Clifton Scannell Emerson
Associates

Engineering Services Report Drainage and Water Services
Proposed K2 Data Centre Development

K2 DATA CENTRES

Client: K2 Strategic Infrastructure Ireland Ltd.

Date: 23rd May 2022

Job Number: 22_043

CONSULTING ENGINEERS

Civil Engineering | Structural Engineering | Transport Engineering | Environmental Engineering | Project Management | Health and Safety

Clifton Scannell Emerson Associates

Clifton Scannell Emerson Associates Limited,
Consulting Engineers, Mentec House, Bakers Point, Dun Laoghaire, Co. Dublin, Ireland A96 K6P3
T. +353 1 2885006 F. +353 1 2833466 E. info@csea.ie W. www.csea.ie

Document Control Sheet

Project Name:	Proposed K2 Data Centre Development
Project Number:	22_043
Report Title:	Engineering Services Report Drainage and Water Services
Filename:	RPT-22_043-002 Engineering Services Report

Issue No.	Issue Status	Date	Prepared by	Checked by
P01	DRAFT	23/05/2022	KB	CD
P02	PLANNING	14/07/2022	CD	CD

Table of Contents

1 Introduction

1.1 Background

The following report is being submitted as part of the planning application for K2 Strategic Infrastructure Ireland Ltd for the proposed K2 data centre development on a site at Kingswood Drive and Kingswood Road, within the Citywest Business Campus, Naas Road, Dublin 24. The site is bound to the north by Kingswood Drive, to the west by Kingswood Road, to the east by greenfield lands, and to the south by existing commercial development. The proposed development of a brownfield site with a total area of approximately 1.9 Hectares. The report outlines the proposals for drainage services and water supply for the development.

1.2 Development Description

The proposed development permitted under Reg. Ref.: SD18A/0301 comprises of the development of a two storey data centre with two storey administration spaces and associated plant spaces with a total permitted floor area of 11,548.5m^2, all associated site development works, landscaping, car parking and two vehicular entrances of Kingswood Drive and Kingswood Road.

The proposed development comprises amendments to the development permitted under Reg. Ref.: SD18A/0301. The proposed amendments comprise the following:

- Alterations to the permitted two storey data centre building including internal reconfiguration, alterations to finished floor levels, alterations to the building footprint to provide for the relocation of an internal staircore to the south of the building, and the replacement of the enclosed first floor level with an open screened roof mounted plant space (resulting in a reduction of 4,091 sq.m in the gross floor area (GFA) of the building).

- Associated alterations to the façade of the data centre building, including alterations to fenestration, cladding, step-out in the southern façade to accommodate a staircore, and a reduction in the eastern building parapet height of c. 2 metres.

- The provision of a canopy over the loading docks on the east facade.

- Alterations to the permitted generator compound, generators, and flues, including a reduction in the number of generators (5 no. now proposed), and provision of MV rooms within the generator compound.

- Provision of an ESB substation compound in the northeastern portion of the site, comprising a single storey substation building (with a GFA of c. 125 sq.m), 2 no. transformers, client control building (with a GFA of c. 47 sq.m), and associated access arrangements within a 2.6 metre high security fence. The ESB substation compound will be accessed from Kingswood Drive.

- Omission of the permitted sprinkler tank, pump room and 10kV Substation, reconfiguration of the permitted car parking, and revisions to permitted boundary treatments.

- Associated alterations to landscaping, access and internal road arrangements, services, lighting, and layout, and all associated and ancillary works.

The extent of the site layout is highlighted in Figure 1.1 below:-

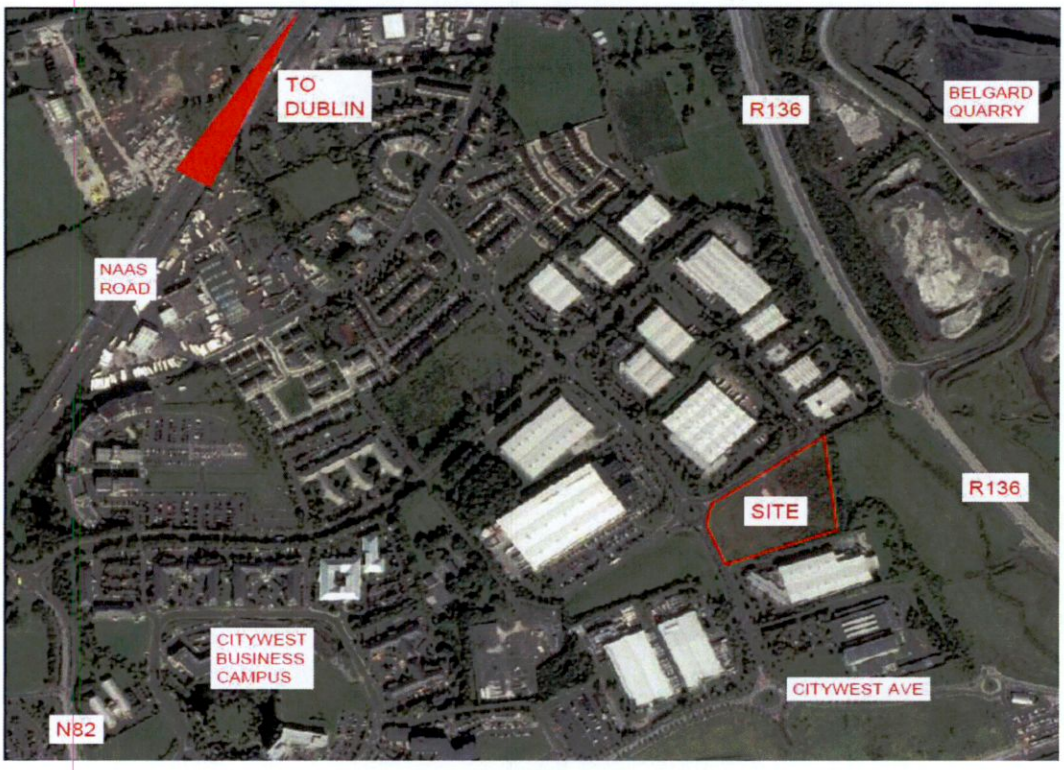


Figure 1.1 – Proposed Site Location Plan

1.3 Existing Land Use

The existing site is currently a brownfield site which was previously used as a construction site compound. It is located within Citywest Business Park as a serviced site. The site is in a cleared state with the exception of existing concrete yard slab in the northern part of the site.

2 Surface Water Drainage

2.1 General

The proposed development will provide attenuation in compliance with the requirements of the Greater Dublin Strategic Drainage Study (GDSDS). The following section outlines the surface water drainage proposals for the development. All SUDS elements have been designed as per the recommendation of the SuDS Manual 2015. The design also takes account of the draft South Dublin County Council (SDCC) Sustainable Drainage Explanatory Design & Evaluation Guide (2022).

All surface water works including connections will be carried out in accordance with the Greater Dublin Regional Code of Practice for Development Works – Drainage.

The documentation provided in support of that application addressed pre-development greenfield run-off rates for 1.9 ha catchment area.

2.2 Drawings

The following drawings provided in support of this planning application are applicable to surface water drainage:

- 22_043-CSE-00-XX-DR-C-2100 Overall Existing Surface Water Drainage Layout Plan
- 22_043-CSE-00-XX-DR-C-2110 Overall Proposed Surface Water Drainage Layout Plan
- 22_043-CSE-00-XX-DR-C-2111 Proposed Permeable and Impermeable Areas
- 22_043-CSE-00-XX-DR-C-2112 Proposed Surface Water Attenuation System Layout Plan
- 22_043-CSE-00-XX-DR-C-2113 Proposed Surface Water Attenuation System Cross-Sections
- 22_043-CSE-00-XX-DR-C-2114 Proposed Surface Water Attenuation System General Arrangement
- 22_043-CSE-00-XX-DR-C-2910 Proposed Standard Trench Details
- 22_043-CSE-00-XX-DR-C-2911 Proposed Services Details Sheet 1
- 22_043-CSE-00-XX-DR-C-2912 Proposed Services Details Sheet 2

2.3 Existing Surface Water Drainage Network

There is an existing 525mm diameter pipe located in the centre of the existing Citywest Business Park Estate Road which runs along the eastern boundary of the site. The 525mm diameter pipe flows in a easterly direction from the north east corner of the site before out falling to the Kingswood Stream circa 65m east of the site. The invert levels of existing manhole is 99.82m OD which is 3.0m deep.

The existing surface water drainage network within Citywest Business Park is private and is the responsibility of Davy Hickey Properties, Citywest.

2.4 *Proposed Surface Water Drainage Network*

2.4.1 Overview

The proposed surface water network for the development collects runoff from roofs, roads and other hard standing areas in a sealed system of pipes and gullies. The surface water drainage pipe network follows the proposed site topography and falls west at an average gradient of approximately 0.5 – 1.0%.

The pipe network outfalls to a surface water attenuation storage tank located in the north east adjacent to the site entrance. The proposed attenuation system outfalls via a carrier drain which discharges attenuated flows to the existing surface water drainage system as described in Section 2.3 of this report.

2.4.2 Surface Water Network Design

The pipe network is designed in accordance with the requirement of Table 6.4 of the Greater Dublin Strategic Drainage Study (GDSDS) – See Fig 2.1 below.

Parameter	Surface Water Sewers
Minimum depth	1.2m cover under highways 0.9m elsewhere
Maximum depth	Normally 5m
Minimum sewer size	225mm
Runoff factors for pipe sizing	100% paved and roof surfaces 0% off pervious surfaces
Rainfall for initial pipe sizing	50mm/hr rainfall intensity
Minimum velocity (pipe full)	1.0m/s
Flooding	Checks made for adequate protection * No flooding for return period less than 30 years except where explicitly planned Simulation modelling is required for sites greater than 24ha**
Roughness – ks	0.6mm

Fig 2.1 – GDSDS Pipe Design Criteria

Manholes shall be provided at junctions in the network, at changes of direction and gradient and at no more than 90m centres.

The surface water pipe network has been modelled using WinDes™ software and the results are contained in **Appendix B**.

2.4.3 Pollution Control Measures

Three different types of pollution control elements will be implemented as part of surface water infrastructure in the development as following:

A. It is proposed to provide a Class 1 full retention separators (Klargestor Model No. NSFP003 or equivalent) downstream of any used in high risk spillage areas in accordance with Section 20 of the Greater Dublin Regional Code of Practice. The full retention separator is designed to treat the full design flow that can be delivered in the drainage system, which is normally equivalent to the flow generated by a rainfall intensity of 50mm/hour. This is provided at the fuel unloading area.

B. It is proposed to provide a Class 1 bypass interceptor (Klargestor Model No. NSBP003 or equivalent) downstream of the main car park. The bypass separator is designed to fully treat all flows generated by rainfall rates up to 5mm/hour. This covers 99% of all rainfall events and is a requirement for car parking areas with 10 spaces or more as outlined in Section 20.1 of the Greater Dublin Regional Code of Practice.

C. It is proposed to provide a Class 1 bypass interceptor (Klargestor Model No. NSBE030 or equivalent) upstream of the Attenuation Tank.

D. Two hydrodynamic solid separators are provided upstream of the connections to the Attenuation Tank to screen rubbish, debris and sediment from the surface water runoff before it enters the attenuation tank. At manhole SWMH 8.5 a Contech Model No. CDS 0606/01 or equivalent is proposed whilst at manhole SWMH 1.10 a Contech Model No. CDS 0806 or equivalent is proposed.

E. It is proposed to provide a Class 1 full retention separators (Klargestor Model No. NSFP003 or equivalent) downstream of the electrical transformers in the Client's MV compound.

Details of the full retention and bypass interceptors proposed are provided in **Appendix C** to this report.

Details of the hydrodynamic solid separator proposed are provided in **Appendix D** to this report.

2.4.4 SuDS Implementation

A number of measures are proposed in order to ensure the proposed scheme is complaint with Sustainable Urban Drainage System (SuDS) the measures outlined in Table 2.1 are proposed in accordance with Table 6.3 of the GDSDS:-

Criterion	Return Period (Years)	Design Objective	Design Measures Provided
River Water Quality Protection	<1	Provision of between 5mm and 10mm interception storage where rainfall runoff to receiving water can be prevented.	Provision of swales where possible.

Criterion	Return Period (Years)	Design Objective	Design Measures Provided
		Provision of treatment volume of volume (minimum pool volume equivalent to 15mm of rainfall)	
River Regime Protection	1 and 100	Discharge rate equal to greenfield runoff rate	Provision of attenuation ponds with flow control device to regulate outflow from site to greenfield runoff rates during peak storm events.
Level of Service (Flooding) for the site	30 and 100	No flooding on site	Site is located outside the 1:1000-year flood zone and the proposed drainage system is designed to cater for the 1:100 year storm event.
	100	No internal property flooding	Finished floor levels are at least 500mm above maximum river levels and on-site storage ponds. The lowest building on the site is the ESB Substation which has a finished floor level of **103.15m** thus the highest allowable water level in the storage tank is **102.65m**.
		No flooding of adjacent urban areas	The proposed surface water scheme for the development manages the 1:100 year flood event within the development.
River Flood Protection	100	'Long-term' storage with temporary flood storage drained by infiltration	Due to site constraints associated with landscape screening there is insufficient space available on site for 'Long-term' storage.

Criterion	Return Period (Years)	Design Objective	Design Measures Provided
		Maximum discharge rate of QBAR or 2 l/s/ha (whichever is greater) for attenuation storage where separate 'long-term' storage cannot be provided.	Discharge rates from the proposed scheme will be controlled in accordance with this requirement.

Table 2.1 – Summary of SuDS Implementation Measures

As noted in Chapter 16 of the Greater Dublin Regional Drainage Code of Practice SuDS area a mandatory requirement of each Local Sanitary Authority. Due to the constrained nature of the site and high level of underground services required to service the buildings limited options are available in terms of SuDS devices.

The objectives of the SDCC Sustainable Drainage Explanatory Design & Evaluation Guide are noted in relation to the selection the proposed attenuation storage device. The Design Note provided in Section 7.7.1 of the document notes the following:-

> *"Ideally runoff should be stored in shallow landscaped features or within permeable surfaces. Where this is not possible, deeper tanks or pipe storage must be robustly justified".*

A number of options were assessed in relation to the Surface Water Attenuation System to be used however the site drainage system outfalls to the existing network in the northeast corner of the site. A planning submission was made on the previous planning application for development on the site (Reg Ref SD18A-0301) which stated the view from northeast of the proposed development would be unsightly. The Conditions of the Grant of Planning for the above application required a landscaping plan which reduced the urban impact of the proposed development. As a result, a landscaping berm with coniferous and deciduous planting is proposed in the northern section of the site adjacent to the surface water drainage outfall. As such, the Attenuation System needs to be structurally capable of supporting the landscape berm and, also, not be impacted by the roots of the planting proposed. Accordingly, a precast concrete attenuation tank is the only technically feasible solution which can be installed within the landscaped area without impacting on the berm and planting required.

A fully landscaped swale has been incorporated into the design in the southeastern corner of the site. The swale will be designed with sympathetic contours and landscape planting in accordance with the requirements of SDDCC Sustainable Drainage Explanatory Design & Evaluation Guide.

2.4.5 Surface Water Attenuation

The surface water network has been designed to provide sufficient capacity to contain and convey all surface water runoff associated with the 1 in 100 year event to the attenuation basins without any overland flooding. This is in compliance with Criterion 3 of Table 6.3 of Volume 2 the GDSDS.

All calculations have allowed for an additional allowance of 20% in rainfall intensities to allow for climate change as per Section 8.4.6.4 of SDDCC Sustainable Drainage Explanatory Design & Evaluation Guide which exceeds the requirements of Table 6.1 of Volume 2 of the GDSDS (10%).

The area for the proposed development site is c.1.9 ha thus the allowable discharge rate for the scheme to be 4.00 l/s. Discharge from the site will be controlled by means of an online hydrobrake vortex control (Unit Reference SHE-0082-4000-2000-4000). Details of the hydrobrake proposed are provided in **Appendix E** to this report

Analysis of the Windes™ results for the data storage facility's drainage network identified the 1440 minute winter storm during the 1 in 100 year return period as the critical storm in terms of attenuation storage volume. The attenuation system design information is outlined below. See **Appendix B** for details of the Windes™ calculations.

- System Invert Level = 100.656m OD
- Proposed Ground Level at Attenuation Tank = 103.631 m approx.
- System Plan Area = 470.4 m^2
- Discharge Rate = 4.0 l/s
- Design Head = 2.00 m
- Critical Storm Event = 1440 Minute Winter Event during 1 in 100 year event.
- High Water Level during 1 in 100 year event = 102.648 m (see page 12 of Windes Calculations). As noted on Table 2.1 the highest allowable water level in the tank in the 1:100 year is 102.650m).
- Depth of Water in Attenuation Tank in 1 in 100 year event = 1.767m
- Storage Volume required for proposed development = 831.2 m^3
- Freeboard = 0.233m
- Storage Volume provided (including freeboard)= 940.957 m^3

Details of the proposed Attenuation System are indicated on 22_043-CSE-00-XX-DR-C-2112 Proposed Surface Water Attenuation System Layout Plan, 22_043-CSE-00-XX-DR-C-2113 Proposed Surface Water Attenuation System Cross-Sections and 22_043-CSE-00-XX-DR-C-2114 Proposed Surface Water Attenuation System General Arrangement.

3 Foul Wastewater Drainage

3.1 General

A pre-connection enquiry (PCE) form was submitted to Irish Water on 12th of May 2022 which addressed water and wastewater demand for the development (IW Reference Number: CDS22003496). The PCE Application form is included in **Appendix F**. Irish Water provided a Confirmation of Feasibility (CoF) for the development on 1st July 2022 (IW Reference Number: CDS22003496), which is included in **Appendix G** which indicated that the scheme would be connected to the Irish Water network without requirement for upgrades to the network.

3.2 Drawings

The following drawings provided in support of this planning application are applicable to wastewater drainage:-

- 22_043-CSE-00-XX-DR-C-2200 Existing Foul Wastewater Drainage Layout
- 22_043-CSE-00-XX-DR-C-2210 Proposed Foul Wastewater Drainage Layout
- 22_043-CSE-00-XX-DR-C-2910 Proposed Standard Trench Details
- 22_043-CSE-00-XX-DR-C-2911 Proposed Services Details Sheet 1
- 22_043-CSE-00-XX-DR-C-2912 Proposed Services Details Sheet 2

3.3 Existing Infrastructure

There is an existing 225mmø foul sewer which flows in an westerly direction along the northern boundary of the site towards the junction of Kingswood Road and Kingswood Drive. At the roundabout junction of Kingswood Road and Kingswood Drive the 225mmø pipe connects to an existing 375mmø which flows in a northerly direction along Kingswood Road.

3.4 Proposed Foul Wastewater Drainage Network

3.4.1 Overview

The proposed wastewater drainage network collects domestic foul wastewater flows from the administration block of the proposed building which are collected by pop-ups which connect to 100mmø internal pipework which discharge to a 150mmø foul sewer external to the proposed building. The external foul sewer flows in a northerly direction to connect to the existing 225mm diameter foul sewer which is located at the northern boundary of the site as described in Section 3.3 of this report.

In addition to domestic foul wastewater flows, cooling water discharge from Air Handling Units (AHU's) (Discussed in Section 3.4.2 of this report) and rainwater which collects in the exhaust stacks of the generators (Discussed in Section 3.4.2 of this report) will discharge to the foul sewer.

Internal pop-ups will be provided to serve the AHU's which will discharge to the external 150mmø foul wastewater sewer in the generator compound to the east of the building. External gullies will be provided at each generator exhaust stacks which will serve the above ground drain points. The foul sewer will flow north from generator compound and a full

retention hydrocarbon separator will be provided on the sewer to provide hydrocarbons entering the Irish Water Network.

3.4.2 Domestic Wastewater Demand

The average campus occupancy is 45 persons thus the wastewater loading for the proposed development is calculated as follows:-

- Average Campus Occupancy (P) = 45 persons
- Daily consumption (G) = 50 litres per head per day (Irish Water Wastewater Code of Practice, Appendix C, Office without canteen)
- Daily Demand (PG) => 45 x 50 = 2,250 l/day
- Infiltration = >10% of Daily Demand = (2,250) x 0.1 = 225
- Trade Flows (E) = 0 l/s
- Average Wastewater Discharge (Dry Weather Flow – DWF) => PG +I+E = ((2,2250 + 225 +0) / (12 x 60 x 60)) = **0.03 l/s**

The peak daily domestic discharge is calculated as follows:-

- Peaking Factor $Pf_{(dom, Ind)}$ = 4.5 (as per Table 2.7 of Appendix B to IW-CDS-5030-03)
- Design Foul Flow (Peak) => $Pf_{(dom, Ind)}$ x PG + I + E = 4.5 x (2,250 / (24 x 60 x 60)) + (225 / 24 x 60 x 60) + 0 = **0.12 l/s**

3.4.3 Cooling Wastewater Discharge

To reduce both energy and water use in its data storage facilities, the Operator utilises direct evaporative cooling systems, which predominately utilises outside air to cool servers. This means that for most of the year there is no Cooling Water Discharge to the foul wastewater sewer. Evaporative cooling is required when the temperature exceeds 22°C. Cooling water demand is discussed in further detail in Section 4 of this report.

Average Cooling Wastewater Discharge is calculated as follows:-

- Average Process Water Demand = 6.63 l/s (Refer to Section 4.4.3 for Details)
- Efficiency Rate = 85% Evaporation
- Discharge of non-absorbed water to Drain => 6.63 l/s x (1-0.85) = 0.99 l/s
- Additional 30% Diversification across 68 No. AHU's => 0.99 l/s x (1-0.3) = 0.69 l/s
- Average Cooling Wastewater Discharge = **0.69 l/s**

Peak Cooling Wastewater Discharge is calculated as follows:-

- Peak Process Water Demand = 10.2 l/s (Refer to Section 4.4.3 for Details)
- Efficiency Rate = 80% Evaporation
- Discharge of non-absorbed water to Drain => 10.2 l/s x (1-0.80) = 2.04 l/s
- Additional 30% Diversification across 68 No. AHU's => 2.04 l/s x (1-0.2) = 1.63 l/s
- Average Cooling Wastewater Discharge = **1.63 l/s**

3.4.4 Wastewater Pipe Design

The network has been designed to ensure that the foul discharge maintains a self-cleansing velocity. The proposed network adheres to the minimum pipe gradients set out in Table 6 of the "Building Regulations Technical Guidance Document H". It is proposed to take all foul drainage from the buildings by means of 100mmø pipes with minimum gradients of 1:60 which connect to 150mmø pipes laid at minimum gradients of 1:100. The key design parameters are summarised as follows:-

Roughness Co-efficient

Roughness Co-Efficient for Gravity Sewer (k_s) = 1.5mm

Self-Cleansing Velocity

The design is based on the requirements of Table 6 of Part H of the Building Regulations. The DC building has 45 staff which equates to a domestic population of 15 persons. Irish Water guidance indicates that population of a domestic dwelling should be estimated based on 2.7 persons per unit thus the DC buildings is equivalent to 5 Dwellings in terms of foul flow. Table 6 of the Part H of the building regulations permits a 150mm @1:150 to serve between 3 and 8 dwellings once 5 WC's are connected (see below). Thus the design provides self-cleansing which is within the acceptable limits of the building regulations.

Capacity

Based on the Colebrook-White Equation a 150mmø pipe at a gradient of 1:100 has a capacity of 15 l/s and a velocity of 0.875 m/s when flowing full. Thus the pipe network has adequate capacity to convey the design peak flows and has a self-cleansing velocity in excess of 0.75 m/s.

3.4.5 Pollution Control Measures on Wastewater Network

The drainage from sprinkler pumphouse is to pass into a Class 1 full retention separator Model NSFP003 located upstream at proposed Manhole FWMH 7. Details of the full retention separator are provided in **Appendix C**.

4 Water Supply

4.1 General

A pre-connection enquiry (PCE) form was submitted to Irish Water on 12th of May 2022 which addressed water and wastewater demand for the development (IW Reference Number: CDS22003496). The PCE Application form is included in **Appendix F**. Irish Water provided a confirmation of feasibility (CoF) for the development on 1st July 2022 (IW Reference Number: CDS22003496), which is included in **Appendix G** which indicated that the scheme would be connected to the Irish Water network subject to the upgrade of the existing road crossing to the north of the site.

4.2 Existing Infrastructure

The site is served by a 200mmø uPVC water main that is located on the northside of Kingswood Drive to the north of the site. Irish Water record drawings indicate two 150mmø road crossing of Kingswood Drive which connect to the 200mmø water main and terminate in the verge on the northern boundary of the site. As noted in Section 4.1 Irish Water have indicated that they require the road crossing serving the site to be upgraded to 200mmø.

4.3 Drawings

The following drawings provided in support of this planning application are applicable to water supply

- 22_043-CSE-00-XX-DR-C-2300 Existing Water Supply Layout Plan
- 22_043-CSE-00-XX-DR-C-2310 Proposed Water Supply Layout Plan
- 22_043-CSE-00-XX-DR-C-2910 Proposed Standard Trench Details
- 22_043-CSE-00-XX-DR-C-2911 Proposed Services Details Sheet 1

4.4 Proposed Water Supply

4.4.1 Overview

It is proposed to take a 150mmø connection from the external watermain on the north side of the site to connect to the Data Centre. A connection for domestic purposes will be provided to the administration area and a connection will be provided to the water treatment room. The ESB substation building will be served by a 50mmø watermain.

4.4.2 Domestic Water Supply Demand

The proposed domestic demand has been calculated in accordance with the Irish Water Code of Practice for Water Infrastructure (Document No. IW-CDS-5020-03).

- Population = 45 persons
- In accordance with Section 3.28 of IW-CDS-5020-03 the demand per head is 45 litres per person.

- Average Day / Peak Week Demand = 1.25 x 0.023 = 0.029 l/s (as per Section 3.7.2 of IW-CDS-5020-03)
- Peak Demand = 0.029 x 5.0 = **0.146 l/s** (as per Section 3.7.2 of IW-CDS-5020-03)

4.4.3 Industrial Water Demand

Average Demand

The proposed data centre has a total of 68 No. Air Handling Units. Between the temperatures 20°C and 24°C the water flow rate required per AHU is 0.097 l/s. Thus the average demand to serve the AHU's is calculated as follows:-

- 0.097 l/s x 68 units = 6.63 l/s.

We have estimated that this average flow would be required for a maximum of 5 hours on any hot day (ASHRAE n-20). Estimated storage is calculated as follows:-

- 5 hours x 60 x 60 x 6.63 = 119,340 litres for one day.

The average demand on the Irish Water Network is calculated based on the demand required to fill the storage tanks. Using 1 day cycle, and a water consumption of 119,340 litres, to fill this water volume over 19 hours, implies the average demand is calculated as follows:-

- 119,340 litres / (19 hours x 60 x 60) = **1.74 l/s**

Peak Demand

The proposed data centre has a total of 68 No. Air Handling Units. These use water to increase their cooling capacity when the ambient temperature rises above 24°C. The maximum water flow rate required per AHU is 0.15 l/s. Thus peak demand is calculated as follows:-

- 0.15 l/s x 68 AHU's = 10.2 l/s.

. We have estimated that a peak flow would be required for a maximum of 5 hours on any hot day (ASHRAE n-20). Estimated storage that the peak flow is as follows:-

- 5 hours x 60 x 60 x 10.2 l/s = 183,600 litres for one day.

The peak demand on the Irish Water Network is calculated based on the demand required to fill the storage tanks. Using 1 day cycle, and a water consumption of 183,600 litres to fill this water volume over 19 hours, implies the peak demand is calculated as follows:-

- 183,600 litres / (19 hours x 60 x 60) = **2.68 l/s**

4.4.4 Industrial Water Storage

As noted in Section 4.4.3 our client requires 48 hour storage. We have estimated that peak flow will be required over a 10 hour duration during the warmest 48 hour period. Water storage required is thus calculated as follows:-

- 10 hours x 60 x 60 x 10.2 l/s = 367,200 litres (367.2 m^3) ~ 400 m^3

- Allowance for Domestic Usage = 3 m^3
- Total Storage Required = 403 m^3

4.4.5 Maximum Annual Industrial Demand

The Irish Water CoF indicates that maximum allowable demand from the site will be limited to 2,975 m^3

4.4.6 Fire Hydrant Main

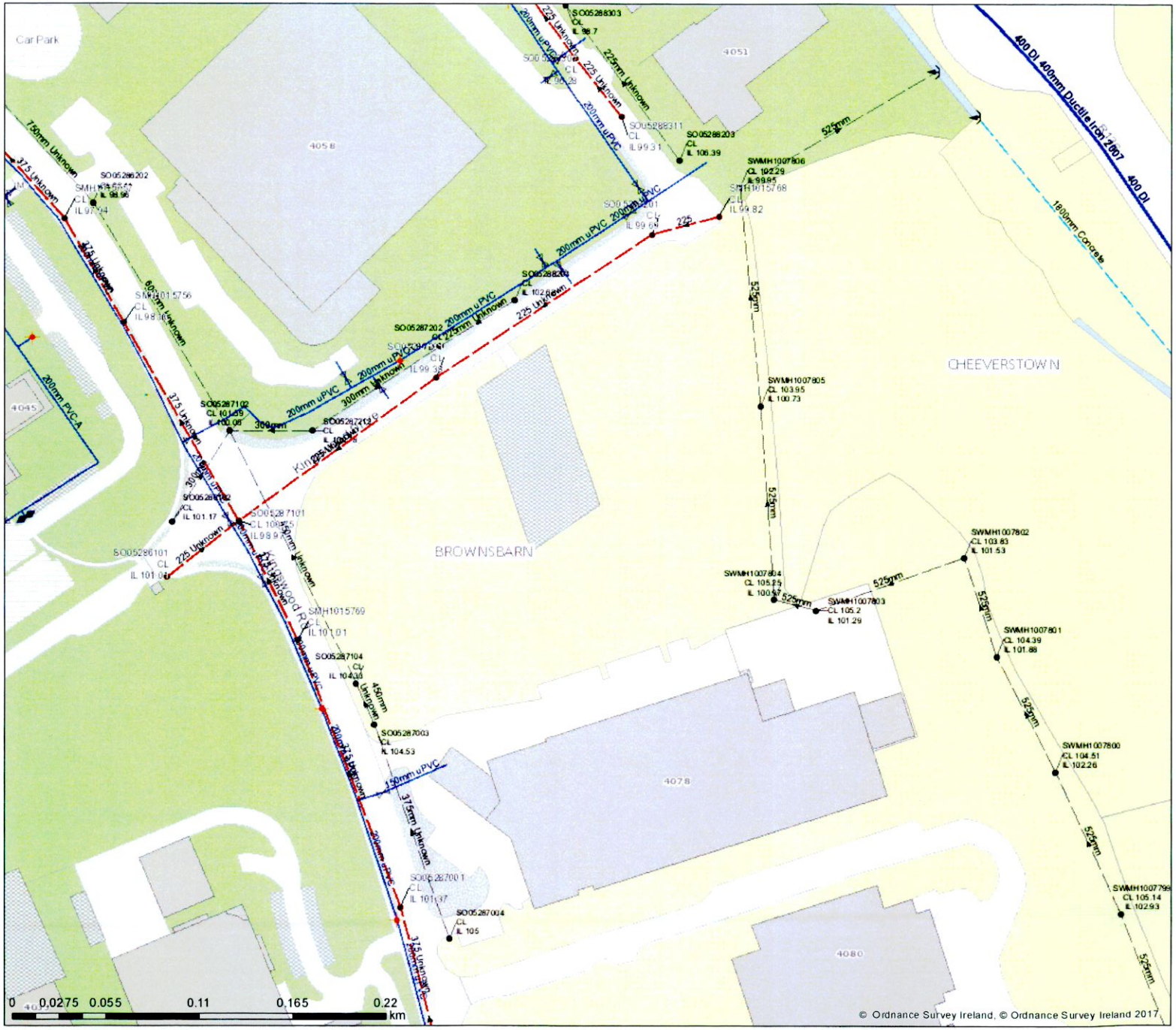
The proposed development will be served by a 150mmø fire hydrant main (final size to be confirmed by specialist designer) which is connected to the external Irish Water Network at the site entrance.

Required fire hydrant flow rates will be 25 l/s in accordance with IS 391:2000. In addition a small flow rate for filling a water mist fire suppression tank is required and is captured within the Industrial flow rate calculations. The fire hydrants will be provided at appropriate locations in accordance with the specialist fire protection contractors design and South Dublin County Council requirements.

Appendices

Appendix A – Record Drawings

Irish Water Web Map



UISCE ÉIREANN : IRISH WATER

Print Date: 19/04/2022

Printed by:Irish Water

Water Distribution Network
- Water Treatment Plant
- Water Pump Station
- Storage Cell/Tower
- Dosing Point
- Meter Station
- Abstraction Point
- Telemetry Kiosk

Reservoir
- Potable
- Raw Water

Water Distribution Mains
- Irish Water
- Private

Trunk Water Mains
- Irish Water
- Private

Water Lateral Lines
- Irish Water
- Non IW
- Water Casings
- Water Abandoned Lines
- Boundary Meter
- Bulk/Check Meter
- Group Scheme
- Source Meter
- Waste Meter
- Unknown Meter : Other Meter
- Non Return
- PRV
- PSV
- Sluice Line Valve Open/Closed
- Butterfly Line Valve Open/Closed
- Sluice Boundary Valve Open/Closed
- Butterfly Boundary Valve Open/Closed
- Scour Valves
- Single Air Control Valve
- Double Air Control Valve
- Water Stop Valves
- Water Service Connections
- Water Distribution Chambers
- Water Network Junctions
- Pressure Monitoring Point
- Fire Hydrant
- Fire Hydrant/Washout

Water Fittings
- Cap
- Reducer
- Tap
- Other Fittings

Sewer Foul Combined Network
- Waste Water Treatment Plant
- Waste Water Pump station

Sewer Mains Irish Water
- Gravity - Combined
- Gravity - Foul
- Gravity - Unknown
- Pumping - Combined
- Pumping - Foul
- Pumping - Unknown
- Syphon - Combined
- Syphon - Foul
- Overflow

Sewer Mains Private
- Gravity - Combined
- Gravity - Foul
- Gravity - Unknown
- Pumping - Combined
- Pumping - Foul
- Pumping - Unknown
- Syphon - Combined
- Syphon - Foul
- Overflow
- Sewer Lateral Lines
- Sewer Casings

Sewer Manholes
- Standard
- Backdrop
- Cascade
- Catchpit
- Bifurcation
- Hatchbox
- Lamphole
- Hydrobrake
- Other: Unknown

Discharge Type
- Outfall
- Overflow
- Soakaway
- Standard Outlet
- Other: Unknown

Cleanout Type
- Rodding Eye
- Flushing Structure
- Other: Unknown

Sewer Inlets
- Catchpit
- Gully
- Standard
- Other: Unknown

Sewer Fittings
- Vent/Col
- Other: Unknown

Storm Water Network

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

Inlet Type
- Gully
- Standard
- Other: Unknown

Storm Manholes
- Standard
- Backdrop
- Cascade
- Catchpit
- Bifurcation
- Hatchbox
- Lamphole
- Hydrobrake
- Other: Unknown

Storm Culverts
- Storm Clean Outs
- Stormwater Chambers

Discharge Type
- Outfall
- Overflow
- Soakaway
- Other: Unknown

Gas Networks Ireland
- Transmission High Pressure Gasline
- Distribution Medium Pressure Gasline
- Distribution Low Pressure Gasline

ESB Networks

ESB HV Lines
- HV Underground
- HV Overhead
- HV Abandoned

ESB MV/LV Lines
- MV Overhead Three Phase
- MV Overhead Single Phase
- LV Overhead Three Phase
- LV Overhead Single Phase
- MV/LV Underground
- Abandoned

Non Service Categories
- Proposed
- Under Construction
- Out of Service
- Decommissioned

Water Non Service Assets
- Water Point Feature
- Water Pipe
- Water Structure

Waste Non Service Assets
- Waste Point Feature
- Sewer
- Waste Structure

Appendix B – Windes Surface Water Drainage Calculations

STORM SEWER DESIGN by the Modified Rational Method

Design Criteria for Pr SW

Pipe Sizes STANDARD Manhole Sizes STANDARD

FSR Rainfall Model - Scotland and Ireland

Return Period (years)	1	PIMP (%)	100
M5-60 (mm)	15.900	Add Flow / Climate Change (%)	0
Ratio R	0.267	Minimum Backdrop Height (m)	0.200
Maximum Rainfall (mm/hr)	50	Maximum Backdrop Height (m)	1.500
Maximum Time of Concentration (mins)	30	Min Design Depth for Optimisation (m)	1.200
Foul Sewage (l/s/ha)	0.000	Min Vel for Auto Design only (m/s)	1.00
Volumetric Runoff Coeff.	0.750	Min Slope for Optimisation (1:X)	500

Designed with Level Soffits

Network Design Table for Pr SW

« - Indicates pipe capacity < flow

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
1.000	18.711	0.281	66.7	0.005	5.00	0.0	0.600	o	225	Pipe/Conduit	
2.000	10.197	0.068	150.0	0.003	5.00	0.0	0.600	o	225	Pipe/Conduit	
3.000	15.853	0.079	200.0	0.010	5.00	0.0	0.600	o	225	Pipe/Conduit	
1.001	7.469	0.037	200.0	0.012	0.00	0.0	0.600	o	225	Pipe/Conduit	
1.002	4.066	0.020	200.0	0.034	0.00	0.0	0.600	o	225	Pipe/Conduit	
4.000	11.095	0.055	201.7	0.013	5.00	0.0	0.600	o	225	Pipe/Conduit	
4.001	11.727	0.059	200.0	0.005	0.00	0.0	0.600	o	225	Pipe/Conduit	
4.002	19.785	0.099	200.0	0.009	0.00	0.0	0.600	o	225	Pipe/Conduit	
1.003	90.000	0.900	100.0	0.442	0.00	0.0	0.600	o	300	Pipe/Conduit	
1.004	24.568	0.164	150.0	0.052	0.00	0.0	0.600	o	375	Pipe/Conduit	
1.005	33.673	0.224	150.0	0.017	0.00	0.0	0.600	o	375	Pipe/Conduit	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
1.000	37.93	5.19	104.760	0.005	0.0	0.0	0.0	1.60	63.8	0.5
2.000	38.03	5.16	104.548	0.003	0.0	0.0	0.0	1.07	42.4	0.3
3.000	37.68	5.29	104.559	0.010	0.0	0.0	0.0	0.92	36.6	1.0
1.001	37.33	5.42	104.480	0.030	0.0	0.0	0.0	0.92	36.6	3.0
1.002	37.15	5.50	104.442	0.064	0.0	0.0	0.0	0.92	36.6	6.4
4.000	37.91	5.20	104.535	0.013	0.0	0.0	0.0	0.92	36.5	1.3
4.001	37.35	5.41	104.480	0.019	0.0	0.0	0.0	0.92	36.6	1.9
4.002	36.47	5.77	104.421	0.028	0.0	0.0	0.0	0.92	36.6	2.7
1.003	34.37	6.73	104.247	0.534	0.0	0.0	0.0	1.57	111.1	49.7
1.004	33.81	7.00	103.272	0.586	0.0	0.0	0.0	1.48	163.1	53.7
1.005	33.09	7.38	103.109	0.603	0.0	0.0	0.0	1.48	163.1	54.1

Network Design Table for Pr SW

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
5.000	3.795	0.038	100.0	0.101	5.00	0.0	0.600	o	225	Pipe/Conduit	
6.000	26.625	0.266	100.0	0.033	5.00	0.0	0.600	o	225	Pipe/Conduit	
6.001	14.577	0.146	100.0	0.000	0.00	0.0	0.600	o	225	Pipe/Conduit	
1.006	11.169	0.074	150.0	0.006	0.00	0.0	0.600	o	375	Pipe/Conduit	
1.007	12.084	0.081	150.0	0.012	0.00	0.0	0.600	o	450	Pipe/Conduit	
7.000	11.153	0.056	200.0	0.094	5.00	0.0	0.600	o	225	Pipe/Conduit	
1.008	15.178	0.101	150.0	0.043	0.00	0.0	0.600	o	450	Pipe/Conduit	
1.009	12.962	0.086	150.0	0.049	0.00	0.0	0.600	o	450	Pipe/Conduit	
1.010	20.337	0.025	813.5	0.000	0.00	0.0	0.600	o	225	Pipe/Conduit	
8.000	8.028	0.080	100.0	0.048	5.00	0.0	0.600	o	225	Pipe/Conduit	
8.001	8.472	0.085	100.0	0.013	0.00	0.0	0.600	o	225	Pipe/Conduit	
8.002	51.908	0.519	100.0	0.204	0.00	0.0	0.600	o	300	Pipe/Conduit	
9.000	26.384	0.264	100.0	0.115	5.00	0.0	0.600	o	300	Pipe/Conduit	
8.003	4.082	0.041	100.0	0.000	0.00	0.0	0.600	o	300	Pipe/Conduit	
8.004	4.674	0.047	100.0	0.000	0.00	0.0	0.600	o	300	Pipe/Conduit	
8.005	5.410	0.081	66.8	0.000	0.00	0.0	0.600	o	300	Pipe/Conduit	
8.006	20.337	2.132	9.5	0.000	0.00	0.0	0.600	o	225	Pipe/Conduit	
10.000	13.851	0.069	200.7	0.076	5.00	0.0	0.600	o	225	Pipe/Conduit	
10.001	20.032	0.100	200.3	0.000	0.00	0.0	0.600	o	225	Pipe/Conduit	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
5.000	38.33	5.05	103.071	0.101	0.0	0.0	0.0	1.31	52.0	10.4
6.000	37.55	5.34	103.445	0.033	0.0	0.0	0.0	1.31	52.0	3.3
6.001	37.07	5.53	103.179	0.033	0.0	0.0	0.0	1.31	52.0	3.3
1.006	32.86	7.51	102.883	0.742	0.0	0.0	0.0	1.48	163.1	66.1
1.007	32.64	7.63	102.734	0.755	0.0	0.0	0.0	1.66	263.6	66.7
7.000	37.91	5.20	102.934	0.094	0.0	0.0	0.0	0.92	36.6	9.7
1.008	32.37	7.78	102.653	0.892	0.0	0.0	0.0	1.66	263.6	78.1
1.009	32.14	7.91	102.552	0.941	0.0	0.0	0.0	1.66	263.6	81.9
1.010	30.91	8.67	100.681	0.941	0.0	0.0	0.0	0.45	17.9«	81.9
8.000	38.18	5.10	104.590	0.048	0.0	0.0	0.0	1.31	52.0	5.0
8.001	37.89	5.21	104.510	0.061	0.0	0.0	0.0	1.31	52.0	6.3
8.002	36.50	5.76	104.350	0.265	0.0	0.0	0.0	1.57	111.1	26.2
9.000	37.70	5.28	104.095	0.115	0.0	0.0	0.0	1.57	111.1	11.8
8.003	36.40	5.80	103.831	0.381	0.0	0.0	0.0	1.57	111.1	37.5
8.004	36.28	5.85	103.790	0.381	0.0	0.0	0.0	1.57	111.1	37.5
8.005	36.17	5.90	103.743	0.381	0.0	0.0	0.0	1.93	136.2	37.5
8.006	35.99	5.98	100.681	0.381	0.0	0.0	0.0	4.26	169.5	37.5
10.000	37.78	5.25	101.775	0.076	0.0	0.0	0.0	0.92	36.5	7.8
10.001	36.86	5.61	101.706	0.076	0.0	0.0	0.0	0.92	36.6	7.8

Network Design Table for Pr SW

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
1.011	20.337	0.025	813.5	0.000	0.00	0.0	0.600	o	225	Pipe/Conduit	
1.012	4.046	0.079	51.2	0.000	0.00	0.0	0.600	o	225	Pipe/Conduit	
1.013	53.594	1.042	51.4	0.000	0.00	0.0	0.600	o	225	Pipe/Conduit	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
1.011	29.79	9.42	100.656	1.397	0.0	0.0	0.0	0.45	17.9«	112.7
1.012	29.74	9.45	100.631	1.397	0.0	0.0	0.0	1.83	72.8«	112.7
1.013	29.07	9.94	100.573	1.397	0.0	0.0	0.0	1.83	72.7«	112.7

Manhole Schedules for Pr SW

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)
SWMH 1.0	106.534	1.774	Open Manhole	1200	1.000	104.760	225				
SWMH 2.0	105.785	1.237	Open Manhole	1200	2.000	104.548	225				
SWMH 3.0	105.784	1.225	Open Manhole	1200	3.000	104.559	225				
SWMH 1.1	105.954	1.474	Open Manhole	1200	1.001	104.480	225	1.000	104.480	225	
								2.000	104.480	225	
								3.000	104.480	225	
SWMH 1.2	105.881	1.439	Open Manhole	1200	1.002	104.442	225	1.001	104.442	225	
SWMH 4.0	105.810	1.275	Open Manhole	1200	4.000	104.535	225				
SWMH 4.1	105.808	1.328	Open Manhole	1200	4.001	104.480	225	4.000	104.480	225	
SWMH 4.2	105.814	1.393	Open Manhole	1200	4.002	104.421	225	4.001	104.421	225	
SWMH 1.3	105.737	1.490	Open Manhole	1200	1.003	104.247	300	1.002	104.422	225	100
								4.002	104.322	225	
SWMH 1.4	104.789	1.517	Open Manhole	1200	1.004	103.272	375	1.003	103.347	300	
SWMH 1.5	105.434	2.325	Open Manhole	1200	1.005	103.109	375	1.004	103.109	375	
SWMH 5.0	105.160	2.089	Open Manhole	1200	5.000	103.071	225				
SWMH 6.0	105.124	1.679	Open Manhole	1200	6.000	103.445	225				
SWMH 6.1	105.090	1.911	Open Manhole	1200	6.001	103.179	225	6.000	103.179	225	
SWMH 1.6	105.072	2.189	Open Manhole	1200	1.006	102.883	375	1.005	102.884	375	1
								5.000	103.033	225	
								6.001	103.033	225	
SWMH 1.7	105.015	2.281	Open Manhole	1200	1.007	102.734	450	1.006	102.809	375	
SWMH 7.0	104.000	1.066	Open Manhole	1200	7.000	102.934	225				
SWMH 1.8	104.838	2.185	Open Manhole	1200	1.008	102.653	450	1.007	102.653	450	
								7.000	102.878	225	
SWMH 1.9	104.724	2.172	Open Manhole	1200	1.009	102.552	450	1.008	102.552	450	
SWMH 1.10	104.090	3.409	Open Manhole	1200	1.010	100.681	225	1.009	102.466	450	2010
SWMH 8.0	105.815	1.225	Open Manhole	1200	8.000	104.590	225				
SWMH 8.1	105.784	1.274	Open Manhole	1200	8.001	104.510	225	8.000	104.510	225	
SWMH 8.2	105.783	1.433	Open Manhole	1200	8.002	104.350	300	8.001	104.425	225	
SWMH9.0	105.785	1.690	Open Manhole	1200	9.000	104.095	300				
SWMH 8.3	105.758	1.927	Open Manhole	1200	8.003	103.831	300	8.002	103.831	300	
								9.000	103.831	300	
SWMH 8.4	105.486	1.696	Open Manhole	1200	8.004	103.790	300	8.003	103.790	300	
SWMH 8.5	105.174	1.431	Open Manhole	1200	8.005	103.743	300	8.004	103.743	300	
SWMH 8.6	104.849	4.168	Open Manhole	1200	8.006	100.681	225	8.005	103.662	300	3056
SWMH 10.0	103.500	1.725	Open Manhole	1200	10.000	101.775	225				
SWMH 10.1	103.793	2.087	Open Manhole	1200	10.001	101.706	225	10.000	101.706	225	
SWMH 1.11	104.366	5.817	Open Manhole	1200	1.011	100.656	225	1.010	100.656	225	
								8.006	98.549	225	
								10.001	101.606	225	950
SWMH 1.12	103.781	3.150	Open Manhole	1200	1.012	100.631	225	1.011	100.631	225	
SWMH 1.13	103.685	3.133	Open Manhole	1200	1.013	100.573	225	1.012	100.552	225	
EXSWMH	102.330	2.799	Open Manhole	1200		OUTFALL		1.013	99.531	225	

Manhole Schedules for Pr SW

MH Name	Manhole Easting (m)	Manhole Northing (m)	Intersection Easting (m)	Intersection Northing (m)	Manhole Access	Layout (North)
SWMH 1.0	705691.622	728139.919	705691.622	728139.919	Required	
SWMH 2.0	705712.628	728136.505	705712.628	728136.505	Required	
SWMH 3.0	705704.057	728161.104	705704.057	728161.104	Required	
SWMH 1.1	705709.272	728146.133	705709.272	728146.133	Required	
SWMH 1.2	705716.325	728148.588	705716.325	728148.588	Required	
SWMH 4.0	705693.719	728177.703	705693.719	728177.703	Required	
SWMH 4.1	705697.385	728167.231	705697.385	728167.231	Required	
SWMH 4.2	705708.454	728171.103	705708.454	728171.103	Required	
SWMH 1.3	705714.988	728152.428	705714.988	728152.428	Required	
SWMH 1.4	705799.932	728182.169	705799.932	728182.169	Required	
SWMH 1.5	705823.120	728190.287	705823.120	728190.287	Required	
SWMH 5.0	705810.881	728218.435	705810.881	728218.435	Required	
SWMH 6.0	705832.123	728193.576	705832.123	728193.576	Required	
SWMH 6.1	705826.346	728219.567	705826.346	728219.567	Required	
SWMH 1.6	705811.985	728222.066	705811.985	728222.066	Required	
SWMH 1.7	705806.164	728231.599	705806.164	728231.599	Required	
SWMH 7.0	705812.697	728246.688	705812.697	728246.688	Required	
SWMH 1.8	705802.170	728243.003	705802.170	728243.003	Required	
SWMH 1.9	705793.181	728255.234	705793.181	728255.234	Required	

Manhole Schedules for Pr SW

MH Name	Manhole Easting (m)	Manhole Northing (m)	Intersection Easting (m)	Intersection Northing (m)	Manhole Access	Layout (North)
SWMH 1.10	705785.745	728265.850	705785.745	728265.850	Required	
SWMH 8.0	705687.818	728203.548	705687.818	728203.548	Required	
SWMH 8.1	705690.588	728211.083	705690.588	728211.083	Required	
SWMH 8.2	705697.605	728215.829	705697.605	728215.829	Required	
SWMH9.0	705770.628	728244.006	705770.628	728244.006	Required	
SWMH 8.3	705745.716	728235.317	705745.716	728235.317	Required	
SWMH 8.4	705744.176	728239.097	705744.176	728239.097	Required	
SWMH 8.5	705748.478	728240.926	705748.478	728240.926	Required	
SWMH 8.6	705753.393	728243.186	705753.393	728243.186	Required	
SWMH 10.0	705792.384	728280.513	705792.384	728280.513	Required	
SWMH 10.1	705781.040	728272.566	705781.040	728272.566	Required	
SWMH 1.11	705766.786	728258.490	705766.786	728258.490	Required	
SWMH 1.12	705780.179	728273.794	705780.179	728273.794	Required	
SWMH 1.13	705777.858	728277.108	705777.858	728277.108	Required	
EXSWMH	705819.238	728311.166			No Entry	

PIPELINE SCHEDULES for Pr SW

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)
1.000	o	225	SWMH 1.0	106.534	104.760	1.549	Open Manhole	1200
2.000	o	225	SWMH 2.0	105.785	104.548	1.012	Open Manhole	1200
3.000	o	225	SWMH 3.0	105.784	104.559	1.000	Open Manhole	1200
1.001	o	225	SWMH 1.1	105.954	104.480	1.249	Open Manhole	1200
1.002	o	225	SWMH 1.2	105.881	104.442	1.214	Open Manhole	1200
4.000	o	225	SWMH 4.0	105.810	104.535	1.050	Open Manhole	1200
4.001	o	225	SWMH 4.1	105.808	104.480	1.103	Open Manhole	1200
4.002	o	225	SWMH 4.2	105.814	104.421	1.168	Open Manhole	1200
1.003	o	300	SWMH 1.3	105.737	104.247	1.190	Open Manhole	1200
1.004	o	375	SWMH 1.4	104.789	103.272	1.142	Open Manhole	1200
1.005	o	375	SWMH 1.5	105.434	103.109	1.950	Open Manhole	1200
5.000	o	225	SWMH 5.0	105.160	103.071	1.864	Open Manhole	1200
6.000	o	225	SWMH 6.0	105.124	103.445	1.454	Open Manhole	1200
6.001	o	225	SWMH 6.1	105.090	103.179	1.686	Open Manhole	1200
1.006	o	375	SWMH 1.6	105.072	102.883	1.814	Open Manhole	1200
1.007	o	450	SWMH 1.7	105.015	102.734	1.831	Open Manhole	1200
7.000	o	225	SWMH 7.0	104.000	102.934	0.841	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)
1.000	18.711	66.7	SWMH 1.1	105.954	104.480	1.249	Open Manhole	1200
2.000	10.197	150.0	SWMH 1.1	105.954	104.480	1.249	Open Manhole	1200
3.000	15.853	200.0	SWMH 1.1	105.954	104.480	1.249	Open Manhole	1200
1.001	7.469	200.0	SWMH 1.2	105.881	104.442	1.214	Open Manhole	1200
1.002	4.066	200.0	SWMH 1.3	105.737	104.422	1.090	Open Manhole	1200
4.000	11.095	201.7	SWMH 4.1	105.808	104.480	1.103	Open Manhole	1200
4.001	11.727	200.0	SWMH 4.2	105.814	104.421	1.168	Open Manhole	1200
4.002	19.785	200.0	SWMH 1.3	105.737	104.322	1.190	Open Manhole	1200
1.003	90.000	100.0	SWMH 1.4	104.789	103.347	1.142	Open Manhole	1200
1.004	24.568	150.0	SWMH 1.5	105.434	103.109	1.950	Open Manhole	1200
1.005	33.673	150.0	SWMH 1.6	105.072	102.884	1.813	Open Manhole	1200
5.000	3.795	100.0	SWMH 1.6	105.072	103.033	1.814	Open Manhole	1200
6.000	26.625	100.0	SWMH 6.1	105.090	103.179	1.686	Open Manhole	1200
6.001	14.577	100.0	SWMH 1.6	105.072	103.033	1.814	Open Manhole	1200
1.006	11.169	150.0	SWMH 1.7	105.015	102.809	1.831	Open Manhole	1200
1.007	12.084	150.0	SWMH 1.8	104.838	102.653	1.735	Open Manhole	1200
7.000	11.153	200.0	SWMH 1.8	104.838	102.878	1.735	Open Manhole	1200

PIPELINE SCHEDULES for Pr SW

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)
1.008	o	450	SWMH 1.8	104.838	102.653	1.735	Open Manhole	1200
1.009	o	450	SWMH 1.9	104.724	102.552	1.722	Open Manhole	1200
1.010	o	225	SWMH 1.10	104.090	100.681	3.184	Open Manhole	1200
8.000	o	225	SWMH 8.0	105.815	104.590	1.000	Open Manhole	1200
8.001	o	225	SWMH 8.1	105.784	104.510	1.049	Open Manhole	1200
8.002	o	300	SWMH 8.2	105.783	104.350	1.133	Open Manhole	1200
9.000	o	300	SWMH9.0	105.785	104.095	1.390	Open Manhole	1200
8.003	o	300	SWMH 8.3	105.758	103.831	1.627	Open Manhole	1200
8.004	o	300	SWMH 8.4	105.486	103.790	1.396	Open Manhole	1200
8.005	o	300	SWMH 8.5	105.174	103.743	1.131	Open Manhole	1200
8.006	o	225	SWMH 8.6	104.849	100.681	3.943	Open Manhole	1200
10.000	o	225	SWMH 10.0	103.500	101.775	1.500	Open Manhole	1200
10.001	o	225	SWMH 10.1	103.793	101.706	1.862	Open Manhole	1200
1.011	o	225	SWMH 1.11	104.366	100.656	3.485	Open Manhole	1200
1.012	o	225	SWMH 1.12	103.781	100.631	2.925	Open Manhole	1200
1.013	o	225	SWMH 1.13	103.685	100.573	2.887	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)
1.008	15.178	150.0	SWMH 1.9	104.724	102.552	1.722	Open Manhole	1200
1.009	12.962	150.0	SWMH 1.10	104.090	102.466	1.174	Open Manhole	1200
1.010	20.337	813.5	SWMH 1.11	104.366	100.656	3.485	Open Manhole	1200
8.000	8.028	100.0	SWMH 8.1	105.784	104.510	1.049	Open Manhole	1200
8.001	8.472	100.0	SWMH 8.2	105.783	104.425	1.133	Open Manhole	1200
8.002	51.908	100.0	SWMH 8.3	105.758	103.831	1.627	Open Manhole	1200
9.000	26.384	100.0	SWMH 8.3	105.758	103.831	1.627	Open Manhole	1200
8.003	4.082	100.0	SWMH 8.4	105.486	103.790	1.396	Open Manhole	1200
8.004	4.674	100.0	SWMH 8.5	105.174	103.743	1.131	Open Manhole	1200
8.005	5.410	66.8	SWMH 8.6	104.849	103.662	0.887	Open Manhole	1200
8.006	20.337	9.5	SWMH 1.11	104.366	98.549	5.592	Open Manhole	1200
10.000	13.851	200.7	SWMH 10.1	103.793	101.706	1.862	Open Manhole	1200
10.001	20.032	200.3	SWMH 1.11	104.366	101.606	2.535	Open Manhole	1200
1.011	20.337	813.5	SWMH 1.12	103.781	100.631	2.925	Open Manhole	1200
1.012	4.046	51.2	SWMH 1.13	103.685	100.552	2.908	Open Manhole	1200
1.013	53.594	51.4	EXSWMH	102.330	99.531	2.574	Open Manhole	1200

Free Flowing Outfall Details for Pr SW

Outfall Pipe Number	Outfall Name	C. Level (m)	I. Level (m)	Min I. Level (m)	D,L (mm)	W (mm)
1.013	EXSWMH	102.330	99.531	0.000	1200	0

Simulation Criteria for Pr SW

Volumetric Runoff Coeff	0.750	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)	60
Foul Sewage per hectare (l/s)	0.000	Output Interval (mins)	1

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 1	Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model	FSR	Profile Type	Summer
Return Period (years)	1	Cv (Summer)	0.750
Region	Scotland and Ireland	Cv (Winter)	0.840
M5-60 (mm)	15.900	Storm Duration (mins)	30
Ratio R	0.267		

Online Controls for Pr SW

Hydro-Brake® Optimum Manhole: SWMH 1.11, DS/PN: 1.011, Volume (m³): 6.5

Unit Reference	MD-SHE-0082-4000-2000-4000
Design Head (m)	2.000
Design Flow (l/s)	4.0
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	82
Invert Level (m)	100.656
Minimum Outlet Pipe Diameter (mm)	100
Suggested Manhole Diameter (mm)	1200

Control Points	Head (m)	Flow (l/s)	Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	2.000	4.0	Kick-Flo®	0.729	2.5
Flush-Flo™	0.356	3.1	Mean Flow over Head Range	-	3.1

The hydrological calculations have been based on the Head/Discharge relationship for the Hydro-Brake® Optimum as specified. Should another type of control device other than a Hydro-Brake Optimum® be utilised then these storage routing calculations will be invalidated

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)
0.100	2.4	0.800	2.6	2.000	4.0	4.000	5.5	7.000	7.2
0.200	3.0	1.000	2.9	2.200	4.2	4.500	5.8	7.500	7.4
0.300	3.1	1.200	3.2	2.400	4.3	5.000	6.1	8.000	7.7
0.400	3.1	1.400	3.4	2.600	4.5	5.500	6.4	8.500	7.9
0.500	3.1	1.600	3.6	3.000	4.8	6.000	6.7	9.000	8.1
0.600	2.9	1.800	3.8	3.500	5.2	6.500	6.9	9.500	8.3

Storage Structures for Pr SW

Tank or Pond Manhole: SWMH 1.11, DS/PN: 1.011

Invert Level (m) 100.656

Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	470.4	2.000	470.4	2.001	0.0

Volume Summary (Static)

Length Calculations based on True Length

Pipe Number	USMH Name	Manhole Volume (m³)	Pipe Volume (m³)	Storage Structure Volume (m³)	Total Volume (m³)
1.000	SWMH 1.0	2.006	0.696	0.000	2.702
2.000	SWMH 2.0	1.399	0.358	0.000	1.757
3.000	SWMH 3.0	1.385	0.583	0.000	1.968
1.001	SWMH 1.1	1.667	0.249	0.000	1.917
1.002	SWMH 1.2	1.627	0.114	0.000	1.741
4.000	SWMH 4.0	1.442	0.393	0.000	1.835
4.001	SWMH 4.1	1.502	0.419	0.000	1.920
4.002	SWMH 4.2	1.575	0.739	0.000	2.314
1.003	SWMH 1.3	1.685	6.277	0.000	7.962
1.004	SWMH 1.4	1.715	2.581	0.000	4.296
1.005	SWMH 1.5	2.630	3.587	0.000	6.216
5.000	SWMH 5.0	2.362	0.103	0.000	2.465
6.000	SWMH 6.0	1.898	1.011	0.000	2.909
6.001	SWMH 6.1	2.161	0.532	0.000	2.693
1.006	SWMH 1.6	2.475	1.101	0.000	3.576
1.007	SWMH 1.7	2.580	1.731	0.000	4.311
7.000	SWMH 7.0	1.205	0.396	0.000	1.601
1.008	SWMH 1.8	2.471	2.223	0.000	4.694
1.009	SWMH 1.9	2.456	1.871	0.000	4.327
1.010	SWMH 1.10	3.855	0.761	0.000	4.616
8.000	SWMH 8.0	1.385	0.272	0.000	1.657
8.001	SWMH 8.1	1.441	0.289	0.000	1.730
8.002	SWMH 8.2	1.621	3.584	0.000	5.205
9.000	SWMH9.0	1.912	1.780	0.000	3.692
8.003	SWMH 8.3	2.179	0.204	0.000	2.383
8.004	SWMH 8.4	1.918	0.246	0.000	2.164
8.005	SWMH 8.5	1.618	0.298	0.000	1.916
8.006	SWMH 8.6	4.714	0.761	0.000	5.475
10.000	SWMH 10.0	1.951	0.503	0.000	2.454
10.001	SWMH 10.1	2.360	0.749	0.000	3.109
1.011	SWMH 1.11	4.196	0.761	940.957	945.914
1.012	SWMH 1.12	3.563	0.113	0.000	3.676
1.013	SWMH 1.13	3.520	2.083	0.000	5.603
Total		72.476	37.365	940.957	1050.798

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

Simulation Criteria

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

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

Synthetic Rainfall Details

Rainfall Model		FSR M5-60 (mm) 15.900	Cv (Summer) 0.750
Region	Scotland and Ireland	Ratio R 0.267	Cv (Winter) 0.840

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, 240, 360, 480, 960, 1440
Return Period(s) (years)	1, 30, 100
Climate Change (%)	20, 20, 20

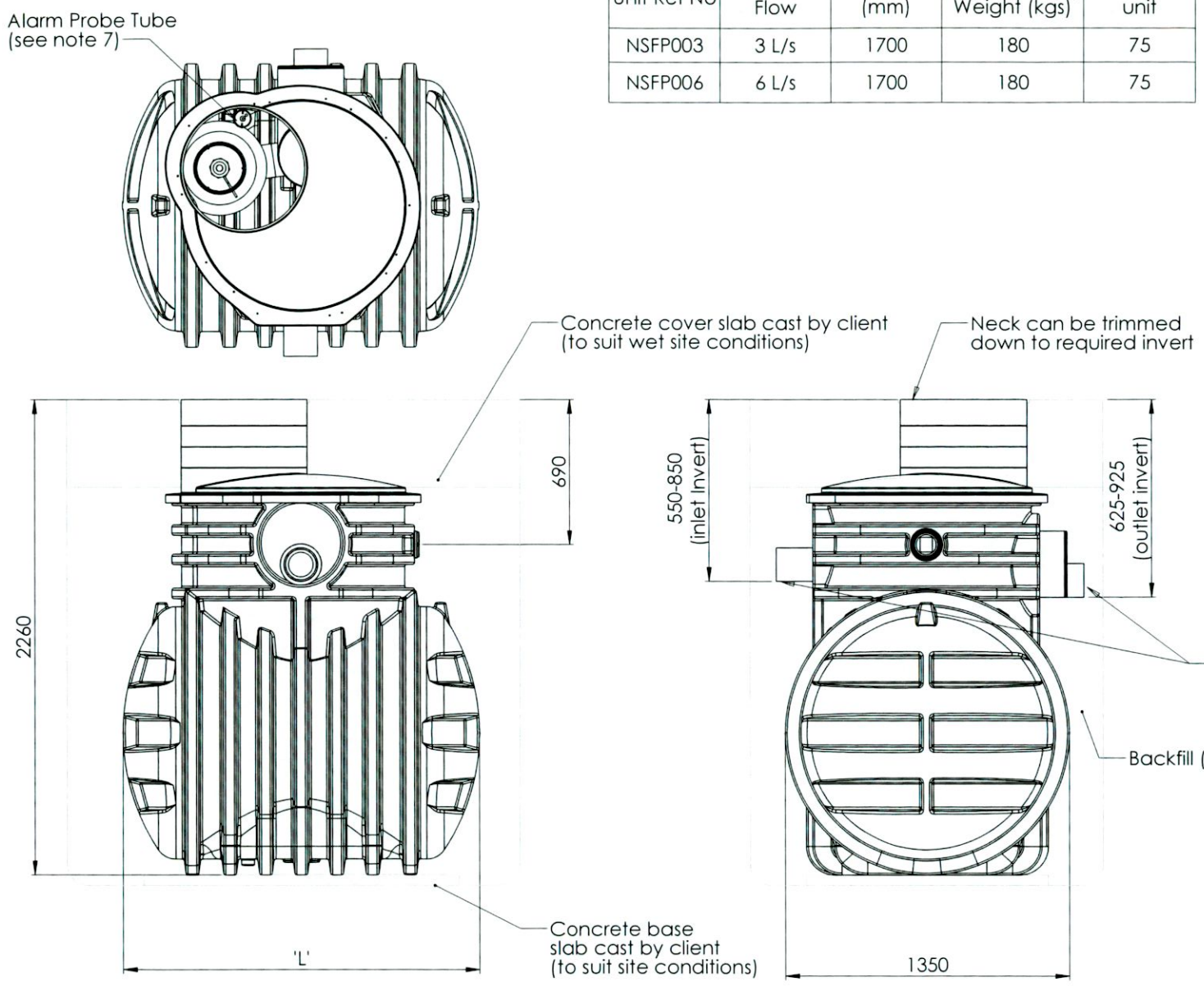
PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)	Surcharged Depth (m)
1.000	SWMH 1.0	15 Winter	100	+20%	100/15 Summer				105.327	0.342
2.000	SWMH 2.0	15 Winter	100	+20%	30/15 Summer				105.326	0.554
3.000	SWMH 3.0	15 Winter	100	+20%	30/15 Summer				105.330	0.546
1.001	SWMH 1.1	15 Winter	100	+20%	30/15 Summer				105.327	0.622
1.002	SWMH 1.2	15 Winter	100	+20%	30/15 Summer				105.322	0.655
4.000	SWMH 4.0	15 Winter	100	+20%	30/15 Summer				105.333	0.573
4.001	SWMH 4.1	15 Winter	100	+20%	30/15 Summer				105.329	0.624
4.002	SWMH 4.2	15 Winter	100	+20%	30/15 Summer				105.325	0.678
1.003	SWMH 1.3	15 Winter	100	+20%	30/15 Summer				105.314	0.767
1.004	SWMH 1.4	30 Winter	100	+20%	30/15 Summer				104.288	0.641
1.005	SWMH 1.5	30 Winter	100	+20%	30/15 Summer				104.184	0.701
5.000	SWMH 5.0	30 Winter	100	+20%	30/15 Summer				104.055	0.759
6.000	SWMH 6.0	30 Winter	100	+20%	100/15 Summer				104.066	0.395
6.001	SWMH 6.1	30 Winter	100	+20%	30/15 Summer				104.053	0.649
1.006	SWMH 1.6	30 Winter	100	+20%	30/15 Summer				104.044	0.786
1.007	SWMH 1.7	30 Winter	100	+20%	30/15 Summer				103.919	0.735
7.000	SWMH 7.0	30 Winter	100	+20%	30/15 Summer				103.900	0.741
1.008	SWMH 1.8	30 Winter	100	+20%	30/15 Summer				103.877	0.773
1.009	SWMH 1.9	30 Winter	100	+20%	30/15 Summer				103.812	0.809
1.010	SWMH 1.10	30 Winter	100	+20%	1/15 Summer				103.730	2.824
8.000	SWMH 8.0	15 Winter	100	+20%	100/15 Summer				104.945	0.130
8.001	SWMH 8.1	15 Winter	100	+20%	100/15 Summer				104.929	0.194
8.002	SWMH 8.2	15 Winter	100	+20%	100/15 Summer				104.909	0.259
9.000	SWMH9.0	15 Winter	100	+20%	30/15 Summer				104.640	0.246
8.003	SWMH 8.3	15 Winter	100	+20%	30/15 Summer				104.596	0.465
8.004	SWMH 8.4	15 Winter	100	+20%	30/15 Summer				104.376	0.286
8.005	SWMH 8.5	15 Winter	100	+20%	30/15 Summer				104.160	0.117
8.006	SWMH 8.6	1440 Winter	100	+20%	1/60 Summer				102.650	1.744
10.000	SWMH 10.0	1440 Winter	100	+20%	30/960 Winter				102.649	0.649
10.001	SWMH 10.1	1440 Winter	100	+20%	30/480 Winter				102.648	0.717
1.011	SWMH 1.11	1440 Winter	100	+20%	1/30 Winter				102.648	1.767
1.012	SWMH 1.12	1440 Winter	100	+20%					100.678	-0.178
1.013	SWMH 1.13	1440 Winter	100	+20%					100.607	-0.191

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

PN	US/MH Name	Flooded Volume (m^3)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
1.000	SWMH 1.0	0.000	0.06			3.7	SURCHARGED	
2.000	SWMH 2.0	0.000	0.10			3.6	SURCHARGED	
3.000	SWMH 3.0	0.000	0.14			4.6	SURCHARGED	
1.001	SWMH 1.1	0.000	0.77			22.3	SURCHARGED	
1.002	SWMH 1.2	0.000	1.12			28.4	SURCHARGED	
4.000	SWMH 4.0	0.000	0.17			5.2	SURCHARGED	
4.001	SWMH 4.1	0.000	0.35			11.1	SURCHARGED	
4.002	SWMH 4.2	0.000	0.49			16.4	SURCHARGED	
1.003	SWMH 1.3	0.000	1.21			130.5	SURCHARGED	
1.004	SWMH 1.4	0.000	0.87			122.1	SURCHARGED	
1.005	SWMH 1.5	0.000	0.81			118.3	SURCHARGED	
5.000	SWMH 5.0	0.000	0.92			27.4	SURCHARGED	
6.000	SWMH 6.0	0.000	0.20			9.8	SURCHARGED	
6.001	SWMH 6.1	0.000	0.26			12.1	SURCHARGED	
1.006	SWMH 1.6	0.000	1.34			143.2	SURCHARGED	
1.007	SWMH 1.7	0.000	0.83			140.2	SURCHARGED	
7.000	SWMH 7.0	0.000	0.85			26.2	FLOOD RISK	
1.008	SWMH 1.8	0.000	0.91			163.9	SURCHARGED	
1.009	SWMH 1.9	0.000	1.01			170.1	SURCHARGED	
1.010	SWMH 1.10	0.000	14.26			169.1	SURCHARGED	
8.000	SWMH 8.0	0.000	0.40			16.2	SURCHARGED	
8.001	SWMH 8.1	0.000	0.55			22.5	SURCHARGED	
8.002	SWMH 8.2	0.000	0.79			82.6	SURCHARGED	
9.000	SWMH9.0	0.000	0.37			36.6	SURCHARGED	
8.003	SWMH 8.3	0.000	1.89			116.0	SURCHARGED	
8.004	SWMH 8.4	0.000	1.89			116.2	SURCHARGED	
8.005	SWMH 8.5	0.000	1.63			116.0	SURCHARGED	
8.006	SWMH 8.6	0.000	0.06			9.5	SURCHARGED	
10.000	SWMH 10.0	0.000	0.06			1.9	SURCHARGED	
10.001	SWMH 10.1	0.000	0.06			1.9	SURCHARGED	
1.011	SWMH 1.11	0.000	0.33			4.0	SURCHARGED	
1.012	SWMH 1.12	0.000	0.10			4.0	OK	
1.013	SWMH 1.13	0.000	0.06			4.0	OK	

Appendix C – Petrol Interceptor Details

Unit Ref No	Nominal Flow	Dim L (mm)	Approx Empty Weight (kgs)	Fall across unit
NSFP003	3 L/s	1700	180	75
NSFP006	6 L/s	1700	180	75



Notes:-

1. Inlet/Outlet pipes are plain pipe Ø160 mm PVCu. The standard EN 858 states minimum connection sizes, units ordered with different sized connections are not fully compliant with the standard.

2. Extension necks for deeper inverts can be provided. These can be cut in 200 mm sections. Max 2.0m Invert recommended. Please ask our sales department for further details.

3. All units require appropriate cover and frame to suit applied loadings.

4. This drawing should be used for dimensional information only.It is essential that this drawing is read in conjunction with the installation guidelines supplied with the unit.(Copies are available from our sales dept.).

5. This drawing is also available on our website www.kingspanenv.com.

6. A Ø76 mm tube (internal) is supplied to house an oil alarm probe.

7. Wet site conditions - Concrete Backfill
Dry site conditions - Pea Shingle Backfill

Please refer to installation manual for details of correct backfilling.

Please check with Kingspan Environmental that this drawing is the latest issue

Issue	Date	Drawn by	Approved by	Description
04	15/12/10	S.Gill		CC934
03	24/02/10	S. Gill		CC794
02	23/09/09	S.Gill		Drawing Description Changed/Table Corrected
01	19/03/09	S.Gill		Initial Release

Material : n/a
Finish : n/a
Weight : Kgs n/a

Tolerance : n/a
Thickness : n/a
Surface Area : n/a

Drawing : NSFP 003-006 Sales Drawing

Drg No - DSO992

All dimensions in mm

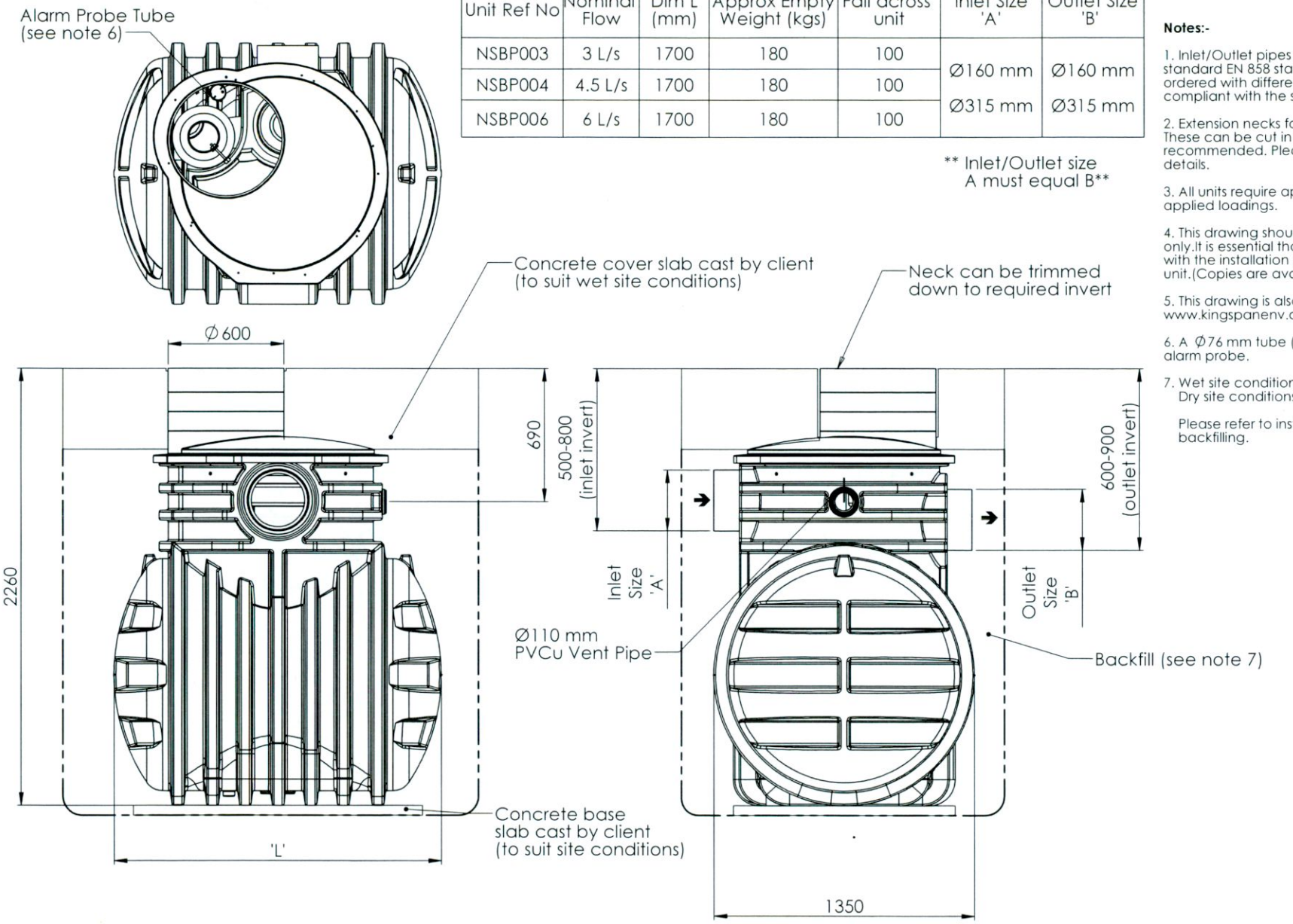
Scale: Not to scale

Kingspan
Environmental

Y:\engineering\Drawing Data\02 - Sales Drawings\DS\DS - 09\DS0992 NSFP003-NSFP006 Full retention Seperators Sales Drawing

Unit Ref No	Nominal Flow	Dim L (mm)	Approx Empty Weight (kgs)	Fall across unit	Inlet Size 'A'	Outlet Size 'B'
NSBP003	3 L/s	1700	180	100	Ø160 mm	Ø160 mm
NSBP004	4.5 L/s	1700	180	100	Ø315 mm	Ø315 mm
NSBP006	6 L/s	1700	180	100		

** Inlet/Outlet size A must equal B**



Notes:-

1. Inlet/Outlet pipes are plain pipe Ø315 mm PVCu. The standard EN 858 states minimum connection sizes, units ordered with different sized connections are not fully compliant with the standard.

2. Extension necks for deeper inverts can be provided. These can be cut in 200 mm sections. Max 2.0m Invert recommended. Please ask our sales department for further details.

3. All units require appropriate cover and frame to suit applied loadings.

4. This drawing should be used for dimensional information only.It is essential that this drawing is read in conjunction with the installation guidelines supplied with the unit.(Copies are available from our sales dept.).

5. This drawing is also available on our website www.kingspanenv.com.

6. A Ø76 mm tube (internal) is supplied to house an oil alarm probe.

7. Wet site conditions - Concrete Backfill
   Dry site conditions - Pea Shingle Backfill

   Please refer to installation manual for details of correct backfilling.

Please check with Kingspan Environmental that this drawing is the latest issue

Issue	Date	Drawn by	Approved by	Description
08	23.06.20	T.Kelly		CC1526 - NSBP004 Nominal Flow Rate Corrected
07	15/12/11	S.Gill		CC1020
06	15/12/10	S.Gill		CC 934

Material : n/a | Tolerance : n/a
Finish : n/a | Thickness : n/a
Weight : Kgs n/a | Surface Area : n/a

Drawing : NSBP003,004 & 006 Sales Drawing

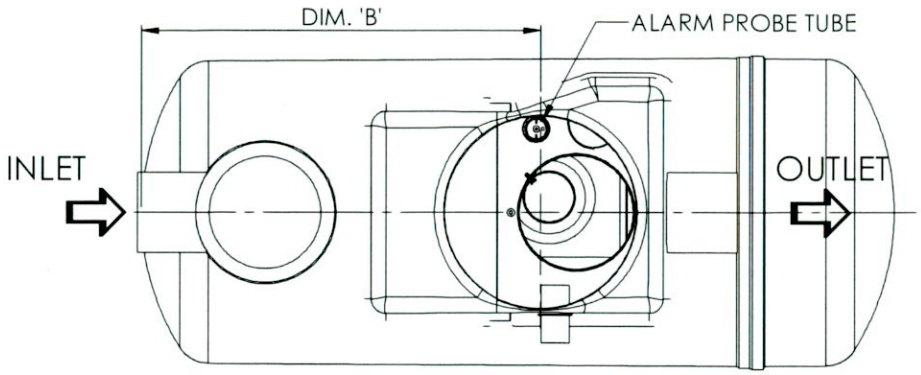
Drg No: DSO993

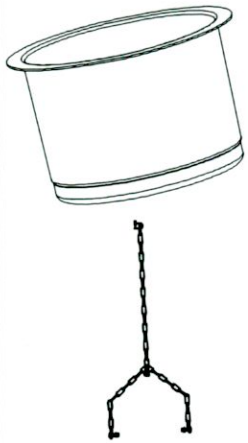
All dimensions in mm

Scale: Not to scale

Z:\Drawing Data\02 - Sales Drawings\DS\DS - 09\DS0993 NSBP003-NSBP006 Class 1 Bypass Seperator Sales Drawing

Kingspan Environmental

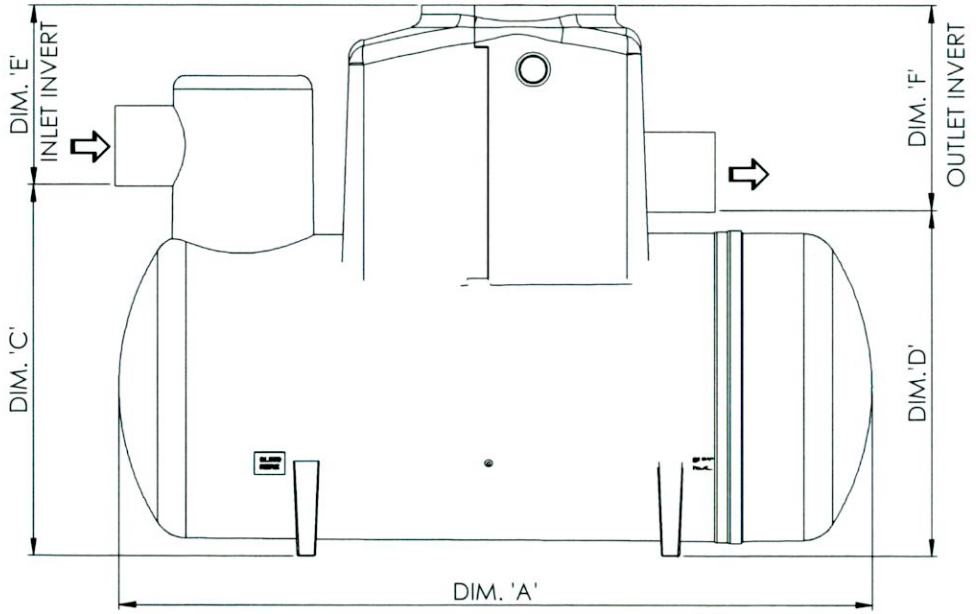


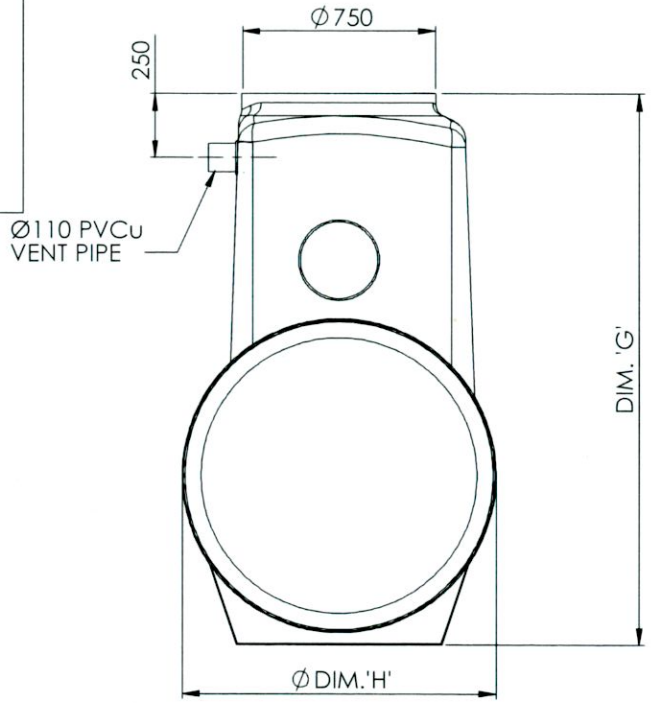


EXTENSION PARTS (IF REQUIRED) INCLUDED IN PRODUCT CODE

NOTES

1. UNITS ARE SUPPLIED WITH THE STANDARD (MINIMUM) PIPEWORK SIZE, AND ORIENTATION SHOWN ON THE DRAWING. THE STANDARD EN858-1 STATES MINIMUM CONNECTION SIZES, UNITS ORDERED WITH DIFFERENT SIZE CONNECTIONS MAY NOT BE FULLY COMPLIANT WITH THE STANDARD. PLEASE CONSULT OUR SALES DEPARTMENT FOR DETAILS OF AVAILABLE OPTIONS, BUT PLEASE NOTE WE DO NOT ALTER INTERNAL PIPEWORK.
2. ALL UNITS SUPPLIED ARE CLASS 1 AND INCLUDE A COALESCER.
3. EXTENSION PARTS FOR DEEPER INVERTS CAN BE PROVIDED FOR ON SITE ASSEMBLY.
4. ALL UNITS REQUIRE APPROPRIATE CONCRETE BASE, COVER AND FRAME TO SUIT APPLIED LOADINGS.
5. THIS DRAWING SHOULD BE USED FOR DIMENSIONAL INFORMATION ONLY.
6. A Ø76mm TUBE IS SUPPLIED TO HOUSE AN OIL ALARM PROBE.





UNIT	NOMINAL FLOW (l/sec.)	DIM.'A'	DIM.'B'	DIM.'C'	DIM.'D'	DIM.'E'	DIM.'F'	DIM.'G'	DIM.'H'	STD. PIPE Ø	APPROX. EMPTY WEIGHT (kg)	FALL ACROSS UNIT
NSBE010	10.0	2070	1095	1450	1350	700	800	2150	1220	315	160	100
NSBE015	15.0	2950	1560	1450	1350	700	800	2150	1220	315	200	100
NSBE020	20.0	3893	2016	1450	1350	700	800	2150	1220	375	220	100
NSBE025	25.0	3575	1900	1680	1580	700	800	2380	1420	375	300	100
NSBE030	30.0	4265	2263	1680	1580	700	800	2380	1420	450	325	100

Please check with Kingspan Environmental that this drawing is the latest issue

Issue	Date	Drawn by	Approved by	Description
07	14.2.18	T.Kelly		CC1405 - Coalescer Extension Chains were Pipe
06	11.11.14	T.Kelly		CC1191 - Alarm Probe Tube Re-Positioned

All dimensions in mm

Scale: Not to scale

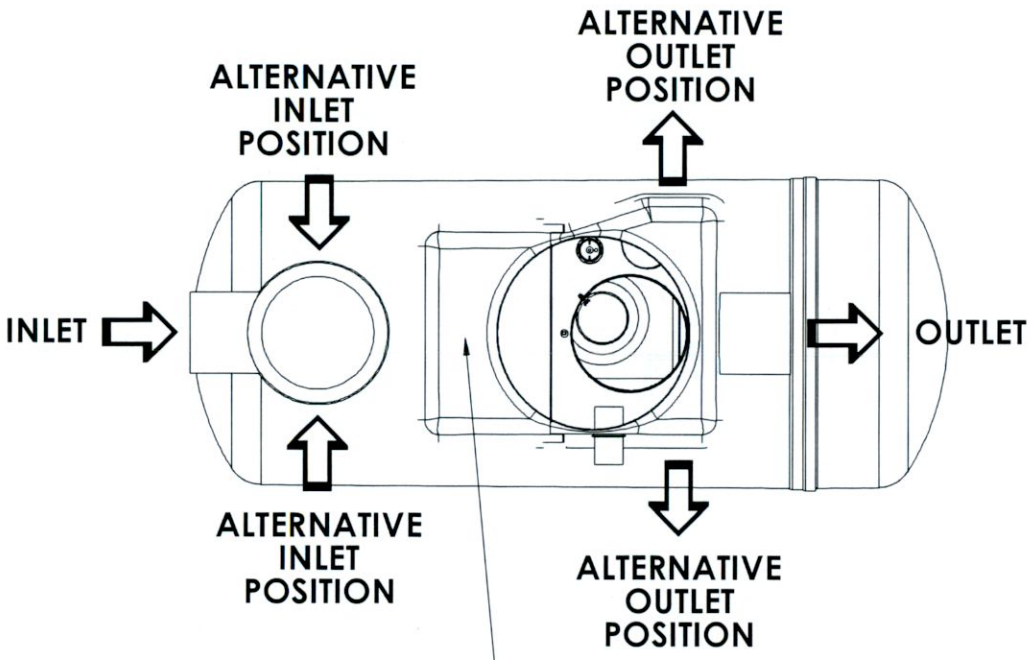
R:\Drawing Data\02 - Sales Drawings\DS\DS - 11\DS1155

Material : Various	Tolerance :
Finish :	Thickness : n/a
Weight :	Surface Area :

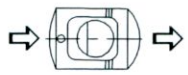
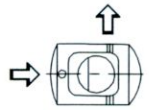
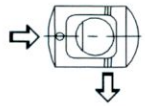
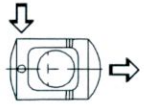
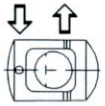
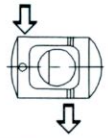
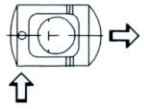
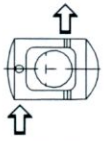
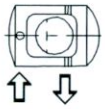
Drawing : DS1155

NSBE010 - NSBE030 Bypass Separators

Kingspan Environmental



Please Note:-
Due to the physically small size of the NSBE010, the inlet pipe, all orientation options, is fitted directly into this turret.

Pipe Orientation Options		
OPTION A 	OPTION B 	OPTION C 
OPTION D 	OPTION E 	OPTION F 
OPTION G 	OPTION H 	OPTION K 

Material : Various	Tolerance (unless stated) :	**Drawing : DS1155** Page 2 of 2
Finish :	Thickness : n/a	
Weight : 226.56 Kg	Surface Area : m²	NSBE010 - 030 BYPASS SEPARATORS
Modelled By :		

All Dimensions In mm | Scale: Do Not Scale | Third Angle Projection

R:\Drawing Data\02 - Sales Drawings\DS\DS - 11\DS1155

Kingspan Environmental

Appendix D – Hydrodynamic Solid Separator Details

SWMH 8.5

SWMH 1.10

CDS Dimensions (mm)

	CDS1040-4	CDS0604	CDS0606	CDS0804	CDS0806	CDS0808	CDS1010	CDS1012	CDS1015
A	370	370	370	370	370	370	500	500	500
B	444	815	615	810	830	810	800	800	830
C	1250	1985	1985	2080	2300	2480	2800	3000	3330
D	800	1200	200	1500	1500	1500	2000	2000	2000
E	1112	1665	1665	1966	1966	1966	2475	2475	2475
F	400	700	700	700	700	800	1000	1000	1000
G (dia)	400	600	600	800	800	800	1000	1000	1000
H	400	400	600	400	600	800	1000	1200	1500

Selection Table — CDS Polypropylene Manhole Units

Model Reference	Hydraulic Peak Flow Rate l/s	Treatment Flow Rate l/s	Drainage Area — Impermeable m²	Chamber Diameter (mm)	Internal Pipe Diameter (mm)
CDS 0404	30	12.5	2,000	900	150/225
CDS 0604	70	23	5,000	1200	225
CDS 0606/01	140	38	10,000	1200	225-375
CDS 0606/02	200	38	15,000	1200	225-375
CDS 0806	350	49	25,000	1500	450
CDS 0808	400	72	30,000	1500	450
CDS 1010	480	116	35,000	2000	450
CDS 1012	550	152	40,000	2000	450/750
CDS 1015	700	211	50,000	2000	450/750
CDS 0804	275	31	20,000	1500	300

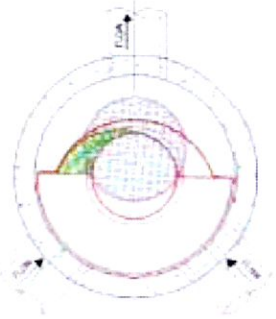
Proposed Peak Flow Rate for each model calculated using Rational Lloyd Davis with a rainfall intensity of 50mm/hr. For greater flows — special design/ construction required.

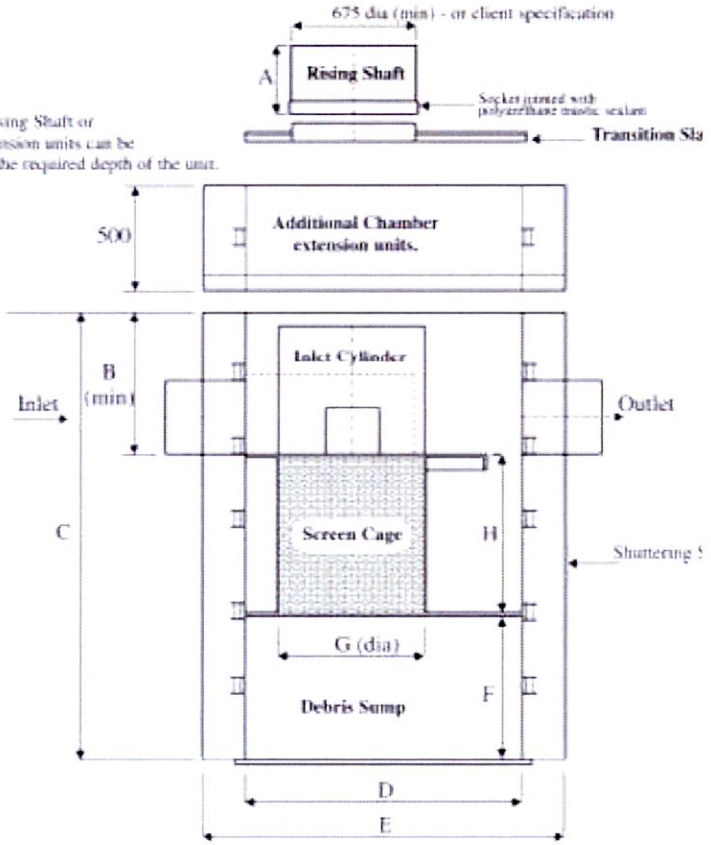
In-Line CDS

For small catchment, these units are used within the drainage system in-line and are supplied as BBA Approved* complete manhole polypropylene units from the selection table above.

Off-Line CDS

Larger catchment areas and retrofit projects designed with larger surface runoff conveyance capacity can receive treatment using a CDS unit placed adjacent to the storm pipeline. Water is channeled to these offline CDS configurations using a diversion structure. The diversion structure and its weir send the water quality flow to the offline CDS unit and also ensure larger flow events from less frequent storm events properly bypass the offline unit without cause flooding upstream of the unit.





Model Designation

A four digit number representing the screen diameter and screen height then follows to give the standard model designation for a CDS screen for installation into standard commercially available pre-fabricated manhole chambers. Example: CDS 0806 designates a separation screen dia. 0.8 m and screen height of 0.6m.

Appendix E – Flow Control Device Details

Technical Specification

Control Point	Head (m)	Flow (l/s)
Primary Design	2.000	4.000
Flush-Flo™	0.357	3.143
Kick-Flo®	0.730	2.520
Mean Flow		3.103

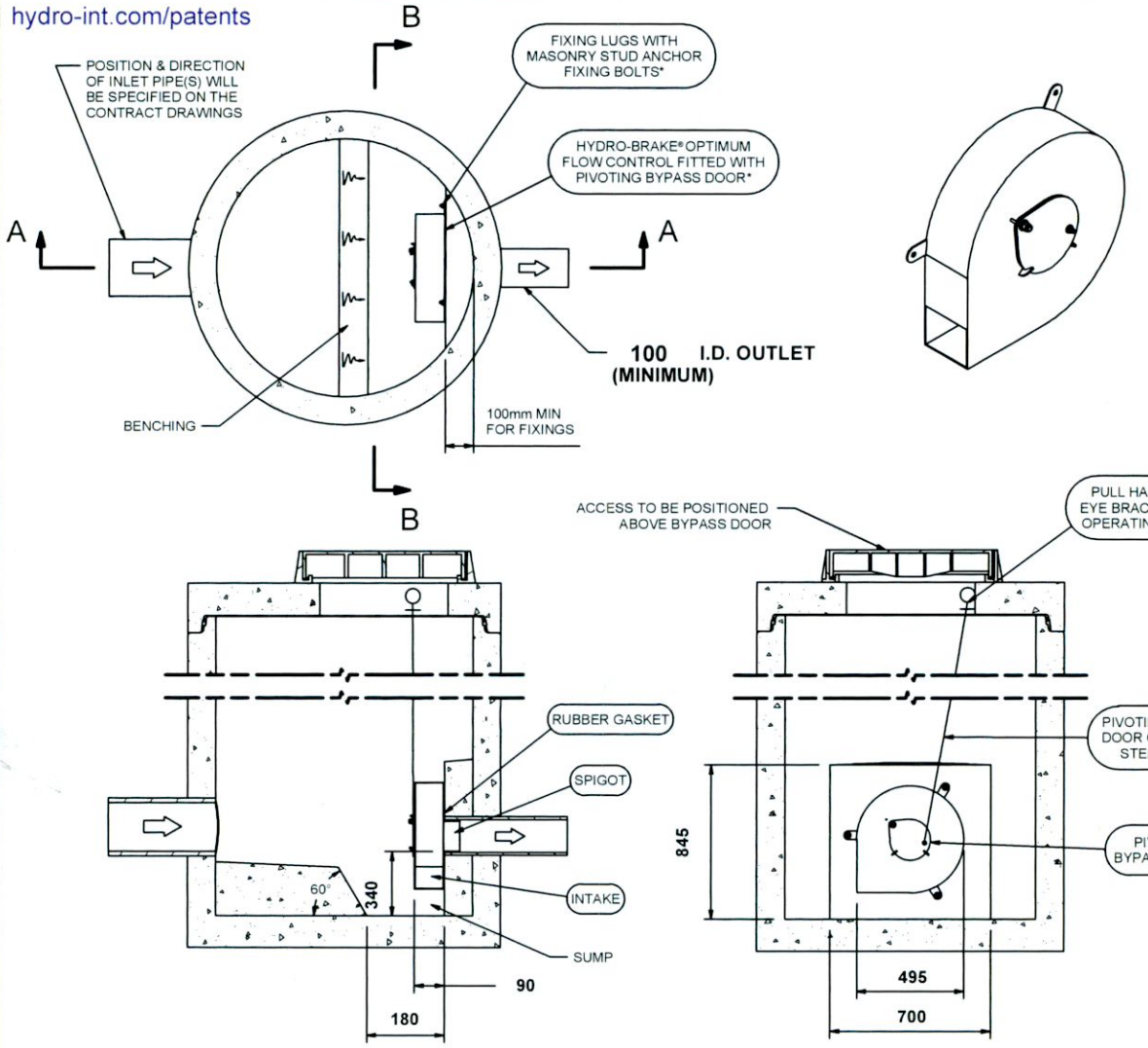
Hydro-Brake® Optimum Flow Control including:

- 3 mm grade 304L stainless steel
- Integral stainless steel pivoting by-pass door allowing clear line of sight through to outlet, c/w stainless steel operating rope
- Beed blasted finish to maximise corrosion resistance
- Stainless steel fixings
- Rubber gasket to seal outlet
- Indicative Weight: 115 kg

BBA APPROVAL INSPECTION TESTING CERTIFICATION
CERTIFICATE 08/4598

WRc Approved
PT/329/0412

hydro-int.com/patents



SECTION A-A

SECTION B-B

IMPORTANT: LIMIT OF HYDRO INTERNATIONAL SUPPLY
THE DEVICE WILL BE HANDED TO SUIT SITE CONDITIONS
FOR SITE SPECIFIC DETAILS AND MINIMUM CHAMBER SIZE REFER TO HYDRO INTERNATIONAL
ALL CIVIL AND INSTALLATION WORK BY OTHERS
* WHERE SUPPLIED
HYDRO-BRAKE® FLOW CONTROL & HYDRO-BRAKE® OPTIMUM FLOW CONTROL ARE REGISTERED TRADEMARKS FOR FLOW CONTROLS DESIGNED AND MANUFACTURED EXCLUSIVELY BY HYDRO INTERNATIONAL

THIS DESIGN LAYOUT IS FOR ILLUSTRATIVE PURPOSES ONLY. NOT TO SCALE.

DESIGN ADVICE

The head/flow characteristics of this SHE-0082-4000-2000-4000 Hydro-Brake® Optimum Flow Control are unique. Dynamic hydraulic modelling evaluates the full head/flow characteristic curve.
The use of any other flow control will invalidate any design based on this data and could constitute a flood risk.

Hydro International®

DATE	6/7/2022 12:07 PM
SITE	
DESIGNER	Steven Waters
REF	

SHE-0082-4000-2000-4000
Hydro-Brake® Optimum

swaters@hydro-int.com

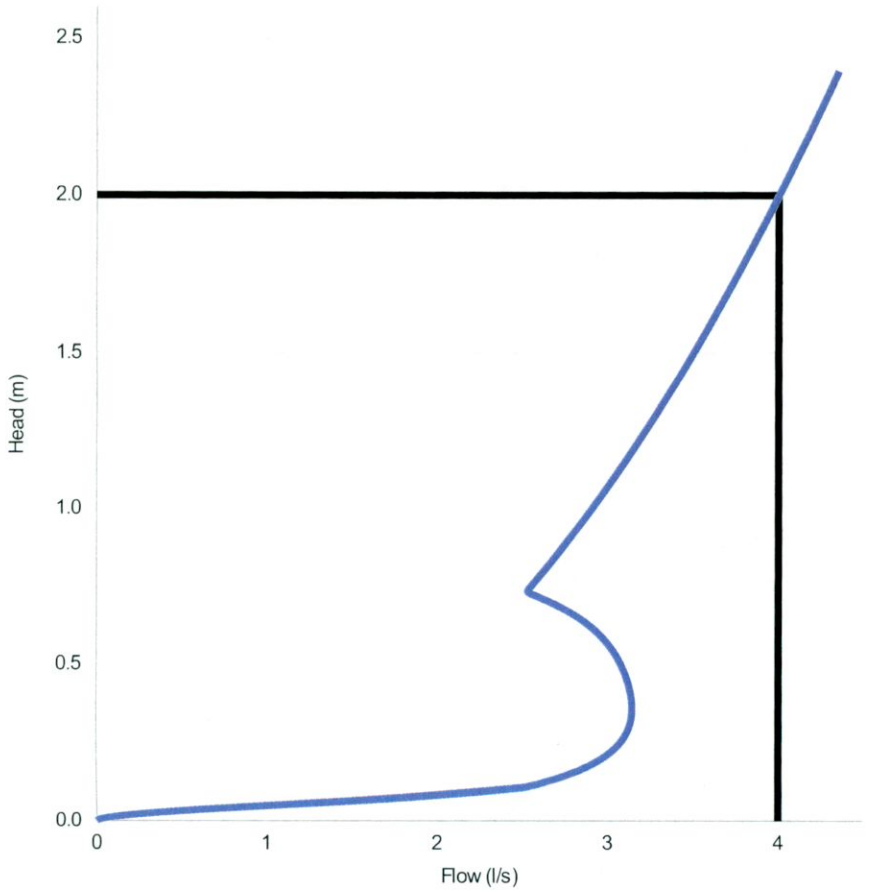
Technical Specification

Control Point	Head (m)	Flow (l/s)
Primary Design	2.000	4.000
Flush-Flo	0.357	3.143
Kick-Flo®	0.730	2.520
Mean Flow		3.103

BBA APPROVAL INSPECTION TESTING CERTIFICATION
CERTIFICATE No 08/4596

WRc APPROVED
PT/329/0412

hydro-int.com/patents



Head (m)	Flow (l/s)
0.000	0.000
0.069	1.640
0.138	2.724
0.207	2.989
0.276	3.107
0.345	3.142
0.414	3.131
0.483	3.090
0.552	3.019
0.621	2.898
0.690	2.697
0.759	2.564
0.828	2.668
0.897	2.767
0.966	2.862
1.034	2.954
1.103	3.042
1.172	3.128
1.241	3.212
1.310	3.292
1.379	3.371
1.448	3.448
1.517	3.523
1.586	3.596
1.655	3.667
1.724	3.737
1.793	3.805
1.862	3.873
1.931	3.938
2.000	4.003

DESIGN ADVICE

The head/flow characteristics of this SHE-0082-4000-2000-4000 Hydro-Brake Optimum® Flow Control are unique. Dynamic hydraulic modelling evaluates the full head/flow characteristic curve.

! **The use of any other flow control will invalidate any design based on this data and could constitute a flood risk.**

Hydro International®

DATE	07/06/2022 12:07
Site	
DESIGNER	Steven Waters
Ref	

SHE-0082-4000-2000-4000

Hydro-Brake Optimum®

Appendix F – Irish Water Pre-Connection Enquiry (PCE)

Pre-connection enquiry form

Business developments, mixed use developments, housing developments

This form is to be filled out by applicants enquiring about the feasibility of a water and/or wastewater connection to Irish Water infrastructure. If completing this form by hand, please use BLOCK CAPITALS and black ink.
Please note that this is a digital PDF form and can be filled in electronically

Please refer to the **Guide to completing the pre-connection enquiry form** on page 14 of this document when completing the form.

*** Denotes mandatory/ required field. Please note, if mandatory fields are not completed the application will be returned.**

Section A | Applicant details

1 *Applicant details:

Registered company name (if applicable): K2 STRATEGIC INFRASTUCTURE IRELAND LTD.

Trading name (if applicable):

Company registration number (if applicable): 639779

Parent company registered company name (if applicable):

Parent company registration number (if applicable):

If you are not a registered company/business, please provide the applicant's name:

*Contact name: FRED MITCHELL

*Postal address: 6TTH FLOOR, RIVERPOINT LOWER MALLOW STREET, LIMERICK

*Eircode: V94WC6A

Please provide either a landline or a mobile number

Landline:

*Mobile: 0873397845

*Email: PROJECTCORE@K2DATACENTRES.COM

2 Agent details (if applicable):

The fields marked with * in this section are mandatory if using an agent

*Contact name: CONOR DOHERTY

Company name (if applicable): CSEA

*Postal address: 3RD FLOOR, THE HIGHLINE
BAKERS POINT, POTTERY ROAD,
DUN LAOGHAIRE, CO. DUBLIN

*Eircode: A96KW29

Please provide either a landline or a mobile number

Landline: 0128850 06

*Mobile 085771651 1

*Email: CONOR.DOHERTY@CSEA.IE

3 *Please indicate whether it is the applicant or agent who should receive future correspondence in relation to the enquiry:

Applicant ○ Agent ◉

Section B | Site details

4 *Site address 1 (include Site name/Building name/Building number):

SITE AT JUNCTION OF KINGSWOOD

***Address 2** ROAD AND KINGSWOOD DRIVE

***Address 3** CITYWEST BUSINESS PARK

***City/Town** TALLAGHT

***County** DUBLIN 24 **Eircode** D24YX53

5 *Irish Grid co-ordinates (proposed connection point):

Eastings (X) 305759 Northings (Y) 228162

Note: Values for Eastings must be between 015,900 and 340,000. Northings, between 029,000 and 362,000
Eg. co-ordinates of GPO, O'Connell St., Dublin: E(X) 315,878 N(Y) 234,619

6 *Local Authority where proposed development is located:

SOUTH DUBLIN COUNTY COUNCIL

7 *Has full planning permission been granted? Yes ☑ No ☐

If 'Yes', please provide the current or previous planning reference number:

SD18A/0301

8 ***Is this development affiliated with a government body/agency?** Yes ☐ No ☑

If 'Yes', please specify the body/agency:

Eg. IDA, HSE, LDA, etc.

Section C | Development details

9 ***Please outline the domestic and/or industry/business use proposed:**

Domestic:

Property type	Number of units	Property type	Number of units
House		Apartments	
Duplex		Number of Apartment Blocks	

Industry/business:

Property type	Number of units	Property type	Number of units
Agricultural		Brewery / Distillery	
Restaurant / Café / Pub		Car Wash / Valeting	
Creche		Data Centre	
Fire Hydrant		Fire Station	
Food Processing		Hotel Accommodation	
Industrial / Manufacturing		Laundry / Laundrette	
Office		Primary Care Centre	
Residential / Nursing Care Home		Retail	
School		Sports Facility	
Student Accommodation		Warehouse	

Other (please specify type)	DATA CENTRE & ELECRICITY SUBSTATION	No. of Units	2

9.1 Please provide additional details if your proposed business use are in the Food Processing, Industrial unit/ Manufacturing, Sports Facility or Other Categories.

DATA CENTRE WITH INDUSTRIAL
WATER DEMAND FOR SEASONAL
COOLING PURPOSES

9.2 Please provide the maximum expected occupancy in number of people, according to the proposed development you selected, e.g. Number of office workers, number of nursing home residents, maximum pub occupancy, number of hotel beds, number of retail workers:

4	5				

10 ***Approximate start date of proposed development:**

0	1	/	0	6	/	2	0	2	2

11 ***Is the development multi-phased?** Yes ☐ No ☑

If 'Yes', application must include a master-plan identifying the development phases and the current phase number.

If 'Yes', please provide details of variations in water demand volumes and wastewater discharge loads due to phasing requirements.

12 ***Please indicate the type of connection required by ticking the appropriate box below:**

Both Water and Wastewater ◉ Please complete both Sections D and E

Water only ○ Please go to Section D

Wastewater only ○ Please go to Section E

Reason for only applying for one service (if applicable):

Section D | Water connection and demand details

13 ***Is there an existing connection to public water mains at the site?** Yes ☐ No ☑

13.1 If yes, is this enquiry for an additional connection to one already installed? Yes ☐ No ☐

13.2 If yes, is this enquiry to increase the size of an existing connection? Yes ☐ No ☐

14 **Approximate date water connection is required:** 01 / 06 / 2023

15 ***What diameter of water connection is required to service the development?** 150 mm

16 ***Is more than one connection required to the public infrastructure to service this development?** Yes ☐ No ☑

If 'Yes', how many? ☐☐

17 **Please indicate the business water demand (shops, offices, schools, hotels, restaurants, etc.):**

Post-development peak hour water demand	0.146	**l/s**
Post-development average hour water demand	0.023	**l/s**

Please include calculations on the attached sheet provided. Where there will be a daily/weekly/seasonal variation in the water demand profile, please provide all such details.

18 **Please indicate the industrial water demand (industry-specific water requirements):**

Post-development peak hour water demand	2.68	**l/s**
Post-development average hour water demand	1.74	**l/s**

Please include calculations on the attached sheet provided. Where there will be a daily/weekly/seasonal variation in the water demand profile, please provide all such details.

19 **What is the existing ground level at the property boundary at connection point (if known) above Malin Head Ordnance Datum?**

103.5 m

20 **What is the highest finished floor level of the proposed development above Malin Head Ordnance Datum?**

106.0 m

21 **Is on-site water storage being provided?** Yes ☑ No ☐

Please include calculations on the attached sheet provided.

22 **Are there fire flow requirements?** Yes ☑ No ☐

Additional fire flow requirements over and above those identified in Q17-18	25	**l/s**

Please include calculations on the attached sheet provided, and include confirmation of requirements from the Fire Authority.

23 **Do you propose to supplement your potable water supply from other sources?** Yes ☐ No ☑

If 'Yes', please indicate how you propose to supplement your potable water supply from other sources (see **Guide to completing the application form** on page 15 of this document for further details):

Section E | Wastewater connection and discharge details

24 ***Is there an existing connection to a public sewer at the site?** Yes ☐ No ☑

24.1 If yes, is this enquiry for an additional connection to the one already installed? Yes ☐ No ☐

24.2 If yes, is this enquiry to increase the size of an existing connection? Yes ☐ No ☐

25 ***Approximate date that wastewater connection is required:** 01 / 06 / 2023

26 ***What diameter of wastewater connection is required to service the development?** 150 mm

27 ***Is more than one connection required to the public infrastructure to service this development?** Yes ☐ No ☑

If 'Yes', how many?

28 **Please indicate the commercial wastewater hydraulic load (shops, offices, schools, hotels, restaurants, etc.):**

Post-development peak discharge	0.12	**l/s**
Post-development average discharge	0.03	**l/s**

Please include calculations on the attached sheet provided.

29 **Please indicate the industrial wastewater hydraulic load (industry-specific discharge requirements):**

Post-development peak discharge	1.63	**l/s**
Post-development average discharge	0.69	**l/s**

Please include calculations on the attached sheet provided.

30 Wastewater organic load:

Characteristic	Max concentration (mg/l)	Average concentration (mg/l)	Maximum daily load (kg/day)
Biochemical oxygen demand (BOD)	450	150	360
Chemical oxygen demand (COD)			
Suspended solids (SS)	500	150	
Total nitrogen (N)	100	60	
Total phosphorus (P)	16	7	
Other			

Temperature range	10-25 deg C
pH range	7

31 *Storm water run-off will only be accepted from brownfield sites that already have a storm/surface water connection to a combined sewer. In the case of such brownfield sites, please indicate if the development intends discharging surface water to the combined wastewater collection system:

Yes ☐ No ☑

If 'Yes', please give reason for discharge and comment on adequacy of SUDS/attenuation measures proposed.

Please submit detailed calculations on discharge volumes, peak flows and attenuation volumes with this application

32 *Do you propose to pump the wastewater? Yes ☐ No ☑

If 'Yes', please include justification for your pumped solution with this application.

33 What is the existing ground level at the property boundary at connection point (if known) above Malin Head Ordnance Datum?

1 0 4 . 9 m

34 What is the lowest finished floor level on site above Malin Head Ordnance Datum? 1 0 6 . 0 m

35 What is the proposed invert level of the pipe exiting the property to the public road?

9 9 . 3 8 m

Section F | Supporting documentation

Please provide the following additional information (all mandatory):

> Site location map: A site location map to a scale of 1:1000, which clearly identifies the land or structure to which the enquiry relates. The map shall include the following details: ☑

i. The scale shall be clearly indicated on the map.

ii. The boundaries shall be delineated in red.

iii. The site co-ordinates shall be marked on the site location map.

> Details of planning and development exemptions (if applicable). ☑

> Calculations (calculation sheets provided below). ☑

> Site layout map to a scale of 1:500 showing layout of proposed development, water network and wastewater network layouts, additional water/wastewater infrastructure if proposed, connection points to Irish Water infrastructure. ☑

> Conceptual design of the connection asset from the proposed development to the existing Irish Water infrastructure, including service conflicts, gradients, pipe sizes and invert levels. ☐

> Any other information that might help Irish Water assess this pre-connection enquiry. ☑

Section G | Declaration

I/We hereby make this application to Irish Water for a water and/or wastewater connection as detailed on this form.

I/We understand that any alterations made to this application must be declared to Irish Water.

The details that I/we have given with this application are accurate.

I/We have enclosed all the necessary supporting documentation.

Any personal data you provide will be stored and processed by Irish Water and may be transferred to third parties for the purposes of the water and/or wastewater connection process. I hereby give consent to Irish Water to store and process my personal data and to transfer my personal data to third parties, if required, for the purposes of the connection process.

If you wish to revoke consent at any time or wish to see Irish Water's full Data Protection Notice, please see **https://www.water.ie/privacy-notice/**

Signature: _____ Date: 12 / 05 / 2022

Your full name (in BLOCK CAPITALS):

CONOR DOHERTY

Irish Water will carry out a formal assessment based on the information provided on this form.
Any future connection offer made by Irish Water will be based on the information that has been provided here.

Please submit the completed form to **newconnections@water.ie** or alternatively, post to:

Irish Water
PO Box 860
South City Delivery Office
Cork City

Please note that if you are sending us your application form and any associated documentation by email, the maximum file size that we can receive in any one email is 35MB.

Please note, if mandatory fields are not completed the application will be returned.

Irish Water is subject to the provisions of the Freedom of Information Act 2014 ("FOIA") and the codes of practice issued under FOIA as may be amended, updated or replaced from time to time. The FOIA enables members of the public to obtain access to records held by public bodies subject to certain exemptions such as where the requested records may not be released, for example to protect another individual's privacy rights or to protect commercially sensitive information. Please clearly label any document or part thereof which contains commercially sensitive information. Irish Water accepts no responsibility for any loss or damage arising as a result of its processing of freedom of information requests.

Calculations

Water demand

See Domestic Water Demand calculation below:-

The total proposed population of the development is 45 which is outlined as follows:-

In accordance with Section 3.28 of IW-CDS-5020-03 the demand per head is 45 litres per person.

Total average demand is 45 x 45 / (24 x 60X 60) = 0.023 l/s

Average Day / Peak Week Demand = 1.25 x 0.023 = 0.029 l/s (as per Section 3.7.2 of IW-CDS-5020-03)

Peak Demand = 0.029 x 5.0 = 0.146 l/s (as per Section 3.7.2 of IW-CDS-5020-03)

See Industrial Water Demand Calculation below:-

Peak Demand

We have 68 No. Air Handling Units. These use water to increase their cooling capacity when the ambient temperature rises above 22°C. The maximum water flow rate required per AHU is 0.15L/s. Therefore 0.15 x 68 units = 10.2 L/s. We have estimated that a peak flow would be required for a maximum of 5 hours on any hot day (ASHRAE n-20). Estimated storage that the peak flow is therefore 5 x 3600 x 10.2 = 183,600 Litres for one day. As our Client requests 48 hour storage we will be designing tank capacity of 367,200 Litres. Using 1 day cycle, and a water consumption of 183,600 Litres to fill this water volume over 19 hours, implies: 183,600/(19x3600)= 2.68 L/s

Average Demand

We have 68 No. Air Handling Units. Between the temperatures 22°C and 24°C the water flow rate required per AHU is 0.097L/s. Therefore 0.097 x 68 units = 6.63 L/s. We have estimated that this average flow would be required for a maximum of 5 hours on any hot day (ASHRAE n-20). Estimated storage used up would be 5 x 3,600 x 6.63 = 119,340 litres for one day. Using 1 day cycle, and a water consumption of 119,340 Litres, to fill this water volume over 19 hours, implies: 119,340/(19x3,600)= 1.74 L/s

Following feedback from Irish Water on other Data Centre applications the following calculations are provided in order to assist the assessment of the application.

Maximum Annual Industrial Water Demand

Summer Flow rate between 20-24°C = 100 hours x 6.63 l/s x 3,600 = 2,386,800 Litres (= 2387 m^3). Summer Flow rate above 24°C = 16hours x 10.2 L/s x 3,600 = 587,520 Lit (=588 m^3). Total Annual Use = 2,387 + 588 = 2,975 m^3.

Maximum Daily Demand

Peak process flow rate (10.2 x 5 x 3600) = 183,600 Litres (=184 m^3). Peak Office Water use in 24 hours = 2,784 Litres (2.78 m^3). Maximum daily demand is 184 + 2.78 = 187 m^3

On-site storage

We have 68 No. Air Handling Units. These use water to increase their cooling capacity when the ambient temperature rises above 22°C using evaporative cooling. The maximum water flow rate required per AHU is 0.15L/s. Therefore 0.15 x 68 units = 10.2 L/s. Estimated storage that the peak flow is therefore 5 x 3600 x 10.2 = 183,600 Litres for one day. As our Client requests 48 hour storage we will be designing tank capacity of 367,200 Litres This has been rounded up to 400 m^3 of stored water. In addition 3 m^3 of storage is provided for domestic purposes.

Fire flow requirements

Hydrant flow rates as per IS391:2000. A small flowrate is also needed for filling a Water Mist Fire Suppression tank. This is included within the industrial flow rate.

See domestic foul wastewater demand calculations below-

The total proposed population of the development is 45 (P) :-

As per Appendix C of IW-CDS-5030-03;
Consumption for Data Centres (G) = 50 l/person/day

Average Demand

PG = 45 x 50 = 2,250 l/day
I = 2,250 x 0.1 = 225 l/day (as per Table 2.4 of Appendix B to IW-CDS-5030-03)
E = 0
Dry Weather Flow = PG+I+E => 2,250 + 225 + 0 / 24 x 60 x 60 = 0.03 l/s

Peak Demand

Pf (dom, ind) = 4.5 as per Table 2.7 of Appendix B to IW-CDS-5030-03).

Design Foul (Peak) Flow = Pf (dom, ind) x PG + I + E => 4.5 x (2,250 / 24 x 60 x60) + (225 / 24 x 60 x60) + 0 = 0.12 l/s

See Industrial waste water demand calculation below:-

Peak Demand

Based on the maximum peak flow rate of 10.2 l/s and an efficiency rate of 80% evaporation = 2.04l/s non-absorbed water. With diversification over 68 AHUs a further 20% diversification is applied = 1.63 l/s.

Average Demand

Based on the average process flow rate of 6.63 L/s and an efficiency rate of 85% evaporation = 0.99 l/s non-absorbed water. With diversification over 68 AHUs a further 30% diversification is applied = 0.69 l/s.

N/A

Guide to completing the pre-connection enquiry form

This form should be completed by applicants enquiring about the feasibility of a water and/or wastewater connection to Irish Water infrastructure.

The Irish Water Codes of Practice are available at **www.water.ie** for reference.

Section A | Applicant Details

Question 1: This question requires the applicant or company enquiring about the feasibility of a connection to identify themselves, their postal address, and to provide their contact details.

Question 2: If the applicant has employed a consulting engineer or an agent to manage the enquiry on their behalf, the agent's address and contact details should be recorded here.

Question 3: Please indicate whether it is the applicant or the agent who should receive future correspondence in relation to the enquiry.

Section B | Site details

Question 4: This is the address of the site requiring the water/wastewater service connection and for which this enquiry is being made.

Question 5: Please provide the Irish Grid co-ordinates of the proposed site. Irish grid positions on maps are expressed in two dimensions as Eastings (E or X) and Northings (N or Y) relative to an origin. You will find these coordinates on your Ordnance Survey map which is required to be submitted with an application.

Question 6: Please identify the Local Authority that is or will be dealing with your planning application, for example Cork City Council.

Question 7: Please indicate if planning permission has been granted for this application, and if so, please provide the planning permission reference number.

Question 8: Please indicate if this development is affiliated with a government body/agency, and if so, specify

Section C | Development details

Question 9: Please specify the number of different property/premises types by filling in the tables provided.

Question 9.1: Please provide additional details if your proposed business use are in the Food Processing, Industrial unit/ Manufacturing, Sports Facility or Other Categories.

Question 9.2: Please indicate the maximum expected occupancy in numbers of people according to the proposed development you selected.

Question 10: Please indicate the approximate commencement date of works on the development.

Question 11: Please indicate if a phased building approach is to be adopted when developing the site. If so, please provide details of the phase master-plan and the proposed variation in water demand/wastewater discharge as a result of the phasing of the development.

Question 12: Please indicate the type of connection required by ticking the appropriate box and proceed to complete the appropriate section or sections.

Section D | Water connection and demand details

Question 13: Please indicate if a water connection already exists for this site.

Question 13.1: Please indicate if this enquiry concerns an additional connection to one already installed on the site.

Question 13.2: Please indicate if you are proposing to upgrade the water connection to facilitate an increase in water demand. Irish Water will determine what impact this will have on our infrastructure.

Question 14: Please indicate the approximate date that the proposed connection to the water infrastructure will be required.

Question 15: Please indicate what diameter of water connection is required to service this development.

Question 16: Please indicate if more than one connection is required to service this development. Please note that the connection size provided may be used to determine the connection charge.

Question 17: If this connection enquiry concerns a business premises, please provide calculations for the water demand and include your calculations on the calculation sheet provided. Business premises include shops, offices, hotels, schools, etc. Demand rates (peak and average) are site specific. Average demand is the total daily volume divided by a 24-hour time period and expressed in litres per second (l/s). For design purposes, please refer to the Irish Water Codes of Practice for Water Infrastructure.

Question 18: If this connection enquiry is for an industrial premises, please calculate the water demand and include your calculations on the calculation sheet provided. Demand rates (peak and average) are site specific. Average demand is the total daily volume divided by a 24-hour time period and expressed in litres per second (l/s). The peak demand for sizing of the pipe network will be as per the specific business production requirements. For design purposes, please refer to the Irish Water Codes of Practice for Water Infrastructure.

Question 19: Please specify the ground level at the location where connection to the public water mains will be made. This is required in order to determine if there is sufficient pressure in the existing water infrastructure to serve your proposed development. Levels should be quoted in metres relative to Malin Head Ordnance Datum.

Question 20: Please specify the highest finished floor level on site. This is required in order to determine if there is sufficient pressure in the existing water infrastructure to serve your proposed development. Levels should be quoted in metres relative to Malin Head Ordnance Datum.

Question 21: If storage is required, water storage capacity of 24-hour water demand must usually be provided at the proposed site. In some cases, 24-hour storage capacity may not be required, for example 24-hour storage for a domestic house would be provided in an attic storage tank. Please calculate the 24-hour water storage requirements and include your calculations on the attached sheet provided. Please also confirm that on-site storage is being provided by ticking the appropriate box.

Question 22: The water supply system shall be designed and constructed to reliably convey the water flows that are required of the development including fire flow requirements by the Fire Authority. The Fire Authority will provide the requirement for fire flow rates that the water supply system will have to carry. Please note that while flows in excess of your required demand may be achieved in the Irish Water network and could be utilised in the event of a fire, Irish Water cannot guarantee a flow rate to meet your fire flow requirement. To guarantee a flow to meet the Fire Authority requirements, you should provide adequate fire storage capacity within your development. Please include your calculations on the attached sheet provided, and further provide confirmation of the Fire Authority requirements.

Question 23: Please identify proposed additional water supply sources, that is, do you intend to connect to the public water mains or the public mains and supplement from other sources? If supplementing public water supply with a supply from another source, please provide details as to how the potable water supply is to be protected from cross contamination at the premises.

Section E | Wastewater connection and discharge details

Question 24: Please indicate if a wastewater connection to a public sewer already exists for this site.

Question 24.1: Please indicate if this enquiry relates to an additional wastewater connection to one already installed.

Question 24.2: Please indicate if you are proposing to upgrade the wastewater connection to facilitate an increased discharge. Irish Water will determine what impact this will have on our infrastructure.

Question 25: Please specify the approximate date that the proposed connection to the wastewater infrastructure will be required.

Question 26: Please indicate what diameter of wastewater connection is required to service this development.

Question 27: Please indicate if more than one connection is required to service this development. Please indicate number required.

Question 28: If this enquiry relates to a business premises, please provide calculations for the wastewater discharge and include your calculations on the attached sheet provided. Business premises include shops, offices, hotels, schools, etc. Discharge rates (peak and average) are site specific. Average discharge is the total daily volume divided by a 24-hour time period and expressed in litres per second (l/s). For design purposes, please refer to the Irish Water Codes of Practice for Wastewater Infrastructure.

Question 29: If this enquiry relates to an industrial premises, please provide calculations for the wastewater discharge and include your calculations on the calculation sheet provided. Discharge rates (peak and average) are site specific. Average discharge is the total daily volume divided by a 24-hour time period and expressed in litres per second (l/s). The peak discharge for sizing of the pipe network will be as per the specific business production requirements. For design purposes, please refer to the Irish Water Codes of Practice for Wastewater Infrastructure.

Question 30: Please specify the maximum and average concentrations and the maximum daily load of each of the wastewater characteristics listed in the wastewater organic load table (if not domestic effluent), and also specify if any other significant concentrations are expected in the effluent. Please complete the table and provide additional supporting documentation if relevant. Note that the concentration shall be in mg/l and the load shall be in kg/day. Note that for business premises (shops, offices, schools, hotels, etc.) for which only domestic effluent will be discharged (excluding discharge from canteens/ restaurants which would require a Trade Effluent Discharge licence), there is no need to complete this question.

Question 31: In exceptional circumstances, such as brownfield sites, where the only practical outlet for storm/ surface water is to a combined sewer, Irish Water will consider permitting a restricted attenuated flow to the combined sewer. Storm/surface water will only be accepted from brownfield sites that already have a storm/surface water connection to a combined sewer and the applicant must demonstrate how the storm/surface water flow from the proposed site is minimised using sustainable urban drainage system (SUDS). This type of connection will only be considered on a case by case basis. Please advise if the proposed development intends discharging surface water to the combined wastewater collection system.

Question 32: Please specify if the development needs to pump its wastewater discharge to gain access to Irish Water infrastructure.

Question 33: Please specify the ground level at the location where connection to the public sewer will be made. This is required to determine if the development can be connected to the public sewer via gravity discharge. Levels should be quoted in metres relative to Malin Head Ordnance Datum.

Question 34: Please specify the lowest floor level of the proposed development. This is required in order to determine if the development can be connected to the public sewer via gravity discharge. Levels should be quoted in metres relative to Malin Head Ordnance Datum.

Question 35: Please specify the proposed invert level of the pipe exiting the property to the public road.

Section F | Supporting documentation

Please provide additional information as listed.

Section G | Declaration

Please review the declaration, sign, and return the completed application form to Irish Water by email or by post using the contact details provided in Section G.

Notes

Notes

Appendix G – Irish Water Confirmation of Feasibility (CoF)

CONFIRMATION OF FEASIBILITY

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

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

www.water.ie

Conor Doherty

3rd Floor, The Highline Bakers Point
Pottery Road
Dun Laoghaire
Co. Dublin
A96 KW29

30 June 2022

Our Ref: CDS22003496 Pre-Connection Enquiry
Site at Junction of Kingswood Road, and Kingswood Drive, Tallaght, Dublin 24

Dear Applicant/Agent,

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

Irish Water has reviewed the pre-connection enquiry in relation to a Water & Wastewater connection for a Business Connection of 2 unit(s) at Site at Junction of Kingswood Road, and Kingswood Drive, Tallaght, Dublin 24, (the **Development)**.

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

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

  The development can proceed on the proviso that the customer provides storage for all annual cooling needs with a maximum allowable annual demand from the site limited to 2 975m^3.

  This storage will be filled in winter by agreement with Irish Water operations and used as required during the summer months.

  Approximately 20m of new 200mm ID pipe main to be laid to connect the site development to the existing 200mm uPVC main in

Kingswood Drive. Bulk meter must be installed on this connection.

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

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

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

Where can you find more information?

- **Section A -** What is important to know?
- **Section B -** Details of Irish Water's Network(s)

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

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

Yours sincerely,

Yvonne Harris

Yvonne Harris
Head of Customer Operations

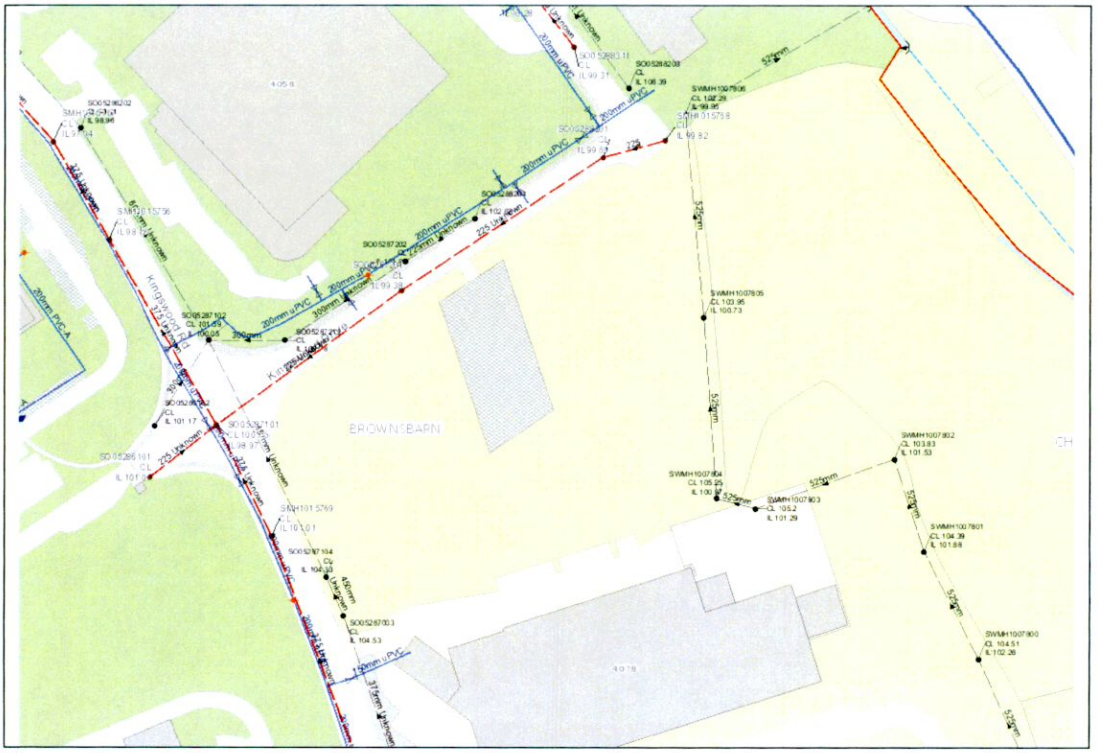
Section A - What is important to know?

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

What are the design requirements for the connection(s)?	• The design and construction of the Water & Wastewater pipes and related infrastructure to be installed in this Development shall comply with ***the Irish Water Connections and Developer Services Standard Details and Codes of Practice,*** available at www.water.ie/connections
Trade Effluent Licensing	• Any person discharging trade effluent** to a sewer, must have a Trade Effluent Licence issued pursuant to section 16 of the Local Government (Water Pollution) Act, 1977 (as amended). • More information and an application form for a Trade Effluent License can be found at the following link: https://www.water.ie/business/trade-effluent/about/ **trade effluent is defined in the Local Government (Water Pollution) Act, 1977 (as amended)

Section B – Details of Irish Water's Network(s)

The map included below outlines the current Irish Water infrastructure adjacent the Development: To access Irish Water Maps email datarequests@water.ie



Reproduced from the Ordnance Survey of Ireland by Permission of the Government. License No. 3-3-34

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

Whilst every care has been taken in respect of the information on Irish Water's network(s), Irish Water assumes no responsibility for and gives no guarantees, undertakings or warranties concerning the accuracy, completeness or up to date nature of the information provided, nor does it accept any liability whatsoever arising from or out of any errors or omissions. This information should not be solely relied upon in the event of excavations or any other works being carried out in the vicinity of Irish Water's underground network(s). The onus is on the parties carrying out excavations or any other works to ensure the exact location of Irish Water's underground network(s) 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.

Clifton Scannell Emerson Associates Limited, Civil & Structural Consulting Engineers
Seafort Lodge, Castledawson Avenue, Blackrock, Co. Dublin, Ireland.

T. +353 1 288 5006 F. +353 1 283 3466 E. info@csea.ie W. www.csea.ie