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PROPOSED RESIDENTIAL DEVELOPMENT AT HOLYWELL, SWORDS, CO. DUBLIN

Engineering Report For Planning | September 2023

ROD
ROUGHAN & O'DONOVAN

Housing at Holywell, Swords, County Dublin

Engineering Report For Planning

Document No: **HHP-ROD-XX-XX-RP-C-0001**

Made: ..... Angelo Sicilia (AS)

Checked:..... Ciaran McGee (CMG)

Approved:..... Sean Kennedy (SK)

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Housing at Holywell, Swords, County Dublin

Engineering Report For Planning

TABLE OF CONTENTS

1. INTRODUCTION

1.1 Background

This report has been prepared to supplement a Planning Submission for a proposed residential development at Holywell, Swords, Co. Dublin. This engineering report sets out the basis for the planning submission in terms of surface and foul drainage, water supply and utilities. An Initial Site Specific Flood Risk Assessment is found in Appendix F. A Preliminary Construction & Environmental Management Plan is found in Appendix G. This report should be read in conjunction with the following drawings;

- HHP-ROD-XX-XX-DR-C-0001 Proposed Layout
- HHP-ROD-XX-XX-DR-C-0030 Surface Water Drainage Layout
- HHP-ROD-XX-XX-DR-C-0031 Foul Water Drainage Layout
- HHP-ROD-XX-XX-DR-C-0040 Water Main Supply Layout
- HHP-ROD-XX-XX-DR-C-0090 Proposed Vehicle Tracking Layout

2. PROPOSED DEVELOPMENT

The proposed development involves the construction of 57 no. apartments (21 no. one bedroom; 28 no. two bedroom; and 8 no. three bedroom) in 3 no. apartment blocks incorporating 33 car parking spaces, 166 no. long-stay bicycle parking and 57 no. short-stay bicycle parking.

The proposed development site has an area of approximately 0.77Ha.

3. SITE INFORMATION

3.1 Site Location

The proposed development is located at Holywell, Swords, Co. Dublin. The site is bounded by the Holywell Distributor Road to the north and west, existing residential development to the east and a residential landscaped area to the south. There is an existing ditch that runs along the southern boundary of the site. The site location is outlined in Figure 1.1 below.

The site is situated within the catchment of the River Gaybrook which generally flows in a west-east direction crossing the Holywell Distributer Road in proximity to the south-west corner of the site.

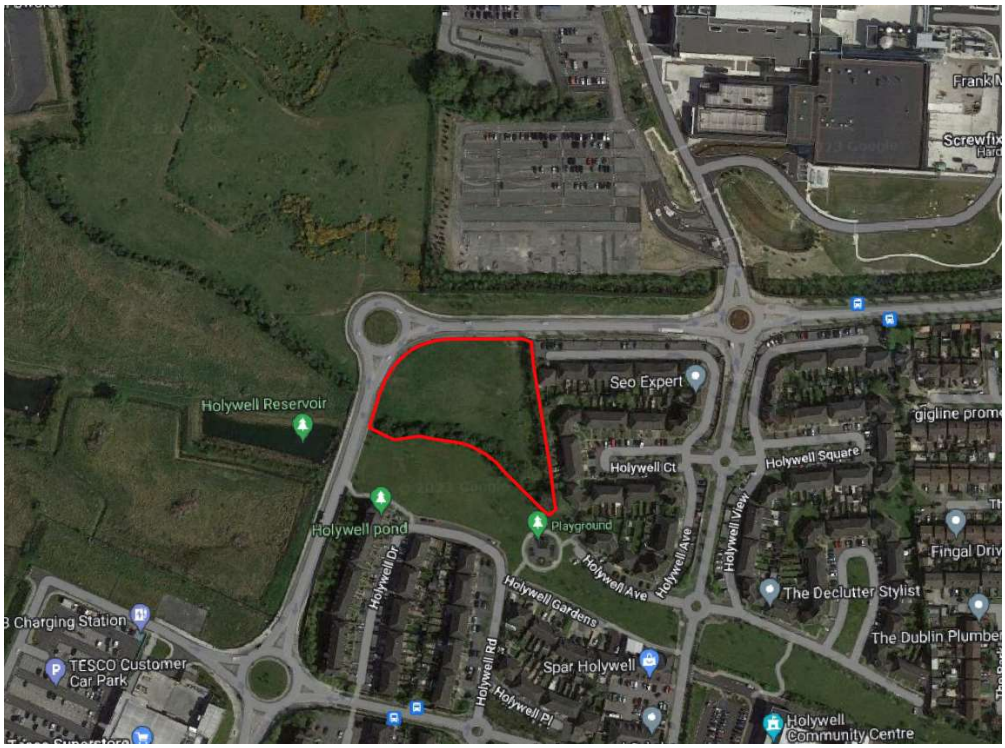


Figure 1.1 Site Location Map and Extents

3.2 Planning History

A planning application was lodged for this site on 30th October 2018 for the development of 29 dwelling units in the following mix: A 2/3 storey duplex/apartment building, 7 no. 2- bedroom ground floor apartments, 2 no. 1-bedroom ground floor apartments, 9 no. 3-bedroom duplex units and 2 no. 2-bedroom two storey apartments. The development also consisted of 9 no. houses comprising 3 no. 3-bedroom mid-terraced units; 2 no. 3-bedroom end of terrace units; 2 no. 4-bedroom semi-detached units and 2 no. 3-bedroom semi-detached units together with all associated site

development/car parking/landscaping works. Planning permission was granted on 3rd January 2019 (Planning Ref F18A/0335).

3.3 Site Topography

The site generally slopes from northeast to southwest. The elevation across the site varies by approximately 2.5m from the highest to lowest points of the site (approximately 3.9% gradient). There is an existing drainage ditch located along the southern boundary of the site. Proposed ground levels are to be set above the flood level of the adjacent ditch.

3.4 Site Hydrology and Flood Risk Assessment

The site is located within the catchment of the River Gaybrook. The River Gaybrook rises approximately 930m southwest of the development site within the Airside Retail Park. The river generally flows in a north easterly direction, where it ultimately discharges to the Malahide Estuary, approximately 3.4km northeast of the development site. According to the OPW Flood Studies Update (FSU) Web Portal, the catchment measures approximately 5.26km^2 in size as outlined in Figure 3.1 below.

Refer to Appendix A for details of the GSI Maps.

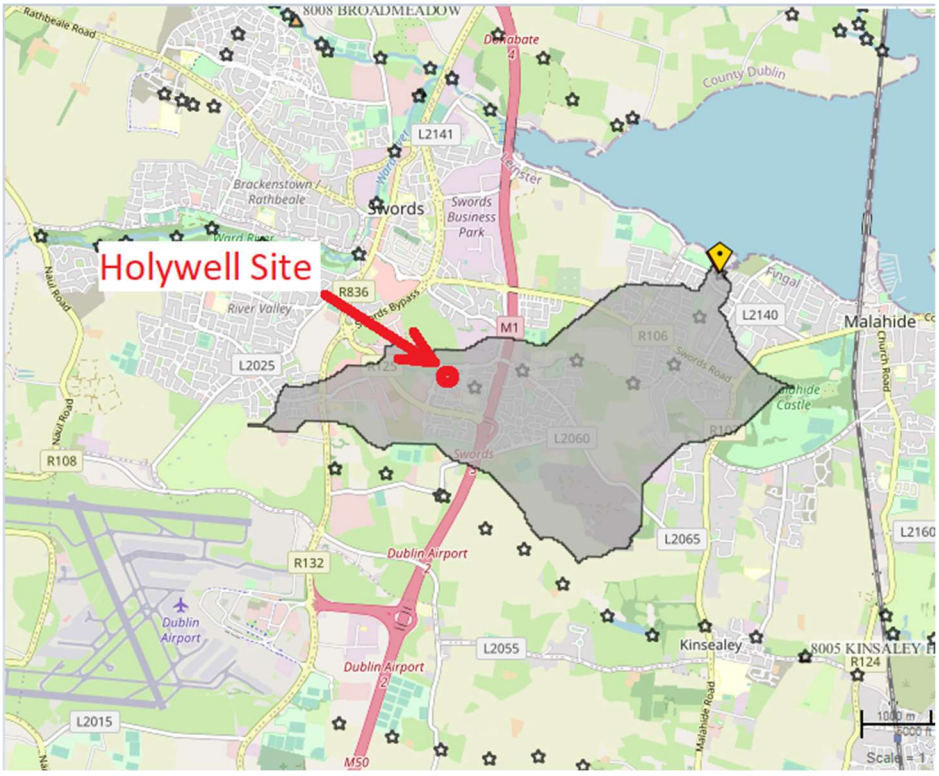


Figure 3.1 FSU Web Portal River Gaybrook Catchment

A detailed Flood Risk Assessment has been prepared to supplement this report. Compensatory flood storage will be provided on the site. Refer to Flood Risk assessment document HHP-ROD-XX-XX-RP-C-0002 for further details.

3.5 Site Geology

Bedrock information obtained from the GSI website indicates that the proposed development site is underlain by the Malahide Formation, consisting of argillaceous

bioclastic limestone shale. The records also show an anticlinal axis at the bedrock which crosses the northwest corner of the site.

Subsoil information obtained from the GSI website indicates that the site is underlain by till derived from limestones. These is also evidence of alluvium shown along the southern boundary of the site where the ditch is located.

Refer to Appendix A for GSI Maps.

4. WATER SUPPLY

This section describes the existing water supply network in the vicinity of the site and summarises the proposed watermain infrastructure required to serve the proposed development.

4.1 Existing Water Supply

The development lands are not currently served by a water supply, however there is an existing 300mm dia. watermain pipe located at Holywell Distributor Road, immediately to the north of the site. The records indicate that there is a spur from this watermain that crosses the Holywell Distributor Road to the north of the site and is capped at the northern site boundary.

Refer to Appendix B for Existing Drainage and Watermain Records.

4.2 Proposed Water Supply

The site is to be connected to the spur at the northern boundary of the site. This spur is connected to the existing water supply network on Holywell Distributer Road, which is indicated to be 300 mm in diameter from Irish Water records. It is proposed to provide a new 100mm dia. watermain to serve the proposed development.

A Pre-Connection Enquiry form was submitted to Irish Water and a Confirmation of Feasibility letter was subsequently received on the 2nd March 2023 which states that a connection to public water supply infrastructure is feasible without any upgrade works being required.

The daily demand has been calculated as 23.1m^3/day, refer to section 5.2.1 below.

All watermains will be constructed in accordance with Irish Water requirements.

Refer to Appendix B for Watermain Records provided by Fingal County Council.

Refer to Appendix C for Irish Water Correspondences.

Refer to Appendix D for Proposed Water Main Supply Layout.

5. FOUL DRAINAGE

It is proposed to provide new separate surface and foul drainage systems to serve the proposed development. This section describes the existing foul drainage services on or near the site and summarises the additional foul drainage infrastructure required to serve the proposed development.

5.1 Existing Foul Drainage

Drainage records obtained from Fingal County Council have identified an existing 225mm dia. foul water sewer located at Holywell Distributer Road, immediately north of the site. The records indicate that the existing asset flows in an eastly direction.

Refer to Appendix B for existing drainage and watermain Records.

5.2 Proposed Foul Drainage

It is proposed to construct a new foul sewer network to serve the development. Foul effluent from the site will discharge to the existing 225mm dia. foul sewer on Holywell Distributer Road.

A Confirmation of Feasibility letter received from Irish Water on the 2nd March 2023 states that a connection to the public foul infrastructure is feasible without any upgrade works being required.

Refer to Appendix C for Irish Water Correspondences.
Refer to Appendix D for the proposed Foul Drainage Layout

5.2.1 Hydraulic & Organic Loading

Daily foul discharge has been estimated based on proposed dwelling numbers and sizes in accordance with EPA and Irish Water guidelines.

The projected total wastewater discharges are indicated in Table 5.1 below:

Table 5.1 Hydraulic and Organic Loading

Dwelling	No. of Units	Population Equivalent (Avg. 2.7 persons per dwelling)	Per Capita WW Flow (l/person/day)	l/day	BOD (g/day per person)	Organic Loading (g/day BOD5)
Apartments	57	153.9	150	23,085	60	9,234

In accordance with Section 3.6 of the Irish Water Code of Practice for Wastewater Infrastructure (2020), a 10% of unit consumption allowance has been made for infiltration.

Dry Weather Flows (DWF):= 57*150*2.7*1.1 = 25,394 litres per day.

Assuming 6 times dry weather flow (DWF), the peak hydraulic discharge arising from this development is: 1.76 l/second.

The pipe network has been designed to ensure that sufficient hydraulic capacity and cleansing velocities are achieved, in accordance with Irish Water Code of Practice.

Max Organic Load:
= 9.234 kg (BOD_5)/day.
Population Equivalent Value:
= 153.9 P.E.

All foul drainage will be constructed in accordance with Greater Dublin Region Code of Practice for Drainage Works and Irish Water requirements.

6. SURFACE WATER DRAINAGE

It is proposed to provide new separate surface and foul drainage systems to serve the proposed development.

This section outlines the existing surface water drainage services onsite and the proposals for the additional surface water drainage requirements as part of the development.

6.1 Existing Surface Water Drainage

The site appears to have no existing surface water drainage infrastructure within the boundary. The nearest surface water networks are located immediately west and north of the site on Holywell Distributer Road.

It appears that the current drainage regime for the subject site is that surface water drains via infiltration and via overland flow routes to the surrounding surface water network.

6.2 Proposed Surface Water Drainage

As part of the development, a number of different SuDS measures are proposed to minimise the impact on water quality and water quantity of the runoff and maximise the amenity and biodiversity opportunities within the site.

The existing topography will allow for the site to drain by gravity to the nearby existing 1200 mm dia. surface water pipe located at Holywell Distributer Road to the southwest of the site.

It is proposed to construct a new surface water drainage system for the development to collect and convey runoff to the outfall location. The site will be served by a new network consisting of surface water pipes, blue / green roofs, permeable paving areas and a detention basin. The lower sub-base levels of the permeable paving, the blue/green roofs and detention basin will provide for the attenuation storage requirements on site as a result of the residential development.

6.2.1 SUDS Approach

The proposed SuDS measures for the site will include Source Control measures as part of a Management Train whereby the surface water is managed locally in small sub-catchments rather than being conveyed to and managed in large systems further down the catchment. The combination of the SuDS measures listed below will maximise the potential for surface water attenuation, reducing the impact on the existing surface water drainage network downstream. The proposed techniques will offer high level of treatment processes and nutrient removal of the runoff, particularly during the ‘first flush’. Finally, the various measures will offer significant amenity and biodiversity opportunities compared to other drainage systems.
It is proposed to provide the following SuDS measures:

- Blue/green roof systems
- Permeable paving to all footway and parking bay areas
- Detention basin
- Flow control devices to limit discharge

A total of 297m^3 of storage will be provided for the 1 in 100-year event (including 20% for climate change). This storage will be provided within the permeable paving sub-base layers, the detention basin and the blue/green roofs. The permeable paving for the footpaths and parking bays and blue/green roofs for the buildings will attenuate the associated runoff from these areas at source. The runoff associated with the access road will be attenuated in the detention basin. The rate of surface water discharge shall be restricted to QBAR (2.13 l/s/ha) for the 1 in 100-year rainfall event in accordance with GDSDS Volume 2 New Development. This equates to a total permitted discharge of approximately 0.8 l/s from the site. Table 6.1 below summarises the attenuation storage provided on the site.

Table 6.1 – Attenuation Storage Provided

Location	Catchment Area	Attenuation Storage Required
Blue / Green Roofs – Apartment Blocks	1,343m^2	112.77m^3
Permeable Paving – Footpaths and Parking Bays	1,345m^2	112.98m^3
Detention Basins - Access Road and Turning Heads	846m^2	71.05m^3
Total Attenuation Provided		**296.8m^3**

The provision of SuDS measures to convey, store and manage the discharge of surface water to the receiving surface water network will aid in managing flood risk.

Refer to Appendix D for the proposed Surface Water Drainage Layout

7. UTILITIES

7.1 Existing Utilities

Existing utility records from major utility providers in Ireland were obtained for the purpose of this planning engineering report. The records obtained indicate that ESB, Eir, Gas Networks Ireland, and Virgin Media have existing services in the vicinity of the subject site. These services are located on Holywell Distributor Road adjacent to the site and in the adjacent residential developments. As part of the development, utility infrastructure will be provided to serve the subject site. Consultations at detailed design stage will be undertaken with the relevant utility providers.

Refer to Appendix F for Existing Utility Records.

8. SUMMARY

This report has outlined the engineering items that will be associated with a proposed residential development at the subject site at Holywell, Swords, Co. Dublin. The findings are summarised as follows:

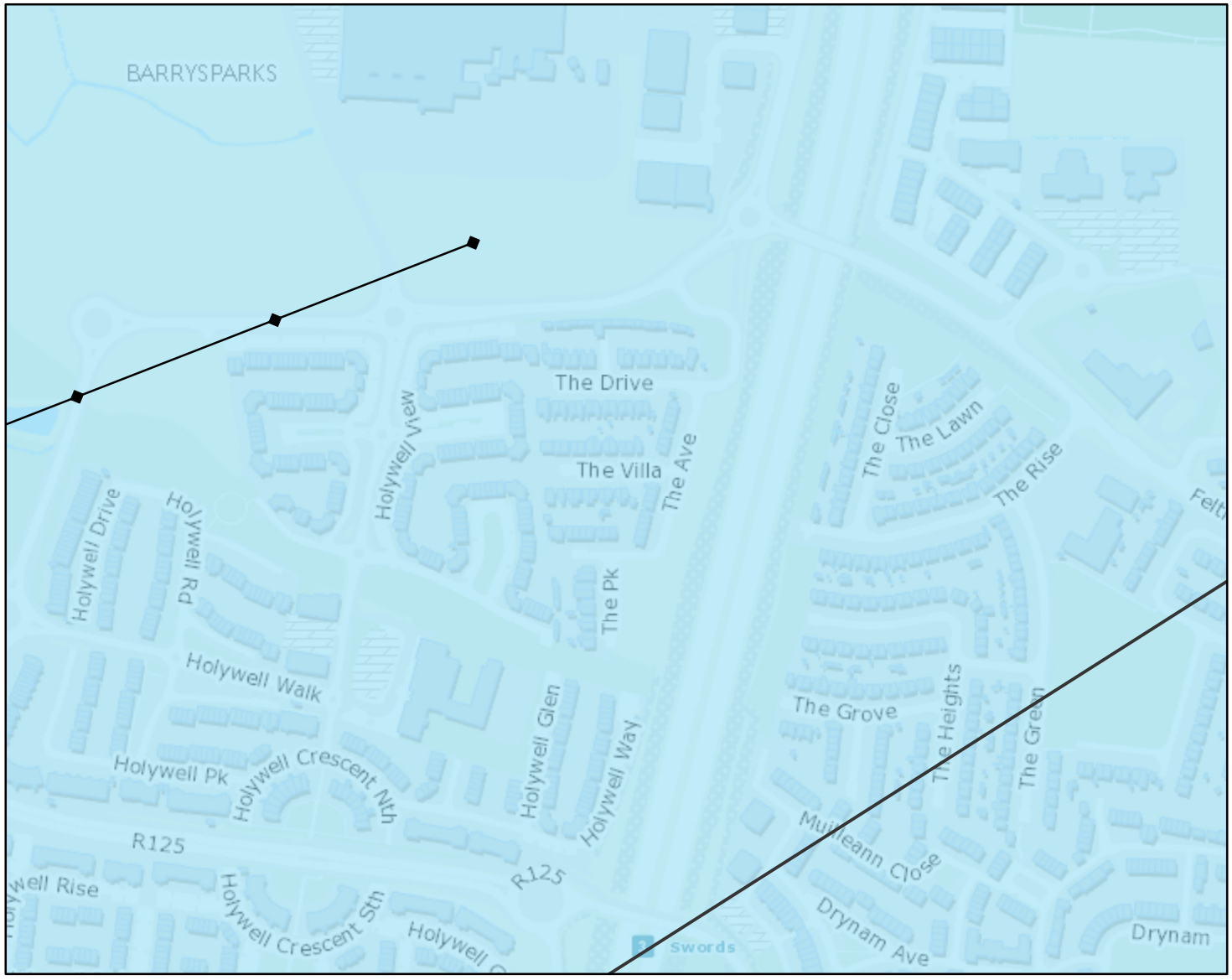
- A detailed Flood Risk Assessment has been prepared to supplement this report. Compensatory flood storage will be provided on the site. Refer to Flood Risk assessment document HHP-ROD-XX-XX-RP-C-0002 for further details.
- The site is to be connected to the existing 300mm dia. watermain pipe located on the Holywell Distributer Road. A new 100mm dia. watermain is to be constructed to serve the development.

- Separate foul and surface water drainage systems will be constructed to serve the site.
- It is proposed to construct a new foul sewer to serve the development. Foul effluent from the site will discharge to the existing 225mm dia. foul sewer located on the Holywell Distributer Road immediately north of the site.
- The site will incorporate a number of SuDS measures.
- Surface water from the site will be collected and attenuated on site, with a peak discharge rate of 2.13 l/s/ha for the 1 in 100 year rainfall event in line with GDSDS, which equates to a total permitted discharge rate of 0.8 l/s.
- Attenuated surface water flows will discharge to the existing 1200mm dia. surface water pipe located at Holywell Distributer Road south-west of the site boundary.
- As part of the development, utility infrastructure will be provided to serve the subject site. Consultations at detailed design stage will be undertaken with the relevant utility providers.

APPENDIX A
GSI MAPS AND GROUND INVESTIGATION DETAILS

Geological Survey
Suirbhéireacht Gheolaíochta
Ireland | Éireann

Bedrock



Scale: 1:5,000

Geological Survey Ireland

N W E S

0 0.035 0.07 0.14 mi
0 0.05 0.1 0.2 km

Map Centre Coordinates (ITM) 719,142 745,486
02/08/2023, 11:28:15

Legend

Bedrock Linework 100k ITM 2018

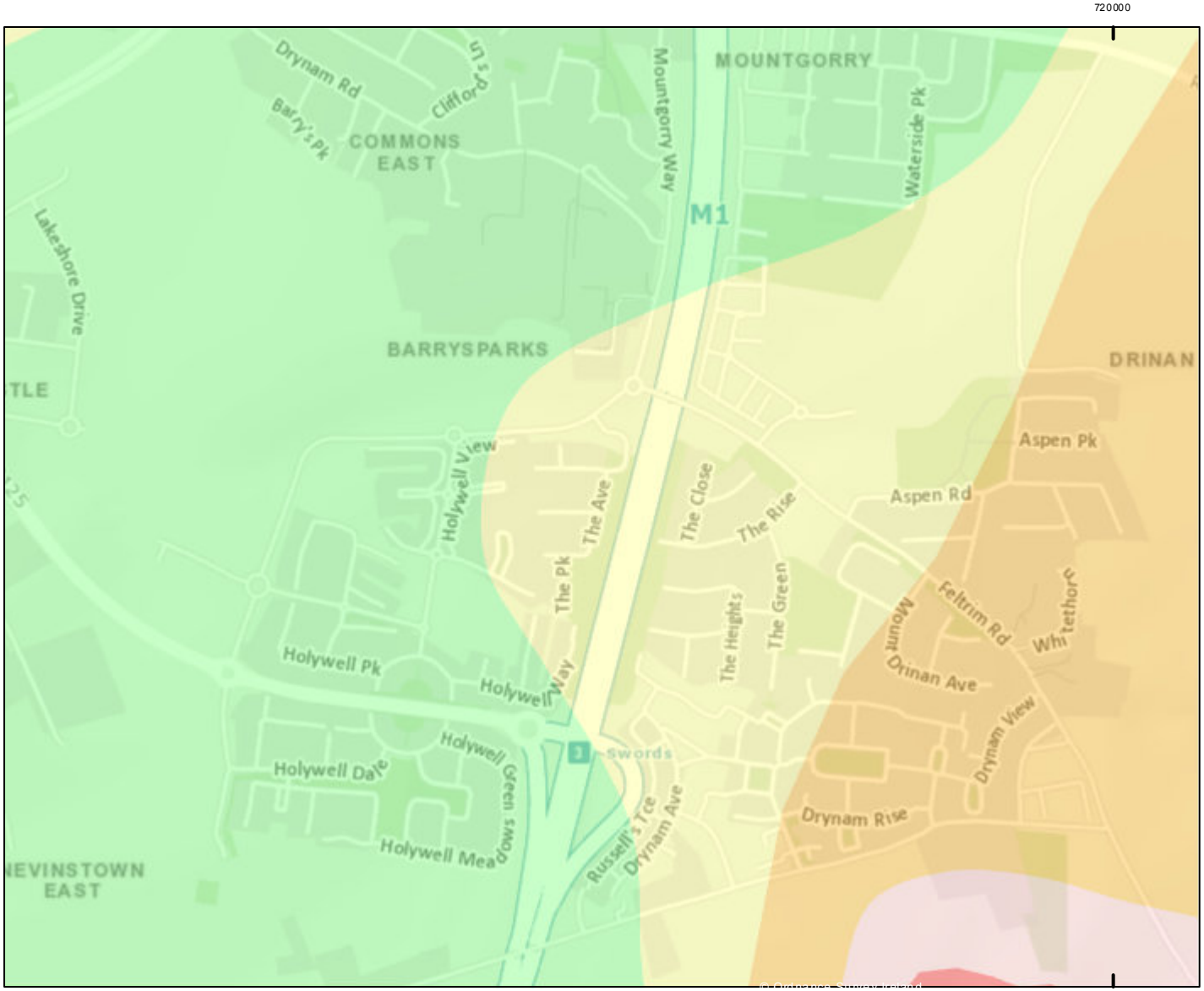
- Anticlinal Axis
- Fault

Bedrock Polygons 100k ITM 2018

- Malahide Formation

Geological Survey
Suirbhéireacht Gheolaíochta
Ireland | Éireann

Groundwater Vulnerability



Legend

Groundwater Vulnerability

- Rock at or near Surface or Karst
- Extreme
- High
- Moderate
- Low
- Water

Scale: 1:10,000

Geological Survey Ireland

N W E S

0 0.05 0.1 0.2 mi

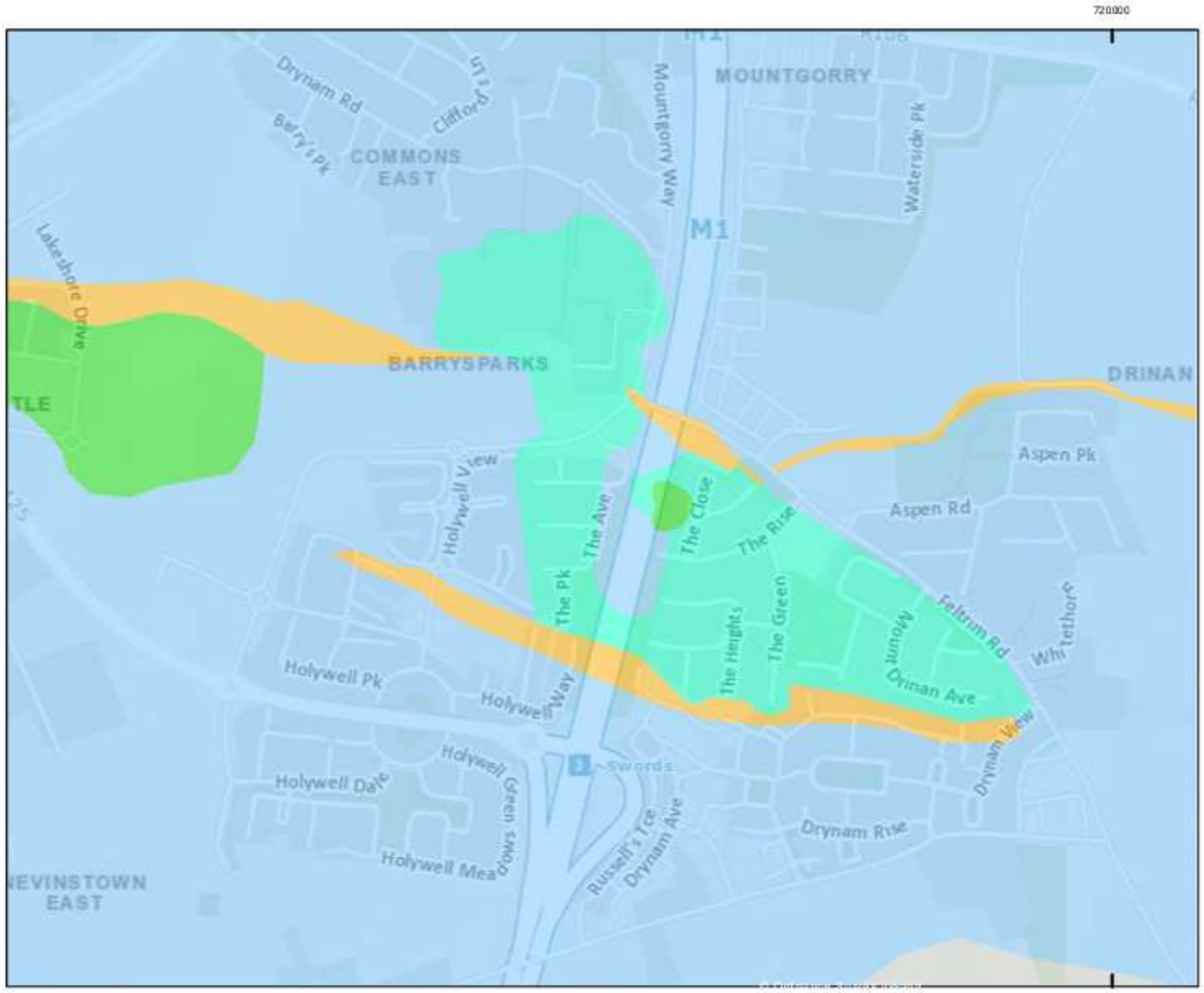
0 0.1 0.2 0.4 km

Map Centre Coordinates (ITM) 719,200 745,511

20/7/2023, 20:12:24

Geological Survey
Suirbhéireacht Gheolaíochta
Ireland | Éireann

Subsoil



Legend

- TLs, Till derived from limestones
- A, Alluvium
- GLs, Gravels derived from Limestones
- Urban

Scale: 1:10,000

Geological Survey Ireland

N W E S

0 0.05 0.1 0.2 mi

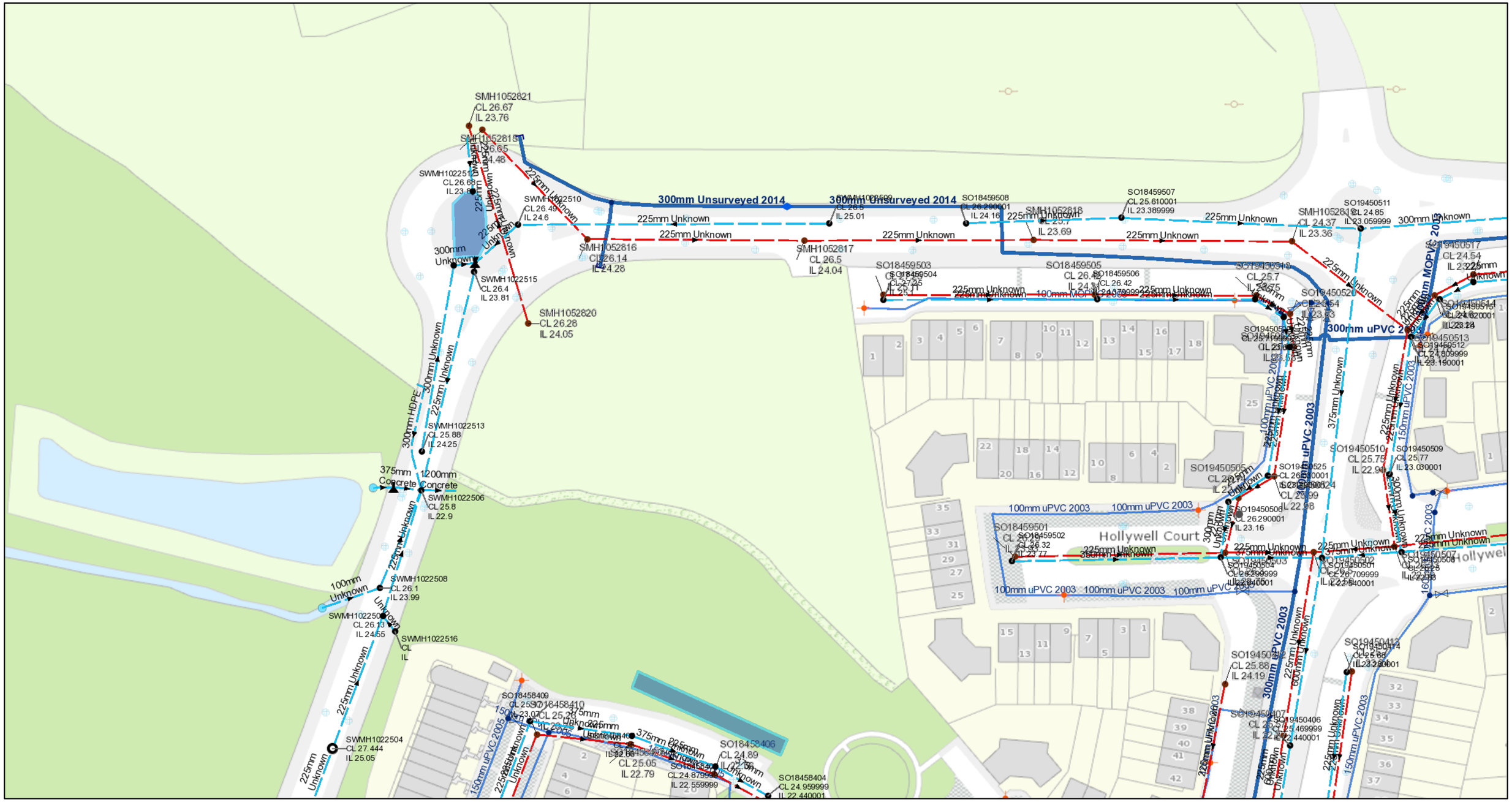
0 0.1 0.2 0.4 km

Map Centre Coordinates (ITM) 719,200 745,531

20/7/2023, 20:16:29

APPENDIX B
UTILITY RECORDS

ArcGIS Web Map



11/8/2022, 10:34:38 AM

1:1,000

0 0.01 0.03 0.05 mi

0 0.02 0.04 0.07 km

- Storm chambers
- Storm Detention Areas
- Storm Open Drains
- Storm Weirs
- Storm Clean Outs
- Storm Culverts

Storm Inlets
- Gully
- Standard
- Other; Unknown

Surface Water Mains
- Surface Gravity Mains
- Surface Gravity Mains Private
- Surface Water Pressurised Mains
- Surface Water Pressurised Mains Private

Storm Discharge Points
- Outfall
- Overflow
- Soakaway

A3

5728

4 x 100PP

5732

4 x 100PP
1 x 1-way MD (14/10)

4 x 100PP
1 x 1-way MD (14/10)

1 x 1-way MD (10
1 x 10/8 Single
1 x 112PP

4749

4750

1x112PP

5733
4 x 100PP

5729

3890

3891

4 x 100PP
1 x 1-way MD (14/10)

2 x 1-way MD (10/8)
1 x 10/8 Single
1 x 112PP

2 x 1-way MD (10/8)
1 x 10/8 Sing
1 x 112PP

4741

4740

2 x 1-way MD (10/8)
1 x 10/8 Single
1 x 112PP

4738

2 x 1-way MD (10/8)
1 x 10/8 Single
1 x 112PP

25

open eir Civil Engineering Infrastructure Service	Scale: 1:500	Irish National Grid Co-Ordinates Centre XY: 318863 m, 245547 m
	Date 24/10/2022	Smallworld Powered by GE

THE INFORMATION GIVEN IS COMPILED FROM PASSIVE ACCESS RECORDS AND IS BELIEVED TO BE CORRECT. THERE MAY, HOWEVER, BE DEPARTURES FROM THE COURSE[S] AND DEPTH[S] SHOWN OR INDICATED. THERE MAY ALSO BE ITEMS OF open eir INFRASTRUCTURE OF WHICH NO RECORDS IS HELD. THE INFORMATION IS GIVEN WITHOUT PREJUDICE TO THE LEGAL RIGHTS OF open eir TO COMPENSATION SHOULD open eir INFRASTRUCTURE BE DAMAGED.

open eir

ESB Networks

TITLE: 20221028-056_A3, HOLYWELL, SWORDS, DUBLIN

COLOUR CODE:

- BLACK - 38KV & HIGHER VOLTAGE OVERHEAD LINES
- GREEN - MV(10KV/20KV) OVERHEAD LINES
- BLUE - LV (400V/230V) OVERHEAD LINES
- CYAN - 38KV & HIGHER VOLTAGE UNDERGROUND CABLE ROUTES
- RED - MV/LV (10KV/20KV/400V/230V) UNDERGROUND CABLE ROUTES

DATE: 28-Oct-2022

** SCALE: 1:1200

** SCALE WHEN PRINTED ON AN A3 PAGE
XY COORDINATES DISPLAYED IN IRISH GRID COORDINATE SYSTEM

WARNING

THIS MAP INDICATES THE APPROXIMATE LOCATION OF ESB TRANSMISSION (400KV, 220KV, 110KV, 38KV) AND DISTRIBUTION (20KV, 10KV, 230V/400V) UNDERGROUND CABLES AND OVERHEAD LINES IN THE GENERAL AREA OF THE PROPOSED WORKS. ESB NETWORKS TAKES NO RESPONSIBILITY FOR THE ACCURACY OR COMPLETENESS OF THE MAP. IT IS THE USER'S RESPONSIBILITY TO INDEPENDENTLY VERIFY THE INFORMATION AND THE LOCATION OF UNDERGROUND CABLES AND OVERHEAD LINES. LOW VOLTAGE (230V/400V) SERVICE CABLES (E.G. HOUSE SERVICES, FACTORY/SHOP SERVICES, PUBLIC LIGHTING LAMP SERVICES, ETC) ARE NOT INCLUDED BUT THEIR PRESENCE SHOULD BE ANTICIPATED. THE DEPTHS OF UNDERGROUND CABLES MUST NEVER BE ASSUMED. ADDITIONAL MORE DETAILED INFORMATION IS AVAILABLE FOR HIGH VOLTAGE TRANSMISSION UNDERGROUND CABLES (38KV, 110KV, 220KV, 400KV) FROM THE LOCAL ESB NETWORKS TRANSMISSION REPRESENTATIVE - SEE ATTACHED LIST FOR CONTACT DETAILS OR CALL 1800 372 757. NO WORK SHOULD BE CARRIED OUT IN THE VICINITY OF 38KV OR HIGHER VOLTAGE UNDERGROUND CABLES WITHOUT PRIOR CONSULTATION WITH ESB NETWORKS. BEFORE ANY MECHANICAL EXCAVATION IS UNDERTAKEN, THE ACTUAL LOCATION OF ALL UNDERGROUND ELECTRICITY CABLES MUST BE ESTABLISHED AND VERIFIED ON THE SITE USING: (A) UP-TO-DATE MAP RECORDS; (B) CABLE LOCATER EQUIPMENT OPERATED IN BOTH POWER AND RADIO MODES; (C) CAREFUL HAND DIGGING OF TRIAL HOLES USING 'SAFE DIGGING PRACTICE'. REFER ALSO TO 'HSA CODE OF PRACTICE FOR AVOIDING DANGER FROM UNDERGROUND SERVICES'. ESB TAKES NO RESPONSIBILITY FOR AND SHALL BEAR NO LIABILITY, HOWSOEVER ARISING, IN RELATION TO ANY DAMAGE, INJURY/DEATH OR LOSS OF SUPPLY AS A RESULT OF DAMAGE OR INTERFERENCE WITH ITS NETWORKS.

ESB NETWORKS HAS ISSUED THIS MAP AS A PDF DOCUMENT. IF VIEWING A PAPER VERSION OF THIS MAP, THE VIEWER MUST ENSURE THAT IT HAS BEEN PRINTED IN COLOUR TO FIT TO AN A3 (OR LARGER) PAGESIZE AND THAT EACH OF THE COLOURS INDICATED ON THE COLOUR CODE LEGEND ABOVE ARE CLEAR AND DISTINCT FROM EACH OTHER TO MAINTAIN A CORRECT REPRESENTATION OF THE ELECTRICAL NETWORK INFORMATION.

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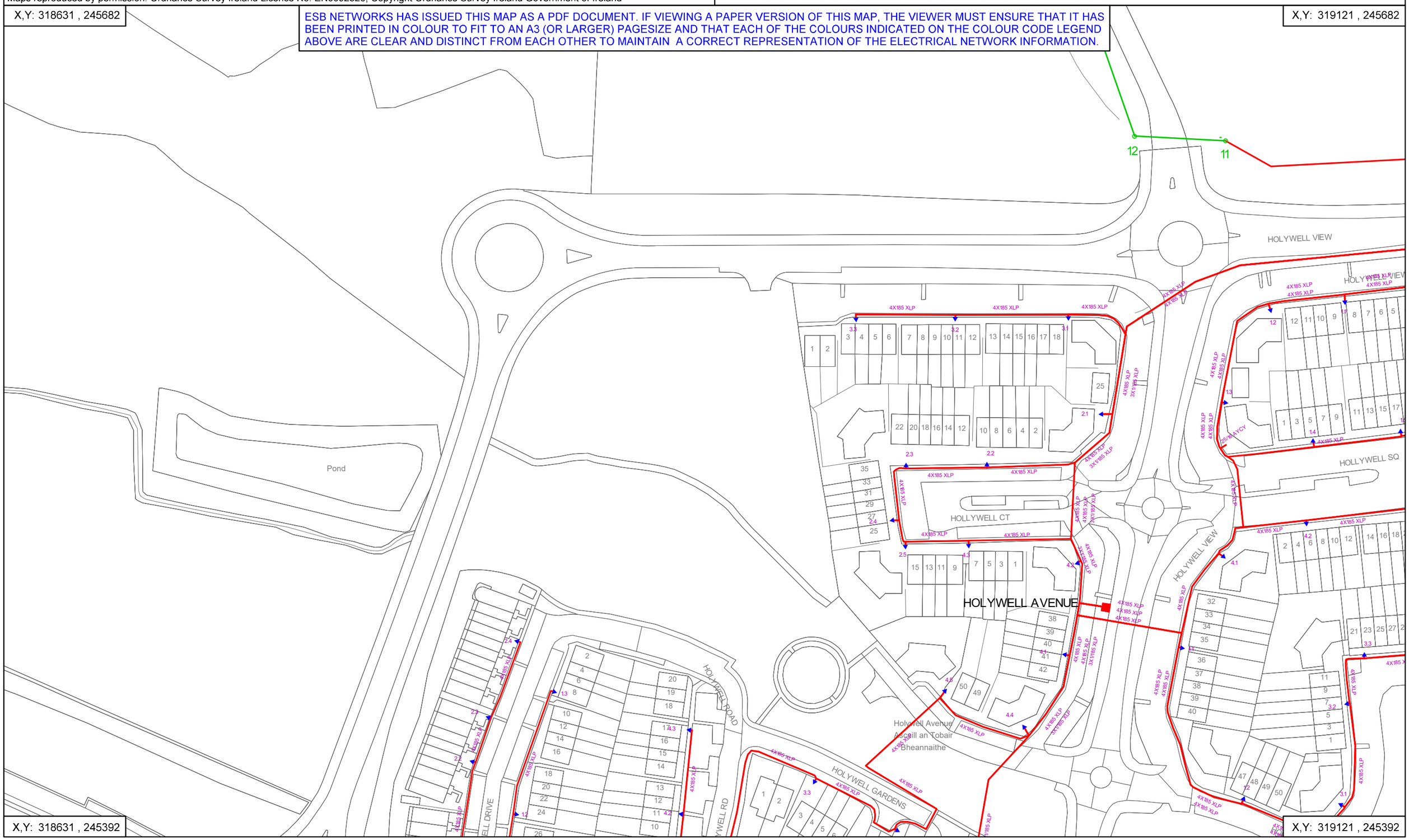
X,Y: 319121 , 245682



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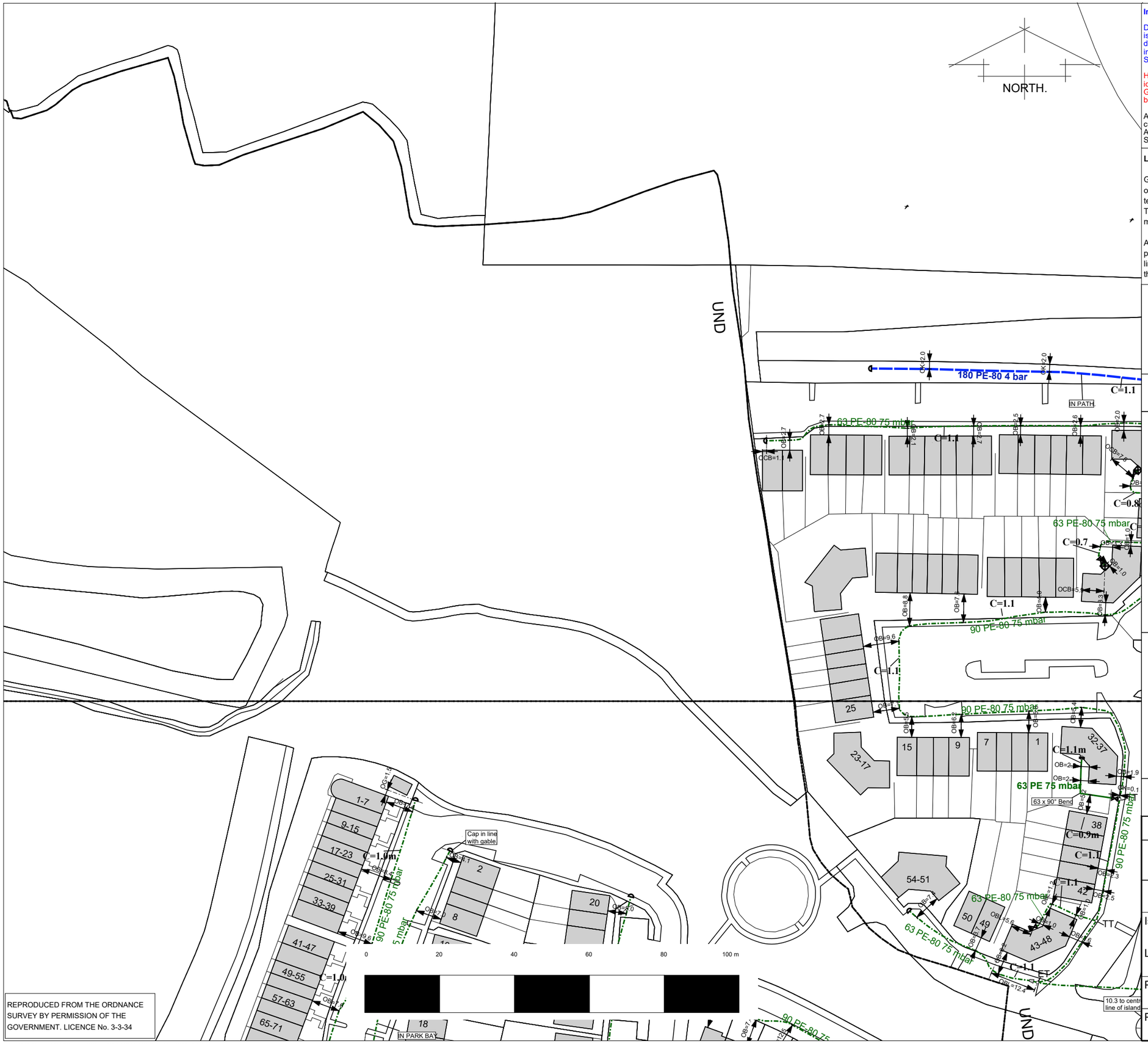
X,Y: 319121 , 245392



REPRODUCED FROM THE ORDNANCE SURVEY BY PERMISSION OF THE GOVERNMENT. LICENCE No. 3-3-34

Important Safety Notice:

Damage to gas pipelines can result in serious injury or death. Gas network information is provided as a general guide. The exact location and depth of medium or low pressure distribution gas pipes must be verified on site by carrying out necessary investigations, including, for example, hand digging trial holes along the route of the pipe.
Service pipes are not generally shown but their presence should always be anticipated.

High pressure transmission pipelines are shown in red. If a transmission pipeline is identified within 10m of any intended excavations then work must not proceed before GNI has been consulted. The true location and depth of a transmission pipeline must be verified on site by a representative of GNI. Contact can be made through 1800 427 747.

All work in the vicinity of the gas 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 (01 614 7000) or can be downloaded at www.hsa.ie.

Legal Notice:

Gas Networks Ireland (GNI) and its affiliates, accept no responsibility for the accuracy of any information contained in this document including data concerning location and technical designation of the gas distribution and transmission network (the Information). The Information should not be relied on for accurate distance or depth of cover measurements.

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 or consequential loss, arising out of or in connection with the use or re-use of the Information.

- Aurora Telecom Fibre Optic Cable
- Aurora Telecom Duct
- Aurora Telecom Sub-duct
- Aurora Telecom Inserted Gas Pipe

Contact Aurora Telecom on 1800-427-399 or (01)203-0120.

- Transmission Pipe (High Pressure)
- Transmission Pipe (Construction Issue)
- Distribution Pipe (Medium Pressure)
- Distribution Pipe (Low Pressure)
- Service Pipe (Medium Pressure)
- Service Pipe (Low Pressure)
- Strategic Pipe (Medium Pressure)
- Strategic Pipe (Low Pressure)
- Inserted Pipe (Medium Pressure)
- Inserted Pipe (Low Pressure)
- Distribution Pipe (Abandoned)

.C=? Cover (depth in meters)	Pressure Monitor
CP Test Point	Protection (Sleeve)
End Cap	Protection (Slabbing)
Hot Tap	Reducer
Installation	Service Terminator
Valve	Tee
Mains Verification **	Transition

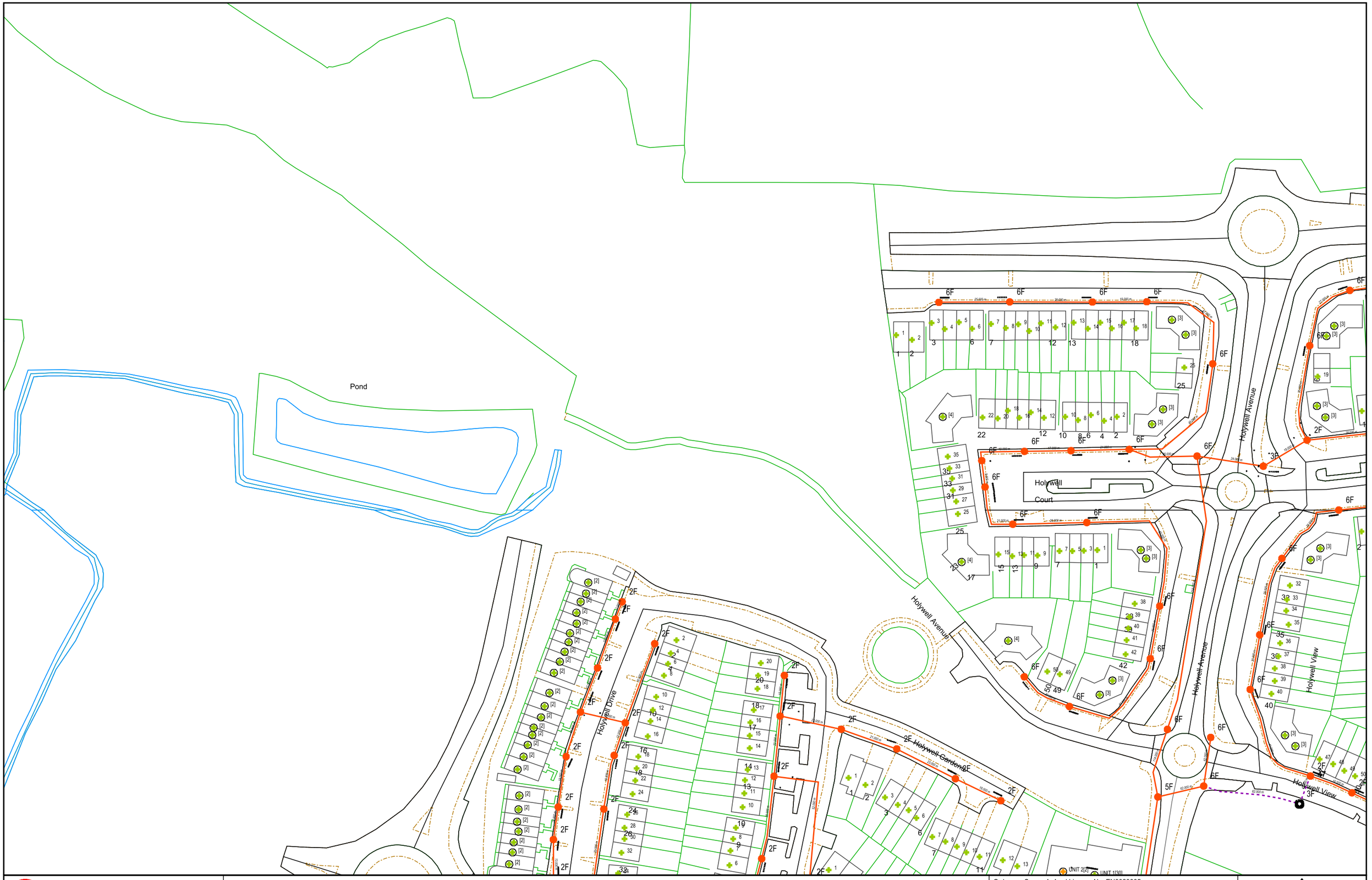
** Please contact GNI on 1800-427747 for specific information.

Design Department - DUBLIN

Gas Networks Ireland

GAS NETWORK INFORMATION

Issue: Fingal County Council	
Location: Holywell Swords	
Plot Date: 25/10/2022	Contact: D Vaughan
Plotted by: KOC	Scale: 1:1000



Virgin media Unit 7, Westgate Business Park, Ballymount, Dublin 24.	PROJECT NAME DESIGNED BY:	Ordnance Survey Ireland Licence No. EN0023805 (c) Ordnance Survey Ireland and Government of Ireland Produced on: 25/10/2022	@ A3

APPENDIX C
RECORD OF CORRESPONDENCE WITH IRISH WATER

CONFIRMATION OF FEASIBILITY

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

Antonio Campello

POGA Consulting Eng.
Unit C2, Nutgrove Office Park
Rathfarnham, Dublin 14
Co. Dublin
D14CR20

2 March 2023

Our Ref: CDS23001535 Pre-Connection Enquiry
Holywell, Swords, Dublin, Dublin

Dear Applicant/Agent,

We have completed the review of the Pre-Connection Enquiry.

Irish Water has reviewed the pre-connection enquiry in relation to a Water & Wastewater connection for a Housing Development of 62 unit(s) at Holywell, Swords, Dublin, Dublin, (the **Development)**.

Based upon the details provided we can advise the following regarding connecting to the networks;

- **Water Connection** - Feasible without infrastructure upgrade by Irish Water
- **Wastewater Connection** - Feasible without infrastructure upgrade by Irish Water

This letter does not constitute an offer, in whole or in part, to provide a connection to any Irish Water infrastructure. Before the Development can be connected to our network(s) you must submit a connection application and be granted and sign a connection agreement with Irish Water.

As the network capacity changes constantly, this review is only valid at the time of its completion. As soon as planning permission has been granted for the Development, a completed connection application should be submitted. The connection application is available at www.water.ie/connections/get-connected/

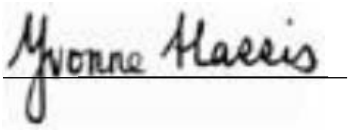
Where can you find more information?

- **Section A -** What is important to know?

This letter is issued to provide information about the current feasibility of the proposed connection(s) to Irish Water's network(s). This is not a connection offer and capacity in Irish Water's network(s) may only be secured by entering into a connection agreement with Irish Water.

For any further information, visit **www.water.ie/connections, email newconnections@water.ie** or contact 1800 278 278**.**

Yours sincerely,



Yvonne Harris
Head of Customer Operations

Section A - What is important to know?

What is important to know?	Why is this important?
Do you need a contract to connect?	• Yes, a contract is required to connect. This letter does not constitute a contract or an offer in whole or in part to provide a connection to Irish Water's network(s). • Before the Development can connect to Irish Water's network(s), you must submit a connection application and be granted and sign a connection agreement with Irish Water.
When should I submit a Connection Application?	• A connection application should only be submitted after planning permission has been granted.
Where can I find information on connection charges?	• Irish Water connection charges can be found at: https://www.water.ie/connections/information/charges/
Who will carry out the connection work?	• All works to Irish Water's network(s), including works in the public space, must be carried out by Irish Water*. *Where a Developer has been granted specific permission and has been issued a connection offer for Self-Lay in the Public Road/Area, they may complete the relevant connection works
Fire flow Requirements	• The Confirmation of Feasibility does not extend to fire flow requirements for the Development. Fire flow requirements are a matter for the Developer to determine. • **What to do?** - Contact the relevant Local Fire Authority
Plan for disposal of storm water	• The Confirmation of Feasibility does not extend to the management or disposal of storm water or ground waters. • **What to do?** - Contact the relevant Local Authority to discuss the management or disposal of proposed storm water or ground water discharges.
Where do I find details of Irish Water's network(s)?	• Requests for maps showing Irish Water's network(s) can be submitted to: datarequests@water.ie

What are the design requirements for the connection(s)?	• 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,*** available at www.water.ie/connections
Trade Effluent Licensing	• Any person discharging trade effluent** to a sewer, must have a Trade Effluent Licence issued pursuant to section 16 of the Local Government (Water Pollution) Act, 1977 (as amended). • More information and an application form for a Trade Effluent License can be found at the following link: https://www.water.ie/business/trade-effluent/about/ **trade effluent is defined in the Local Government (Water Pollution) Act, 1977 (as amended)

APPENDIX D
DESIGN DRAWINGS

Notes:

1. This drawing is to be read in conjunction with the all relevant engineer's and architect's drawings, specifications and designer's risk assessments.
2. All levels are in metres to ordnance datum Malin Head.
3. The topographical information is replicated from information received from others and is issued as background information only.

LEGEND:

- Redline Boundary
- Proposed Road
- Proposed Permeable Paving - 220mm Thick Sub-base Storage Layer
- Proposed Landscaping. Refer to landscaping drawings.
- Proposed Pedestrian Footway

Block **B**
6 storeys
FFL +26.40

Block **C**
4 storeys
FFL +26.40

Block **A**
5 storeys
FFL +26.40

FOOTWAY TO BE WIDENED TO ALLOW FIRE TENDER ACCESS

HOLYWELL AVENUE

PLAN LAYOUT
SCALE: 1:200@A1

No.	Revision	Date	By	Chk'd	App'd
P01	WORK IN PROGRESS	16/08/2023	AS	CMG	SK
P02	PLANNING SUBMISSION	29/09/2023	AS	CMG	SK

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Project Title: HOUSING AT HOLYWELL, SWORDS, COUNTY DUBLIN

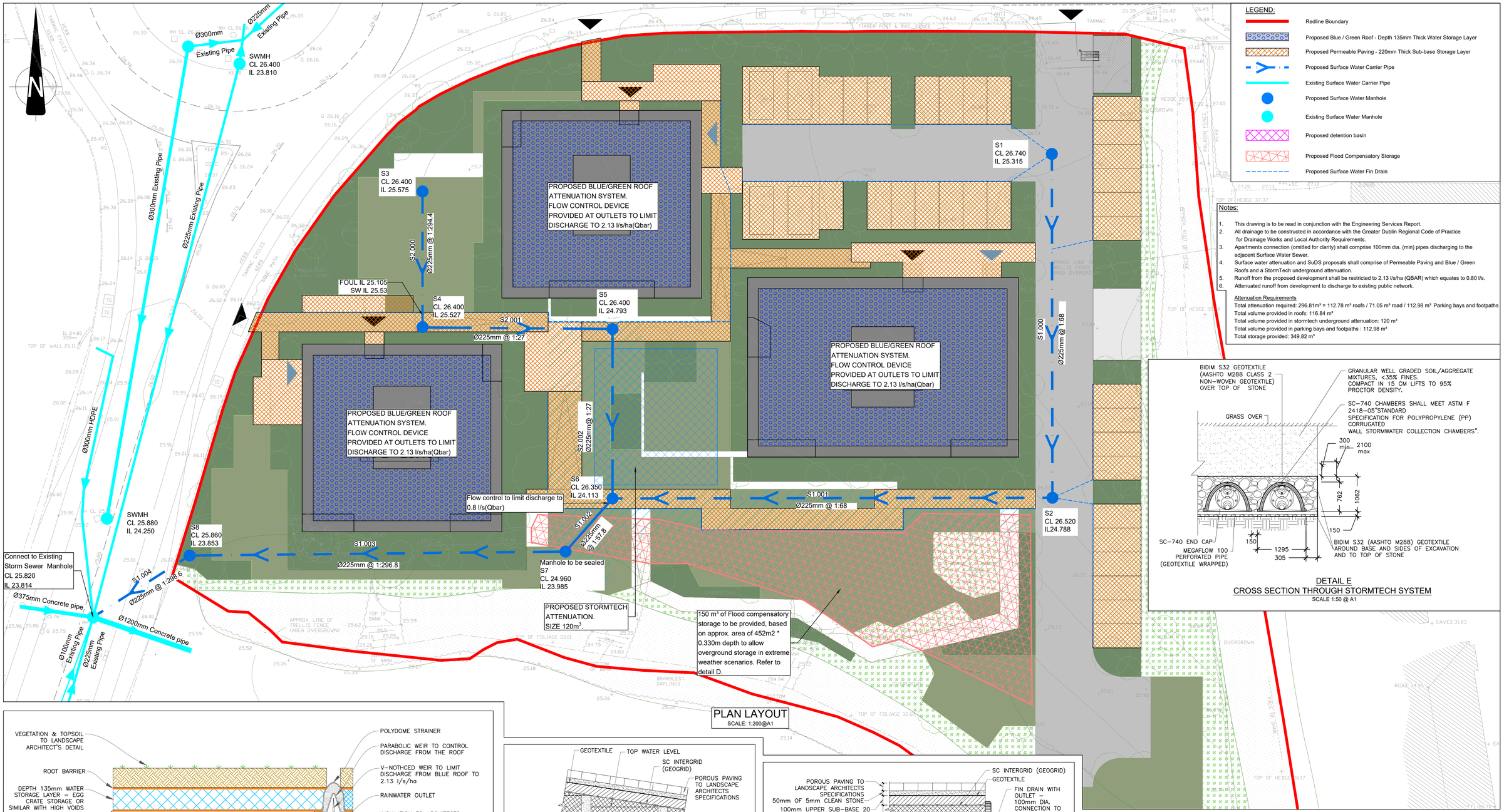
Drawing Title: PROPOSED LAYOUT
Sheet 1 of 1

Drawing Number: Project | Originator | Volume | Location | Type | Role | Number
HHP - ROD - XX - XX - DR - C - 0001

Drawn:	Designed:	Checked:	Approved:	Status:	Scale (A1)	Date:	Job No:	Rev:
MA	AS	CMG	SK	S4 - Stage Approval	1:200	AUGUST 2023	23.130	P02

Thursday 12 October 2023 14:27:37 J:\2023\23130\23130-02_WIP\01 MODELS\01 CAD\01 DWG\01 STG 1 - EDIT AS NEEDED\HHP-ROD-XX-XX-DR-C-0001.DWG

DO NOT SCALE USE FIGURED DIMENSIONS ONLY



LEGEND:

- Redline Boundary
- Proposed Blue / Green Roof - Depth 135mm Thick Water Storage Layer
- Proposed Permeable Paving - 220mm Thick Sub-base Storage Layer
- Proposed Surface Water Carrier Pipe
- Existing Surface Water Carrier Pipe
- Proposed Surface Water Manhole
- Existing Surface Water Manhole
- Proposed detention basin
- Proposed Flood Compensatory Storage
- Proposed Surface Water Fin Drain

Notes:

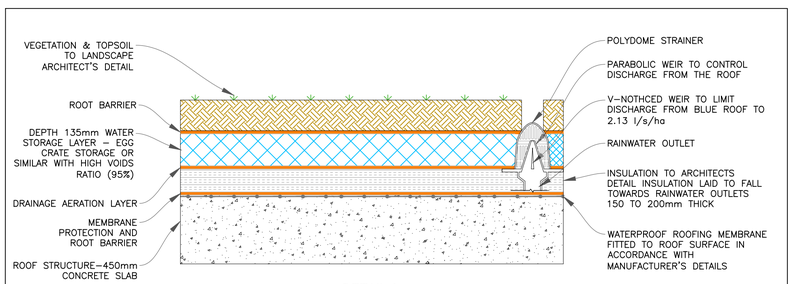
1. This drawing is to be read in conjunction with the Engineering Services Report.
2. All drainage to be constructed in accordance with the Greater Dublin Regional Code of Practice for Drainage Works and Local Authority Requirements.
3. Apartments connection (omitted for clarity) shall comprise 100mm dia. (min) pipes discharging to the adjacent Surface Water Sewer.
4. Surface water attenuation and SuDS proposals shall comprise of Permeable Paving and Blue / Green Roofs and a StormTech underground attenuation.
5. Runoff from the proposed development shall be restricted to 2.13 l/s/ha (QBAR) which equates to 0.80 l/s.
6. Attenuated runoff from development to discharge to existing public network.

Attenuation Requirements

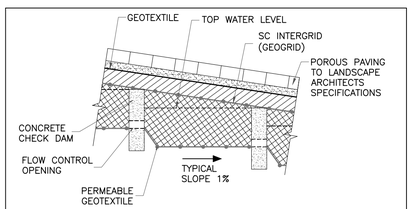
Total attenuation required: 296.81m³ = 112.78 m³ roofs / 71.05 m³ road / 112.98 m³ Parking bays and footpaths
Total volume provided in roofs: 116.84 m³
Total volume provided in stormtech underground attenuation: 120 m³
Total volume provided in parking bays and footpaths : 112.98 m³
Total storage provided: 349.82 m³

DETAIL E
CROSS SECTION THROUGH STORMTECH SYSTEM
SCALE 1:50 @ A1

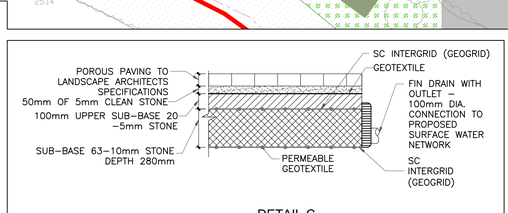
PLAN LAYOUT
SCALE: 1:200@A1



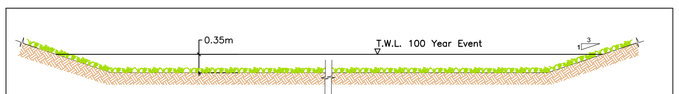
DETAIL A
BLUE AND GREEN ROOF BUILD UP
SCALE 1:20 @ A1



DETAIL B
TYPICAL PERMEABLE PAVING DETAIL
(RAMPED/SLOPE AREAS)
SCALE 1:20 @ A1



DETAIL C
TYPICAL PERMEABLE PAVING DETAIL
(PARKING BAYS & FOOTPATHS)
SCALE 1:20 @ A1



DETAIL D
TYPICAL SECTION THROUGH
COMPENSATORY STORAGE AREA
SCALE : 1:100

No.	Revision	Date	By	Chk'd	App'd
P01	WORK IN PROGRESS	16/08/2023	AS	CMG	SK
P02	WORK IN PROGRESS - ISSUED FOR CO-ORDINATION PURPOSES	29/08/2023	AS	CMG	SK
P03	PLANNING SUBMISSION	29/09/2023	AS	CMG	SK

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Project Title: HOUSING AT HOLYWELL, SWORDS, COUNTY DUBLIN

Drawing Title: SURFACE WATER DRAINAGE LAYOUT
Sheet 1 of 1

Drawing Number: HHP - ROD - XX - XX - DR - C - 0030

Drawn:	Designed:	Checked:	Approved:	Status:	Scale (A1)	Date:	Job No:	Rev:
MA	AS	CMG	SK	S4 - Stage Approval	1:200	AUGUST 2023	23.130	P03

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Notes:

1. This drawing is to be read in conjunction with the all relevant engineer's and architect's drawings, specifications and designer's risk assessments.
2. All levels are in metres to ordnance datum Malin Head.
3. The topographical information is replicated from information received from others and is issued as background information only.

LEGEND:

- Redline Boundary
- Proposed Foul Gravity Pipe
- Existing Public Foul Drainage Pipe
- Proposed Foul Manhole
- Existing Foul Manhole

Ø225mm EXISTING FOUL

Connect to Existing Sewer Manhole
CL 26.490
IL 24.040

Ø225mm EXISTING FOUL

Ø225mm EXISTING FOUL

Block **B**
6 storeys
FFL +26.40

Block **C**
4 storeys
FFL +26.40

Block **A**
5 storeys
FFL +26.40

F1
CL 26.250
IL 25.105

F1.000
Ø225mm @ 1:80

F1.001
Ø225mm @ 1:100

F2
CL 26.250
IL 24.585

F3
CL 26.250
IL 24.529

F1.002
Ø225mm @ 1:150.2

F4
CL 27.290
IL 24.252

F1.003
Ø225mm @ 1:137

F2.000
Ø225mm @ 1:150.5

F4
CL 26.520
IL 25.095

HOLYWELL AVENUE

PLAN LAYOUT
SCALE: 1:200@A1

No.	Revision	Date	By	Chk'd	App'd
P01	WORK IN PROGRESS	16/08/2023	AS	CMG	SK
P02	WORK IN PROGRESS - MINOR CHANGES TO COVER LEVELS & GRADIENTS	23/08/2023	AS	CMG	SK
P03	PLANNING SUBMISSION	29/09/2023	AS	CMG	SK

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Drawn: MA | Designed: AS | Checked: CMG | Approved: SK | Status: S4 - Stage Approval

Project Title: HOUSING AT HOLYWELL, SWORDS, COUNTY DUBLIN

Drawing Title: FOUL WATER DRAINAGE LAYOUT
Sheet 1 of 1

Drawing Number: Project HHP - Originator ROD - Volume XX - Location XX - Type DR - Role C - Number 0031

Scale (A1): 1:200 | Date: AUGUST 2023 | Job No: 23.130 | Rev: P03

DO NOT SCALE USE FIGURED DIMENSIONS ONLY

Thursday 12 October 2023 14:31:30 J:\2023\23130\23130-02_WIP\01 MODELS\01 CAD\01 DWG\01 STG 1 - EDIT AS NEEDED\HHP-ROD-XX-XX-DR-C-0031.DWG

LEGEND:

- REDLINE BOUNDARY
- EXISTING WATERMAIN
- PROPOSED 100mm DIA.WATERMAIN TO IRISH WATER CODE OF PRACTICE
- SCV — PROPOSED SCOUR VALVE
- AV — PROPOSED AIR VALVE
- SV — PROPOSED SLUICE VALVE
- H — PROPOSED HYDRANT
- M — PROPOSED METER
- MC — PROPOSED MANIFOLD CHAMBER
- 46M HYDRANT RADIUS

NOTES

1. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH THE ENGINEERING SERVICES REPORT.
2. ALL WATERMAINS TO BE CONSTRUCTED IN ACCORDANCE WITH IRISH WATER CODE OF PRACTICE AND STANDARD DETAILS.
3. HYDRANTS TO BE CONSTRUCTED IN ACCORDANCE WITH IRISH WATER DETAIL STD-W-18.
4. SLUICE VALVES TO BE CONSTRUCTED IN ACCORDANCE WITH IRISH WATER DETAIL STD-W-15.
5. PIPE BEDDING AND BACKFILL TO BE CONSTRUCTED IN ACCORDANCE WITH IRISH WATER DETAIL STD-W-13.
6. MARKER POSTS TO BE CONSTRUCTED IN ACCORDANCE WITH IRISH WATER DETAIL STD-W-27.
7. THRUST BLOCKS TO BE CONSTRUCTED IN ACCORDANCE WITH IRISH WATER DETAIL STD-W-28.
8. WATERMAIN PIPE MATERIAL, THE SPECIFICATION SHALL BE IN ACCORDANCE WITH SECTION 3.9 OF WATER CODE OF PRACTICE.
9. ALL HYDRANT COVERS, WHERE LOCATED IN GRASS AREAS, SHALL BE SURROUNDED BY A CONCRETE PLINTH, 200mm ALL ROUND AND 100mm DEEP FORMED WITH C20/25 CONCRETE, IN ACCORDANCE WITH SECTION 3.18 OF WATER CODE OF PRACTICE.
10. AIR VALVES TO BE CONSTRUCTED IN ACCORDANCE WITH IRISH WATER DETAIL STD-W-22.
11. SCOUR VALVES TO BE CONSTRUCTED IN ACCORDANCE WITH IRISH WATER DETAIL STD-W-30A.

Ø300mm PIPE WATERMAIN

Connect to Existing Spur Watermain on Holywell Distributor Road in Accordance with Irish Water Standard Detail STD-W-04

NOTE :
Fire-fighting flow rate of 2100l/min/2hrs (35l/s) required across the hydrant system, assuming low pressure this will result in a tank volume of 252m^3.

Requirement of Fire Storage Tank to be confirmed following Fire Cert Applicaiton.
Proposed 252m³ Fire Fighting Tank in lieu of above. Detail and manufacturer TBC. Shown as indicative only.

100mm OD PE PIPE WATERMAIN

Fire Tender Connection

Block **B**
6 storeys
FFL +26.40

Block **C**
4 storeys
FFL +26.40

Block **A**
5 storeys
FFL +26.40

SCV

Scour Valve to Discharge to Nearest SW Manhole

NOTE :
The distance from a hydrant to a vehicle access roadway or hard standing area for fire appliances is not more than 30m (Kilkenny Fire and Rescue Service Guidance Specification for Fire Hydrants and Fire Fighting)

6.000
6.764
30.000

FOOTWAY TO BE WIDENED TO ALLOW FIRE TENDER ACCESS (EXTENT TO BE AGREED)

PLAN LAYOUT
SCALE: 1:200@A1

No.	Revision	Date	By	Chk'd	App'd
P01	WORK IN PROGRESS	16/08/2023	AS	CMG	SK
P02	PLANNING SUBMISSION	29/09/2023	AS	CMG	SK

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Project Title: HOUSING AT HOLYWELL, SWORDS, COUNTY DUBLIN

Drawing Title: WATER MAIN SUPPLY LAYOUT
Sheet 1 of 1

Drawing Number: Project HHP - Originator ROD - Volume XX - Location XX - Type DR - Role C - Number 0040

Drawn: MA | Designed: AS | Checked: CMG | Approved: SK | Status: S4 - Stage Approval

Scale (A1): 1:200 | Date: AUGUST 2023 | Job No: 23.130 | Rev: P02

Thursday 12 October 2023 14:32:04 2023\2313\23130-02_WIP\01 MODELS\01 CAD\01 DWG\01 STG 1 - EDIT AS NEEDED\HHP-ROD-XX-XX-DR-C-0040.DWG

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Notes:

1. This drawing is to be read in conjunction with the all relevant engineer's and architect's drawings, specifications and designer's risk assessments.
2. All levels are in metres to ordnance datum Malin Head.
3. The topographical information is replicated from information received from others and is issued as background information only.

LEGEND:

- Redline Boundary
- Proposed Road
- Proposed Permeable Paving - 220mm Thick Sub-base Storage Layer
- Proposed Landscaping. Refer to landscaping drawings.
- Proposed Pedestrian Footway

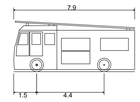
Block **A**
5 storeys
FFL +26.40

Block **B**
6 storeys
FFL +26.40

Block **C**
4 storeys
FFL +26.40

FOOTWAY TO BE WIDENED TO ALLOW FIRE TENDER ACCESS

HOLYWELL AVENUE



Pumping Appliance

Overall Length	7.900m
Overall Width	2.500m
Overall Body Height	3.300m
Min Body Ground Clearance	0.140m
Track Width	2.500m
Lock-to-lock time	4.00s
Curb to Curb Turning Radius	7.750m

PLAN LAYOUT
SCALE: 1:200@A1

No.	Revision	Date	By	Chk'd	App'd
P01	WORK IN PROGRESS	16/08/2023	SK	BDG	BDG
P02	PLANNING SUBMISSION	29/09/2023	SK	BDG	BDG

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Drawn: SK | Designed: BDG | Checked: BDG | Approved: SK | Status: S4 - Stage Approval

Project Title: HOUSING AT HOLYWELL, SWORDS, COUNTY DUBLIN

Drawing Title: PROPOSED VEHICLE TRACKING LAYOUT
Sheet 1 of 1

Drawing Number: Project SHH - Originator ROD - Volume XX - Location XX - Type DR - Role C - Number 0090

Scale (A1): 1:200 | Date: AUGUST 2023 | Job No: 23.130 | Rev: P02

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APPENDIX E
DRAINAGE CALCULATIONS

STORM SEWER DESIGN by the Modified Rational Method

Design Criteria for Storm

Pipe Sizes STANDARD Manhole Sizes STANDARD

FSR Rainfall Model - Scotland and Ireland

Return Period (years)	1	PIMP (%)	100
M5-60 (mm)	15.700	Add Flow / Climate Change (%)	20
Ratio R	0.280	Minimum Backdrop Height (m)	0.200
Maximum Rainfall (mm/hr)	50	Maximum Backdrop Height (m)	1.500
Maximum Time of Concentration (mins)	30	Min Design Depth for Optimisation (m)	0.600
Foul Sewage (l/s/ha)	0.000	Min Vel for Auto Design only (m/s)	0.75
Volumetric Runoff Coeff.	0.750	Min Slope for Optimisation (1:X)	500

Designed with Level Soffits

Network Design Table for Storm

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
S1.000	35.853	0.527	68.0	0.059	4.00	0.1	0.600	o	225	Pipe/Conduit	
S1.001	45.851	0.674	68.0	0.023	0.00	0.1	0.600	o	225	Pipe/Conduit	
S2.000	14.147	0.048	294.7	0.000	4.00	0.0	0.600	o	225	Pipe/Conduit	
S2.001	19.805	0.734	27.0	0.000	0.00	0.1	0.600	o	225	Pipe/Conduit	
S2.002	17.674	0.655	27.0	0.000	0.00	0.2	0.600	o	225	Pipe/Conduit	
S1.002	7.395	0.128	57.8	0.000	0.00	0.0	0.600	o	225	Pipe/Conduit	
S1.003	39.182	0.132	296.8	0.000	0.00	0.0	0.600	o	225	Pipe/Conduit	
S1.004	11.942	0.040	298.6	0.000	0.00	0.0	0.600	o	225	Pipe/Conduit	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
S1.000	40.83	4.38	25.315	0.059	0.1	0.0	1.3	1.59	63.1	7.9
S1.001	39.34	4.86	24.788	0.082	0.2	0.0	1.8	1.59	63.1	10.7
S2.000	41.05	4.31	25.575	0.000	0.0	0.0	0.0	0.76	30.1	0.0
S2.001	40.62	4.44	25.527	0.000	0.1	0.0	0.0	2.53	100.5	0.1
S2.002	40.25	4.56	24.793	0.000	0.3	0.0	0.1	2.53	100.5	0.4
S1.002	39.13	4.93	24.113	0.082	0.5	0.0	1.8	1.72	68.6	11.0
S1.003	36.82	5.80	23.985	0.082	0.5	0.0	1.8	0.75	30.0	11.0
S1.004	36.19	6.06	23.853	0.082	0.5	0.0	1.8	0.75	29.9	11.0

Free Flowing Outfall Details for Storm

Outfall Pipe Number	Outfall Name	C. Level (m)	I. Level (m)	Min I. Level (m)	D,L (mm)	W (mm)
S1.004	S	25.820	23.813	23.000	0	0

Simulation Criteria for Storm

Volumetric Runoff Coeff	0.750	Additional Flow - % of Total Flow	20.000
Areal Reduction Factor	1.000	MADD Factor * 10m³/ha Storage	2.000
Hot Start (mins)	0	Inlet Coeffiecient	0.800
Hot Start Level (mm)	0	Flow per Person per Day (l/per/day)	0.000
Manhole Headloss Coeff (Global)	0.500	Run Time (mins)	60
Foul Sewage per hectare (l/s)	0.000	Output Interval (mins)	1

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

Synthetic Rainfall Details

Rainfall Model	FSR	Profile Type	Summer
Return Period (years)	1	Cv (Summer)	0.750
Region	Scotland and Ireland	Cv (Winter)	0.840
M5-60 (mm)	15.700	Storm Duration (mins)	30
Ratio R	0.280		

Online Controls for Storm

Orifice Manhole: S6, DS/PN: S1.002, Volume (m³): 5.0

Diameter (m) 0.021 Discharge Coefficient 0.600 Invert Level (m) 24.113

Storage Structures for Storm

Tank or Pond Manhole: S6, DS/PN: S1.002

Invert Level (m) 24.113

Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	182.0	0.762	182.0	0.763	0.0

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

Simulation Criteria

Areal Reduction Factor	1.000	Additional Flow - % of Total Flow	20.000
Hot Start (mins)	0	MADD Factor * 10m³/ha Storage	2.000
Hot Start Level (mm)	0	Inlet Coeffiecient	0.800
Manhole Headloss Coeff (Global)	0.500	Flow per Person per Day (l/per/day)	0.000
Foul Sewage per hectare (l/s)	0.000		

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

Synthetic Rainfall Details

Rainfall Model	FSR	Ratio R	0.300
Region	Scotland and Ireland	Cv (Summer)	0.750
M5-60 (mm)	15.400	Cv (Winter)	0.840

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

Profile(s)	Summer and Winter
Duration(s) (mins)	15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440, 2160, 2880, 4320, 5760, 7200, 8640, 10080
Return Period(s) (years)	1, 30, 100
Climate Change (%)	0, 0, 0

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
S1.000	S1	15 Winter	1	+0%					25.370
S1.001	S2	15 Winter	1	+0%					24.852
S2.000	S3	360 Winter	1	+0%					25.575
S2.001	S4	15 Winter	1	+0%					25.528
S2.002	S5	30 Winter	1	+0%					24.797
S1.002	S6	10080 Winter	1	+0%	1/720 Summer				24.621
S1.003	S7	10080 Winter	1	+0%					24.008
S1.004	S8	10080 Winter	1	+0%					23.877

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
S1.000	S1	-0.170	0.000	0.14		8.2	OK	
S1.001	S2	-0.161	0.000	0.18		10.8	OK	
S2.000	S3	-0.225	0.000	0.00		0.0	OK	
S2.001	S4	-0.224	0.000	0.00		0.1	OK	
S2.002	S5	-0.221	0.000	0.00		0.4	OK	

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

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
S1.002	S6	0.283	0.000	0.01		0.6	SURCHARGED	
S1.003	S7	-0.202	0.000	0.02		0.6	OK	
S1.004	S8	-0.201	0.000	0.03		0.6	OK	

30 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

Simulation Criteria

Areal Reduction Factor	1.000	Additional Flow - % of Total Flow	20.000
Hot Start (mins)	0	MADD Factor * 10m³/ha Storage	2.000
Hot Start Level (mm)	0	Inlet Coeffiecient	0.800
Manhole Headloss Coeff (Global)	0.500	Flow per Person per Day (l/per/day)	0.000
Foul Sewage per hectare (l/s)	0.000		

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

Synthetic Rainfall Details

Rainfall Model	FSR	Ratio R	0.300
Region	Scotland and Ireland	Cv (Summer)	0.750
M5-60 (mm)	15.400	Cv (Winter)	0.840

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

Profile(s)	Summer and Winter
Duration(s) (mins)	15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440, 2160, 2880, 4320, 5760, 7200, 8640, 10080
Return Period(s) (years)	1, 30, 100
Climate Change (%)	0, 0, 0

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
S1.000	S1	15 Winter	30	+0%					25.400
S1.001	S2	15 Winter	30	+0%					24.890
S2.000	S3	360 Winter	30	+0%					25.575
S2.001	S4	15 Winter	30	+0%					25.528
S2.002	S5	30 Winter	30	+0%					24.797
S1.002	S6	10080 Winter	30	+0%	1/720 Summer				24.724
S1.003	S7	10080 Winter	30	+0%					24.009
S1.004	S8	10080 Winter	30	+0%					23.878

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
S1.000	S1	-0.140	0.000	0.30		18.1	OK	
S1.001	S2	-0.123	0.000	0.41		25.0	OK	
S2.000	S3	-0.225	0.000	0.00		0.0	OK	
S2.001	S4	-0.224	0.000	0.00		0.1	OK	
S2.002	S5	-0.221	0.000	0.00		0.4	OK	

30 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
S1.002	S6	0.386	0.000	0.01		0.7	SURCHARGED	
S1.003	S7	-0.201	0.000	0.03		0.7	OK	
S1.004	S8	-0.200	0.000	0.03		0.7	OK	

100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

Simulation Criteria

Areal Reduction Factor	1.000	Additional Flow - % of Total Flow	20.000
Hot Start (mins)	0	MADD Factor * 10m³/ha Storage	2.000
Hot Start Level (mm)	0	Inlet Coeffiecient	0.800
Manhole Headloss Coeff (Global)	0.500	Flow per Person per Day (l/per/day)	0.000
Foul Sewage per hectare (l/s)	0.000		

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

Synthetic Rainfall Details

Rainfall Model	FSR	Ratio R	0.300
Region	Scotland and Ireland	Cv (Summer)	0.750
M5-60 (mm)	15.400	Cv (Winter)	0.840

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

Profile(s)	Summer and Winter
Duration(s) (mins)	15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440, 2160, 2880, 4320, 5760, 7200, 8640, 10080
Return Period(s) (years)	1, 30, 100
Climate Change (%)	0, 0, 0

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
S1.000	S1	15 Winter	100	+0%					25.413
S1.001	S2	15 Winter	100	+0%					24.906
S2.000	S3	360 Winter	100	+0%					25.575
S2.001	S4	15 Winter	100	+0%					25.528
S2.002	S5	10080 Winter	100	+0%					24.799
S1.002	S6	10080 Winter	100	+0%	1/720 Summer				24.774
S1.003	S7	10080 Winter	100	+0%					24.009
S1.004	S8	10080 Winter	100	+0%					23.878

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
S1.000	S1	-0.127	0.000	0.39		23.4	OK	
S1.001	S2	-0.107	0.000	0.53		31.9	OK	
S2.000	S3	-0.225	0.000	0.00		0.0	OK	
S2.001	S4	-0.224	0.000	0.00		0.1	OK	
S2.002	S5	-0.219	0.000	0.00		0.4	OK	

100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
S1.002	S6	0.436	0.000	0.01		0.7	SURCHARGED	
S1.003	S7	-0.201	0.000	0.03		0.7	OK	
S1.004	S8	-0.200	0.000	0.03		0.7	OK	

Base flows added to the model to represent the attenuated runoff generated from the Permeable Paving areas and Blue/Green Roof systems.

FOUL SEWERAGE DESIGN

Design Criteria for Foul - Main

Pipe Sizes STANDARD Manhole Sizes STANDARD

Industrial Flow (l/s/ha)	0.00	Add Flow / Climate Change (%)	10
Industrial Peak Flow Factor	0.00	Minimum Backdrop Height (m)	0.200
Flow Per Person (l/per/day)	150.00	Maximum Backdrop Height (m)	1.500
Persons per House	2.70	Min Design Depth for Optimisation (m)	1.200
Domestic (l/s/ha)	0.00	Min Vel for Auto Design only (m/s)	0.75
Domestic Peak Flow Factor	6.00	Min Slope for Optimisation (1:X)	500

Designed with Level Soffits

Network Design Table for Foul - Main

PN	Length (m)	Fall (m)	Slope (1:X)	Area (ha)	Houses	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
F1.000	41.555	0.520	79.9	0.000	42	0.0	1.500	o	225	Pipe/Conduit	
F1.001	5.505	0.056	99.0	0.000	0	0.0	1.500	o	225	Pipe/Conduit	
F1.002	36.192	0.241	150.2	0.000	0	0.0	1.500	o	225	Pipe/Conduit	
F2.000	22.121	0.147	150.5	0.000	15	0.0	1.500	o	225	Pipe/Conduit	
F1.003	29.668	0.212	140.0	0.000	0	0.0	1.500	o	225	Pipe/Conduit	

Network Results Table

PN	US/IL (m)	Σ Area (ha)	Σ Base Flow (l/s)	Σ Hse	Add Flow (l/s)	P.Dep (mm)	P.Vel (m/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
F1.000	25.105	0.000	0.0	42	0.1	25	0.54	1.28	51.1	1.3
F1.001	24.585	0.000	0.0	42	0.1	26	0.50	1.15	45.9	1.3
F1.002	24.529	0.000	0.0	42	0.1	29	0.43	0.94	37.2	1.3
F2.000	25.095	0.000	0.0	15	0.0	18	0.31	0.93	37.2	0.5
F1.003	24.252	0.000	0.0	57	0.2	33	0.49	0.97	38.5	1.8

PIPELINE SCHEDULES for Foul - Main

Upstream Manhole

PN	Hyd Sect	Diam (mm)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
F1.000	o	225	F1	26.250	25.105	0.920	Open Manhole	1200
F1.001	o	225	F2	26.250	24.585	1.440	Open Manhole	1200
F1.002	o	225	F3	26.250	24.529	1.496	Open Manhole	1200
F2.000	o	225	F4	26.520	25.095	1.200	Open Manhole	1200
F1.003	o	225	F4	27.290	24.252	2.813	Open Manhole	1200

Downstream Manhole

PN	Length (m)	Slope (1:X)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
F1.000	41.555	79.9	F2	26.250	24.585	1.440	Open Manhole	1200
F1.001	5.505	99.0	F3	26.250	24.529	1.496	Open Manhole	1200
F1.002	36.192	150.2	F4	27.290	24.288	2.777	Open Manhole	1200
F2.000	22.121	150.5	F4	27.290	24.948	2.117	Open Manhole	1200
F1.003	29.668	140.0	F	26.490	24.040	2.225	Open Manhole	0

APPENDIX F
INITIAL SITE SPECIFIC FLOOD RISK ASSESSMENT

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PROPOSED RESIDENTIAL DEVELOPMENT AT HOLYWELL, CO. DUBLIN

Initial Site Specific Flood Risk Assessment | September 2023

ROD
ROUGHAN & O'DONOVAN

Proposed Residential Development at Holywell Co. Dublin

Initial Site Specific Flood Risk Assessment

Document No: HHP-ROD-XX-XX-RP-C-0002

Author:..... Angelo Sicilia (AS)

Checker: ..... Warren Vokes (WV)

Approver:..... John Paul Rooney (JPR) / Seán Kennedy (SK)

Document No	Revision	Description	Made	Checked	Approved	Date
HHP-ROD-XX-XX-RP-C-0002	P01	Flood Risk Assessment	AS	WV	JPR	10/08/2023
HHP-ROD-XX-XX-RP-C-0002	P02	Issued for Planning	AS	WV	SK	29/09/2023
HHP-ROD-XX-XX-RP-C-0002	P03	Issued for Planning	AS	WV	SK	17/10/2023

Proposed Residential Development at Holywell Co. Dublin

Initial Site-Specific Flood Risk Assessment

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APPENDICES

1. INTRODUCTION

Roughan & O'Donovan Consulting Engineers has carried out a Flood Risk Assessment for a greenfield site development at Holywell Co. Dublin for a proposed residential development. This report has been prepared to assess the flood risk to the subject sites and adjacent lands as a result of the proposed development.

1.1 Description of Proposed Development and Study Area

The site is located at Holywell, Swords, Co. Dublin. and is bounded by the Holywell Distributor Road to the north and west, existing residential development to the east and a residential landscaped area to the south. There is an existing ditch that runs along the southern boundary of the site. The site location is outlined in Figure 1.1 below.The site is situated within the catchment of the River Gaybrook which generally flows in a west-east direction and outfalls into the Malahide bay approximately 1 km west of the Malahide Marina.

The proposed development involves the construction of 57 no. apartments (21 no. one bedroom; 28 no. two bedroom; and 8 no. three bedroom) in 3 no. apartment blocks incorporating 33 car parking spaces, 166 no. long-stay bicycle parking and 57 no. short-stay bicycle parking.

Proposed access is located at the north-east corner of the site on Holywell Distribution Road. The proposed finished floor levels are set at 26.4 mOD. The proposed development will incorporate 150m^3 of compensatory flood storage. The development includes landscaping of the surrounding area within the development site and associated utilities & drainage work.

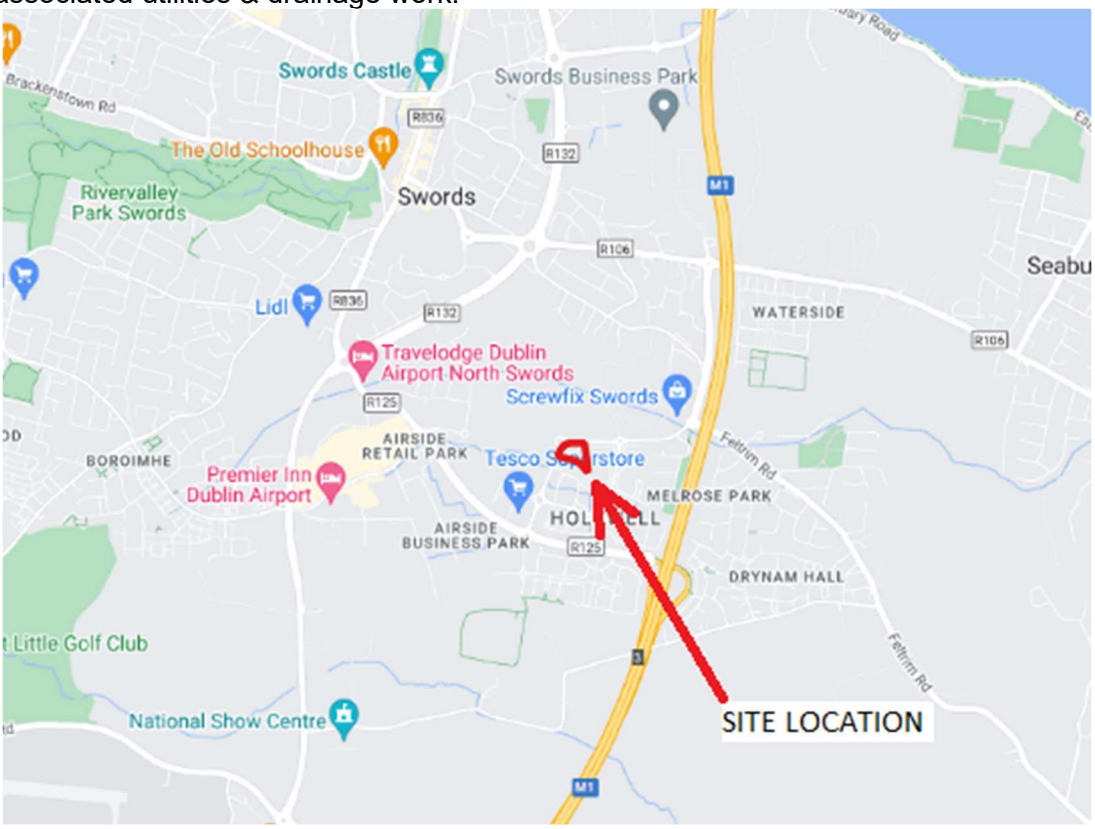


Figure 1.1 Site Location (map underlay source: Google Maps)

2. FLOOD RISK

2.1 Introduction

This report has been prepared in accordance with 'The Planning System and Flood Risk Management Guidelines for Planning Authorities' herein referred to as 'The Guidelines' as published by the Office of Public Works (OPW) and Department of Environment, Heritage and Local Government (DoEHLG) in 2009.

2.2 Identification of Flood Risk

Flood risk is a combination of the likelihood of a flood event occurring and the potential consequences arising from that flood event and is then normally expressed in terms of the following relationship:

Flood risk = Likelihood of flooding x Consequences of flooding.

To fully assess flood risk an understanding of where the water comes from (i.e. the source), how and where it flows (i.e. the pathways) and the people and assets affected by it (i.e. the receptors) is required. Figure 2.1 below shows a source-pathway-receptor model reproduced from 'The Guidelines' (DEHLG-OPW, 2009).

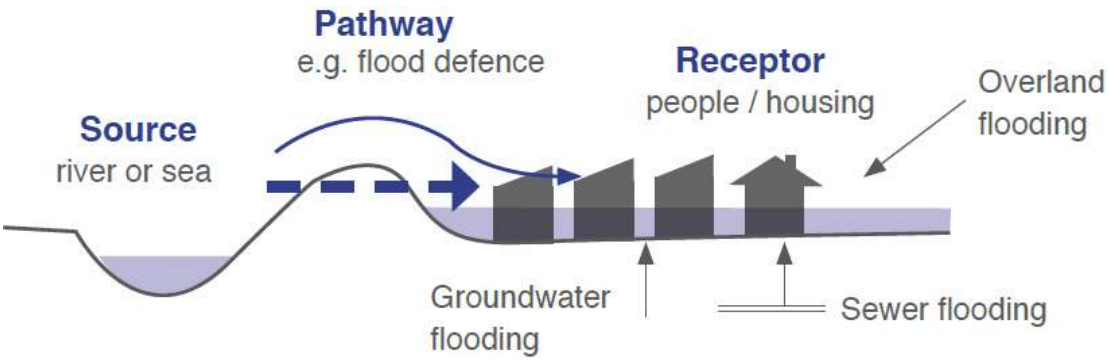


Figure 2.1 Sources, Pathways and Receptors of Flooding

The principal sources of flooding generally are rainfall or higher than normal sea levels. The principal pathways are rivers, drains, sewers, overland flow and river and coastal floodplains. The receptors can include people, their property and the environment. All three elements as well as the vulnerability and exposure of receptors must be examined to determine the potential consequences.

The Guidelines set out a staged approach to the assessment of flood risk with each stage carried out only as needed. The stages are listed below:

- *Stage I Flood Risk Identification* – to identify whether there may be any flooding or surface water management issues.
- *Stage II Initial Flood Risk Assessment* – to confirm sources of flooding that may affect an area or proposed development, to appraise the adequacy of existing information and to scope the extent of the risk of flooding which may involve preparing indicative flood zone maps.
- *Stage III Detailed Flood Risk Assessment* – to assess flood risk issues in sufficient detail and to provide a quantitative appraisal of potential flood risk to a proposed or existing development or land to be zoned, of its potential impact on flood risk elsewhere and of the effectiveness of any proposed mitigation measures.

2.3 Likelihood of Flooding

The Guidelines define the likelihood of flooding as the percentage probability of a flood of a given magnitude or severity occurring or being exceeded in any given year. It is generally expressed as a return period or annual exceedance probability (AEP). A 1% AEP flood indicates a flood event that will be equalled or exceeded on average once every hundred years and has a return period of 1 in 100 years. Annual Exceedance probability is the inverse of return period as shown Table 2.1 below.

Table 2.1 Correlation Between Return Period and AEP

Return Period (years)	Annual Exceedance Probability (%)
1	100
10	10
50	2
100	1
200	0.5
1000	0.1

2.4 Definition of Flood Zones

Flood zones are geographical areas within which the likelihood of flooding is in a particular range. These are split into three categories in The Guidelines:

Flood Zone A

Flood Zone A where the probability of flooding from rivers and the sea is highest (greater than 1% or 1 in 100 for river flooding or 0.5% or 1 in 200 for coastal/tidal flooding);

Flood Zone B

Flood Zone B where the probability of flooding from rivers and the sea is moderate (between 0.1% or 1 in 1000 and 1% or 1 in 100 for river flooding and between 0.1% or 1 in 1000 or 0.5% or 1 in 200 for coastal/tidal flooding);

Flood Zone C

Flood Zone C where the probability of flooding from rivers and the sea is low (less than 0.1% or 1 in 1000 for both river and coastal/tidal flooding. Flood Zone C covers all plan areas which are not in zones A or B.

It is important to note that when determining flood zones the presence of flood protection structures should be ignored. This is because areas protected by flood defences still carry a residual risk from overtopping or breach of defences and the fact that there is no guarantee that the defences will be maintained in perpetuity.

2.5 Sequential Approach & Justification Test

The Guidelines outline the sequential approach that is to be applied to all levels of the planning process. This approach should also be used in the design and layout of a development and the broad philosophy is shown in Figure 2.2 below. In general, development in areas with a high risk of flooding should be avoided as per the sequential approach. However, this is not always possible as many town and city centres are within flood zones and are targeted for development.

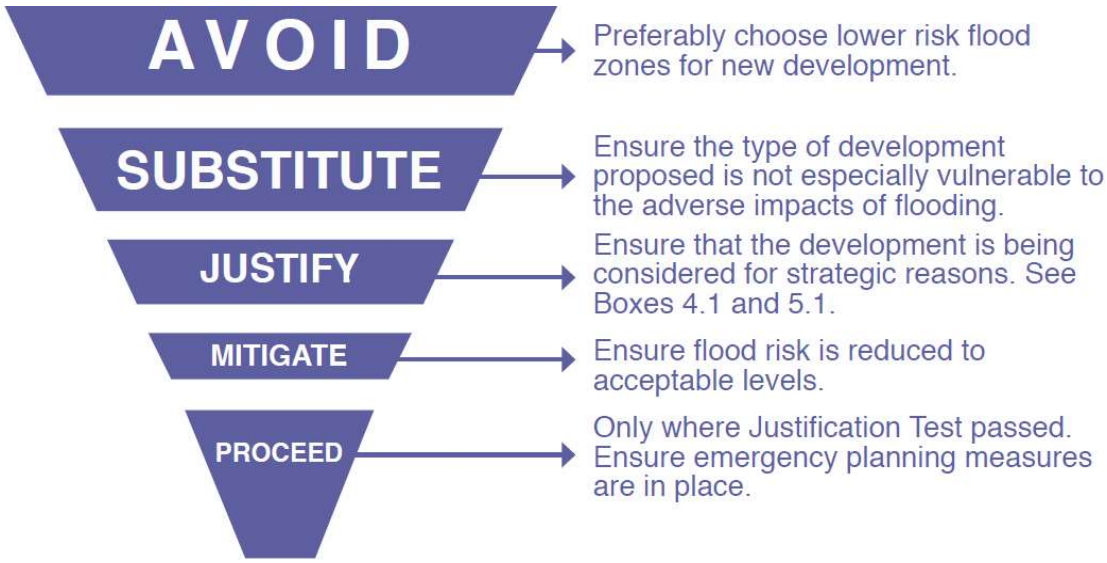


Figure 2.2 Sequential Approach (Source: The Planning System and Flood Risk Management)

The Justification Test has been designed to rigorously assess the appropriateness, or otherwise, of developments that are being considered in areas of moderate or high flood risk. The test comprises the following two processes.

- The first is the Plan-making Justification Test and is used at the plan preparation and adoption stage where it is intended to zone or otherwise designate land which is at moderate or high risk of flooding.
- The second is the Development Management Justification Test and is used at the planning application stage where it is intended to develop land at moderate or high risk of flooding for uses or development vulnerable to flooding that would generally be inappropriate for that land.

Table 2.2 Matrix of Vulnerability Versus Flood Zone to Illustrate Appropriate Development that is Required to Meet the Justification Test (Source: The Planning System and Flood Risk Management)

	Flood Zone A	Flood Zone B	Flood Zone C
Highly vulnerable development (including essential infrastructure)	Justification Test	Justification Test	Appropriate
Less vulnerable development	Justification Test	Appropriate	Appropriate
Water-compatible development	Appropriate	Appropriate	Appropriate

3. STAGE 1: FLOOD RISK IDENTIFICATION

3.1 General

This Stage 1 Flood Risk Identification includes a review of the existing information and the identification of any flooding or surface water management issues in the study area that may warrant further investigation.

3.2 Vulnerability

As per the OPW Guidelines, the proposed development is classified as "highly vulnerable" development as it comprises residential uses. The guidelines stipulate that typically highly vulnerable developments are only appropriate within Flood Zone C (low risk areas).

3.3 Information Sources Consulted

The following information sources were consulted as part of the Stage 1 Flood Risk Identification:

Table 3.1 Information Sources Consulted

Source	Data Gathered
Primary Sources of Baseline Data	
Catchment Flood Risk Assessment and Management Study (CFRAM): www.floodinfo.ie	Fluvial, Pluvial, Coastal flooding examined
National Indicative Fluvial Maps: www.floodinfo.ie	National Indicative Fluvial Maps examined
OPW Past Flood Events Mapping: www.floodinfo.ie	OPW Records of Fluvial, Pluvial, Coastal flooding examined
Fingal East Meath Flood Risk Assessment and Management Study www.floodinfo.ie	FEM FRAM Fluvial Maps consulted
Secondary Sources of Baseline Data	
Strategic Flood Risk Assessment (SFRA) of the Fingal County Development Plan 2023-2029	Fluvial, Coastal and Pluvial flooding examined
Stage 2 Site Specific Flood Risk Assessment Holywell, Swords, Co. Dublin – February 2022 (McCloy Consulting)	Flood Risk assessment examined
Geological Survey of Ireland (GSI) Maps	GSI Teagasc subsoils map consulted to identify if alluvial sediments are shown to be present at development site that may indicate historic flooding.
Historical Maps	OSI 25" mapping assessed
News Reports	News reports published in newspapers or digital news websites.

3.4 Primary Sources of Baseline Data

(i) Fingal East Meath Flood Risk Assessment and Management Study

The FEM FRAM was undertaken as a pilot study for the OPW's Catchment Flood Risk Assessment and Management (CFRAM) programme. The site and

surrounding area are included in the FEM FRAM Swords (south) Fluvial Extent Map. The mapping indicates flooding on site in the 1 in 1000 year event. The mapping also indicates flooding emanating from surface water sources in the upstream catchment.
An overview of the OPW FEM FRAM Swords (south) Fluvial Extent Mapping is reproduced in appendix B.

(ii) National Indicative Fluvial Maps (NIFM)

The indicative fluvial flood maps were finalised in December 2020. The mapping presents flood extents for river reaches that were not previously modelled as part of the CFRAMS and have catchments larger than 5 km2. As per the OPW the use of these maps is to "provide an indication of areas that may be prone to flooding. They are not necessarily locally accurate and should not be used as the sole basis for defining the Flood Zones nor for making decisions on planning applications." As the site was considered as part of the CFRAMS study the NIFM maps are not applicable.

(iii) OPW past flood Events (Floodinfo.ie)

The OPW National Flood Hazard Mapping was examined to identify any recorded flood events within the vicinity of the site. No flood events have been recorded on the site, however, a number of flood events have been recorded within 1 km from the site.
An overview of the OPW National Flood Hazard Mapping is reproduced in appendix B.

3.5 Secondary Sources of Baseline data

The following sources were also examined to identify areas that may be liable to flooding:

(i) Strategic Flood Risk Assessment (SFRA) of the Fingal County Development Plan 2023-2029

The site area is covered as part of the Fingal County Development Plan 2023-2029. There are indicators of flooding on site in the 1 1in 1000 year event in the current climate scenario maps, maps for medium range scenario Flood Extents and High-End future scenario Flood Extents also indicate that there is a probability of flooding on the site.
An overview of the Strategic Flood Risk Assessment Flood Extents Mapping is reproduced in appendix B.

(ii) Stage 2 Site Specific Flood Risk Assessment Holywell, Swords, Co. Dublin – February 2022

A Stage 2 Site Specific Flood Risk Assessment was undertaken for a residential development and associated access roads, car parking and open amenity space in February 2022.

The study concluded that the site is within Flood Zone C, as defined in the OPW Guidelines. However, the site has been shown to be affected by climate change fluvial flooding and pluvial / surface water flooding.

The study indicates that the southern extent of the site is at risk of fluvial flooding in a climate change scenario, and further detailed assessment is required.

(iii) Geological Survey of Ireland Maps

According to the Geological Survey Ireland (GSI), the underlying subsoil is Till derived from limestones, and there are no known karst features (swallow holes, enclosed depressions, wells or springs) within the footprint of the site.

(iv) Historical Maps

Historical Maps were studied. No areas of the site have been identified as liable to flooding.

(v) News reports

No News report of flooding have been found in relation to the site.

3.6 Source – Pathway – Receptor Model

The following source-pathway-receptor model has been developed using the information examined in the Stage I Flood Risk Identification to categorise the sources of flooding, where it flows to (pathway) and the people and infrastructure affected by it (receptors). The likelihood and consequences of each type of flooding have also been assessed to determine the risk. These are summarised in Table 3.2 (taken from Appendix A of the Guidelines).

Table 3.2 Source-Pathway-Receptor Model

Source	Pathway	Receptor	Likelihood	Consequence	Risk
Fluvial flooding	Overbank flow from the Gaybrook Stream	Dwelling houses	*Medium*	*High*	***Medium***
Pluvial / Surface Water flooding	Extreme rainfall events and inadequate surface water drainage	Dwelling houses	*Possible*	*High*	***Medium***
Coastal flooding	Extreme tides, storm surges or wave overtopping	Dwelling houses	*Highly Unlikely*	*High*	***Low***
Ground-water Flooding	Rising groundwater levels	Dwelling houses	*Low* (No reports or geological indicators)	*High*	***Low***

3.7 Stage 1 Conclusions

3.7.1 Fluvial Flooding

A number of sources of information including previous Site-Specific Flood Risk Assessment and Fingal Strategic Flood Risk Assessment Flood Extents maps indicates that the site is at risk of fluvial flooding. Therefore, the risk of fluvial flooding at the site is classified as medium and a Stage 2 – Initial Fluvial Flood Risk Assessment is required for the development.

3.7.2 Coastal Flooding

Coastal flooding was not identified as a source of flooding affecting the site in any of the sources of information consulted including CFRAM maps. The site is more than 20 m above sea level. Therefore, the risk of coastal flooding at the site is classified as low and further assessment is not required.

3.7.3 Surface Water / Pluvial Flooding

The sources consulted indicate that the site may be subject to surface water derived flooding. Flood maps from the SFRA of Fingal County Development Plan, show flood affecting the surrounding developments and road infrastructures on the southern part of the site, this might be related to inadequate drainage capacity of the existing drainage infrastructures and may result in increased runoff volume routed towards the site object of this study. Therefore, the risk of Surface Water flooding at the site is classified as medium and a stage 2 – Initial Surface Water Flood Risk Assessment is required for the development.

3.7.4 Groundwater Flooding

Groundwater flooding was not identified as a source of flooding affecting the site. Therefore, the risk of groundwater flooding is classified as Low and no further assessment is required.

4. STAGE 2 – INITIAL FLOOD RISK ASSESSMENT

4.1 General

The Stage 2 Initial Flood Risk Assessment will confirm the sources of flooding that may affect the proposed development site.

4.2 Sources of Flooding

Flooding from Fluvial / Surface Water

The subject site is situated within the catchment of the Gaybrook Stream. The sources consulted as part of this assessment indicate that as portion of the subject site is at risk of flooding in the present day 1 in 1000 year fluvial event, it is therefore within Flood Zone B as defined in the OPW Guidelines. Flooding of the surface water network upstream of the site also appears to create flow paths that converge on the subject site.

The FEM FRAMS flood map includes model nodes along the Gaybrook Stream indicating flood levels for the 1% AEP and the 0.1% AEP present day. The closest node (3Ga3779) is located just upstream of the subject site before the river enters a culvert that conveys the water to another open channel to the east of Holywell. Table 4.1 shows the predictive 1% AEP and 0.1% AEP present day flood levels at the node 3Ga3779.

Climate Scenario	1% AEP Water Level (mOD)	0.1% AEP Water Level (mOD)
Current	24.08	25.57
High End Future Scenario (HEFS)	N/A	25.88

Note: the location of the node 3Ga3779 upstream of the subject lands means it is likely that the estimated flood levels are higher than they are within the subject lands. For the purposes of this assessment they are seen as appropriate but may be subject to revision downward following further assessment.

As per the Strategic Flood Risk Assessment for the Fingal Development Plan 2023-2029, the development is to include an appropriate freeboard. As per the Fingal SFRA, freeboard for Highly Vulnerable developments is the greater of:

- 500mm freeboard above current scenario; or
- 250mm above the HEFS (for Highly vulnerable developments).

Levels are given in table below. The minimum design floor level is therefore 26.13mOD.

Table 4.1 Design Flood Level

	Current	HEFS
FEM FRAM Flood Maps	25.57	25.88
Freeboard (as per Fingal SFRA)	0.5	0.25
Total	26.07	26.13

As the proposed finished floor level is set at 26.4mOD, the highest water level anticipated from fluvial flooding is 0.27m below the proposed finished floor level.

The layout of the proposed building includes minor areas of structures within the floodplain as derived from the FEMFRAM levels. These structures may displace flood waters within the subject lands in extreme events. A Civils 3D surface model was created to overlay the flood level on the site layout to determine the volume of water displaced by the proposed buildings. Based on this and upon a desktop survey of hydraulic and topographic conditions, the site layout design includes for 150m^3 of compensatory storage. The FEMFRAM levels are seen as appropriately conservative for the site and may be subject to revision downward following further assessment. Further topographic survey and hydraulic analysis at compliance stage will confirm the volumes of compensatory storage required on site to appropriately manage the displaced volumes if required.

The output from the Civils 3D surface model can be found in Appendix C.

Surface Water Flooding

Surface water flooding occurs when the local drainage system cannot convey stormwater flows from extreme rainfall events. The rainwater does not drain away through the normal drainage pathways or infiltrate into the ground but instead ponds on or flows over the ground instead. Surface water flooding is unpredictable as it depends on a number of factors including ground levels, rainfall and the local drainage network. The drainage network for any development on the site will incorporate Sustainable Drainage Systems (SuDS) for the purpose for managing surface water in terms of both flow and quality.

5. JUSTIFICATION TEST

The flood risk assessment carried out for the purposes of the proposed residential development determined that the subject site is potentially within lands at risk of flooding. In this context, the proposed development satisfies the Justification Test as outlined below:

5.1 The subject lands have been zoned or otherwise designated for the use or form of development in an operative development plan, which has been adopted or varied taking account of these Guidelines.

The subject site is zoned "Residential". As per the Fingal Council Development Plan 2023-2029 Residential Zoning Objective states "Provide for residential development and protect and improve residential amenity". The proposed development is suitable for the zonings as it is a residential development. Therefore, the proposed development is suitable for the subject site zoning.

5.2. The proposal has been subject to an appropriate flood risk assessment that demonstrates:

5.2.1. The development proposed will not increase flood risk elsewhere and, if practicable, will reduce overall flood risk;

Fluvial flooding effects the proposed development in the 0.1%AEP event and above. The proposed development will not alter flow paths or existing flood defences. The proposed development will displace a minor amount of flood waters in extreme events though these volumes are to be compensated for on site.

5.2.2 The development proposal includes measures to minimise flood risk to people, property, the economy and the environment as far as reasonably possible;

The residential unit's minimum finished floor level will be in excess of the 0.1%AEP event level plus an appropriate freeboard. The proposed finished floor level was derived from FEMFRAM Study which included an allowance for climate change as per OPW Guidance. The proposed development will incorporate 150m^3 of compensatory storage in combination with flood resistant design features that will manage risk associated with increased risk as a result of future climate change.

5.2.3 The development proposed includes measures to ensure that residual risks to the area and/or development can be managed to an acceptable level as regards the adequacy of existing flood protection measures or the design, implementation and funding of any future flood risk management measures and provisions for emergency services access;

The proposed development has been designed with regard to flood resilient construction measures and materials. The proposed development will be subject to a maintenance plan, the maintenance of the proposed development will be undertaken by the relevant competent specialists.

5.2.4 The development proposed addresses the above in a manner that is also compatible with the achievement of wider planning objectives in relation to development of good urban design and vibrant and active streetscapes.

The proposed residential development will facilitate compact and sustainable urban growth. The proposed development is in keeping with the surrounding areas visuals and uses within Swords.

5.1 Justification Test Conclusions

The proposed development has been determined to have satisfied all requirements of the justification test.

6. CONCLUSION OF STAGE 2 SFRA

The available sources consulted above indicate that a portion of the proposed development site is liable to flood in the 1 in 1000 year current climate scenario from fluvial sources.

Flood risk management measures incorporated within the design will protect the development up to the design flood event (1 in 1000 year + 20% climate change factor) with an appropriate freeboard and shall ensure flood risk is not increased upstream or downstream of the site. Details of the proposed compensatory storage measures (~150m^3) shall be provided at compliance stage.

APPENDIX A

GLOSSARY OF TERMS

GLOSSARY OF TERMS

Catchment: The area that is drained by a river or artificial drainage system.

Catchment Flood Risk Assessment and Management Studies (CFRAMS): A catchment-based study involving an assessment of the risk of flooding in a catchment and the development of a strategy for managing that risk in order to reduce adverse effects on people, property and the environment. CFRAMS precede the preparation of Flood Risk Management Plans (see entry for FRMP).

Climate change: Long-term variations in global temperature and weather patterns, which occur both naturally and as a result of human activity, primarily through greenhouse gas emissions.

Core of an urban settlement: The core area of a city, town or village which acts as a centre for a broad range of employment, retail, community, residential and transport functions.

Detailed flood risk assessment: A methodology to assess flood risk issues in sufficient detail and to provide a quantitative appraisal of flood hazard and potential risk to an existing or proposed development, of its potential impact on flood elsewhere and of the effectiveness of any proposed measures.

Estuarial (or tidal) flooding: Flooding from an estuary, where water level may be influenced by both river flows and tidal conditions, with the latter usually being dominant.

Flooding (or inundation): Flooding is the overflowing of water onto land that is normally dry. It may be caused by overtopping or breach of banks or defences, inadequate or slow drainage of rainfall, underlying groundwater levels or blocked drains and sewers. It presents a risk only when people, human assets and ecosystems are present in the areas that flood.

Flood Relief Schemes (FRS): A scheme designed to reduce the risk of flooding at a specific location.

Flood Defence: A man-made structure (e.g. embankment, bund, sluice gate, reservoir or barrier) designed to prevent flooding of areas adjacent to the defence.

Flood Risk Assessment (FRA): FRA can be undertaken at any scale from the national down to the individual site and comprises 3 stages: Flood risk identification, initial flood risk assessment and detailed flood risk assessment.

Flood Risk Identification: A desk- based study to identify whether there may be any flooding or surface water management issues related to a plan area or proposed development site that may warrant further investigation.

Flood Hazard: The features of flooding which have harmful impacts on people, property or the environment (such as the depth of water, speed of flow, rate of onset, duration, water quality, etc.).

Floodplain: A flood plain is any low-lying area of land next to a river or stream, which is susceptible to partial or complete inundation by water during a flood event.

Flood Risk: An expression of the combination of the flood probability, or likelihood and the magnitude of the potential consequences of the flood event.

Flood Storage: The temporary storage of excess run-off, or river flow in ponds, basins, reservoirs or on the flood plain.

Flood Zones: A geographic area for which the probability of flooding from rivers, estuaries or the sea is within a particular range.

Fluvial flooding: Flooding from a river or other watercourse.

Groundwater flooding: Flooding caused by groundwater escaping from the ground when the water table rises to or above ground level.

Initial flood risk assessment: A qualitative or semi-quantitative study to confirm sources of flooding that may affect a plan area or proposed development site, to appraise the adequacy of existing information, to provide a qualitative appraisal of the risk of flooding to development, including the scope of possible mitigation measures, and the potential impact of development on flooding elsewhere, and to determine the need for further detailed assessment.

Freeboard: Factor of safety applied for water surfaces. Defines the distance between normal water level and the top of a structure, such as a dam, that impounds or restrains water.

Justification Test: An assessment of whether a development proposal within an area at risk of flooding meets specific criteria for proper planning and sustainable development and demonstrates that it will not be subject to unacceptable risk nor increase flood risk elsewhere. The justification test should be applied only where development is within flood risk areas that would be defined as inappropriate under the screening test of the sequential risk-based approach adopted by this guidance.

Likelihood (probability) of flooding: A general concept relating to the chance of an event occurring. Likelihood is generally expressed as a probability or a frequency of a flood of a given magnitude or severity occurring or being exceeded in any given year. It is based on the average frequency estimated, measured or extrapolated from records over a large number of years and is usually expressed as the chance of a particular flood level being exceeded in any one year. For example, a 1-in-100 or 1% flood is that which would, on average, be expected to occur once in 100 years, though it could happen at any time.

Ordnance Datum (or OD) Malin: is a vertical datum used by an ordnance survey as the basis for deriving altitudes on maps. A spot height may be expressed as AOD for "above ordnance datum". Usually mean sea level (MSL) is used for the datum. In the Republic of Ireland, OD for the Ordnance Survey of Ireland is Malin Ordnance Datum: the MSL at Portmoor Pier, Malin Head, County Donegal, between 1960 and 1969. Prior to 1970, Poolbeg Ordnance Datum was used: the low water of spring tide at Poolbeg lighthouse, Dublin, on 8 April 1837. Poolbeg OD was about 2.7 metres lower than Malin OD.

Management Train/Treatment Train: the sequence of drainage components that collect, convey, store and treat runoff as it drains through the site.

Mitigation: The term is used to describe an action that helps to lessen the impacts of a process or development on the receiving environment. It is used most often in association with measures that would seek to reduce negative impacts of a process or development.

Pathways: These provide the connection between a particular source (e.g. high river or tide level) and the receptor that may be harmed (e.g. property). In flood risk management, pathways are often 'blocked' by barriers, such as flood defence structures, or otherwise modified to reduce the incidence of flooding.

Pluvial flooding: Usually associated with convective summer thunderstorms or high intensity rainfall cells within longer duration events, pluvial flooding is a result of rainfall-generated overland flows which arise before run-off enters any watercourse or sewer. The intensity of rainfall can be such that the run-off totally overwhelms surface water and underground drainage systems.

Regional Planning Guidelines (RPG): These provide the regional context and priorities for applying national planning strategy to each NUTS III region and encourage greater co-ordination of planning policies at the city/county level. RPGs are an important part of the flood policy hierarchy as they can assist in co-ordinating flood risk management policies at the regional level.

Resilience: Sometimes known as "wet-proofing", resilience relates to how a building is constructed in such a way that, although flood water may enter the building, its impact is minimised, structural integrity is maintained, and repair, drying and cleaning and subsequent reoccupation are facilitated.

Receptors: Things that may be harmed by flooding (e.g. people, houses, buildings or the environment).

Residual risk: The risk which remains after all risk avoidance, substitution and mitigation measures have been implemented, on the basis that such measures can only reduce risk, not eliminate it.

Sequential Approach: The sequential approach is a risk-based method to guide development away from areas that have been identified through a flood risk assessment as being at risk from flooding. Sequential approaches are already established and working effectively in the plan-making and development management processes.

Sustainable Drainage System (SuDS): Drainage systems that are considered to be environmentally beneficial, causing minimal or no long-term detrimental impact.

Site-specific Flood Risk Assessment: An examination of the risks from all sources of flooding of the risks to and potentially arising from development on a specific site, including an examination of the effectiveness and impacts of any control or mitigation measures to be incorporated in that development.

Source: Refers to a source of hazard (e.g. the sea, heavy rainfall).

Strategic Flood Risk Assessment: The assessment of flood risk on a wide geographical area against which to assess development proposed in an area (Region, County, Town).

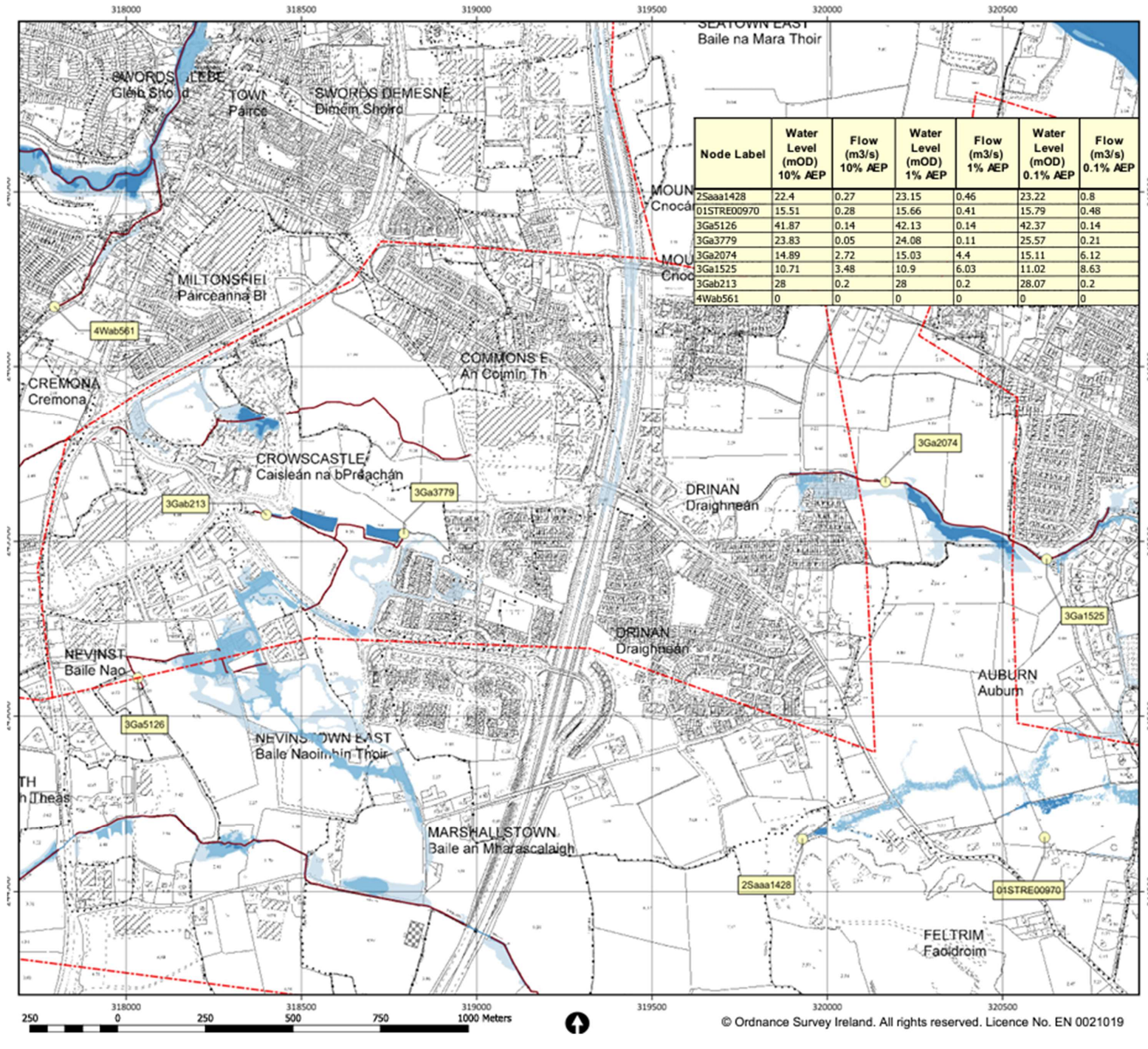
Vulnerability: The resilience of a particular group of people or types of property or habitats, ecosystems or species to flood risk, and their ability to respond to a hazardous condition and the damage or degree of impact they are likely to suffer in the event of a flood. For example, elderly people may be more likely to suffer injury, and be less able to evacuate, in the event of a rapid flood than younger people.

Source: *The definitions above are sourced from the DoEHLG Guidelines for Planning Authorities on 'The Planning System and Flood Risk Management, 2009' and Ciria 753 "the SuDS Manual".*

APPENDIX B

INDICATIVE FLOOD SOURCES

FEM FRAMRiver Flood Extents



Node Label	Water Level (mOD) 10% AEP	Flow (m3/s) 10% AEP	Water Level (mOD) 1% AEP	Flow (m3/s) 1% AEP	Water Level (mOD) 0.1% AEP	Flow (m3/s) 0.1% AEP
2Saaa1428	22.4	0.27	23.15	0.46	23.22	0.8
01STRE00970	15.51	0.28	15.66	0.41	15.79	0.48
3Ga5126	41.87	0.14	42.13	0.14	42.37	0.14
3Ga3779	23.83	0.05	24.08	0.11	25.57	0.21
3Ga2074	14.89	2.72	15.03	4.4	15.11	6.12
3Ga1525	10.71	3.48	10.9	6.03	11.02	8.63
3Gab213	28	0.2	28	0.2	28.07	0.2
4Wab561	0	0	0	0	0	0

Location Plan:

LEGEND

- AFA Boundary
- Defended Area
- Modelled River Centreline
- Node Point
- 10% AEP Fluvial Extent (High Risk)
- 1% AEP Fluvial Extent (Medium Risk)
- 0.1% AEP Fluvial Extent (Low Risk)
- Flood Defence - Embankment
- Flood Defence - Wall
- Gate
- NODE123 — Node Label
- XX% AEP — Standard of Protection of Flood Defence

IMPORTANT USER NOTE:
THE VIEWER OF THIS MAP SHOULD REFER TO THE DISCLAIMER, GUIDANCE NOTES AND CONDITIONS OF USE THAT ACCOMPANY THIS MAP.

The Office of Public Works
Jonathan Swift Street
Trim
Co. Meath

Project:
FINGAL EAST MEATH FRAM STUDY

Map: **SWORDS (SOUTH) FLUVIAL EXTENT MAP**

Map Type:	EXTENT		
Source:	FLUVIAL		
Map Area:	HPW		
Scenario:	CURRENT		
Drawn by:	IH	Date:	Mar - 2019
Checked by:	TC	Date:	Mar - 2019
Approved by:	GP	Date:	Mar - 2019

Map No.: E09SWS_EXFCD_F1_34
Revision: F1
Map Scale: 1:10000 Plot Scale: 1:1 @ A3

OPW – PAST FLOOD EVENTS LOCAL AREA SUMMARY REPORT

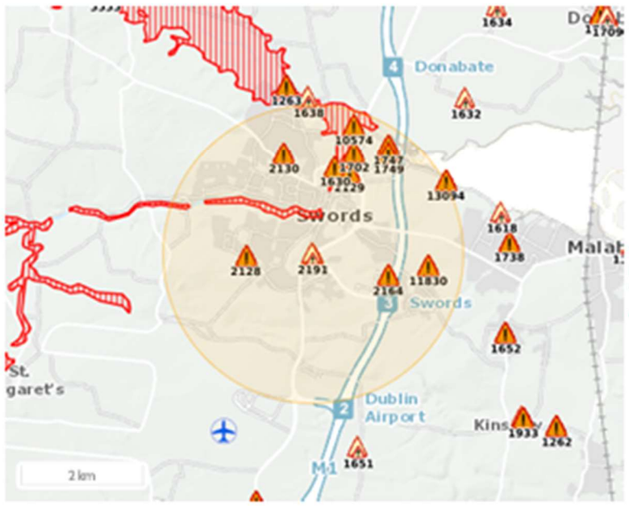
Past Flood Event Local Area Summary Report

OPW

Report Produced: 8/8/2023 15:27

This Past Flood Event Summary Report summarises all past flood events within 2.5 kilometres of the map centre.

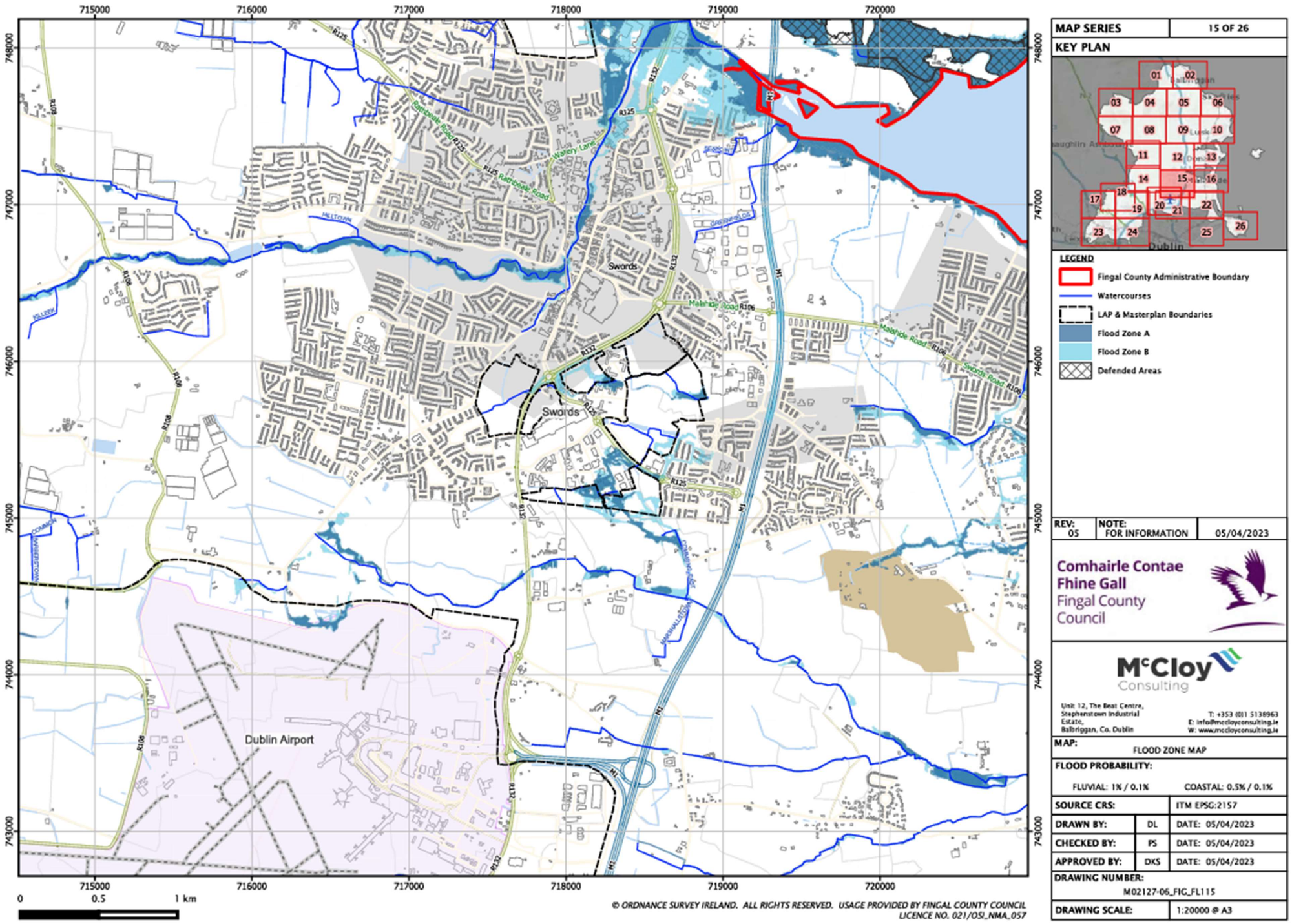
This report has been downloaded from www.floodinfo.ie (the "Website"). The users should take account of the restrictions and limitations relating to the content and use of the Website that are explained in the Terms and Conditions. It is a condition of use of the Website that you agree to be bound by the disclaimer and other terms and conditions set out on the Website and to the privacy policy on the Website.



13 Results

	Name (Flood_ID)	Start Date	Event Location
1.	Ward North Street Swords Nov 2002 (ID-1630)	13/11/2002	Exact Point
	Additional Information: Reports (4) Press Archive (3)		
2.	N1 at Roundabout at Fingallions Nov 2002 (ID-1702)	13/11/2002	Exact Point
	Additional Information: Reports (1) Press Archive (0)		
3.	Estuary Road Swords Feb 2002 (ID-1747)	01/02/2002	Approximate Point
	Additional Information: Reports (1) Press Archive (0)		
4.	Gartan Court Swords Feb 2002 (ID-1749)	01/02/2002	Exact Point
	Additional Information: Reports (1) Press Archive (0)		
5.	Rathingle Swords Nov 1982 (ID-2128)	05/11/1982	Exact Point
	Additional Information: Reports (1) Press Archive (0)		
6.	Seatown Villas Swords Nov 1982 (ID-2129)	05/11/1982	Exact Point
	Additional Information: Reports (1) Press Archive (0)		
7.	Pine Grove Park Swords Nov 1982 (ID-2130)	05/11/1982	Exact Point
	Additional Information: Reports (1) Press Archive (0)		
8.	Melrose Park Oct 2002 (ID-2164)	19/10/2002	Exact Point
	Additional Information: Reports (1) Press Archive (0)		
9.	Pinnock Hill Nov 2002 (ID-2191)	14/11/2002	Exact Point
	Additional Information: Reports (1) Press Archive (0)		
10.	Pinnock Hill October 2002 (ID-1468)	19/10/2002	Exact Point
	Additional Information: Reports (4) Press Archive (0)		
11.	Pinnock Hill Swords Recurring (ID-1459)	n/a	Exact Point
	Additional Information: Reports (7) Press Archive (0)		
12.	Ward Swords Co.Dublin August 2008 (ID-10574)	08/08/2008	Approximate Point
	Additional Information: Reports (1) Press Archive (0)		
13.	Flooding at Kinsealy Court, Swords, Co. Dublin (ID-11830)	24/11/2011	Approximate Point
	Additional Information: Reports (1) Press Archive (0)		

FINGAL SFRA – FLOOD ZONE MAP



MAP SERIES | 15 OF 26

KEY PLAN

LEGEND

- Fingal County Administrative Boundary
- Watercourses
- LAP & Masterplan Boundaries
- Flood Zone A
- Flood Zone B
- Defended Areas

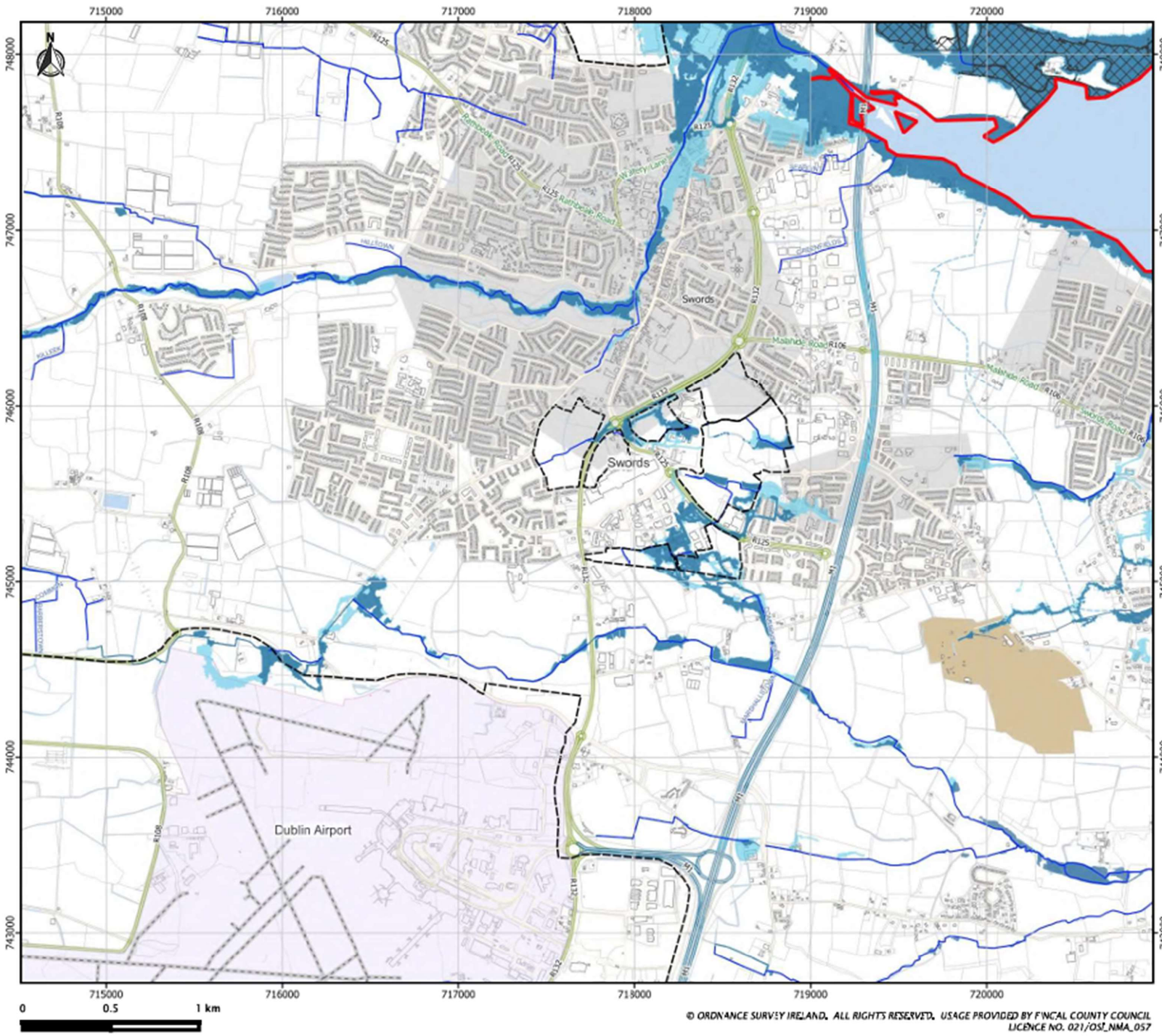
REV:	NOTE:	
05	FOR INFORMATION	05/04/2023

Comhairle Contae Fhine Gall
Fingal County Council

McCloy Consulting
Unit 12, The Beat Centre, Stephenstown Industrial Estate, Balbriggan, Co. Dublin
T: +353 (0)1 5136963
E: info@mccloyconsulting.ie
W: www.mccloyconsulting.ie

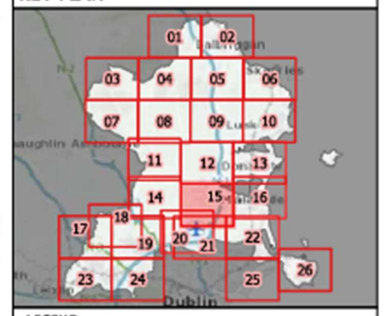
MAP:	FLOOD ZONE MAP	
FLOOD PROBABILITY:	FLUVIAL: 1% / 0.1%	COASTAL: 0.5% / 0.1%
SOURCE CRS:		ITM EPSG:2157
DRAWN BY:	DL	DATE: 05/04/2023
CHECKED BY:	PS	DATE: 05/04/2023
APPROVED BY:	DKS	DATE: 05/04/2023
DRAWING NUMBER:	M02127-06_FIG_FL115	
DRAWING SCALE:	1:20000 @ A3	

FINGAL SFRA – MID RANGE FUTURE SCENARIO FLOOD EXTENTS



MAP SERIES	15 OF 26

KEY PLAN



LEGEND

- Fingal County Administrative Boundary
- Watercourses
- LAP & Masterplan Boundaries
- 1% / 0.5% AEP MRFS Flood Extent
- 0.1% AEP MRFS Flood Extent
- No Climate Change Data Available; Present Day Flood Data Only.CC Flood Risk Subject to Site Specific Assessment

REV:	NOTE:	DATE:
05	FOR INFORMATION	05/04/2023

Comhairle Contae Fhine Gall
Fingal County Council

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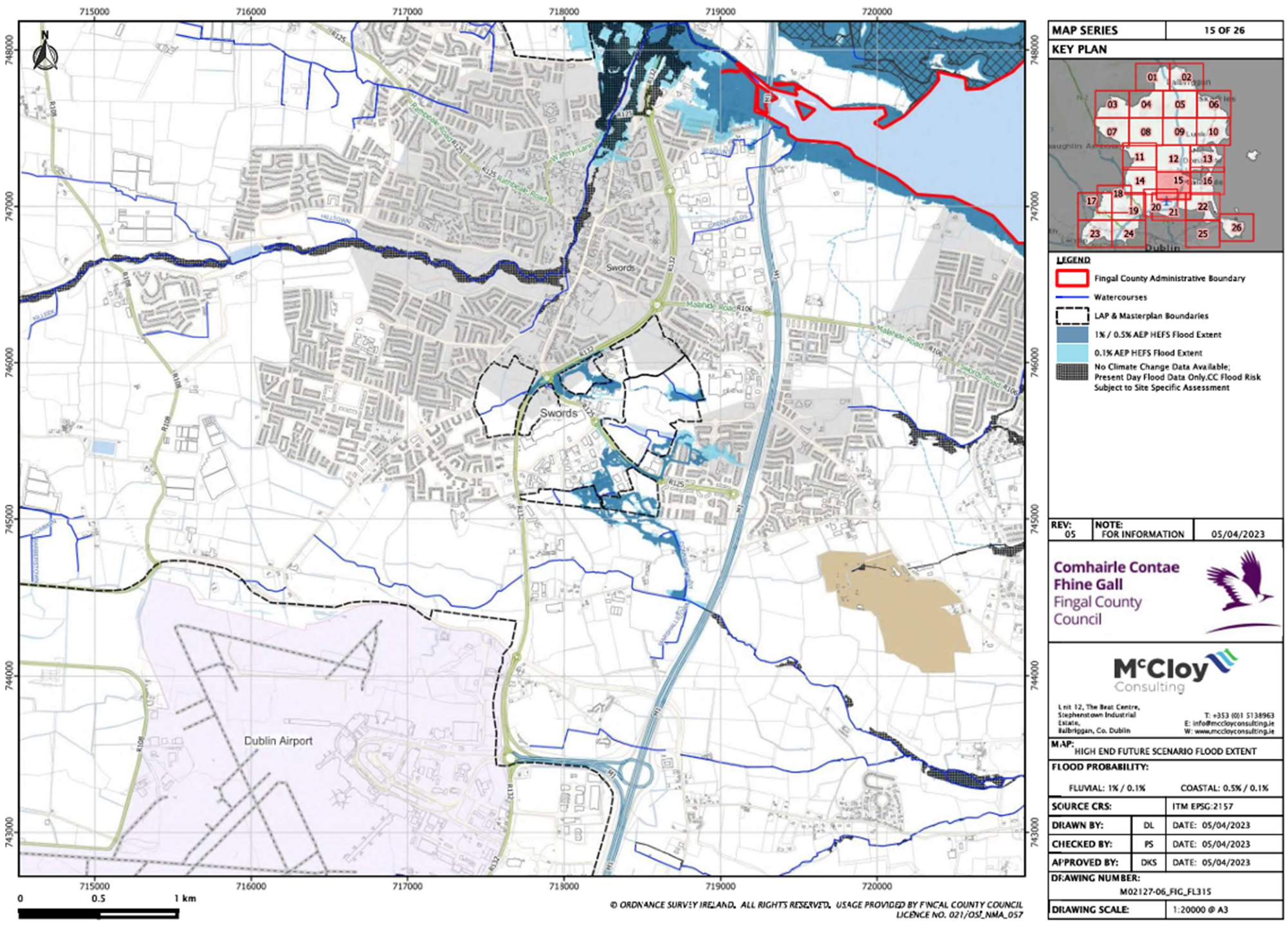
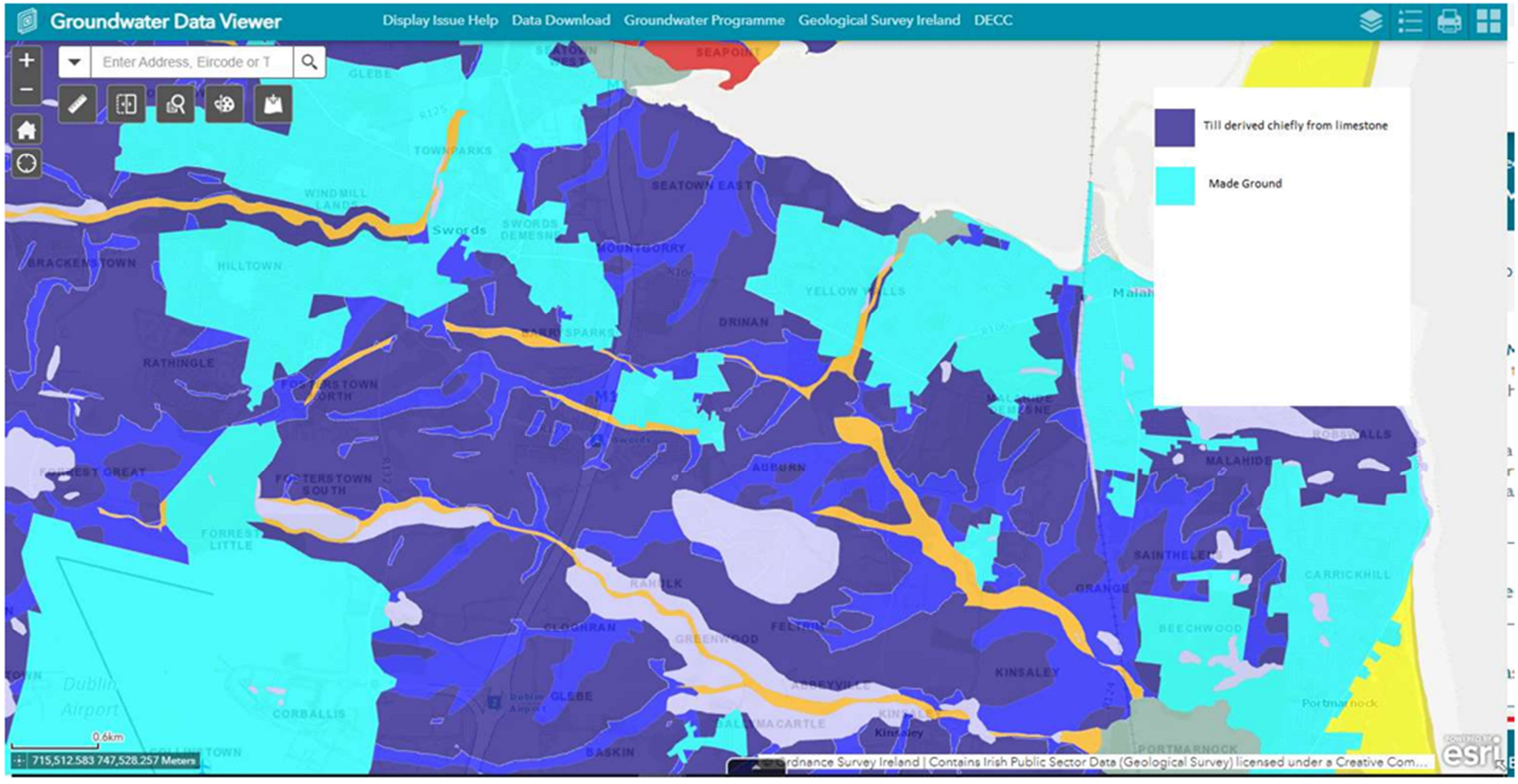
MAP:	MID RANGE FUTURE SCENARIO FLOOD EXTENT	
FLOOD PROBABILITY:	FLUVIAL: 1% / 0.1%	COASTAL: 0.5% / 0.1%
SOURCE CRS:		ITM EPSG:2157
DRAWN BY:	DL	DATE: 05/04/2023
CHECKED BY:	PS	DATE: 05/04/2023
APPROVED BY:	DKS	DATE: 05/04/2023
DRAWING NUMBER:	M02127-06_FIG_FL215	
DRAWING SCALE:	1:20000 @ A3	

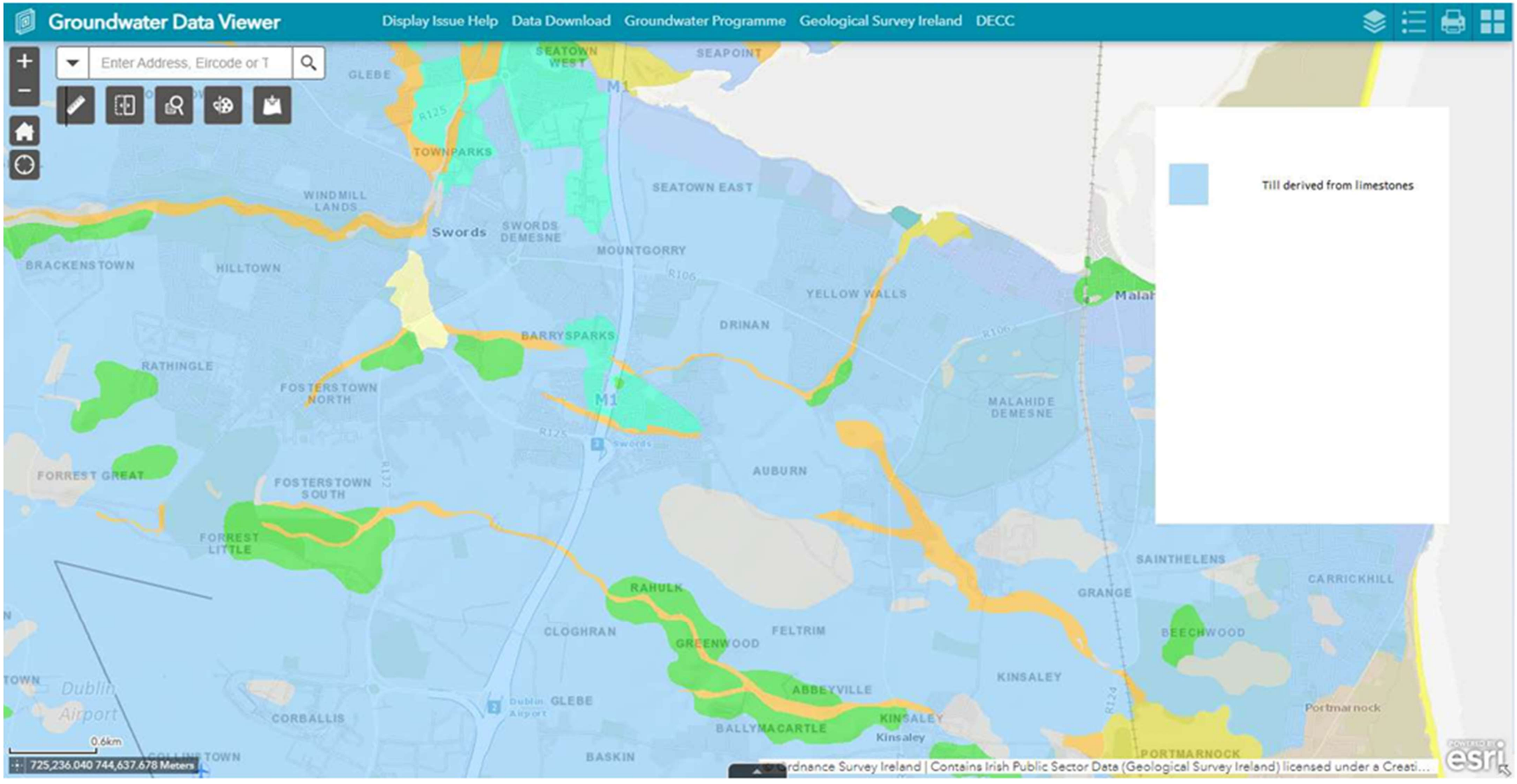
FINGAL SFRA – HIGH END FUTURE SCENARIO FLOOD EXTENTS



Geological Survey of Ireland: Teagasc Subsoil Mapping

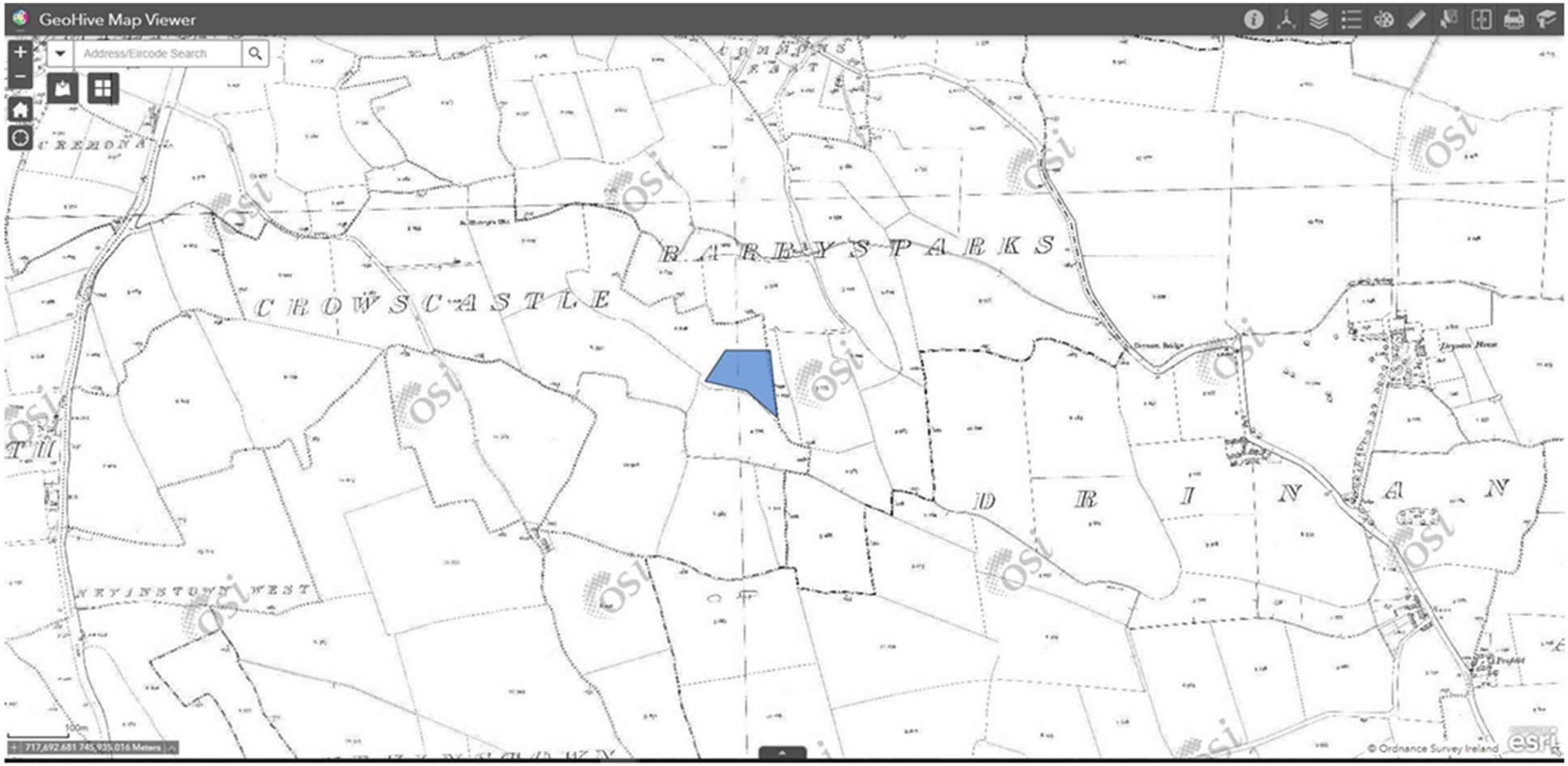


Geological Survey of Ireland: Subsoil (Quaternary Sediments)



Historical Maps: 6" Genie

Historical Maps: 25" Genie



APPENDIX C

DISPLACED VOLUME CALCULATION

NOTES;

1. HIGH WATER LEVEL CONTOUR OF 25.880m (0.1% HIGH END FUTURE SCENARIO (HEFS), FEM FRAMS FLOOD MAP-NODE 3Ga3779)
2. DUE TO THE LEVEL INCREASE ACROSS THE SITE, 150m^3 OF COMPENSATORY STORAGE REQUIRED.
3. 150m3 COMPENSATORY STORAGE SHOWN AS;452m^2 AREA OF 0.33m DEPTH.

Block **A**
5 storeys
FFL +26.40

Block **B**
6 storeys
FFL +26.40

Block **C**
4 storeys
FFL +26.40

EXISTING HIGH WATER LEVEL CONTOUR:25.880m

25.880m

25.880m

25.880m

150m^3 FLOOD COMPENSATORY STORAGE

N

HOLYWELL AVENUE

APPENDIX G
PRELIMINARY CONSTRUCTION & ENVIRONMENTAL MANAGEMENT PLAN

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Email: info@rod.ie www.rod.ie

PROPOSED RESIDENTIAL DEVELOPMENT AT HOLYWELL, SWORDS, CO. DUBLIN

Preliminary Construction & Environmental Management Plan | September 2023

ROD
ROUGHAN & O'DONOVAN

Housing at Holywell, Swords, County Dublin

Preliminary Construction & Environmental Management Plan

Document No: HHP-ROD-XX-XX-RP-C-C0003

Made: ..... Ciaran McGee (CMG)

Checked:..... Sean Kennedy (SK)

Approved:..... Ben Gallery (BDG)

Revision	Description	Made	Checked	Approved	Date
P01	Issued for Planning	CMG	SK	-	29/09/2023
P02	Issued for Planning	CMG	SK	BDG	17/10/2023

Housing at Holywell, Swords, County Dublin
Preliminary Construction & Environmental Management Plan
TABLE OF CONTENTS

1. INTRODUCTION

This Preliminary Construction & Environmental Management Plan (CEMP) has been prepared to outline the envisaged procedures, sequencing, construction methodology and environmental control measures anticipated by the Project Team engaged in the planning, liaison, and construction of the proposed residential development at Holywell, Swords, Co. Dublin. The plan outlines proposals on traffic and environmental management measures to be adopted during construction. The appointed construction Contractor will prepare and be responsible for implementing the Final Construction & Environmental Management Plan for Construction.

This document is designed to be a live document which will eventually address how any planning conditions imposed on the project will be managed or discharged by the construction team.

The CEMP incorporates 3 main elements:

1. Description of the construction of the development.
2. Traffic management considerations.
3. Environmental management considerations, including demolition waste management.

2. CONSTRUCTION OF THE DEVELOPMENT

2.1 Site Location

The proposed development is located at Holywell, Swords, Co. Dublin. The site is bounded by the Holywell Distributor Road to the north and west, existing residential development to the east and a residential landscaped area to the south.

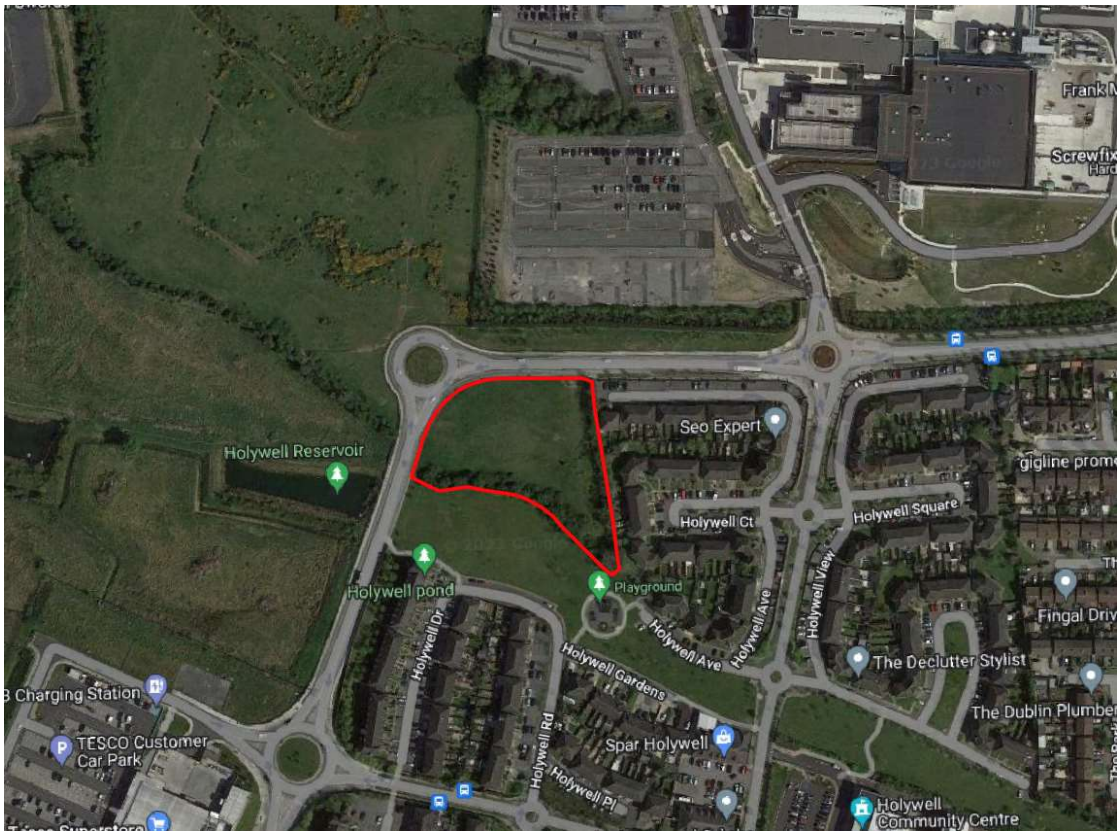

Figure 2.1 Proposed Development Location

2.2 Description of the Site

The site generally slopes from northeast to southwest. The elevation across the site varies by approximately 2.5m from the highest to lowest points of the site (approximately 3.9% gradient). There is an existing drainage ditch located along the southern boundary of the site. Proposed ground levels are to be set above the flood level of the adjacent ditch.

2.3 Project Details

Table 2.1 Description of Organisations

Organisations	
Client	Fingal County Council
Architect	Henchion & Reuter Architects
Engineering Consultants	Roughan & O'Donovan Consulting Engineers
Contractor	Yet to be Appointed

2.4 Programme

The project is due to commence in 2024 with a period of construction of approximately 12 months.

2.5 Working Hours

Except where otherwise agreed with Fingal County Council (FCC), working hours will be 07:00 – 19:00 Monday to Friday and 09:00 – 17:00 Saturday and closed on Sundays.

2.6 Pre-Start Survey

A Pre-Start Survey of the works will be carried out prior to construction works commencing. This will consist of a photographic aided report on the existing environment including; existing structures, boundaries, footpaths, roads, access points, fences lines, walls, hedge lines, kerb lines, lighting columns, street furniture and road signs. The findings of the survey will be documented and stored by the Contractor.

2.7 Construction Site Compounds, Accommodation, Welfare & Storage

It is envisaged that the main project offices will be established on the site, welfare facilities will be provided adjacent to the main project offices for operatives on the site. The site offices shall be located to minimise any potential impact on existing trees and landscape. It is envisaged that storage facilities shall be provided adjacent to the main project offices.

2.7.1 Accommodation

Site offices will be constructed from modular anti-vandal containers. The offices shall be provided with a metered mains power supply and electric heating. It is the contractors responsibility to obtain agreement for any connections from Uisce Éireann (IW) for temporary connections.

2.7.2 Welfare Facilities

The main offices must include welfare facilities including toilets and kitchen facilities for staff. Operative welfare facilities including drying rooms and locker rooms will be provided.

2.8 Construction of the Development

The construction and commissioning of the development will commence following planning and permitting consent approval, and will comprise of the following elements of work:

2.8.1 Site Set-up

Initially offices and storage containers will be transported to the site to provide accommodation and welfare in advance of the works commencing.

2.8.2 Existing Structures and Buildings

There are existing residential developments located to the east and south of the development site and existing industrial developments to the north. The contractor will incorporate protection measures such as minimising duct, noise and vibrations on site during construction to protect these existing developments.

2.8.3 Proposed Development

The proposed development involves the construction of 3 no. apartment blocks comprising of 57 no. units at Holywell, Swords, Co. Dublin. The proposed development has a gross site area of approximately 0.78 hectares.

2.8.4 Associated Civils Works

A new access will be constructed to serve the development off the Holywell Distributor Road. This access will be constructed at the northern boundary of the site, where the current access is located.

New connections to drainage, water supply and utilities will be brought into the site from the Holywell Distributor Road.

3. TRAFFIC MANAGEMENT

The proposed development will be accessed from the existing access off the Holywell Distributor Road. The Contractor will agree traffic management proposals with Fingal County Council and An Garda Síochána to facilitate traffic in the surrounding area at all times. Once all the necessary earth moving (minimal cut/fill) is completed, there will be limited construction traffic on the existing road network as the initial phase involves processing and moving aggregates within the site boundary. Typical construction associated traffic would include operatives travelling to and from work and deliveries of materials.

All Traffic Management proposals shall be agreed with Fingal County Council and An Garda Síochána prior to construction of the development.

3.1 Constraints

The main constraints for construction activities relates to the construction of the new services connections to the site and the construction of the new site entrance. There are a number of residential and industrial developments served by the Hollywell Distributor Road located within the vicinity of the development site. Road users will need to be accommodated throughout the works.

3.1.1 Associated Civil Works

It is proposed to carry out the construction of the service connections within the existing road / footpaths simultaneously. These works are intended to be undertaken concurrently to minimise the impacts on the surrounding road network.

3.1.2 Vehicular Access to Site

The site will be accessed from the existing access off the Hollywell Distributor Road. There will be no other access points to the site. Deliveries and general traffic from HGV's will be required to access the development via the Hollywell Distributor Road. The HGV's will be directed to the appropriate location and an appropriate member of staff from the contractor will be notified to meet the delivery and arrange offloading. Pedestrian safety barriers will be erected at the entrance to the site to permit safe passage for pedestrians across the access to the development segregating members of the public from the HGV's and other vehicles entering the development.

3.2 Construction Traffic

As with any construction project, the contractors will be obliged to carry out a comprehensive Construction Traffic Management Plan (CTMP) in consultation with the local authority, Fingal County Council (FCC) before the commencement of the construction phase. The purpose of such a plan is to outline the measures to manage the expected construction traffic during the construction period and will be revised accordingly as works progress. The CTMP will also detail how facilities for existing road users will be maintained whilst construction operations are proceeding.
During the construction phase the project will generate a range of traffic, which can be broken down into the main phases of construction as outlined below.

3.2.1 Site Set-up

Earthworks plant will be required to prepare the compound area, install services and commence enabling works. Portacabins will be required for the site compounds, as well as portable toilets/welfare facilities, and lock up containers.

It is expected that parking for site operatives will be a requirement throughout the construction of the development. It is considered that there will be adequate land within the curtilage of the site to accommodate temporary car and truck parking for site operatives. Site operatives will be encouraged to use public transport.

3.2.2 Services Connection Construction on Hollywell Distributor Road

Excavations may generate unsuitable fill material which will be transported by tipper lorries back to the site for use in landscaping or transported off site to a licensed waste disposal facility. Materials such as pipes, precast manhole rings, kerbs etc will all come to site on flatbed lorries. Additional construction plant will be required for resurfacing works.

3.2.3 Proposed Development

The commencement of the main construction works will require additional construction plant. Regular deliveries of materials and ready mixed concrete will take place during these works. There will also be an increase in the workforce resulting in more cars and vans accessing the site.

3.2.4 Routes for HGV's to Site

It is envisaged that HGV's travelling from the north, will access the site via the M1 Junction 4, heading south via the R132 and then west via the R125 before heading on to the Hollywell Distributor Road.

It is envisaged that HGV's travelling from the west will access the site via the R125 before heading on to the Hollywell Distributor Road.

It is envisaged that HGV's travelling from the east will access the site via the Feltrim Road before heading on to the Hollywell Distributor Road.

It is envisaged that HGV's travelling from the south will access the site via the M1 Junction 3, heading west via the R125 before heading on to the Hollywell Distributor Road.

Final routes for HGV's to site shall be agreed by the Contractor with Fingal County Council prior to construction commencing.

3.3 Maintenance of Public Roads

There will be potential for delivery vehicles and other site traffic to carry mud and silt onto the public roads when exiting the site. In order to prevent this, a wheelwash will be utilised on site. This will be used as required to wash down vehicles prior to leaving the site. If required a road sweeper may also be deployed on the immediately adjacent road network to the site to keep this clean and prevent vehicles carrying mud onto the surrounding road network. The road sweeper will be required during the works on the Hollywell Distributor Road. Roadside gullies will be maintained by the road sweeper contractor. Road line markings will be monitored and markings that require replacement throughout the duration of the project will be replaced by a specialist contractor.

3.3.1 Dust

Dust is a nuisance and can be damaging to humans, machinery, plants and animals. All workers on site are to consider the nuisance caused by the impacts of dust. The effects of dust will be minimised using the following techniques;

- Avoid creating unnecessary dust.

- Cover materials which could create dust when windy.
- Dampen down dust in operations which create dust.
- Ensure that vehicles leaving site do not leave mud on the road.

4. ENVIRONMENTAL MANAGEMENT SYSTEM

This CEMP shall be read in conjunction with the measures outlined in the environmental assessments that accompanies this planning application.

4.1 Identification

Prior to commencement of site works the Design Team and the Contractor will convene to identify the potential environmental issues which may arise throughout the duration of the Project. These will include off-site issues and cover the design, construction and commissioning phases of the Project, up to handover to operations staff. Each issue will be entered on a register of environmental risks.

4.2 Assessment

The Project Team will undertake an assessment of each of the identified environmental risks. This assessment will produce a clear definition of the risk, the potential impacts it may have and the consequences arising from the occurrence of the risk. The findings will be entered on the register of environmental risks.

4.3 Mitigation

Mitigation measures will be devised based upon the individually assessed risks. These could range from changes in design to remove the risk to on-site precautions to manage the risk and prevent the impact being realised. The agreed mitigation measures will be entered on the register of environmental risks. Any specific mitigation measures defined by planning conditions will also be addressed.

4.4 Monitoring, Recording & Reviewing

The register of environmental risks will act as the management tool for the control of environmental issues arising for the project. It will be reviewed on a regular basis to identify the efficiency of the mitigation measures employed based upon the monitoring data collected and records kept.

4.5 Minimising the Environmental Impacts

The Project Team and all its employees shall conduct their work in such a manner that unnecessary risks and disturbance to the environment are avoided. As part of the Environmental Management System, personnel are made aware of issues which may impact on the environment, and are encouraged to act responsibly.

4.6 External Stakeholders

With respect to environmental impacts, consultations will be undertaken with the Local Authority (Fingal County Council) and relevant environmental stakeholders as required.

4.7 Noise & Vibration

Noise will be generated from delivery vehicles and from concreting operations (vibrating concrete pokers etc). Noise hoarding will be erected around noisy equipment/activities where necessary. Effective management of noise on site will consist of the following measures;

- Ensure plant and equipment have properly operating silencers / mufflers.
- Do not leave plant and other vehicles / machinery running needlessly. This causes unnecessary pollution.

- Consider the location of noisy plant in order to minimise nuisance to nearby houses, motorists, and wildlife.

4.8 Protection of Watercourses

There is an existing drainage ditch located along the southern boundary of the site. However, following a number of site visits and discussions with FCC, the ditch appears to be dry. Flow from the Gaybrook steam is culverted to bypass the subject site. Run-off or surface water that is generated within the site will be discharged to the existing storm water network rather than to the ditch or other open watercourses.

Even though the ditch appears to be dry, as a further precaution, all works in proximity to the existing drainage ditch shall follow the generic best practice guidance outlined in the following documents:

- *Guidelines for Crossing Watercourses during the Construction of National Road Schemes* (NRA, 2008c).
- *Guidelines on Protection of Fisheries during Construction Works in and Adjacent to Waters* (IFI, 2016).
- *CIRIA C648 Control of water pollution from linear construction projects: technical guidance* (CIRIA, 2006).

The following protection measures will also be followed to ensure water quality discharged from site is maintained:

- All machinery will be refuelled from mobile tankers on the local/access/haul/site roads. No refuelling will take place within 50m the ditch.
- Mobile storage facilities, such as fuel bowsers, will be bunded to 110% capacity to prevent spills. Tanks for bowsers and generators will be double skinned.
- When not in use, all valves and fuel trigger guns from fuel storage containers will be locked.
- Only dedicated trained and competent personnel will carry out refuelling operations. A spill kit and drip tray will be on site at all times and available for all refuelling operations. Equipment will not be left unattended during refuelling. All pipework from containers to pump nozzles will have anti siphon valves fitted.
- Strict procedures for plant inspection, maintenance and repairs will be detailed in the contractor's method statements and machinery will be checked for leaks before arrival on site.
- All site plant will be inspected at the beginning of each day prior to use. Defective plant will not be used until the defect is satisfactorily fixed.
- All major repair and maintenance operations will take place off site.
- Care will be taken at all times to avoid contamination of the environment with contaminants other than hydrocarbons, such as uncured concrete and other chemicals.
- Surface water from the site be treated in attenuation ponds prior to discharging to the storm water network.

4.9 Waste / Demolition Management

The proper management and handling of waste on site is essential to ensure that pollution and increased levels of contamination are minimised. Effective management of waste on site will consist of the following measures;

- Closed skip containers
- Non dumping/littering policy on site
- Waste segregation
- Regular clean up of the site
- Careful handling and transportation to avoid damage to raw materials.
- Efficient ordering

Excavated material from the site will be tested accordingly. Acceptable material can be recycled and used as part of the development or as import on other schemes, while unacceptable material will be transported off site to a licensed waste disposal facility.

5. Conclusion

The Housing at Holywell project in Swords, County Dublin, envisage the construction of a residential development with three apartment blocks totalizing 57 units in an area of 0.78 Hectares. The site, located along the Holywell Distributor Road.

Key aspects of the plan include setting up construction facilities, accommodating workers, and implementing measures to manage traffic and minimize environmental impacts. The project aims to establish access via the Holywell Distributor Road and will adhere to regulations set forth by Fingal County Council and An Garda Síochána. The plan also outlines strategies to mitigate dust, noise, and vibration, as well as to protect watercourses and manage waste. The document underscores the importance of environmental responsibility and collaboration with stakeholders throughout the development process. The plan serves as a comprehensive guide for construction activities, traffic management, and environmental protection measures.