at the correct time.
- Residents have not received sufficient time to make a detailed response coupled with the Bank Holiday period.

TII – have raised no further issues.

Conclusion:

No. P / 2044 / 17

Dún Laoghaire-Rathdown County Council

LOCAL GOVERNMENT ACTS 1925 - 2014

RECORD OF EXECUTIVE BUSINESS CHIEF EXECUTIVE'S ORDERS

It is considered that the proposed development represents a high quality residential development that makes efficient use of zoned lands within close proximity to well serviced public transport links whilst protecting and enhancing the Protected Structure on site.

The proposed development incorporates a mix of apartments that are well served by public and private open space. The layout of the scheme has been largely guided by the presence of a Protected Structure and a number of mature trees on the site.

Conservation Division are satisfied that all previous issues raised have been resolved and a whole the development is sympathetic to the setting and amenity of the Protected Structure.

It is considered that the proposed development succeeds in achieving an efficient use of land while respecting the amenities of the area.

The proposed development is considered to be in accordance with the proper planning and sustainable development of the area and in accordance with Local and National Planning Policy, in particular, the Dun Laoghaire-Rathdown County Development Plan, 2016-2022.

RECOMMENDATION
Pursuant to the Planning and Development Act, 2000, as amended, it is hereby recommended, for the reason set out in the First Schedule hereto, to GRANT PERMISSION for the said development in accordance with the plans and particulars, subject to the conditions set out in the Second Schedule.

FIRST SCHEDULE
Having regard to the residential zoning of the site as set out in the 2016-2022 Dún Laoghaire-Rathdown County Development Plan, it is considered that the proposed development is consistent with the provisions of the Dún Laoghaire-Rathdown County Development Plan, 2016-2022, and is considered to be in accordance with the proper planning and sustainable development of the area.

SECOND SCHEDULE
I recommend that a decision to GRANT PERMISSION be made under the Planning & Development Act 2000, as amended, subject to the following (43) condition(s):-

1. The development shall be carried out in its entirety in accordance with the plans, particulars and specifications lodged with the application, as amended by Further Information received on 28th July, 2017, save as may be required by the other conditions attached hereto.
   REASON: To ensure that the development shall be in accordance with the permission and that effective control be maintained.
2. Proposed Block D (House types T1 and T2) which comprises 5 houses in total shall be omitted. Any future application on this portion of the site shall ensure adequate protection of the residential amenities of the existing dwelling to the south west at

Dún Laoghaire-Rathdown County Council

LOCAL GOVERNMENT ACTS 1925 - 2014

RECORD OF EXECUTIVE BUSINESS CHIEF EXECUTIVE'S ORDERS

Alhambra on Leopardstown Road and shall provide for further visitor car parking on the site.
REASON: In the interests of residential amenity.

3. The vehicular access to the scheme shall be provided via both Brewery Road and Leopardstown Road with double ramped basement car parking. Ramp access A and Ramp Access B to the basement car park shall be operational and available for use prior to occupation of any of the proposed Blocks (A-C). Only left in/left out movements shall be permitted at the Leopardstown Road Access.
REASON: In the interest of traffic safety.

4. The works to the protected structure at St. Joseph's shall be completed prior to the occupation of Blocks A-C.
REASON: In the interest of the protection of the Built Heritage of the County.

5. The applicant shall relocate the direct pedestrian accesses to the existing open space along the northern boundary so that they are located away from the existing trees. The applicant shall submit revised plans for the written agreement of the Planning Authority that address this matter.
REASON: To ensure the protection, safety, prudent retention and long-term viability of trees on or adjoining to be retained and immediately adjacent to the site.

6. Each apartment shall be used as a single dwelling unit only and shall not be sub-divided in any manner or used as two or more separate habitable units.
REASON: To prevent unauthorised development.

7. An acceptable street naming and house numbering scheme (in both Irish and English) shall be submitted for the written agreement of the Planning Authority prior to the commencement of development or the erection of any advertising hoardings on site. In this regard, the use of street names reflecting local place names or local history would be acceptable.
REASON: In the interest of orderly development.

8. Details of all external finishes including materials, colours and textures shall be submitted prior to the commencement of development for the written agreement of the Planning Authority.
REASON: In the interest of visual amenity.

9. Prior to commencement of development, the developer shall comply with the Dún Laoghaire-Rathdown County Council Housing Strategy drawn up in accordance with Part V, Section 96(4) of the Planning & Development Act, 2000, as amended, and in accordance with agreement to be reached with the County Council's Housing and Community Department unless the developer shall have applied for and been granted an exemption certificate under Section 97 of the Planning & Development Act, 2000, as amended.
REASON: To comply with the County Council Housing Strategy & Part V of the Planning & Development Act, 2000, as amended.

10. All public services to the proposed development, including electrical, telephone cables and equipment shall be located underground throughout the entire site. Provision shall

be made for broadband connectivity in the development.
REASON: In the interest of amenity.

11. Prior to the commencement of development on site, the applicant shall submit:
a. A Construction Waste Management Plan, having regard to Circular WPR 07/06 - Best Practice Guidelines on the Preparation of Waste Management Plans for Construction and Demolition Projects - published by the DECLG, July, 2006 shall be submitted to the Planning Authority for written agreement. This plan shall provide details including intended construction practice for the management of waste arising from the construction process and in particular recyclable materials.
b. A Waste Management Plan shall be submitted for the written agreement of the Planning Authority. This plan shall contain details for the management of waste and in particular, recyclable materials and food waste arising within the development including the provision of facilities for the separation, storage and collection of the waste and the provision of adequate signage and lighting to facilitate the ongoing operation of these facilities.
REASON: In the interests of the proper planning and sustainable development of the area.

12. Prior to the commencement of any permitted development or any related construction activity or tree felling on the site, the applicant shall lodge a Tree and Hedgerow Bond to the value of €100,000.00 with the Planning Authority. This is to ensure the protection of trees on and immediately adjacent to the site to make good any damage caused during the construction period.
The bond lodgment shall be coupled with an Arboricultural Agreement with the developer empowering the planning authority to apply such security (or part thereof) to the satisfactory protection of any tree/hedgerow or trees/hedgerows on or immediately adjoining the site or the appropriate and reasonable replacement of any such trees/hedgerows which die, are removed or become seriously damaged or diseased within a period of three years from the substantial completion of the development. Any replacement planting shall use large semi-mature tree size(s) and species or similar as may be stipulated by the planning authority.
An Arboricultural Assessment Report and Certificate is to be signed off by a qualified Arborist after a period of 3 years of completion of the works. Any remedial tree surgery, tree felling works recommended in that report and certificate shall be undertaken by the developer under the supervision of the Arborist. The bond will only be refunded upon receipt by Dun Laoghaire-Rathdown's Parks and Landscape Services of a satisfactory post-construction arboricultural assessment carried out by a qualified arborist and provided that the hedges/trees proposed for retention are alive, in good condition with a useful life expectancy.
REASON: to ensure the protection, safety, prudent retention and long-term viability of trees to be retained on and immediately adjacent to the site.

13. Prior to the commencement of any permitted development, the developer shall engage the services of a qualified arborist as an arboricultural consultant for the entire period of construction activity. The applicant shall inform the planning authority in writing of the appointment and name of the consultant prior to commencement of development. The consultant shall visit the site at minimum on a monthly basis to ensure the

implementation of all of the recommendations in the tree reports and plans.
The arborist shall include secondary tree protection fencing around all root protection areas of trees to be retained. All works within these areas to be supervised at all times by the project arborist and the fencing can only be temporarily removed to undertake works under the supervision of the arborist. The arborist shall agree the exact location and detail of the secondary fencing in writing with the Parks & Landscape Services prior to the commencement of any permitted development.
To ensure the protection of trees to be retained within the site, the applicant shall implement all the recommendations pertaining to tree retention, tree protection and tree works, as detailed in the Arboricultural Method Statement and Tree Protection Plan in the submitted tree report. All tree felling, surgery and remedial works shall be completed upon completion of the works. All works on retained trees shall comply with proper arboricultural techniques conforming to BS 3998: 2010 Tree Work - Recommendations. The clearance of any vegetation including trees and scrub should be carried out outside the bird-breeding season (1st March - 31st August inclusive) or as stipulated under the Wildlife Acts, 1976 and 2000.
The arborist shall carry out a post construction tree survey and assessment on the condition of the retained trees. A completion certificate is to be signed off by the arborist when all permitted development works are completed and in line with the recommendations of the tree report. The certificate shall be submitted to Dun Laoghaire-Rathdown's Parks and Landscape Services for written agreement upon completion of the works. The applicant shall also be made aware of their obligations to constantly assess and survey the trees after construction because of the potential impact and the age/condition of these trees as outlined in the tree and hedgerow survey.
REASON: To ensure and give practical effect to the retention, protection and sustainability of trees during and after construction of the permitted development.

14. Prior to commencement of any relevant aspect of the works, the applicant shall submit and agree details of all foundations/works within the root protection areas of trees to be retained. The applicant shall use sheet pile foundations where they will help with the retention of the trees. The applicant shall also employ hand digging techniques within the RPAs of all trees to be retained - as advised by the project Arborist.
REASON: To ensure and give practical effect to the retention, protection and sustainability of trees during and after construction of the permitted development.

15. Prior to the commencement of any permitted development, the developer shall appoint and retain the services of a qualified Landscape Architect (or qualified Landscape Designer) as a Landscape Consultant, throughout the life of the construction works and shall notify the Planning Authority of that appointment in writing prior to commencement. A Practical Completion Certificate is to be signed off by the Landscape Architect when all landscape works are fully completed to the satisfaction of Dun Laoghaire-Rathdown's Parks and Landscape Services and in accordance with the permitted landscape proposals.
REASON: To ensure full and verifiable implementation of the approved landscape design.

Dún Laoghaire-Rathdown County Council

LOCAL GOVERNMENT ACTS 1925 - 2014

RECORD OF EXECUTIVE BUSINESS CHIEF EXECUTIVE'S ORDERS

16. For dual vehicular access (Preferred Vehicular Access Strategy of ILTP Consulting Report) only left in left out movements shall be permitted at the Leopardstown Road access.
REASON: In the interest of traffic safety.

17. Prior to commencement of development full details of the proposed works to be carried out at the Applicant's expense at Leopardstown Road shall be submitted for written agreement of the Planning Authority. Works to include:

    a) Left in/left out only vehicular access at Leopardstown Road;

    b) 2 metres minimum width footpath on both sides of vehicular entrance to proposed development;

    c) Relocated Bus Stop with kassel kerbs and provision for future bus shelter for proposed bus priority route;

    d) Close off of other existing access points at Leopardstown Road Development frontage;

    e) Reinstatement of grass verge, footpath and cycle track;

    f) Bollards, road marking, signage, public lighting.

    REASON: In the interest of traffic safety

18. All works to be carried out on the public road (including on footpaths and verge areas) shall be at the Applicant's expense to meet the Dun Laoghaire-Rathdown County Council's 'Taking-in-Charge' requirements and all to the satisfaction of the Planning Authority.
REASON: In the interest of proper planning and sustainable development of the area.

19. The Applicant shall ensure, prior to undertaking works to be carried out on the public road, that they shall obtain a Road Opening Licence from the Road Maintenance and the Roads Control Sections.
REASON: In the interest of traffic safety

20. Prior to commencement of development, the applicant shall submit a detailed drawing showing which car parking spaces within the proposed development are to be designated for the relevant dwelling units, crèche drop off and visitor spaces as well as specific uses (Electric Charging, Disabled, Car Club etc) in accordance with Dun Laoghaire-Rathdown County Development Plan, 2016-2022, Table 8.2.3 and Table 8.2.4 standards ensuring allocation of at least 1 car parking space per residential unit. A minimum of 10% of car parking spaces shall be designated for visitor parking so as to avoid future visitors to the proposed residential development from parking in the nearby residential areas. In accordance with County Development Plan, 2016-2022, Section 8.2.4.5, the car parking spaces must be sold off with the units and not sold separately or let to avoid non-take up by residents.
REASON: In the interest of clarity.

21. The applicant shall ensure provision of all required cycle parking facilities and access routes correctly designed and constructed in accordance with Dun Laoghaire Rathdown

Dún Laoghaire-Rathdown County Council

LOCAL GOVERNMENT ACTS 1925 - 2014

RECORD OF EXECUTIVE BUSINESS CHIEF EXECUTIVE'S ORDERS

County Council Cycling Policy July, 2017 - 'Standards for Cycle Parking and associated Cycling Facilities for New Developments'.
REASON: In the interests of proper planning and sustainable development of the area.

22. The proposed underground car park shall be in accordance with CDP Section 8.2.4.10 and comply with requirements of the Institution of Structural Engineers booklet entitled 'Design Recommendations for Multi Storey and Underground Car Park Fourth Edition' (2011).
REASON: In the interest of proper planning and sustainable development of the area.

23. The Applicant shall ensure provision of electric vehicle charging points for minimum number of car parking spaces in accordance with Section 8.2.4.12 of the Dun Laoghaire-Rathdown County Development Plan, 2016-2022. The following weblink is recommended http://www.esb.ie/electric-cars/index.jsp.
REASON: In the interest of proper planning and sustainable development of the area.

24. The Applicant shall carry out at their own expense the recommendations and measures as accepted and noted in the Feedback forms for the submitted Quality Audit (dated April, 2017) and Road Safety Audit (dated March, 2017) prepared by ILTP Consulting unless otherwise agreed with Dun Laoghaire-Rathdown County Council. A Stage 2 detailed design Quality Audit is recommended prior to commencement of construction. Post construction/prior to occupation, a Stage 3 Road Safety Audit and a post completion Quality Audit shall be carried out at the Applicant's expense in accordance with the Design Manual for Urban Roads & Streets (DMURS) and TII (Transport Infrastructure Ireland) standards. All measures recommended by the Auditor shall be undertaken unless the Planning Authority approves a departure in writing. A feedback report shall also be submitted providing a response to each of the items.
REASON: In the interest of traffic safety

25. The Applicant shall ensure that the Stage 2 detailed design Quality Audit and post completion Quality Audit includes a full cycle audit of the basement car park and linkage to external pedestrian/cycle routes.
REASON: In the interest of traffic safety

26. Prior to commencement of development in accordance with the Dun Laoghaire-Rathdown County Development Plan, 2016-2022, Section 8.2.4.3, details of an appointed Travel Plan (Mobility Management Plan) Manager shall be provided to the Planning Authority. The Applicant/Developer shall ensure in accordance with CDP, 2016-2022, Section 8.2.4.3 that the recommended initiatives and monitoring of a Travel Plan (Mobility Management Plan) are implemented as outlined in the submitted Mobility Management Plan by ILTP Consulting dated July, 2017.

27. The Applicant shall comply with the recommendations of the submitted Construction Management Plan prepared by Barrett Mahoney Consulting Engineers dated 7th April, 2017. Prior to the commencement of development, the Applicant shall submit for the written agreement of the Planning Authority, a construction traffic management plan to be implemented during the construction of the works.
REASON: In the interest of traffic safety

Dún Laoghaire-Rathdown County Council

LOCAL GOVERNMENT ACTS 1925 - 2014

RECORD OF EXECUTIVE BUSINESS CHIEF EXECUTIVE'S ORDERS

28. The Applicant shall ensure that the Contractor shall provide parking for construction staff in order to avoid overspill onto public roads/local residential areas.
REASON: In the interest of traffic safety

29. Prior to commencement of development, the Applicant shall submit to DLRCoCo's Public Lighting Section, details for agreement of the proposed street lighting within the proposed development. Details shall include lantern type, lighting column height and type and light intensity/lux levels. The proposed street lighting shall be shown to be designed in accordance with Dun Laoghaire-Rathdown County Council's February, 2015 guidance document for, 'Public Lighting Installations in Residential and Industrial Areas'. For bollard lighting, the use of only low voltage LED type bollard lighting is recommended.
REASON: In the interest of traffic safety

30. Before any building works take place, the applicant shall construct the connection to the 600mm diameter surface water sewer on the north side of the site.
REASON: In the interest of public health.

31. Following the installation of the two hydrobrakes, the applicant shall give notice to the Planning Authority that the hydrobrakes have been installed and set to the maximum limits shown on the drainage drawing and shall facilitate an inspection of these by the planning authority (Drainage Planning Section), if required to do so.
REASON: In the interest of public health.

32. The mitigation measures in relation to bats set out in the Ecological Impact Assessment by Scott Cawley submitted in support of the application shall be followed. Bat activity surveys consisting of dusk emergence and dawn re-entry surveys of the existing tees and building identified as having potential features suitable as bat roosts shall be carried out in the May-August Period. If a bat roost is identified then a derogation licence shall be applied for to NPWS it is intended to remove or otherwise interfere with it.
REASON: To prevent any injury occurring to bats or their breeding or resting places which are afforded protection under the Habitats Directive., 1992.

33. Clearance of vegetation including trees from the development site shall only take place outside the period from the 1st March to the 31st August in any year.
REASON: To prevent the destruction of the nests, eggs and young of any bird which may breed in the numerous trees and shrubs suitable for nesting present on this site.

34. The applicant shall complete, within a period to be specified in writing to the Applicant by the Planning Authority, all infrastructural works (including Roads, Footpaths, Car Parks, Open Spaces, Sewers, Watermains, Drains & Public Lighting) to current Council standards for Residential Developments. The specified period for completion of the infrastructural works shall be a period of not less than 2 years from the commencement of such works.
REASON: To ensure the development is carried out in accordance with Council Standards for Residential Development in the interests of the proper planning and sustainable development of the area in which the development is located.

Dún Laoghaire-Rathdown County Council

LOCAL GOVERNMENT ACTS 1925 - 2014

RECORD OF EXECUTIVE BUSINESS CHIEF EXECUTIVE'S ORDERS

35. Prior to commencement of development, the applicant shall submit full details of a properly constituted Private Management Company for the written agreement of the Planning Authority. This shall include a layout map of the development showing ~~the~~ any areas to be taken in charge ~~(including in details of the Community Room)~~ and those areas to be maintained by the Private Management Company. Membership of this Company shall be compulsory for all purchasers of property in the development. Confirmation that this Company has been set up shall be submitted to the Planning Authority prior to the occupation of the first residential unit. All roads and services within the privately managed areas are to be completed to the Council's taking in charge standards. Details submitted shall also include management details of the community room.
REASON: To provide for the satisfactory completion and maintenance of the development in the interest of residential amenity.

36. Construction work shall be restricted to between the hours of 0800hrs - 1900hrs Monday to Friday and 0800hrs - 1300hrs on Saturdays. No construction works to be carried out on Sundays and Public Holidays. The use of compressors/generators or any such equipment shall not be used outside the specified construction hours.
REASON: To reduce the impact of noise emanating from the site in the interests of the amenities of the adjoining residences.

37. The Developer shall, prior to commencement or as otherwise agreed in writing with the Planning Authority, pay the sum of €26,271.65 to the Planning Authority as a contribution towards expenditure that was/or is proposed to be incurred by the Planning Authority in respect of the provision of Surface Water Public Infrastructure and Facilities benefiting development in the area of the Authority, as provided for in the Development Contribution Scheme made by Dún Laoghaire-Rathdown County Council on the 14th December, 2015. These rates of contribution shall be updated effective from 1 January each year during the life of the Scheme in accordance with the SCSI Tender Price Index (See Article 12 of the Scheme) commencing from 1st January, 2018. Contributions shall be payable at the index adjusted rate pertaining to the year in which implementation of the planning permission is commenced, as provided for in Note 1 to the Table at Article 9 of the Scheme. Outstanding balances may be subject to interest charges.
REASON: It is considered reasonable that the payment of a contribution be required in respect of the provision of the Surface Water Public Infrastructure and Facilities benefiting development in the area of the Planning Authority and that is provided, or that is intended will be provided, by or on behalf of the Local Authority.

Note on above Condition:
Please note that with effect from 1st January, 2014 Irish Water are now the statutory body responsible for both water and waste water services. Accordingly, the contribution payable has been reduced by the amount of the contribution associated with these services. Further details/clarification can be obtained from Irish Water at Tel. 1 850 278 278.

38. The Developer shall, prior to commencement or as otherwise agreed in writing with the Planning Authority, pay the sum of €601,635.08 to the Planning Authority as a contribution towards expenditure that was/or is proposed to be incurred by the

Dún Laoghaire-Rathdown County Council

LOCAL GOVERNMENT ACTS 1925 - 2014

RECORD OF EXECUTIVE BUSINESS CHIEF EXECUTIVE'S ORDERS

Planning Authority in respect of the provision of the Roads Public Infrastructure and Facilities benefiting development in the area of the Authority, as provided for in the Development Contribution Scheme made by Dún Laoghaire-Rathdown County Council on the 14th December, 2015. These rates of contribution shall be updated effective from 1 January each year during the life of the Scheme in accordance with the SCSI Tender Price Index (See Article 12 of the Scheme) commencing from 1st January, 2018. Contributions shall be payable at the index adjusted rate pertaining to the year in which implementation of the planning permission is commenced, as provided for in Note 1 to the Table at Article 9 of the Scheme. Outstanding balances may be subject to interest charges.
REASON: It is considered reasonable that the payment of a contribution be required in respect of the provision of the Roads Public Infrastructure and Facilities benefiting development in the area of the Planning Authority and that is provided, or that is intended will be provided, by or on behalf of the Local Authority.

39. The Developer shall, prior to commencement or as otherwise agreed in writing with the Planning Authority, pay the sum of €390,535.37 to the Planning Authority as a contribution towards expenditure that was/or is proposed to be incurred by the Planning Authority in respect of the provision of the Community & Parks Public Infrastructure, Facilities and Amenities benefiting development in the area of the Authority, as provided for in the Development Contribution Scheme made by Dún Laoghaire-Rathdown County Council on the 14th December, 2015. These rates of contribution shall be updated effective from 1 January each year during the life of the Scheme in accordance with the SCSI Tender Price Index (See Article 12 of the Scheme) commencing from 1st January, 2018. Contributions shall be payable at the index adjusted rate pertaining to the year in which implementation of the planning permission is commenced, as provided for in Note 1 to the Table at Article 9 of the Scheme. Outstanding balances may be subject to interest charges.
REASON: It is considered reasonable that the payment of a contribution be required in respect of the provision of the Community & Parks Public Infrastructure, Facilities and Amenities benefiting development in the area of the Planning Authority and that is provided, or that is intended will be provided, by or on behalf of the Local Authority.

40. No development on foot of this permission shall commence until security for the provision and satisfactory completion of services (including roads, footpaths, open spaces, public lighting, sewers, watermains and drains) in accordance with the Plans and particulars lodged with the application, has been given by:-

    a) Lodgement with the Council of an approved Insurance Company Bond in the sum of €486,100.00 which shall be kept in force by the Developer until such time as Roads, Open Spaces, Car Parks, Sewers, Watermains and Drains are completed to the satisfaction of the Council OR/...

    b) Lodgement with the Council of a Cash Sum of €296,100.00 to be applied by the Council at its absolute discretion if such services are not duly provided to its satisfaction on the provision and completion of such services to standard specifications.

Dún Laoghaire-Rathdown County Council

LOCAL GOVERNMENT ACTS 1925 - 2014

RECORD OF EXECUTIVE BUSINESS CHIEF EXECUTIVE'S ORDERS

43. A conservation accredited architect shall be retained to oversee the works to St Josephs house.
Reason:- In the interest of preservation of a protected structure.
REASON: To ensure that a ready sanction may be available to the Council to induce the provision of services and prevent disamenity in the development.

41. That a financial contribution shall be paid by the proposer to the Council towards the cost of the extension of Luas Line B from the Sandyford Depot to Cherrywood, namely Luas Line B1. This contribution to be paid prior to the commencement of the development or in such other manner as may otherwise be agreed with the Planning Authority. The rate of contribution payable shall be that pertaining to the particular year in which implementation of the Planning Permission is commenced. The Supplementary Development Contribution Scheme provides for an annual increase in the levels of contribution payable, as outlined in the scheme, by a factor of 5% compound interest per annum. The levels of contribution will be reviewed annually on the 13th of January of each year during which the scheme is in force to take account of the aforementioned increase.
The rate of contribution payable in respect of this development, at current contribution rates, is €580,427.10 and is subject to increase as outlined above.
It should be noted that contributions assessed in accordance with the Supplementary Development Contribution Scheme cannot be appealed to An Bord Pleanala unless the applicant considers the levy referred to in this condition has not been properly applied in accordance with the terms of the Scheme.
REASONS FOR CONTRIBUTIONS: To part finance the extension of the Luas Line B1 from Sandyford Depot to Cherrywood, as provided for in the Supplementary Development Contribution Scheme adopted by the Council of Dunlaoghaire-Rathdown on the 13th of January, 2003. (incorporating amendments to Clause 13 as adopted by the County Council at it's meeting on 13th May, 2013 – to be effective for all decisions from 14th May, 2013).

42. This development shall not be carried out without prior agreement, in writing, between the Applicant and the Planning Authority relating to the payment of development contributions.
REASON: Investment by Dún Laoghaire-Rathdown County Council in Local Authority works has facilitated and will facilitate the proposed development. It is considered appropriate and reasonable that the developer should contribute to the cost of same.

NOTE 1: Where the applicant proposes to connect directly or indirectly to a public water/wastewater network operated by Irish Water, the applicant must sign a connection agreement with Irish Water prior to the commencement of the development and adhere to the standards and conditions set out in that agreement.

NOTE 2: In the interests of Public Health and Environmental Sustainability, Irish Water Infrastructure capacity requirements and proposed connections to the Water and Waste Water Infrastructure will be subject to the constraints of the Irish Water Capital Investment Programme.

NOTE 3: In advance of making the connections to the public foul/combined sewers, the applicant shall contact the Drainage Area Engineer of the County Council.

NOTE 4: When constructing the surface water discharge pipe from manhole S1.6 to the

No. P/2044/17

Dún Laoghaire-Rathdown County Council

LOCAL GOVERNMENT ACTS 1925 - 2014

RECORD OF EXECUTIVE BUSINESS CHIEF EXECUTIVE'S ORDERS

surface water public sewer, the applicant shall exercise maximum caution not to disturb other public utilities in the way (see the water services drawing). In advance of this work, the applicant shall forward to the Dublin City Extra Municipal Area Engineer and present to this person a plan to approach and reinstate the excavation.

NOTE 5: The attention of the applicant is drawn to Section 34(13) of the Planning and Development Act 2000, which relates as follows, 'A person shall not be entitled solely by reason of a permission under this section to carry out any development'.

Laura McGeeman 24/8/17
Senior Planner

Endorsed: _____
Senior Executive Officer

ORDER: A decision, pursuant to Section 34(8) of the Planning & Development Act, 2000, as amended, for Register Reference D17A/0337, to **GRANT PERMISSION** for the above proposal, subject to the (42) condition(s) as set out above is hereby made.

REG. REF.: **D17A/0337**

Signed: Dave Irvine **Dated:** 24TH AUGUST 2017
Approved Officer

Thereunto empowered by order of Príomhfheidhmeannach, Comhairle Contae Dhún Laoghaire-Ráth An Dúin, Order No. 2102, dated 9 AUGUST 2017 delegating to me all her powers, functions and duties in relation to the County Council of Dún Laoghaire-Rathdown in respect of this matter.

Our Ref: PL 06D.249248
P.A.Reg.Ref: D17A/0337
Your Ref: Homeland Silverpines Limited

An Bord Pleanála

Brock McClure,
Planning and Development Consultants,
63 York Road,
Dun Laoghaire,
Co. Dublin.

14 MAY 2018

Appeal **Re:** Demolition of 3 no. houses and change of use of St. Joseph's House (a protected structure) to provide for a development of 139 no. residential units with all associated site works. Annaghkeen and Dalwhinnie, Leopardstown Rd, D.18 & Brewery Rd, Stillorgan, Dublin

Dear Sir/Madam,

An order has been made by An Bord Pleanála determining the above-mentioned appeal under the Planning and Development Acts 2000 to 2017. A copy of the order is enclosed.

In accordance with section 146(5) of the Planning and Development Act 2000, as amended, the Board will make available for inspection and purchase at its offices the documents relating to any matter falling to be determined by it, within 3 days following the making of its decision. The documents referred to shall be made available for a period of 5 years, beginning on the day that they are required to be made available. In addition, the Board will also make available the Inspector's Report, the Board Direction and Board Order in respect of the matter on the Board's website (www.pleanala.ie). This information is normally made available on the list of decided cases on the website on the Wednesday following the week in which the decision is made.

The Public Access Service for the purpose of inspection/purchase of file documentation is available on weekdays from 9.15am to 5.30pm (including lunchtime) except on public holidays and other days on which the office of the Board is closed.

In cases where a grant of (full) planning permission is notified by the Board, it is policy to include a copy of the Department of the Environment and Local Government's Leaflet PL11 - **Guide to the Building Control System** and a copy of the Health and Safety Authority's leaflet **Safety and Health on Construction Projects - The Role of Clients** with the notification. These leaflets are issued at the request of the above bodies.

Board Direction Attached

Tel (01) 858 8100
LoCall 1890 275 175
Fax (01) 872 2684
Website www.pleanala.ie
Email bord@pleanala.ie

64 Marlborough Street
Dublin 1
D01 V902

A further enclosure contains information in relation to challenges by way of judicial review to the validity of a decision of An Bord Pleanála under the provisions of the Planning and Development Act, 2000, as amended.

Yours faithfully,

Rita Donnelly
Executive Officer

Encl:

BP 100LN.ltr

An Bord Pleanála

Board Order
PL 06D.249248

Planning and Development Acts 2000 to 2017

Planning Authority: Dún Laoghaire-Rathdown County Council

Planning Register Reference Number: D17A/0337

Appeal by Maureen O'Driscoll on behalf of Tudor Lawns Residents Association of 7 Tudor Lawns, Foxrock, Dublin and by others and by Homeland Silverpines Limited care of Brock McClure of 63 York Road, Dun Laoghaire, County Dublin against the decision made on the 24th day of August, 2017 by Dún Laoghaire-Rathdown County Council to grant subject to conditions a permission to the said Homeland Silverpines Limited in accordance with plans and particulars lodged with the said Council.

Proposed Development: A seven year permission for a deveopment on an overall site of circa 1.65 hectares at 'Annaghkeen' and 'Dalwhinnie', Leopardstown Road (R113) and Saint Joseph's House for the Adult Deaf and Deaf Blind (a Protected Structure) and adjoining lands including 'Marian Villa' and Brewery Road (N31), Stillorgan, County Dublin. The proposed development shall provide for the demolition of three number existing residential dwellings known as 'Annaghkeen', Dalwhinnie' and 'Marian Villa' and associated outbuildings (combined demolition circa 662.2 square metres gross floor area) and the material change of use of Saint Joseph's House from residential care facility to residential use to provide for an overall development of 139 number residential units (133 number apartments and six number houses) all in a scheme of two-five storeys partly over dual access basement level. The proposal shall provide for a new residential scheme (Blocks A-E) including: (a) the construction of Blocks A-C (three-five storeys) over dual access basement level (circa 4,311 square metres) comprising 122 number apartment units;

D; (c) the refurbishment and separation of Saint Joseph's House (two storeys) into 11 number residential units to form Block E, which shall include the demolition of a single storey extension and associated outbuildings (demolition total circa 172.82 square metres gross floor area), the removal of external gates, modifications to elevations including new windows, doors and glazed balcony, new external steps and ramps, modifications to internal layout including the removal of walls and partitions and the addition of new dividing walls and part new roof. Block A (five storeys) shall provide for 53 number apartment units (13 number one beds, 37 number two beds and three number three beds); Block B (five storeys) shall provide for 58 number apartment units (7 number one beds, 49 number two beds and two number three beds); Block C (three storeys) shall provide for 11 number apartment units (seven number one beds, three number two beds and one number three beds); Block D (2-3 storeys) shall provide for six number townhouses (five number three bed terrace houses - Type T1 and one number four bed detached house - Type T2) and Block E (2 storeys) shall provide for 11 number apartment units (eight number two beds and three number three beds) in the former Saint Joseph's House building all with associated balcony/terrace/private garden areas. The development shall also consist of the amalgamation of three number existing access points along Leopardstown Road (R113) to provide for one number vehicular and pedestrian access point. The existing access point from Brewery Road (N31) to Saint Joseph's House via Silverpines will be maintained and the existing access serving the Anne Sullivan Centre for the Deaf Blind will be maintained with minor revisions to the point of access. Permission is also sought for 166 number car parking spaces (139 number at basement level, 27 number at surface level); 200 number bicycle parking spaces; bike stores (at basement and surface level); bin storage areas (at basement and surface level); plant areas; circa 5,960 square metres of public open space (including new tree walk, courtyard spaces and new play area); new boundary treatment; green roofs associated with Blocks A-C; provision for pedestrian connections to the adjoining park; site services and all associated site development service connections and landscape works. (As amended by the further public notice received by the planning authority on the 28th day of July, 2017).

Decision

GRANT permission for the above proposed development in accordance with the said plans and particulars based on the reasons and considerations under and subject to the conditions set out below.

Matters Considered

In making its decision, the Board had regard to those matters to which, by virtue of the Planning and Development Acts and Regulations made thereunder, it was required to have regard. Such matters included any submissions and observations received by it in accordance with statutory provisions.

Reasons and Considerations

In coming to its decision, the Board had regard to the following:

- the policies and objectives in the Dún Laoghaire-Rathdown County Development Plan 2016-2022,
- the nature, scale and design of the proposed development,
- the availability in the area of a wide range of social and transport infrastructure including LUAS and QBC connections,
- the pattern of existing and permitted development in the area,
- the submissions and observations received, and
- the report of the Planning Inspector,

it is considered that, subject to compliance with the conditions set out below, the proposed development would not seriously injure the residential or visual amenities of the area or of property in the vicinity, would respect the character of Saint Joseph's House, a Protected Structure, (RPS reference number 1548), would respect the character of the wider area, would be acceptable in terms of traffic and pedestrian safety and convenience and would provide greater permeability and connectivity in the area. The proposed development would, therefore, be in accordance with the proper planning and sustainable development of the area.

In deciding not to accept the Inspector's recommendation to refuse permission, the Board concurred with the analysis of the planning authority and was satisfied that sufficient separation distance was established between the proposed apartment Blocks A and B from the Protected Structure and Leopardstown Lawn respectively to protected visual and residential amenity and that the character and setting of the Protected Structure was adequately protected. Furthermore, the Board agreed with the planning authority that the height of the proposed Blocks A and B was justified in the context of the Building Height Strategy contained in the in the Dún Laoghaire-Rathdown County Development Plan and was also in accordance with the Ministerial Guidelines. It was, therefore, considered that the proposed development would not injure the residential or visual amenities of the area and would be in accordance with the proper planning and sustainable development of the area.

Conditions

1. The development shall be carried out and completed in accordance with the plans and particulars lodged with the application, as amended by the further plans and particulars submitted on the 28th day of July, 2017, except as may otherwise be required in order to comply with the following conditions. Where such conditions require details to be agreed with the planning authority, the developer shall agree such details in writing with the planning authority prior to commencement of development and the development shall be carried out and completed in accordance with the agreed particulars.

   Reason: In the interest of clarity.

2 Details and samples of the materials, colours and textures of all the external finishes to the proposed development including pavement finishes shall be submitted to, and agreed in writing with, the planning authority prior to commencement of development.

   Reason: In the interest of the visual amenities of the area.

3. The vehicular access to the scheme shall be provided via both the Brewery Road and Leopardstown Road with double ramped basement car parking. Ramp access A and Ramp access B to the basement car park shall be operational and available for use prior to occupation of any of the proposed Blocks (A-C). Only left in/left out movements shall be permitted at the Leopardstown Road Access.

   Reason: In the interest of traffic safety.

4. The works to the protected structure at Saint Joseph's shall be completed prior to the occupation of Blocks A-C.

   Reason: In the interest of the protection of the Built Heritage of the County.

5. The developer shall relocate the direct pedestrian accesses to the existing open space along the northern boundary so that they are located away from the existing trees. The developer shall submit revised plans for the written agreement of the planning authority that address this matter.

Reason: To ensure the protection, safety, prudent retention and long term viability of the trees to be retained on site and immediately adjacent to the site.

6. Proposals for an estate/street name, house/apartment numbering scheme and associated signage shall be submitted to, and agreed in writing with, the planning authority prior to commencement of development. Thereafter, all estate and street signs, and house/apartment numbers, shall be provided in accordance with the agreed scheme. The proposed name(s) shall be based on local historical or topographical features, or other alternatives acceptable to the planning authority. No advertisements/marketing signage relating to the name(s) of the development shall be erected until the developer has obtained the planning authority's written agreement to the proposed name(s).

Reason: In the interest of urban legibility and to ensure the use of locally appropriate placenames for new residential areas.

7. Construction and demolition waste shall be managed in accordance with a construction waste and demolition management plan, which shall be submitted to, and agreed in writing with, the planning authority prior to commencement of development. This plan shall be prepared in accordance with the "Best Practice Guidelines on the Preparation of Waste Management Plans for Construction and Demolition Projects", published by the Department of the Environment, Heritage and Local Government in July, 2006. The plan shall include details of waste to be generated during site clearance and construction phases, and details of the methods and locations to be employed for the prevention, minimisation, recovery and disposal of this material in accordance with the provision of the Waste Management Plan for the Region in which the site is situated.

Reason: In the interest of sustainable waste management.

8. No additional development shall take place above roof parapet level, including lift motor enclosures, air handling equipment, storage tanks, ducts or other external plant, telecommunication aerials, antennas or equipment, unless authorised by a further grant of planning permission.

Reason: To protect the residential amenities of property in the vicinity and the visual amenities of the area.

9. Water supply and drainage arrangements, including the attenuation and disposal of surface water, shall comply with the requirements of the planning authority for such works and services. In addition, prior to commencement of development mitigation measures against the risk of flooding shall be agreed with the planning authority including measures to address egress of occupants from the building in the case of flooding of surrounding land.

Reason: In the interest of public health.

10. (a) All foul sewage and soiled water shall be discharged to the public foul sewer.

(b) Only clean, uncontaminated storm water shall be discharged to the surface water drainage system.

Reason: In the interest of public health.

11. Prior to commencement of development, the developer shall lodge with the planning authority a cash deposit, a bond of an insurance company or such other security as may be accepted in writing by the planning authority, to secure the protection of the trees on site and to make good any damage caused during the construction period, coupled with an agreement empowering the planning authority to apply such security, or part thereof, to the satisfactory protection of any tree or trees on the site or the replacement of any such trees which die, are removed or become seriously damaged or diseased within a period of three years from the substantial completion of the development with others of similar size and species. The form and amount of the security shall be as agreed between the planning authority and the developer or, in default of agreement, shall be referred to An Bord Pleanála for determination.

Reason: To secure the protection of the trees on the site.

12. Prior to the commencement of any permitted development, the developer shall engage the services of a qualified arborist as an arboricultural consultant for the entire period of construction activity. The developer shall inform the planning authority in writing of the appointment and name of the consultant prior to commencement of development. The consultant shall visit the site at minimum on a monthly basis to ensure the implementation of all of the recommendations in the tree reports and plans. The arborist shall include secondary tree protection fencing around all root protection areas of trees to be retained. All works within these areas shall be supervised at all times by the project arborist and the fencing can only be temporarily removed to undertake works under the supervision of the arborist. The arborist shall agree the exact location and detail of the secondary fencing in writing with the Parks and Landscape Services prior to the commencement of any permitted development. To ensure the protection of trees to be retained within the site, the developer shall implement all the recommendations pertaining to tree retention, tree protection and tree works, as detailed in the Arboricultural Method Statement and Tree Protection Plan in the submitted tree report. All tree felling, surgery and remedial works shall be completed upon completion

of the works. All works on retained trees shall comply with proper arboricultural techniques conforming to BS 3998: 2010 Tree Work - Recommendations. The clearance of any vegetation including trees and scrub shall be carried out outside the bird-breeding season (1st March - 31st August inclusive) or as stipulated under the Wildlife Acts, 1976 and 2000. The arborist shall carry out a post construction tree survey and assessment on the condition of the retained trees. A completion certificate shall be signed off by the arborist when all permitted development works are completed and in line with the recommendations of the tree report. The certificate shall be submitted to Dún Laoghaire-Rathdown County Council's Parks and Landscape Services for written agreement upon completion of the works. The developer shall also be made aware of their obligations to constantly assess and survey the trees after construction because of the potential impact and the age/condition of these trees as outlined in the tree and hedgerow survey.

Reason: To ensure and give practical effect to the retention, protection and sustainability of trees during and after construction of the permitted development.

13. Dual vehicular access (Preferred Vehicular Access Strategy of ILTP Consulting Report) only left in/left out movements shall be permitted at the Leopardstown Road access. Prior to commencement of development, full details of the proposed works to be carried out at the developer's expense at Leopardstown Road shall be submitted for the written agreement of the planning authority. Works shall include:

(a) left in/left out only vehicular access at Leopardstown Road;

(b) two metres minimum width footpath on both sides of vehicular entrance to the proposed development;

(c) relocated Bus Stop with kassel kerbs and provision for future bus shelter for proposed bus priority route;

(d) close off of other existing access points at Leopardstown Road Development frontage;

(e) reinstatement of grass verge, footpath and cycle track; and

(f) bollards, road marking, signage and public lighting.

Reason: In the interest of traffic safety.

14. The developer shall ensure provision of electric vehicle charging points for minimum number of car parking spaces in accordance with Section 8.2.4.12 of the Dún Laoghaire-Rathdown County Development Plan 2016-2022.

Reason: In the interest of the proper planning and sustainable development of the area.

15. Prior to commencement of development, details of an appointed Travel Plan (Mobility Management Plan) Manager shall be provided to the planning authority. The developer shall ensure in accordance with Dún Laoghaire-Rathdown County Development Plan 2016-2022, Section 8.2.4.3 that the recommended initiatives and monitoring of a Travel Plan (Mobility Management Plan) are implemented as outlined in the submitted Mobility Management Plan by ILTP Consulting dated July, 2017.

Reason: In the interest of traffic safety.

16. The construction of the development shall be managed in accordance with a Construction Management Plan, which shall be submitted to, and agreed in writing with, the planning authority prior to commencement of development. This plan shall provide details of intended construction practice for the development, including hours of working, noise management measures and off-site disposal of construction/demolition waste.

Reason: In the interests of public safety and residential amenity.

17. Public lighting shall be provided in accordance with a scheme, details of which shall be submitted to, and agreed in writing with, the planning authority prior to commencement of development. Such lighting shall be provided prior to the making available for occupation of the proposed development.

Reason: In the interests of amenity and public safety.

18. The mitigation measures in relation to bats set out in the Ecological Impact Assessment by Scott Cawley submitted in support of the application shall be followed. Bat activity surveys consisting of dusk emergence and dawn re-entry surveys of the existing tees and building identified as having potential features suitable as bat roosts shall be carried out in the May-August Period. If a bat roost is identified, a derogation licence shall be applied for to National Parks and Wildlife Services it is intended to remove or otherwise interfere with it.

Reason: To prevent any injury occurring to bats or their breeding or resting places which are afforded protection under the Habitats Directive 1992.

19. Prior to commencement of development, the developer shall submit full details of a properly constituted Private Management Company for the written agreement of the planning authority. This shall include a layout map of the development showing any areas to be taken in charge and those areas to be maintained by the Private Management Company. Membership of this Company shall be compulsory for all purchasers of property in the development. Confirmation that this Company has been set up shall be submitted to the planning authority prior to the occupation of the first residential unit. All roads and services within the privately managed areas shall be completed to the Council's taking in charge standards. Details shall also include management details of the community room.

Reason: To provide for the satisfactory completion and maintenance of the development in the interest of residential amenity.

20. Prior to commencement of development, the applicant or other person with an interest in the land to which the application relates shall enter into an agreement in writing with the planning authority in relation to the provision of housing in accordance with the requirements of section 94(4) and section 96(2) and (3) (Part V) of the Planning and Development Act 2000, as amended, unless an exemption certificate shall have been applied for and been granted under section 97 of the Act, as amended. Where such an agreement is not reached within eight weeks from the date of this order, the matter in dispute (other than a matter to which section 96(7) applies) may be referred by the planning authority or any other prospective party to the agreement to An Bord Pleanála for determination.

Reason: To comply with the requirements of Part V of the Planning and Development Act 2000, as amended, and of the housing strategy in the development plan of the area.

21. Prior to commencement of development, the developer shall lodge with the planning authority a cash deposit, a bond of an insurance company, or other security to secure the provision and satisfactory completion of roads, footpaths, watermains, drains, open space and other services required in connection with the development, coupled with an agreement empowering the local authority to apply such security or part thereof to the satisfactory completion of any part of the development. The form and amount of the security shall be as agreed between the planning authority and the developer or, in default of agreement, shall be referred to An Bord Pleanála for determination.

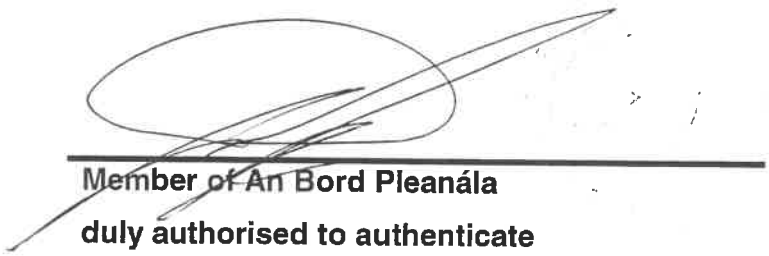
Reason: To ensure the satisfactory completion of the development.

22. The developer shall pay to the planning authority a financial contribution in respect of public infrastructure and facilities benefiting development in the area of the planning authority that is provided or intended to be provided by or on behalf of the authority in accordance with the terms of the Development Contribution Scheme made under section 48 of the Planning and Development Act 2000, as amended. The contribution shall be paid prior to commencement of development or in such phased payments as the planning authority may facilitate and shall be subject to any applicable indexation provisions of the Scheme at the time of payment. Details of the application of the terms of the Scheme shall be agreed between the planning authority and the developer or, in default of such agreement, the matter shall be referred to An Bord Pleanála to determine the proper application of the terms of the Scheme.

Reason: It is a requirement of the Planning and Development Act 2000, as amended, that a condition requiring a contribution in accordance with the Development Contribution Scheme made under section 48 of the Act be applied to the permission.

23. The developer shall pay to the planning authority a financial contribution in respect of the extension of Luas Line B1 from the Sandyford Depot to Cherrywood in accordance with the terms of the Supplementary Development Contribution Scheme made by the planning authority under section 49 of the Planning and Development Act 2000, as amended. The contribution shall be paid prior to commencement of development or in such phased payments as the planning authority may facilitate and shall be subject to any applicable indexation provisions of the Scheme at the time of payment. Details of the application of the terms of the Scheme shall be agreed between the planning authority and the developer or, in default of such agreement, the matter shall be referred to An Bord Pleanála to determine the proper application of the terms of the Scheme.

Reason: It is a requirement of the Planning and Development Act 2000, as amended, that a condition requiring a contribution in accordance with the Supplementary Development Contribution Scheme made under section 49 of the Act be applied to the permission.



Member of An Bord Pleanála
duly authorised to authenticate
the seal of the Board.

Dated this 11th **day of** May **2018**

BARRETT **MAHONY**
CONSULTING ENGINEERS
CIVIL & STRUCTURAL

APPENDIX

II

IRISH WATER DOCUMENTS

Paul Stephenson
Barrett Mahony,
52-54, Sandwith St Lower
D02WR26
Dublin
Ireland

Uisce Éireann
Bosca OP 448
Oifig Sheachadta na
Cathrach Theas
Cathair Chorcaí

Irish Water
PO Box 448,
South City
Delivery Office,
Cork City.

www.water.ie

6 September 2021

Re: Design Submission for St.Joseph House, Silver Pines, Dublin (the "Development") (the "Design Submission") / Connection Reference No: CDS19008244 - REV 1

Dear Paul Stephenson,

Many thanks for your recent Design Submission.

We have reviewed your proposal for the connection(s) at the Development. Based on the information provided, which included the documents outlined in Appendix A to this letter, Irish Water has no objection to your proposals.

This letter does not constitute an offer, in whole or in part, to provide a connection to any Irish Water infrastructure. Before you can connect to our network you must sign a connection agreement with Irish Water. This can be applied for by completing the connection application form 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 (CRU)(https://www.cru.ie/document_group/irish-waters-water-charges-plan-2018/).

You the customer (including any designers/contractors or other related parties appointed by you) is entirely responsible for the design and construction of all water and/or wastewater infrastructure within the Development which is necessary to facilitate connection(s) from the boundary of the Development to Irish Water's network(s) (the "**Self-Lay Works**"), as reflected in your Design Submission. Acceptance of the Design Submission by Irish Water does not, in any way, render Irish Water liable for any elements of the design and/or construction of the Self-Lay Works.

If you have any further questions, please contact your Irish Water representative:
Name: Fionán Ginty
Phone: 01 8925734
Email: fginty@water.ie

Yours sincerely,

Yvonne Harris

Yvonne Harris
Head of Customer Operations

Appendix A

Document Title & Revision

BPR-BMD-00-00-DR-C-1000-PL12 Foul and Surface Drainage Ground Fl. Layout

BPR-BMD-00-00-DR-C-1020-PL8 Watermains

BPR-BMD-00-00-DR-C-1101-PL3 Proposed Drainage Sections

Notes:

A full detailed design submission for the proposed wastewater pump station shall be submitted at connection application stage and will be subject to detailed design review.

*For further information, visit **www.water.ie/connections***

Notwithstanding any matters listed above, the Customer (including any appointed designers/contractors, etc.) is entirely responsible for the design and construction of the Self-Lay Works. Acceptance of the Design Submission by Irish Water will not, in any way, render Irish Water liable for any elements of the design and/or construction of the Self-Lay Works.

Paul Stephenson

Barrett Mahony,
52-54, Sandwith St Lower, Dublin
Dublin
D02WR26
Ireland

Uisce Éireann
Bosca OP 448
Oifig Sheachadta na
Cathrach Theas
Cathair Chorcaí

Irish Water
PO Box 448,
South City
Delivery Office,
Cork City.

www.water.ie

12 July 2021

Re: CDS19008244 pre-connection enquiry - Subject to contract | Contract denied

Connection for Housing Development of 463 unit(s) at St.Joseph House, Silver Pines, Dublin

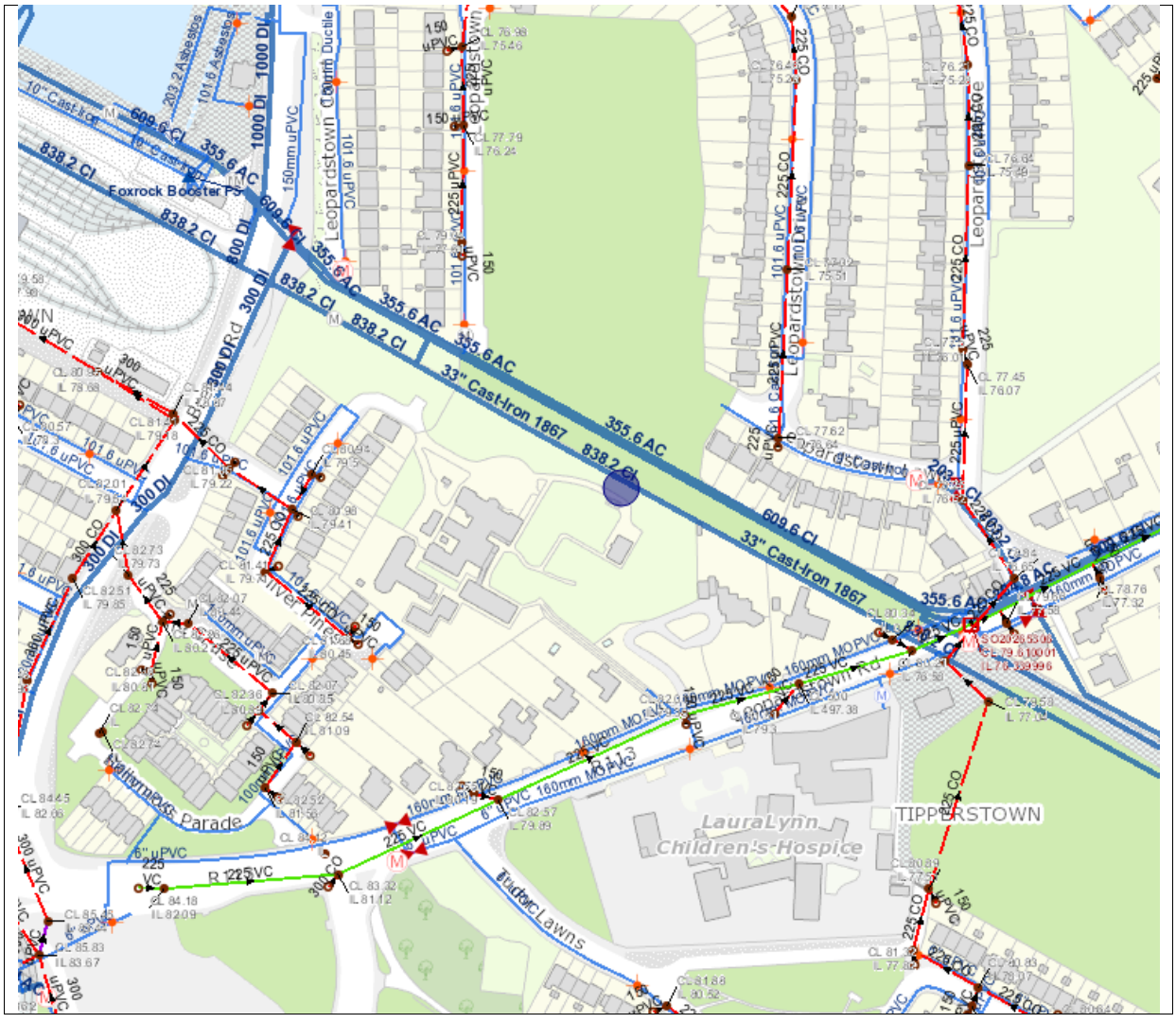
Dear Sir/Madam,

Irish Water has reviewed your pre-connection enquiry in relation to a Water & Wastewater connection at St.Joseph House, Silver Pines, Dublin (the **Premises**). Based upon the details you have provided with your pre-connection enquiry and on our desk top analysis of the capacity currently available in the Irish Water network(s) as assessed by Irish Water, we wish to advise you that your proposed connection to the Irish Water network(s) can be facilitated at this moment in time.

SERVICE	**OUTCOME OF PRE-CONNECTION ENQUIRY** **THIS IS NOT A CONNECTION OFFER. YOU MUST APPLY FOR A CONNECTION(S) TO THE IRISH WATER NETWORK(S) IF YOU WISH TO PROCEED.**
Water Connection	New connection to the existing network is feasible without upgrade.
Wastewater Connection	Feasible subject to upgrades
SITE SPECIFIC COMMENTS	
Water Connection	N/A
Wastewater Connection	Feasible to connect subject to flows from the entire development site being limited to 5l/s and the delivery of an Irish Water project to augment the bifurcation of sewers at the Leopardstown Road and an existing Irish Water storage tank at Burton Hall Road. This upgrade project is scheduled to be completed by 2023 (this may be subject to change). Work on these assets will be in the public domain. Provision for a gravity bypass should be included in the development's pumped solution design, which will need to be decommissioned at a future date. The development's pumping station will be the responsibility of the developer to operate, maintain and decommission. The details of the

	pumping station, operational requirements and bypass will be subject to any future Connection Agreement for the development. The connection point is to the Silver Pines estate and the network west of the development site.
Strategic Housing Development	Irish Water notes that the scale of this development dictates that it is subject to the Strategic Housing Development planning process. In advance of submitting your full application to An Bord Pleanala for assessment, you must have reviewed this development with Irish Water and received a Statement of Design Acceptance in relation to the layout of water and wastewater services.
The design and construction of the Water & Wastewater pipes and related infrastructure to be installed in this development shall comply with the Irish Water Connections and Developer Services Standard Details and Codes of Practice that are available on the Irish Water website. Irish Water reserves the right to supplement these requirements with Codes of Practice and these will be issued with the connection agreement.	

The map included below outlines the current Irish Water infrastructure adjacent to your site:



General Notes:

1) The initial assessment referred to above is carried out taking into account water demand and wastewater discharge volumes and infrastructure details on the date of the assessment. **The availability of capacity may change at any date after this assessment.**
2) This feedback does not constitute a contract in whole or in part to provide a connection to any Irish Water infrastructure. All feasibility assessments are subject to the constraints of the Irish Water Capital Investment Plan.
3) The feedback provided is subject to a Connection Agreement/contract being signed at a later date.
4) A Connection Agreement will be required to commencing the connection works associated with the enquiry this can be applied for at https://www.water.ie/connections/get-connected/
5) A Connection Agreement cannot be issued until all statutory approvals are successfully in place.
6) Irish Water Connection Policy/ Charges can be found at https://www.water.ie/connections/information/connection-charges/
7) Please note the Confirmation of Feasibility does not extend to your fire flow requirements.
8) Irish Water is not responsible for the management or disposal of storm water or ground waters. You are advised to contact the relevant Local Authority to discuss the management or disposal of proposed storm water or ground water discharges
9) To access Irish Water Maps email datarequests@water.ie
10) All works to the Irish Water infrastructure, including works in the Public Space, shall have to be carried out by Irish Water.

If you have any further questions, please contact Marko Komso from the design team on 022 54611 or email mkomso@water.ie For further information, visit **www.water.ie/connections.**

Yours sincerely,

Yvonne Harris

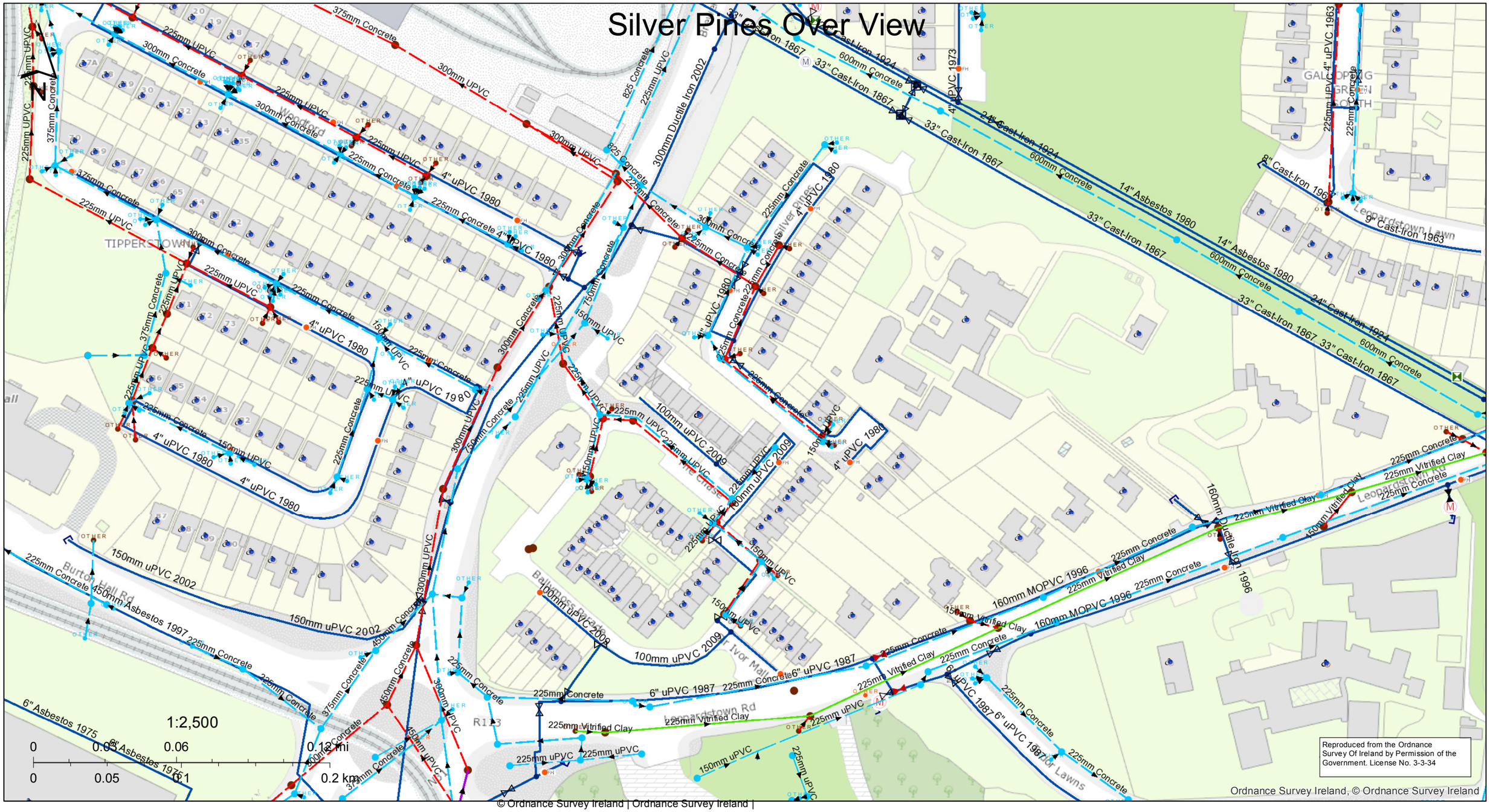
Head of Customer Operations

BARRETT **MAHONY**
CONSULTING ENGINEERS
CIVIL & STRUCTURAL

APPENDIX III

EXISTING SERVICE MAPS

Silver Pines Over View



February 20, 2017

Legend

Surface	Standard	Storm Clean Outs	Cascade	Standard Outlet	Gully	PSV	Water Stop Valves
Surface	Other; Unknown	Combined	Catchpit	Other; Unknown	Standard	Other	Meter
Cascade	Vent/Col	Foul	Hatchbox	Rodding Eye	Other; Unknown	Open	Group Scheme
Catchpit	Other; Unknown	Overflow	Lamphole	Flushing Structure	Vent/Col	Closed	Source
Hatchbox	Outfall	Unknown	Standard	Other; Unknown	Other; Unknown	Part Closed	
Lamphole	Overflow	Combined	Other; Unknown	Sewer Flow Control Valves	Non-return	Open	
Standard	Soakaway	Foul	Outfall	Treatment plant	Hydro	Closed	
Other; Unknown	Other; Unknown	Overflow	Overflow	Pump station	Orifice Plate	Part Closed	
Gully	Storm Culverts	Unknown	Soakaway	Catchpit	PRV	Air Control Valves	

Irish Water gives this information as to the position of its underground network as a general guide only on the strict understanding that it is based on the best available information provided by each Local Authority in Ireland. It should not be relied upon in the event of excavations or other works being carried out in the vicinity of the network. The onus is on the parties carrying out the works to ensure the exact location of the network is identified prior to mechanical works being carried out. Service pipes are not generally shown but their presence should be anticipated. © Irish Water

UISCE ÉIREANN : IRISH WATER

"Gas Networks Ireland (GNI), their affiliates and assigns, accept no responsibility for any information contained in this document concerning location and technical designation of the gas distribution and transmission network ("the Information"). Any representations and warranties express or implied, are excluded to the fullest extent permitted by law. No liability shall be accepted for any loss or damage including, without limitation, direct, indirect, special, incidental, punitive or consequential loss including loss of profits, arising out of or in connection with the use of the Information (including maps or mapping data). NOTE: DIAL BEFORE YOU DIG Phone 1850 427 747 or e-mail dig@gasnetworks.ie – The actual position of the gas/electricity distribution and transmission network must be verified on site before any mechanical excavating takes place. If any mechanical excavation is proposed, hard copy maps must be requested from GNI re gas. All work in the vicinity of the gas distribution and transmission network must be completed in accordance with the current edition of the Health & Safety Authority publication, 'Code of Practice For Avoiding Danger From Underground Services' which is available from the Health and Safety Authority (1890 28 93 89) or can be downloaded free of charge at www.hsa.ie."

BARRETT **MAHONY**
CONSULTING ENGINEERS
CIVIL & STRUCTURAL

APPENDIX IV

SITE INVESTIGATION

Soakaway Design f -value from field tests (F2C) IGSL

Contract:	Berwick Pines	Contract No:	22530
Test No.	SA01 - Cycle 1	Northing:	720248.762
Client	BMCE	Easting:	726355.221
Date:	27/05/2020	Elevation:	81.736

Summary of ground conditions

from	to	Description	Ground water
0.00	0.20	TOPSOIL	
0.20	1.80	Brown very sandy gravelly CLAY with cobble and boulders	Seepage at 2.2
1.80	2.25	Golden gravelly granitic SAND with cobble and boulders	

Notes: Two cycles carried out. Presoak carried out before Cycle 1 for 60mins.
(B) - AA136498 - 2.0mbgl
(B)- AA136497 - 0.9mbgl

Field Data

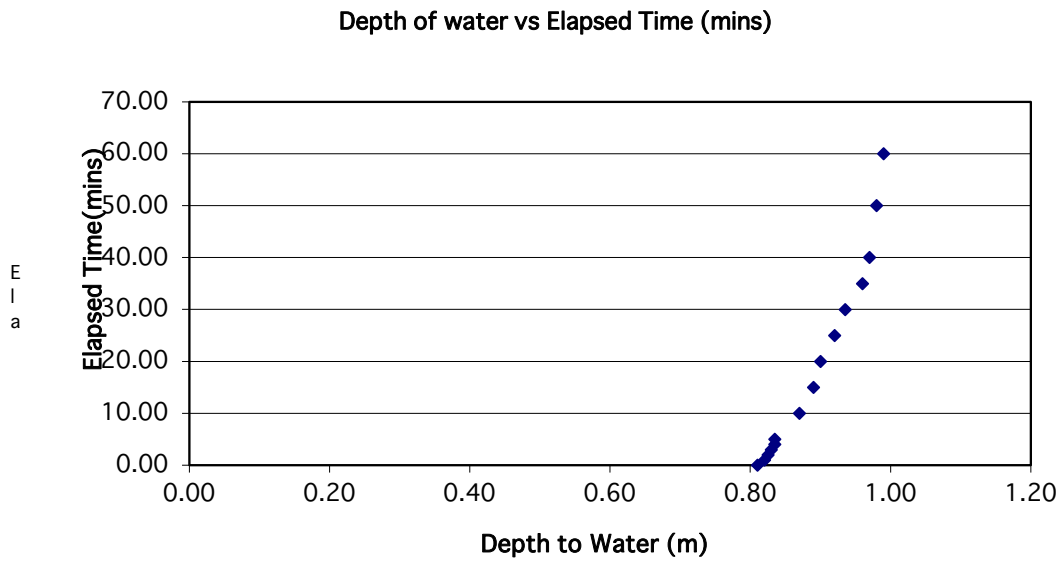
Depth to Water (m)	Elapsed Time (min)
0.81	0.00
0.82	1.00
0.83	2.00
0.83	3.00
0.84	4.00
0.84	5.00
0.87	10.00
0.89	15.00
0.90	20.00
0.92	25.00
0.94	30.00
0.96	35.00
0.97	40.00
0.98	50.00
0.99	60.00

Field Test

Depth of Pit (D)	2.25	m
Width of Pit (B)	0.45	m
Length of Pit (L)	1.50	m
Initial depth to Water =	0.81	m
Final depth to water =	0.99	m
Elapsed time (mins)=	60.00	
Top of permeable soil		m
Base of permeable soil		m
Base area=	0.675	m2
*Av. side area of permeable stratum over test perio	5.265	m2
Total Exposed area =	5.94	m2

Infiltration rate (f) = Volume of water used/unit exposed area / unit time

f= 0.00034 m/min or 5.682E-06 m/sec



Soakaway Design f -value from field tests (F2C) IGSL

Contract:	Berwick Pines	Contract No:	22530
Test No.	SA01 - Cycle 2	Northing:	720248.762
Client	BMCE	Easting:	726355.221
Date:	27/05/2020	Elevation:	81.736

Summary of ground conditions

from	to	Description	Ground water
0.00	0.20	TOPSOIL	
0.20	1.80	Brown very sandy gravelly CLAY with cobble and boulders	Seepage at 2.2
1.80	2.25	Golden gravelly granitic SAND with cobble and boulders	

Notes: Two cycles carried out. Presoak carried out before Cycle 1 for 60mins.
(B) - AA136498 - 2.0mbgl
(B)- AA136497 - 0.9mbgl

Field Data

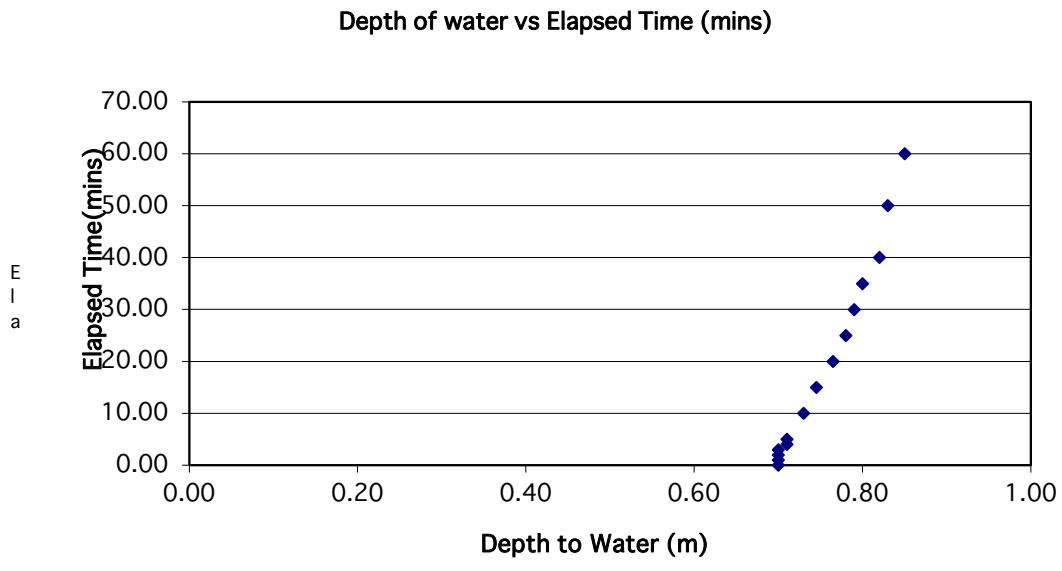
Depth to Water (m)	Elapsed Time (min)
0.70	0.00
0.70	1.00
0.70	2.00
0.70	3.00
0.71	4.00
0.71	5.00
0.73	10.00
0.75	15.00
0.77	20.00
0.78	25.00
0.79	30.00
0.80	35.00
0.82	40.00
0.83	50.00
0.85	60.00

Field Test

Depth of Pit (D)	2.25	m
Width of Pit (B)	0.45	m
Length of Pit (L)	1.50	m
Initial depth to Water =	0.70	m
Final depth to water =	0.85	m
Elapsed time (mins)=	60.00	
Top of permeable soil		m
Base of permeable soil		m
Base area=	0.675	m2
*Av. side area of permeable stratum over test perio	5.7525	m2
Total Exposed area =	6.4275	m2

Infiltration rate (f) = Volume of water used/unit exposed area / unit time

f= 0.00026 m/min or 4.376E-06 m/sec



Trinity Green
Environmental Consultants

Clonfert
Maynooth
Co. Kildare
t: 01-6290616
m: 086-2434828
Vat No. 3251411B

Soil Infiltration Test for Design of Soakaway

At

Berwick Pines, Leopardstown Road, Sandyford

Prepared by

Dr. Eugene Bolton
Senior Consultant
Trinity Green

Report on Soil Infiltration Test

Introduction

To manage the surface water from the development it is proposed to construct Soakaways in accordance with BRE Digest365 As part of this, the infiltration capacity of the soil was assessed. Dr. Eugene Bolton of Trinity Green Environmental Consultants was commissioned to carry out soil Infiltration Tests in accordance with BRE Digest365 to establish the suitability of the site for disposal of water.

1.0 Visual assessment of Site

The site is located in an Urban setting where the landscape is relatively flat and on the day of the tests there was no surface water present. There is no vegetation on the site or in adjoining lands that would indicate poor soakage

2.0 *Sub-soil profile*

Tests were completed at 2 locations. Location 1 is the larger site.

2.1 Location 1

A test pit was excavated to 2.1mbgl. The topsoil consists of a 400mm layer of gravely clay
The subsoil is a brown Gravely CLAY but with increasing gravel content down to 1.8m bgl where the subsoil is a gravel with high clay content. A large boulder was present at 1.6m bgl
There was no evidence of a watertable in this pit.

2.11Infiltration Tests

The Infiltration rate, generally expressed as metres per second, is the volume of water that enters the soil over a unit area and unit time. In order to obtain this measurement a pit is excavated and filled with water. The fall in the level of the water is recorded over time.
A separate test pit was excavated and this pit had dimensions

Length 1.3m
Width 0.3m
Depth 1.2m

The base of the pit was filled with water to a depth of 800mm and the drop in the water level was followed over time

2.12 Results

The time required for the level to fall from 75% full to 25% full (ie 50% drop) – from a water depth of 0.6m to a water depth of 0.2m is estimated to be 336min.

Table 1 – Time taken for water level to fall

Elapsed Time (Mins)	Depth of Water (mm)
0	800
3	780
37	580
44	540
71	500
84	480
109	460
127	430
169	370
191	340
225	300
262	260
284	240
320	210
334	200

Infiltration rate (f) = Volume of water used/unit exposed area /unit time

Volume = pit length (m) x Width (m) x Drop in water level (m)
= 1.3 x 0.3 x 0.4
= 0.156m3

Exposed area = (Length x Half the effective height x 2) + (Width x Half the effective height x 2) + Base area
= (1.3 x 0.4 x 2) + (0.3 x 0.4 x 2) + (1.3 x 0.3)
= 1.67m2

Time = 336min

Infiltration rate (f) = 0.156/1.67/336

= 2.78E-04 m/min

f = 4.6E-06 m/sec

2.2 Location 2

A test pit was excavated to 2.0 mbgl. The topsoil consists of a 300mm layer of gravely clay The subsoil is a redish brown CLAY down to 1m. From 1m to pit base the subsoil is a compacted granite derived gravel with low clay content

There was water in this pit at 1.8m bgl – there may be mottling at a higher level but this wasn't evident due to the nature and colour of the subsoil.

2.21 Infiltration Tests

The Infiltration rate, generally expressed as metres per second, is the volume of water that enters the soil over a unit area and unit time. In order to obtain this measurement a pit is excavated and filled with water. The fall in the level of the water is recorded over time.
A separate test pit was excavated and this pit had dimensions

Length 1.2m
Width 0.35m
Depth 1.2m

The base of the pit was filled with water to a depth of 800mm and the drop in the water level was followed over time

2.3 Results

The time required for the level to fall from 75% full to 25% full (ie 50% drop) – from a water depth of 0.6m to a water depth of 0.2m is estimated to be 314min.

Table 1 – Time taken for water level to fall

Elapsed Time (Mins)	Depth of Water (mm)
0	800
3	770
10	740
28	680
33	670
63	600
78	570
99	530
116	500
128	480
162	430
183	400
191	390
223	350
257	310
285	280
314	250
379	200

Infiltration rate (f) = Volume of water used/unit exposed area /unit time

Volume = pit length (m) x Width (m) x Drop in water level (m)
= 1.2 x 0.35 x 0.4
= 0.168m3

Exposed area = (Length x Half the effective height x 2) + (Width x Half the effective height x 2) + Base area
= (1.2 x 0.4 x 2) + (0.35 x 0.4 x 2) + (1.2 x 0.35)
= 1.66m2

Time = 314min

Infiltration rate (f) = 0.168/1.66/314

= 3.2E-04 m/min

f = 5.3E-06 m/sec

3.0 *Conclusions*

From the above observation it is concluded that the soakage is reasonable but from the result of the second test the watertable is at about 1.8m bgl

Signed .....
Dr. Eugene Bolton
Senior Consultant
Trinity Green

30/07/2019

Photo

Location 1 - Trial Pit – Depth 2.1

Test Pit before water added – Depth 1.2m

Pit during test

Location 2

Test Pit before addition of water – depth 1.2m

Pit during test


St. Joseph House
Silver Pines
Anne Sullivan Centre for people who are deafblind
Leopardstown
Leopardstown
Silverpark GAA g
LauraLynn - Ireland's Children's Hospice
1
2

TRIAL PIT RECORD

REPORT NUMBER 22530

CONTRACT	Berwick Pines	**TRIAL PIT NO.**	**TP01**
		SHEET	Sheet 1 of 1
LOGGED BY	S.Cunningham	**CO-ORDINATES**	720,204.79 E 726,343.87 N
		DATE STARTED	26/05/2020
		DATE COMPLETED	26/05/2020
CLIENT	BCME	**GROUND LEVEL (m)**	81.63
ENGINEER		**EXCAVATION METHOD**	7T JCB

Geotechnical Description	Legend	Depth (m)	Elevation	Water Strike	Samples: Sample Ref	Samples: Type	Samples: Depth	Vane Test (KPa)	Hand Penetrometer (KPa)
TOPSOIL		0.10	81.53		AA136472	Env	0.00-1.50		
MADE GROUND comprised of soft black ash and charcoal with glass bottles and china fragments.		0.60	81.03		AA136470	B	0.50		
MADE GROUND comprised of reddish sandy gravelly silty CLAY with red brick and glass fragments.					AA136471	B	1.00		
Stiff brown very sandy gravelly CLAY with a medium cobble content and occasional boulders. Sand is fine to coarse. Gravel is subrounded to subangular, fine to coarse. Cobbles and boulders are rounded comprised of granite.		1.60	80.03		AA136474	Env	1.60-2.40		
					AA136473	B	2.00		
End of Trial Pit at 2.40m		2.40	79.23						

0.0
1.0
2.0
3.0
4.0

Groundwater Conditions
Pit was dry

Stability
Unstable in MADE GROUND

General Remarks
Pit terminated at 2.2mbgl due to large granite boulders/possible bedrock.

IGSL TP LOG 22530.GPJ IGSL.GDT 4/6/20

TRIAL PIT RECORD

REPORT NUMBER 22530

CONTRACT	Berwick Pines	**TRIAL PIT NO.**	**TP02**
		SHEET	Sheet 1 of 1
LOGGED BY	S.Cunningham	**CO-ORDINATES**	720,234.35 E 726,317.10 N
		DATE STARTED	26/05/2020
		DATE COMPLETED	26/05/2020
CLIENT	BCME	**GROUND LEVEL (m)**	82.55
ENGINEER		**EXCAVATION METHOD**	7T JCB

Geotechnical Description	Legend	Depth (m)	Elevation	Water Strike	Samples: Sample Ref	Samples: Type	Samples: Depth	Vane Test (KPa)	Hand Penetrometer (KPa)
0.0 TOPSOIL					AA136500	Env	0.00-1.50		
MADE GROUND comprised of grey/white ash and charcoal fragments		0.20	82.35						
Firm brown sandy gravelly CLAY with a low cobble content and occasional boulders. Sand is fine to coarse. Gravel is subrounded to subangular, fine to coarse. Cobbles and boulders are rounded comprised of granite.		0.60	81.95		AA136499	B	0.50		
1.0					AA136482	B	1.00		
Medium dense golden gravelly granitic SAND with a low cobble content and occasional boulders. Sand is fine to coarse. Gravel is subrounded to subangular, fine to coarse. Cobbles and boulders are rounded comprised of granite. (Highly weathered granite)		1.20	81.35						
		1.50	81.05						
End of Trial Pit at 1.70m									
2.0									
3.0									
4.0									

Groundwater Conditions
Pit was dry

Stability
Stable

General Remarks
Pit terminated at 1.7mbgl due to large granite boulders

IGSL TP LOG 22530.GPJ IGSL.GDT 4/6/20

TRIAL PIT RECORD

REPORT NUMBER 22530

CONTRACT	Berwick Pines	**TRIAL PIT NO.**	**TP03**
		SHEET	Sheet 1 of 1
LOGGED BY	S.Cunningham	**CO-ORDINATES**	720,261.31 E 726,370.76 N
		DATE STARTED	26/05/2020
		DATE COMPLETED	26/05/2020
CLIENT	BCME	**GROUND LEVEL (m)**	81.48
ENGINEER		**EXCAVATION METHOD**	7T JCB

Geotechnical Description	Legend	Depth (m)	Elevation	Water Strike	Samples: Sample Ref	Samples: Type	Samples: Depth	Vane Test (KPa)	Hand Penetrometer (KPa)
0.0 TOPSOIL		0.20	81.28						
Firm brown very sandy gravelly CLAY with a medium cobble content and frequent large granite boulders (>1.0m). Sand is fine to coarse. Gravel is subrounded to subangular, fine to coarse. Cobbles and boulders are rounded comprised of granite.					AA136466	Env	0.20-1.10		
					AA136465	B	0.70		
1.0 Medium dense brown clayey gravelly granitic SAND with a high cobble content and frequent boulders. Sand is fine to coarse. Gravel is subrounded to subangular, fine to coarse. Cobbles and boulders are rounded comprised of granite.		1.10	80.38		AA136467	B	1.20		
					AA136468	Env	1.20-2.00		
2.0 End of Trial Pit at 2.20m		2.20	79.28	(Seepage)	AA136469	B	2.20		
3.0									
4.0									

Groundwater Conditions
Seepage at 2.2mbgl

Stability
Stable

General Remarks
Pit terminated at 2.2mbgl due to possible bedrock.

TRIAL PIT RECORD

REPORT NUMBER 22530

CONTRACT	Berwick Pines	**TRIAL PIT NO.**	**TP04**
		SHEET	Sheet 1 of 1
LOGGED BY	S.Cunningham	**CO-ORDINATES**	720,292.48 E 726,350.38 N
		DATE STARTED	26/05/2020
		DATE COMPLETED	26/05/2020
CLIENT	BCME	**GROUND LEVEL (m)**	82.02
ENGINEER		**EXCAVATION METHOD**	7T JCB

Geotechnical Description	Legend	Depth (m)	Elevation	Water Strike	Samples: Sample Ref	Samples: Type	Samples: Depth	Vane Test (KPa)	Hand Penetrometer (KPa)
0.0 TOPSOIL		0.30	81.72						
MADE GROUND comprised of very sandy gravelly CLAY with a medium cobble and boulder content with an abundance of buried breezeblocks and rooftiles.					AA103791	Env	0.30-1.30		
					AA136475	B	0.70		
1.0									
Medium dense golden gravelly granitic SAND with a low cobble content and occasional boulders. Sand is fine to coarse. Gravel is subrounded to subangular, fine to coarse. Cobbles and boulders are rounded comprised of granite. (Highly weathered granite)		1.40	80.62		AA103793	Env	1.40-1.80		
					AA103792	B	1.60		
End of Trial Pit at 1.80m		1.80	80.22						
2.0									
3.0									
4.0									

Groundwater Conditions
Pit was dry

Stability
Very Unstable between 0.5mbgl - 1.0mbgl due to high quantity of buried breezeblocks/roof tiles

General Remarks
Pit terminated at 1.8mbgl due to possible bedrock.

TRIAL PIT RECORD

REPORT NUMBER 22530

CONTRACT	Berwick Pines	**TRIAL PIT NO.**	**TP05**
		SHEET	Sheet 1 of 1
LOGGED BY	S.Cunningham	**CO-ORDINATES**	720,383.01 E 726,393.07 N
		DATE STARTED	27/05/2020
		DATE COMPLETED	27/05/2020
CLIENT	BCME	**GROUND LEVEL (m)**	80.52
ENGINEER		**EXCAVATION METHOD**	7T JCB

Geotechnical Description	Legend	Depth (m)	Elevation	Water Strike	Samples: Sample Ref	Samples: Type	Samples: Depth	Vane Test (KPa)	Hand Penetrometer (KPa)
0.0 TOPSOIL		0.25	80.27						
Firm brown slightly sandy slightly gravelly CLAY. (Possible MADE GROUND - Possible built up ground according to landowner)					AA136485	Env	0.30-1.30		
					AA136483	B	0.60		
1.0					AA136487	B	1.20		
		1.60	78.92		AA136486	Env	1.60-2.10		
Firm brown sandy gravelly CLAY with a low cobble content and occasional boulders. Sand is fine to coarse. Gravel is subrounded to subangular, fine to coarse. Cobbles and boulders are rounded comprised of granite.					AA136484	B	1.75		
2.0					AA136488	B	1.90		
End of Trial Pit at 2.10m		2.10	78.42						
3.0									
4.0									

Groundwater Conditions
Pit was dry

Stability
Stable

General Remarks
Pit terminated at 2.1mbgl due to large granite boulders. 1 foot bucket used at landowner request

TRIAL PIT RECORD

REPORT NUMBER 22530

CONTRACT	Berwick Pines	**TRIAL PIT NO.**	**TP06**
		SHEET	Sheet 1 of 1
LOGGED BY	S.Cunningham	**CO-ORDINATES**	720,372.21 E 726,374.26 N
		DATE STARTED	
		DATE COMPLETED	
CLIENT	BCME	**GROUND LEVEL (m)**	80.84
ENGINEER		**EXCAVATION METHOD**	7T JCB

Geotechnical Description	Legend	Depth (m)	Elevation	Water Strike	Samples: Sample Ref	Samples: Type	Samples: Depth	Vane Test (KPa)	Hand Penetrometer (KPa)
MADE GROUND - Gravel surface		0.00							
MADE GROUND comprised of grey/brown very sandy very gravelly CLAY.		0.20	80.64		AA136489	Env	0.20-1.00		
Brown very sandy very gravelly CLAY with a medium cobble content and frequent boulders. (Possible reworked material - Possible MADE GROUND)		0.40	80.44		AA136491	B	0.50		
					AA136492	B	1.20		
Firm to stiff brown/grey slightly sandy gravelly CLAY with a medium cobble and boulder content. Sand is fine to coarse. Gravel is subrounded to subangular, fine to coarse. Cobbles and boulders are rounded comprised of granite.		1.40	79.44		AA136490	Env	1.40-2.40		
					AA136493	B	2.00		
Medium dense golden gravelly granitic SAND with a low cobble content and occasional boulders. Sand is fine to coarse. Gravel is subrounded to subangular, fine to coarse. Cobbles and boulders are rounded comprised of granite. (Highly weathered granite)		2.40	78.44		AA136494	B	2.50		
		2.70	78.14						
End of Trial Pit at 0.00m		3.00							
		4.00							

Groundwater Conditions

Stability

General Remarks

SA01 – 1 of 4

SA01 – 2 of 4

SA01 – 3 of 4

SA01 – 4 of 4

TP01 – 1 of 4

TP01 – 2 of 4

TP01 – 3 of 4

TP01 – 4 of 4

TP02 – 1 of 3

TP02 – 2 of 3

TP02 – 3 of 3

TP03 – 1 of 4

TP03 – 2 of 4

TP03 – 3 of 4

TP03 – 4 of 4

TP04 – 1 of 3

TP04 – 2 of 3

TP04 – 3 of 3

TP05 – 1 of 3

TP05 – 2 of 3

TP05 – 3 of 3

TP06 – 1 of 3

TP06 – 2 of 3

TP06 – 3 of 3

PLATE TEST REPORT SHEET (F3.1)

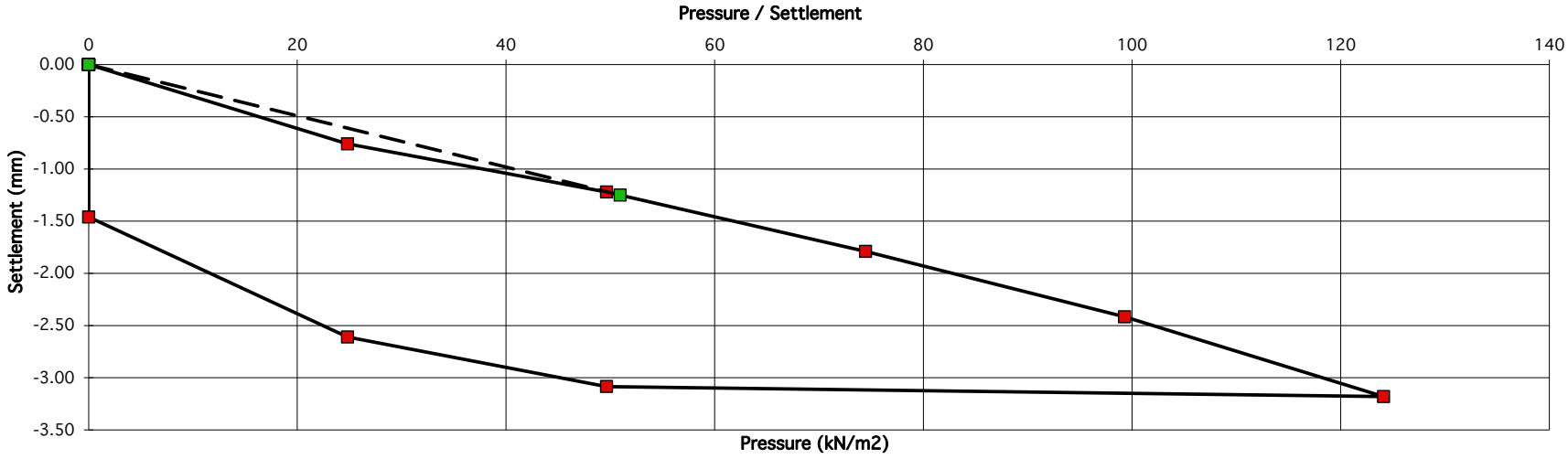
Applied Pressure/Settlement Curve

Reference No.	R111442
Contract	22530 - Berwick Pines
Test No.	CBR01- Load
Location	See Map for Reference
Depth	0.5mbgl
Client	BCME
Plate Diameter:	450 mm
Test Method	BS 1377: Part 9: 1990 Test4 - Incremental Loading Test
Technician	S.Cunningham
Authorised by	
Date	26/05/2020

Description of soil under test
(natural soil, placed fill, sub-base)

Brown very sandy slightly gravelly CLAY with a low cobble content

Easting	720301.2
Northing	726377.9
Elevation	81.55



Gradient at 1.25 mm settlement intersection = 41
Modulus of subgrade reaction = 26 MPa/m
Correction factor applied = 0.64 as per HD 25-26/10

Equivalent CBR value in accordance with NRA HD25-26/10 2.8 %

PLATE TEST REPORT SHEET (F3.1)

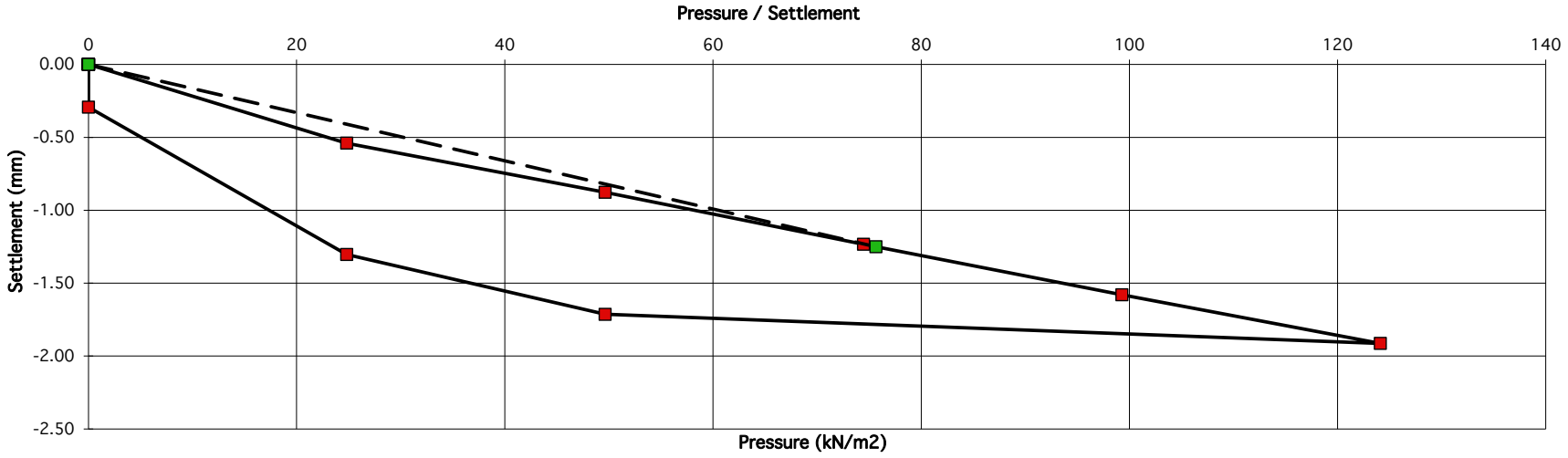
Applied Pressure/Settlement Curve

Reference No.	R111442
Contract	22530 - Berwick Pines
Test No.	CBR01 - Reload
Location	See Map for Reference
Depth	0.5mbgl
Client	BCME
Plate Diameter:	450 mm
Test Method	BS 1377: Part 9: 1990 Test4 - Incremental Loading Test
Technician	S.Cunningham
Authorised by	
Date	26/05/2020

Description of soil under test
(natural soil, placed fill, sub-base)

Brown very sandy slightly gravelly CLAY with a low cobble content

Easting	720301.2
Northing	726377.9
Elevation	81.55



Gradient at 1.25 mm settlement intersection = 61
Modulus of subgrade reaction = 39 MPa/m
Correction factor applied = 0.64 as per HD 25-26/10

Equivalent CBR value in accordance with NRA HD25-26/10 5.5 %

PLATE TEST REPORT SHEET (F3.1)

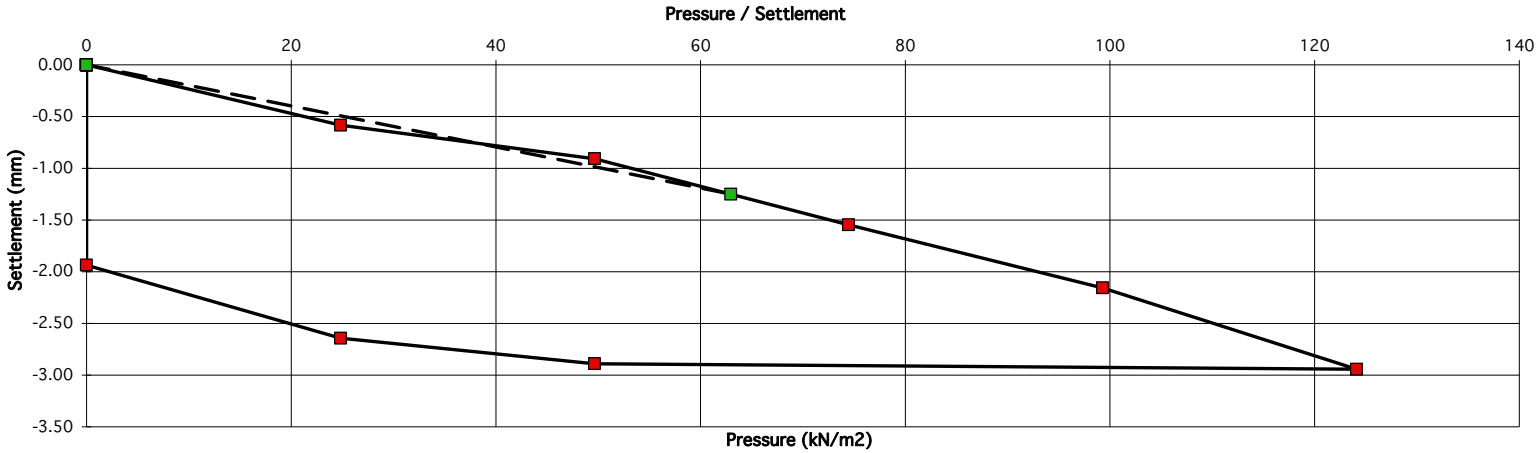
Applied Pressure/Settlement Curve

Reference No.	R111443
Contract	22530 - Berwick Pines
Test No.	CBR02- Load
Location	See Map for Reference
Depth	0.5mbgl
Client	BCME
Plate Diameter:	450 mm
Test Method	BS 1377: Part 9: 1990 Test4 - Incremental Loading Test
Technician	S.Cunningham
Authorised by	
Date	26/05/2020

Description of soil under test (natural soil, placed fill, sub-base)

Brown very sandy slightly gravelly CLAY with a low cobble content

Easting	720326.188
Northing	726353.235
Elevation	81.93



Gradient at 1.25 mm settlement intersection = 50
Modulus of subgrade reaction = 32 MPa/m
Correction factor applied = 0.64 as per HD 25-26/10

Equivalent CBR value in accordance with NRA HD25-26/10 4.0 %

PLATE TEST REPORT SHEET (F3.1)

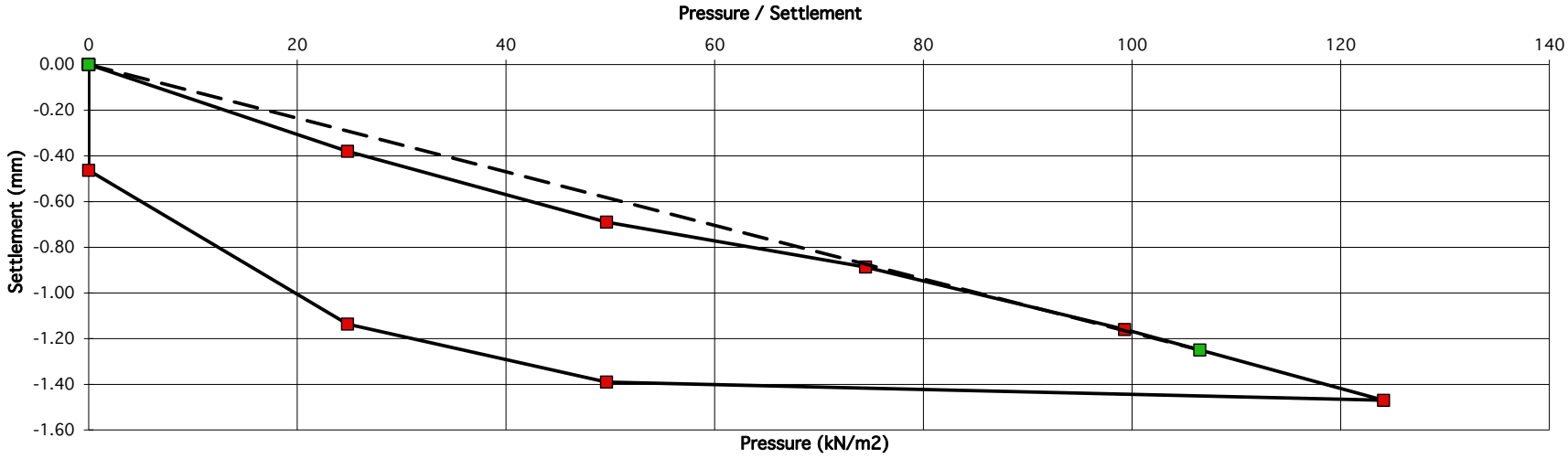
Applied Pressure/Settlement Curve

Reference No.	R111443
Contract	22530 - Berwick Pines
Test No.	CBR02 - Reload
Location	See Map for Reference
Depth	0.5mbgl
Client	BCME
Plate Diameter:	450 mm
Test Method	BS 1377: Part 9: 1990 Test4 - Incremental Loading Test
Technician	S.Cunningham
Authorised by	
Date	26/05/2020

Description of soil under test
(natural soil, placed fill, sub-base)

Brown very sandy slightly gravelly CLAY with a low cobble content

Easting	720326.188
Northing	726353.235
Elevation	81.93



Gradient at 1.25 mm settlement intersection = 85
Modulus of subgrade reaction = 55 MPa/m
Correction factor applied = 0.64 as per HD 25-26/10

Equivalent CBR value in accordance with NRA HD25-26/10 9.9 %

BARRETT MAHONY
CONSULTING ENGINEERS
CIVIL & STRUCTURAL

APPENDIX V

FOUL AND WATER SUPPLY CALCULATIONS

BARRETT MAHONY
CONSULTING ENGINEERS
CIVIL & STRUCTURAL

Dublin | London | Sofia
Sandwith House,
52-54 Lower Sandwith Street,
Dublin 2, D02 WR26, Ireland

Phone +353 1 6773200
Email bmce@bmce.ie
www.bmce.ie

APPENDIX V.A:
FOUL WASTEWATER CALCULATION

(Workers calculated: area in m² / area per FTE (Full Time Equivalent employee); as per Employment Densities Guide from OFFPAT)

RESIDENTIAL: 463 Apartment Units

The foul effluent from the proposed dwellings is calculated as per the Irish Water Code of Practice for Wastewater Infrastructure (Dec. 2017) assuming dry weather flow of 150 l/head/day plus a 10% infiltration rate and using the Irish Water assumed average occupancy of 2.7 persons/unit.

Daily Flow = (Population Equivalent) × (Allowance per head)
Number of Apartments = 463
Number of Occupants = 463 x 2.7 = 1,250.1
1,250.1 domestic occupants x 150L/day/person = 187,515 l/day

$$\text{Average Flow} = \frac{Daily\ Flow}{(Flow\ duration)\times 3600}$$

$$= \frac{187{,}515}{24\times 60\times 60} = 2.17 \text{ l/s}$$

Infiltration = (Average Flow) × 10%
= 2.17 x 0.1 = 0.217 l/s

Peak Flow = (Average Flow × Peaking Factor) + Infiltration
= (2.17 x 6) + 0.217 = 13.239 l/s

CRECHE: approximately 282 m2

The water demand from the proposed childcare facility is calculated as per the Irish Water Code of Practice for Wastewater Infrastructure (Dec. 2017) assuming dry weather flow of 36 l/head/day plus a 10% infiltration rate.

Daily Flow = (Population) × (Allowance per head)
Number of Occupants = 25 (assumed)

25 creche occupants x 36L/day/person = 900 l/day

$$\text{Average Flow} = \frac{Daily\ Flow}{(Flow\ duration)\times 3600}$$

$$= \frac{900}{24\times 60\times 60} = 0.0104 \text{ l/s}$$

Infiltration = (Average Flow) × 10%
= 0.0104 x 0.1 = 0.00104 l/s

Peak Flow = (Average Flow × Peaking Factor) + Infiltration
= (0.0104 x 4.5) + 0.00104 = 0.0478 l/s

BARRETT MAHONY
CONSULTING ENGINEERS
CIVIL & STRUCTURAL

Dublin | London | Sofia
Sandwith House,
52-54 Lower Sandwith Street,
Dublin 2, D02 WR26, Ireland

Phone +353 1 6773200
Email bmce@bmce.ie
www.bmce.ie

CAFE: approximately 49 m2

a) Visitors:

- Assuming 1,000 visitors per day
- Daily flow visitors: 1,000 x 15 l/person/day = 15,000 l/day

b) Workers:

- 49 m² / 15 = 3.3
- Daily flow workers: 3.3 x 30 l/person/day = 99l/day

Total Daily Flow = 15,000 + 99 = 15,099 l/day

Average Flow = $\frac{Daily\ Flow}{(Flow\ duration)\times 3600}$

= $\frac{15{,}099}{24\times 60\times 60}$ = 0.175 l/s

Infiltration = (Average Flow) × 10%
= 0.175 x 0.1 = 0.0175 l/s

Peak Flow = (Average Flow × Peaking Factor) + Infiltration
= (0.175 x 4.5) + 0.0175 = 0.805 l/s

RESIDENTIAL AMENITY SPACE: approximately 636 m2

a) Visitors:

- Assuming 200 visitors per day
- Daily flow visitors: 200 x 15 l/person/day = 3,000 l/day

b) Workers:

- Assume 10 workers
- Daily flow workers : 10 x 45 l/person/day = 450 l/day

Total Daily Flow = 3,000 + 450 = 3,450 l/day

Average Flow = $\frac{Daily\ Flow}{(Flow\ duration)\times 3600}$

= $\frac{3{,}450}{24\times 60\times 60}$ = 0.04 l/s

Infiltration = (Average Flow) × 10%
= 0.04 x 0.1 = 0.004 l/s

Peak Flow = (Average Flow × Peaking Factor) + Infiltration
= (0.04 x 4.5) + 0.004 = 0.184 l/s

BARRETT MAHONY
CONSULTING ENGINEERS
CIVIL & STRUCTURAL

Dublin | London | Sofia
Sandwith House,
52-54 Lower Sandwith Street,
Dublin 2, D02 WR26, Ireland

Phone +353 1 6773200
Email bmce@bmce.ie
www.bmce.ie

EXISTING

Number of untis = 10
Number of occupants = 10 x 2.7 = 27.0

Daily Flow = (Population Equivalent) × (Allowance per head)
Daily Flow = 27 x 150 = 4,050 l/day

Average Flow = $\frac{Daily\ Flow}{(Flow\ duration)\times 3600}$

= $\frac{4{,}050}{24\times 60\times 60}$ = 0.0474 l/s

Infiltration = (Average Flow) × 10%
= 0.047 x 0.1 = 0.0047 l/s

Peak Flow = (Average Flow × Peaking Factor) + Infiltration
= (0.0474 x 6) + 0.0047 = 0.2891 l/s

TOTAL WASTEWATER

DOMESTIC:
TOTAL AVERAGE FLOW = 2.17 l/s
TOTAL PEAK FLOW = 13.239 l/s

DTHERS:
TOTAL AVERAGE FLOW = 0.225 l/s
TOTAL PEAK FLOW = 0.99 l/s

EXISTING:
TOTAL AVERAGE FLOW = 0.0474 l/s
TOTAL PEAK FLOW = 0.2891 l/s

TOTAL AVERAGE FLOW = 2.217 l/s
TOTAL PEAK FLOW = 14.229 l/s

BARRETT MAHONY
CONSULTING ENGINEERS
CIVIL & STRUCTURAL

Dublin | London | Sofia
Sandwith House,
52-54 Lower Sandwith Street,
Dublin 2, D02 WR26, Ireland

Phone +353 1 6773200
Email bmce@bmce.ie
www.bmce.ie

APPENDIX V.B:
WATER SUPPLY CALCULATION

(Workers calculated: area in m² / area per FTE (Full Time Equivalent employee); as per Employment Densities Guide from OFFPAT)

RESIDENTIAL: 463 Apartment Units

The foul effluent from the proposed dwellings is calculated as per the Irish Water Code of Practice for Wastewater Infrastructure (Dec. 2017) assuming dry weather flow of 150 l/head/day plus a 10% infiltration rate and using the Irish Water assumed average occupancy of 2.7 persons/unit.

Daily Flow = (Population Equivalent) × (Allowance per head)
Number of Apartments = 463
Number of Occupants = 463 x 2.7 = 1,250.1
1,250.1 domestic occupants x 150L/day/person = 187,515 l/day

Average Flow = $\frac{Daily\ Flow}{(Flow\ duration)\times 3600}$ x 1.25

= $\frac{187{,}515}{24\times 60\times 60}$ x 1.25= 2.713 l/s

Peak Flow = (Average Flow × 5)
= (2.86 x 5) = 13.563 l/s

CRECHE: approximately 282 m2

The water demand from the proposed childcare facility is calculated as per the Irish Water Code of Practice for Wastewater Infrastructure (Dec. 2017) assuming dry weather flow of 36 l/head/day plus a 10% infiltration rate.

Daily Flow = (Population) × (Allowance per head)
Number of Occupants = 25 (assumed)

25 creche occupants x 36L/day/person = 900 l/day

Average Flow = $\frac{Daily\ Flow}{(Flow\ duration)\times 3600}$ x 1.25

= $\frac{900}{24\times 60\times 60}$ x 1.25= 0.013 l/s

Peak Flow = (Average Flow × 5)
= (0.013 x 5) = 0.065 l/s

CAFE: approximately 49 m2

a) Visitors:
- Assuming 1,000 visitors per day
- Daily flow visitors: 1,000 x 15 l/person/day = 15,000 l/day

b) Workers:
- 49 m² / 15 = 3.3
- Daily flow workers: 3.3 x 30 l/person/day = 99l/day

Total Daily Flow = 15,000 + 99 = 15,099 l/day

Average Flow = $\frac{Daily\ Flow}{(Flow\ duration)\times 3600}$ x 1.25

= $\frac{15{,}099}{24\times 60\times 60}$ x 1.25= 0.218 l/s

Peak Flow = (Average Flow × 5)
= (0.218 x 5) = 1.09 l/s

BARRETT MAHONY
CONSULTING ENGINEERS
CIVIL & STRUCTURAL

Dublin | London | Sofia
Sandwith House,
52-54 Lower Sandwith Street,
Dublin 2, D02 WR26, Ireland

Phone +353 1 6773200
Email bmce@bmce.ie
www.bmce.ie

RESIDENTIAL AMENITY SPACE: approximately 636 m2

a) Visitors:
- Assuming 200 visitors per day
- Daily flow visitors: 200 x 15 l/person/day = 3,000 l/day

b) Workers:
- Assume 10 workers
- Daily flow workers : 10 x 45 l/person/day = 450 l/day

Total Daily Flow = 3,000 + 450 = 3,450 l/day

Average Flow = $\frac{Daily\ Flow}{(Flow\ duration)\times 3600}$ x 1.25

= $\frac{3{,}450}{24\times 60\times 60}$ x 1.25= 0.05 l/s

Peak Flow = (Average Flow × 5)
= (0.045 x 5) = 0.25 l/s

EXISTING

Number of untis = 10
Number of occupants = 10 x 2.7 = 27.0

Daily Flow = (Population Equivalent) × (Allowance per head)
Daily Flow = 27 x 150 = 4,050 l/day

Average Flow = $\frac{Daily\ Flow}{(Flow\ duration)\times 3600}$ x 1.25

= $\frac{4{,}050}{24\times 60\times 60}$ x 1.25 = 0.0586 l/s

Peak Flow = (Average Flow × 5)
= (0.0586 x 5) = 0.293 l/s

TOTAL WATER SUPPLY

DOMESTIC:
TOTAL AVERAGE FLOW = 2.713 l/s
TOTAL PEAK FLOW = 13.563 l/s

DTHERS:
TOTAL AVERAGE FLOW = 0.281 l/s
TOTAL PEAK FLOW = 1.405 l/s

EXISTING:
TOTAL AVERAGE FLOW = 0.0586 l/s
TOTAL PEAK FLOW = 0.293 l/s

TOTAL AVERAGE FLOW = 2.994 l/s
TOTAL PEAK FLOW = 14.968 l/s

BARRETT **MAHONY**
CONSULTING ENGINEERS
CIVIL & STRUCTURAL

APPENDIX VI

CAUSEWAY FLOW CALCULATIONS

Design Settings

Rainfall Methodology	FSR	Maximum Time of Concentration (mins)	30.00
Return Period (years)	5	Maximum Rainfall (mm/hr)	50.0
Additional Flow (%)	0	Minimum Velocity (m/s)	1.00
FSR Region	Scotland and Ireland	Connection Type	Level Soffits
M5-60 (mm)	17.400	Minimum Backdrop Height (m)	0.200
Ratio-R	0.274	Preferred Cover Depth (m)	1.200
CV	1.000	Include Intermediate Ground	✓
Time of Entry (mins)	4.00	Enforce best practice design rules	✓

Nodes

Name	Area (ha)	T of E (mins)	Cover Level (m)	Node Type	Manhole Type	Diameter (mm)	Easting (m)	Northing (m)	Depth (m)
S1.0A	0.129	4.00	83.000	Manhole	Adoptable	1200	720186.000	726317.000	1.300
S1.0	0.129	4.00	83.000	Manhole	Adoptable	1200	720193.000	726325.000	1.500
S1.1	0.129	4.00	82.300	Manhole	Adoptable	1200	720227.000	726343.000	1.475
Soakaway			82.000	Manhole	Adoptable	1200	720259.000	726382.000	1.500
S5.0			81.800	Manhole	Adoptable	1200	720263.000	726390.000	1.200
S2.0	0.129	4.00	82.200	Manhole	Adoptable	1200	720266.002	726375.879	1.350

Links

Name	US Node	DS Node	Length (m)	ks (mm) / n	Velocity Equation	US IL (m)	DS IL (m)	Fall (m)	Slope (1:X)	Dia (mm)	Link Type	T of C (mins)	Rain (mm/hr)
1.000	S1.0A	S1.0	10.630	0.600	Colebrook-White	81.700	81.500	0.200	53.2	300	Circular	4.08	50.0
1.001	S1.0	S1.1	38.471	0.600	Colebrook-White	81.500	80.850	0.650	59.2	300	Circular	4.40	50.0
1.002	S1.1	Soakaway	50.448	0.600	Colebrook-White	80.825	80.500	0.325	155.2	300	Circular	5.06	50.0
1.003	Soakaway	S5.0	8.944	0.600	Colebrook-White	80.825	80.600	0.225	39.8	300	Circular	5.12	50.0
1.004	S2.0	Soakaway	9.300	0.600	Colebrook-White	80.850	80.700	0.150	62.0	225	Circular	4.09	50.0

Name	US Node	DS Node	Vel (m/s)	Cap (l/s)	Flow (l/s)	US Depth (m)	DS Depth (m)	Minimum Depth (m)	Maximum Depth (m)	Σ Area (ha)	Σ Add Inflow (l/s)
1.000	S1.0A	S1.0	2.161	152.7	23.3	1.000	1.200	1.000	1.200	0.129	0.0
1.001	S1.0	S1.1	2.047	144.7	46.6	1.200	1.150	1.150	1.200	0.258	0.0
1.002	S1.1	Soakaway	1.259	89.0	69.9	1.175	1.200	1.175	1.200	0.387	0.0
1.003	Soakaway	S5.0	2.501	176.8	93.2	0.875	0.900	0.875	0.900	0.516	0.0
1.004	S2.0	Soakaway	1.663	66.1	23.3	1.125	1.075	1.075	1.125	0.129	0.0

Pipeline Schedule

Link	Length (m)	Slope (1:X)	Dia (mm)	Link Type	US CL (m)	US IL (m)	US Depth (m)	DS CL (m)	DS IL (m)	DS Depth (m)
1.000	10.630	53.2	300	Circular	83.000	81.700	1.000	83.000	81.500	1.200
1.001	38.471	59.2	300	Circular	83.000	81.500	1.200	82.300	80.850	1.150
1.002	50.448	155.2	300	Circular	82.300	80.825	1.175	82.000	80.500	1.200
1.003	8.944	39.8	300	Circular	82.000	80.825	0.875	81.800	80.600	0.900

Link	US Node	Dia (mm)	Node Type	MH Type	DS Node	Dia (mm)	Node Type	MH Type
1.000	S1.0A	1200	Manhole	Adoptable	S1.0	1200	Manhole	Adoptable
1.001	S1.0	1200	Manhole	Adoptable	S1.1	1200	Manhole	Adoptable
1.002	S1.1	1200	Manhole	Adoptable	Soakaway	1200	Manhole	Adoptable
1.003	Soakaway	1200	Manhole	Adoptable	S5.0	1200	Manhole	Adoptable

Pipeline Schedule

Link	Length (m)	Slope (1:X)	Dia (mm)	Link Type	US CL (m)	US IL (m)	US Depth (m)	DS CL (m)	DS IL (m)	DS Depth (m)
1.004	9.300	62.0	225	Circular	82.200	80.850	1.125	82.000	80.700	1.075

Link	US Node	Dia (mm)	Node Type	MH Type	DS Node	Dia (mm)	Node Type	MH Type
1.004	S2.0	1200	Manhole	Adoptable	Soakaway	1200	Manhole	Adoptable

Simulation Settings

Rainfall Methodology	FSR	Skip Steady State	x
FSR Region	Scotland and Ireland	Drain Down Time (mins)	240
M5-60 (mm)	17.400	Additional Storage (m³/ha)	20.0
Ratio-R	0.274	Check Discharge Rate(s)	x
Summer CV	1.000	Check Discharge Volume	x
Analysis Speed	Detailed		

Storm Durations

15	60	180	360	600	960	2160	4320	7200	10080
30	120	240	480	720	1440	2880	5760	8640	

Return Period (years)	Climate Change (CC %)	Additional Area (A %)	Additional Flow (Q %)
5	0	0	0
10	0	0	0
30	0	0	0
100	20	0	0

Node Soakaway Soakaway Storage Structure

Base Inf Coefficient (m/hr)	0.02045	Invert Level (m)	79.250	Depth (m)	1.500
Side Inf Coefficient (m/hr)	0.02045	Time to half empty (mins)		Inf Depth (m)	
Safety Factor	2.0	Pit Width (m)	7.000	Number Required	1
Porosity	0.95	Pit Length (m)	52.000		

Rainfall

Event	Peak Intensity (mm/hr)	Average Intensity (mm/hr)
5 year 15 minute summer	141.320	39.989
5 year 30 minute summer	96.231	27.230
5 year 60 minute summer	67.501	17.838
5 year 120 minute summer	43.366	11.460
5 year 180 minute summer	34.304	8.828
5 year 240 minute summer	27.717	7.325
5 year 360 minute summer	21.848	5.622
5 year 480 minute summer	17.621	4.657
5 year 600 minute summer	14.705	4.022
5 year 720 minute summer	13.313	3.568
5 year 960 minute summer	11.213	2.953
5 year 1440 minute summer	8.433	2.260
5 year 2160 minute summer	6.259	1.730
5 year 2880 minute summer	5.337	1.430
5 year 4320 minute summer	4.186	1.094

Rainfall

Event	Peak Intensity (mm/hr)	Average Intensity (mm/hr)
5 year 5760 minute summer	3.535	0.905
5 year 7200 minute summer	3.061	0.781
5 year 8640 minute summer	2.713	0.692
5 year 10080 minute summer	2.450	0.625
10 year 15 minute summer	163.392	46.234
10 year 30 minute summer	111.623	31.585
10 year 60 minute summer	78.321	20.698
10 year 120 minute summer	50.274	13.286
10 year 180 minute summer	39.603	10.191
10 year 240 minute summer	31.895	8.429
10 year 360 minute summer	25.023	6.439
10 year 480 minute summer	20.111	5.315
10 year 600 minute summer	16.737	4.578
10 year 720 minute summer	15.117	4.052
10 year 960 minute summer	12.686	3.341
10 year 1440 minute summer	9.494	2.544
10 year 2160 minute summer	7.008	1.937
10 year 2880 minute summer	5.953	1.595
10 year 4320 minute summer	4.641	1.213
10 year 5760 minute summer	3.902	0.999
10 year 7200 minute summer	3.367	0.859
10 year 8640 minute summer	2.977	0.759
10 year 10080 minute summer	2.682	0.684
30 year 15 minute summer	207.371	58.679
30 year 30 minute summer	142.406	40.296
30 year 60 minute summer	99.326	26.249
30 year 120 minute summer	63.241	16.713
30 year 180 minute summer	49.531	12.746
30 year 240 minute summer	39.716	10.496
30 year 360 minute summer	30.957	7.966
30 year 480 minute summer	24.761	6.544
30 year 600 minute summer	20.529	5.615
30 year 720 minute summer	18.484	4.954
30 year 960 minute summer	15.436	4.065
30 year 1440 minute summer	11.472	3.075
30 year 2160 minute summer	8.407	2.323
30 year 2880 minute summer	7.102	1.903
30 year 4320 minute summer	5.492	1.436
30 year 5760 minute summer	4.591	1.175
30 year 7200 minute summer	3.943	1.006
30 year 8640 minute summer	3.472	0.886
30 year 10080 minute summer	3.118	0.795
100 year +20% CC 15 minute summer	323.126	91.434
100 year +20% CC 30 minute summer	223.166	63.148
100 year +20% CC 60 minute summer	154.641	40.867
100 year +20% CC 120 minute summer	97.587	25.789
100 year +20% CC 180 minute summer	75.949	19.544
100 year +20% CC 240 minute summer	60.608	16.017
100 year +20% CC 360 minute summer	46.907	12.071
100 year +20% CC 480 minute summer	37.322	9.863
100 year +20% CC 600 minute summer	30.814	8.428
100 year +20% CC 720 minute summer	27.650	7.411

Rainfall

Event	Peak Intensity (mm/hr)	Average Intensity (mm/hr)
100 year +20% CC 960 minute summer	22.965	6.047
100 year +20% CC 1440 minute summer	16.939	4.540
100 year +20% CC 2160 minute summer	12.315	3.404
100 year +20% CC 2880 minute summer	10.341	2.772
100 year +20% CC 4320 minute summer	7.926	2.072
100 year +20% CC 5760 minute summer	6.582	1.685
100 year +20% CC 7200 minute summer	5.624	1.435
100 year +20% CC 8640 minute summer	4.932	1.258
100 year +20% CC 10080 minute summer	4.414	1.126

Results for 5 year Critical Storm Duration. Lowest mass balance: 99.64%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	S1.0A	10	81.803	0.103	33.1	0.3215	0.0000	OK
15 minute summer	S1.0	10	81.641	0.141	66.2	0.4018	0.0000	OK
15 minute summer	S1.1	11	81.105	0.280	99.3	0.8069	0.0000	OK
2880 minute summer	Soakaway	2040	79.833	-0.667	7.6	201.6532	0.0000	OK
15 minute summer	S5.0	1	80.600	0.000	0.0	0.0000	0.0000	OK
15 minute summer	S2.0	10	80.976	0.126	33.1	0.3846	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute summer	S1.0A	1.000	S1.0	33.1	1.230	0.217	0.2867	
15 minute summer	S1.0	1.001	S1.1	66.2	1.483	0.457	1.8457	
15 minute summer	S1.1	1.002	Soakaway	92.5	1.443	1.039	3.2310	
2880 minute summer	Soakaway	1.003	S5.0	0.0	0.000	0.000	0.0000	0.0
2880 minute summer	Soakaway	Infiltration		1.2				
15 minute summer	S2.0	1.004	Soakaway	33.1	1.553	0.500	0.1982	

Results for 10 year Critical Storm Duration. Lowest mass balance: 99.64%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	S1.0A	10	81.813	0.113	38.3	0.3525	0.0000	OK
15 minute summer	S1.0	10	81.654	0.154	76.6	0.4377	0.0000	OK
15 minute summer	S1.1	11	81.228	0.403	114.9	1.1592	0.0000	SURCHARGED
2160 minute summer	Soakaway	1740	79.919	-0.581	10.0	231.4187	0.0000	OK
15 minute summer	S5.0	1	80.600	0.000	0.0	0.0000	0.0000	OK
15 minute summer	S2.0	10	80.989	0.139	38.3	0.4240	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute summer	S1.0A	1.000	S1.0	38.3	1.267	0.251	0.3219	
15 minute summer	S1.0	1.001	S1.1	76.6	1.492	0.529	2.0521	
15 minute summer	S1.1	1.002	Soakaway	105.7	1.514	1.187	3.3662	
2160 minute summer	Soakaway	1.003	S5.0	0.0	0.000	0.000	0.0000	0.0
2160 minute summer	Soakaway	Infiltration		1.3				
15 minute summer	S2.0	1.004	Soakaway	38.3	1.603	0.579	0.2222	

Results for 30 year Critical Storm Duration. Lowest mass balance: 99.64%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	S1.0A	10	81.836	0.136	48.6	0.4234	0.0000	OK
15 minute summer	S1.0	11	81.731	0.231	97.4	0.6594	0.0000	OK
15 minute summer	S1.1	11	81.513	0.688	141.1	1.9809	0.0000	SURCHARGED
4320 minute summer	Soakaway	3060	80.104	-0.396	8.0	295.2986	0.0000	OK
15 minute summer	S5.0	1	80.600	0.000	0.0	0.0000	0.0000	OK
15 minute summer	S2.0	10	81.016	0.166	48.6	0.5046	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute summer	S1.0A	1.000	S1.0	48.8	1.318	0.320	0.4492	
15 minute summer	S1.0	1.001	S1.1	92.5	1.539	0.639	2.4759	
15 minute summer	S1.1	1.002	Soakaway	129.7	1.843	1.457	3.4647	
4320 minute summer	Soakaway	1.003	S5.0	0.0	0.000	0.000	0.0000	0.0
4320 minute summer	Soakaway	Infiltration		1.3				
15 minute summer	S2.0	1.004	Soakaway	48.6	1.679	0.735	0.2687	

Results for 100 year +20% CC Critical Storm Duration. Lowest mass balance: 99.64%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	S1.0A	11	82.886	1.186	75.7	3.6971	0.0000	FLOOD RISK
15 minute summer	S1.0	11	82.835	1.335	130.1	3.8067	0.0000	FLOOD RISK
15 minute summer	S1.1	11	82.290	1.465	185.3	4.2194	0.0000	FLOOD RISK
2880 minute summer	Soakaway	2700	80.635	0.135	14.8	479.0222	0.0000	OK
15 minute summer	S5.0	1	80.600	0.000	0.0	0.0000	0.0000	OK
15 minute summer	S2.0	10	81.205	0.355	75.7	1.0807	0.0000	SURCHARGED

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute summer	S1.0A	1.000	S1.0	60.3	1.302	0.395	0.7486	
15 minute summer	S1.0	1.001	S1.1	119.8	1.702	0.828	2.7091	
15 minute summer	S1.1	1.002	Soakaway	181.5	2.577	2.039	3.5166	
2880 minute summer	Soakaway	1.003	S5.0	0.0	0.000	0.000	0.0000	0.0
2880 minute summer	Soakaway	Infiltration		1.5				
15 minute summer	S2.0	1.004	Soakaway	75.3	1.893	1.138	0.3655	

Design Settings

Rainfall Methodology	FSR	Maximum Time of Concentration (mins)	30.00
Return Period (years)	5	Maximum Rainfall (mm/hr)	50.0
Additional Flow (%)	0	Minimum Velocity (m/s)	1.00
FSR Region	Scotland and Ireland	Connection Type	Level Soffits
M5-60 (mm)	17.400	Minimum Backdrop Height (m)	0.200
Ratio-R	0.274	Preferred Cover Depth (m)	1.200
CV	1.000	Include Intermediate Ground	✓
Time of Entry (mins)	4.00	Enforce best practice design rules	✓

Nodes

Name	Area (ha)	T of E (mins)	Cover Level (m)	Node Type	Manhole Type	Diameter (mm)	Easting (m)	Northing (m)	Depth (m)
S3.0	0.040	4.00	81.300	Manhole	Adoptable	1200	720233.233	726407.392	0.700
S3.1	0.040	4.00	81.150	Manhole	Adoptable	1200	720246.371	726435.496	0.750
S3.2	0.015	4.00	81.000	Manhole	Adoptable	1200	720209.301	726455.480	0.750
S3.3	0.068	4.00	81.100	Manhole	Adoptable	1200	720199.565	726436.244	0.950
S3.4	0.081	4.00	81.150	Manhole	Adoptable	1200	720193.538	726424.190	1.075
S3.5	0.084	4.00	81.150	Manhole	Adoptable	1200	720186.619	726427.824	1.150
S3.6			81.100	Manhole	Adoptable	1200	720205.585	726455.297	1.250
S3.7			80.900	Manhole	Adoptable	1200	720195.634	726471.641	1.100

Links

Name	US Node	DS Node	Length (m)	ks (mm) / n	Velocity Equation	US IL (m)	DS IL (m)	Fall (m)	Slope (1:X)	Dia (mm)	Link Type	T of C (mins)	Rain (mm/hr)
1.005	S3.0	S3.1	31.023	0.600	Colebrook-White	80.600	80.400	0.200	155.1	300	Circular	4.41	50.0
1.006	S3.1	S3.2	42.113	0.600	Colebrook-White	80.400	80.250	0.150	280.8	300	Circular	5.16	50.0
1.007	S3.2	S3.3	21.560	0.600	Colebrook-White	80.250	80.150	0.100	215.6	300	Circular	5.50	50.0
1.008	S3.3	S3.4	13.477	0.600	Colebrook-White	80.150	80.075	0.075	179.7	300	Circular	5.69	50.0
1.009	S3.4	S3.5	7.815	0.600	Colebrook-White	80.075	80.000	0.075	104.2	300	Circular	5.78	50.0
1.010	S3.5	S3.6	15.218	0.600	Colebrook-White	80.000	79.900	0.100	152.2	300	Circular	5.98	50.0
1.012	S3.6	S3.7	19.135	0.600	Colebrook-White	79.850	79.800	0.050	382.7	225	Circular	6.83	50.0

Name	US Node	DS Node	Vel (m/s)	Cap (l/s)	Flow (l/s)	US Depth (m)	DS Depth (m)	Minimum Depth (m)	Maximum Depth (m)	Σ Area (ha)	Σ Add Inflow (l/s)
1.005	S3.0	S3.1	1.260	89.0	7.2	0.400	0.450	0.400	0.450	0.040	0.0
1.006	S3.1	S3.2	0.933	66.0	14.5	0.450	0.450	0.450	0.450	0.080	0.0
1.007	S3.2	S3.3	1.067	75.4	17.2	0.450	0.650	0.450	0.650	0.095	0.0
1.008	S3.3	S3.4	1.169	82.7	29.5	0.650	0.775	0.650	0.775	0.163	0.0
1.009	S3.4	S3.5	1.540	108.8	44.1	0.775	0.850	0.775	0.850	0.244	0.0
1.010	S3.5	S3.6	1.272	89.9	59.3	0.850	0.900	0.850	0.900	0.328	0.0
1.012	S3.6	S3.7	0.662	26.3	59.3	1.025	0.875	0.875	1.025	0.328	0.0

Pipeline Schedule

Link	Length (m)	Slope (1:X)	Dia (mm)	Link Type	US CL (m)	US IL (m)	US Depth (m)	DS CL (m)	DS IL (m)	DS Depth (m)
1.005	31.023	155.1	300	Circular	81.300	80.600	0.400	81.150	80.400	0.450
1.006	42.113	280.8	300	Circular	81.150	80.400	0.450	81.000	80.250	0.450
1.007	21.560	215.6	300	Circular	81.000	80.250	0.450	81.100	80.150	0.650
1.008	13.477	179.7	300	Circular	81.100	80.150	0.650	81.150	80.075	0.775
1.009	7.815	104.2	300	Circular	81.150	80.075	0.775	81.150	80.000	0.850
1.010	15.218	152.2	300	Circular	81.150	80.000	0.850	81.100	79.900	0.900
1.012	19.135	382.7	225	Circular	81.100	79.850	1.025	80.900	79.800	0.875

Link	US Node	Dia (mm)	Node Type	MH Type	DS Node	Dia (mm)	Node Type	MH Type
1.005	S3.0	1200	Manhole	Adoptable	S3.1	1200	Manhole	Adoptable
1.006	S3.1	1200	Manhole	Adoptable	S3.2	1200	Manhole	Adoptable
1.007	S3.2	1200	Manhole	Adoptable	S3.3	1200	Manhole	Adoptable
1.008	S3.3	1200	Manhole	Adoptable	S3.4	1200	Manhole	Adoptable
1.009	S3.4	1200	Manhole	Adoptable	S3.5	1200	Manhole	Adoptable
1.010	S3.5	1200	Manhole	Adoptable	S3.6	1200	Manhole	Adoptable
1.012	S3.6	1200	Manhole	Adoptable	S3.7	1200	Manhole	Adoptable

Simulation Settings

Rainfall Methodology	FSR	Skip Steady State	x
FSR Region	Scotland and Ireland	Drain Down Time (mins)	240
M5-60 (mm)	17.400	Additional Storage (m³/ha)	20.0
Ratio-R	0.274	Check Discharge Rate(s)	x
Summer CV	1.000	Check Discharge Volume	x
Analysis Speed	Detailed		

Storm Durations

15	60	180	360	600	960	2160	4320	7200	10080
30	120	240	480	720	1440	2880	5760	8640	

Return Period (years)	Climate Change (CC %)	Additional Area (A %)	Additional Flow (Q %)
5	0	0	0
10	0	0	0
30	0	0	0
100	20	0	0

Node S3.6 Online Hydro-Brake® Control

Flap Valve	x	Objective	(HE) Minimise upstream storage
Replaces Downstream Link	✓	Sump Available	✓
Invert Level (m)	79.850	Product Number	CTL-SHE-0051-1100-0850-1100
Design Depth (m)	0.850	Min Outlet Diameter (m)	0.075
Design Flow (l/s)	1.1	Min Node Diameter (mm)	1200

Node S3.6 Depth/Area Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Safety Factor	2.0	Invert Level (m)	79.850
Side Inf Coefficient (m/hr)	0.02045	Porosity	1.00	Time to half empty (mins)	

Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)
0.000	205.0	0.0	0.451	205.0	0.0	0.851	0.0	0.0
0.450	205.0	0.0	0.850	205.0	0.0			

Node S3.2 Depth/Area Storage Structure

Base Inf Coefficient (m/hr)	0.02045	Safety Factor	2.0	Invert Level (m)	80.300
Side Inf Coefficient (m/hr)	0.02045	Porosity	0.30	Time to half empty (mins)	

Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)
0.000	725.0	0.0	0.400	725.0	0.0	0.401	0.0	0.0

Rainfall

Event	Peak Intensity (mm/hr)	Average Intensity (mm/hr)
5 year 15 minute summer	141.320	39.989
5 year 30 minute summer	96.231	27.230
5 year 60 minute summer	67.501	17.838
5 year 120 minute summer	43.366	11.460
5 year 180 minute summer	34.304	8.828
5 year 240 minute summer	27.717	7.325
5 year 360 minute summer	21.848	5.622
5 year 480 minute summer	17.621	4.657
5 year 600 minute summer	14.705	4.022
5 year 720 minute summer	13.313	3.568
5 year 960 minute summer	11.213	2.953
5 year 1440 minute summer	8.433	2.260
5 year 2160 minute summer	6.259	1.730
5 year 2880 minute summer	5.337	1.430
5 year 4320 minute summer	4.186	1.094
5 year 5760 minute summer	3.535	0.905
5 year 7200 minute summer	3.061	0.781
5 year 8640 minute summer	2.713	0.692
5 year 10080 minute summer	2.450	0.625
10 year 15 minute summer	163.392	46.234
10 year 30 minute summer	111.623	31.585
10 year 60 minute summer	78.321	20.698
10 year 120 minute summer	50.274	13.286
10 year 180 minute summer	39.603	10.191
10 year 240 minute summer	31.895	8.429
10 year 360 minute summer	25.023	6.439
10 year 480 minute summer	20.111	5.315
10 year 600 minute summer	16.737	4.578
10 year 720 minute summer	15.117	4.052
10 year 960 minute summer	12.686	3.341
10 year 1440 minute summer	9.494	2.544
10 year 2160 minute summer	7.008	1.937
10 year 2880 minute summer	5.953	1.595
10 year 4320 minute summer	4.641	1.213
10 year 5760 minute summer	3.902	0.999
10 year 7200 minute summer	3.367	0.859
10 year 8640 minute summer	2.977	0.759
10 year 10080 minute summer	2.682	0.684

Rainfall

Event	Peak Intensity (mm/hr)	Average Intensity (mm/hr)
30 year 15 minute summer	207.371	58.679
30 year 30 minute summer	142.406	40.296
30 year 60 minute summer	99.326	26.249
30 year 120 minute summer	63.241	16.713
30 year 180 minute summer	49.531	12.746
30 year 240 minute summer	39.716	10.496
30 year 360 minute summer	30.957	7.966
30 year 480 minute summer	24.761	6.544
30 year 600 minute summer	20.529	5.615
30 year 720 minute summer	18.484	4.954
30 year 960 minute summer	15.436	4.065
30 year 1440 minute summer	11.472	3.075
30 year 2160 minute summer	8.407	2.323
30 year 2880 minute summer	7.102	1.903
30 year 4320 minute summer	5.492	1.436
30 year 5760 minute summer	4.591	1.175
30 year 7200 minute summer	3.943	1.006
30 year 8640 minute summer	3.472	0.886
30 year 10080 minute summer	3.118	0.795
100 year +20% CC 15 minute summer	323.126	91.434
100 year +20% CC 30 minute summer	223.166	63.148
100 year +20% CC 60 minute summer	154.641	40.867
100 year +20% CC 120 minute summer	97.587	25.789
100 year +20% CC 180 minute summer	75.949	19.544
100 year +20% CC 240 minute summer	60.608	16.017
100 year +20% CC 360 minute summer	46.907	12.071
100 year +20% CC 480 minute summer	37.322	9.863
100 year +20% CC 600 minute summer	30.814	8.428
100 year +20% CC 720 minute summer	27.650	7.411
100 year +20% CC 960 minute summer	22.965	6.047
100 year +20% CC 1440 minute summer	16.939	4.540
100 year +20% CC 2160 minute summer	12.315	3.404
100 year +20% CC 2880 minute summer	10.341	2.772
100 year +20% CC 4320 minute summer	7.926	2.072
100 year +20% CC 5760 minute summer	6.582	1.685
100 year +20% CC 7200 minute summer	5.624	1.435
100 year +20% CC 8640 minute summer	4.932	1.258
100 year +20% CC 10080 minute summer	4.414	1.126

Results for 5 year Critical Storm Duration. Lowest mass balance: 99.93%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	S3.0	10	80.668	0.068	10.3	0.1549	0.0000	OK
15 minute summer	S3.1	10	80.518	0.118	20.6	0.2602	0.0000	OK
2880 minute summer	S3.2	1980	80.345	0.095	1.4	9.9803	0.0000	OK
2880 minute summer	S3.3	1980	80.345	0.195	2.4	0.4991	0.0000	OK
2880 minute summer	S3.4	1980	80.345	0.270	3.6	0.7115	0.0000	OK
2880 minute summer	S3.5	1980	80.345	0.345	9.4	0.8935	0.0000	SURCHARGED
2880 minute summer	S3.6	1980	80.345	0.495	4.9	101.9729	0.0000	SURCHARGED
15 minute summer	S3.7	1	79.800	0.000	1.0	0.0000	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute summer	S3.0	1.005	S3.1	10.3	0.562	0.115	0.5866	
15 minute summer	S3.1	1.006	S3.2	19.8	1.142	0.301	0.7490	
2880 minute summer	S3.2	1.007	S3.3	1.4	0.356	0.019	0.7270	
2880 minute summer	S3.2	Infiltration		0.0				
2880 minute summer	S3.3	1.008	S3.4	2.4	0.470	0.029	0.7758	
2880 minute summer	S3.4	1.009	S3.5	8.2	0.529	0.076	0.5359	
2880 minute summer	S3.5	1.010	S3.6	4.9	0.486	0.054	1.0716	
2880 minute summer	S3.6	Hydro-Brake®	S3.7	1.0				133.6
2880 minute summer	S3.6	Infiltration		0.0				

Results for 10 year Critical Storm Duration. Lowest mass balance: 99.93%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	S3.0	10	80.673	0.073	11.9	0.1666	0.0000	OK
15 minute summer	S3.1	10	80.528	0.128	23.8	0.2822	0.0000	OK
2160 minute summer	S3.2	1620	80.390	0.140	1.9	19.7956	0.0000	OK
2160 minute summer	S3.3	1620	80.390	0.240	3.2	0.6139	0.0000	OK
2160 minute summer	S3.4	1620	80.390	0.315	4.8	0.8297	0.0000	SURCHARGED
2160 minute summer	S3.5	1620	80.390	0.390	10.9	1.0097	0.0000	SURCHARGED
2160 minute summer	S3.6	1620	80.390	0.540	4.9	111.2101	0.0000	SURCHARGED
15 minute summer	S3.7	1	79.800	0.000	1.0	0.0000	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute summer	S3.0	1.005	S3.1	11.9	0.582	0.133	0.6525	
15 minute summer	S3.1	1.006	S3.2	23.1	1.210	0.350	0.8229	
2160 minute summer	S3.2	1.007	S3.3	1.9	0.391	0.025	0.9960	
2160 minute summer	S3.2	Infiltration		0.0				
2160 minute summer	S3.3	1.008	S3.4	3.2	0.495	0.038	0.8809	
2160 minute summer	S3.4	1.009	S3.5	9.3	0.561	0.085	0.5503	
2160 minute summer	S3.5	1.010	S3.6	4.9	0.467	0.055	1.0716	
2160 minute summer	S3.6	Hydro-Brake®	S3.7	1.0				107.8
2160 minute summer	S3.6	Infiltration		0.0				

Results for 30 year Critical Storm Duration. Lowest mass balance: 99.93%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	S3.0	10	80.683	0.083	15.1	0.1879	0.0000	OK
15 minute summer	S3.1	10	80.547	0.147	30.2	0.3227	0.0000	OK
1440 minute summer	S3.2	1320	80.468	0.218	5.5	36.9692	0.0000	OK
1440 minute summer	S3.3	1320	80.468	0.318	5.3	0.8149	0.0000	SURCHARGED
1440 minute summer	S3.4	1320	80.468	0.393	6.9	1.0366	0.0000	SURCHARGED
1440 minute summer	S3.5	1320	80.468	0.468	13.5	1.2129	0.0000	SURCHARGED
1440 minute summer	S3.6	1320	80.468	0.618	11.7	127.3714	0.0000	SURCHARGED
15 minute summer	S3.7	1	79.800	0.000	1.0	0.0000	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute summer	S3.0	1.005	S3.1	15.1	0.618	0.169	0.7759	
15 minute summer	S3.1	1.006	S3.2	29.6	1.319	0.449	0.9658	
1440 minute summer	S3.2	1.007	S3.3	3.1	0.429	0.041	1.3502	
1440 minute summer	S3.2	Infiltration		0.0				
1440 minute summer	S3.3	1.008	S3.4	4.3	0.555	0.053	0.9490	
1440 minute summer	S3.4	1.009	S3.5	10.8	0.589	0.100	0.5503	
1440 minute summer	S3.5	1.010	S3.6	11.7	0.489	0.130	1.0716	
1440 minute summer	S3.6	Hydro-Brake®	S3.7	1.0				81.4
1440 minute summer	S3.6	Infiltration		0.0				

Results for 100 year +20% CC Critical Storm Duration. Lowest mass balance: 99.93%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
2160 minute summer	S3.0	1920	80.954	0.354	1.4	0.8040	0.0000	SURCHARGED
2160 minute summer	S3.1	1920	80.954	0.554	2.8	1.2168	0.0000	FLOOD RISK
2160 minute summer	S3.2	1920	80.954	0.704	5.3	88.2947	0.0000	FLOOD RISK
2160 minute summer	S3.3	1920	80.954	0.804	3.3	2.0595	0.0000	FLOOD RISK
2160 minute summer	S3.4	1920	80.954	0.879	7.1	2.3176	0.0000	FLOOD RISK
2160 minute summer	S3.5	1920	80.954	0.954	5.7	2.4716	0.0000	FLOOD RISK
2160 minute summer	S3.6	1920	80.954	1.104	9.0	175.6006	0.0000	FLOOD RISK
15 minute summer	S3.7	1	79.800	0.000	1.0	0.0000	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
2160 minute summer	S3.0	1.005	S3.1	1.4	0.321	0.016	2.1846	
2160 minute summer	S3.1	1.006	S3.2	2.8	0.392	0.042	2.9656	
2160 minute summer	S3.2	1.007	S3.3	-2.2	0.349	-0.029	1.5182	
2160 minute summer	S3.2	Infiltration		0.0				
2160 minute summer	S3.3	1.008	S3.4	4.0	0.474	0.048	0.9490	
2160 minute summer	S3.4	1.009	S3.5	3.5	0.518	0.032	0.5503	
2160 minute summer	S3.5	1.010	S3.6	9.0	0.471	0.100	1.0716	
2160 minute summer	S3.6	Hydro-Brake®	S3.7	1.2				134.9
2160 minute summer	S3.6	Infiltration		0.0				

Design Settings

Rainfall Methodology	FSR	Maximum Time of Concentration (mins)	30.00
Return Period (years)	5	Maximum Rainfall (mm/hr)	50.0
Additional Flow (%)	0	Minimum Velocity (m/s)	1.00
FSR Region	Scotland and Ireland	Connection Type	Level Soffits
M5-60 (mm)	17.400	Minimum Backdrop Height (m)	0.200
Ratio-R	0.274	Preferred Cover Depth (m)	1.200
CV	1.000	Include Intermediate Ground	✓
Time of Entry (mins)	4.00	Enforce best practice design rules	✓

Nodes

Name	Area (ha)	T of E (mins)	Cover Level (m)	Node Type	Manhole Type	Diameter (mm)	Easting (m)	Northing (m)	Depth (m)
S4.0	0.030	4.00	82.000	Manhole	Adoptable	1200	720298.000	726363.000	1.000
S4.1	0.030	4.00	82.000	Manhole	Adoptable	1200	720314.935	726355.201	1.150
S4.2	0.571	4.00	82.000	Manhole	Adoptable	1200	720358.000	726408.000	2.650
S4.3			80.750	Manhole	Adoptable	1200	720383.000	726395.000	1.575
S4.4			80.400	Manhole	Adoptable	1200	720398.000	726387.725	1.325
S4.5			80.600	Manhole	Adoptable	1200	720403.784	726376.878	1.600

Links

Name	US Node	DS Node	Length (m)	ks (mm) / n	Velocity Equation	US IL (m)	DS IL (m)	Fall (m)	Slope (1:X)	Dia (mm)	Link Type	T of C (mins)	Rain (mm/hr)
1.000	S4.0	S4.1	18.645	0.600	Colebrook-White	81.000	80.850	0.150	124.3	225	Circular	4.27	50.0
1.001	S4.1	S4.2	68.135	0.600	Colebrook-White	80.850	79.350	1.500	45.4	225	Circular	4.85	50.0
1.002	S4.2	S4.3	28.178	0.600	Colebrook-White	79.350	79.175	0.175	161.0	225	Circular	5.31	50.0
1.004	S4.3	S4.4	16.671	0.600	Colebrook-White	79.175	79.075	0.100	166.7	225	Circular	5.58	50.0
1.005	S4.4	S4.5	12.293	0.600	Colebrook-White	79.075	79.000	0.075	163.9	225	Circular	5.78	50.0

Name	US Node	DS Node	Vel (m/s)	Cap (l/s)	Flow (l/s)	US Depth (m)	DS Depth (m)	Minimum Depth (m)	Maximum Depth (m)	Σ Area (ha)	Σ Add Inflow (l/s)
1.000	S4.0	S4.1	1.171	46.6	5.4	0.775	0.925	0.775	0.925	0.030	0.0
1.001	S4.1	S4.2	1.946	77.4	10.8	0.925	2.425	0.925	2.425	0.060	0.0
1.002	S4.2	S4.3	1.027	40.9	114.0	2.425	1.350	1.350	2.425	0.631	0.0
1.004	S4.3	S4.4	1.010	40.1	114.0	1.350	1.100	1.100	1.350	0.631	0.0
1.005	S4.4	S4.5	1.018	40.5	114.0	1.100	1.375	1.100	1.375	0.631	0.0

Pipeline Schedule

Link	Length (m)	Slope (1:X)	Dia (mm)	Link Type	US CL (m)	US IL (m)	US Depth (m)	DS CL (m)	DS IL (m)	DS Depth (m)
1.000	18.645	124.3	225	Circular	82.000	81.000	0.775	82.000	80.850	0.925
1.001	68.135	45.4	225	Circular	82.000	80.850	0.925	82.000	79.350	2.425
1.002	28.178	161.0	225	Circular	82.000	79.350	2.425	80.750	79.175	1.350
1.004	16.671	166.7	225	Circular	80.750	79.175	1.350	80.400	79.075	1.100

Link	US Node	Dia (mm)	Node Type	MH Type	DS Node	Dia (mm)	Node Type	MH Type
1.000	S4.0	1200	Manhole	Adoptable	S4.1	1200	Manhole	Adoptable
1.001	S4.1	1200	Manhole	Adoptable	S4.2	1200	Manhole	Adoptable
1.002	S4.2	1200	Manhole	Adoptable	S4.3	1200	Manhole	Adoptable
1.004	S4.3	1200	Manhole	Adoptable	S4.4	1200	Manhole	Adoptable

Pipeline Schedule

Link	Length (m)	Slope (1:X)	Dia (mm)	Link Type	US CL (m)	US IL (m)	US Depth (m)	DS CL (m)	DS IL (m)	DS Depth (m)
1.005	12.293	163.9	225	Circular	80.400	79.075	1.100	80.600	79.000	1.375

Link	US Node	Dia (mm)	Node Type	MH Type	DS Node	Dia (mm)	Node Type	MH Type
1.005	S4.4	1200	Manhole	Adoptable	S4.5	1200	Manhole	Adoptable

Simulation Settings

Rainfall Methodology	FSR	Skip Steady State	x
FSR Region	Scotland and Ireland	Drain Down Time (mins)	240
M5-60 (mm)	17.400	Additional Storage (m³/ha)	20.0
Ratio-R	0.274	Check Discharge Rate(s)	x
Summer CV	1.000	Check Discharge Volume	x
Analysis Speed	Detailed		

Storm Durations

15	60	180	360	600	960	2160	4320	7200	10080
30	120	240	480	720	1440	2880	5760	8640	

Return Period (years)	Climate Change (CC %)	Additional Area (A %)	Additional Flow (Q %)
5	0	0	0
10	0	0	0
30	0	0	0
100	20	0	0

Node S4.2 Online Hydro-Brake® Control

Flap Valve	x	Objective	(HE) Minimise upstream storage
Replaces Downstream Link	✓	Sump Available	✓
Invert Level (m)	79.350	Product Number	CTL-SHE-0091-4000-1300-4000
Design Depth (m)	1.300	Min Outlet Diameter (m)	0.150
Design Flow (l/s)	4.0	Min Node Diameter (mm)	1200

Node S4.2 Depth/Area Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Safety Factor	1.0	Invert Level (m)	79.400
Side Inf Coefficient (m/hr)	0.00000	Porosity	1.00	Time to half empty (mins)	

Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)
0.000	310.0	0.0	1.300	310.0	0.0	1.301	0.0	0.0

Rainfall

Event	Peak Intensity (mm/hr)	Average Intensity (mm/hr)
5 year 15 minute summer	141.320	39.989
5 year 30 minute summer	96.231	27.230
5 year 60 minute summer	67.501	17.838
5 year 120 minute summer	43.366	11.460
5 year 180 minute summer	34.304	8.828

Rainfall

Event	Peak Intensity (mm/hr)	Average Intensity (mm/hr)
5 year 240 minute summer	27.717	7.325
5 year 360 minute summer	21.848	5.622
5 year 480 minute summer	17.621	4.657
5 year 600 minute summer	14.705	4.022
5 year 720 minute summer	13.313	3.568
5 year 960 minute summer	11.213	2.953
5 year 1440 minute summer	8.433	2.260
5 year 2160 minute summer	6.259	1.730
5 year 2880 minute summer	5.337	1.430
5 year 4320 minute summer	4.186	1.094
5 year 5760 minute summer	3.535	0.905
5 year 7200 minute summer	3.061	0.781
5 year 8640 minute summer	2.713	0.692
5 year 10080 minute summer	2.450	0.625
10 year 15 minute summer	163.392	46.234
10 year 30 minute summer	111.623	31.585
10 year 60 minute summer	78.321	20.698
10 year 120 minute summer	50.274	13.286
10 year 180 minute summer	39.603	10.191
10 year 240 minute summer	31.895	8.429
10 year 360 minute summer	25.023	6.439
10 year 480 minute summer	20.111	5.315
10 year 600 minute summer	16.737	4.578
10 year 720 minute summer	15.117	4.052
10 year 960 minute summer	12.686	3.341
10 year 1440 minute summer	9.494	2.544
10 year 2160 minute summer	7.008	1.937
10 year 2880 minute summer	5.953	1.595
10 year 4320 minute summer	4.641	1.213
10 year 5760 minute summer	3.902	0.999
10 year 7200 minute summer	3.367	0.859
10 year 8640 minute summer	2.977	0.759
10 year 10080 minute summer	2.682	0.684
30 year 15 minute summer	207.371	58.679
30 year 30 minute summer	142.406	40.296
30 year 60 minute summer	99.326	26.249
30 year 120 minute summer	63.241	16.713
30 year 180 minute summer	49.531	12.746
30 year 240 minute summer	39.716	10.496
30 year 360 minute summer	30.957	7.966
30 year 480 minute summer	24.761	6.544
30 year 600 minute summer	20.529	5.615
30 year 720 minute summer	18.484	4.954
30 year 960 minute summer	15.436	4.065
30 year 1440 minute summer	11.472	3.075
30 year 2160 minute summer	8.407	2.323
30 year 2880 minute summer	7.102	1.903
30 year 4320 minute summer	5.492	1.436
30 year 5760 minute summer	4.591	1.175
30 year 7200 minute summer	3.943	1.006
30 year 8640 minute summer	3.472	0.886
30 year 10080 minute summer	3.118	0.795

Rainfall

Event	Peak Intensity (mm/hr)	Average Intensity (mm/hr)
100 year +20% CC 15 minute summer	323.126	91.434
100 year +20% CC 30 minute summer	223.166	63.148
100 year +20% CC 60 minute summer	154.641	40.867
100 year +20% CC 120 minute summer	97.587	25.789
100 year +20% CC 180 minute summer	75.949	19.544
100 year +20% CC 240 minute summer	60.608	16.017
100 year +20% CC 360 minute summer	46.907	12.071
100 year +20% CC 480 minute summer	37.322	9.863
100 year +20% CC 600 minute summer	30.814	8.428
100 year +20% CC 720 minute summer	27.650	7.411
100 year +20% CC 960 minute summer	22.965	6.047
100 year +20% CC 1440 minute summer	16.939	4.540
100 year +20% CC 2160 minute summer	12.315	3.404
100 year +20% CC 2880 minute summer	10.341	2.772
100 year +20% CC 4320 minute summer	7.926	2.072
100 year +20% CC 5760 minute summer	6.582	1.685
100 year +20% CC 7200 minute summer	5.624	1.435
100 year +20% CC 8640 minute summer	4.932	1.258
100 year +20% CC 10080 minute summer	4.414	1.126

Results for 5 year Critical Storm Duration. Lowest mass balance: 99.32%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	S4.0	10	81.063	0.063	7.7	0.1095	0.0000	OK
15 minute summer	S4.1	10	80.917	0.067	15.4	0.1114	0.0000	OK
720 minute summer	S4.2	525	79.865	0.515	23.3	147.1199	0.0000	SURCHARGED
360 minute summer	S4.3	200	79.224	0.049	4.0	0.0553	0.0000	OK
120 minute summer	S4.4	82	79.124	0.049	4.0	0.0556	0.0000	OK
120 minute summer	S4.5	82	79.047	0.047	4.0	0.0000	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute summer	S4.0	1.000	S4.1	7.7	0.808	0.166	0.1781	
15 minute summer	S4.1	1.001	S4.2	15.2	0.866	0.197	1.5372	
720 minute summer	S4.2	Hydro-Brake®	S4.3	4.0				
360 minute summer	S4.3	1.004	S4.4	4.0	0.628	0.100	0.1062	
120 minute summer	S4.4	1.005	S4.5	4.0	0.642	0.099	0.0767	79.3

Results for 10 year Critical Storm Duration. Lowest mass balance: 99.32%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	S4.0	10	81.068	0.068	8.9	0.1183	0.0000	OK
15 minute summer	S4.1	10	80.923	0.073	17.8	0.1202	0.0000	OK
720 minute summer	S4.2	540	79.961	0.611	26.6	177.3840	0.0000	SURCHARGED
180 minute summer	S4.3	100	79.224	0.049	4.0	0.0553	0.0000	OK
60 minute summer	S4.4	46	79.124	0.049	4.0	0.0556	0.0000	OK
60 minute summer	S4.5	47	79.047	0.047	4.0	0.0000	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute summer	S4.0	1.000	S4.1	8.9	0.839	0.191	0.1982	
15 minute summer	S4.1	1.001	S4.2	17.7	0.896	0.228	1.6419	
720 minute summer	S4.2	Hydro-Brake®	S4.3	4.0				
180 minute summer	S4.3	1.004	S4.4	4.0	0.628	0.100	0.1062	
60 minute summer	S4.4	1.005	S4.5	4.0	0.642	0.099	0.0767	67.8

Results for 30 year Critical Storm Duration. Lowest mass balance: 99.32%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	S4.0	10	81.078	0.078	11.3	0.1349	0.0000	OK
15 minute summer	S4.1	10	80.933	0.083	22.6	0.1365	0.0000	OK
720 minute summer	S4.2	660	80.163	0.813	32.3	240.9552	0.0000	SURCHARGED
60 minute summer	S4.3	36	79.224	0.049	4.0	0.0553	0.0000	OK
30 minute summer	S4.4	82	79.124	0.049	4.0	0.0556	0.0000	OK
30 minute summer	S4.5	83	79.047	0.047	4.0	0.0000	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute summer	S4.0	1.000	S4.1	11.3	0.891	0.243	0.2366	
15 minute summer	S4.1	1.001	S4.2	22.5	0.942	0.290	1.7735	
720 minute summer	S4.2	Hydro-Brake®	S4.3	4.0				
60 minute summer	S4.3	1.004	S4.4	4.0	0.628	0.100	0.1062	
30 minute summer	S4.4	1.005	S4.5	4.0	0.642	0.099	0.0767	62.2

Results for 100 year +20% CC Critical Storm Duration. Lowest mass balance: 99.32%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	S4.0	10	81.101	0.100	17.6	0.1740	0.0000	OK
15 minute summer	S4.1	10	80.956	0.106	35.2	0.1746	0.0000	OK
960 minute summer	S4.2	840	80.684	1.334	40.2	405.3764	0.0000	SURCHARGED
960 minute summer	S4.3	840	79.224	0.049	4.1	0.0557	0.0000	OK
960 minute summer	S4.4	840	79.125	0.050	4.1	0.0560	0.0000	OK
960 minute summer	S4.5	855	79.048	0.048	4.1	0.0000	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute summer	S4.0	1.000	S4.1	17.6	0.993	0.378	0.3304	
15 minute summer	S4.1	1.001	S4.2	35.1	1.048	0.454	1.9780	
960 minute summer	S4.2	Hydro-Brake®	S4.3	4.1				
960 minute summer	S4.3	1.004	S4.4	4.1	0.630	0.101	0.1072	
960 minute summer	S4.4	1.005	S4.5	4.1	0.644	0.100	0.0774	254.6

BARRETT **MAHONY**
CONSULTING ENGINEERS
CIVIL & STRUCTURAL

APPENDIX VII

ICEC HYDROGEOLOGY REPORT

HYDROGEOLOGICAL ASSESSMENT OF PROPOSED SOAKAWAY

Strategic Housing Development at St. Joseph's House and Adjoining Properties at Brewery Road and Leopardstown Road, Dublin 18.

IE CONSULTING
WATER-ENVIRONMENTAL-CIVIL

September 2021

IE CONSULTING
WATER-ENVIRONMENTAL-CIVIL

HYDROGEOLOGICAL ASSESSMENT OF PROPOSED SOAKAWAY

Client: HOMELAND SILVERPINES LIMITED

Location: Strategic Housing Development at St. Joseph's House and Adjoining Properties at Brewery Road and Leopardstown Road, Dublin 18.

Date: 23rd September 2021

Document Control

PROJECT NUMBER: IE2268		DOCUMENT REF: IE2268_Report_4968			
5.0	Final	JK	PMS	PMS	23-9-2021
4.0	Final	JK	PMS	PMS	15-9-2021
3.0	Final	JK	PMS	PMS	11-8-2021
2.0	Draft	JK	PMS	PMS	3/6/2021
1.0	Draft	JK	PMS	PMS	07/5/2021
Revision	Purpose Description	Originated	Checked	Reviewed	Date

Contents

1. Background

It is proposed to utilise a soakaway as part of the management of stormwater for a proposed Strategic Housing Development at St. Joseph's House and Adjoining Properties at Brewery Road and Leopardstown Road, Dublin 18.

Barret Mahony have commissioned a hydrogeological assessment to support their design, for the forthcoming strategic housing development planning application to An Bord Pleanala.

2. Approach to Study

A desk review of the following source of information was undertaken;

- GSI public website
- Apex Geophysical Survey May 2016 – focussing on Northern part of Development site.
- Ground Investigation Ireland Report September 2016- focussing on Northern part of Development site (blocks A/B/C),
- Trinity Green- Soil Infiltration- July 2019
- 19-198-001A - TOPO SURVEY - ISSUED 121019.pdf
- IGSL Ground Investigation report May 2020.-focussing on Southern leg of site (Blocks D/F)
- BP2-OMP-01-ZZ-DR-A-1001 Masterplan
- BPR-BMD-00-00-DR-C-1000 Proposed Foul and Surface Drainage Ground PL5
- BPR-BMD-00-ZZ-DR-C-1205 Suds Details.pdf
- BPR-BMD-00-00-DR-C-1005-Schematic Suds Plan Layout.pdf

These should be referred to, if necessary, when reading this report.

3. Conceptual Ground Model

A conceptual understanding of the ground conditions on the site has been established as follows;

The ground elevation is approximately 83m O.D to the south dropping to approximately 81m O.D to the north, with a slight slope to the Northeast. The local topography slopes towards the Northeast and the Irish Sea.

The underlying bedrock comprises a pale grey fine to coarse grained Granite. The top 1.0m of the granite is weathered to a sand, and competent granite bedrock is encountered typically at between 1.5m bgl and 2.7m bgl. The elevation of competent rock profile is variable but appears consistent within this range.

The granite sand is not found everywhere, but where present is in the range of 0.3m to 1.2m thick.

A consistent cover of gravelly CLAY (glacial Till) overlies the Granite and Granite Sand except where replaced by Made Ground. The Made Ground may be a combination of reworked/imported material.

The Granite is classified by the Geological Survey of Ireland (GSI) as a *POOR Aquifer, generally unproductive except for localised zones*. Localised zones include deep weathered zones or faults. The maps do not indicate the presence of any such features in the area, and the geophysical survey undertaken as part of this project did not identify any such features. It is reasonable therefore to suggest that the Granite beneath this site is generally impervious and probably receives little to no recharge.

The GSI applies a recharge cap of 80mm per year which is approximately 20% of the 417mm effective rainfall (total rainfall – evapotranspiration). This suggests that the remaining 80% is shed as surface run-off and picked up by drainage features or watercourses.

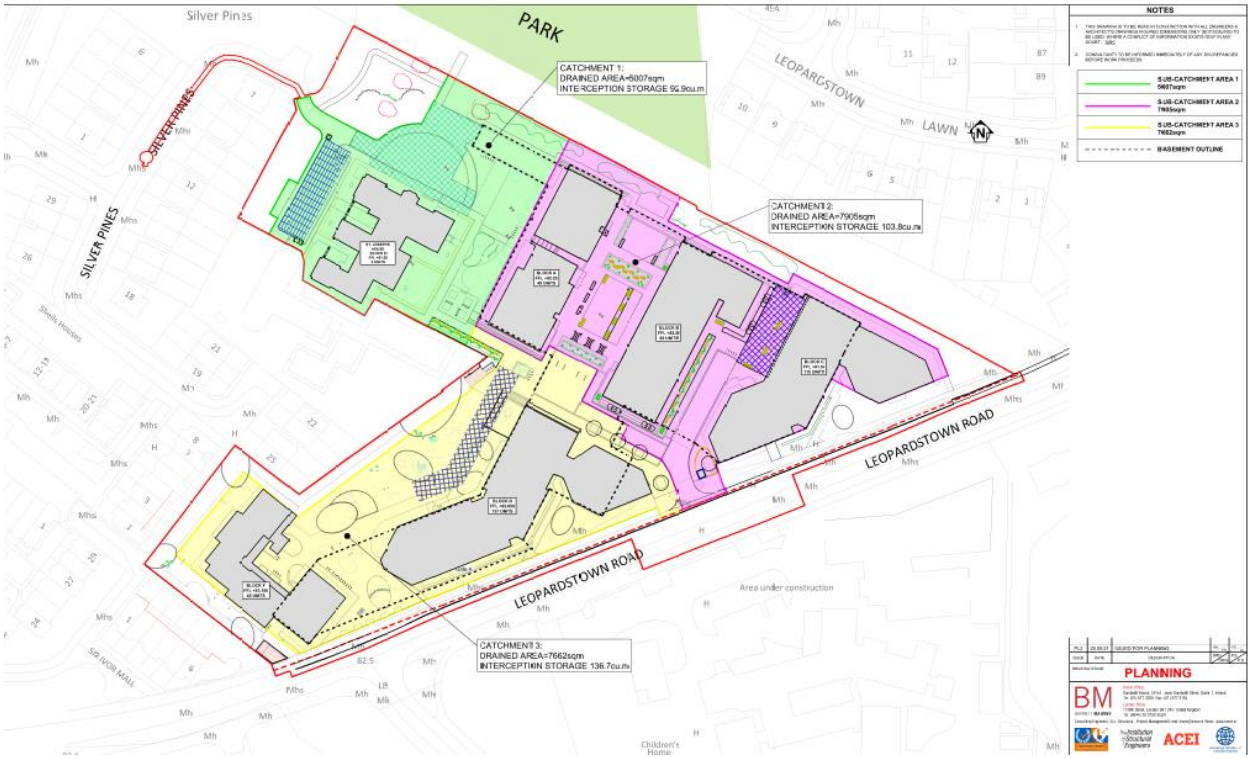
Furthermore any rainfall that does pass through the low permeability gravelly CLAY, will be vertically constrained by the low permeability of the granite. The water will therefore dissipate slowly through the impersistent granite Sand, and will follow the topographic gradient towards the Northeast, possibly recharging some local streams such as the Brewery Stream.

During wet weather, the suspected slow permeability, will lead to the formation of a perched water table on top of the granite bedrock.

4. Description of proposed surface water management in Sub Catchment 3

Surface water management for the proposed development has been divided into a series of sub-catchments. As the other sub-catchments are serviced by discharges to public storm sewers following attenuation, they are not considered further in this report. Sub-catchment 3 is serviced by SUD's devices including a soakaway, which is the main subject of this assessment.

Sub-catchment 3 is approximately 8000m^2 in area as shown below in yellow.



Approximately 60% of the sub-catchment is landscaping, receiving natural recharge. Approximately 25% of the area will be fitted with permeable paving as a SUDs device.

This means that approximately 15% of the area or 1200m^2 will comprise roof area, with green roof SUDs devices, which will attenuate flows from the roof. This attenuated flow will be conveyed to the soakaway.

- The soakaway will occupy a plan area of 364m^2 and comprises 546m^3 of cellular crate proprietary system with a nominal porosity of 95%, at 1.5m deep & ~750mm cover (base @ 2.25m BGL at 79.25m O.D)

The soakaway has a storage volume of approximately 519m^3.

The derived "f" value from the BRE Test is 5.86 x 10^{-6} m/s.

The design outflow is calculated as follows

Outflow from the soakaway

$O = a_{s50} \times f \times D$

where:

- a_{s50} = the internal surface area of the soakaway to 50% effective depth: this excludes the base area which is assumed to clog with fine particles and become ineffective in the long-term;
- f = the soil infiltration rate determined in a trial pit at the site of the soakaway;
- D = the storm duration.

a_{s50} is calculated at 2 x (52 +7) x(1.5÷2) = 88m^2

Taking a storm duration of 120 minutes = 120 x 60 seconds = 7200 seconds.

The outflow will be 88 x 5.86 x 10^{-6} x 7200 = 3.7 m^3 over 2 hours or 1.85 m^3/hr.

The effective storage volume with 95% free volume = 546m^3 x 0.95 = 519m^3

A high level emergency overflow from the soakaway is provided should this storage volume be exceeded, which in turn outfalls to the storm sewers.

Although the outflow from the soakaway will be slow, there is significant storage volume available to compensate for this, and in the event that this is exceeded, the overflow will be automatically engaged.

The time of emptying half of the storage volume

Check on time of emptying half storage volume, t_{s50}

$$t_{s50} = \frac{S \times 0.5}{a_{s50} \times f} = \frac{519 \times 0.5}{88 \times (5.86 \times 10^{-6})}$$

$$= t_{s50} = 140 \text{ hours}$$

This is a high value. However, the soakaway design demonstrates adequate storage for upto a 100 year+20% Climate change 7200 minute event, demonstrating a factor of safety of 5, which is adequate.

The inherent lack of permeability in the bedrock, means that the watertable will rise after storm events as a perched watertable develops. The basement will therefore need to be protected against ingress of water.

This suggests that there is a likelihood that the emergency overflow will need to be engaged only in a very extreme event.

5. Risks to proposed and existing infrastructure

The concentration of recharge into a soakaway area of 400m^2 will create a recharge mound during particularly wet periods, which will slowly dissipate over time because of the low permeability value.

The water will dissipate laterally mainly through the granite sand in accordance with the shallow groundwater flow following a normal direction of drainage to the Northeast.

Reference to the geophysical survey suggests it is likely that the proposed basement will be excavated in competent rock based on the finished floor level of 78.66m O.D. The competent rock is effectively impermeable as previously discussed.

This means that the normal pathway of drainage to the Northeast will be impeded. Not only will outflow from the soakaway be impeded, the movement of groundwater from beneath the suds devices in this sub-catchment will also be impeded.

The configuration of the basement, does not allow for the provision of high permeability vertical corridors, although some water will enter the annulus between the basement wall and the rock cut. If this annulus is contiguous around the basement, some off-site flow will occur, and possibly re-connect with the natural ground pathway beyond the site. However a further mitigation measure is required.

It is proposed to include a horizontal array of relief drains as shown on drawing No. BPR-BMD-00-00-DR-C-1000 PL5 which will convey water from the annular space beside the basement directly beneath the basement into the annular space at the downgradient side of the basement.

The fan configuration of pipes will allow even dissipation of stormwater on the far side of the basement, and will allow re-connection with normal flow paths.

The system will be self-regulating controlled by the thickness and permeability of the natural subsoils.

Once re-connected to the natural flowpaths, there will be no down-gradient changes to normal seasonal variations in groundwater.

This means that down gradient conditions will be unchanged in both quantity and quality from the current situation and thus no impacts on property or the environment will arise, including to trees in nearby public parks. Although it could be argued that the site is hydraulically linked to the South Dublin Bay SAC 000210 and the South Dublin Bay and Tolka Estuary SPA 004024, there will be no impact attributable to the proposed developed, which therefore precludes the need for Appropriate Assessment or the need to implement mitigation measures to protect the SAC's

6. Conclusions

In our opinion the proposed use of a soakaway to manage stormwater for this proposed development is constrained by the low permeability characteristics of the bedrock, but the incorporation of an emergency overflow together with the use of suds devices to attenuate flow, and to accommodate rainfall from other areas of the sub-catchment will overcome the constraints.

The configuration of the proposed basement, would impede the dissipation pathway because it will cut off the natural flowpaths.

The provision of an array of drains under the basement to equalise groundwater levels, and to provide continuity of flowpaths, is considered to represent an appropriate design measure, which will create a neutral residual drainage impact from the proposed development.

As a result, no downstream impacts will result to infrastructure or environmental assets, including public amenities and European protected sites.

BARRETT **MAHONY**
CONSULTING ENGINEERS
CIVIL & STRUCTURAL

APPENDIX VIII

SURFACE WATER AUDIT

STORMWATER AUDIT (STAGE 1)

JBA Project Code	2021s0615
Contract	Berwick Pines Residential Development at Berwick Pines, Leopardstown Road, Dublin 18
Client	Homeland Silverpines Ltd.
Date	16th June 2021
Author	Leanne Leonard
Subject	**Stormwater Audit - Stage 1 Report**

1 Berwick Pines Residential Development at Leopardstown Road, Dublin 18.

1.1 Introduction

JBA Consulting have been contracted by Homeland Silverpines Ltd. to undertake a Stage 1 audit of the surface water drainage design by Barrett Mahony Consulting Engineers (BMCE) for the proposed residential development at Leopardstown Road, Dublin 18.

The results of the audit are set out in the table below.

1.2 Stage 1 Audit

Design Parameter	Audit Result
Proposed Development	The subject site is located on the Leopardstown Road in Dublin 18. The proposed development will comprise 463 nr. Apartments across six blocks, together with a café and creche. The site has been split into two phases. Phase 1 (Blocks A, B and E) was previously granted permission by An Bord Pelanála (Ref: PL 06D.249248) in 2017. The site layout, with Phase 1 shaded in blue, is shown below.  The total site area is stated to be 2.58 hectares (ha). The subject of this Stage 1 stormwater audit is to review the proposed surface water drainage design and sustainable urban drainage system proposals for the proposed development.
Relevant Studies/Documents	The following documents were considered as part of this surface water audit: • The SuDS Manual (CIRIA C753); • Recommendations for Site Development Works for Housing Areas (DoEHLG); • Greater Dublin Strategic Drainage Strategy (GDSDS); • Greater Dublin Regional Code of Practice for Drainage Works; • DLRCC Green Roof Guidance Document (Appendix 16 of the County Development Plan 2016-2022); • BRE Digest 365

Key Considerations & Benefits of SUDs	The key benefits and objectives of SuDS considered as part of this audit and listed below include: • Reduction of run-off rates; • Provision of volume storage; • Volume treatment provided; • Reduction in volume run-off; • Water quality improvement; • Biodiversity.
Site Characteristics	**Soil:** The soil at the site has been indicated as being Soil type 2 (SPR 0.30) following site investigation by Trinity Green in July 2019. Trial pits show varying depths of made ground over clay over sand. Assumed bedrock was encountered in most locations at c. 79-80mOD to the west of the site, reducing to c. 77-78mOD to the east of the site. Infiltration tests were carried out in two test pits. The first encountered brown gravelly clay over gravel and the second (in the location of the proposed soakaway) encountered gravel with low clay content. Soil type 1 is the soil classification on the UK suds website, therefore any calculation of Qbar based on a soil type 2 will be somewhat more conservative. Infiltration testing was carried out as part of the SI to 3nr infiltration test locations. Two tests were undertaken by IGSL at the proposed soakaway location, which resulted in infiltration rates c. 5.7X10-6m/s. The tests were carried out at a depth of 2.25m bgl and while seepage was noted at 2.2m bgl, it is noted that IGSL confirmed that this is a localised perched flow, and not the groundwater table given the flow quickly dissipated. Tests were carried out by Trinity Green at two other locations within the site at a depth of 1.2m bgl. Results were 4.6x10-6m/s and 5.3x10-6m/s. **Rainfall (basis for surface water pipeline network design):** Rainfall parameters can be estimated using Met Éireann data, using the Flood Studies Report (FSR) values or the values in the GDSDS. The Met Éireann method can be more representative of a site if selected correctly. The figures presented below match those retrieved by JBA. **BMCE value** / **JBA Value** Rainfall model: Met Éireann / Met Éireann M5-60 (mm): 17.4mm / 17.4mm Ratio R: 0.274 / 0.274 BMCE have broken the site into three subcatchments. Catchment 1 comprises Block E and environs. Catchment 2 comprises Blocks A, B, C and evirons. Catchment 3 comprises Blocks D, F and envrions.. There is an existing gravity connection from St. Joseph's House (Block E) to the surface water sewer in Silver Pines. This connection will be retained and will serve Catchment A. Catchment 2 will discharge via gravity to an existing 225mm surface water sewer located along the Leopardstown Road, via a new connection. Catchment 3 will discharge to ground via a soakaway, with an emergency overflow to the existing surface water network in Silver Pines. Using an SPR value of 0.30 for the site, the greenfield runoff rate (QBAR) for the overall development has been calculated by BMCE as 5.07 l/sec for the entire site, which is acceptable. The proposed discharge from each catchment has been summarised below. Subcatchment 1 – 1.07 l/s

	Subcatchment 2 – 4.0 l/s Subcatchment 3 – Discharge to ground via soakaway. This strategy has been agreed with DLRCC Drainage Dept. As the QBAR figure is greater than the 2l/sec/ha allowance in the GDSDS, QBAR will be the limiting discharge for all storm events from the subject development.
SuDS Measures Considered	BMCE have included the following SUDs measures within the proposed development. No reference has been made to any other measures considered.

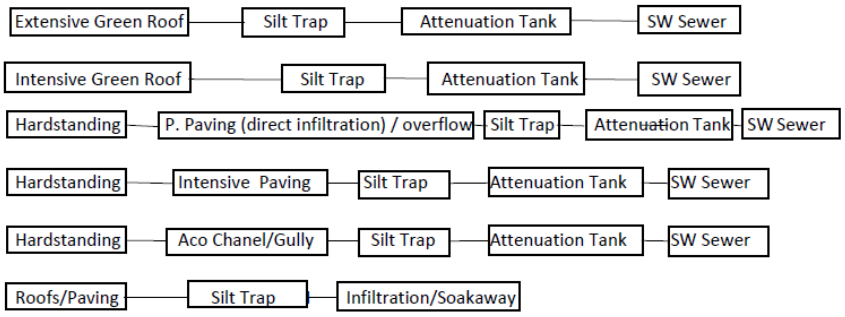
SUDS Technology	Comments
Green Roofs	A mixture of extensive and intensive green roofs are proposed to all apartment blocks, except for Block E which is an existing building on the site. BMCE note that 90% coverage will be achieved, which is greater than the 60% required in the DLRCC Green Roof Policy.
Swale/ Filter Drain / Infiltration trench	None proposed. Drainage trenches outside the basement walls, connected by a network of pipes crossing under the basement will facilitate natural groundwater flow across the proposed structures.
Permeable Paving	The car parking spaces, courtyards and footpaths throughout the site will be made up of permeable paving. The invert level of the outlet has been raised 100mm above the base of the stone media to intercept the first flush.
Petrol Interceptor	It is proposed to include a hydrocarbon interceptor for the trafficked area within Catchment 2.
Surface Water Attenuation	Attenuation will be provided by way of: A. 2 nr. geocellular storage structures. B. Soakaways C. Permeable Paving
Site Run-off Rates	BMCE propose to limit discharge to the equivalent of QBAR for all storm events.
Detention Basins, Retention Ponds, Stormwater Wetlands	N/A
Tree Root Structural Cell Systems, Bio-retention, rain garden	N/A

Surface Water Drainage Design	All surface water flows generated by the development will be attenuated and discharged to existing surface water sewers at a rate of QBAR.
SuDS Management Train	**Source Control** and **Site Control** are addressed by the use of SuDS devices (interception storage) and attenuation with outflow controlled by a Hydrobrake. A hydrocarbon interceptor has been proposed for runoff from the trafficked area within Catchment 2.

As recommended with the SUDs Manual (Table 3.3) assuming effective pre-treatment is in place the following number of treatment train components are recommended:

	No. of treatment train components recommended	Comment/Proposals
Roof areas	1	Extensive and Intensive Green roofs have been proposed to all roofs (except for the existing building).
Residential roads, parking areas, commercial zones	2	Permeable paving has been proposed to car parking spaces, footpaths and courtyards within the development. Intensive paving has been proposed to podiums. A silt trap has been proposed downstream prior to discharge to the attenuation structures and soakaway.
Refuse collection, industrial areas, loading bays, lorry parks and highways.	3	Not applicable.

The below figure summarises the SuDS Management Train for the site.



BMCE have undertaken a SuDS pollutant analysis in accordance with the Simple Index Approach in Ciria C753, to ensure that effective treatment of runoff is provided.
A hydrobrake designed for a linear discharge profile will be provided at the outfalls of the attenuation structures to limit flows to a maximum of QBAR.

Climate Change	An allowance of 20% increase in flows has been included for climate change for the rainfall intensities for the purposes of sizing the attenuation storage. This is over and above the requirements of the GDSDS but as discussed and agreed with DLRCC.
Volume Storage	BMCE have provided attenuation calculations for the proposed soakaway and attenuation volumes using the software Flow. Volumes account for the 100-year return storm event + 20% climate change.
Volume Run-off	No comparison of pre and post development storm volumes have been provided, however, as it is proposed to limit discharge to QBAR for all storm events, such a

	calculation is not deemed necessary.
Treatment Volume / Water Quality Improvement	Interception storage is proposed by way of green roofs, permeable paving and a soakaway. A petrol interceptor has also been provided.
Return Period	A 100-year return period plus 20% for climate change has been used in the design for the attenuation systems.
Exceedance flows	BMCE have considered exceedance flows. In the unlikely event of blockage of road gullies, flow will be conveyed towards the roadways for the most part. Exceedance flows to the north will be directed towards the park adjacent to the northern boundary. Given the low probability of exceedance flows greater than 1/100-year storm, this may be acceptable to DLRCC.
Health & Safety and Maintenance Issues	The proposed drainage system comprises SuDS devices, traditional road gullies, attenuation systems and underground pipes. These elements are considered acceptable from a Health & Safety perspective once supplier/manufacturers guides are followed and complied with during the detailed design, construction and operation. Optimum performance of the SuDS treatment train is subject to the frequency of maintenance provided. A proposed maintenance regime has been provided for each of the SuDS Measures. At detailed design stage this should be expanded to include non-SuDS measures (e.g. gullies, hydrobrake etc.). Regular maintenance of the flow control device will be required to remove any blockages, particularly in the wake of heavy rainfall events or local floods. It is recommended that the petrol interceptor be fitted with an audible high-level silt and oil alarm for maintenance and safety purposes. Regular inspection and maintenance are recommended for the petrol interceptor. Please note that silt and debris removed from the petrol interceptor during maintenance will be classified as contaminated material and should only be handled and transported by a suitably licensed contractor and haulier and disposed of at a suitably licensed landfill only.
Design Review Process	Upon review of the initial drainage design, JBA Consulting provided feedback, resulting in some modifications, namely: • The SPR used for green areas in the network and attenuation calculations. • The inclusion of a hydrocarbon interceptor. • The refinement of attenuation calculations for Catchment 1 to accurately represent the StormTech and overflow to permeable paving arrangement. A summary of comments and record of the audit trail are appended to this report. Based on this being at preliminary design stage and a Stage 1 Surface Water Audit, JBA Consulting's comments have all been satisfactorily addressed.
Summary of items to be considered at Detailed Design Stage	There are a number of items that can be addressed at detailed design stage. A summary of same are as follows: • Proper detail design and construction of SuDS devices is paramount to ensure long term optimum hydraulic performance as well as maximisation of biodiversity opportunity. It is recommended that a collaborated approach to detail design is adopted between engineers, architects, ecologies and landscape architects.

	• Hydrobrake selection to be give due consideration to hydraulic performance, actual head behind the unit, maximum potential clear passage size and maintenance requirements. • Section 2.2 of Appendix IV states that "there was water in [location 2] at 1.8m bgl" and concludes that "the water table is at about 1.8m bgl" but the Soakaway Design sheet indicates Seepage at 2.2m bgl. The IGSL also notes seepage at 2.2m bgl, but S2.3.5 of the report notes that IGSL confirmed that this is a localised perched flow, and not the groundwater table. Additionally, trial pit 01 has water in the photo, but this isn't logged in the trial hole record. Given the site investigation was undertaken in May and July, they are bound to present a favourable groundwater level. To ensure that the base of the proposed soakaway is at least 1m above the maximum anticipated groundwater level, further site investigation, including groundwater monitoring over the winter period, should take place at detailed design stage.
Audit Result	JBA Consulting considers that the surface water drainage design for the proposed development is acceptable and meets the requirements of the Stage 1 Stormwater Audit.

Audit Report Prepared by: Leanne Leonard BEng MIEI
Engineer

Approved by: Michael O'Donoghue BEng CEng MIEI
Senior Engineer

Note:

*JBA Consulting Engineers & Scientists Ltd. role on this project is as an independent reviewer/auditor. JBA Consulting Engineers & Scientists hold no design responsibility on this project. All issues raised and comments made by JBA are for the consideration of the Design Engineer (*BMCE*). Final design, construction supervision, with sign-off and/or commissioning of the surface water system so that the final product is fit for purpose with a suitable design, capacity and life-span, remains the responsibility of the Design Engineers.*

Appendix A – Audit Trail Record

JBA Consulting Stormwater Audit - Stage 1 Feedback Form

Project:	Berwick Pines - Stage 1 SWA
Date:	01/06/2021
JBA Reviewers	Leanne Leonard
Project Number:	2021s0615

Item No.	JBA Review Comment	Comment/Clarification Request/Suggested Mitigation	Response from Client/Client Representative	Acceptable / Not Acceptable
	07/05/2021	07/05/2021	19/05/2021	
	Reference Documents 19.236-IR-01_Rev PL3 BPR-BMD-00-00-DR-C-1000 PL5 BPR-BMD-00-00-DR-C-1005 PL4 BPR-BMD-00-00-DR-C-1006 PL1 BPR-BMD-00-B1-DR-C-1001 PL4 BPR-BMD-00-ZZ-DR-C-1202 PL2 BPR-BMD-00-ZZ-DR-C-1205 PL4 BPR-BMD-00-ZZ-DR-C-1207 PL1			
1	Soakaway Tests The map included in Appendix IV has renumbered the soakaway locations so that SA01 is to the east and SA02 is to the west. However, Figure 2.2 in Section 2.3.3.1 of the report shows them the other way around.	Can BMCE confirm which location relates to each soakaway test.	Apologies for confusion. 3 no. soakaways have been done in 2 phases. The 2 initial soakaways (1.2m deep) are in the locations shown in Appendix IV, carried out By Trinity Green. SA02 relates to the proposed catchment 3 soakaway. Further to this, DLR suggested to carry out another deeper soakaway, which was undertaken by IGSL, also at the location of the proposed soakaway, and with location shown on Fig 2.2. Both tests near the soakaway resulted in infiltration rates circa 5.7E-6m/s. The other test near Block C is not relevant as infiltration was subsequently omitted in that Catchment.	Acceptable
2	Simple Index Approach Section 2.3.8 of the report uses the entrances to the basement car parking to demonstrate the SIA approach. This example assumes that permeable paving will be provided, however, drawing BPR-BMD-00-00-DR-C-1005 shows impermeable pavement for these entrances. Therefore, the mitigation indices for permeable paving cannot be used. While silt traps provide an opportunity for larger solids to settle in lower flows, they won't capture any hydrocarbons. It is not clear whether vehicles will pass through the (permeable paving) courtyard in front of St, Joseph's House to gain access to the basement beneath Block A. It is however, acknowledged that extensive SuDS measures have been provided throughout the site and the SuDS management train has been adequately addressed in all other areas.	BMCE to consider the includsion of a hydrocarbon interceptor for runoff from impermeable roadways. BMCE to confirm access route for basement entrance beneath Block A and whether runoff passes through permeable paving prior to enterring the SW sewer.	The area of impermeable surface is relatively small, and thus the hydrocarbon interceptor was not deemed necessary. However, on reflection, 50 car spaces is a arbitrary threshold we often use, and despite the basement being the primary place for spills, we still agree that an interceptor would be appropriate, so have included on C1000 now. Yes, vehicles can access the basement via the permeable paving courtyard in front of St. Josephs House. This runoff will enter the permeable paving which overflows to the SW network in Catchment 1.	Acceptable
3	Runoff Factors The runoff factor applied to landscaped areas appears a little low at 0.1.This should match the runoff factor of 0.3 (Soil Type 2) used in the QBAR calculations.	BMCE to review. The same SPR should be used in both the Qbar calculation and for green areas in the attenuation calculations.	You are correct. The runoff factor for landscaped areas has been increased to 0.3 to match the SOIL value.	Acceptable
4	Soakaway The soakaway has been designed with a FOS of 5. However, given flooding of the soakaway could result in damage to buidings or structures, and flooding of a basement, a FOS of 10 should be used. Section 25.2.3 of the CIRIA SuDS Manual C753, advised that infiltration should not take place within 5m of foundations of buildings or structures.	BMCE to review and consider using FOS of 10 within the soakaway design. Has 5m clearance between the soakaway and Block D foundation/basement been provided?	Flooding of the soakaway would not result in damage of the buildings or structures, as the overland flow study (C1015) shows that water can escape from the site onto surrounding roads, without impact on the buildings. In addition, an overflow facility has been provided. The basement will be fully waterproofed. We are satisifed that the FOS =5 is appropriate, as advised in Ciria C753. >5m clearance to basement and boundaries is confirmed.	Acceptable
5	Interception Storage Section 2.3.10.1 states "soft landscaping and planted areas are conservatively taken as providing natural interception storage of 15mm".	Is this referenced in the CiRIA SuDS Manual? Can BMCE provide a reference for this statement please?	See SuDS Manual C753 Section 3.3 where interception is defined as 'mimic greenfield hydraulic response characteristics, where small rainfall events do not generally produce any runoff'. Soft landscaping is very similar to the greenfield characteristics, and therefore it can be inferred that it is providing this 'natural interception', despite no physical engineered layer being applied.	Acceptable
6	FLOW Calculations The links in the FLOW calculations do not match the pipes shown on the drainage layout drawing. How has the design head for the hydrobrake in subcatchment 1 been determined (1.0m)? The invert level of the hydrobrake is 79.85m and the top of the StormTech chamber is 80.381m. This suggests an actual head of 0.531m. Furthermore the depth of the tank in the FLOW model is stated to be 0.7m, whereas the depth of SC 310 units are 0.406m. Has the stone above the units been included in the structure depth?	BMCE to provide sketch/plan with FLOW pipe/manhole references labelled. BMCE to review and advise.	yes, the stone above the tank has been included in the storage depth of the stormtech tank. This also allows the supplemental storage in the permeable paving (above 80.4) to be surcharged when required. The tank hydrobrake design head should be 850mm (80.7-79.85) and has been updated as such	Acceptable
7	Allowable discharge Qbar for the site has been calculated as 5.07 l/s. However, the total discharge from the site is 6.0 l/s (2 l/s from subcatchment 1 and 4 l/s from subcatchment 2). Notwithstanding that, given subcatchment 3 will discharge to ground, the area used within the greenfield runoff calculation should be reduced accordingly.	BMCE to review.	in light of advice from the hydrobrake supplier that a lower value of 1.07l/s could now be supplied, we have revised the calculations, and increased the storage appropriately. Subcatchment 3 is still positively drained, which is the definition in the DLRCC draft development plan as to the area to be taken to calculate the greefield runoff. No runoff is discharged from this part of the site, either overland or to the SW network. Therefore, we believe it is valid to use the area to calculate the greefield runoff rate for the wider site. This has been agreed with DLRCC Drainage	Acceptable subject to DLRCC agreement.
8	Infiltration Rates Two infiltration tests were carried out, one in subcatchment 2 and the other in subcatchment 3. However the higher infiltration rate achieved has been used in both subcatchments in the FLOW calculations.	BMCE to use the appropriate infiltration rate for each subcatchment.	the correct infiltration rate is used for the soakaway tank as detailed in response to item no. 4 above.	Acceptable
9	Hydrobrake Emergency Overflow/By-pass The BMCE response to DLRCC query 9 states that "a penstock is provided on the flow control device as required". However, detail ST1 on drawing BPR-BMD-00-ZZ-DR-C-1205 notes that the "Hydrobrake is to be provided without a by-pass door".	Will an emergency overflow arrangement be provided at the hydrobrake manhole should blockage occur? If not, has this been agreed with DLRCC?	DLRCC will not accept the inclusion of a bypass door or emergency overflow. They want any blockage or flooding to be contained and dealt with within the site and consider same a maintenance issue, which may be ignored to the detriment of the public SW network if either of the above is provided.	Acceptable

Item No.	JBA Review Comment	Comment/Clarification Request/Suggested Mitigation	Response from Client/Client Representative	Acceptable / Not Acceptable
10	Attenuation Tank Reinforced concrete attenuation tanks are not usually favoured by DLRCC. Have proprietary attenuation systems been considered in subcatchment 2? Has the RC tank been agreed with DLRCC?	BMCE to advise.	Yes, this tank has been agreed with DLRCC as part of a previous 2017 planning permission on this part of the subject site (incl. Block A & B only). There was not sufficient space in this area for a proprietary arched (Stormtech) type tank as used in Catchment 1.	Acceptable
11	Exceedence Flows Have exceedence flows been considered?	BMCE to advise.	Yes, the overland flow study is shown on C1015	Acceptable. See Note 14
	14/06/2021			
	Reference Documents 19.236-IR-01_Rev PL4 BPR-BMD-00-00-DR-C-1000 PL7 BPR-BMD-00-00-DR-C-1005 PL5 BPR-BMD-00-00-DR-C-1015 PL3 BPR-BMD-00-B1-DR-C-1205 PL4 BPR-BMD-00-ZZ-DR-C-1206 PL5 BPR-BMD-00-ZZ-DR-C-1208 PL6			
12	Appendix VII refers to a Hydrogeology Report by ICEC.	Can BMCE please provide the hydrogeology report to ensure compliance with the findings and recommendations within?	This has been issued for information	Acceptable
13	There appears to be an error/typo in the FLOW calculations for the permeable paving storage for catchment 1. The drawing states 700m2 x 0.4m deep x 0.3 voids area. The Flow calculations state 415m2 and 1.0 porosity. This results in a volume of 166m3 instead of 84m3.	BMCE to review and amend.	There was in fact a slip on the permeable paving storage in the Flow Model. Having re-run it we need to increase the stoarage to 114m3 (800m2 x 0.475m x 0.3 voids). This is pushing the limit of what we can fit in but it does work.	Acceptable
14	It is noted that the overland flows from catchment 2 are directed towards third party lands. Given this overland flow route is for exceedence events it may be acceptable to DLRCC.	No response required.	N/A	N/A