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Engineering Services Report

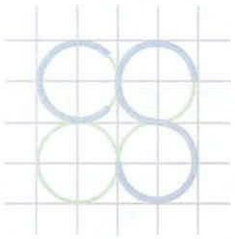
Proposed Housing Development

Main Street, Newcastle, Co. Dublin

Client: Deane & Deane Ltd

Job No. D098

June 2022



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ENGINEERING SERVICES REPORT

PROPOSED HOUSING DEVELOPMENT, MAIN STREET, NEWCASTLE, CO. DUBLIN

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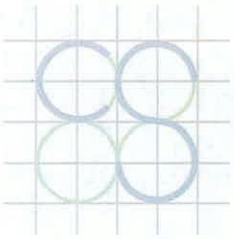
BS 1192 FIELD	**NCA-CSC-ZZ-XX-RP-C-0001_ESR**

Job Ref.	Author	Reviewed By	Authorised By	Issue Date	Rev. No.
D098	LJ	SS	OS	10-06-2022	P1
D098	LJ	SS	OS	19-05-2022	P0



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1.0 INTRODUCTION

Cronin & Sutton Consulting Engineers (CS Consulting) have been commissioned by Deane & Deane Ltd to prepare an Engineering Services Report for a Proposed Housing Development at Main Street, Newcastle, Co. Dublin.

This report details the following aspects of the proposed development:

- Stormwater Drainage Infrastructure
- Foul Drainage Infrastructure
- Potable Water Infrastructure

In preparing this report, CS Consulting has made reference to the following:

- South Dublin Development Plan 2016-2022
- Draft South Dublin Development Plan 2022-2028
- Irish Water Code of Practice for Water Infrastructure (2020)
- Irish Water Code of Practice for Wastewater Infrastructure (2020)
- Irish Water Drainage and Water Supply Records

The Engineering Services Report is to be read in conjunction with the engineering drawings and documents submitted by CS Consulting and with all other relevant documentation submitted by other members of the project design team.

2.0 SITE LOCATION AND PROPOSED DEVELOPMENT

2.1 Site Location

The site of the proposed development lies along Main Street, Newcastle. The site has a total area of approx. 1.3ha and is located in the administrative jurisdiction of South Dublin County Council.

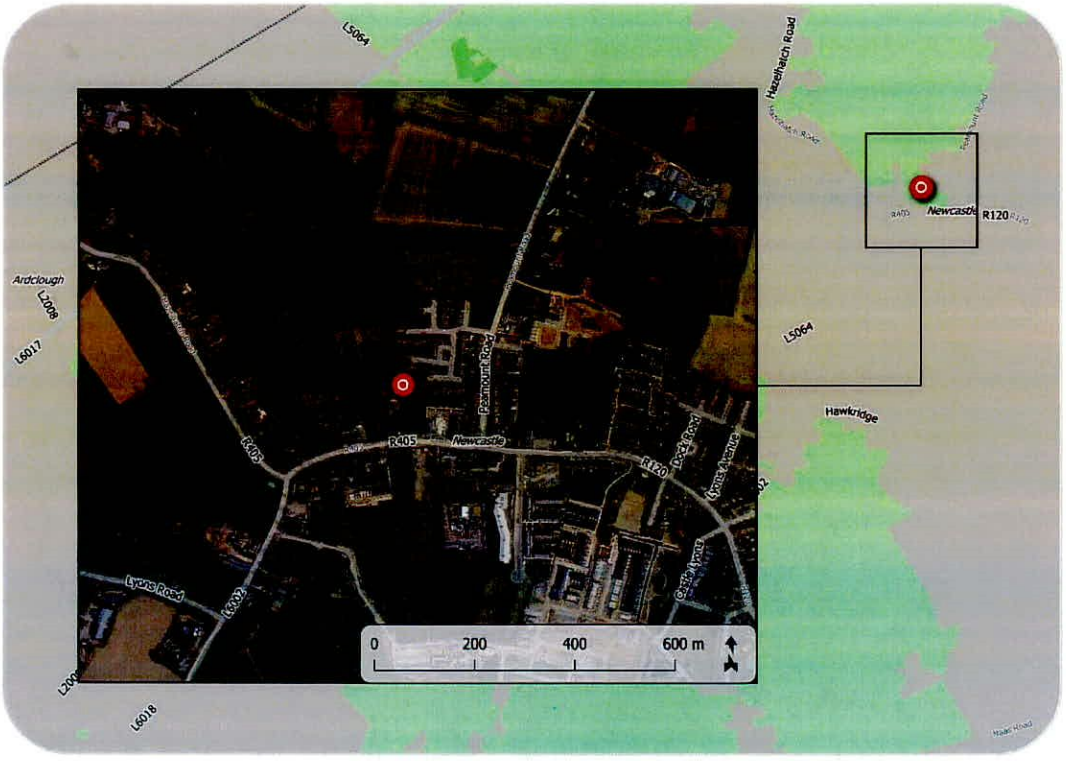


Figure 1 – Location of proposed development site
(map data & imagery: EPA, NTA, OSM Contributors, Google)

The location of the proposed development site is shown in Figure 1 above; the indicative extents of the development site, as well as relevant elements of the surrounding road network, are shown in more detail in Figure 2.

The site is bounded to the south by St. Finian's Community Hall, southwest, and east by residential and commercial properties. It is bounded to the north and west by greenfields.

Figure 2 – Indicative site extents
(map data & imagery: NTA, SDCC, OSM Contributors, Google)

2.2 Existing Land Use

The subject site comprises of 2no. sheds with a footprint of 850m².

2.3 Description of Proposed Development

The proposed development will consist of the demolition of 2 no. sheds and the construction of 30 no. dwellings, 1 no. vehicular and pedestrian link with Main Street, Newcastle, 1 no. vehicular and pedestrian link with Glebe Square Newcastle, 1no. pedestrian only link with Market Square to the east, and all associated and ancillary site development works.

3.0 SURFACE WATER DRAINAGE

3.1 Existing Stormwater Drainage Infrastructure

South Dublin County Council's drainage records indicate an existing 225mm diameter concrete sewer along the south-western boundary and 600mm diameter concrete sewer to the south along Mainstreet. In addition, 225mm, and 150mm diameter concrete sewer runs along Peamount Road to the east of the development site. See **Appendix A** for South Dublin County Council's drainage records.

3.2 Proposed Stormwater Drainage Arrangements

In accordance with the requirements of SDCC Drainage Division all new developments are to incorporate the principles of Sustainable Urban Drainage Systems, (SuDs). The SuDs principles require a two-fold approach to address storm water management on new developments.

The first aspect is to reduce any post development run-off to pre-development discharge rates. The development is to retain storm water volumes predicted to be experienced during extreme rainfall events. This is defined as the volume of storm water generated during a 1 in 100 year storm event increased by 20% for predicted climate change factors.

To ensure an accurate calculation of the required attenuation for the site Met Eireann was contacted to provide:

a) The SAAR (Standard Annual Average Rainfall) for the area: 775mm/year

b) The sliding duration table for the site indicating the 1:100 year rainwater intensities to be used

c) Soil type value for the subject lands this has been established as soil type 2.

These parameters allow the Q-Bar, greenfield runoff rate, to be calculated. The Q-Bar value for the site is 2.05l/sec/Ha. Therefore, the allowable discharge rate off site for any given storm even will be limited to 2.70l/sec. Please refer to **Appendix C** for a copy of Q-Bar calculations.

The proposed development is to retain storm water volumes predicted to be experienced during extreme rainfall events. This is defined as the volume of storm water generated during a 1 in 100 year storm event increased by 20% for predicted climate change factors. The attenuation volume requirement of 551m³ for the 1 in 100 year storm event. It is proposed that 2no. attenuation facilities shall be installed for the proposed development site. 1no. detention basin of size 523m³ shall be located on the north-west corner of the development and 1no. attenuation stormtech tank of size 28m³ in the north-east part of the development. The outfall shall be via gravity into the ditch to the north-west boundary of the development by a 300mm diameter surface water sewer. Please refer to **Appendix C** for a copy of Attenuation calculations.

It is worth noting that the above-mentioned attenuation volumes cater for the proposed development site area. In addition, the attenuation volumes also cater for the area of the existing community centre immediately south of the development site. Details of this arrangement are noted in sub-section 4.3 of this report, and on CS Consulting drawing **NCA-CSC-ZZ-SI-DR-C-0003.**

The second aspect is the policy of the Local Authority to include Sustainable Urban Drainage Systems, SuDS, for all new applications with the emphasis on the nature-based SuDS features as per the latest guidance document (Sustainable Drainage Explanatory Design & Evaluation Guide 2022, South Dublin County Council). Given the above the following SuDS features are proposed:

- Swales;
- Permeable paving;
- Bio-Retention areas;
- Infiltration trench;
- Tree pits;
- Detention basin and attenuation stormtech tank with flow control device, sized to contain a 1-in-100-year storm event and increased by 20% for predicted climate change to limit the surface water discharge from the site during extreme rainfall events.

  It is worth noting that the design of the detention basin has been coordinated with the proposed development landscape design in order to provide a dual function namely to provide main surface water attenuation storage function during the storm events and secondly to provide quality amenity area for the use of proposed development while attenuation function is not required. In that regard the detention basin has been designed with land drains, engineered soil and drainage layers in order to quicken the draining down of the detention basin base.

The choice of SuDS types and location of the same sought to reduce the length of "piped" connection within the surface water drainage system while providing integration and coordination of the SuDS elements with the proposed site layout, more specifically the proposed developments landscape design.

In addition to the above-mentioned SuDS features is also proposed to utilize low water usage appliances to aid in the reduction of water usage on the development.

3.3 SDCC Drainage Department Correspondence

During the discussions with SDCC drainage department it has been noted by SDCC that the existing surface water drainage pipe to the west of the proposed development conveying the storm water flow from the Main Street into the existing ditch may not be sufficient. In that regard applicant was requested to provide a 450mm diameter storm water pipe connection through the proposed development site that could serve as an alternative connection from the Main Street to the existing ditch in the future. See **Appendix B**.

This proposed storm water pipe connection is illustrated on CS Consulting Drawing **NCA-CSC-ZZ-SI-DR-C-0003**.

4.0 FOUL DRAINAGE

4.1 Existing Foul Drainage Infrastructure

South Dublin County Council's drainage records indicate an existing 225mm diameter foul sewer along Mainstreet flowing west to east. In addition, 225mm and 300mm diameter foul sewers run to the eastern boundary of the proposed development along the residential units. See **Appendix A** for South Dublin County Council's drainage records.

4.2 Proposed Foul Generation and Foul Drainage Arrangements

The proposed development shall consist of 30no. residential units.

Based on Irish Water guidelines, the foul effluent generated shall be:

- For the residential units:

  ⇒ 446l/day per unit (based on 2.7 persons per unit x 150l/person/day, plus a 10% increase factor);

  ⇒ 446l/day x 30 units = 13,380 l/day = 13.38 m^3/day;

  ⇒ 13,380/60/60/24 = 0.15486 l/sec Average flow (1 DWF);

  ⇒ 0.15486*6 = 0.929 l/sec Peak Flow (6 DWF).

All foul effluent generated from the proposed development shall be collected in separate foul pipes of 225mm diameter and flow under gravity to the existing foul drainage sewer located in Glebe Square along the north-east of the proposed development.

The drainage network for the development shall be in accordance with Part H of the Building Regulations and to the requirements and specifications of Irish Water.

4.3 Irish Water Correspondence

1. A Pre-Connection Enquiry for 30no. residential units was submitted to Irish Water.
2. Irish Water issued Confirmation of Feasibility (CoF) in November 2019 and noted that the water connection is feasible subjected to upgrades,

   "Newcastle Local Network Reinforcement Project which is on the Irish Water Capital Investment Program has to be completed prior the connection. It is scheduled to be completed by Q4/ 2029 (subject to change). Also, Newcastle (Aylemore) PS and associated rising main have to be upgraded prior the connection. A study is currently underway to determine the capacity available at the Pumping Station. The outcome of the study will identify the required upgrades.

   Alternately to the two conditions, removal of storm water flow, from the local foul/combined sewer network, to facilitate the provision of capacity will be required. The flow reduction should be in a ratio of 3:1 during the 1 in1 year design storm event. Site identification for the works has to be agreed with the Local Authority. The storm flow diversion works will be funded by the Developer."

3. Furter to the receipt of the CoF, applicant has contacted SDCC Drainage Department in order to discuss and agree an area from which the storm water flow could be removed from the existing combined sewer network, and it has been agreed in principles that the area of community centre to the front of the proposed development is suitable for this purpose.
4. This information has also been presented to Irish water who confirmed that the proposal is to the satisfaction of Irish Water.

A copy of correspondence with SDCC and Irish Water is presented in **Appendix B** of this report. Refer to CS Consulting Drawing **NCA-CSC-ZZ-SI-DR-C-0003** for further details.

5.0 POTABLE WATER SUPPLY

5.1 Existing Water Supply Infrastructure

South Dublin County Council's drainage records indicate an existing Asbestos watermain to the south of the proposed development along Main Street running in east-west direction. An existing 250mm diameter HPPE runs along the Peamount Road to the east of the development site. See **Appendix A** for South Dublin County Council's drainage records.

5.2 Potable Water Demand

The proposed development shall consist of 30no. residential units. It is proposed to make a new connection off the existing watermain on the southern boundary of the development site along Main Street and supply a 125mm OD watermain to the proposed development site.

Based on Irish Water guidelines, the potable water requirements shall be:

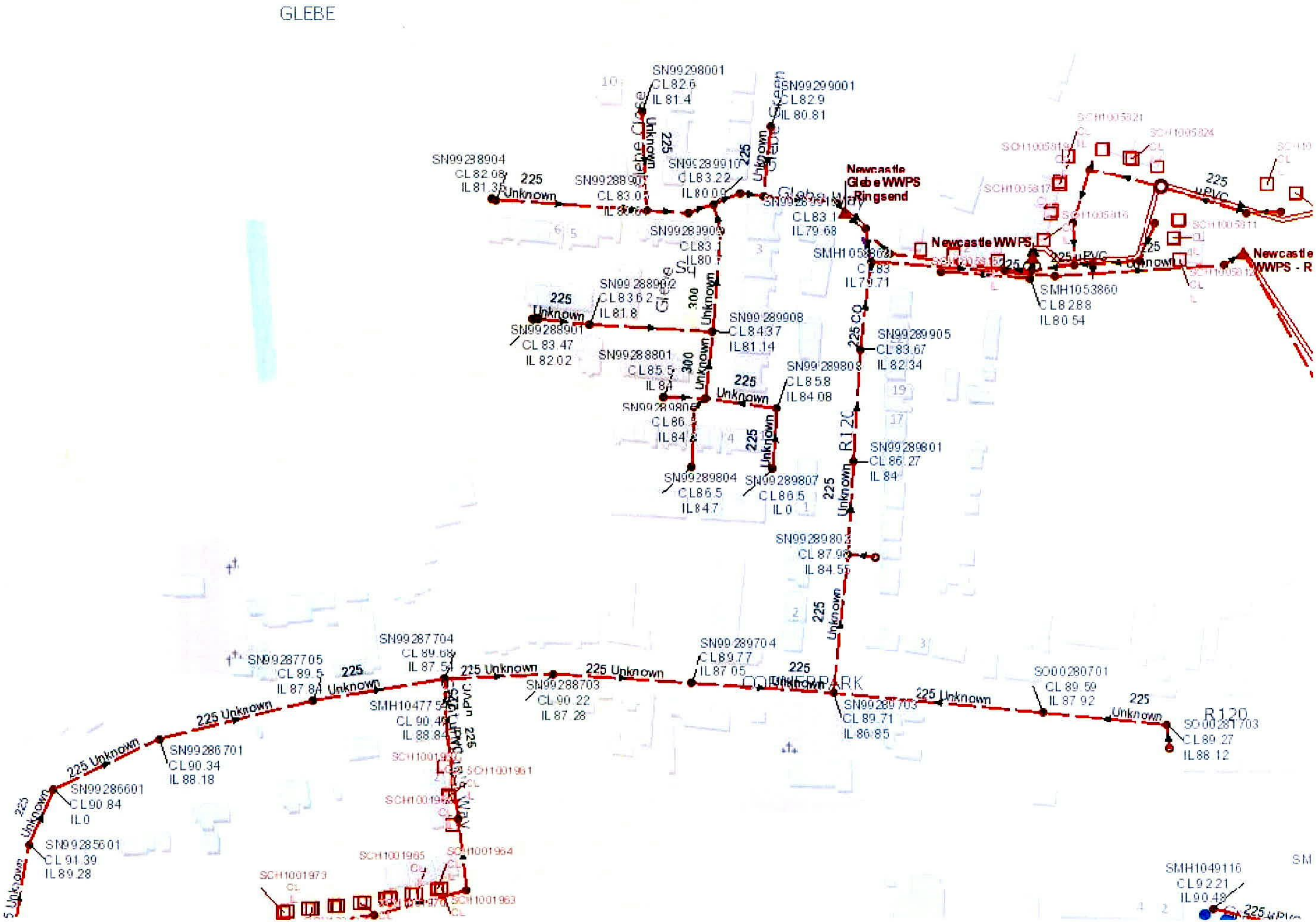
- For the residential units:
  - ⇒ 405 l/day per unit (based on 2.7 persons per unit x150l/person/day);
  - ⇒ 405 l/day x 30 units = 13,380 l/day = 13.380 m^3/day;
  - ⇒ 0.154 l/sec Average water demand;
  - ⇒ 0.774 l/s Peak Demand (5 times the average water demand).

5.3 Irish Water Correspondence

A Pre-Connection Enquiry for 30no. residential units has been submitted to Irish Water and we received a favourable response. See **Appendix B** for copies of the Confirmation of Feasibility Acceptance received from Irish Water.

The proposed watermain infrastructure and routing plan is shown on drawing **NCA-CSC-ZZ-SI-DR-C-0003** with this submission.

Appendix A: South Dublin County Council Drainage and Watermain Records


GLEBE
SN99298001
CL 82.6
IL 81.4
SN99299001
CL 82.9
IL 80.81
SN99288904
CL 82.08
IL 81.35
225 Unknown
Newcastle Glebe WWPS Ringsend
Newcastle WWPS
SN99289909
CL 83.1
SN99289908
CL 84.37
IL 81.14
SN99288901
CL 83.47
IL 82.02
SN99289905
CL 83.67
IL 82.34
SMH1053860
CL 82.88
IL 80.54
SN99289801
CL 86.27
IL 84
SN99289804
CL 86.5
IL 84.7
SN99289807
CL 86.5
IL 0
SN99289802
CL 87.96
IL 84.55
SN99287704
CL 89.68
IL 87.54
SN99287705
CL 89.5
IL 87.84
SN99289704
CL 89.77
IL 87.05
SN99288703
CL 90.22
IL 87.28
SN99289703
CL 89.71
IL 86.85
SO00280701
CL 89.59
IL 87.92
SO00281703
CL 89.27
IL 88.12
SN99286701
CL 90.34
IL 88.18
SN99286601
CL 90.84
IL 0
SN99285601
CL 91.39
IL 89.28
SMH1049116
CL 92.21
IL 90.48
R120
225 Unknown
225 uPVC


GLEBE
CORNERPARK
225mm Unknown
450mm Unknown
750mm Unknown
225mm Concrete
150mm uPVC
300mm Concrete
600mm Concrete
SN99299002
SN99288911
SN99288908
SN99289917
SN99289020
SN99289911
SN99289913
SN99289912
SN99289909
SN99289906
SN99289902
SN99289628
SN99287701
SWMH1013899
SWMH1013900
SWMH1013902
SWMH1020192
SWMH1013897
SWMH1022613
SO00281702
SO00281705
SO00281701
R1
Clayton Road

GLEBE
101.6 Asbestos
110mm PE
110mm uPVC
Glebe Sq
Glebe Green
250mm HPPE
101.6 uPVC
5" Asbestos
110mm HDPE
180mm PVC-A
150mm PE
Graydon Rd

Appendix B: Irish Water and South Dublin County Council Correspondence

CS Consulting / Jamie Crampton

19-22 Dame Street
Dublin 2
D02E267

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

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

www.water.ie

9 November 2021

Re: CDS21002575 pre-connection enquiry - Subject to contract | Contract denied

Connection for Housing Development of 31 units at Main Street Newcastle ED, Newcastle South Dublin, Dublin 22

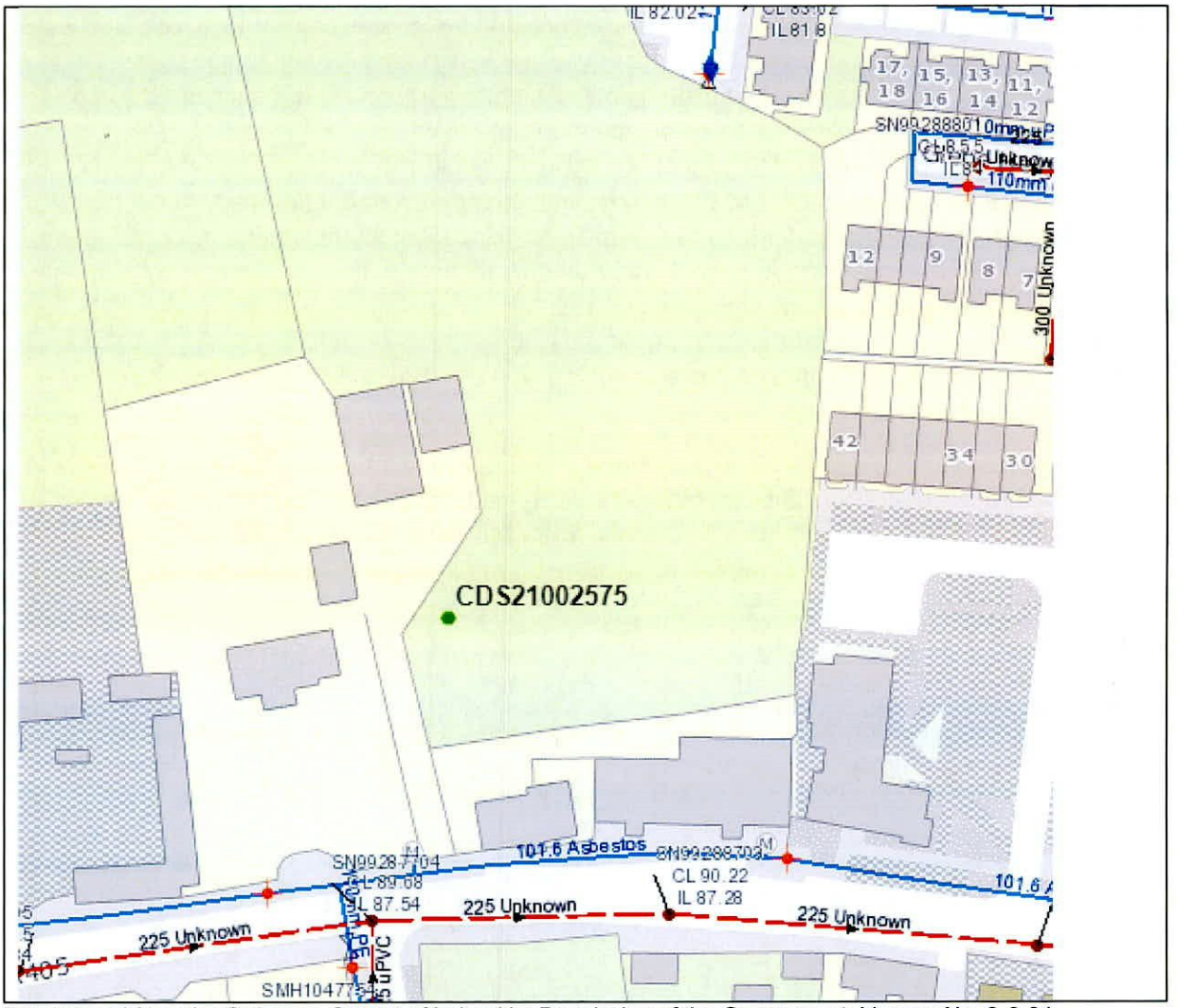
Dear Sir/Madam,

Irish Water has reviewed your pre-connection enquiry in relation to a Water & Wastewater connection at Main Street Newcastle ED, Newcastle South Dublin, Dublin 22 (the **Premises**). Based upon the details you have provided with your pre-connection enquiry and on our desk top analysis of the capacity currently available in the Irish Water network(s) as assessed by Irish Water, we wish to advise you that your proposed connection to the Irish Water network(s) can be facilitated at this moment in time.

SERVICE	**OUTCOME OF PRE-CONNECTION ENQUIRY** **THIS IS NOT A CONNECTION OFFER. YOU MUST APPLY FOR A CONNECTION(S) TO THE IRISH WATER NETWORK(S) IF YOU WISH TO PROCEED.**
Water Connection	Feasible without infrastructure upgrade by Irish Water
Wastewater Connection	Feasible Subject to upgrades
SITE SPECIFIC COMMENTS	
Wastewater Connection	Newcastle Local Network Reinforcement Project which is on the Irish Water Capital Investment Program has to be completed prior the connection. It is scheduled to be completed by Q4/ 2029 (subject to change). Also, Newcastle (Aylemore) PS and associated rising main have to be upgraded prior the connection. A study is currently underway to determine the capacity available at the Pumping Station. The outcome of the study will identify the required upgrades. Alternately to the two conditions, removal of storm water flow, from the local foul/combined sewer network, to facilitate the provision of capacity will be required. The flow reduction should be in a ratio of 3:1 during the 1 in1 year design storm event. Site identification for the works has to be agreed with the Local Authority. The storm flow diversion works will be funded by the Developer.

The design and construction of the Water & Wastewater pipes and related infrastructure to be installed in this development shall comply with the Irish Water Connections and Developer Services Standard Details and Codes of Practice that are available on the Irish Water website. Irish Water reserves the right to supplement these requirements with Codes of Practice and these will be issued with the connection agreement.

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



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Whilst every care has been taken in its compilation Irish Water gives this information as to the position of its underground network as a general guide only on the strict understanding that it is based on the best available information provided by each Local Authority in Ireland to Irish Water. Irish Water can assume no responsibility for and give no guarantees, undertakings or warranties concerning the accuracy, completeness or up to date nature of the information provided and does not accept any liability whatsoever arising from any errors or omissions. This information should not be relied upon in the event of excavations or any other works being carried out in the vicinity of the Irish Water underground network. The onus is on the parties carrying out excavations or any other works to ensure the exact location of the Irish Water underground network is identified prior to excavations or any other works being carried out. Service connection pipes are not generally shown but their presence should be anticipated.

General Notes:

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

If you have any further questions, please contact Marina Byrne from the design team via email mzbyrne@water.ie For further information, visit **www.water.ie/connections.**

Yours sincerely,

Yvonne Harris

Yvonne Harris

Head of Customer Operations

Slaven Sose

Subject: FW: D098 CDS21002575 Main Street Newcastle ED, Newcastle South Dublin, Dublin 22 EMAIL:0161689

From: newconnections <newconnections@water.ie>
Sent: Monday 11 April 2022 13:37
To: Owen Sullivan <owen.sullivan@csconsulting.ie>
Subject: RE: D098 CDS21002575 Main Street Newcastle ED, Newcastle South Dublin, Dublin 22 EMAIL:0161689

Dear Owen,

Thank you for your email and please forgive the delayed response. As per your request below please see the following response from our design engineer;

"The proposal is to the stratification of Irish Water.

The existing situation of storm water connected to foul network needs to be verified (could be dye testing supervised by LA or field inspectors) before any existing infrastructure is demolished.
The information, verified by surveys, should be provided at a connection application stage"

Should you have any further queries please do not hesitate to contact us.

Kind Regards,

Hayden Doyle
New Connections Specialist- Connections and Developer Services

Uisce Éireann
Bosca OP 860, Oifig Sheachadta na Cathrach Theas, Cathair Chorcaí, Éire
Irish Water
PO Box 860, South City Delivery Office, Cork City, Ireland
T: 1800 278 278
Minicom: 1850 378 378
www.water.ie

---------- Original Message ----------
From: Owen Sullivan <owen.sullivan@csconsulting.ie>;
Received: Wed Mar 23 2022 16:22:50 GMT+0000 (Greenwich Mean Time)
To: New Connections Queue newconnections@water.ie <newconnections@water.ie>;
Cc: Slaven Sose <slaven.sose@csconsulting.ie>; James Wood <slaven.sose@csconsulting.ie>; declan.dowling@csconsulting.ie;

Subject: D098 CDS21002575 Main Street Newcastle ED, Newcastle South Dublin, Dublin 22 EMAIL:0161689

To Whom it may concern,

Re ; CDS21002575

We had received a COF (attached) for the site above.

I note the following;

Water Connection Feasible without infrastructure upgrade by Irish Water and Wastewater Connection Feasible Subject to upgrades.

In relation to the waste water connection we note that IW requested that we address the following statement;

Newcastle Local Network Reinforcement Project which is on the Irish Water Capital Investment Program has to be completed prior the connection. It is scheduled to be completed by Q4/ 2029 (subject to change).
Also, Newcastle (Aylemore) PS and associated rising main have to be upgraded prior the connection. A study is currently underway to determine the capacity available at the Pumping Station. The outcome of the study will identify the required upgrades.

Alternately to the two conditions, removal of storm water flow, from the local foul/combined sewer network, to facilitate the provision of capacity will be required. The flow reduction should be in a ratio of 3:1 during the 1 in1 year design storm event. Site identification for the works has to be agreed with the Local Authority. The storm flow diversion works will be funded by the Developer.

Response;

In response to the second paragraph we have located an area that the applicant can remove storm water flow from the local foul network. We have located in the area of the community centre to the front of the site does not have the benefit of a storm drain and all the flow from the site and the nearest road gully is out falling to the foul drain. We propose the following calculation for the site to justify the extraction of storm from the foul network (by re directing the flow into the applicants development and into a water course); we note that we require only 286sqm but we are proposing to redirect the storm flow from the roof area 492m2 which is excess of the required 292m2.

There are 30units in the proposed development.
446l/day x 30units = 13,380l/day or 13.380m3/day
13,380/60/60/24 = 0.15486l/sec (1DWF)
PEAK FLOW = 0.15486 x 6 = 0.929L/SEC (6DWF)

Irish water require that we remove 3times 6DWF from the foul network.
3 x 0.929l/sec = 2.788l/sec needs to be removed from foul network

Using the rational method to calculate the equivalent contributing area

Q=2.78 x I x A x CV x Cr or rearranging A=Q/(2.78 x I x Cv x Cr)

Q=2.788l/sec

I=30mm/hr suds manual recommends 35mm/hr which reduces area below (244m2 instead of 286m2)
Cv=0.9 as recommended in suds manual
Cr=1.3 as recommended in suds manual

A=2.788/(2.78 x 30 x 0.9 x 1.3)= 0.02857ha or 286m2

Area to be found is 286m2.

Furthermore we have the agreement in principle from the council, see attached email and drawing.

We propose to lodge the planning application at the end of March and noting the above in the application documents to address the COF commentary. We hope that this proposal is to the stratification of Irish Water.

If you could comment if required on the above.

Regards,

Owen Sullivan Managing Director

Tech Cert Civil Eng, MIEI, Health, Safety & Welfare Cert

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Thank you for your attention.

Tá an fhaisnéis á seachadadh dírithe ar an duine nó ar an eintiteas chuig a bhfuil sí seolta amháin agus féadfar ábhar faoi rún, faoi phribhléid nó ábhar atá íogair ó thaobh tráchtála de a bheith mar chuid de. Tá aon athsheachadadh nó scaipeadh den fhaisnéis, aon athbhreithniú ar nó aon úsáid eile a bhaint as, nó aon ghníomh a dhéantar ag brath ar an bhfaisnéis seo ag daoine nó ag eintitis nach dóibh siúd an fhaisnéis seo, toirimiscthe agus féadfar é a bheith neamhdhleathach. Níl Uisce Éireann faoi dhliteanas maidir le seachadadh iomlán agus ceart na faisnéise sa chumarsáid seo nó maidir le haon mhoill a bhaineann léi. Ní ghlacann Uisce Éireann le haon dliteanas faoi ghnímh nó faoi iarmhairtí bunaithe ar úsáid thoirmiscthe na faisnéise seo. Níl Uisce Éireann faoi dhliteanas maidir le seachadadh ceart agus iomlán na faisnéise sa chumarsáid seo nó maidir le haon mhoill a bhaineann léi. Má fuair tú an teachtaireacht seo in earráid, más é do thoil é, déan teagmháil leis an seoltóir agus scrios an t-ábhar ó gach aon ríomhaire. Féadfar ríomhphost a bheith soghabhálach i leith truaillithe, idircheaptha agus i leith leasaithe neamhúdaraithe. Ní ghlacann Uisce Éireann le haon fhreagracht as athruithe nó as idircheapadh a rinneadh ar an ríomhphost seo i ndiaidh é a sheoladh nó as aon dochar do chórais na bhfaighteoirí déanta ag an teachtaireacht seo nó ag a ceangaltáin. Más é do thoil é, tabhair faoi deara chomh maith go bhféadfar monatóireacht a dhéanamh ar theachtaireachtaí chuig nó ó Uisce Éireann chun comhlíonadh le polasaithe agus le caighdeáin Uisce Éireann a chinntiú agus chun ár ngnó a chosaint. Fochuideachta gníomhaíochta de chuid Ervia is ea Uisce Éireann atá faoi theorainn scaireanna, de bhun fhorálacha an tAcht um Sheirbhísí Uisce 2013, a bhfuil a bpríomh ionad gnó ag 24-26 Teach Colvill, Sráid na Talbóide, BÁC 1.

Go raibh maith agat as d'aird a thabhairt.

Slaven Sose

From: Ronan Toft <rtoft@SDUBLINCOCO.ie>
Sent: Tuesday 22 March 2022 15:44
To: Owen Sullivan
Cc: Declan Dowling; Brian Harkin; Padraig Slye
Subject: RE: Owen Sullivan - CS Consulting - Proposed SDCC development at Newcastle

Hi Owen,

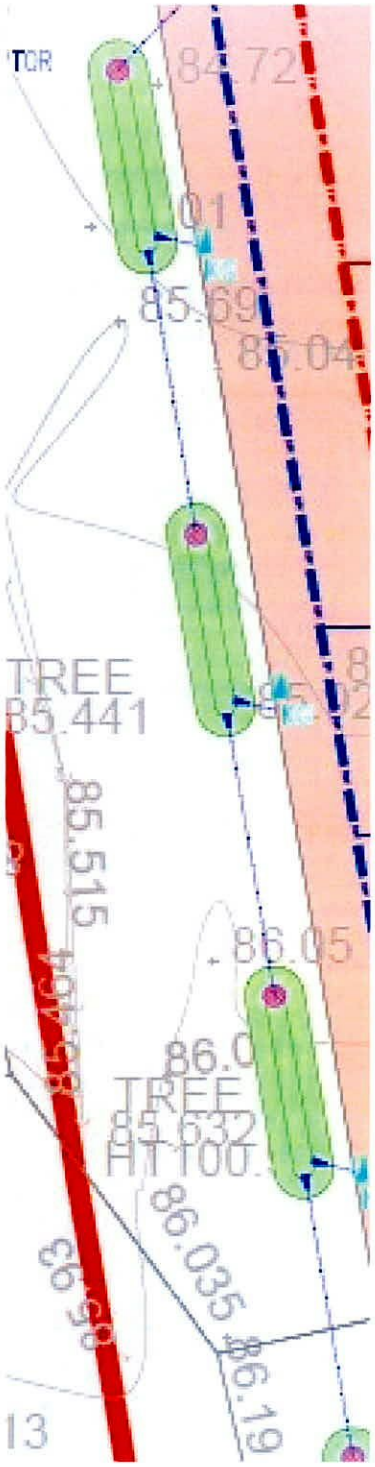
Apologies for missing your call yesterday, I tried ringing back earlier.

In principle SDCC have no objection with your proposal to divert existing community centre surface water drainage from the foul sewer to the newly proposed surface water sewer provided it can be demonstrated that the Surface water discharge will be attenuated to pre developed greenfield run off rates.

Regarding the layout of the new SW sewer can you look to have less sharp bends particularly at SDMH3. Ideally we would like to see 45 degree max but certainly not sharper than 90 degrees.

It is good to see SuDS incorporated into this scheme to take run off from proposed roads. Perhaps the swale shown below could be continuous to prevent piped sections/potential blockage points. Please submit details of all suds with your application.

Many thanks,
Ronan



From: Owen Sullivan <owen.sullivan@csconsulting.ie>
Sent: Monday 21 March 2022 17:48
To: Ronan Toft <rtoft@SDUBLINCOCO.ie>
Cc: Declan Dowling <declan.dowling@csconsulting.ie>
Subject: RE: Owen Sullivan - CS Consulting - Proposed SDCC development at Newcastle

Hi Ronan,

COF attached.

rgds Owen.

Owen Sullivan Managing Director

Tech Cert Civil Eng, MIEI, Health, Safety & Welfare Cert

T 01-5480863 M 0876870504

E owen.sullivan@csconsulting.ie W www.csconsulting.ie

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It may suit our Team to send emails at various times of day but we do not expect a response or action outside of normal working hours.

From: Ronan Toft <rtoft@SDUBLINCOCO.ie>
Sent: Monday 21 March 2022 16:07
To: Owen Sullivan <owen.sullivan@csconsulting.ie>
Cc: Declan Dowling <declan.dowling@csconsulting.ie>
Subject: RE: Owen Sullivan - CS Consulting - Proposed SDCC development at Newcastle

Hi Owen,

I will hopefully get to discuss this internally tomorrow. We may need to set up a teams meeting to discuss but I will get back to you. In the meantime can you please forward the COF to me.

Thanks,
Ronan

From: Owen Sullivan <owen.sullivan@csconsulting.ie>
Sent: Wednesday 16 March 2022 16:06
To: Ronan Toft <rtoft@SDUBLINCOCO.ie>
Cc: Declan Dowling <declan.dowling@csconsulting.ie>
Subject: RE: Owen Sullivan - CS Consulting - Proposed SDCC development at Newcastle

Ronan,

Hope all is well.

Two items I wanted to discuss with you.

1. We have indicated the 'additional' 450 diameter pipe that the council wanted in the plans. See attached drawing and the magenta coloured line indicated said drain through the site and not connected to the site network. This is as I believe what the council would like included as part of the application.
2. As part of the COF from IW they have notified us of having issues with the foul pumping station and capacity. So I have done some investigation in the area looking for possible cross connections from storm entering the foul system. I am led to believe with a drainage survey that the storm from the community site may be discharging to the foul network, there is no storm drains in the public road in the vicinity of the site. I propose that as part of the planning application that we re directed the storm drains from said foul drains and into a new storm drain in the road and into the additional pipe in the application site. We have used a tried and tested method for extraction of storm from foul drains at a ration of 3;1. I proposed the following calculation;

   There are 30units in the proposed development.
   446l/day x 30units = 13,380l/day or 13.380m3/day
   13,380/60/60/24 = 0.15486l/sec (1DWF)
   PEAK FLOW = 0.15486 x 6 = 0.929L/SEC (6DWF)

   Irish water require that we remove 3times 6DWF from the foul network.
   3 x 0.929l/sec = 2.788l/sec needs to be removed from foul network

   Using the rational method to calculate the equivalent contributing area

   Q=2.78 x I x A x CV x Cr or rearranging A=Q/(2.78 x I x Cv x Cr)

   Q=2.788l/sec
   I=30mm/hr suds manual recommends 35mm/hr which reduces area below (244m2 instead of 286m2)
   Cv=0.9 as recommended in suds manual
   Cr=1.3 as recommended in suds manual

   A=2.788/(2.78 x 30 x 0.9 x 1.3)= 0.02857ha or 286m2

   <u>Area to be found is 286m2.</u>

I have worked out the community centre catchment to be in the order of 820m2 well in excess of the 286m2 required. The rood area alone is 492m2.

Could you advise given item 1+2 above that you would be in agreement with the possible extraction of the storm from the foul line and diverted into a dedicated storm line so I can revert to IW with a proposal and get IW to agree of the extraction methods and ratio.

Hope this is clear and let me know if any queries.

Rgds Owen.

Owen Sullivan Managing Director
Tech Cert Civil Eng, MIEI, Health, Safety & Welfare Cert

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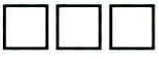

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E: info@csconsulting.ie	**E:** info@csconsultinguk.com	**E:** info@csconsulting.ie

From: Ronan Toft <rtoft@SDUBLINCOCO.ie>
Sent: Thursday 5 August 2021 14:43
To: Owen Sullivan <owen.sullivan@csconsulting.ie>
Cc: Chris Galvin <cgalvin@SDUBLINCOCO.ie>; Stephen Byrne <sbyrne@SDUBLINCOCO.ie>; Brian Harkin <bharkin@SDUBLINCOCO.ie>
Subject: RE: Owen Sullivan - CS Consulting - Proposed SDCC development at Newcastle

Hi Owen,

As discussed please see attached survey drawing for the surface water network in the area adjacent to the Old Glebe property, Main St, Newcastle.

A couple of points to note:

- This is a work in progress currently. It is twin 300mm surface water pipes running from MH6A to the outfall and not a 150/300mm as shown on drawing and survey maps.
- It would be worth double checking via a resurvey at this location all MH/Outfall levels, pipe locations and MH /Outfall locations on site prior to submitting a planning application. Please contact the SDCC Drainage Maintenance Depot,Deansrath to arrange to have the local drainage inspector on site when carrying out any survey/investigations.

Regards,
Ronan

From: Ronan Toft
Sent: Thursday 29 July 2021 17:12
To: Owen Sullivan <owen.sullivan@csconsulting.ie>
Cc: Chris Galvin <cgalvin@SDUBLINCOCO.ie>; Stephen Byrne <sbyrne@SDUBLINCOCO.ie>; Brian Harkin <bharkin@SDUBLINCOCO.ie>
Subject: RE: Owen Sullivan - CS Consulting - Proposed SDCC development at Newcastle

Hi Owen,

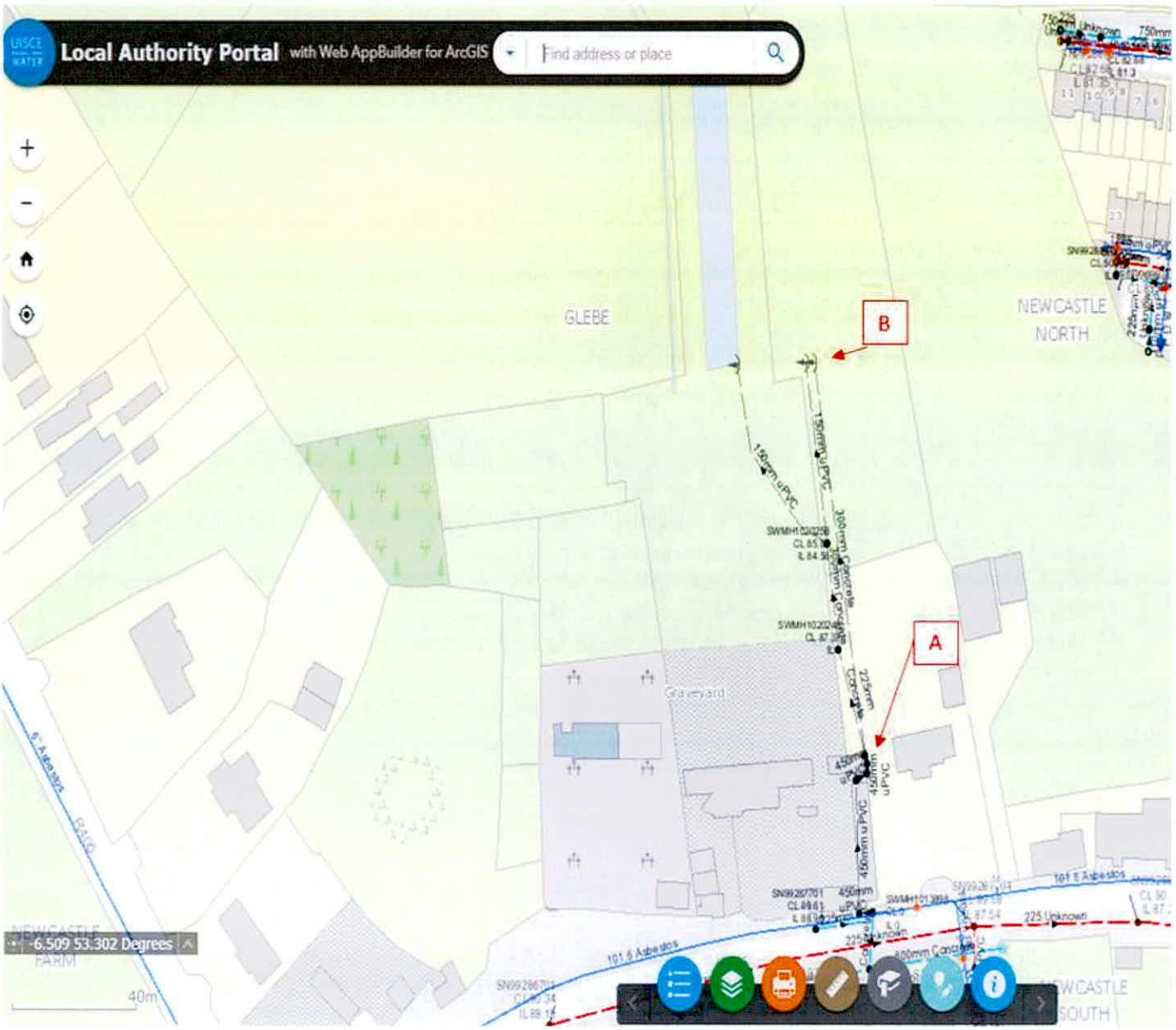
Thank you for your email.

See attached historical drainage map to give you an idea of drainage ditch routes to the north west of your site.

As discussed, in terms of surface water discharge location, Water Services request that as part of your development you would upsize part of the surface water network shown below (300mm pipe) from inlet manhole (Point A) to outfall to open channel (Point B). A surface water connection to this upsized pipe may then be acceptable in principle from your development. Should any upgrade works be in third party lands the applicant would be required to submit a letter of consent from the landowner for these works with their application and the planning application boundary would need to be extended to incorporate same.

Also we would request you investigate the potential of providing a surface water pipe from the upsized surface water pipe as mentioned above to Newcastle mainstreet at the entrance to your development. The purpose of this pipe would be to facilitate surface water drainage from future development in the area. The feasibility of this would depend on the achievable invert level of the pipe at main street. Can you confirm what invert level would likely be achievable at this location?

A recent survey of the surface water drainage network in this area was carried out by SDCC. I will send you a map showing the results of same next week, I need to discuss with our technician first who is on leave until then.



Kind regards,

Ronan Toft

Assistant Engineer

Environment, Water and Climate Change

South Dublin County Council

County Hall, Tallaght, Dublin 24 D24 YNN5

| T: +353 1 414 9000 | Ext: 4333

| M: +353 86 065 5367 |

| email rtoft@sdublincoco.ie |

From: Owen Sullivan <owen.sullivan@csconsulting.ie>
Sent: Wednesday 28 July 2021 12:14
To: Ronan Toft <rtoft@SDUBLINCOCO.ie>
Subject: Owen Sullivan - CS Consulting - Proposed SDCC development at Newcastle

Hi Ronan,

Hope all is well.

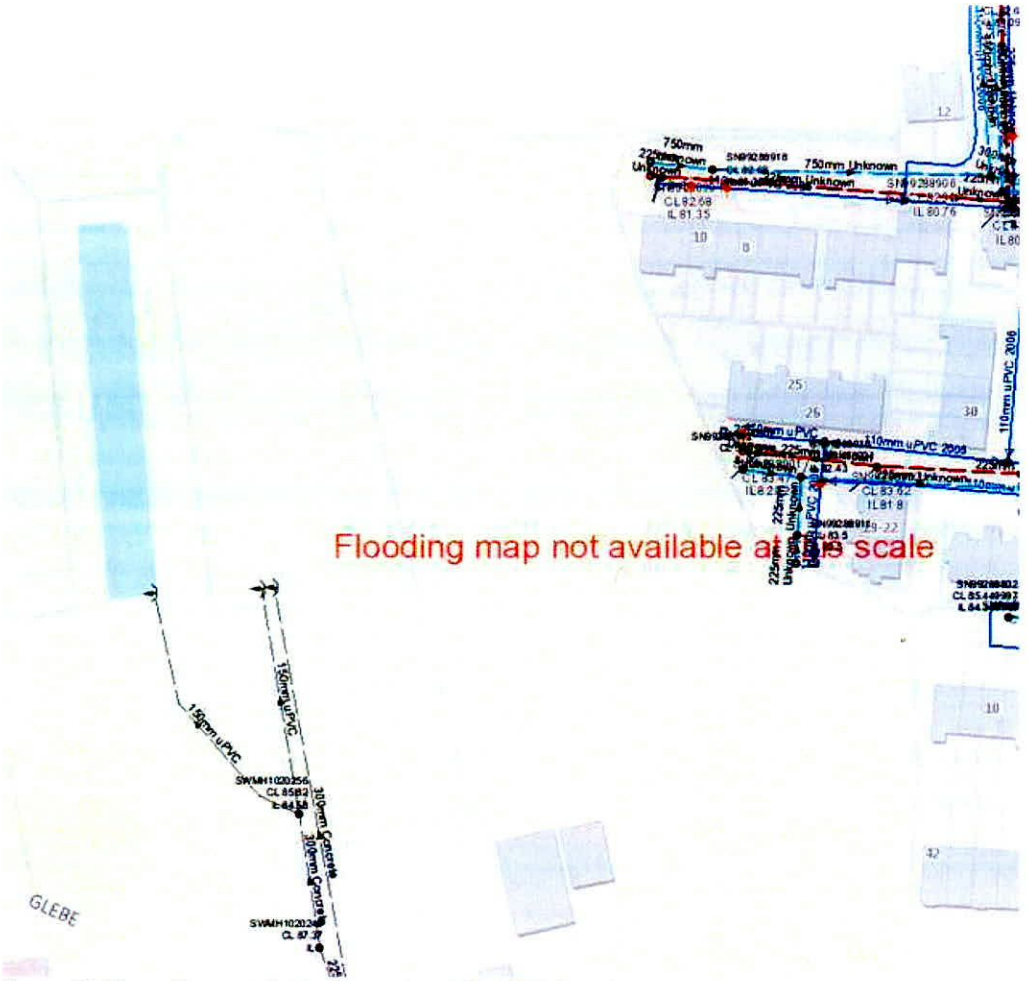
I understand that there is a pre planning meeting on the site we discussed some time ago for a resi site on the main street in Newcastle.

I note below what we can find on the public record in relation to the public drains / ditches in the area.

If the meeting goes well from a layout perspective, we will be then heading to the next stage of the design. That is to ascertain the infiltration rate of the ground so we can re charge ground water as mush as possible and then the outfall route.

I recall you may have some additional maps that may assist us and direct us to the location of where the council would like us to discharge to. Would you be able to issue any information that could assist if possible please.

regards Owen.



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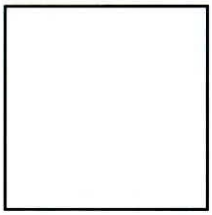

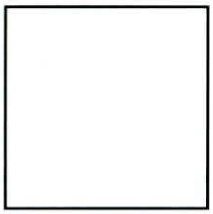

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Is eolas faoi rún an t-eolas atá sa ríomhphost seo agus d'fhéadfadh go mbeadh sé faoi phribhléid ó thaobh an dlí de. Is don té ar seoladh chuige/chuici agus dósan/dise amháin an t-eolas. Ní ceadmhach do dhuine ar bith eile rochtain a bheith aige/aici ar an ríomhphost seo. Murar duit an ríomhphost seo tá nochtadh, cóipeáil, dáileadh ná aon ghníomh eile a dhéanamh nó aon ghníomh eile a fhágáil gan déanamh ar iontaoibh an ríomhphoist seo toirmiscthe ort agus d'fhéadfadh siad sin a bheith neamhdhleathach. Má fuair tú an teachtaireacht leictreonach seo trí earráid téigh i dteagmháil, le do thoil, leis an té a sheol í nó le info@sdublincoco.ie. Glanadh an teachtaireacht seo le bogearraí Frithvíreas.

Comhairle Contae
Átha Cliath Theas
South Dublin County Council

Appendix C: Q-Bar, Attenuation, and Drainage Calculations

Project:	Newcastle South Dublin Attenuation
Project No.:	D098
Calculation:	Attenuation 100-year
Calcs By:	JMC
Checked By:	OS
Date:	30/3/21

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Site Location:	Newcastle, South Dublin		
Design Storm Return Period:	100 years		
Climate Change Factor:	20 %		
Soil Type:	2		
Total Site Area:	1.32 ha		
Hardstand Area:	0.65 ha	.....@	80% Impervious
Softstand Area:	0.67 ha	.....@	20% Impervious
Effective Impermeable Area:	0.65 ha		

Allowable Outflow	**Calculate**	
IH124: QBAR = 0.00108 x $AREA^{0.89}$ x $SAAR^{1.17}$ x $SOIL^{2.17}$		
AREA:	0.01 km^2	
SAAR:	775 mm	From Met Office
SOIL:	0.3	
QBAR/ha	2.05 l/s/ha	
Allowable Outflow	**2.7 l/s**	Smallest Allowable Discharge Rate (2l/s)

Storage required =	**701 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)
5	16.9	20.3	243.4	431	129	0	129	1	128
10	23.6	28.3	169.9	301	180	0	180	2	179
15	27.8	33.4	133.4	236	213	0	213	2	210
30	34.8	41.8	83.5	148	266	0	266	5	261
60	43.6	52.3	52.3	93	333	0	333	10	324
120	54.6	65.5	32.8	58	417	0	417	20	398
180	62.2	74.6	24.9	44	476	0	476	29	446
240	68.3	82.0	20.5	36	522	0	522	39	483
360	77.9	93.5	15.6	28	596	0	596	59	537
540	88.9	106.7	11.9	21	680	0	680	88	592
720	97.6	117.1	9.8	17	746	0	746	117	629
1080	111.4	133.7	7.4	13	852	0	852	176	676
1440	122.3	146.8	6.1	11	935	0	935	234	701
2880	133.0	159.6	3.3	6	1017	0	1017	468	548
4320	142.8	171.4	2.4	4	1092	0	1092	703	389
5760	151.6	181.9	1.9	3	1159	0	1159	937	222
8640	167.3	200.8	1.4	2	1279	0	1279	1405	-126
11520	181.2	217.4	1.1	2	1385	0	1385	1874	-488
14400	193.8	232.6	1.0	2	1482	0	1482	2342	-860
17280	205.5	246.6	0.9	2	1571	0	1571	2811	-1239
23040	226.9	272.3	0.7	1	1735	0	1735	3748	-2013
28800	246.4	295.7	0.6	1	1884	0	1884	4684	-2801
36000	268.9	322.7	0.5	1	2056	0	2056	5856	-3800

Met Eireann
Return Period Rainfall Depths for sliding Durations
Irish Grid: Easting: 299810, Northing: 228850,

	Interval		Years												
DURATION	6months,	1year,	2,	3,	4,	5,	10,	20,	30,	50,	75,	100,	150,	200,	250,	500,
5 mins	2.4,	3.6,	4.2,	5.2,	5.9,	6.4,	8.2,	10.3,	11.7,	13.7,	15.5,	16.9,	19.2,	20.9,	22.4,	N/A ,
10 mins	3.4,	5.0,	5.9,	7.3,	8.2,	9.0,	11.5,	14.4,	16.3,	19.1,	21.6,	23.6,	26.7,	29.1,	31.2,	N/A ,
15 mins	4.0,	5.9,	7.0,	8.6,	9.7,	10.6,	13.5,	16.9,	19.2,	22.5,	25.4,	27.8,	31.4,	34.3,	36.7,	N/A ,
30 mins	5.3,	7.7,	9.0,	11.1,	12.5,	13.6,	17.2,	21.4,	24.2,	28.3,	31.9,	34.8,	39.2,	42.7,	45.6,	N/A ,
1 hours	6.9,	10.0,	11.7,	14.3,	16.0,	17.4,	21.9,	27.2,	30.7,	35.6,	40.1,	43.6,	49.0,	53.2,	56.7,	N/A ,
2 hours	9.1,	13.0,	15.2,	18.4,	20.6,	22.3,	28.0,	34.4,	38.8,	44.9,	50.3,	54.6,	61.1,	66.3,	70.5,	N/A ,
3 hours	10.7,	15.2,	17.7,	21.4,	23.9,	25.8,	32.3,	39.6,	44.5,	51.3,	57.5,	62.2,	69.6,	75.4,	80.1,	N/A ,
4 hours	12.0,	17.0,	19.7,	23.7,	26.5,	28.6,	35.7,	43.7,	49.0,	56.5,	63.1,	68.3,	76.3,	82.6,	87.7,	N/A ,
6 hours	14.1,	19.8,	22.9,	27.6,	30.7,	33.1,	41.1,	50.2,	56.2,	64.6,	72.1,	77.9,	86.9,	93.9,	99.7,	N/A ,
9 hours	16.5,	23.1,	26.7,	32.0,	35.6,	38.3,	47.4,	57.7,	64.5,	74.0,	82.4,	88.9,	99.0,	106.8,	113.2,	N/A ,
12 hours	18.5,	25.8,	29.7,	35.5,	39.5,	42.5,	52.5,	63.7,	71.0,	81.4,	90.5,	97.6,	108.5,	117.0,	124.0,	N/A ,
18 hours	21.7,	30.1,	34.6,	41.3,	45.7,	49.2,	60.5,	73.2,	81.5,	93.1,	103.4,	111.4,	123.6,	133.0,	140.8,	N/A ,
24 hours	24.3,	33.6,	38.5,	45.9,	50.8,	54.6,	66.9,	80.8,	89.8,	102.5,	113.7,	122.3,	135.5,	145.7,	154.2,	183.6,
2 days	30.5,	40.9,	46.4,	54.4,	59.7,	63.7,	76.7,	91.1,	100.4,	113.2,	124.4,	133.0,	146.1,	156.1,	164.3,	192.7,
3 days	35.5,	47.0,	52.8,	61.4,	67.0,	71.3,	85.0,	99.9,	109.5,	122.6,	134.1,	142.8,	156.0,	166.0,	174.3,	202.6,
4 days	40.0,	52.3,	58.5,	67.6,	73.5,	78.0,	92.3,	107.7,	117.6,	131.1,	142.7,	151.6,	165.0,	175.2,	183.5,	211.9,
6 days	48.0,	61.7,	68.5,	78.4,	84.8,	89.7,	105.0,	121.4,	131.8,	145.9,	158.1,	167.3,	181.1,	191.6,	200.1,	229.0,
8 days	55.2,	70.0,	77.4,	88.0,	94.9,	100.1,	116.2,	133.5,	144.3,	159.1,	171.7,	181.2,	195.4,	206.1,	214.9,	244.4,
10 days	61.8,	77.7,	85.6,	96.8,	104.0,	109.5,	126.5,	144.5,	155.8,	171.0,	184.0,	193.8,	208.4,	219.4,	228.3,	258.4,
12 days	68.0,	84.9,	93.2,	105.0,	112.6,	118.3,	136.0,	154.7,	166.4,	182.1,	195.4,	205.5,	220.5,	231.7,	240.8,	271.4,
16 days	79.6,	98.2,	107.3,	120.2,	128.4,	134.5,	153.5,	173.4,	185.8,	202.4,	216.4,	226.9,	242.5,	254.2,	263.7,	295.3,
20 days	90.5,	110.7,	120.5,	134.2,	142.9,	149.5,	169.6,	190.6,	203.5,	220.9,	235.5,	246.4,	262.6,	274.7,	284.5,	317.1,
25 days	103.4,	125.3,	135.8,	150.6,	159.9,	166.9,	188.3,	210.4,	224.1,	242.2,	257.6,	268.9,	285.8,	298.4,	308.5,	342.0,

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

FOUL SEWERAGE DESIGN

Design Criteria for Foul - Main

Pipe Sizes STANDARD Manhole Sizes STANDARD

Industrial Flow (l/s/ha)	0.00	Add Flow / Climate Change (%)	0
Industrial Peak Flow Factor	0.00	Minimum Backdrop Height (m)	0.200
Flow Per Person (l/per/day)	150.00	Maximum Backdrop Height (m)	0.000
Persons per House	2.70	Min Design Depth for Optimisation (m)	0.000
Domestic (l/s/ha)	0.00	Min Vel for Auto Design only (m/s)	0.75
Domestic Peak Flow Factor	6.00	Min Slope for Optimisation (1:X)	500

Designed with Level Inverts

Network Design Table for Foul - Main

PN	Length (m)	Fall (m)	Slope (1:X)	Area (ha)	Houses	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)
F1.000	18.055	0.451	40.0	0.000	2	0.0	1.500	o	150
F1.001	43.587	0.897	48.6	0.000	4	0.0	1.500	o	150
F1.002	45.696	1.523	30.0	0.000	11	0.0	1.500	o	225
F1.003	36.505	1.227	29.8	0.000	7	0.0	1.500	o	225
F2.000	66.255	2.209	30.0	0.000	5	0.0	1.500	o	150
F2.001	43.484	0.435	100.0	0.000	0	0.0	1.500	o	150
F2.002	16.376	0.279	58.6	0.000	1	0.0	1.500	o	150
F1.004	23.115	0.154	150.0	0.000	0	0.0	1.500	o	225

Network Results Table

PN	US/IL (m)	Σ Area (ha)	Σ Base Flow (l/s)	Σ Hse	Add Flow (l/s)	P.Dep (mm)	P.Vel (m/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
F1.000	86.600	0.000	0.0	2	0.0	6	0.26	1.39	24.5	0.1
F1.001	86.149	0.000	0.0	6	0.0	10	0.35	1.26	22.2	0.2
F1.002	85.252	0.000	0.0	17	0.0	13	0.55	2.10	83.5	0.5
F1.003	83.729	0.000	0.0	24	0.0	15	0.62	2.11	83.8	0.7
F2.000	85.425	0.000	0.0	5	0.0	8	0.39	1.60	28.3	0.1
F2.001	83.216	0.000	0.0	5	0.0	10	0.26	0.88	15.5	0.1
F2.002	82.781	0.000	0.0	6	0.0	10	0.33	1.15	20.2	0.2
F1.004	82.502	0.000	0.0	30	0.0	24	0.38	0.94	37.2	0.8

Manhole Schedules for Foul - Main

MH Name	MH CL (m)	MH Depth (m)	MH Connection	MH Diam.,L*W (mm)	PN	Pipe Out Invert Level (m)	Diameter (mm)	PN	Pipes In Invert Level (m)	Diameter (mm)	Backdrop (mm)
F1	88.300	1.700	Open Manhole	1200	F1.000	86.600	150				
F2	87.500	1.351	Open Manhole	1050	F1.001	86.149	150	F1.000	86.149	150	
F3	87.300	2.048	Open Manhole	1200	F1.002	85.252	225	F1.001	85.252	150	
F4	85.200	1.471	Open Manhole	1050	F1.003	83.729	225	F1.002	83.729	225	
F5	87.000	1.575	Open Manhole	1050	F2.000	85.425	150				
F6	84.200	0.984	Open Manhole	1050	F2.001	83.216	150	F2.000	83.216	150	
F7	84.200	1.419	Open Manhole	1050	F2.002	82.781	150	F2.001	82.781	150	
F5	83.600	1.098	Open Manhole	1050	F1.004	82.502	225	F1.003	82.502	225	
								F2.002	82.502	150	
F	83.600	1.252	Open Manhole	0		OUTFALL		F1.004	82.348	225	

PIPELINE SCHEDULES for Foul - Main

Upstream Manhole

PN	Hyd Sect	Diam (mm)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
F1.000	o	150	F1	88.300	86.600	1.550	Open Manhole	1200
F1.001	o	150	F2	87.500	86.149	1.201	Open Manhole	1050
F1.002	o	225	F3	87.300	85.252	1.823	Open Manhole	1200
F1.003	o	225	F4	85.200	83.729	1.246	Open Manhole	1050
F2.000	o	150	F5	87.000	85.425	1.425	Open Manhole	1050
F2.001	o	150	F6	84.200	83.216	0.834	Open Manhole	1050
F2.002	o	150	F7	84.200	82.781	1.269	Open Manhole	1050
F1.004	o	225	F5	83.600	82.502	0.873	Open Manhole	1050

Downstream Manhole

PN	Length (m)	Slope (1:X)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
F1.000	18.055	40.0	F2	87.500	86.149	1.201	Open Manhole	1050
F1.001	43.587	48.6	F3	87.300	85.252	1.898	Open Manhole	1200
F1.002	45.696	30.0	F4	85.200	83.729	1.246	Open Manhole	1050
F1.003	36.505	29.8	F5	83.600	82.502	0.873	Open Manhole	1050
F2.000	66.255	30.0	F6	84.200	83.216	0.834	Open Manhole	1050
F2.001	43.484	100.0	F7	84.200	82.781	1.269	Open Manhole	1050
F2.002	16.376	58.6	F5	83.600	82.502	0.948	Open Manhole	1050
F1.004	23.115	150.0	F	83.600	82.348	1.027	Open Manhole	0

Area Summary for Foul - Main

Pipe Number	Gross Area (ha)	Pipe Total (ha)
1.000	0.000	0.000
1.001	0.000	0.000
1.002	0.000	0.000
1.003	0.000	0.000
2.000	0.000	0.000
2.001	0.000	0.000
2.002	0.000	0.000
1.004	0.000	0.000
	Total	Total
	0.000	0.000

Free Flowing Outfall Details for Foul - Main

Outfall Pipe Number	Outfall Name	C. Level (m)	I. Level (m)	Min I. Level (m)	D,L (mm)	W (mm)
F1.004	F	83.600	82.348	81.935	0	0

Existing Network Details for Storm

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	k (mm)	HYD SECT	DIA (mm)
S1.000	45.696	1.523	30.0	0.114	4.00	0.600	o	225
S1.001	37.717	0.629	60.0	0.000	0.00	0.600	o	225
S1.002	21.155	0.353	59.9	0.036	0.00	0.600	o	225
S1.003	75.097	2.347	32.0	0.062	0.00	0.600	o	225
S2.000	59.445	0.396	150.1	0.166	4.00	0.600	o	225
S2.001	21.626	0.072	300.4	0.053	0.00	0.600	o	300
S2.002	42.041	0.140	300.3	0.067	0.00	0.600	o	300
S1.004	29.165	0.097	300.7	0.100	0.00	0.600	o	375
S3.000	5.240	0.026	201.5	0.000	4.00	0.600	o	225
S1.005	20.363	0.068	299.5	0.029	0.00	0.600	o	300
S1.006	13.043	0.040	326.1	0.000	0.00	0.600	o	300
S1.007	28.084	0.086	326.6	0.000	0.00	0.600	o	300
S1.008	1.526	0.005	325.0	0.000	0.00	0.600	o	300
S4.000	10.733	0.199	53.9	0.029	4.00	0.600	o	225
S4.001	43.785	0.438	100.0	0.058	0.00	0.600	o	225

PN	US/MH Name	US/CL (m)	US/IL (m)	US C.Depth (m)	DS/CL (m)	DS/IL (m)	DS C.Depth (m)	Ctrl	US/MH (mm)
S1.000	SWMH1	90.130	88.600	1.305	89.600	87.077	2.298		1200
S1.001	SWMH2	89.600	87.077	2.298	88.250	86.448	1.577		1200
S1.002	SWMH3	88.250	86.448	1.577	87.500	86.095	1.180		1200
S1.003	SWMH6	87.500	85.138	2.137	84.200	82.791	1.184		1200
S2.000	SWMH7	85.900	83.400	2.275	84.000	83.004	0.771		1200
S2.001	SWMH8	84.000	83.004	0.696	84.200	82.932	0.968		1200
S2.002	SWMH9	84.200	82.932	0.968	84.200	82.792	1.108		1200
S1.004	SWMH10	84.200	82.791	1.034	84.200	82.694	1.131		1350
S3.000	SWMH11	84.200	82.700	1.275	84.200	82.674	1.301		1200
S1.005	SWMH12	84.200	82.674	1.226	84.200	82.606	1.294	Depth/Flow Relationship	1350
S1.006	SWMH13	84.200	82.606	1.294	84.200	82.566	1.334		1200
S1.007	SWMH14	84.200	82.566	1.334	83.600	82.480	0.820		1200
S1.008	SWMH15	83.600	82.480	0.820	85.650	82.475	2.875		1200
S4.000	SWMH4	87.200	85.775	1.200	87.300	85.576	1.499		1200
S4.001	SWMH5	87.300	85.576	1.499	87.500	85.138	2.137		1200

Manhole Schedules for Storm

MH Name	MH CL (m)	MH Depth (m)	MH Connection	MH Diam.,L*W (mm)	Pipe Out PN	Pipe Out Invert Level (m)	Pipe Out Diameter (mm)	Pipes In PN	Pipes In Invert Level (m)	Pipes In Diameter (mm)	Backdrop (mm)
SSWMH1	90.130	1.530	Open Manhole	1200	S1.000	88.600	225				
SSWMH2	89.600	2.523	Open Manhole	1200	S1.001	87.077	225	S1.000	87.077	225	
SSWMH3	88.250	1.802	Open Manhole	1200	S1.002	86.448	225	S1.001	86.448	225	
SSWMH6	87.500	2.362	Open Manhole	1200	S1.003	85.138	225	S1.002	86.095	225	957
SSWMH7	85.900	2.500	Open Manhole	1200	S2.000	83.400	225				
SSWMH8	84.000	0.996	Open Manhole	1200	S2.001	83.004	300	S2.000	83.004	225	
SSWMH9	84.200	1.268	Open Manhole	1200	S2.002	82.932	300	S2.001	82.932	300	
SSWMH10	84.200	1.409	Open Manhole	1350	S1.004	82.791	375	S1.003	82.791	225	
								S2.002	82.792	300	
SSWMH11	84.200	1.500	Open Manhole	1200	S3.000	82.700	225				
SSWMH12	84.200	1.526	Open Manhole	1350	S1.005	82.674	300	S1.004	82.694	375	95
								S3.000	82.674	225	
SSWMH13	84.200	1.594	Open Manhole	1200	S1.006	82.606	300	S1.005	82.606	300	
SSWMH14	84.200	1.634	Open Manhole	1200	S1.007	82.566	300	S1.006	82.566	300	
SSWMH15	83.600	1.120	Open Manhole	1200	S1.008	82.480	300	S1.007	82.480	300	
SEX. DITCH	85.650	3.175	Open Manhole	0		OUTFALL		S1.008	82.475	300	
SSWMH4	87.200	1.425	Open Manhole	1200	S4.000	85.775	225				
SSWMH5	87.300	1.724	Open Manhole	1200	S4.001	85.576	225	S4.000	85.576	225	
SSWMH5	87.500	2.362	Open Manhole	1200		OUTFALL		S4.001	85.138	225	

PIPELINE SCHEDULES for Storm

Upstream Manhole

PN	Hyd Sect	Diam (mm)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
S1.000	o	225	SSWMH1	90.130	88.600	1.305	Open Manhole	1200
S1.001	o	225	SSWMH2	89.600	87.077	2.298	Open Manhole	1200
S1.002	o	225	SSWMH3	88.250	86.448	1.577	Open Manhole	1200
S1.003	o	225	SSWMH6	87.500	85.138	2.137	Open Manhole	1200
S2.000	o	225	SSWMH7	85.900	83.400	2.275	Open Manhole	1200
S2.001	o	300	SSWMH8	84.000	83.004	0.696	Open Manhole	1200
S2.002	o	300	SSWMH9	84.200	82.932	0.968	Open Manhole	1200
S1.004	o	375	SSWMH10	84.200	82.791	1.034	Open Manhole	1350
S3.000	o	225	SSWMH11	84.200	82.700	1.275	Open Manhole	1200
S1.005	o	300	SSWMH12	84.200	82.674	1.226	Open Manhole	1350
S1.006	o	300	SSWMH13	84.200	82.606	1.294	Open Manhole	1200
S1.007	o	300	SSWMH14	84.200	82.566	1.334	Open Manhole	1200
S1.008	o	300	SSWMH15	83.600	82.480	0.820	Open Manhole	1200
S4.000	o	225	SSWMH4	87.200	85.775	1.200	Open Manhole	1200
S4.001	o	225	SSWMH5	87.300	85.576	1.499	Open Manhole	1200

Downstream Manhole

PN	Length (m)	Slope (1:X)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
S1.000	45.696	30.0	SSWMH2	89.600	87.077	2.298	Open Manhole	1200
S1.001	37.717	60.0	SSWMH3	88.250	86.448	1.577	Open Manhole	1200
S1.002	21.155	59.9	SSWMH6	87.500	86.095	1.180	Open Manhole	1200
S1.003	75.097	32.0	SSWMH10	84.200	82.791	1.184	Open Manhole	1350
S2.000	59.445	150.1	SSWMH8	84.000	83.004	0.771	Open Manhole	1200
S2.001	21.626	300.4	SSWMH9	84.200	82.932	0.968	Open Manhole	1200
S2.002	42.041	300.3	SSWMH10	84.200	82.792	1.108	Open Manhole	1350
S1.004	29.165	300.7	SSWMH12	84.200	82.694	1.131	Open Manhole	1350
S3.000	5.240	201.5	SSWMH12	84.200	82.674	1.301	Open Manhole	1350
S1.005	20.363	299.5	SSWMH13	84.200	82.606	1.294	Open Manhole	1200
S1.006	13.043	326.1	SSWMH14	84.200	82.566	1.334	Open Manhole	1200
S1.007	28.084	326.6	SSWMH15	83.600	82.480	0.820	Open Manhole	1200
S1.008	1.526	325.0	SEX. DITCH	85.650	82.475	2.875	Open Manhole	0
S4.000	10.733	53.9	SSWMH5	87.300	85.576	1.499	Open Manhole	1200
S4.001	43.785	100.0	SSWMH5	87.500	85.138	2.137	Open Manhole	1200

Free Flowing Outfall Details for Storm

Outfall Pipe Number	Outfall Name	C. Level (m)	I. Level (m)	Min I. Level (m)	D,L (mm)	W (mm)
S1.008	SEX. DITCH	85.650	82.475	82.470	0	0

Free Flowing Outfall Details for Storm

Outfall Pipe Number	Outfall Name	C. Level (m)	I. Level (m)	Min I. Level (m)	D,L (mm)	W (mm)
S4.001	SSWMH5	87.500	85.138	85.138	1200	0

Simulation Criteria for Storm

Volumetric Runoff Coeff	0.840	Additional Flow - % of Total Flow	0.000
Areal Reduction Factor	1.000	MADD Factor * 10m³/ha Storage	2.000
Hot Start (mins)	0	Inlet Coeffiecient	0.800
Hot Start Level (mm)	0	Flow per Person per Day (l/per/day)	0.000
Manhole Headloss Coeff (Global)	0.500	Run Time (mins)	5760
Foul Sewage per hectare (l/s)	0.000	Output Interval (mins)	24

Number of Input Hydrographs 0 Number of Offline Controls 0 Number of Time/Area Diagrams 0
Number of Online Controls 1 Number of Storage Structures 2 Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model	FSR	Profile Type	Winter
Return Period (years)	100	Cv (Summer)	0.750
Region	Scotland and Ireland	Cv (Winter)	0.840
M5-60 (mm)	17.400	Storm Duration (mins)	2880
Ratio R	0.273		

Online Controls for Storm

Depth/Flow Relationship Manhole: SSWMH12, DS/PN: S1.005, Volume (m^3): 5.4

Invert Level (m) 82.674

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.200	2.7000	1.400	2.7000	2.600	2.7000	3.800	2.7000	5.000	2.7000
0.400	2.7000	1.600	2.7000	2.800	2.7000	4.000	2.7000	5.200	2.7000
0.600	2.7000	1.800	2.7000	3.000	2.7000	4.200	2.7000	5.400	2.7000
0.800	2.7000	2.000	2.7000	3.200	2.7000	4.400	2.7000	5.600	2.7000
1.000	2.7000	2.200	2.7000	3.400	2.7000	4.600	2.7000	5.800	2.7000
1.200	2.7000	2.400	2.7000	3.600	2.7000	4.800	2.7000	6.000	2.7000

Storage Structures for Storm

Tank or Pond Manhole: SSWMH9, DS/PN: S2.002

Invert Level (m) 82.932

Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	45.0	0.600	45.0	1.200	0.0	1.800	0.0	2.400	0.0
0.100	45.0	0.700	45.0	1.300	0.0	1.900	0.0	2.500	0.0
0.200	45.0	0.701	0.0	1.400	0.0	2.000	0.0		
0.300	45.0	0.900	0.0	1.500	0.0	2.100	0.0		
0.400	45.0	1.000	0.0	1.600	0.0	2.200	0.0		
0.500	45.0	1.100	0.0	1.700	0.0	2.300	0.0		

Tank or Pond Manhole: SSWMH12, DS/PN: S1.005

Invert Level (m) 83.200

Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	577.0	0.600	865.0	1.200	0.0	1.800	0.0	2.400	0.0
0.100	622.0	0.700	917.0	1.300	0.0	1.900	0.0	2.500	0.0
0.200	668.0	0.701	0.0	1.400	0.0	2.000	0.0		
0.300	716.0	0.900	0.0	1.500	0.0	2.100	0.0		
0.400	765.0	1.000	0.0	1.600	0.0	2.200	0.0		
0.500	814.0	1.100	0.0	1.700	0.0	2.300	0.0		

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

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

Profile(s) Summer and Winter
Duration(s) (mins) 15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440, 2160, 2880, 4320, 5760, 7200, 8640, 10080
Return Period(s) (years) 1, 30, 100
Climate Change (%) 0, 0, 20

PN	Storm	Return Period	Climate Change	First X Surcharge	First Y Flood	First Z Overflow	O/F Act.	Lvl Exc.
S1.000	15 Winter	100	+20%					
S1.001	15 Winter	100	+20%					
S1.002	15 Winter	100	+20%	100/15 Summer				
S1.003	15 Winter	100	+20%	100/15 Summer				
S2.000	15 Winter	100	+20%	30/15 Summer				
S2.001	30 Winter	100	+20%	30/15 Summer				
S2.002	960 Winter	100	+20%	1/30 Summer				
S1.004	960 Winter	100	+20%	1/15 Summer				
S3.000	960 Winter	100	+20%	1/15 Summer				
S1.005	960 Winter	100	+20%	1/15 Summer				
S1.006	1440 Summer	100	+20%					
S1.007	8640 Winter	30	0%					
S1.008	5760 Winter	30	0%					
S4.000	15 Winter	100	+20%					
S4.001	15 Winter	100	+20%					

PN	US/MH Name	Water Level (m)	Surch'ed Depth (m)	Flooded Volume (m³)	Flow / Cap.	O'flow (l/s)	Pipe Flow (l/s)	Status
S1.000	SSWMH1	88.719	-0.106	0.000	0.55	0.0	50.1	OK
S1.001	SSWMH2	87.228	-0.074	0.000	0.78	0.0	49.4	OK
S1.002	SSWMH3	86.695	0.022	0.000	1.04	0.0	63.6	SURCHARGED
S1.003	SSWMH6	85.562	0.199	0.000	0.95	0.0	84.8	SURCHARGED
S2.000	SSWMH7	84.516	0.891	0.000	1.49	0.0	60.7	SURCHARGED
S2.001	SSWMH8	83.715	0.411	0.000	1.18	0.0	66.1	FLOOD RISK
S2.002	SSWMH9	83.661	0.429	0.000	0.15	0.0	8.7	SURCHARGED
S1.004	SSWMH10	83.658	0.492	0.000	0.19	0.0	19.7	SURCHARGED
S3.000	SSWMH11	83.656	0.731	0.000	0.00	0.0	-0.1	SURCHARGED
S1.005	SSWMH12	83.657	0.683	0.000	0.05	0.0	2.7	SURCHARGED
S1.006	SSWMH13	82.652	-0.254	0.000	0.06	0.0	2.7	OK
S1.007	SSWMH14	82.608	-0.258	0.000	0.05	0.0	2.7	OK
S1.008	SSWMH15	82.522	-0.258	0.000	0.05	0.0	2.7	OK
S4.000	SSWMH4	85.845	-0.155	0.000	0.21	0.0	12.7	OK
S4.001	SSWMH5	85.725	-0.076	0.000	0.76	0.0	37.6	OK