OCSC

O'CONNOR · SUTTON · CRONIN

MULTIDISCIPLINARY CONSULTING ENGINEERS

C1058: DISTILLERY WALK APARTMENTS - MIDLETON

ENGINEERING SERVICES REPORT

For

CORK COUNTY COUNCIL

3 May 2024

NOTICE

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DOCUMENT CONTROL & HISTORY

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P02	S4	Anett Bognar-Nemeth	John McBeath	John McBeath	3/05/2024

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1 INTRODUCTION

1.1. APPOINTMENT

O' Connor Sutton Cronin (OCSC) & Associates Ltd have been commissioned by the Cork County Council to provide civil and structural design services for a proposed new multi-storey apartment block, at Distillery Walk, Midleton, Co Cork.

This report is prepared for the purpose of a Planning Permission submission to Cork County Council. This report outlines proposals for the provision of foul drainage, potable water supply and storm drainage to the proposed development.

1.2. DEVELOPMENT DESCRIPTION

The project involves the construction of 16no. housing units and a community room on an existing walled garden site off Distillery Lane, in Midleton's town centre. The housing scheme has been designed as a 6no. storey apartment building with 3no. one bed units on each floor except the ground floor which contains a community room and a single one bed apartment. The intention is that this housing scheme would be allocated to accommodate elderly residents specifically. The remainder of the site is designed as a public garden space that also allows for management of storm water drainage on the site. The project is being developed in collaboration with the local Lions Club.

This subject site has been identified by Cork County Council's Housing Directorate as a key site within the town suitable for redevelopment. It is rectangular in shape and enclosed on all sites by a tall stone wall, approximately 6m. high. It measures 0.109Ha (0.27 acres) in area and is relatively flat. The subject site is in the ownership of Midleton Lions Club. It is bounded to the north by a private apartment development and by public lanes / access ways on the remaining 3no. sides.

1.3. ADMINISTRATIVE JURISDICTION

The site is located within the administrative jurisdiction of Cork County Council, whose offices are located at County Hall, Carrigrohane Road, Cork.

1.4. SITE LOCATION

The subject site is located on Distillery Walk in Midleton town centre. It is rectangular in shape and enclosed on all sides by an old stone wall. It measures 0.109Ha (0.27 acres) in area. It is located less than 50m from Main Street to the East. Refer to Figure 1.1 for the site location.

The area is situated approximately 140m north of the Dungourney River, which flows east-west to the south of the site; and approximately 250m east of the Owennacurra River which runs north-south to the west of the site. The site is relatively flat brownfield site at approximately 3.4m OD, typically varying from a lowest level of 3.29m OD in the middle of the eastern part of the site to 3.61m OD on the slightly higher western side of the site.

There is a 3.5-4m high wall surrounding the site. Distillery Walk runs south-west north-east to the south of the site, and continues from the site to the west, connecting to Main St. There is a lane parallel to the south of Distillery Walk and is approximately 500-600mm lower. There is a car park to the southeast of the site which gradually drops in elevation going south towards the Dungourney River. As Distillery Walk goes west from the site (3.6mOD) it also drops in elevation until it meets Main St (3.11mOD).

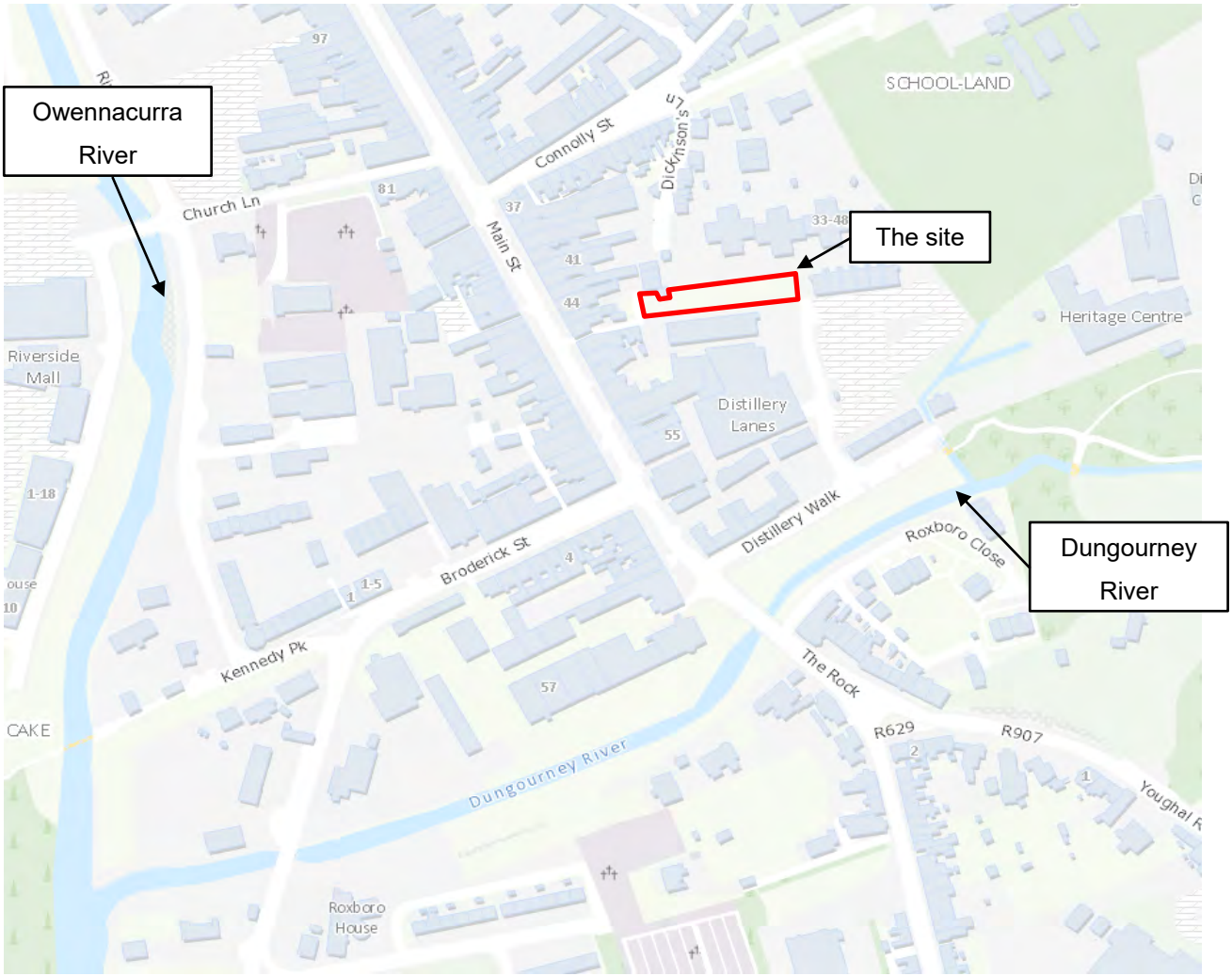


Figure 1.1: Site location

The northern boundary of the site is with a residential development, Corabbey Court. This area is also relatively flat, rising slightly going north from the site. Further to the north ground levels drop slightly again towards Connolly St.

1.5. LIMITATIONS

This Engineering Services Report has been prepared for the sole use of Cork County Council. No other warranty, expressed or implied, is made as to the professional advice included in this report or any other services provided by OCSC. This report may not be disclosed by the Client nor relied upon by any other party without the prior and express written agreement of OCSC.

2 FOUL WATER DRAINAGE

2.1. EXISTING FOUL DRAINAGE INFRASTRUCTURE

As part of the initial scheme design, Cork County Council were contacted to establish the existing foul water sewer network in the vicinity of the proposed development and a below ground utility survey was undertaken on the grounds of the site taking in the portion of Corabbey Court running along the northern, eastern boundary and a portion of a lane running along the south boundary of the site. The survey extent is marked in blue line in Figure 2.1 below.

The survey drawing indicates that there is an existing 100-150mm dia. PVC sewer serving the residential apartments to the north, running from east to west towards North-West. There is also an existing manhole found outside at the southwest corner of the site and the 300mm concrete pipe running from south to north along to the western boundary. Please refer to Appendix A for the existing below ground utility survey drawings.

Figure 2.1: Below ground utility survey drawing - Existing foul sewer (marked in brown colour)

2.2. PROPOSED FOUL WATER DESIGN

2.2.1. OVERVIEW

The new foul drainage network will be required for the development and will be designed in accordance with IS EN 752, the Building Regulations Part H and the Irish Water Code of Practice for Wastewater.

It is proposed that foul effluent from the proposed development will flow by gravity via a 150mm dia uPVC pipe network along the southern boundary wall within the site and will be tied into the existing manhole outside of the site boundary at the southwest corner. Please refer to the proposed foul drainage on drawing C1058-OCSC-XX-XX-DR-C-0100 in Appendix A.

The new foul sewer layout has been designed to ensure that tying into the existing sewer will be located under the existing gate that will be retained without undermining the existing wall, thereby avoiding any negative impact on the historical stone boundary wall.

All gravity foul sewer pipes shall be designed to achieve a minimum self-cleansing velocity of 0.75m/s with a maximum velocity of 3.0m/s. Self-cleansing is considered to be satisfied by a 150mm diameter sewer having a gradient not flatter than 1 in 150. The foul sewers shall be designed in accordance with the "Recommendations for Site Development Works for Housing Areas", TGD H and the Irish Water Code of Practice for Wastewater Infrastructure design guide and detailed calculations are enclosed in Appendix B.

2.2.2. MAXIMUM DESIGN FLOW

(Any individual 150mm dia. sewer)

16 No. Units with 2 person/dwelling:

32person * 150l/person/day = 4800 l / day

= 0.0556 l / sec (DWF)

Sewer Designed For (6*DWF) = 0.33 l / sec (6DWF)

The development will generate a maximum dry weather flow of 0.056 l/sec and a peak flow of 0.33 l/sec in any individual sewer. This is based upon the guidance given in section 3.6 of The Irish Water Code of Practice for Wastewater.

The outfall pipes from the development are 150mm diameter laid at a gradient of approximately 1:120, which gives a capacity of 14.22 litres / second. Therefore, there is adequate capacity within the foul sewer network to accommodate the design flows.

A Connection Application Form has been submitted to Irish Water for the proposed development with a decision awaited. Please refer to Appendix B for the full foul sewer calculation package.

3 STORM WATER DRAINAGE

3.1. EXISTING STORM DRAINAGE INFRASTRUCTURE

As part of the initial scheme design, Cork County Council were contacted to establish the existing storm water sewer network in the vicinity of the proposed development and a below ground utility survey was undertaken on the grounds of the site taking in the portion of Corabbey Court running along the northern and eastern boundaries and a portion of a lane running along the south boundary of the site. The survey extent including the pipeline and the associated manholes/AJ's/gullies is marked in green line in Figure 3.1 below.

The survey drawing indicates that there is an existing 100-225mm diameter PVC sewer serving the residential apartments to the north, running from west to east to the north of the site. This sewer then transitions to a 300mm diameter concrete pipe along the eastern boundary towards Distillery Walk to the south. Additionally, there is an existing manhole located outside at the southwest corner of the site and a 450mm diameter concrete pipe running from south to north across the western side of the site. Following a discussion with the Local Area Engineers, it has been suggested that the existing storm pipe crossing the site may be an old industrial line, necessitating further investigation before works commence. A CCTV survey will be sought as part of the next stage to clarify its condition and viability for connection. Please refer to Appendix A for the existing below ground utility survey drawings.

Figure 3.1: Below ground utility survey drawing - Existing storm sewer (marked in green colour)

3.2. PROPOSED STORM WATER DESIGN

3.2.1. OVERVIEW

The storm water drainage elements of the planning permission sought on the subject lands are designed in accordance with IS EN 752 & the Building Regulations Part H.

All new developments must ensure that a comprehensive sustainable urban drainage system, SuDS, is incorporated into the development. SuDS requires that post development run-off rates are maintained at equivalent or lower levels than pre-development levels. The development must be able to retain, within its boundaries, storm water volumes from extreme storm events up to a probability of 1 in 100 years, more commonly expressed as a 1.0% AEP (Annual Exceedance Probability). Any new development must have the physical capacity to retain storm water volumes and, if necessary, release these attenuated surface water volumes to an outfall at a controlled flow rate.

A further component of the SuDS protocols is to increase the overall water quality of surface water runoff before it enters a natural water course or into a public sewer, which ultimately discharges to a water body. This is to ensure the highest possible standard of storm water quality and to prevent degradation of the water course resource by contamination.

3.2.2. PROPOSED SURFACE WATER DESIGN

The majority of surface water drainage from the building is proposed to discharge to the existing public drainage network. Surface water will be collected via a series of rainwater down pipes from the roof of the building, channel drains and gullies from the access ramp and from the terrace and will be discharging into the onsite underground attenuation tank. From here surface water will be released via a flow controlled hydro break to the public storm sewer. Outflow from the site will be restricted to green field runoff rate at 3.9 l/s. The proposed surface water network will consist of a new gravity fed sewer system designed in accordance with IS EN 752. The pipes of the main sewer will be uPVC and will vary from 150mm to 225mm in diameter.

In addition to the above, 150mm diameter PVC filter drains underlaying the permeable paved paths is proposed to discharge the stormwater into a wet swale channel. Catchpits are proposed to be installed at each of the outlet into the swale from the filter drain to avoid sediments entering the swale. Refer to further details in section 3.2.3. of this document.

The Surface Water drainage layout is shown on drawing C1058-OCSC-XX-XX-DR-C-0100 in Appendix A with surface water design calculations provided in Appendix C.

3.2.3. SPECIFIC SUDS MEASURES PROPOSED

There are a number of systems available to address the SuDS requirements for the new developments according to the Cork County Development Plan 2022.
It is proposed that, as a minimum, the following mechanisms will be considered and incorporated into the SuDS surface water management regime:

Attenuated Storage

Attenuation storage tank is proposed to be provided in the form of a reinforced concrete underground storage tank for events up to and including the 1.0% AEP rainfall with a climate change allowance of 20%. The minimum storage capacity of the tank is 26m3.

Hydro-brake

It is proposed to provide a hydro-brake at the outfall of the surface water network before connecting to the existing sewer to restrict the outflow of water from the site. The hydro-brake will be fitted with a pull cord bypass and a penstock valve installed on the inlet to the manhole for maintenance purposes.

Swale

A vegetated swale (conveyance channel) is proposed to be horizontally constructed in the middle part of the landscaping area. Refer to Figure 3.2 below for the proposed site layout.

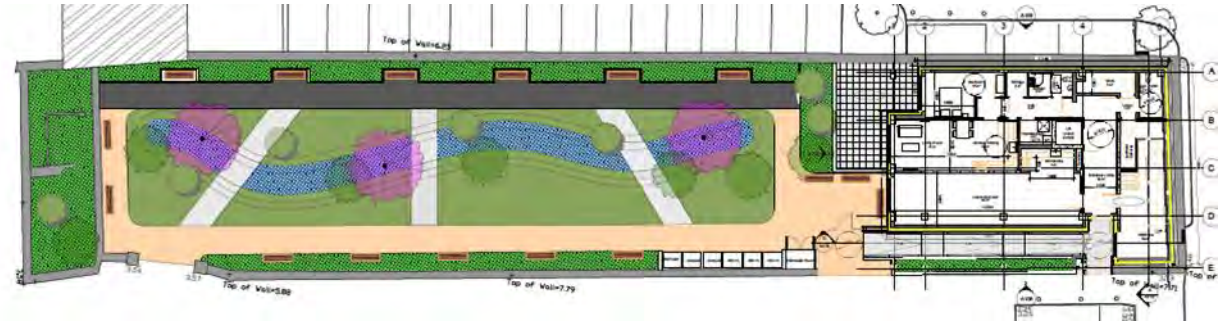


Figure 3.2: Proposed site layout

It is proposed that the swale will collect runoff from the hard surface areas to the north with filter strip being constructed along the path for pre-treatment and will collect rainwater via filter drains laid under the permeable paved paths along the southern boundary.

To meet the CIRIA SuDS manual 2015, a trapezoidal cross section with a bottom width of 0.5m and a depth of 0.6m with side slopes of 1:3 proposed to resist erosion and has been considered for hydraulic design.

The swale to be designed for a maximum velocity of 1.0 m/s. The hydraulic flow velocity has been calculated by using the Manning's equation. Attenuation of peak flows is better achieved in grassed/ vegetated surface water channels and consequently the rate of discharge of runoff into the receiving sewer/watercourse is significantly slowed down.

The hydraulic capacity of the swale has been calculated 0.338m/s which is less than the maximum allowable velocity of 1.0m/s, therefore the proposed swale with its parameters is adequate.

A 225mm outlet is proposed at the lowest point of the swale, situated above the consistent water level, to facilitate the discharge of any excess water into the attenuation tank. This overflow therefore mitigating the risk of flooding in heavy rainfall events.

Six intermediate inlets indicated that are proposed to discharge surface water from the permeable paved path into the swale.

The wetland planting including trees and shrubs are proposed around that will enhance the biodiversity of the area and will provide a visual experience to the amenity space for the community.

Permeable pavement

Permeable pavement with porous surface materials is considered for a section of the paths around the inner landscape area. A perforated drain is proposed to be laid under the permeable pavement that will collect the water and discharge it into the swale. The approximately area of the permeable surface is 0.02ha. Dividing by the 6no. of inlets, the area for an inlet is 0.003ha. By carrying out an initial calculation, based on the rainfall data and the granular soil properties under the permeable pavement, the allowable outflow is 0.014l/s/inlet. The flow into the swale is less than the flow capacity in the swale therefore the proposed inlets are adequate.

Catch pits

Catch pits in the form of small chambers will also be provided upstream of all filter drain inlets to the swale to prevent silt and debris entering to the swale causing buildup and blockages in the channel.

Landscape/Green Areas

Green areas have been provided wherever possible which will reduce the overall quantity of surface water runoff from the site.

A sketch of the proposed SuDS systems with initial calculations can be found in Appendix D to the rear of this report. Refer to document no. C1058-OCSC-XX-XX-RP-C-0003-S4-P01 Drainage Impact Assessment included within the planning package for further information and design calculations.

4 WATER SUPPLY

4.1 EXISTING WATER MAIN LAYOUT

As part of the initial scheme design, Cork County Council were contacted to establish the existing potable water network in the vicinity of the proposed development and a below ground utility survey was undertaken on the grounds of the site taking in the portion of Corabbey Court running along the northern and eastern boundaries and a portion of a lane running along the south boundary of the site. The survey including the existing watermain is shown in Figure 3.1 below.

Figure 4.1: Below ground utility survey drawing - Existing watermain (marked in blue colour)

There is an existing watermain serving the residential apartments to the north, located under the main road around the site. There is an existing fire hydrant approximately 15m from the boundary wall to the north at the T-junction of the main road.

4.2. PROPOSED WATERMAIN LAYOUT

It is proposed that a new 100mm HDPE pipe to be connected to the existing main at the southeast corner with a 90degree bend to serve the new building. A water meter will be provided where the new watermains enter the development and individual properties will be fitted with an approved meter box located as required for water metering purposes in accordance with Irish Water specifications.

The position of the existing hydrant has been checked to ensure it is at a sufficient distance from the proposed development. It has been found that the south-east corner of the proposed building is more than 46m away. According to Irish Water Water Infrastructure Standard Details, no domestic property shall be more than 46m from a hydrant. Therefore, a new fire hydrant is to be provided in accordance with TGD B, located no less than 6m from the proposed building.

A Pre-Connection-Enquiry has been submitted to Irish Water for the development and a letter of feasibility is currently awaited. The proposed watermain layout is included in Appendix A.

5 SITE ACCESS

The planned development does not involve vehicular traffic, nor the construction of an access road or a carparking area. Pedestrian access to the site will be provided from the adjacent lane via pedestrian gates.

6 FLOODING

With reference to Distillery Walk Apartments, Midleton - Flood Risk Assessment Report – O1058-OCSC-XX-XX-RP-C-0001-S4-P01 - Issued 13 February 2024, OCSC Consulting Engineers investigated the publicly available information in relation to flooding in the Midleton area. Following review of the Arup Flood Maps developed for the Midleton Flood Relief Scheme and the Midleton flooding event of October 18th, 2023, it is proposed to set the finished floor level at 4.22m, to ensure it remains above the current 1:1000-year (0.1% AEP) fluvial flood level with an additional climate change and freeboarding allowance at the site.

Flood maps are included in Appendix E of this report.

Please refer to document no. C1058-OCSC-XX-XX-RP-C-0001-S4-P01 Flood Risk Assessment report for full details.

7 VERIFICATION

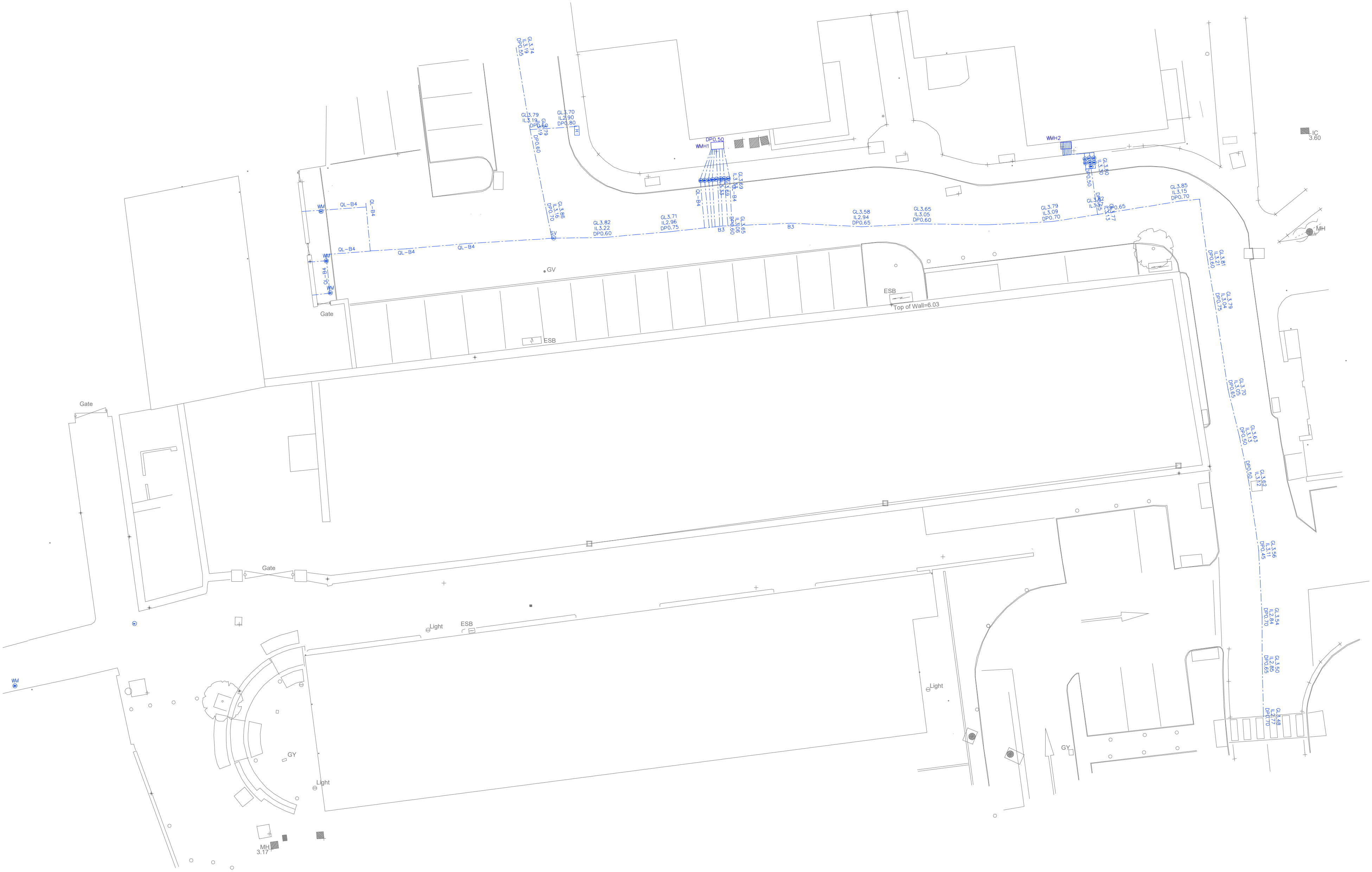
This report was compiled and verified by:

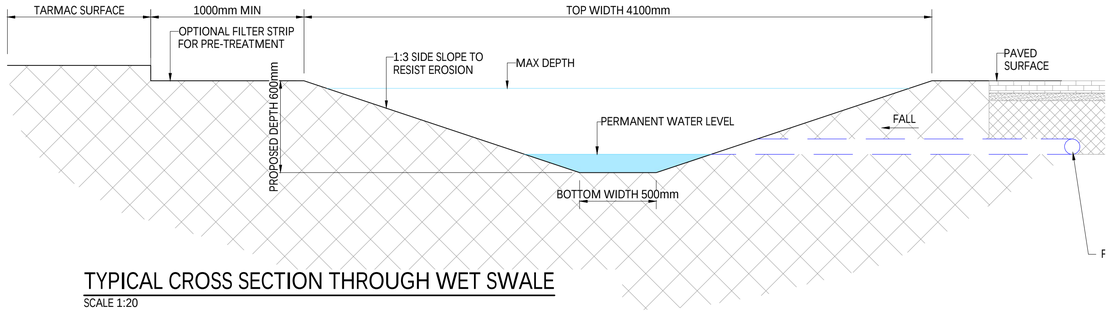
Anett Bognar-Nemeth BSc (Hons), MEng (Hons)
Civil & Structural Project Engineer
O'Connor Sutton Cronin & Associates

Appendix A EXISTING AND PROPOSED DRAINAGE- AND WATERMAIN LAYOUT


SURVEY AREA
SURVEY AREA
SURVEY AREA
SURVEY AREA
SURVEY AREA
SURVEY AREA
SURVEY AREA
SURVEY AREA
SURVEY AREA
SURVEY AREA
Gate
Gate
Gate
GV
ESB
ESB
Top of Wall=6.03
Light
Light
Light
GY
GY
MH
3.17
IC
3.60
F01
CL:3.65
IL:2.35
DPI_30
F02
CL:3.54
IL:2.54
DPO_95
F03
CL:3.79
IL:2.71
F04
CL:3.47
IL:2.17
DPI_30
150MM PVC
100MM PVC
300MM CONC
DPI_10
DPI_20
DPI_30
DPI_05
DPI_15
DPI_25
DPI_35
DPI_45


SURVEY AREA
Gate
ESB
GV
Top of Wall=6.03
Light
GY
SMH OSA
MH 3.17
IC 3.60
150MM PVC
225MM PVC
100MM PVC
450MM CONC
S01
S02
S03
S04
S05
S06
S07
S08
S11
S12


WMH1
DP0.50
WMH2
IC
3.60
MH
GL3.79
IL3.19
DP0.60
GL3.70
IL2.90
DP0.80
GL3.82
IL3.22
DP0.60
GL3.71
IL2.96
DP0.75
GL3.58
IL2.94
DP0.65
GL3.65
IL3.05
DP0.60
GL3.79
IL3.09
DP0.70
GL3.85
IL3.15
DP0.70
QL-B4
B3
WM
GV
Gate
ESB
Top of Wall=6.03
Light
GY
MH
3.17



TYPICAL CROSS SECTION THROUGH WET SWALE

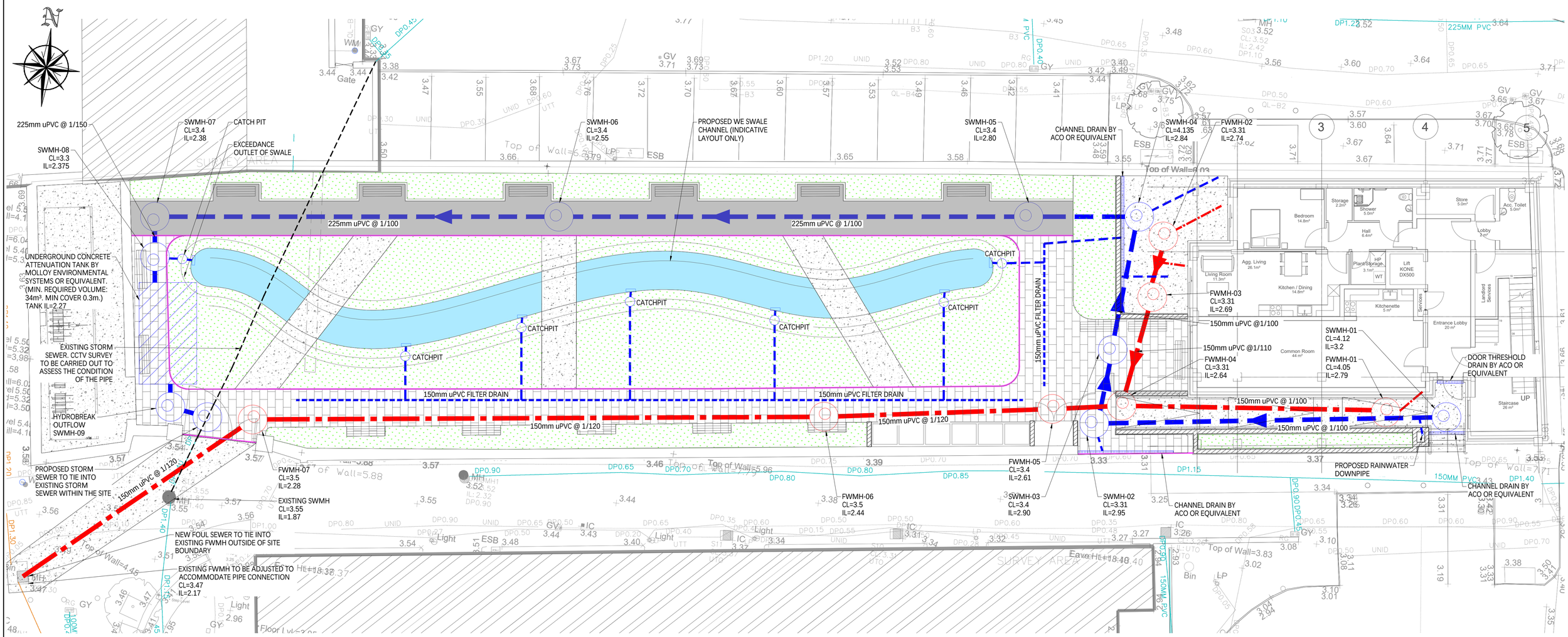
SCALE 1:20

FOUL & SURFACE WATER NOTES:

1. FOR SETTING OUT REFER TO ARCHITECT'S DRAWINGS.
2. THIS DRAWING TO BE READ IN CONJUNCTION WITH ALL OTHER ARCHITECTURAL AND ENGINEERING DRAWINGS AND ALL OTHER RELEVANT DRAWINGS AND SPECIFICATIONS.
3. FOR UNDER FLOOR DRAINAGE ARRANGEMENT PLEASE REFER TO ARCHITECT'S DRAWINGS.
4. DO NOT SCALE THIS DRAWING. USE FIGURE DIMENSIONS ONLY.
5. ALL SURFACE WATER SEWERS SHALL BE CARRIED OUT STRICTLY IN ACCORDANCE WITH THE RECOMMENDATIONS CONTAINED IN "RECOMMENDATIONS FOR SITE DEVELOPMENT WORKS FOR HOUSING AREAS" AS PUBLISHED BY DEPARTMENT OF ENVIRONMENT AND LOCAL GOVERNMENT AND IRISH WATER STANDARD DETAILS FOR WASTE WATER INFRASTRUCTURE.
6. ALL FOWL SEWER WORKS TO BE CARRIED OUT IN ACCORDANCE WITH THE IRISH WATER CODE OF PRACTICE FOR WASTEWATER INFRASTRUCTURE & IRISH WATERS WASTE WATER INFRASTRUCTURE STANDARD DETAILS
7. GROUND LEVELS, COVER LEVELS AND INVERT LEVELS ARE APPROXIMATE ONLY. EXACT LEVELS TO BE CONFIRMED ON SITE.
8. THE DEVELOPMENT SHALL BE CONNECTED TO THE PUBLIC SEWER TO THE SATISFACTION OF THE LOCAL AUTHORITY AND IRISH WATER. THE MINIMUM COVER TO ANY SEWER PIPE SHALL BE 1.2m IN ROAD AND 0.9m IN OPEN SPACES AND FOOTPATHS NOT ADJACENT TO CARRIAGEWAYS. WHERE IT IS NOT POSSIBLE TO ACHIEVE THESE MINIMUM COVERS, PIPES SHALL BE BEDDED AND SURROUNDED IN CONCRETE 150thk.
9. THE SEWERS AND MANHOLES SHALL BE LAID AND TESTED TO THE SATISFACTION OF IRISH WATER AND THE LOCAL AUTHORITY. LAYING, BEDDING AND BACK FILLING OF SEWERS SHALL BE IN ACCORDANCE WITH THE IRISH WATER STANDARD DETAILS.
10. ALL SERVICE TRENCHES IN ROADS SHALL BE BACK FILLED AND PROPERLY COMPACTED WITH GRANULAR MATERIAL IN ACCORDANCE WITH IRISH WATER STANDARD DETAILS FOR WASTEWATER INFRASTRUCTURE.
11. GULLIES A) ALL GULLIES AND MANHOLES LOCATED IN THE PUBLIC ROAD SHALL BE LOCKING TYPE. GULLIES TO BE LOACTED EVERY 45m OR 200m2 OF HARD STANDING. B) DOUBLE GULLIES TO BE PROVIDED AT ALL ROAD SAG CURVES AND CUL DE SACS WHERE INDICATED. SEPARATE CONNECTIONS SHALL BE PROVIDED FOR EACH GULLY.
12. MAIN DRAINGE INDICATED ONLY. ALL SECONDARY DRAINAGE INCLUDING GULLIES, DOOR THRESHOLD DRAINS, BIGTs, RWPs, AJs ETC. OMITTED FOR CLARITY AT THIS STAGE.
13. ALL MANHOLE COVERS TO BE D400
14. ALL MANHOLE COVERS IN PAVEMENT AREAS TO BE RECESSED
15. ALL INTERNAL MANHOLES ARE TO HAVE DOUBLE SEALED, RECESSED MANHOLE COVERS
16. ALL BELOW GROUND FLOOR SLAB FOUL AND SURFACE WATER PIPEWORK TO BE MIN 150Ø U.N.O.
17. REFER TO TYPICAL BELOW GROUND FLOOR SLAB DRAINAGE DETAILS FOR INTERNAL DRAINAGE SUPPORT DETAIL
18. FLOOR GULLIES TO BE CAST INTO CONCRETE SLAB/SCREED. MIN B125 RATED COVER. FINISH TO ARCHITECT'S SPECIFICATION

LEGEND:

- DENOTES NEW uPVC STORM WATER SEWER WITH PIPE SIZE, GRADE, MANHOLE/IC/AJ/MH REF & INVERT LEVEL TO IRISH WATER CODE OF PRACTICE
- DENOTES NEW uPVC FOUL WATER SEWER WITH PIPE SIZE, GRADE, MANHOLE/IC/AJ/MH REF & INVERT LEVEL TO IRISH WATER CODE OF PRACTICE
- DENOTES FILTER DRAIN UNDER PERMEABLE PAVEMENT
- DENOTES NEW VEGETATED WET SWALE
- DENOTES CHANNEL DRAIN BY ACO OR EQUIVALENT
- DENOTES EXISTING STORM SEWER
- DENOTES EXISTING FOUL SEWER
- SUDS INLET BY ACO OR EQUIVALENT



- THIS DRAWING TO BE READ IN CONJUNCTION WITH ALL OTHER RELEVANT DESIGN TEAM DRAWINGS AND SPECIFICATIONS.
- FOR SETTING OUT REFER TO ARCHITECT'S DRAWINGS. DO NOT SCALE THIS DRAWING. USE FIGURED DIMENSIONS ONLY.
- NO PART OF THIS DOCUMENT MAY BE REPRODUCED OR TRANSMITTED IN ANY FORM OR STORED IN ANY RETRIEVAL SYSTEM OF ANY NATURE WITHOUT THE WRITTEN PERMISSION OF O'CONNOR SUTTON CRONIN AS COPYRIGHT HOLDER EXCEPT AS AGREED FOR USE ON THE PROJECT FOR WHICH THE DOCUMENT WAS ORIGINALLY ISSUED.

Rev No.	Date	Revision Note	Drn by	Chkd by
P01	26/02/24	ISSUED FOR PLANNING	MA	ABN
P02	03/05/24	ISSUED FOR PLANNING	MA	ABN

Rev No.	Date	Revision Note	Drn by	Chkd by

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Client: CORK COUNTY COUNCIL
Project: 16No. APARTMENTS AT DISTILLERY LANE, MIDLETON CO.CORK
Title: DRAINAGE LAYOUT

Code	Originator	Zone	Level	Type	Role	Number	Status	Revision
C1058	OCSC	XX	XX	DR	C	0001	S3	P02

Date:02/24 Scale @ A1: 1/100 Drn by:CW Chkd by:ANB Aprvd by:JMcB

THRUST BLOCKS:

THRUST BLOCKS / ANCHOR BLOCKS

1. ANCHOR BLOCKS SHALL BE GRADE C25/30 CONCRETE AND SHALL BE PLACED AROUND PRESSURE PIPES AT BOTH SIDES OF ALL VALVE CHAMBERS AND AT BENDS OF GREATER CURVATURE THAN 22.5°
2. BLOCKS SHALL BE TAKEN 150MM BELOW THE PIPE INVERT FOR THE FULL WIDTH OF TRENCH AND SHALL ENCASE THE PIPES TO 150MM OVER THE TOP OF THE BARREL.
3. THE MIN. LENGTH OF ANCHOR BLOCK SHALL BE 600MM FOR PIPES UP TO 150 . FOR PIPES GREATER THAN 150 THE MINIMUM LENGTH SHALL BE TAKEN AS 900MM.
4. ANCHOR BLOCKS SHALL BE PROVIDED AT ALL DEAD ENDS, TEES & TAPERS.
5. STEEPLY INCLINED PIPELINES SHALL BE SECURED BY TRANSVERSE ANCHOR BLOCKS SPACED IN ACCORDANCE WITH THE FOLLOWING TABLE.

GRADIENT	SPACING
1 IN 2 AND STEEPER	05.5M
1 IN 2 – 1 IN 4	11.0M
1 IN 4 – 1 IN 5	16.6M
1 IN 5 – 1 IN 6	22.0M

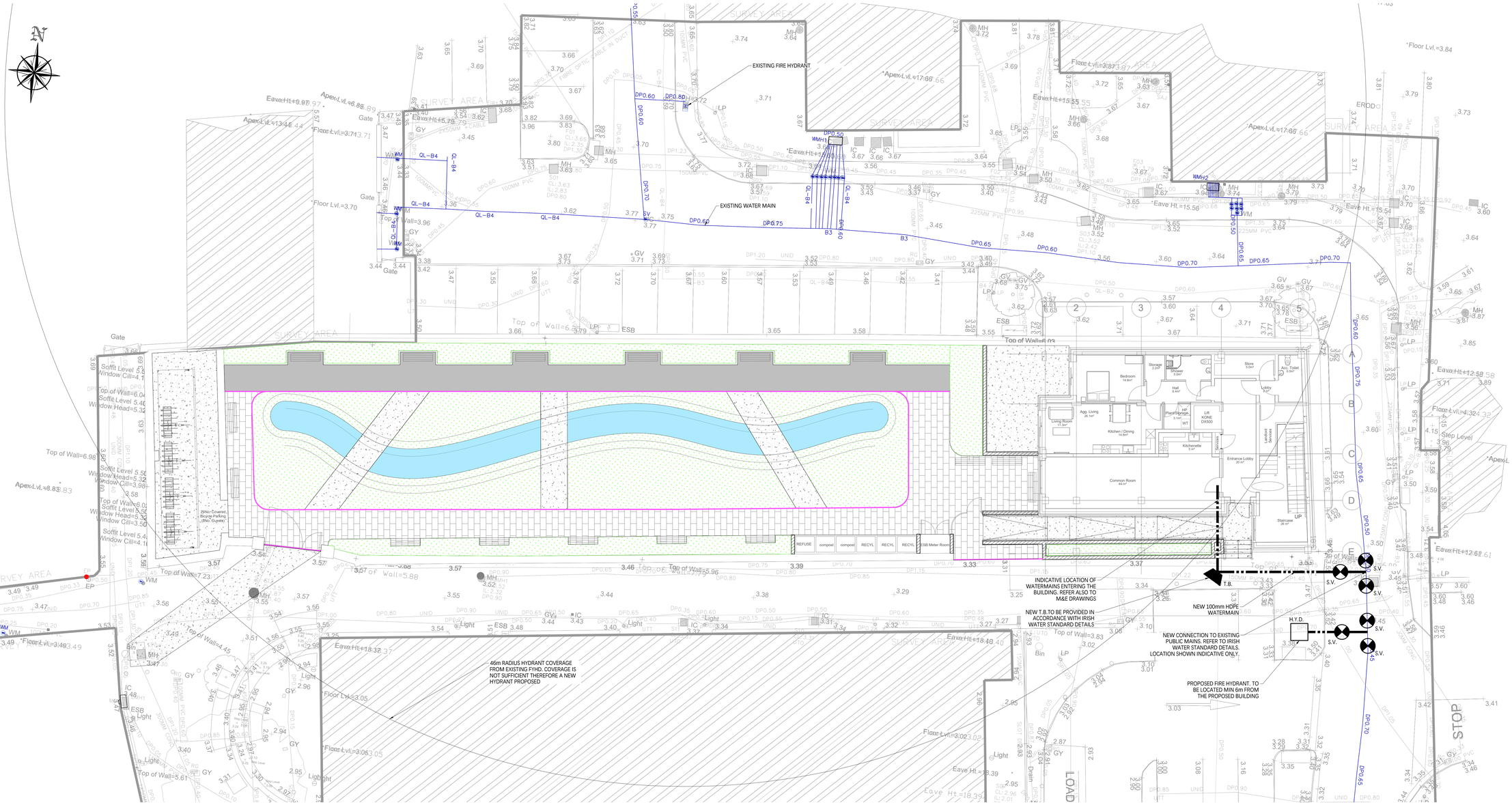
6. ANCHOR BLOCKS ON STEEPLY INCLINED PIPELINES SHALL PROJECT EQUALLY INTO EACH SIDE. OTHER DIMENSIONS SHALL BE AS DETAILED ABOVE.

WATERMAIN NOTES:

1. FOR SETTING OUT REFER TO ARCHITECT'S DRAWINGS.
2. THIS DRAWING TO BE READ IN CONJUNCTION WITH ALL OTHER ARCHITECTURAL AND ENGINEERING DRAWING AND ALL OTHER RELEVANT DRAWINGS AND SPECIFICATIONS.
3. DO NOT SCALE THIS DRAWING. USE FIGURE DIMENSIONS ONLY.
4. ALL WORKS SHALL BE CARRIED OUT STRICTLY IN ACCORDANCE WITH THE RECOMMENDATIONS CONTAINED IN "RECOMMENDATIONS FOR SITE DEVELOPMENT WORKS FOR HOUSING AREAS" AS PUBLISHED BY DEPARTMENT OF ENVIRONMENT AND LOCAL GOVERNMENT AND IRISH WATER STANDARD DETAILS FOR WATER INFRASTRUCTURE.
5. WATERMAIN SHALL BE MINIMUM 100mm HDPE, LAID OUT AS INDICATE ON SITE PLAN.IN ADDITION ON SITE PLAN, SLUICE VALVES SHALL BE FITTED ON EACH CUL-DE-SAC.SLUICE VALVE TYPE SHALL BE AGREED WITH IRISH WATER BEFORE INSTALLATION.
6. EACH DEAD - END MAIN SHALL TERMINATE WITH A HYDRANT FOR FLUSHING PURPOSES.
7. STOPCOCKS SHALL BE PROVIDED ON EACH SERVICE PIPE AND SHALL COMPLY WITH BS 1010. AN APPROPRIATE WATER SERVICE CONTROL UNTIL TO BE INSTALLED AT POINT OF INDIVIDUAL CONNECTION TO BE THE WATERMAIN.
8. MINIMUM COVER TO ALL WATERMAIN SHALL BE 900mm AND MINIMUM COVER TO ALL SERVICE PIPE SHALL BE 600mm.
9. A COMBINATION METERING SYSTEM SHALL BE FITTED TO THE WATERMAIN AS AGREED WITH IRISH WATER.
10. WATERMAIN SHALL BE LAID AND TESTED TO THE SATISFACTION OF IRISH WATER.
11. MARKER STRIPS SHALL BE LAID IN THE TRENCHES IDENTIFYING THE SERVICES UNDERNEATH.
12. INDICATOR PLATES SHALL BE ERECTED ADJACENT TO ALL FIRE HYDRANTS AND SLUICE VALVES.

LEGEND:

- S.V. SLUICE VALVE
- S.C. STOP COCK
- F.M. FLOW METER
- H.Y.D. FIRE HYDRANT
- T.B. THRUST BLOCK
- HDPE WATERMAIN
- EXISTING WATERMAIN



- THIS DRAWING TO BE READ IN CONJUNCTION WITH ALL OTHER RELEVANT DESIGN TEAM DRAWINGS AND SPECIFICATIONS.
- FOR SETTING OUT REFER TO ARCHITECT'S DRAWINGS. DO NOT SCALE THIS DRAWING. USE FIGURED DIMENSIONS ONLY.
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Rev No.	Date	Revision Note	Drn by	Chkd by
P01	26/02/24	ISSUED FOR PLANNING	MA	ABN
P02	03/05/24	ISSUED FOR PLANNING	MA	ABN

Rev No.	Date	Revision Note	Drn by	Chkd by

OCSC
O'CONNOR SUTTON CRONIN
MULTIDISCIPLINARY CONSULTING ENGINEERS
Civil / Structural / Environmental / Mechanical / Electrical / Sustainability
Cork Office: North Point House, North Point Business Park, New Mallow Road, Cork.
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Dublin · London · Belfast · Galway · Cork · Birmingham

Client: CORK COUNTY COUNCIL
Project: 16No. APARTMENTS AT DISTILLERY LANE, MIDLETON CO.CORK
Title: WATERMAIN LAYOUT

Code	Originator	Zone	Level	Type	Role	Number	Status	Revision
C1058	OCSC	XX	XX	DR	C	0200	S3	P02

Date: 02/24 Scale @ A0: 1/100 Drn by: CW Chkd by: ANB Aprvd by: JMcB

Appendix B FOUL WATER DESIGN CALCULATIONS

JOB NAME:	**JOB NO:**	**DATE:**	**Pipe Ks: 1.5**
Distillery Lane Apartments, Midleton, Co. Cork	C1058	08/11/2023	
TITLE:	**CALCS BY:**	**CHECK'D:**	**DU / House:**
FOUL SEWER CAPACITY CALCS	ABN	CM	

O'CONNOR SUTTON CRONIN
NORTH POINT HOUSE
NORTH POINT BUSINESS PARK
NEW MALLOW ROAD
CORK.
Tel: 021 2355816

Pipe Section			RESIDENTIAL			COMMERCIAL											
			Pop.	DWF (l/s) (150 l/d/p)	Design Flow (6xDWF)	Pop	DWF (l/s) (30 l/d/p)	Design Flow (6xDWF)	Total DWF (l/s)	Pipe Diameter (mm)	U/S IL (m)	D/S IL (m)	Length (m)	Slope (1:X)	Pipe Capacity (l/s)	Adequate Capacity?	Prop. Velocity (m/s)
FWMH 01	to	FWMH 04	12	0.020833	0.13	0	0.00	0.00	0.13	150	2.79	2.64	15.4	103	15.27	✓	0.23
FWMH 02	to	FWMH 03	10	0.017361	0.10	0	0.00	0.00	0.10	150	2.74	2.69	5.0	100	15.47	✓	0.18
FWMH 03	to	FWMH 04	22	0.038194	0.23	0	0.00	0.00	0.23	150	2.69	2.64	5.0	100	15.44	✓	0.29
FWMH 04	to	FWMH 05	32	0.055556	0.33	0	0.00	0.00	0.33	150	2.64	2.61	3.5	117	14.31	✓	0.31
FWMH 05	to	FWMH 06	32	0.055556	0.33	0	0.00	0.00	0.33	150	2.61	2.44	20.0	118	14.25	✓	0.31
FWMH 06	to	FWMH 07	32	0.055556	0.33	0	0.00	0.00	0.33	150	2.44	2.28	19.0	119	14.19	✓	0.31
FWMH 07	to	EXISTING FWMH	32	0.055556	0.33	0	0.00	0.00	0.33	150	2.28	2.17	13.0	118	14.22	✓	0.31

Note:
Self cleansing is considered to be satisfied by a 150mm diameter sewer having a gradient not flatter than 1 in 150 and a flow rate greater than 0.46 l / s (equivalent of 10 dwellings). Where the sewer is 100mm in diamter the minium acceptable gradient is 1 in 80 where at least 1 WC is connected

Appendix C STORM WATER DESIGN CALCULATIONS

Project: Distillery Lane Apartments
Project No.: C1058
Calculation: Attenuation 100-year
Calcs By: ABN
Checked By: JMcB
Date: 22/01/2024

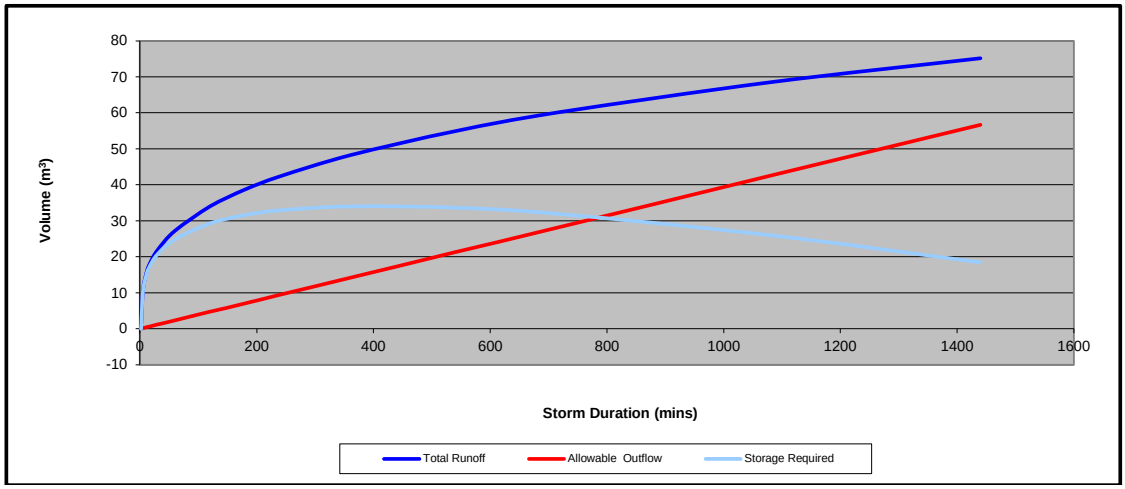
Site Location:	Midleton		
Design Storm Return Period:	100 years		
Climate Change Factor:	20 %		
Soil Type:	3		
Total Site Area:	0.110 ha		
Hardstand Area:	0.059 ha	……@	100% Impervious
Softstand Area:	0.05 ha	……@	0% pervious
Effective Impermeable Area:	0.059 ha		

Allowable Outflow	**Calculate**
IH124: QBAR = 0.00108 x $AREA^{0.89}$ x $SAAR^{1.17}$ x $SOIL^{2.17}$	
AREA:	0.0006 km^2
SAAR:	1306.5 mm
SOIL:	0.37
QBAR/ha	5.96 l/s/ha
Allowable Outflow	**0.66 l/s**

Storage required =	**34 m^3**	

Duration (min)	Rainfall 100-Year (mm)	Rainfall 100-Year with CCF (mm)	Intensity (mm/hr)	Discharge (Q = 2.71iA) (l/s)	Proposed Runoff (m^3)	Contiguous Land Runoff (m^3)	Total Runoff (m^3)	Allowable Outflow (m^3)	Storage Required (m^3)
2	0.0	0.0	0.0	0	0	0	0	0	0
5	15.4	18.5	221.8	35	11	0	11	0	10
10	21.5	25.8	154.8	25	15	0	15	0	14
15	25.3	30.4	121.4	19	17	0	17	1	17
30	31.6	37.9	75.8	12	22	0	22	1	21
60	39.4	47.3	47.3	8	27	0	27	2	25
120	49.2	59.0	29.5	5	34	0	34	5	29
180	56.0	67.2	22.4	4	39	0	39	7	32
240	61.3	73.6	18.4	3	42	0	42	9	33
360	69.8	83.8	14.0	2	48	0	48	14	34
540	79.5	95.4	10.6	2	55	0	55	21	34
720	87.2	104.6	8.7	1	60	0	60	28	32
1080	99.2	119.0	6.6	1	69	0	69	42	26
1440	108.8	130.6	5.4	1	75	0	75	57	18
2880	124.8	149.8	3.1	0	86	0	86	113	-27
4320	138.3	166.0	2.3	0	96	0	96	170	-74
5760	150.1	180.1	1.9	0	104	0	104	227	-123
8640	170.9	205.1	1.4	0	118	0	118	340	-222
11520	189.3	227.2	1.2	0	131	0	131	453	-323
14400	206.0	247.2	1.0	0	142	0	142	567	-424
17280	221.5	265.8	0.9	0	153	0	153	680	-527
23040	250.1	300.1	0.8	0	173	0	173	907	-734
28800	276.4	331.7	0.7	0	191	0	191	1133	-942
36000	306.9	368.3	0.6	0	212	0	212	1417	-1205

Project:	Distillery Lane Apartments
Project No.:	C1058
Calculation:	Attenuation 100-year
Calcs By:	ABN
Checked By:	JMcB
Date:	22/01/2024



Met Eireann
Return Period Rainfall Depths for sliding Durations
Irish Grid: Easting: 188295, Northing: 73497,

	Interval		Years												
DURATION	6months,	1year,	2,	3,	4,	5,	10,	20,	30,	50,	75,	100,	150,	200,	250,	500,
5 mins	3.0,	4.2,	4.8,	5.7,	6.4,	6.8,	8.4,	10.2,	11.3,	12.9,	14.3,	15.4,	17.1,	18.4,	19.5,	N/A ,
10 mins	4.2,	5.8,	6.7,	8.0,	8.9,	9.5,	11.7,	14.1,	15.8,	18.0,	20.0,	21.5,	23.9,	25.7,	27.2,	N/A ,
15 mins	4.9,	6.9,	7.9,	9.4,	10.4,	11.2,	13.8,	16.6,	18.5,	21.2,	23.5,	25.3,	28.1,	30.2,	32.0,	N/A ,
30 mins	6.5,	9.0,	10.3,	12.1,	13.4,	14.4,	17.6,	21.1,	23.4,	26.6,	29.4,	31.6,	34.9,	37.5,	39.6,	N/A ,
1 hours	8.7,	11.7,	13.3,	15.7,	17.3,	18.5,	22.4,	26.7,	29.5,	33.4,	36.8,	39.4,	43.4,	46.4,	49.0,	N/A ,
2 hours	11.5,	15.4,	17.4,	20.3,	22.3,	23.8,	28.6,	33.8,	37.2,	41.9,	46.0,	49.2,	53.9,	57.6,	60.6,	N/A ,
3 hours	13.5,	18.0,	20.3,	23.6,	25.8,	27.5,	32.9,	38.9,	42.7,	47.9,	52.5,	56.0,	61.2,	65.3,	68.6,	N/A ,
4 hours	15.2,	20.1,	22.6,	26.3,	28.7,	30.6,	36.4,	42.9,	47.0,	52.7,	57.6,	61.3,	67.0,	71.4,	74.9,	N/A ,
6 hours	17.9,	23.5,	26.4,	30.6,	33.3,	35.4,	42.0,	49.2,	53.8,	60.2,	65.7,	69.8,	76.1,	80.9,	84.9,	N/A ,
9 hours	21.1,	27.5,	30.8,	35.5,	38.6,	41.0,	48.5,	56.6,	61.7,	68.8,	74.9,	79.5,	86.5,	91.8,	96.1,	N/A ,
12 hours	23.7,	30.8,	34.4,	39.6,	42.9,	45.5,	53.6,	62.4,	68.0,	75.6,	82.2,	87.2,	94.7,	100.4,	105.0,	N/A ,
18 hours	28.0,	36.0,	40.1,	46.0,	49.8,	52.7,	61.9,	71.7,	77.9,	86.4,	93.7,	99.2,	107.6,	113.9,	119.0,	N/A ,
24 hours	31.4,	40.3,	44.8,	51.2,	55.4,	58.5,	68.5,	79.1,	85.8,	95.0,	102.9,	108.8,	117.7,	124.5,	130.0,	148.7,
2 days	40.3,	50.6,	55.7,	62.9,	67.5,	71.0,	81.9,	93.4,	100.6,	110.3,	118.6,	124.8,	134.1,	141.1,	146.8,	165.9,
3 days	47.7,	59.0,	64.6,	72.5,	77.5,	81.3,	93.0,	105.2,	112.8,	123.1,	131.8,	138.3,	147.9,	155.2,	161.1,	180.7,
4 days	54.3,	66.5,	72.5,	80.9,	86.3,	90.3,	102.7,	115.6,	123.6,	134.3,	143.4,	150.1,	160.2,	167.7,	173.7,	193.9,
6 days	66.0,	79.8,	86.6,	95.9,	101.8,	106.3,	119.8,	133.9,	142.5,	154.0,	163.7,	170.9,	181.6,	189.5,	195.9,	217.2,
8 days	76.5,	91.8,	99.1,	109.2,	115.7,	120.4,	135.0,	150.0,	159.2,	171.4,	181.7,	189.3,	200.5,	208.8,	215.5,	237.7,
10 days	86.4,	102.8,	110.7,	121.5,	128.4,	133.5,	148.9,	164.8,	174.5,	187.3,	198.0,	206.0,	217.7,	226.4,	233.3,	256.3,
12 days	95.7,	113.2,	121.5,	133.1,	140.3,	145.7,	161.9,	178.6,	188.7,	202.1,	213.3,	221.5,	233.7,	242.7,	249.9,	273.6,
16 days	113.2,	132.7,	141.9,	154.5,	162.5,	168.3,	186.1,	204.0,	215.0,	229.3,	241.3,	250.1,	263.1,	272.6,	280.3,	305.4,
20 days	129.6,	150.9,	160.9,	174.5,	183.1,	189.4,	208.4,	227.6,	239.2,	254.4,	267.1,	276.4,	290.0,	300.1,	308.1,	334.4,
25 days	149.2,	172.4,	183.3,	198.1,	207.3,	214.1,	234.5,	255.0,	267.4,	283.6,	297.0,	306.9,	321.3,	331.9,	340.3,	367.9,

NOTES:
N/A Data not available
These values are derived from a Depth Duration Frequency (DDF) Model
For details refer to:
'Fitzgerald D. L. (2007), Estimates of Point Rainfall Frequencies, Technical Note No. 61, Met Eireann, Dublin',
Available for download at www.met.ie/climate/dataproducts/Estimation-of-Point-Rainfall-Frequencies_TN61.pdf

JOB NAME:	JOB NO:	DATE:	Pipe Ks:	0.6 mm
Distillery Lane Apartments, Midleton, Co. Cork	C1058	23/11/21		
			Te:	4 mins
TITLE:	CALCS BY:	CHECK'D:		
	ABN	CM	Design Storm:	5 years
STORM SEWER CAPACITY CALCS				

Pipe Section			U/S Level (m)	D/S Level (m)	Length (m)	Slope (1:X)	Pipe Diameter (mm)	Pipe Capacity (l/s)	Full Velocity (m/s)	T_{pipe} (mins)	Tc (mins)	Rainfall Intensity, i (mm/hr)	Imp Area (Ha)	Cum. Imp Area (Ha)	Flow (Q = 2.71Ai) (l/s)	Adequate Capacity?
SWMH 01	to	SWMH 02	3.12	2.95	17	100	225	51.93	1.31	0.22	4.22	93.04	0.02	0.02	3.78	✓
SWMH 02	to	SWMH 03	2.95	2.90	5	100	225	51.93	1.31	0.06	4.28	91.95	0.0005	0.02	3.86	✓
SWMH 03	to	SWMH 04	2.9	2.84	6	100	225	51.93	1.31	0.08	4.36	90.69	0.0005	0.016	3.93	✓
SWMH 04	to	SWMH 05	2.84	2.8	4	100	225	51.93	1.31	0.05	4.41	89.87	0.03	0.044	10.72	✓
SWMH 05	to	SWMH 06	2.8	2.55	25	100	225	51.93	1.31	0.32	4.73	85.15	0.00	0.044	10.15	✓
SWMH 06	to	SWMH 07	2.55	2.38	17	100	225	51.93	1.31	0.22	4.94	82.29	0.00	0.044	9.81	✓
SWMH 07	to	SWMH 08	2.38	2.375	0.5	100	225	51.93	1.31	0.01	4.95	82.21	0.00	0.044	9.80	✓
SWMH 08	to	ATT. TANK	2.375	2.37	0.5	100	225	51.93	1.31	0.01	4.96	82.13	0.00	0.044	9.79	✓
ATT. TANK	to	EXISTING MH	1.92	1.90	2	100	225	51.93	1.31	0.03	4.98	81.81	0.00	0.044	9.76	✓

Project:	Distillery Lane Apartments
Project No.:	C1058
Calculation:	Attenuation 100-year
Calcs By:	ABN
Checked By:	JMcB
Date:	22/01/2024

O'CONNOR SUTTON CRONIN
NORTH POINT HOUSE
NORTH POINT BUSINESS PARK
NEW MALLOW ROAD
CORK.
Tel: 021 2355816

Site Location:	Midleton	
Design Storm Return Period:	100 years	
Climate Change Factor:	20 %	
Total Area of pervious pavement:	0.02 ha	
Hardstand Area:	0.02 ha	……@ 100% pervious
Effective Impermeable Area A_D:	0.02 ha	

Soakaway Design - To BRE Digest 365				
Infiltration Coefficient from Percolation Test		0.011805	m/min	average value from SI report
Soil Infiltration Rate	f	1.97E-04	m/s	Infitration Coefficeint / F
Length	L	50	m	length of filter drain
Effective Depth	D_e	0.5	m	
Porosity of Fill Material	n	0.95		
Width	W	1.5	m	width of paved path
Internal Surface Area @ 50% Depth	$a_{s50\%}$	25.75	m	

REQUIRED STORAGE: **2.176 m^3**

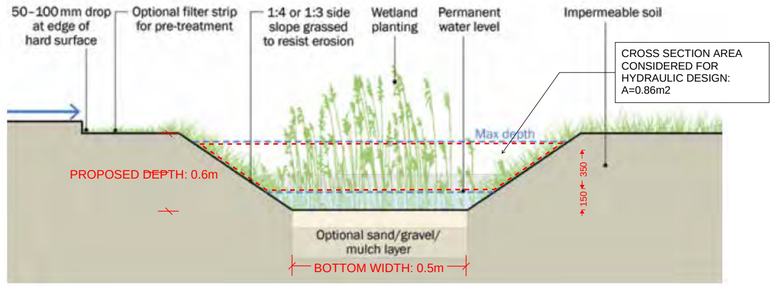
DIMENSIONS (L x W x H): **50.000m x 2.000m x 0.50m**

Duration (min)	Rainfall 100-Year (mm)	Rainfall 100-Year with CCF (mm)	Inflow I (m^3)	Outflow O (m^3)	Required Storage S (m^3)	Volume Provided P	Optimum (Size to ensure P>S) = P - S	Time of emptying half storage volume $t_{s50\%}$ (hrs)
2	0.0	0.0	0.000	0.608	-0.608	35.625	36.233	-0.02
5	15.4	18.5	3.696	1.520	**2.176**	35.625	33.449	0.06
10	21.5	25.8	5.160	3.040	2.120	35.625	33.505	0.06
15	25.3	30.4	6.072	4.560	1.512	35.625	34.113	0.04
30	31.6	37.9	7.584	9.119	-1.535	35.625	37.160	-0.04
60	39.4	47.3	9.456	18.239	-8.783	35.625	44.408	-0.24
120	49.2	59.0	11.808	36.477	-24.669	35.625	60.294	-0.68
180	56.0	67.2	13.440	54.716	-41.276	35.625	76.901	-1.13
240	61.3	73.6	14.712	72.955	-58.243	35.625	93.868	-1.60
360	69.8	83.8	16.752	109.432	-92.680	35.625	128.305	-2.54
540	79.5	95.4	19.080	164.149	-145.069	35.625	180.694	-3.98
720	87.2	104.6	20.928	218.865	-197.937	35.625	233.562	-5.43
1080	99.2	119.0	23.808	328.297	-304.489	35.625	340.114	-8.35
1440	108.8	130.6	26.112	437.729	-411.617	35.625	447.242	-11.28
2880	124.8	149.8	29.952	875.459	-845.507	35.625	881.132	-23.18
4320	138.3	166.0	33.192	1313.188	-1279.996	35.625	1315.621	-35.09
5760	150.1	180.1	36.024	1750.918	-1714.894	35.625	1750.519	-47.01
8640	170.9	205.1	41.016	2626.376	-2585.360	35.625	2620.985	-70.88
11520	189.3	227.2	45.432	3501.835	-3456.403	35.625	3492.028	-94.75
14400	206.0	247.2	49.440	4377.294	-4327.854	35.625	4363.479	-118.64
17280	221.5	265.8	53.160	5252.753	-5199.593	35.625	5235.218	-142.54
23040	250.1	300.1	60.024	7003.670	-6943.646	35.625	6979.271	-190.35
28800	276.4	331.7	66.336	8754.588	-8688.252	35.625	8723.877	-238.18
36000	306.9	368.3	73.656	10943.235	-10869.579	35.625	10905.204	-297.98

Appendix D SUSTAINABLE URBAN DRAINAGE SYSTEMS

PROPOSED SUDS MEASURES ACCORDING TO STRATEGIC FLOOD RISK ASSESSMENT (SFRA) AS PART OF CORK COUTY DEVELOPMENT PLAN 2022:

- RAISED GROUND FLOOR LEVEL
- SWALE COLLECT RUNOFF FROM HARD SURFACE WITH FILTER STRIP FOR PRE-TREATMENT (NO NEED FOR KERBS AND GULLIES) + DRAIN PATHS VIA FILTER DRAIN
- PROVISION OF VEGETATED SWALES (CONVEYANCE CHANNEL) IN ACCORDANCE WITH CIRIA SUDS MANUAL 2015
- ATTENUATION TANK TO CONTROL RAINWATER DISCHARGE INTO THE EXISTING STORM SEWER AND DECREASE RISK OF FLOODING FROM THE SWALE



TYPICAL CROSS SECTION OF A WET SWALE AS PER FIGURE 17.3 IN CIRIA SuDS MANUAL 2015

SWALE TO BE DESIGNED FOR MAX VELOCITY 1.0m/s

HYDRAULIC DESIGN CHECK:
HYDRAULIC FLOW VELOCITY CALCULATION USING MANNING'S EQUATION: v=(R^2/3*S^1/2)/n
HYDRAULIC RADIUS: CROSS SECTION/WETTED PERIMETER
R=A/P =0.86m2/3.61m=0.238
S: AVERAGE LONGITUDINAL SLOPE 1.5%->0.015
n: MANNING'S NUMBER: 0.3 TAKEN FOR GRASSED CHANNEL
v=0.157m/s <1.0m/s -> adequate

Outflow pipe capacity check: 225mm dia pipe proposed
Q(l/s)=A*v ->Q=0.0134 m3/s=13.4 l/s ->adequate capacity

Pipe Section	U/S Level (m)	D/S Level (m)	Length (m)	Slope (1:X)	Pipe Diameter (mm)	Pipe Capacity (l/s)	Full Velocity (m/s)	Flow (Q = 2.71Ai) (l/s)	Adequate Capacity?
Swale to outflow	2.894	2.877	1.7	100	225	51.93	1.31	13.40	✓

Inlet to swale:
total permeable area 0.02ha / 6 inlet: 0.003ha

Allowable Outflow	Calculate
IH124: QBAR = 0.00108 x AREA$^{0.89}$ x SAAR$^{1.17}$ x SOIL$^{2.17}$	
AREA:	0.0000 km^2
SAAR:	1091 mm
SOIL:	0.37
QBAR/ha	4.83 l/s/ha
Allowable Outflow	**0.014 l/s**

Flow into the swale is less than the flow capacity in the swale --> inlet is adequate

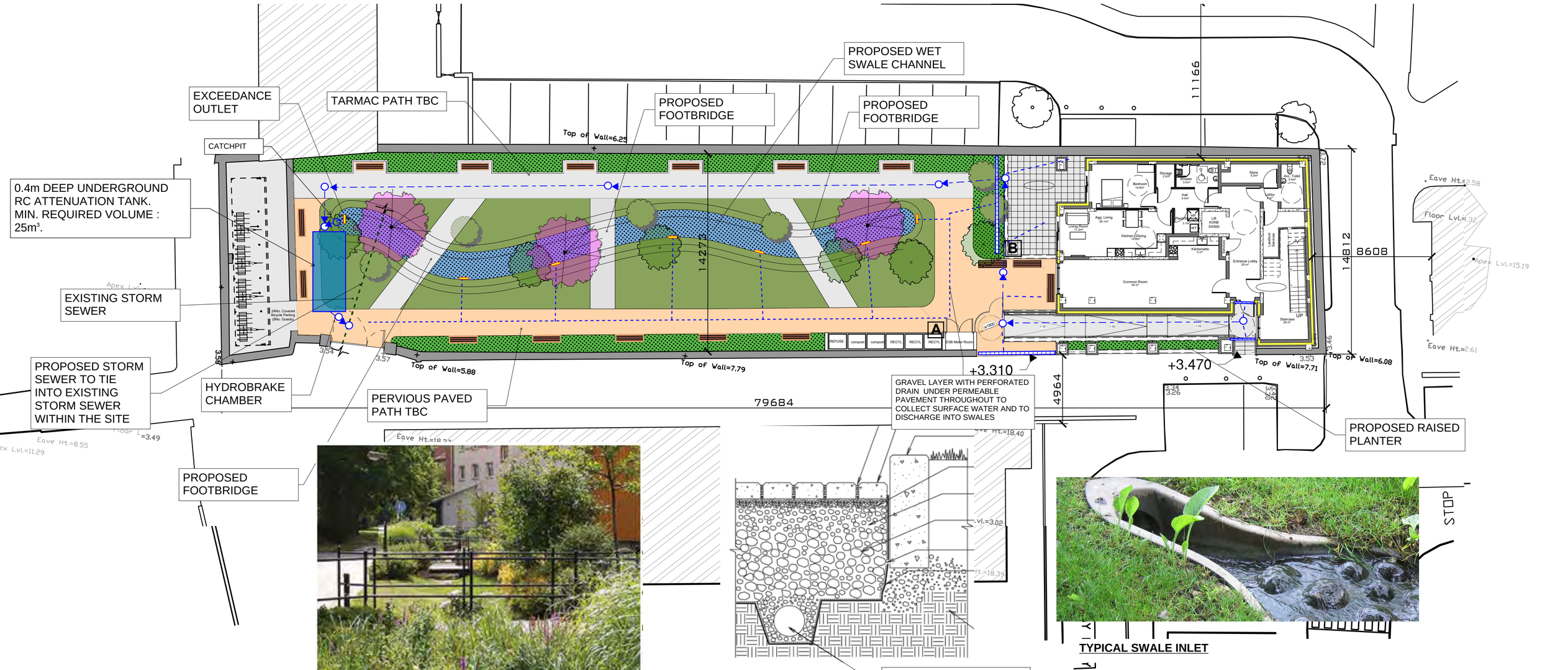


IMAGE OF TYPICAL FOOTBRIDGE OVER SWALE CHANNEL WITH HANDRAIL

TYPICAL SECTION THROUGH PERMEABLE PAVEMENT WITH DRAINAGE

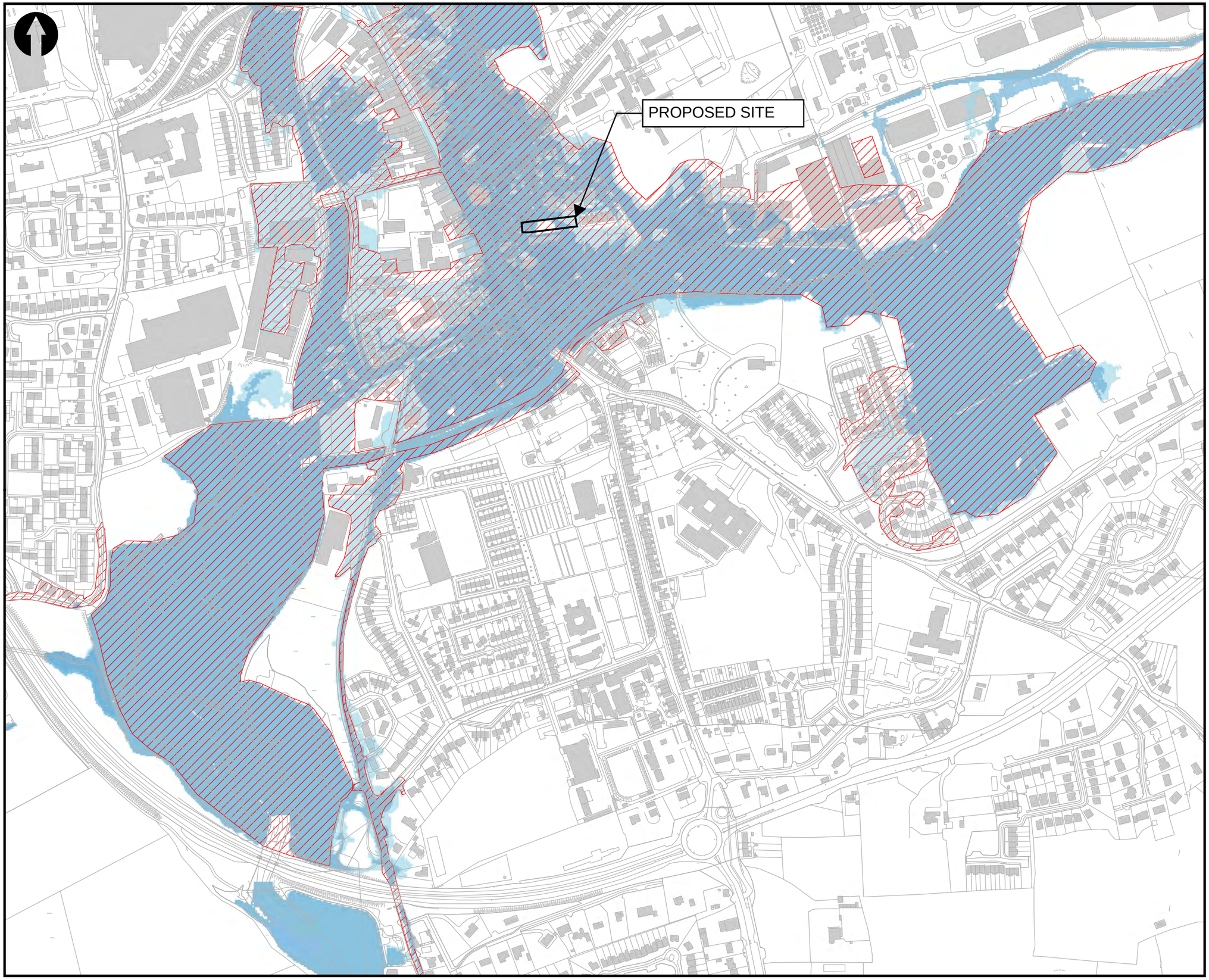
TYPICAL SWALE INLET

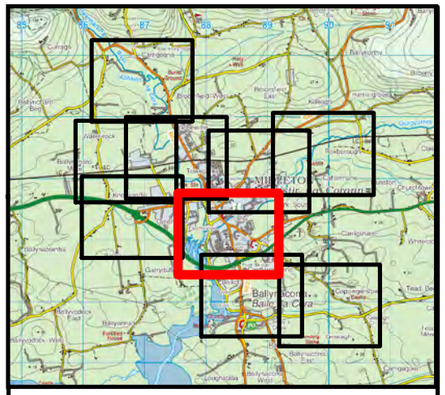
OCSC
O'CONNOR · SUTTON · CRONIN
MULTIDISCIPLINARY CONSULTING ENGINEERS

C1058-OCSC-XX-XX-SK-C-0002-P03-S3
PROPOSED SUDS MEASURES

REV: P03	BY: ABN	DATE: 03/05/24

Appendix E FLOOD MAPS





Legend:

- 1% Fluvial AEP
- 0.1% Fluvial AEP
- Storm Babet Estimated Flood Extent

WORKING DRAFT

Rev:	Note:	Date:

ARUP

Map:
Midleton Storm Babet (18/10/2023)
Estimated Flood Extents

Map type:	Fluvial Flood Extents	
Source:	Midleton Flood Relief Scheme	
Scenario:	Storm Babet	
Drawn By:	CB	Date: 20/12/2023
Checked By:	KB	Date: 20/12/2023
Approved By:	BO'B	Date: 20/12/2023
Drawing No:	1	
Map Series:	Page 3 of 9	
Drawing Scale:	1:5,000 @ A3	

0 50 100 200 300 400 500 Meters

PROPOSED SITE

3OWE_2281

R3.00373

3DUN_1030

3DUN_422

3DUN_0

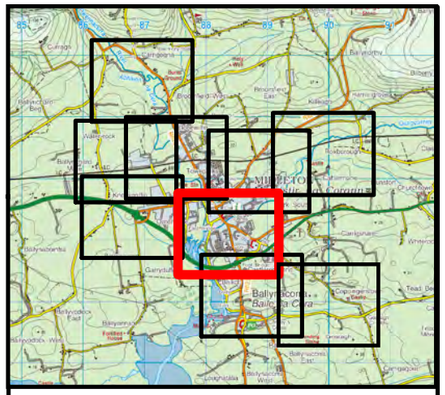
3DUN_-47

3OWE_1587

3OWE_1270

Node Label	Water Level (OD) 10% AEP	Flow (m^3/s) 10% AEP	Water Level (OD) 1% AEP	Flow (m^3/s) 1% AEP	Water Level (OD) 0.1% AEP	Flow (m^3/s) 0.1% AEP
3DUN_1030	4.16	18.29	4.29	21.06	4.48	24.44
3DUN_422	3.13	21.32	3.42	21.78	3.77	23.19
3DUN_0	2.50	21.62	2.71	31.56	3.17	39.99
3DUN_-47	2.48	21.67	2.68	31.62	3.04	42.33
R3.00373	7.01	1.68	7.02	1.69	7.04	1.75
3OWE_2281	3.03	48.19	3.48	78.44	3.95	102.51
3OWE_1587	2.46	60.48	2.67	93.97	2.95	138.00
3OWE_1270	2.38	78.98	2.49	118.91	2.54	173.21

0 50 100 200 300 400 500 Meters



Legend:

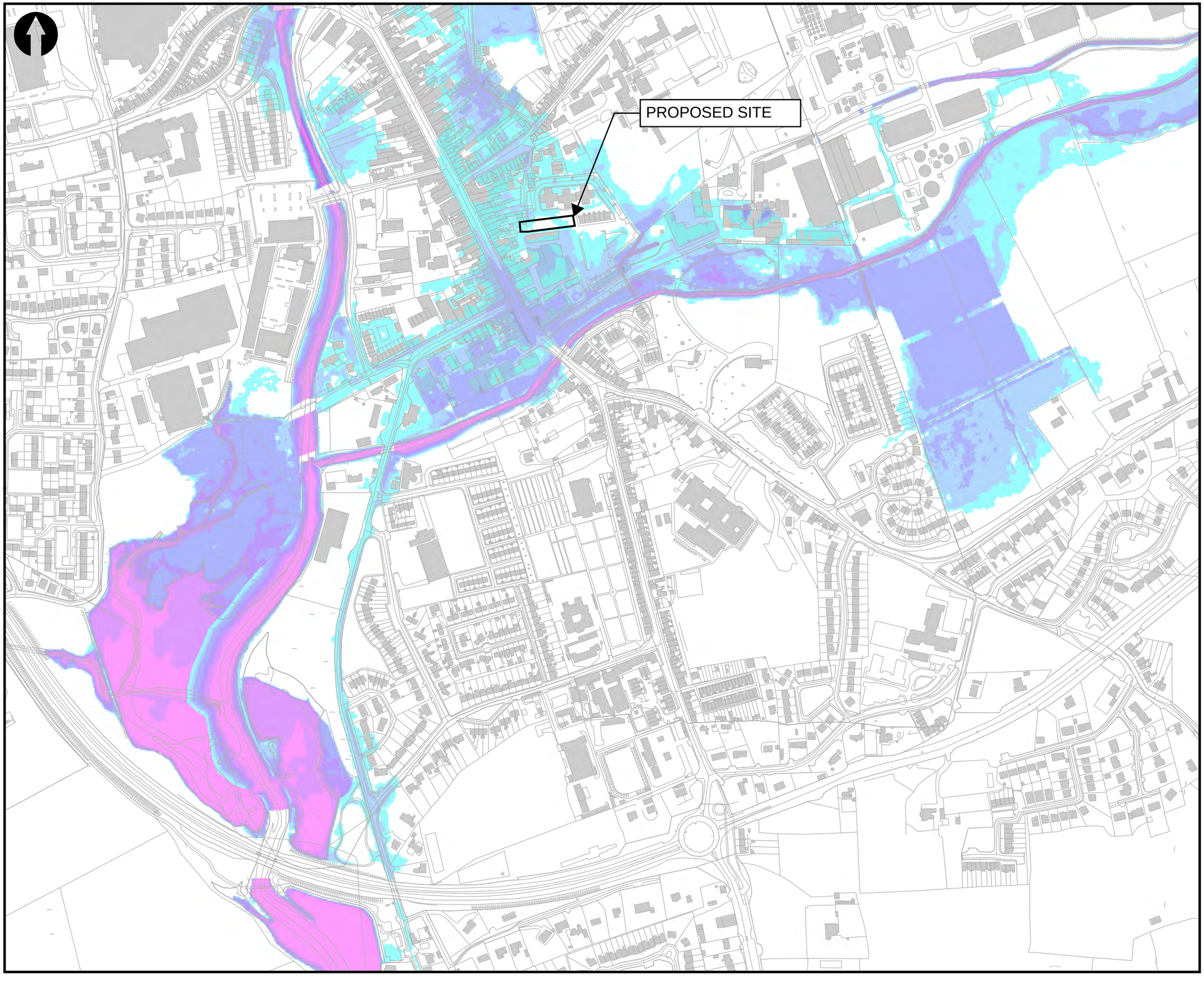
- 10% Fluvial AEP
- 1% Fluvial AEP
- 0.1% Fluvial AEP

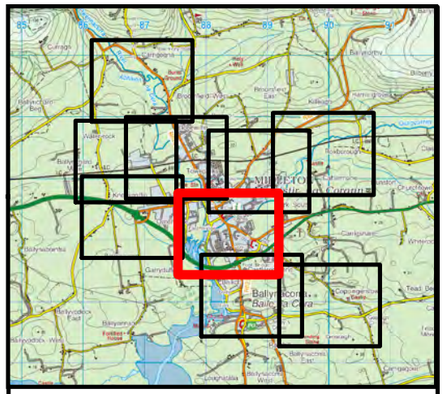
Rev:	Note:	Date:

ARUP

Map:
Midleton Fluvial Flood Extents

Map type:	Fluvial Flood Depth	
Source:	Midleton Flood Relief Scheme	
Scenario:	Current	
Drawn By:	CB	Date: 21/09/2022
Checked By:	KB	Date: 21/09/2022
Approved By:	BO'B	Date: 21/09/2022
Drawing No:	1	
Map Series:	Page 3 of 9	
Drawing Scale:	1:5,000 @ A3	





Legend:

1% Fluvial AEP Flood Depth (m)

- 0 - 0.25
- 0.25 - 0.5
- 0.5 - 1.0
- 1.0 - 1.5
- 1.5 - 2.0
- > 2

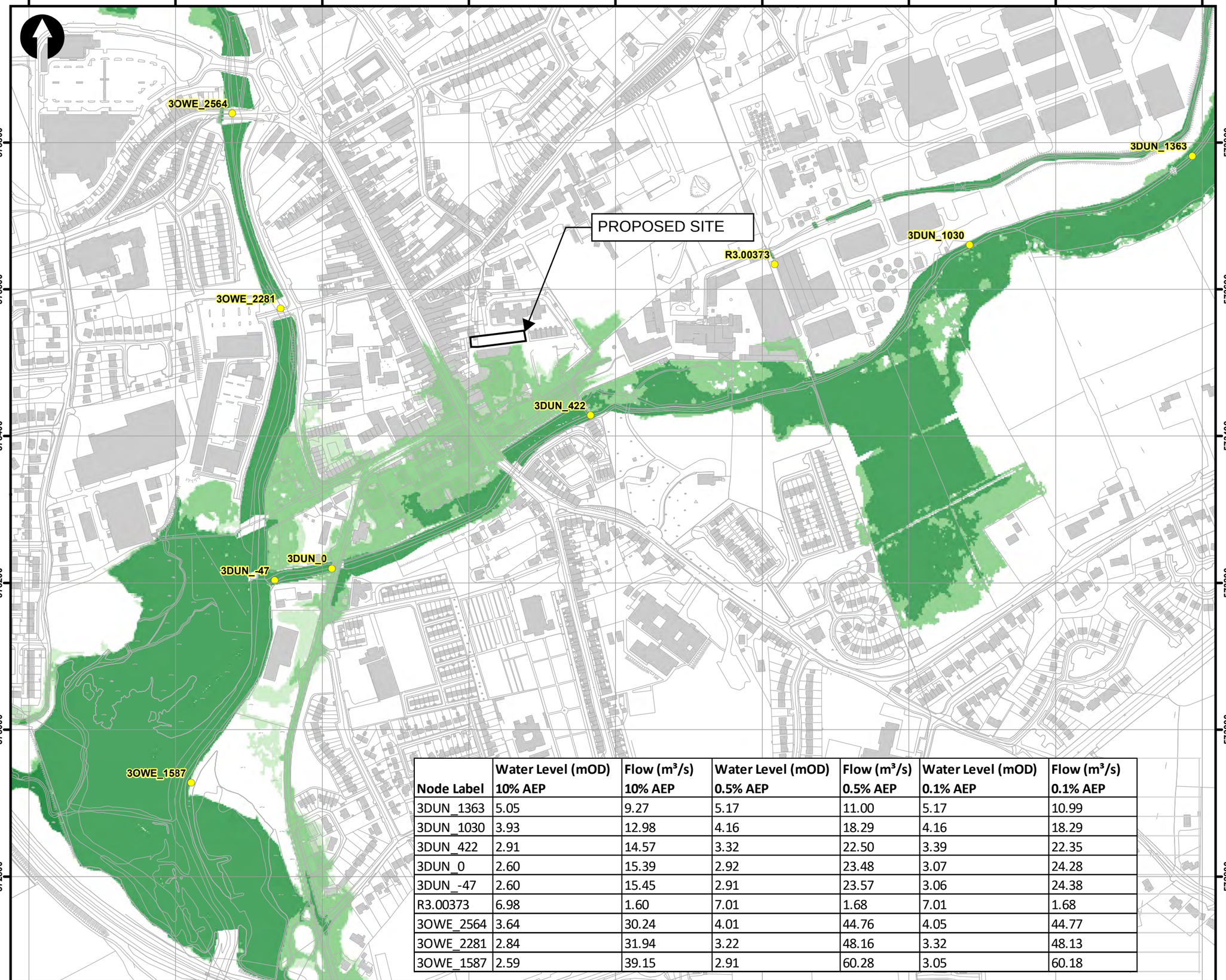
0 50 100 200 300 400 500 Meters

Rev:	Note:	Date:

ARUP

Map:
Midleton Fluvial Flood Depths

Map type:	Fluvial Flood Depth	
Source:	Midleton Flood Relief Scheme	
Scenario:	Current	
Drawn By:	CB	Date: 22/09/2022
Checked By:	KB	Date: 22/09/2022
Approved By:	BO'B	Date: 22/09/2022
Drawing No:	1	
Map Series:	Page 3 of 9	
Drawing Scale:	1:5,000 @ A3	



Legend:

- 10% Tidal AEP
- 0.5% Tidal AEP
- 0.1% Tidal AEP

Node Label	Water Level (mOD) 10% AEP	Flow (m^3/s) 10% AEP	Water Level (mOD) 0.5% AEP	Flow (m^3/s) 0.5% AEP	Water Level (mOD) 0.1% AEP	Flow (m^3/s) 0.1% AEP
3DUN_1363	5.05	9.27	5.17	11.00	5.17	10.99
3DUN_1030	3.93	12.98	4.16	18.29	4.16	18.29
3DUN_422	2.91	14.57	3.32	22.50	3.39	22.35
3DUN_0	2.60	15.39	2.92	23.48	3.07	24.28
3DUN_-47	2.60	15.45	2.91	23.57	3.06	24.38
R3.00373	6.98	1.60	7.01	1.68	7.01	1.68
3OWE_2564	3.64	30.24	4.01	44.76	4.05	44.77
3OWE_2281	2.84	31.94	3.22	48.16	3.32	48.13
3OWE_1587	2.59	39.15	2.91	60.28	3.05	60.18

Rev:	Note:	Date:

ARUP

Map:
Midleton Tidal Flood Extents

Map type:	Tidal Flood Extent	
Source:	Midleton Flood Relief Scheme	
Scenario:	Current	
Drawn By:	CB	Date: 04/09/2020
Checked By:	KB	Date: 04/09/2020
Approved By:	BO'B	Date: 04/09/2020
Drawing No:	1	
Map Series:	Page 3 of 3	
Drawing Scale:	1:5,000 @ A3	

587600 587800 588000 588200 588400 588600 588800 589000 589200

573800 573600 573400 573200 573000 572800

PROPOSED SITE

Legend:

0.5% Tidal AEP Flood Depth (m)

- 0 - 0.25
- 0.25 - 0.5
- 0.5 - 1.0
- 1.0 - 1.5
- 1.5 - 2.0
- > 2

Rev:	Note:	Date:

ARUP

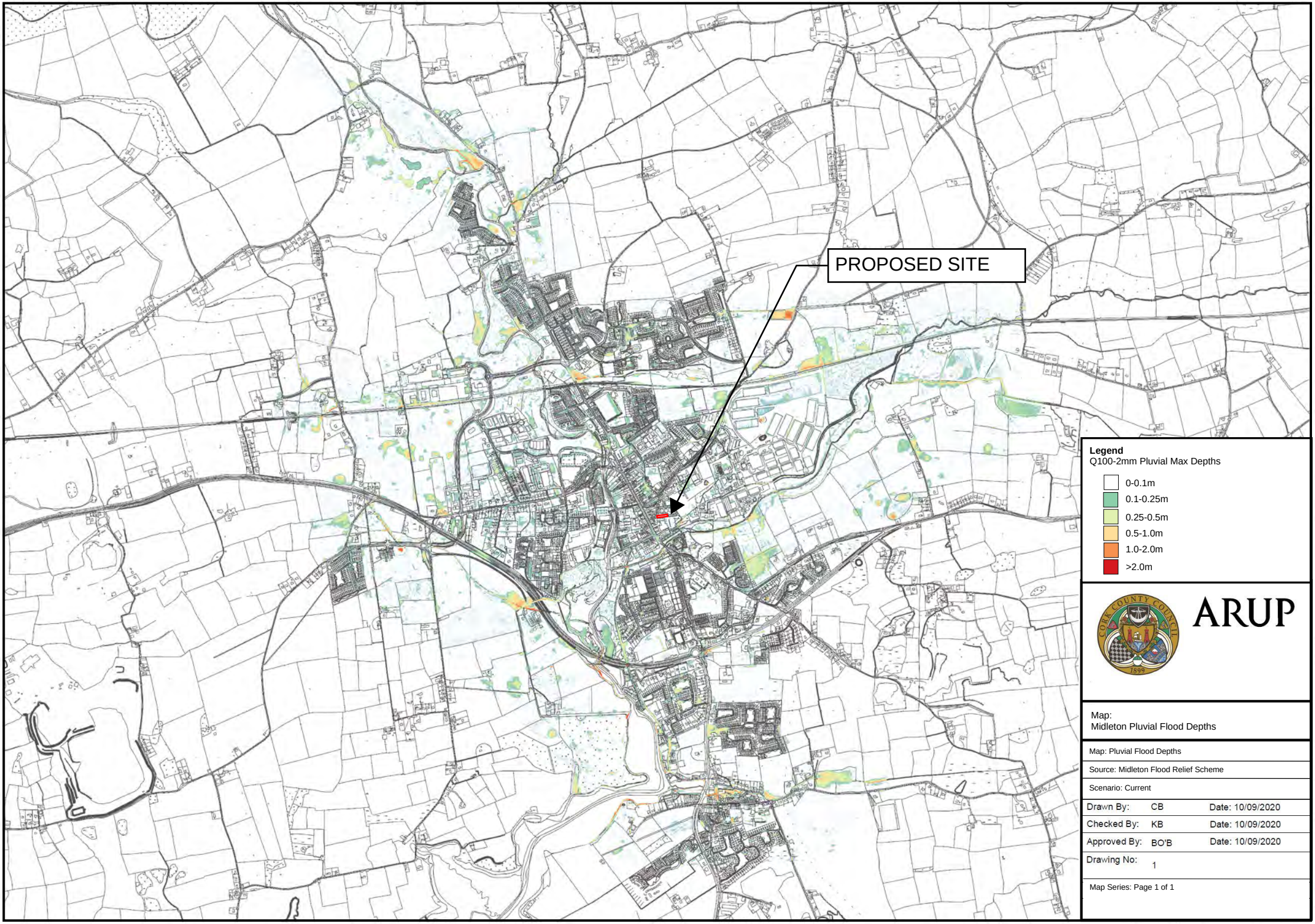
Map:
Midleton Tidal Flood Depths

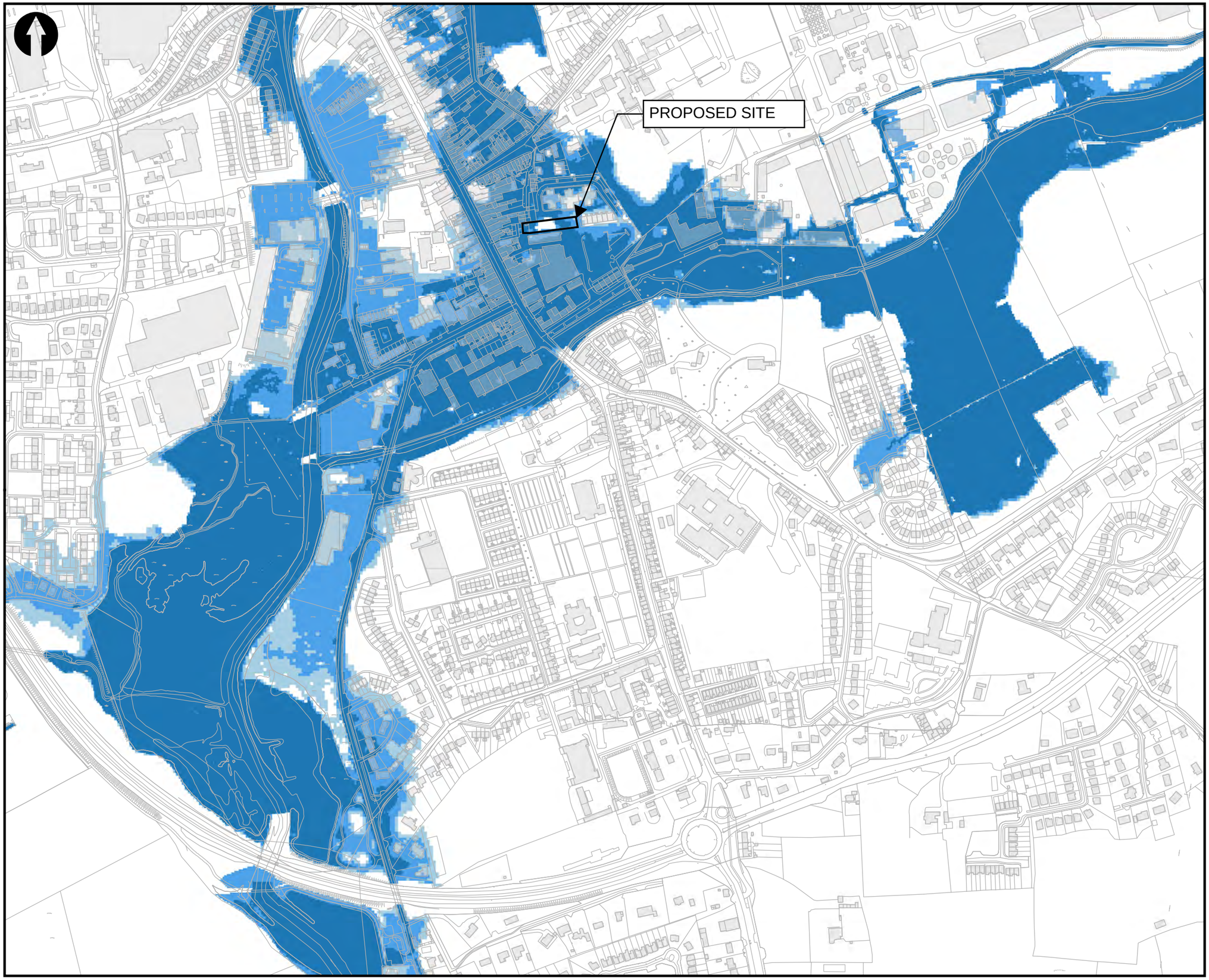
Map type:	Tidal Flood Depth	
Source:	Midleton Flood Relief Scheme	
Scenario:	Current	
Drawn By:	CB	Date: 04/09/2020
Checked By:	KB	Date: 04/09/2020
Approved By:	BO'B	Date: 04/09/2020
Drawing No:	1	
Map Series:	Page 2 of 3	
Drawing Scale:	1:5,000 @ A3	

587600 587800 588000 588200 588400 588600 588800 589000 589200

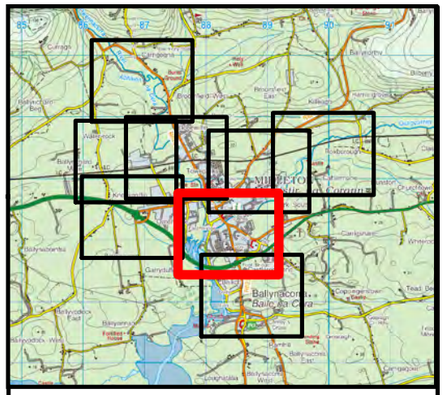
Meters

0 50 100 200 300 400 500


PROPOSED SITE
Legend
Q100-2mm Pluvial Max Depths
0-0.1m
0.1-0.25m
0.25-0.5m
0.5-1.0m
1.0-2.0m
>2.0m
ARUP
Map:
Midleton Pluvial Flood Depths
Map: Pluvial Flood Depths
Source: Midleton Flood Relief Scheme
Scenario: Current
Drawn By: CB Date: 10/09/2020
Checked By: KB Date: 10/09/2020
Approved By: BO'B Date: 10/09/2020
Drawing No: 1
Map Series: Page 1 of 1



0 50 100 200 300 400 500 Meters



Legend:

- Current 1% Fluvial AEP
- MRFS Fluvial 1% AEP
- HEFS Fluvial 1% AEP

Rev:	Note:	Date:

ARUP

Map:
Midleton Fluvial Flood Extents (Undefended)

Map type:	Fluvial Flood Depth	
Source:	Midleton Flood Relief Scheme	
Scenario:	Current, MRFS & HEFS	
Drawn By:	CB	Date: 03/03/2022
Checked By:	KB	Date: 03/03/2022
Approved By:	BO'B	Date: 03/03/2022
Drawing No:	1	
Map Series:	Page 3 of 8	
Drawing Scale:	1:5,000 @ A3	

PROPOSED SITE

Legend:

- Current Tidal 0.5% AEP
- MRFS Tidal 0.5% AEP
- HEFS Tidal 0.5% AEP

Rev:	Note:	Date:

ARUP

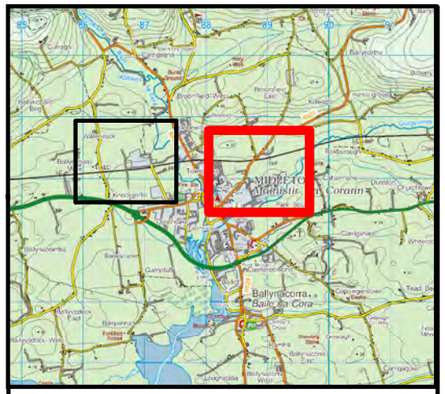
Map:
Midleton Tidal Flood Extents (Undefended)

Map type:	Tidal Flood Extent	
Source:	Midleton Flood Relief Scheme	
Scenario:	Current, MRFS & HEFS	
Drawn By:	CB	Date: 03/03/2022
Checked By:	KB	Date: 03/03/2022
Approved By:	BO'B	Date: 03/03/2022
Drawing No:	1	
Map Series:	Page 3 of 3	
Drawing Scale:	1:5,000 @ A3	

0 50 100 200 300 400 500 Meters

PROPOSED SITE

0 50 100 200 300 400 500 Meters



Legend:

Design Groundwater Flood Extent

Rev:	Note:	Date:

ARUP

Map:
Midleton Groundwater Flood Extent

Map type:	Groundwater Flood Extent	
Source:	Midleton Flood Relief Scheme	
Scenario:	Current	
Drawn By:	AP	Date: 07/09/2020
Checked By:	KB	Date: 07/09/2020
Approved By:	BO'B	Date: 07/09/2020
Drawing No:	1	
Map Series:	Page 1 of 2	
Drawing Scale:	1:5,000 @ A3	

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