Mount Saint Mary's Civil Planning Report

13.10.2024

24093-X-XXX-RP-TNT-CE-0004

TENT ENGINEERING

Site Address:

Mount Saint Mary's,
Dundrum Road,
Dundrum,
Dublin 14

Client:

Dún Laoghaire-Rathdown County Council

TENT ENGINEERING

Revision and Review

This report has been prepared for the sole benefit, use and information of the client. The liability of Tent Engineering with respect to the information contained in this report will not extend to any third party.

PURPOSE

- [ ] P1 Information
- [ ] P2 Coordination
- [x] P3 Planning
- [ ] P4 Building Control
- [ ] P5 Pre-tender
- [ ] P6 Tender
- [ ] P7 Construction

ACCEPTANCE (BY OTHERS)

- [ ] S Issued
- [ ] A Accepted
- [ ] B Accepted subject to comments
- [ ] C Rejected
- [ ] D Acceptance not required

Accepted by

REVISION(S)

Rev.	Description	Date
00	1st Issue	13.10.2024
01	2nd Issue	10.02.2025

AUTHOR(S)

Name
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REVIEWER(S)

Name
Edward Heukers Co-Founder, Director Structural Engineer

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32 Francis Street, Dublin
Co. Dublin, D08NN96

Contents

1 Introduction

1.1 Proposals contained or forming part of this report represent the design intent and may be subject to alteration or adjustment in completing the detailed design for this project. Where such adjustments are undertaken as part of the detailed design and are deemed a material deviation from the intent contained in this document, prior approval shall be obtained from the relevant authority in advance of commencing such works.

1.2 Where the proposed works to which this report refers are undertaken more than twelve months following the issue of this report, Tent Engineering shall reserve the right to re-validate the findings and conclusions by undertaking appropriate further investigations and designs at no additional cost to Tent Engineering Ltd.

1.2 This report refers to the Foul and Surface water drainage and fresh Water provisions associated with the proposed development at Mount Saint Mary's, Dundrum Road, Dundrum, Dublin 14. The development will be served by the proposed site infrastructure as shown on the enclosed drawings.

1.3 The development is located at Mount Saint Mary's, Dundrum Road, Dundrum, Dublin 14. The immediate surrounding area is noted for being well-developed, consisting of various commercial and industrial buildings, along with associated infrastructure. This built-up environment includes roads, parking areas, and existing utilities, providing a robust setting for the proposed development.

1.4 The subject site is greenfield land and demolition works are not needed.

1.5 Our proposed site is approximately 9804m^2, and is moderately flat, with no noteworthy proposed differences in level. The site is currently not in use and has no major above or underground structures identified at this stage.

1.5 No adverse existing infrastructure has been identified on or below our site. A conclusive survey is to confirm cable and pipe positions below and over our site post-planning. No diversions are expected at this stage.

1.6 This report is to be read as supplement to the planning application for the development at Mount St Mary's, including but not limited to Flood Risk Assessment *24093-X-XXX-RP-TNT-CE-0002.*

1.7 A Confirmation of Feasibility by Uisce Eireann is applied for and when granted will be shared as appendix to the current report.

Fig 1.1 - Proposed site location

2 Foul Water Drainage

2.1 The foul water drainage system proposed for the site has been designed in accordance with the Irish Water 'Code of Practice for Wastewater Infrastructure'.

2.2 A design peak flow equal to 6 times the calculated discharge volume is applied and 10% for unit consumption volume is added.

2.3 Sewers drain via gravity, unless noted otherwise. Foul sewers and lateral drains should be designed to run at no more than 75% of pipe full conditions.

2.4 An existing foul water network has been identified, connected to the current site, after interrogation of GIS service maps.

2.5 The site is bounded by Dundrum Road to the west and the Churchfields Estate to the east. Existing services adjacent to our site offer a tie-in point for our sewer. An existing public sewer of ø225mm uPVC flows to the east in Churchfields Estate.

Prior to works commencing the contractor is to survey and confirm position, inverts and feasibility to connect to the existing branch. GIS maps offer sufficient detail at this stage.

2.6 The design water consumption for foul flow calculation purposes is taken to be as outlined in the table below, following from the Irish Water 'Waste Water Code of Practice' and specialist confirmations as appropriate.

A standard residential unit demands a foul capacity of circa 150L/person per day.

Description	Daily Discharge
Block A: No. 65 Units	22035L
Block B: No. 56 Units	14196L
Block C: No. 8 Units	2400L
Total	38631L

2.7 The information of 2.2 and 2.6 results in a peak average daily waste waster discharge determination as outlined below.
(a) 38631 x 1.1 x 6.0 / 86400 = 2.951L/s.
The above determination results in a typical ø225mm diameter foul water network requirement.

2.8 The typical foul water gradient to be used is 1:150 U.N.O. Pipe material is uPVC U.N.O.

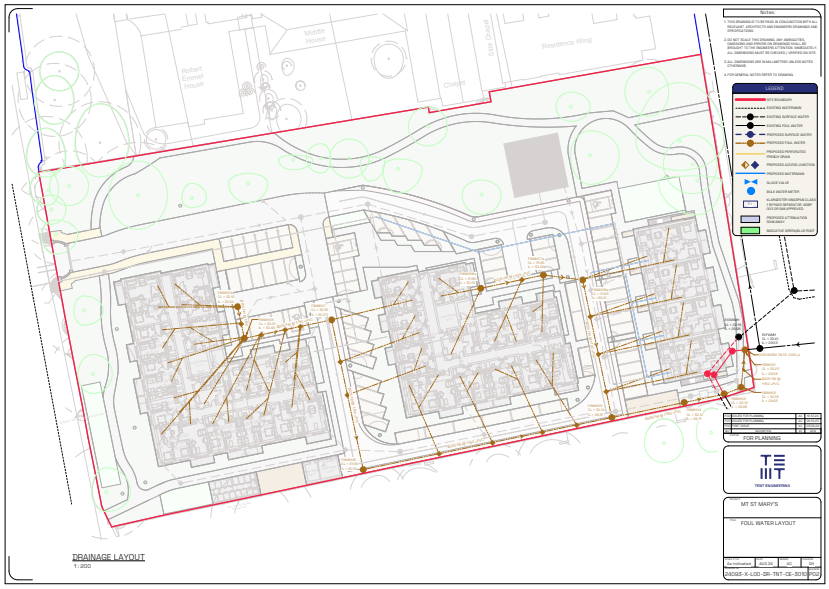
2.9 The site and Chruchfields Estate have a mild slope, not to the detriment of pipe gradients, self-cleaning velocities, and invert levels. A gravity system is feasible.

2.10 The proposed layout for the foul infrastructure serves the site as shown below in figure 2.1.

2.11 Prior to construction and installation of connections, a survey is to confirm position and invert levels of the relevant networks and manholes, percolation test, and further post-planning approvals as applicable.

2.12 Foul water designs follow Irish Water approved typical details and specifications.

Fig 2.1 - Foul Water Layout



3 Water Supply

3.1 The water supply system proposed for the site has been designed in accordance with the Irish Water 'Code of Practice for Water Infrastructure'.

3.2 A design peak flow equal to 5 times the calculated demand volume is applied and 25% for dry weather flow volume is added.

3.3 An existing water main network has been identified, to the west of the current site, after interrogation of GIS service maps.

3.3 Just off Dundrum Road, there is an fire hydrant connect to the existing watermain. Two fire hydrants will be installed on-site to ensure adequate coverage in the event of an emergency.

3.4 The design water demand for fresh water supply calculation purposes is taken to be as outlined in the table below, following from the Irish Water 'Water Code of Practice' and specialist confirmations.

A standard residential unit demands a foul capacity of circa 150L/person per day.

Description	Daily Demand
Block A: No. 65 Units	22035L
Block B: No. 56 Units	14196L
Block C: No. 8 Units	2400L
Total	38631L

3.5 The information of 3.2 and 3.4 results in a peak average daily water demand determination as outlined below:

(a) 38631 x 1.25 x 5.0 / 86400 = 2.794L/s.

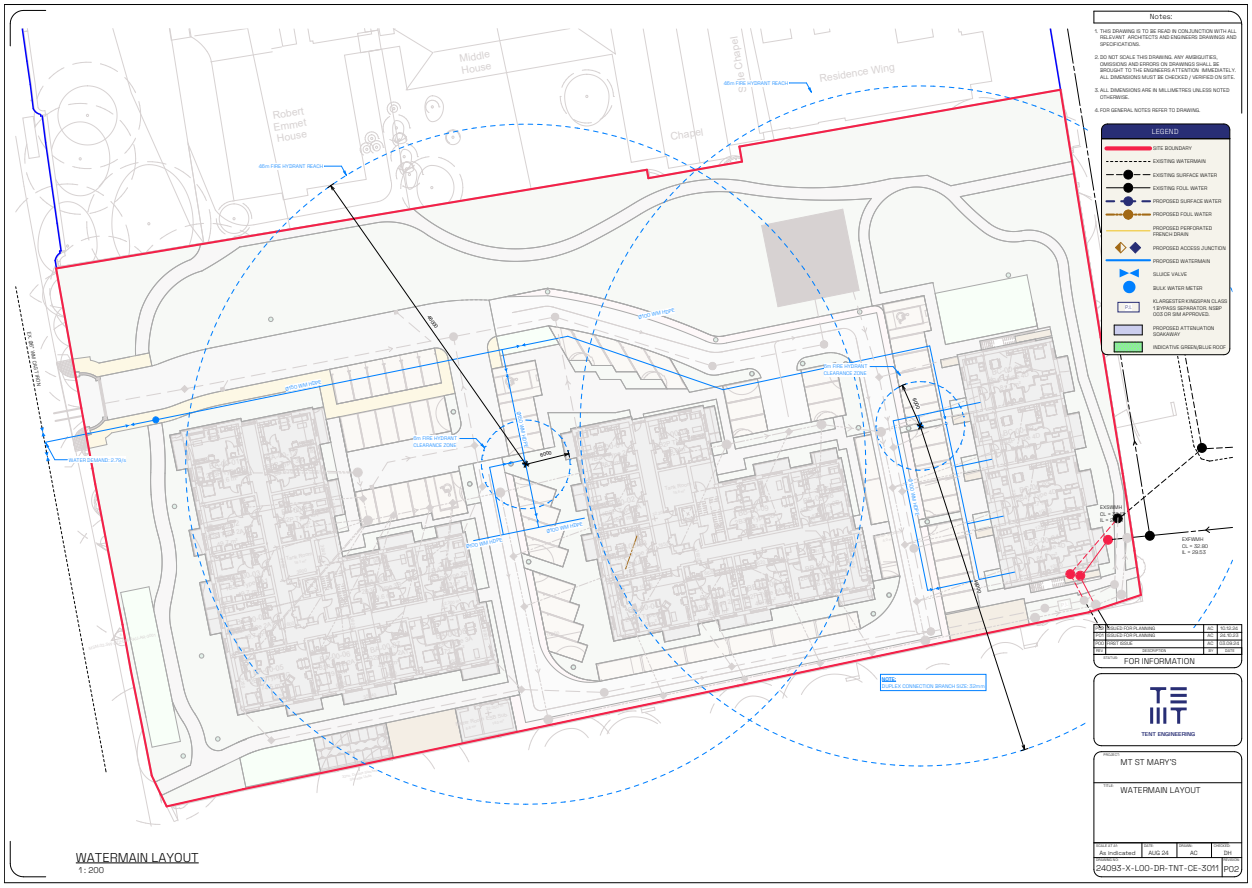
The above determination results in a typical 150mm nominal diameter fresh water network connection requirement.

3.6 The water pipe size is Ø100mm U.N.O., from Block A, B, and C, each of which connects into a single Ø150mm pipe, U.N.O., that directly ties into the public network. The pipe material is HDPE (PE-80 rating), U.N.O.

3.7 The proposed layout for the fresh water infrastructure serves the site as shown below in figure 3.1.

3.8 All on-site water details are to be Irish Water approved typical details and specifications.

Fig 3.1 - Watermain Layout



4 Surface Water Drainage

4.1 All proposed drainage is designed and detailed in accordance with the GDSDS Regional Drainage Policies Technical Document - Volume 2, BRE Digest 365 - Soakaway Design Manual and The SUDS Manual - Ciria C753.

4.2 All surface water from the proposed site area is actively drained and appropriately discharged, ultimately into a separate sewer of the existing network.

4.3 The proposed Surface Water Drainage System proposed for the site has been designed using the following parameters:

(a) Rain intensity and return periods specific to our site, obtained from Met Eireann.
(b) Impermeability factor of 1.0 (100%)
(c) Permeability run-off factor of 0.3 (30%)
(d) Climate change factor 1.20 (+20%)
(e) Urban creep factor 1.10 (+10%)
(f) 100 year return period for attenuation storage volume requirements
(g) 10 year return period for CIRIA SuDS soak away requirements
(h) 5mm interception rainfall depth.
(i) Site storm water discharge is limited to the higher value of 2L/s/ha or QBAR, but a minimum flow based on a flow control device with an orifice size of 50mm is allowed for

4.4 The following areas have been considered for the proposed development:

Description	**Size**
Total site	9804m^2
Roofs and hardstanding area (impermeable)	4486m^2
Landscape area (open space)	3524m^2
Permeable surface	1794m^2

4.5 The proposed site is moderately flat. A gravity system is feasible. No surcharging of the site network occurs during rare storm events.

4.6 The proposed layout for the storm water drainage system serves the site as shown on the enclosed drawings.

4.7 Sustainable Urban Drainage Systems (SUDs)

The following Sustainable Urban Drainage Systems have been incorporated:
(a) Green roof (interception storage)
(b) Blue roof (attenuation storage)
(c) Permeable surface (reduced run-off)
(d) Aco-Drains (surface water drainage)
(e) Tree Pits (attenuation storage)
(f) Soakaway (absorption & attenuation)
(g) Petrol Interceptor (environmental)
(h) French Drain (infiltration & transportation)

Green Blue roofs have been incorporated following the 'Green & Blue Roof Guide 2021'.

(a) A lightweight green roof cover, as part of a blue roof is proposed for flat roof areas. >70% of the flat roof area between the eaves (intensive) is required, following the local council development plan. This contributes to the interception storage during storm events and reduces the flow and discharge rates from the impermeable roof surface and blue roof storage requirements.

(b) >70% of the flat roof area provides blue roof short-term soak-away storage volume. A minimum 25mm of attenuation depth is to be provided to achieve 27.475m^3 of storage volume. Surface water discharge is to be limited from the upper roof of Block A with a flow control to 0.33L/s, from the lower roof of Block A with a flow control of 0.29L/s and from Block B with a flow control of 0.32L/s. The Blue Roofs will not connect directly into the soakaway but will connected to the surface water network after the hydrobrake. This is done to ensure controlled discharge rates that prevent overloading the soakaway system. Blue roof flow rates are limited based on natural flow rates (QBAR) for the relevant catchment area, with an overflow system that avoids increased accumulation past the provided attenuation volume.

(c) The development will feature permeable surfaces across all footpaths, the road surrounding the residential blocks and the waste transfer area. By implementing permeable surfaces, the site is expected to achieve a reduction in stormwater runoff by nearly 70% compared to conventional hard surfaces. Permeable surfaces will mitigate the risk of flooding but also promote groundwater recharge.

(d) The site is equipped with Aco-drains placed at building entrances. These drains are designed to mitigate potential water accumulation, thereby minimizing the risk of water pooling.

(e) Tree pits have been incorporated into the site's surface water management strategy as standalone SuDS features. These pits are specifically designed to capture, filter, and infiltrate stormwater runoff, reducing the strain on traditional drainage systems. A total of 16 tree pits are proposed for the Mount Saint Mary's development, with each providing a storage volume of 1.01m³, resulting in a combined total storage capacity of 16.16m³.

(f) An open crate two layer soakaway system with a minimum free volume of 84.05m³ is provided. The dimensions of the soakaway are 11.2m x 11.2m x 0.67m. The soakaway requirements are designed with climate change increases following CIRIA C753. Site specific soil infiltration rates and the ground water table level are to be determined during post-planning works, prior to finalisation of the strategy and proposed systems. Surface water discharge from site is limited to 2L/s.

(g) A petrol interceptor is to reduce the potential (low) risk of any pollutants being discharged into the public surface water network. The interceptor filters debris, chemicals, rubbers, oils, fuels, and other potentially environmentally harmful fragments, prior to discharging into the soak away tank.

(h) A proposed French drain will be implemented to effectively manage surface water by redirecting water away from critical areas. This drainage system will typically comprise a trench filled with gravel or rock, containing a perforated pipe that facilitates the efficient movement of water. By channelling excess water away, the French drain will significantly reduce the risk of flooding and waterlogging.

5 Flood Risk Summary

5.1 Refer to report 24093-X-XXX-RP-TNT-CE-0002 for the detailed Flood Risk Assessment.

5.2 The initial flood risk assessment is undertaken by taking cognisance of the guidance given in the Office of Public Works (OPW) and the Department of Environment, Heritage and Local Government (DEHLG) document titled 'The planning system and flood risk management' (2009).

5.3 Flood data has been interrogated via online available flood maps. Relevant Flood Maps are currently available and are not noted to be under review by the governing authority.

5.4 The proposed development lies within an area classified as Flood Zone C "lowest risk of flooding from rivers and sea". This initial flood risk assessment is undertaken by taking cognisance of the guidance given in the Office of Public Works (OPW) and the Department of Environment, Heritage and Local Government (DEHLG) document titled 'The planning system and flood risk management' (2009).

5.5 The project is conservatively considered a '*less vulnerable development*'.

5.6 A review of all potential sources of flooding at the subject site concludes the following:

Flood Source	**Risk of Flood after development**
On-site drainage system	Low Designed with adequate capacity and allowing for climate change.
Local Authority drainage system	Low Assuming local council and public infrastructure authority continue to maintain and service their networks
Sea and Rivers	Low
Groundwater	Low

5.7 The OPW provides records for predictive and historic flood maps. These land maps have been consulted and interrogated regarding documented flood events in the vicinity of the subject site.

5.8 The nearest recorded flood is event was fluvial, was located circa 1100m to the west of our site and is of no direct risk to our development. No nearby fluvial flood risks have been identified.

5.9 The site does not require additional flood prevention measures.

5.10 A flood justification test is not needed.

5.11 A stage 2 flood risk assessment is not needed.

6 Appendix A - Rainfall Data

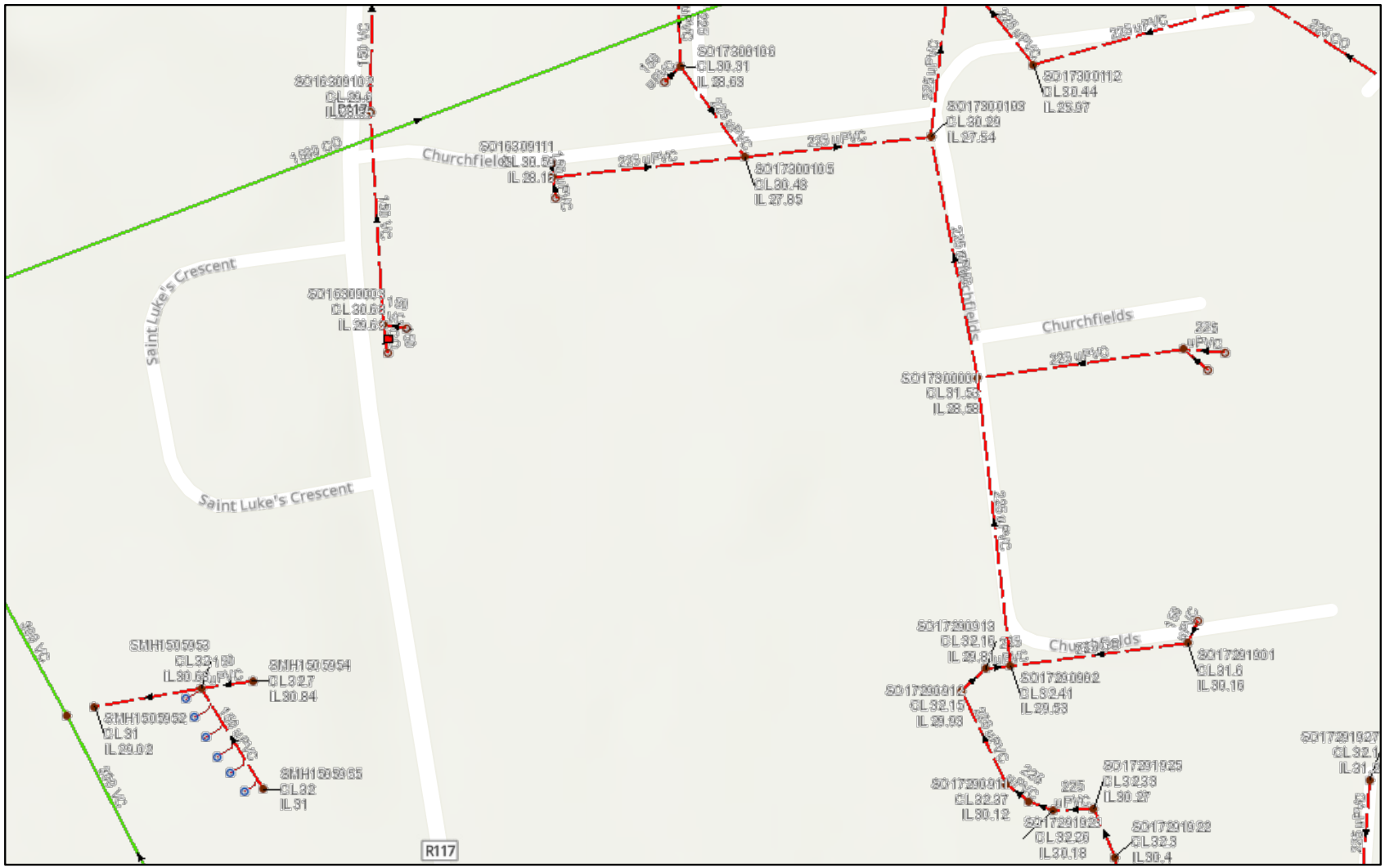
Met Eireann
Return Period Rainfall Depths for sliding Durations
Irish Grid: Easting: 316989, Northing: 229995,

	Interval		Years									
DURATION	6months,	1year,	2,	3,	4,	5,	10,	20,	30,	50,	75,	100,	120,
5 mins	2.5,	3.6,	4.2,	5.2,	5.8,	6.4,	8.1,	10.0,	11.3,	13.2,	14.9,	16.2,	17.1,
10 mins	3.5,	5.1,	5.9,	7.2,	8.2,	8.9,	11.2,	13.9,	15.8,	18.4,	20.7,	22.5,	23.8,
15 mins	4.1,	5.9,	7.0,	8.5,	9.6,	10.4,	13.2,	16.4,	18.6,	21.6,	24.4,	26.5,	28.0,
30 mins	5.4,	7.8,	9.0,	11.0,	12.3,	13.3,	16.7,	20.6,	23.2,	26.9,	30.2,	32.8,	34.5,
1 hours	7.1,	10.1,	11.7,	14.1,	15.8,	17.0,	21.2,	26.0,	29.1,	33.5,	37.5,	40.5,	42.6,
2 hours	9.4,	13.2,	15.2,	18.2,	20.2,	21.8,	26.9,	32.6,	36.4,	41.7,	46.5,	50.1,	52.6,
3 hours	11.1,	15.4,	17.7,	21.1,	23.4,	25.1,	30.9,	37.3,	41.6,	47.5,	52.7,	56.7,	59.4,
4 hours	12.5,	17.2,	19.7,	23.4,	25.9,	27.8,	34.1,	41.1,	45.6,	52.0,	57.6,	62.0,	64.9,
6 hours	14.7,	20.1,	22.9,	27.1,	30.0,	32.1,	39.1,	46.9,	52.0,	59.1,	65.3,	70.1,	73.4,
9 hours	17.3,	23.5,	26.7,	31.5,	34.7,	37.1,	45.0,	53.7,	59.3,	67.2,	74.1,	79.4,	83.0,
12 hours	19.4,	26.2,	29.7,	35.0,	38.4,	41.1,	49.6,	59.0,	65.2,	73.6,	81.0,	86.7,	90.5,
18 hours	22.9,	30.6,	34.6,	40.5,	44.4,	47.4,	57.0,	67.5,	74.3,	83.7,	91.9,	98.2,	102.4,
24 hours	25.7,	34.2,	38.6,	45.0,	49.3,	52.5,	62.9,	74.3,	81.6,	91.7,	100.5,	107.2,	111.7,
2 days	31.9,	41.5,	46.3,	53.4,	57.9,	61.4,	72.4,	84.3,	91.9,	102.2,	111.1,	117.9,	122.4,
3 days	37.2,	47.6,	52.9,	60.4,	65.3,	69.0,	80.6,	93.1,	100.9,	111.6,	120.8,	127.8,	132.4,
4 days	41.9,	53.1,	58.7,	66.7,	71.9,	75.8,	88.0,	101.0,	109.1,	120.2,	129.7,	136.8,	141.5,
6 days	50.4,	63.0,	69.2,	78.0,	83.6,	87.9,	101.1,	115.0,	123.8,	135.5,	145.5,	153.0,	157.9,
8 days	58.1,	71.8,	78.6,	88.1,	94.2,	98.7,	112.8,	127.6,	136.8,	149.2,	159.7,	167.5,	172.6,
10 days	65.3,	80.1,	87.3,	97.4,	103.9,	108.7,	123.7,	139.2,	148.9,	161.8,	172.7,	180.8,	186.2,
12 days	72.1,	87.9,	95.5,	106.2,	113.0,	118.1,	133.8,	150.1,	160.1,	173.5,	184.9,	193.3,	198.8,
16 days	85.0,	102.5,	110.9,	122.7,	130.1,	135.7,	152.7,	170.2,	181.0,	195.4,	207.4,	216.4,	222.3,
20 days	97.1,	116.2,	125.4,	138.1,	146.1,	152.0,	170.2,	188.9,	200.3,	215.5,	228.3,	237.7,	243.9,
25 days	111.6,	132.5,	142.5,	156.2,	164.9,	171.3,	190.8,	210.8,	223.0,	239.1,	252.6,	262.6,	269.1,

NOTES:
These values are derived from a Depth Duration Frequency (DDF) Model update 2023
For details refer to:
'Mateus C., and Coonan, B. 2023. Estimation of point rainfall frequencies in Ireland. Technical Note No. 68. Met Eireann',
Available for download at:
http://hdl.handle.net/2262/102417

7 Appendix B - Infrastructure Layouts

Foul Water Network - Mount Saint Mary's



22/09/2024

1:2,230

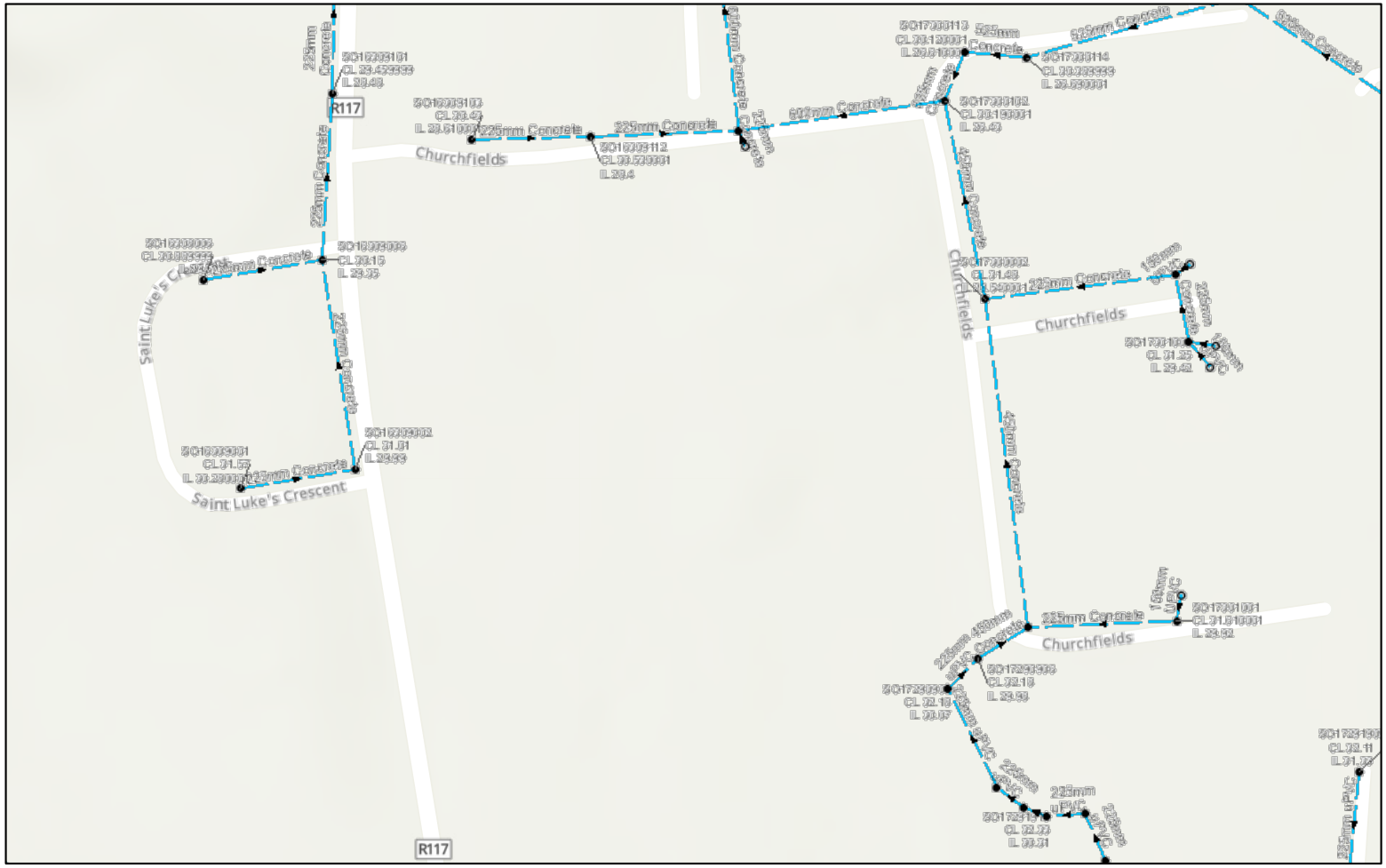
0 0.01 0.02 0.04 mi

0 0.02 0.04 0.07 km

Esri Community Maps Contributors, Esri UK, Esri, TomTom, Garmin, Foursquare, GeoTechnologies, Inc, METI/NASA, USGS, Sources: Esri,

Note: The information provided on the included maps as to the position of Uisce Eireann underground network(s) is provided as a general guide only. The information is based on the best available information provided by each Local Authority in Ireland to Uisce Eireann.

Surface Water Network - Mount Saint Mary's



22/09/2024

1:2,230

0 0.01 0.02 0.04 mi

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Esri Community Maps Contributors, Esri UK, Esri, TomTom, Garmin, Foursquare, GeoTechnologies, Inc, METI/NASA, USGS, Sources: Esri,

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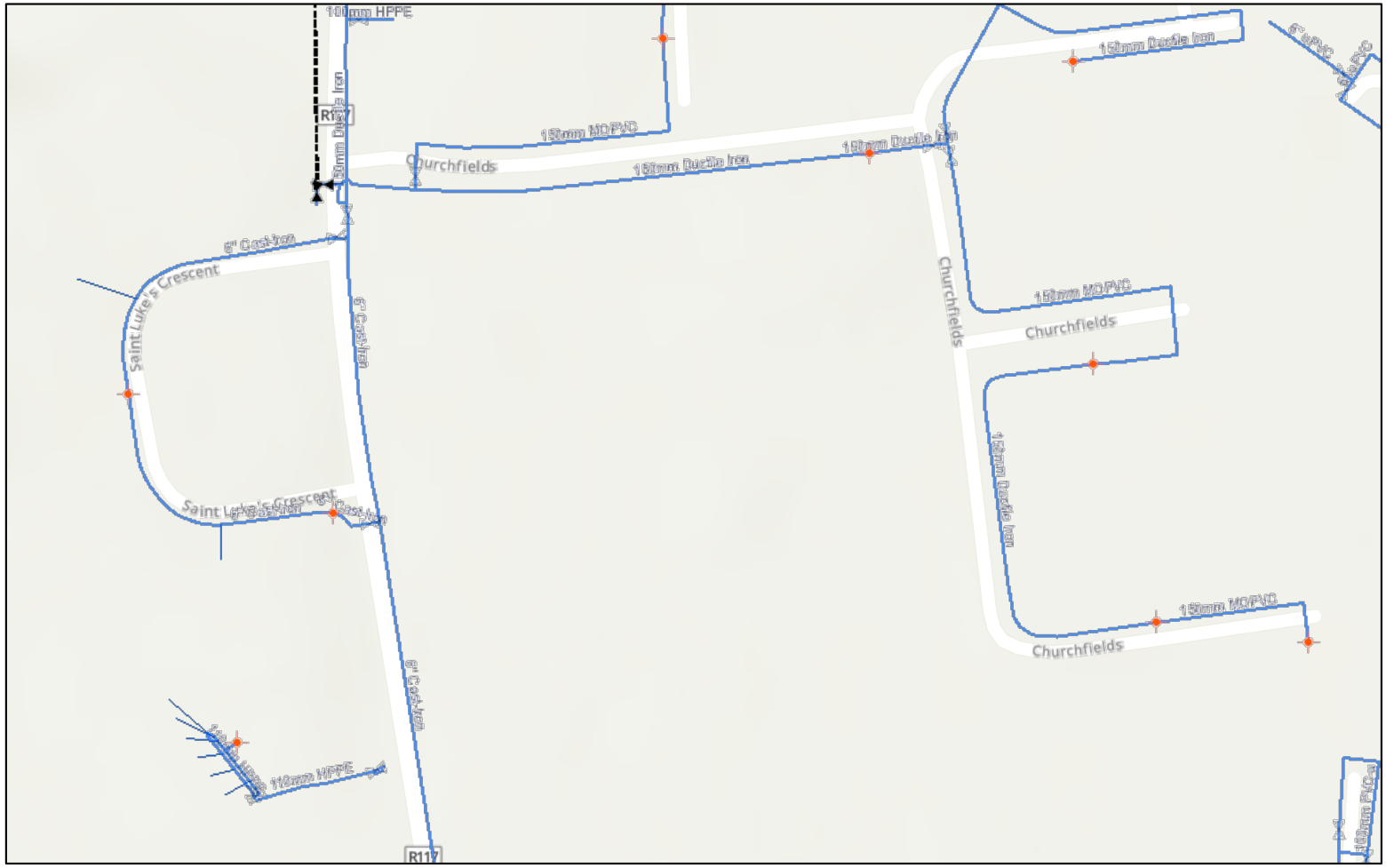
Watermain Network - Mount Saint Mary's



22/09/2024

1:2,230

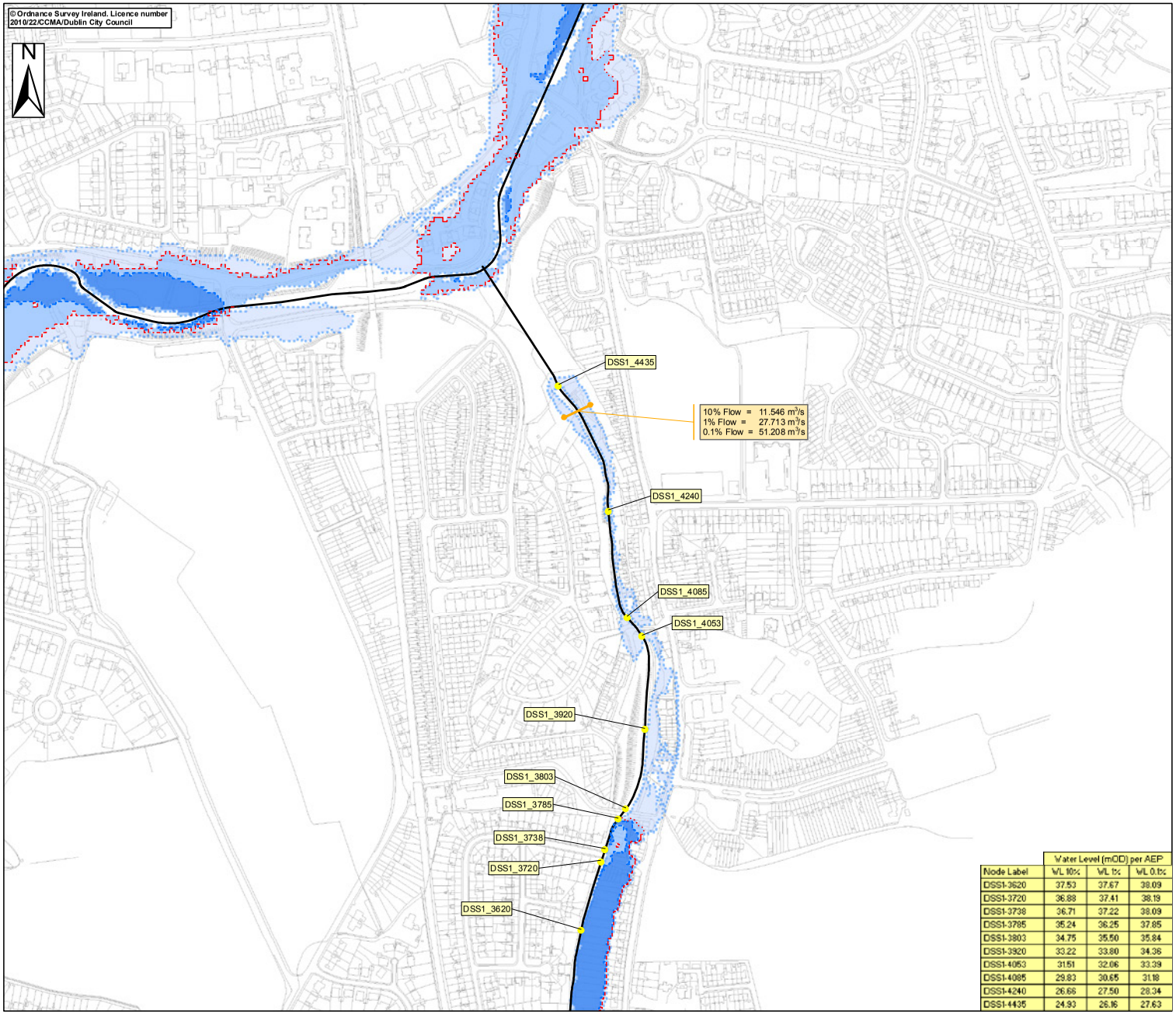
0 0.01 0.02 0.04 mi

0 0.02 0.04 0.07 km

Esri Community Maps Contributors, Esri UK, Esri, TomTom, Garmin, Foursquare, GeoTechnologies, Inc, METI/NASA, USGS, Sources: Esri,

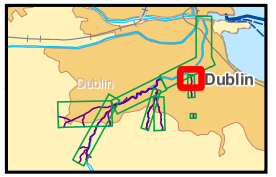
Note: The information provided on the included maps as to the position of Uisce Eireann underground network(s) is provided as a general guide only. The information is based on the best available information provided by each Local Authority in Ireland to Uisce Eireann.

8 Appendix C - Flood Data



Node Label	Water Level (mOD) per AEP		
	WL 10%	WL 1%	WL 0.1%
DSS1-3620	37.53	37.67	38.09
DSS1-3720	36.88	37.41	38.19
DSS1-3738	36.71	37.22	38.09
DSS1-3785	35.24	36.25	37.85
DSS1-3803	34.75	35.50	35.84
DSS1-3920	33.22	33.80	34.36
DSS1-4053	31.51	32.06	33.39
DSS1-4085	29.83	30.65	31.18
DSS1-4240	26.66	27.50	28.34
DSS1-4435	24.93	26.16	27.63

Location Plan:



Legend:

- 10 % AEP Flood Extent (1 in 10 chance in any given year)
- 1 % AEP Flood Extent (1 in 100 chance in any given year)
- 0.1 % AEP Flood Extent (1 in 1000 chance in any given year)
- Defended Area
- High Confidence (<20m) (10% AEP)
- Medium Confidence (<40m) (10% AEP)
- Low Confidence (>40m) (10% and 0.1% AEP)
- High Confidence (<20m) (1% AEP)
- Medium Confidence (<40m) (1% AEP)
- Low Confidence (>40m) (1% AEP)
- River Centreline
- Node Point
- OS_2975 — Node Label (refer to table)
- Flow reporting location
- 10% Flow = 1.20 / 1% Flow = 1.56 / 0.1% Flow = 2.17 — Peak flow during design flood extent

USER NOTE:

USERS OF THESE MAPS SHOULD REFER TO THE DETAILED DESCRIPTION OF THEIR DERIVATION, LIMITATIONS IN ACCURACY AND GUIDANCE AND CONDITIONS OF USE PROVIDED AT THE FRONT OF THIS BOUND VOLUME. IF THIS MAP DOES NOT FORM PART OF BOUND VOLUME, IT SHOULD NOT BE USED FOR ANY PURPOSE.

Client:

Dublin City Council · South Dublin County Council · Dún Laoghaire-Rathdown County Council · OPW

Project:

DODDER CATCHMENT FLOOD RISK ASSESSMENT AND MANAGEMENT STUDY

Map:

PRESENT DAY DUNDRUM SLANG

Map Type: FLOOD EXTENT

Source: FLUVIAL FLOODING

Map Area: URBAN AREA

Scenario: CURRENT

Drawn By : A.A.B Date : 26 November 2010

Checked By : A.J. Date : 26 November 2010

Approved By : A.G.B Date : 26 November 2010

DSS/EXT/UA/CURS/105

Map Series : Page 3 of 3

Drawing Scale : 1: 5,000 Plot Scale : 1:1 @ A3

0 0.1 0.2 Kilometers

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ELMWOOD HOUSE
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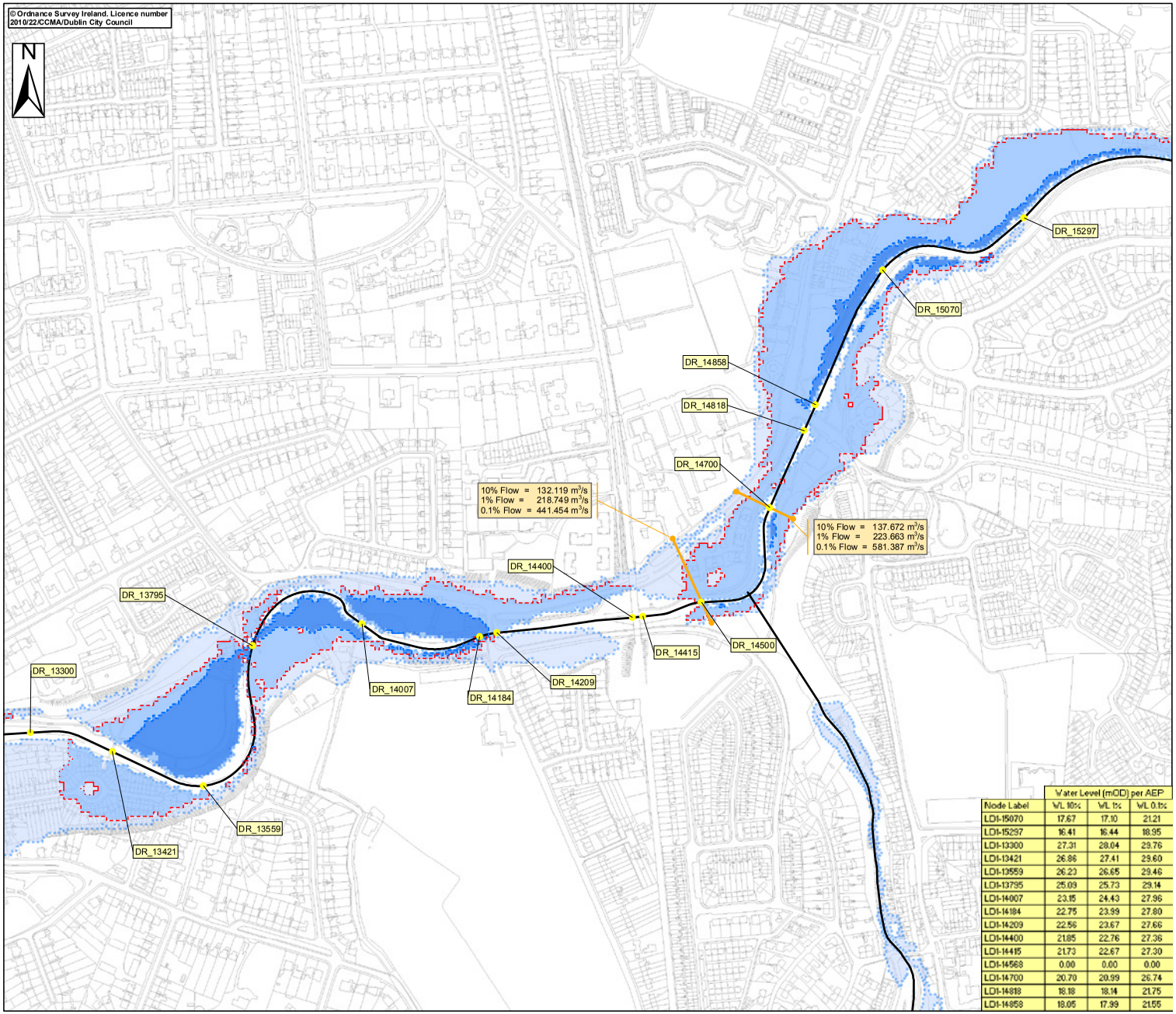
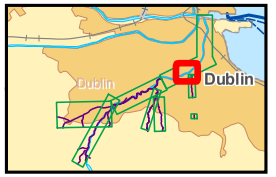
BELFAST BT12 6RZ
TEL : 028 9066 7914
FAX : 028 9066 8286
www.rpsgroup.com/Ireland



Node Label	Water Level (mOD) per AEP		
	WL 10%	WL 1%	WL 0.1%
LDI-15070	17.67	17.10	21.21
LDI-15297	16.41	16.44	18.95
LDI-13300	27.31	28.04	29.76
LDI-13421	26.86	27.41	29.60
LDI-13559	26.23	26.65	29.46
LDI-13795	25.09	25.73	29.14
LDI-14007	23.15	24.43	27.96
LDI-14184	22.75	23.99	27.80
LDI-14209	22.56	23.67	27.66
LDI-14400	21.85	22.76	27.36
LDI-14415	21.73	22.67	27.30
LDI-14568	0.00	0.00	0.00
LDI-14700	20.70	20.99	26.74
LDI-14818	18.18	18.14	21.75
LDI-14858	18.05	17.99	21.55

Location Plan:



Legend:

- 10 % AEP Flood Extent (1 in 10 chance in any given year)
- 1 % AEP Flood Extent (1 in 100 chance in any given year)
- 0.1 % AEP Flood Extent (1 in 1000 chance in any given year)
- Defended Area
- High Confidence (<20m) (10% AEP)
- Medium Confidence (<40m) (10% AEP)
- Low Confidence (>40m) (10% and 0.1% AEP)
- High Confidence (<20m) (1% AEP)
- Medium Confidence (<40m) (1% AEP)
- Low Confidence (>40m) (1% AEP)
- River Centreline
- Node Point
- OS_2975 — Node Label (refer to table)
- Flow reporting location
- 10% Flow = 1.20 / 1% Flow = 1.56 / 0.1% Flow = 2.17 — Peak flow during design flood extent

USER NOTE:

USERS OF THESE MAPS SHOULD REFER TO THE DETAILED DESCRIPTION OF THEIR DERIVATION, LIMITATIONS IN ACCURACY AND GUIDANCE AND CONDITIONS OF USE PROVIDED AT THE FRONT OF THIS BOUND VOLUME. IF THIS MAP DOES NOT FORM PART OF BOUND VOLUME, IT SHOULD NOT BE USED FOR ANY PURPOSE.

Client:

Dublin City Council · South Dublin County Council · Dún Laoghaire-Rathdown County Council · OPW

Project:

DODDER CATCHMENT FLOOD RISK ASSESSMENT AND MANAGEMENT STUDY

Map:

PRESENT DAY DODDER

Map Type: FLOOD EXTENT
Source: FLUVIAL FLOODING
Map Area: URBAN AREA
Scenario: CURRENT
Drawn By : A.A.B Date : 26 November 2010
Checked By : A.J. Date : 26 November 2010
Approved By : A.G.B Date : 26 November 2010

Figure No. :

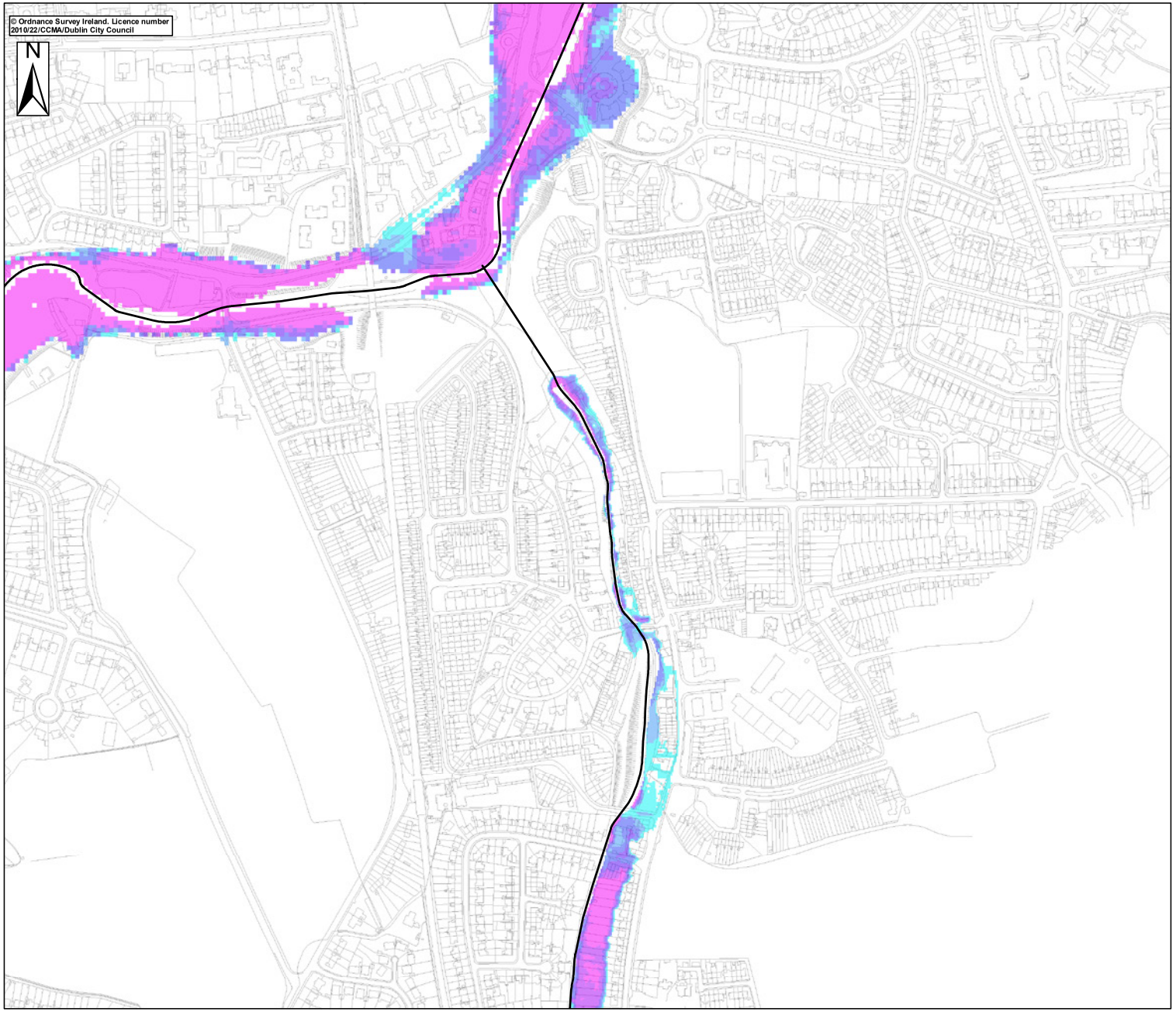
DR/EXT/UA/CURS/101

Map Series : Page 7 of 12

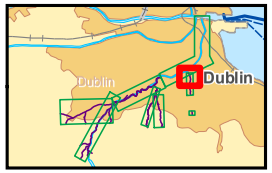
Drawing Scale : 1: 5,000 Plot Scale : 1:1 @ A3

0 0.1 0.2
Kilometers

RPS Consulting Engineers
ELMWOOD HOUSE
74 BOUCHER ROAD
BELFAST BT12 6RZ
TEL : 028 9066 7914
FAX : 028 9066 8286
www.rpsgroup.com/Ireland



Location Plan:



Legend:

Depth Grid [m]

- 0 - 0.25 m
- 0.25 - 0.50 m
- 0.50 - 1.00 m
- 1.00 - 1.50 m
- 1.5 - 2.00 m
- > 2.00 m
- River Centreline

USER NOTE:

USERS OF THESE MAPS SHOULD REFER TO THE DETAILED DESCRIPTION OF THEIR DERIVATION, LIMITATIONS IN ACCURACY AND GUIDANCE AND CONDITIONS OF USE PROVIDED AT THE FRONT OF THIS BOUND VOLUME. IF THIS MAP DOES NOT FORM PART OF BOUND VOLUME, IT SHOULD NOT BE USED FOR ANY PURPOSE.

Client:

Dublin City Comhairle Átha Cliath | South Dublin County Council | Fingal County Council | OPW

Project:

DODDER CATCHMENT FLOOD RISK ASSESSMENT AND MANAGEMENT STUDY

Map:

DUNDRUM SLANG

Map Type:	DEPTH
Return Period:	0.1% AEP EVENT
Source:	FLUVIAL FLOODING
Map Area:	URBAN AREA
Scenario:	CURRENT
Drawn By :	A.A.B Date : 26 November 2010
Checked By :	A.J. Date : 26 November 2010
Approved By :	A.G.B Date : 26 November 2010

Figure No. :

DSS/EXT/UA/DEP/1000/105A

Map Series : Page 3 of 3

Drawing Scale : 1: 5,000 **Plot Scale : 1:1 @ A3**

0 0.1 0.2
Kilometers

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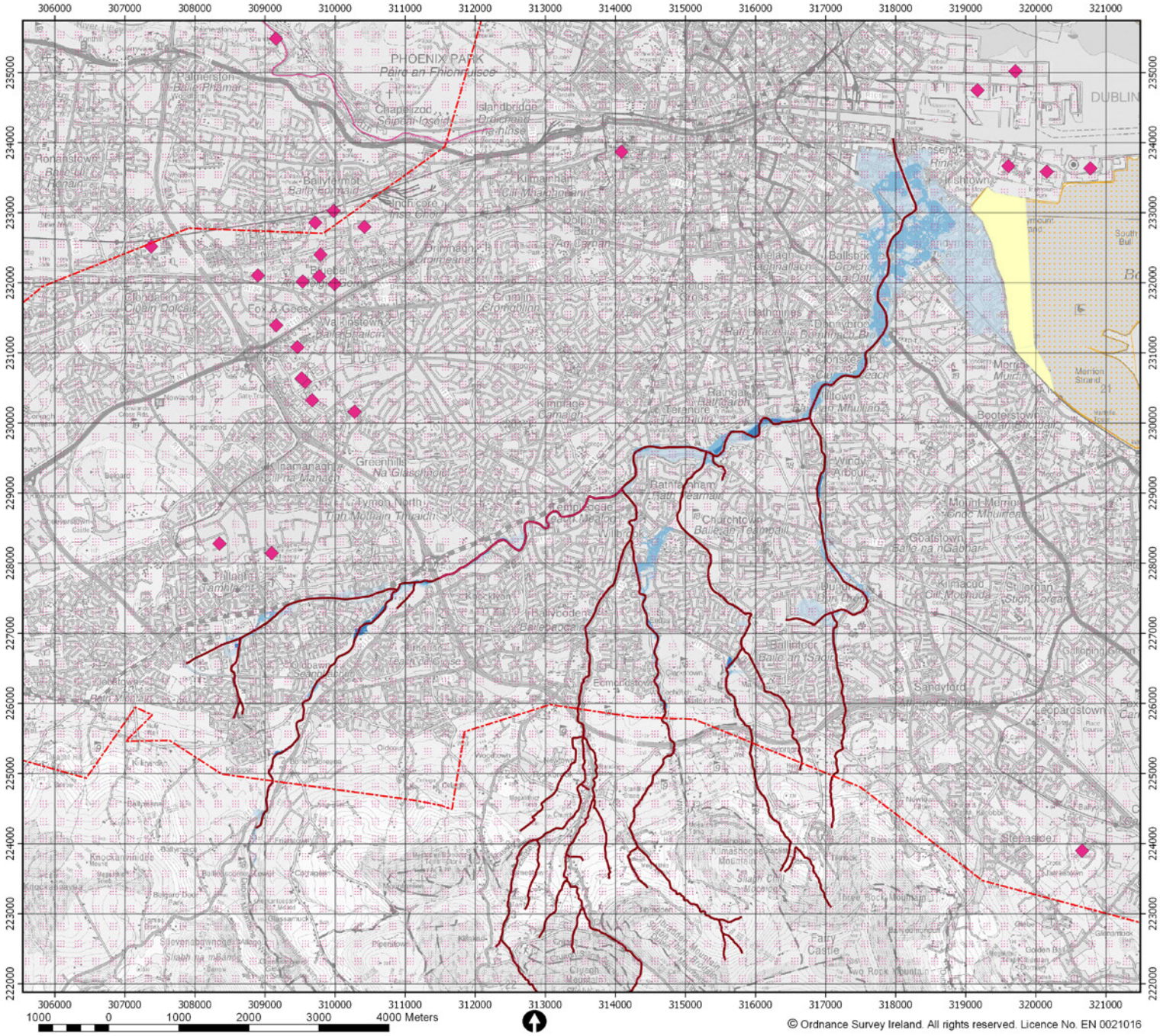

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9 Appendix D - Attenuation Requirement

hrwallingford

Surface water storage requirements for sites

www.uksuds.com | Storage estimation tool

Calculated by:	Conor Edwards
Site name:	Mt. Saint Mary's - Total Site
Site location:	Milltown, Co. Dublin

This is an estimation of the storage volume requirements that are needed to meet normal best practice criteria in line with Environment Agency guidance "Rainfall runoff management for developments", SC030219 (2013), the SuDS Manual C753 (Ciria, 2015) and the non-statutory standards for SuDS (Defra, 2015). It is not to be used for detailed design of drainage systems. It is recommended that hydraulic modelling software is used to calculate volume requirements and design details before finalising the design of the drainage scheme.

Site Details

Latitude:	53.30756° N
Longitude:	6.24519° W
Reference:	1363588617
Date:	Dec 09 2024 15:05

Site characteristics

Total site area (ha):	0.9804
Significant public open space (ha):	0.3524
Area positively drained (ha):	0.6280000000000001
Impermeable area (ha):	0.4486
Percentage of drained area that is impermeable (%):	71
Impervious area drained via infiltration (ha):	0.1794
Return period for infiltration system design (year):	100
Impervious area drained to rainwater harvesting (ha):	0
Return period for rainwater harvesting system (year):	100
Compliance factor for rainwater harvesting system (%):	100
Net site area for storage volume design (ha):	0.54
Net impermable area for storage volume design (ha):	0.28
Pervious area contribution to runoff (%):	30

* where rainwater harvesting or infiltration has been used for managing surface water runoff such that the effective impermeable area is less than 50% of the 'area positively drained', the 'net site area' and the estimates of Q_{BAR} and other flow rates will have been reduced accordingly.

Methodology

esti	IH124
Q_{BAR} estimation method:	Calculate from SPR and SAAR
SPR estimation method:	Calculate from SOIL type

Soil characteristics

	Default	Edited
SOIL type:	4	4
SPR:	0.47	0.47

Hydrological characteristics

	Default	Edited
Rainfall 100 yrs 6 hrs:	--	70.1
Rainfall 100 yrs 12 hrs:	--	86.7
FEH / FSR conversion factor:	1	1.4
SAAR (mm):	848	848
M5-60 Rainfall Depth (mm):	14	14
'r' Ratio M5-60/M5-2 day:	0.3	0.3
Hydological region:	12	12
Growth curve factor 1 year:	0.85	0.85
Growth curve factor 10 year:	1.72	1.72
Growth curve factor 30 year:	2.13	2.13

Design criteria

Climate change allowance factor:	1.2	Growth curve factor 100 years:	2.61	2.61
Urban creep allowance factor:	1.1	Q_{BAR} for total site area (l/s):	5.92	5.92
Volume control approach	Flow control to max of 2 l/s/ha or Qbar	Q_{BAR} for net site area (l/s):	3.25	3.25
Interception rainfall depth (mm):	5			
Minimum flow rate (l/s):	2			

Site discharge rates

	Default	Edited
1 in 1 year (l/s):	2.8	2.8
1 in 30 years (l/s):	3.3	3.3
1 in 100 year (l/s):	3.3	3.3

Estimated storage volumes

	Default	Edited
Attenuation storage 1/100 years (m^3):	108	174
Long term storage 1/100 years (m^3):	0	0
Total storage 1/100 years (m^3):	108	174

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hrwallingford

Surface water storage requirements for sites

www.uksuds.com | Storage estimation tool

Calculated by:	Conor Edwards
Site name:	Mt. Saint Mary's - Total Site Excl. Green/Blue Roof Area
Site location:	Milltown, Co. Dublin

This is an estimation of the storage volume requirements that are needed to meet normal best practice criteria in line with Environment Agency guidance "Rainfall runoff management for developments", SC030219 (2013), the SuDS Manual C753 (Ciria, 2015) and the non-statutory standards for SuDS (Defra, 2015). It is not to be used for detailed design of drainage systems. It is recommended that hydraulic modelling software is used to calculate volume requirements and design details before finalising the design of the drainage scheme.

Site Details

Latitude:	53.30748° N
Longitude:	6.24528° W
Reference:	2033254286
Date:	Dec 09 2024 15:07

Site characteristics

Total site area (ha):	0.8705
Significant public open space (ha):	0.3524
Area positively drained (ha):	0.5181
Impermeable area (ha):	0.3387
Percentage of drained area that is impermeable (%):	65
Impervious area drained via infiltration (ha):	0.1794
Return period for infiltration system design (year):	100
Impervious area drained to rainwater harvesting (ha):	0
Return period for rainwater harvesting system (year):	100
Compliance factor for rainwater harvesting system (%):	100
Net site area for storage volume design (ha):	0.32
Net impermable area for storage volume design (ha):	0.17
Pervious area contribution to runoff (%):	30

* where rainwater harvesting or infiltration has been used for managing surface water runoff such that the effective impermeable area is less than 50% of the 'area positively drained', the 'net site area' and the estimates of Q_{BAR} and other flow rates will have been reduced accordingly.

Methodology

esti	IH124
Q_{BAR} estimation method:	Calculate from SPR and SAAR
SPR estimation method:	Calculate from SOIL type

Soil characteristics

	Default	Edited
SOIL type:	4	4
SPR:	0.47	0.47

Hydrological characteristics

	Default	Edited
Rainfall 100 yrs 6 hrs:	--	70.1
Rainfall 100 yrs 12 hrs:	--	86.7
FEH / FSR conversion factor:	1	1.4
SAAR (mm):	848	848
M5-60 Rainfall Depth (mm):	14	14
'r' Ratio M5-60/M5-2 day:	0.3	0.3
Hydological region:	12	12
Growth curve factor 1 year:	0.85	0.85
Growth curve factor 10 year:	1.72	1.72
Growth curve factor 30 year:	2.13	2.13

Design criteria

Climate change allowance factor:	1.2
Urban creep allowance factor:	1.1
Volume control approach	Flow control to max of 2 l/s/ha or Qbar
Interception rainfall depth (mm):	5
Minimum flow rate (l/s):	2

Growth curve factor 100 years:	2.61	2.61
Q_{BAR} for total site area (l/s):	5.26	5.26
Q_{BAR} for net site area (l/s):	1.93	1.93

Site discharge rates

	Default	Edited
1 in 1 year (l/s):	2	2
1 in 30 years (l/s):	2	2
1 in 100 year (l/s):	2	2

Estimated storage volumes

	Default	Edited
Attenuation storage 1/100 years (m^3):	60	96
Long term storage 1/100 years (m^3):	0	0
Total storage 1/100 years (m^3):	60	96

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hrwallingford

Surface water storage requirements for sites

www.uksuds.com | Storage estimation tool

Calculated by:	Conor Edwards
Site name:	Mt. Saint Mary's - Block A Green Roof
Site location:	Milltown, Co. Dublin

This is an estimation of the storage volume requirements that are needed to meet normal best practice criteria in line with Environment Agency guidance "Rainfall runoff management for developments", SC030219 (2013), the SuDS Manual C753 (Ciria, 2015) and the non-statutory standards for SuDS (Defra, 2015). It is not to be used for detailed design of drainage systems. It is recommended that hydraulic modelling software is used to calculate volume requirements and design details before finalising the design of the drainage scheme.

Site Details

Latitude:	53.30749° N
Longitude:	6.24554° W
Reference:	4239440769
Date:	Dec 09 2024 14:53

Site characteristics

Total site area (ha):	0.0539
Significant public open space (ha):	0
Area positively drained (ha):	0.0539
Impermeable area (ha):	0.0539
Percentage of drained area that is impermeable (%):	100
Impervious area drained via infiltration (ha):	0
Return period for infiltration system design (year):	100
Impervious area drained to rainwater harvesting (ha):	0
Return period for rainwater harvesting system (year):	100
Compliance factor for rainwater harvesting system (%):	100
Net site area for storage volume design (ha):	0.05
Net impermable area for storage volume design (ha):	0.05
Pervious area contribution to runoff (%):	30

* where rainwater harvesting or infiltration has been used for managing surface water runoff such that the effective impermeable area is less than 50% of the 'area positively drained', the 'net site area' and the estimates of Q_{BAR} and other flow rates will have been reduced accordingly.

Methodology

esti	IH124
Q_{BAR} estimation method:	Calculate from SPR and SAAR
SPR estimation method:	Calculate from SOIL type

Soil characteristics

	Default	Edited
SOIL type:	4	4
SPR:	0.47	0.47

Hydrological characteristics

	Default	Edited
Rainfall 100 yrs 6 hrs:	--	70.1
Rainfall 100 yrs 12 hrs:	--	86.7
FEH / FSR conversion factor:	1	1.4
SAAR (mm):	848	848
M5-60 Rainfall Depth (mm):	14	14
'r' Ratio M5-60/M5-2 day:	0.3	0.3
Hydological region:	12	12
Growth curve factor 1 year:	0.85	0.85
Growth curve factor 10 year:	1.72	1.72
Growth curve factor 30 year:	2.13	2.13

Design criteria

Climate change allowance factor:	1.2	Growth curve factor 100 years:	2.61	2.61
Urban creep allowance factor:	1.1	Q_{BAR} for total site area (l/s):	0.33	0.33
Volume control approach	Flow control to max of 2 l/s/ha or Qbar	Q_{BAR} for net site area (l/s):	0.33	0.33
Interception rainfall depth (mm):	5			
Minimum flow rate (l/s):	2			

Site discharge rates

	Default	Edited
1 in 1 year (l/s):	2	2
1 in 30 years (l/s):	2	2
1 in 100 year (l/s):	2	2

Estimated storage volumes

	Default	Edited
Attenuation storage 1/100 years (m^3):	5	9
Long term storage 1/100 years (m^3):	0	0
Total storage 1/100 years (m^3):	5	9

This report was produced using the storage estimation tool developed by HRWallingford and available at www.uksuds.com. The use of this tool is subject to the UK SuDS terms and conditions and licence agreement, which can both be found at http://uksuds.com/terms-and-conditions.htm. The outputs from this tool have been used to estimate storage volume requirements. The use of these results is the responsibility of the users of this tool. No liability will be accepted by HR Wallingford, the Environment Agency, CEH, Hydrosolutions or any other organisation for the use of these data in the design or operational characteristics of any drainage scheme.

hrwallingford

Surface water storage requirements for sites

www.uksuds.com | Storage estimation tool

Calculated by:	Conor Edwards
Site name:	Mt. Saint Mary's - Block C Green Roof
Site location:	Milltown, Co. Dublin

This is an estimation of the storage volume requirements that are needed to meet normal best practice criteria in line with Environment Agency guidance "Rainfall runoff management for developments", SC030219 (2013), the SuDS Manual C753 (Ciria, 2015) and the non-statutory standards for SuDS (Defra, 2015). It is not to be used for detailed design of drainage systems. It is recommended that hydraulic modelling software is used to calculate volume requirements and design details before finalising the design of the drainage scheme.

Site Details

Latitude:	53.30757° N
Longitude:	6.24532° W
Reference:	2628903228
Date:	Dec 09 2024 15:04

Site characteristics

Total site area (ha):	0.0477
Significant public open space (ha):	0
Area positively drained (ha):	0.0477
Impermeable area (ha):	0.0477
Percentage of drained area that is impermeable (%):	100
Impervious area drained via infiltration (ha):	0
Return period for infiltration system design (year):	100
Impervious area drained to rainwater harvesting (ha):	0
Return period for rainwater harvesting system (year):	100
Compliance factor for rainwater harvesting system (%):	100
Net site area for storage volume design (ha):	0.05
Net impermable area for storage volume design (ha):	0.05
Pervious area contribution to runoff (%):	30

* where rainwater harvesting or infiltration has been used for managing surface water runoff such that the effective impermeable area is less than 50% of the 'area positively drained', the 'net site area' and the estimates of Q_{BAR} and other flow rates will have been reduced accordingly.

Methodology

esti	IH124
Q_{BAR} estimation method:	Calculate from SPR and SAAR
SPR estimation method:	Calculate from SOIL type

Soil characteristics

	Default	Edited
SOIL type:	4	4
SPR:	0.47	0.47

Hydrological characteristics

	Default	Edited
Rainfall 100 yrs 6 hrs:	--	70.1
Rainfall 100 yrs 12 hrs:	--	86.7
FEH / FSR conversion factor:	1	1.4
SAAR (mm):	848	848
M5-60 Rainfall Depth (mm):	14	14
'r' Ratio M5-60/M5-2 day:	0.3	0.3
Hydological region:	12	12
Growth curve factor 1 year:	0.85	0.85
Growth curve factor 10 year:	1.72	1.72
Growth curve factor 30 year:	2.13	2.13

Design criteria

Climate change allowance factor:	1.2	Growth curve factor 100 years:	2.61	2.61
Urban creep allowance factor:	1.1	Q_{BAR} for total site area (l/s):	0.29	0.29
Volume control approach	Flow control to max of 2 l/s/ha or Qbar	Q_{BAR} for net site area (l/s):	0.29	0.29
Interception rainfall depth (mm):	5			
Minimum flow rate (l/s):	2			

Site discharge rates

	Default	Edited
1 in 1 year (l/s):	2	2
1 in 30 years (l/s):	2	2
1 in 100 year (l/s):	2	2

Estimated storage volumes

	Default	Edited
Attenuation storage 1/100 years (m^3):	3	6
Long term storage 1/100 years (m^3):	0	0
Total storage 1/100 years (m^3):	3	6

This report was produced using the storage estimation tool developed by HRWallingford and available at www.uksuds.com. The use of this tool is subject to the UK SuDS terms and conditions and licence agreement, which can both be found at http://uksuds.com/terms-and-conditions.htm. The outputs from this tool have been used to estimate storage volume requirements. The use of these results is the responsibility of the users of this tool. No liability will be accepted by HR Wallingford, the Environment Agency, CEH, Hydrosolutions or any other organisation for the use of these data in the design or operational characteristics of any drainage scheme.

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Surface water storage requirements for sites

www.uksuds.com | Storage estimation tool

Calculated by:	Conor Edwards
Site name:	Mt. Saint Mary's - Block B Green Roof
Site location:	Milltown, Co. Dublin

This is an estimation of the storage volume requirements that are needed to meet normal best practice criteria in line with Environment Agency guidance "Rainfall runoff management for developments", SC030219 (2013), the SuDS Manual C753 (Ciria, 2015) and the non-statutory standards for SuDS (Defra, 2015). It is not to be used for detailed design of drainage systems. It is recommended that hydraulic modelling software is used to calculate volume requirements and design details before finalising the design of the drainage scheme.

Site Details

Latitude:	53.30743° N
Longitude:	6.24547° W
Reference:	2901893052
Date:	Dec 09 2024 14:59

Site characteristics

Total site area (ha):	0.0535
Significant public open space (ha):	0
Area positively drained (ha):	0.0535
Impermeable area (ha):	0.0535
Percentage of drained area that is impermeable (%):	100
Impervious area drained via infiltration (ha):	0
Return period for infiltration system design (year):	100
Impervious area drained to rainwater harvesting (ha):	0
Return period for rainwater harvesting system (year):	100
Compliance factor for rainwater harvesting system (%):	100
Net site area for storage volume design (ha):	0.05
Net impermable area for storage volume design (ha):	0.05
Pervious area contribution to runoff (%):	30

* where rainwater harvesting or infiltration has been used for managing surface water runoff such that the effective impermeable area is less than 50% of the 'area positively drained', the 'net site area' and the estimates of Q_{BAR} and other flow rates will have been reduced accordingly.

Methodology

esti	IH124
Q_{BAR} estimation method:	Calculate from SPR and SAAR
SPR estimation method:	Calculate from SOIL type

Soil characteristics

	Default	Edited
SOIL type:	4	4
SPR:	0.47	0.47

Hydrological characteristics

	Default	Edited
Rainfall 100 yrs 6 hrs:	--	70.1
Rainfall 100 yrs 12 hrs:	--	86.7
FEH / FSR conversion factor:	1	1.4
SAAR (mm):	848	848
M5-60 Rainfall Depth (mm):	14	14
'r' Ratio M5-60/M5-2 day:	0.3	0.3
Hydological region:	12	12
Growth curve factor 1 year:	0.85	0.85
Growth curve factor 10 year:	1.72	1.72
Growth curve factor 30 year:	2.13	2.13

Design criteria

Climate change allowance factor:	1.2	Growth curve factor 100 years:	2.61	2.61
Urban creep allowance factor:	1.1	Q_{BAR} for total site area (l/s):	0.32	0.32
Volume control approach	Flow control to max of 2 l/s/ha or Qbar	Q_{BAR} for net site area (l/s):	0.32	0.32
Interception rainfall depth (mm):	5			
Minimum flow rate (l/s):	2			

Site discharge rates

	Default	Edited
1 in 1 year (l/s):	2	2
1 in 30 years (l/s):	2	2
1 in 100 year (l/s):	2	2

Estimated storage volumes

	Default	Edited
Attenuation storage 1/100 years (m^3):	5	9
Long term storage 1/100 years (m^3):	0	0
Total storage 1/100 years (m^3):	5	9

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10 Appendix E - Soak Away Requirement

Tekla Tedds Tent Engineering	Project				Job no.	
	Calcs for				Start page no./Revision 1	
	Calcs by 1	Calcs date 09/12/2024	Checked by	Checked date	Approved by	Approved date

SOAKAWAY DESIGN

In accordance with CIRIA C753 SUDS

Tedds calculation version 2.0.05

Design rainfall intensity

Location of catchment area	Other
Impermeable area drained to the system	A = **2919.0** m^2
Return period	Period = **100** yr
Ratio 60 min to 2 day rainfall of 5 yr return period	r = **0.277**
5-year return period rainfall of 60 minutes duration	M5_60min = **17.0** mm
Increase of rainfall intensity due to global warming	$p_{climate}$ = **20** %

Soakaway / infiltration trench details

Soakaway type	Rectangular
Width of pit	w = **12800** mm
Length of pit	l =**12800** mm
Percentage free volume	V_{free} = **96** %
Soil infiltration rate	f = **30.0×10^{-6}** m/s
Base area	A_b = w × l = **163840000** mm^2
Perimeter	P = 2 × (w + l) = **51200** mm
Coefficient b	b = P × f / (A_b × V_{free}) = **0.04** hr^{-1}

Table equations (Eq. 25.4)

Rainfall intensity	i = M100 / D
Coefficient a	a = A_b / P - (A × i / (P × f))
Minimum depth required	H = a × ($e^{(-bD)}$ - 1)

Duration, D (min)	Growth factor Z1	M5 rainfalls (mm)	Growth factor Z2	100 year rainfall, M100 (mm)	Intensity, i (mm/hr)	a (mm)	Min depth req (mm)
5	0.33;	6.8;	1.90;	12.9;	154.51;	-78362;	229
10	0.48;	9.8;	1.97;	19.3;	116.10;	-58085;	339
15	0.58;	11.9;	1.97;	23.4;	93.79;	-46310;	405
30	0.76;	15.6;	1.97;	30.7;	61.41;	-29219;	509
60	1.00;	20.4;	1.93;	39.3;	39.31;	-17549;	606
120	1.27;	25.8;	1.88;	48.6;	24.31;	-9632;	654
240	1.62;	33.1;	1.83;	60.4;	15.11;	-4778;	627
360	1.86;	37.9;	1.79;	67.7;	11.28;	-2755;	524
600	2.21;	45.1;	1.74;	78.7;	7.87;	-955;	283
1440	3.04;	62.0;	1.67;	103.7;	4.32;	920;	0

Minimum depth of soakaway	H_{max} = **654** mm
Time to empty soakaway to half vol. - Eq.24.6(2)	t_{s50} = V_{free} × A_b / (f × P) × Ln((H_{max} + A_b / P) / (H_{max} / 2 + A_b / P)) = 2hr 31min 19s

PASS - Soakaway discharge time less than or equal to 24 hours

11 Appendix F - Drainage Calculations

Residential

Foul Water Demand					
	Units	**Avg. People**	**L/person**	**L**	
Block A	65	2.26	150	22035	
Block B	56	1.69	150	14196	
Block C	8	2	150	2400	
1.1	Dry weather volume		Total	42494	L daily demand
6.0	Peak factor		Peak	254965	L peak demand
				2.951	L/s

Residential

Water Demand					
	Units	**Avg. People**	**L/person**	**L**	
Block A	65	2.26	150	22035	
Block B	56	1.69	150	14196	
Block C	8	2	150	2400	
1.25	Dry weather volume		Total	48289	L daily demand
5.0	Peak factor		Peak	241444	L peak demand
				2.794	L/s

12 Appendix F - Confirmation of Feasibility

CONFIRMATION OF FEASIBILITY

Edward Heukers

Tent Engineering
32 Francis Street
Dublin 8
D08 NN96

5 November 2024

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

Uisce Éireann
PO Box 448
South City
Delivery Office
Cork City

www.water.ie

Our Ref: CDS24007034 Pre-Connection Enquiry
Mount St Mary's, Dundrum Road, Dublin 14

Dear Applicant/Agent,

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

Uisce Éireann has reviewed the pre-connection enquiry in relation to a Water & Wastewater connection for a Housing Development of 129 unit(s) at Mount St Mary's, Dundrum Road, Dublin 14, (the **Development)**.

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

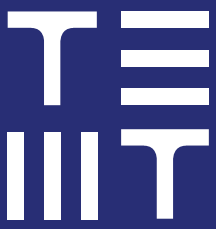
- **Water Connection** - Feasible without infrastructure upgrade by Uisce Éireann
- **Wastewater Connection** - Feasible without infrastructure upgrade by Uisce Éireann

- Please note that proposed diversion must be approved by UÉ Diversion Team prior any works on the site. For design submissions and queries related to the diversion please contact the Team via email address diversions@water.ie

This letter does not constitute an offer, in whole or in part, to provide a connection to any Uisce Éireann 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 Uisce Éireann.

Stiúrthóirí / Directors: Tony Keohane (Cathaoirleach / Chairman), Niall Gleeson (POF / CEO), Christopher Banks, Fred Barry, Gerard Britchfield, Liz Joyce, Patricia King, Eileen Maher, Cathy Mannion, Michael Walsh.
Oifig Chláraithe / Registered Office: Teach Colvill, 24-26 Sráid Thalbóid, Baile Átha Cliath 1, D01 NP86 / Colvill House, 24-26 Talbot Street, Dublin, Ireland D01NP86
Is cuideachta ghníomhaíochta ainmnithe atá faoi theorainn scaireanna é Uisce Éireann / Uisce Éireann is a design activity company, limited by shares. Cláraithe in Éirinn Uimh.: 530363 / Registered in Ireland No.: 530363.

UE / LH / OP448 / 0323



TENT ENGINEERING