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Engineering Services Report

Kilcock West SHD2

Boycetown, Kilcock, Co. Kildare

Client: Teresa Monaghan

Job No. S037

August 2022



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ENGINEERING SERVICES REPORT

KILCOCK WEST SHD2

BOYCETOWN, KILCOCK, CO. KILDARE

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1.0 INTRODUCTION

Cronin & Sutton Consulting Engineers (CS Consulting) have been commissioned by Teresa Monaghan to prepare an Engineering Services Report to accompany a planning application for a proposed 272-unit Strategic Housing Development (SHD) at Boycetown, Kilcock, Co. Kildare.

This report assesses the proposed development under the following headings:

- Foul Drainage Infrastructure
- Stormwater Drainage Infrastructure
- Potable Water Infrastructure
- Foundation Design

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

- Kildare County Development Plan 2017-2023
- Kilcock Local Area Plan 2015-2021 (November 2015)
- Regional Code of Practice For development works, Version 6
- Irish Water Code of Practice for Water Infrastructure
- Irish Water Code of Practice for Wastewater Infrastructure
- Greater Dublin Strategic Development Study
- Local Authority Drainage Records

The Engineering Services Report is to be read in conjunction with the engineering drawings and documents submitted by CS Consulting and with the various additional information submitted by the other members of the design team, as part of the planning submission.

2.0 SITE LOCATION AND PROPOSED DEVELOPMENT

2.1 Site Location

The site of the proposed development is located on the western outskirts of Kilcock, Co. Kildare, in the operational area of Kildare County Council (KCC). The core of the development site encompasses an area of 8.75ha, while the planning application boundary extends to 11.39ha.

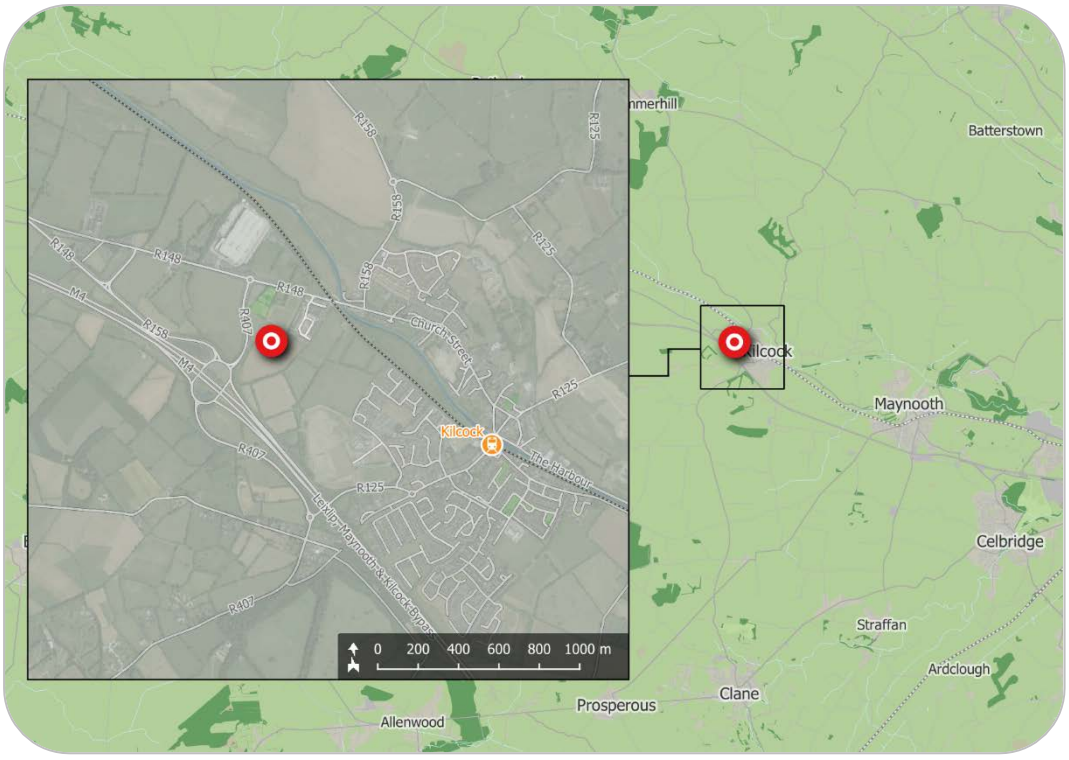


Figure 1 – Location of proposed development site
(map data and imagery: EPA, OSi, OSM Contributors, Google)

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

The site is located adjacent to Junction 8 on the M4 motorway. It is bounded to the north by the R148 regional road, to the west by the R158

regional road, to the north-east by the existing Boycetown Court residential development, to the east by undeveloped farmland, and to the south-east by lands on which planning permission has been granted for a Strategic housing Development (SHD).

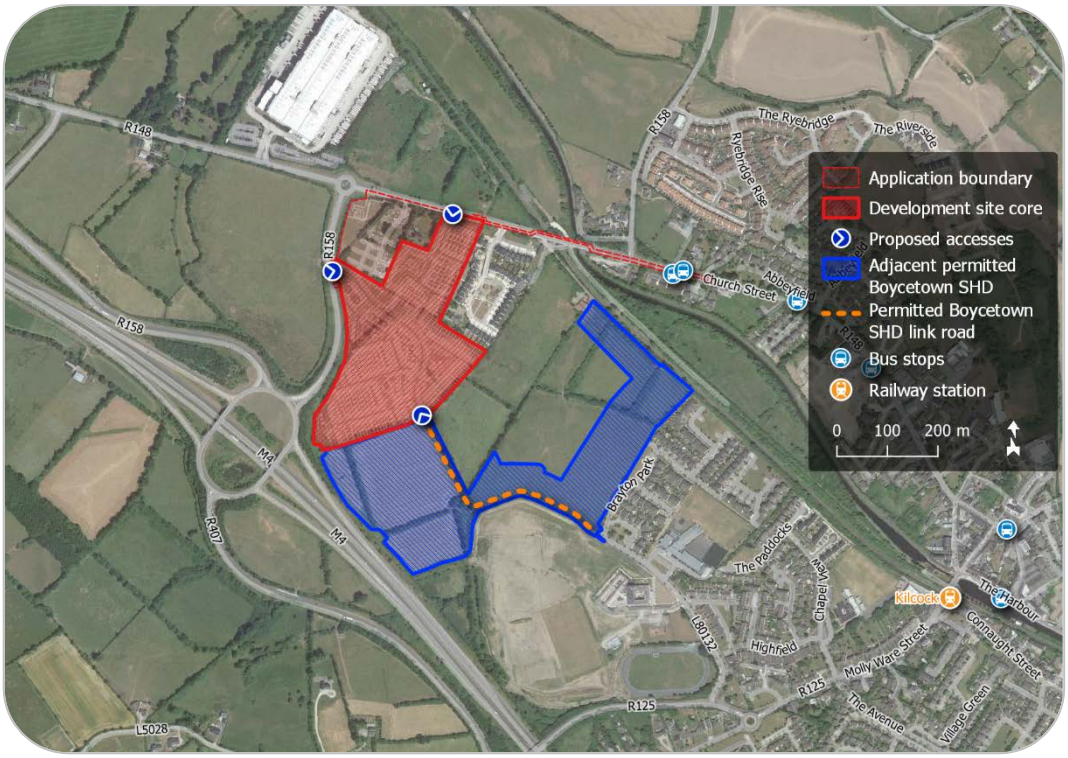


Figure 2 – Site extents and transport context
(map data and imagery: NTA, OSi, OSM Contributors, Google)

2.2 Existing Land Use

The core of the development site comprises greenfield agricultural land, an existing farm access to which is located on the R158, at its western boundary. The site rises from an elevation of 75.0m in the north to 81.0m at the middle of the site and falls to 78.0m to the south towards the M4 motorway, which runs along the site's south-western boundary. A former church (Kilbeg House, now in residential use) and the existing St. Joseph's Cemetery are located within the north-west corner of the overall

development site; these are to remain essentially unchanged by the proposed development.

2.3 Description of Proposed Development

The proposed development (30,839 sq.m GFA) will consist of the demolition of a detached, vacant cottage (gfa 69sq.m) and the construction of 272 residential units (149 no. houses, 65 apartments and 58 duplexes), childcare facility and foul pumping station along with associated ancillary works and site works.

The 149 no. dwellings consist of:

- 40 no. 4 bed 2 storey houses (House Type A1, A2, A3, A4, A5)
- 8 no. 4 bed 3 storey houses (House Type E1, E2)
- 90 no. 3 bed 2 storey houses (House Type B1, B2, B3, C1, C2)
- 11 no. 2 bed 2 storey houses (House Type D1)

The proposed apartments and duplexes are provided in 7 no. blocks (Blocks A, B, C, D, E, F, G) ranging in height from 3 to 4 storeys, with the exception of 1no. Duplex Block (Type N1), which is a 3 storey, end of terrace unit. Block A and Block B containing Rooftop terraces at 4th floor level.

The Duplex Blocks (Type J1, Type, J2, Type J3, Type J4, Type K1, Type L1, Type M1, Type N1) are all 3-storey and contain 58 units divided as follows:

- 6no. 1 bed ground floor apartment units (Units L1-A)
- 23no. 2 bed ground floor apartment units (Units J1-A, J2-A, J3-A, J4-A, K1-A, M1-A, N1-A)
- 1no. 2 bed duplex unit (two-storey unit) (Units K1-B)
- 25no. 3 bed duplex units (two-storey units) (Units J1-B, J2-B, J3-B, J4-B, L1-B)
- 3no. 4 bed duplex units (two-storey units) (Units M1-B, N1-B)

The 65 apartments are located within Blocks A, B, C and D divided as follows:

- 17no. 1 bed units (Type F1, Type F2, Type F3, Type F4, Type F5, Type F6)
- 37no. 2 bed units (Type G1, Type G2, Type G3, Type G4, Type G5-A, Type G5-B, Type G6, Type G7, Type G8)
- 11no. 3 bed units (Type H1, Type H2)

Block D also contains a childcare facility (gfa.526.2 sqm) and includes a dedicated outdoor play area (about 210 sq.m).

Ancillary works including 1 no. vehicular entrances off the R148 to the north and 1 no. vehicular entrance off the R158 to the west, a spine road which will link with the permitted spine road on the adjoining lands to the south-east under PL09.306826, internal roads, footpaths, cycle lanes, car parking (465 no. spaces), cycle storage/parking (426 no. spaces), 2 no. bus stops, bin storage, public open space, hard and soft landscaping, natural play area, play equipment, boundary treatments, public lighting, 3 no. substations (14sq.m each) and controlled pedestrian crossing on the R148.

All associated site and infrastructural works including underground wastewater pump station (a wetwell); welfare building 6.25sqm and 3m in height; 472m of 125mm OD rising main and 250m of gravity sewer along the R148; an underground emergency storage tank, capacity 230 m^3 approx.; above ground lifting gantry; valve and flowmeter chambers; a chemical dosing facility for odour control; Passive Carbon Unit; Kiosks; above ground surge vessel (<13 m^3); Landscaping, fencing and access off the R148. The proposed development includes all necessary ancillary pipework and manholes, diversion of existing utilities; new power supply and water connection for the pump station, ducting, mechanical and electrical services, plant, instrumentation, automation, controls and equipment. It also includes all associated site development works, hardstanding areas and access and site drainage. The proposed development includes works

on lands owned by Kildare County Council to facilitate access and drainage infrastructure.

3.0 FOUL DRAINAGE

3.1 Existing Foul Drainage Infrastructure

A review of the Irish Water drainage records for the area shows an existing 150mm diameter foul sewer located on the R148, a distance of 300m from the north east corner of the proposed site and a 300mm diameter foul located a further 150 metres away in the direction of Kilcock on the R148. Refer to Mott McDonald drawings attached to this application for Irish Water drainage records.

Irish Water viewed an original pre connection application as premature as there wasn't sufficient capacity in the local network to provide water/waste water services for the development. Irish Water felt that a more regional strategy regarding local pumping stations should be explored as overloading the area with numerous pumping stations was not seen as a suitable solution.

Following preliminary discussions with Irish Water, CS Consulting were advised by Irish Water to re-submit a pre-connection enquiry form, as Irish Water were currently carrying out a review of the local Kilcock area with a view to adjusting the telemetry between various pumping stations to optimise the network's capacity. Irish Water felt that by reviewing recently available technical data that the solution may be available. As requested, CS Consulting re-submitted the documentation.

Following Irish Water's review of the collected data, and by carrying out alterations to the local pumping and telemetry systems, capacity in the region was confirmed. As such, Irish Water's response to the Pre-Connection Enquiry indicated that the original solution of utilising a proposed pumping station, rising main and existing infrastructure was acceptable to them and that there is sufficient capacity within the up-graded existing foul drainage infrastructure.

3.2 Proposed Foul Drainage Arrangements

The proposed development shall be serviced by a new drainage system with separate sewers and manholes for both foul and storm water within the site boundary. The proposed foul network has been designed in accordance with the *Building Regulations* and the *Regional Code of Practice for Drainage* Works, Version 6.

The proposed development is to consist of 272no. residential units and a crèche accommodating up to 67no. children (with a max. staffing complement of 18 at any one time).

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

- <u>For the residential units:</u>
  - ⇒ 446 l/day per unit (based on 2.7 persons per unit x 150l/person/day, plus a 10% increase factor).
  - ⇒ 446l/day/unit x 272 units = 121,312 l/day = 121.31 m^3/day.
- <u>For the Childcare Facility:</u>
  - ⇒ 60 l/day per person.
  - ⇒ (67 children + 18 staff) x 60L = 5,100 l/day = 5.10m^3/day.
- <u>Total Foul Sewer flow for proposed development</u>
  - ⇒ 126,412 l/day = 1.463 l/sec Average flow (1 DWF).
  - ⇒ 8.778 l/sec Peak Flow (6 DWF).

All foul effluent generated from the proposed development shall be collected in 150mm and 225mm diameter pipes and flow under gravity to the proposed pumping station and pipe infrastructure designed and to be constructed by Irish Water.

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

Under instruction from Irish Water, an allowance in the foul sewer design has been made for future development to cater for approximately 441 residential units. Therefore, the proposed foul drainage infrastructure will cater for a total of 713 units.

A Pre-Connection Enquiry was submitted to Irish Water. Please refer to **Appendix A** for a copy of the Confirmation of Feasibility received in response from Irish Water. A Statement of Design Acceptance was subsequently received from Irish Water; this is provided as **Appendix E.**

The foul sewer network has been model designed using the Microdrainage WinDES software, the details of which are shown in **Appendix D.**

The proposed foul water drainage infrastructure and routing plan is shown on drawing **S037-CSC-XX-XX-DR-C-0105 & 0106**. The proposed rising main drainage infrastructure is shown on Mott McDonald Drawings enclosed with this application.

4.0 STORMWATER DRAINAGE

4.1 Existing Stormwater Drainage Infrastructure

The existing site comprises of 8.75ha of undeveloped agricultural land. The site has a maximum elevation of 83.00mAOD to the east of the site and a low point of 74.59mAOD at the north east corner of the site. See CSC drawing no. **S037-CSC-XX-XX-DR-C-0102** for a topographical survey of the site. The site has an elevated ridge which cuts the site in two and the natural drainage regime for the subject lands drains away from this high point. The existing drainage pattern for the site has been identified and indicated on drawing **S037-CSC-XX-XX-DR-C-0105 & 0106** (Proposed drainage Layout), which accompanies this planning submission. There are no watercourses of significance crossing the site. At present the site does not have any type of restricted flow from the subject lands.

4.2 Allowable Discharge Rate

In order to calculate the allowable discharge rate off the site a number of parameters are required to be established:

- Standard Average Annual Rainfall, SAAR (from Met Éireann data)
- Sliding duration rainfall data (from Met Éireann data)
- Soil Type (from the Flood Studies Report & the HR Wallingford SuDS site)

The site is designated as Soil Type 2, based on the Flood Studies Report and the SuDS website. Soil Type 2 would generally be a loam type soil with medium infiltration and with a low discharge rate. The mapping from the Flood Studies Report can be viewed as a high-level interpretation of the soil characteristics as known at the time, but local areas may differ significantly from the map's values.

4.3 Proposed Stormwater Drainage Arrangements

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

The **first** aspect is to reduce any post development run-off to pre-development discharge rates. The development is to retain storm water volumes predicted to be experienced during extreme rainfall events. This is defined as the volume of storm water generated during a 1-in-100-year storm event, increased for predicted climate change factors. The reduced discharge rates from both catchments will prevent off site flooding during extreme flood events. By reducing the flow from the subject lands during extreme rainfall events, the development must incorporate a storage system to retain the rainwater while releasing it at a controlled rate.

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

a) The SAAR (Standard Annual Average Rainfall) for the area: 843mm/year

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

c) Soil type value obtained from site investigation (as noted above, this has been established as Soil Type 2).

The proposed layout of the site will require two distinct stormwater catchments, **Catchments A & B**. The overall positively drained area of the site is 87910ha (of which 5.356ha is hardstanding). The QBar discharge rate for the overall catchment is 19.9 l/s.

Catchment A covers the northern section of the subject lands and has the following characteristics.

Overall Area: 4.993ha (hardstanding 2.822ha) QBar discharge rate of 11.3 l/s. Attenuation required for an extreme rainfall event (increased by 30% for predicted climate change) is in the order of 1,964m³. The proposed attenuation is divided into 3 sub-catchments (1, 2 and 3) draining to 3 attenuation storage facilities arranged in series, as shown on the drainage plan. The total storage provided in the attenuation facilities within catchment A will be 1766m³, (refer to Section 4.4 below for the reduction in proposed storage due to modelling accuracies). Refer to catchment drawing **S037-CSC-XX-XX-DR-C-0104** for breakdown of storage calculations.

Catchment B covers the southern section of the subject lands and has the following characteristics.

Overall Area: 4.993ha (hardstanding 2.822ha) QBar discharge rate of 8.6 l/s. Attenuation required for an extreme rainfall event (increased by 30% for predicted climate change) is in the order of 1,897m³ draining to attenuation storage facility no. 4 as shown. The total attenuation storage provided in catchment B will be 1,242m³, (refer to Section 4.4 below for the reduction in proposed storage due to modelling accuracies). Refer to catchment drawing **S037-CSC-XX-XX-DR-C-0104** for breakdown of storage calculations.

In summary, for catchments A and B, the total storage attenuation required for the 1-in-100-year storm event (increased by 30% for predicted climate change effects) is 3,008m³ and the total storage provided in the attenuation facilities.

These values incorporate the volume of storm water required to be retained for a critical storm during a 1-in-100-year storm event, further increased by

30% to accommodate the predicted effects of long term climate change. The flow from the site will be restricted by the use of flow control systems. Both catchment A & B will discharge their restricted flow into the local drainage networks.

The Storm Sewer network has been designed using Microdrainage WinDES software and has been simulated for the 100-year return period plus an allowance for 30% climate change. This is a requirement from the Local Authority and incorporated into the design. The Water Services Department also indicated that an additional 10% for 'Urban Creep' should be considered for the application. Following consideration for same it has been discounted. The 'Urban Creep' factor is usual more appropriately used for sites located in heavily development city centre locations where large areas of hardstanding surfacing is present and the accumulation of same leads to significate local run-off, as the proposed development is not located in such a developed area the increased 10% for 'Urban Creep' has not been applied.

The summary results show minor surcharging with no flooding for the 1-in-100-year event. Refer to **Appendix C** for calculations.

See CS Consulting drawings **S037-CSC-XX-XX-DR-C-0105 & 0106** (Proposed drainage Layout) and **S037-CSC-XX-XX-DR-C-0104** (Proposed Catchment Areas).

4.4 Proposed Stormwater Attenuation Calculations

It should be noted that the proposed attenuation requirements generated by the hydraulic modelling indicate that a reduced storage capacity is required compared with the storage volumes generated by the attenuation spread sheet. This is due to the fact that the WinDes hydraulic modelling looks at the system in 'real time' and that by incorporating factors

such the time of flow with the pipes, friction factors, pipe and manhole capacity the storage volume required can be reduced.

The **second** aspect of SuDS protocols is to enhance, as far as is practical, the overall surface water quality. A number of systems are proposed to aid in the overall improvement of water quality.

SuDS proposals will incorporate the following:

- Swales
- Tree Pit Drainage Systems
- Permeable Paving to all new parking spaces
- Water butts for local irrigation and washing down
- Attenuation tanks with flow control devices, sized to contain a 1-in-100-year storm event and increased by 20% for predicted climate change, to limit the surface water discharge from the site during extreme rainfall events.

True SuDs features will allow storm water generated on site to be collected and disposed of into the sites subsoil through a

4.5 Compliance with the Greater Dublin Strategic Drainage Study

There are 4 sub criteria for level of services as set out in the GDSDS-RDP Volume 2 Section 6.3.4 (table 6.3).

1) No flooding on site, except where planned (30-year high estimated rainfall).
2) No internal property flooding (100-year high intensity rainfall event).
3) No internal flooding (100-year river event and critical duration for site).
4) No flooding off site except where specifically planned (100-year high intensity rainfall event).

The treatment train as outlined above will allow the development to comply with the items, 1 - 4 noted above with regards to compliance with the GDSDS. Noted below is the Interception and treatment volume for the development.

- Total impermeable areas from all roofs, roads, and paved surfaces = 53560m^2
- Interception volume based on 5mm depth rainfall = 267.8m^3
- Treatment volume based on 15mm depth rainfall = 803.4m^3
- Total interception/treatment volume provided = 1071.2m^3

In order to fully utilize the Suds treatment train and to allow storm water generated on site to be retained and directed into the subsoil a comprehensive site investigation was commissioned by Causeway Geotechnical. Their report which forms part of this application submission carried out trial pits and boreholes across the site in locations where sustainable drainage features would be located. The boreholes were installed to enable ongoing monitoring of the local and regional groundwater regime for the lands. It is noted in the response from the Water Services Department that they acknowledged that while groundwater monitoring should take place over more time than is available for an SHD application they would take this into consideration, once ground water monitoring was proposed to be ongoing while the application is with the Planning Board. CS Consulting can confirm that groundwater monitoring will be on going for the next 12 months to ensure an accurate suite of ground water data is available should the application obtain planning and the detailed design commence.

The initial results for the soil infiltration tests were poor. The tests were carried out to *BRE Digest 365* requirements. The investigation noted little infiltration. This therefore would curtail the ability of incorporating large detention ponds or similar surface water features into the proposed schemes design,

as to include such features would require large volumes of surface water to be detained onsite until the critical storm had passed and the storm water retention zone had drained. It is deemed that this would present an unacceptable health and safety hazard on site. as such Suds features as noted above will be incorporated into the overall site design for the required interception and treatment volumes as required but the volume of water generated on site during the 1-in-100 year storm event will be stored in under ground tanks. While this is not the optimal solution for the sustainable disposal of storm water given the sites very poor infiltration rates it is deemed the best solution due to the sites layout and the existing site geotechnical conditions.

Refer to drawing no. **S037-CSC-XX-XX-DR-C-0108** (Proposed Sustainable Drainage System Layout) for the development's proposed SuDS layout. And drawing **S037-CSC-XX-XX-DR-C-0140** for a typical attenuation tank arrangement.

5.0 POTABLE WATER SUPPLY

5.1 Existing Potable Water System

Records obtained from Irish Water indicate public watermains on the R148 to the north and a public watermain to the west of the site, as shown on drawing **S037-CSC-XX-XX-DR-C-0107** (Proposed Watermain Layout).

5.2 Proposed Potable Water System

It is proposed to make a new connection off the existing watermain running along the northern boundary of the development site and supply a 150mm diameter watermain to the proposed development site.

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

- For the residential units:
  - ⇒ 405l/day per unit (based on 2.7 persons per unit x150l/person/day);
  - ⇒ 405l/day/apt x 272 units = 110,160 l/day = 110.2m³/day.
  - ⇒ 1.275 l/sec Average water demand.
  - ⇒ 6.375 l/s Peak Demand (5 times the average water demand).
- For the Childcare Facility:
  - ⇒ 60 l/day per person.
  - ⇒ (67 children + 18 staff) x 60L = 5,100 l/day = 5.1m³/day.
  - ⇒ 0.059 l/sec Average water demand.
  - ⇒ 0.295 l/s Peak Demand (5 times the average water demand).

- Total Potable Water Demand for proposed development

  ⇒ 1.334 l/sec Average flow (1 DWF).

  ⇒ 6.670 l/sec Peak Flow (5 DWF).

A Pre-Connection Enquiry was submitted to Irish Water. Please refer to **Appendix A** for a copy of the Confirmation of Feasibility letter received in response from Irish Water. A Statement of Design Acceptance was subsequently received from Irish Water; this is provided as **Appendix E.**

The proposed watermain infrastructure and routing plan is shown on drawing **S037-CSC-XX-XX-DR-C-0107** (Proposed Watermain Layout) included with this submission.

6.0 FOUNDATION DESIGN

6.1 Foundations for Typical House Typology

It is expected that the structure of the houses will be supported on traditional strip foundations but will be subject to a full assessment and design appraisal (including a review of the water table levels) following receipt of the Ground Investigation Report. The proposed foundations will compromise of strip and pad foundations on mass concrete (lean mix trench fill) where required extending to the stiffer ground formations layers where necessary.

The floor slab construction to the typical house typologies will comprise of either:

1. a ground floor slab 150mm in thickness (reinforced with minimum cracking steel) and formed on 50mm T3 blinding with minimum 225mm T2 granular material to SR.21 Annex E requirements (see Figure 3);

   or

2. a suspended concrete slab (greater than 900mm of fill) 250mm in thickness (cast in-situ) or 200mm in thickness if precast hollowcore suspended slabs are proposed. The suspended slab will also have a minimum of 50mm T3 blinding with 225mm of T2 granular material to SR.21 Annex E requirements (see Figure 4).

The foundations to the typical 2- and 3-storey house units for both ground bearing and suspended slab types will vary between 900mm to 1500mm in width. The depth of these strip foundations will be 300mm.

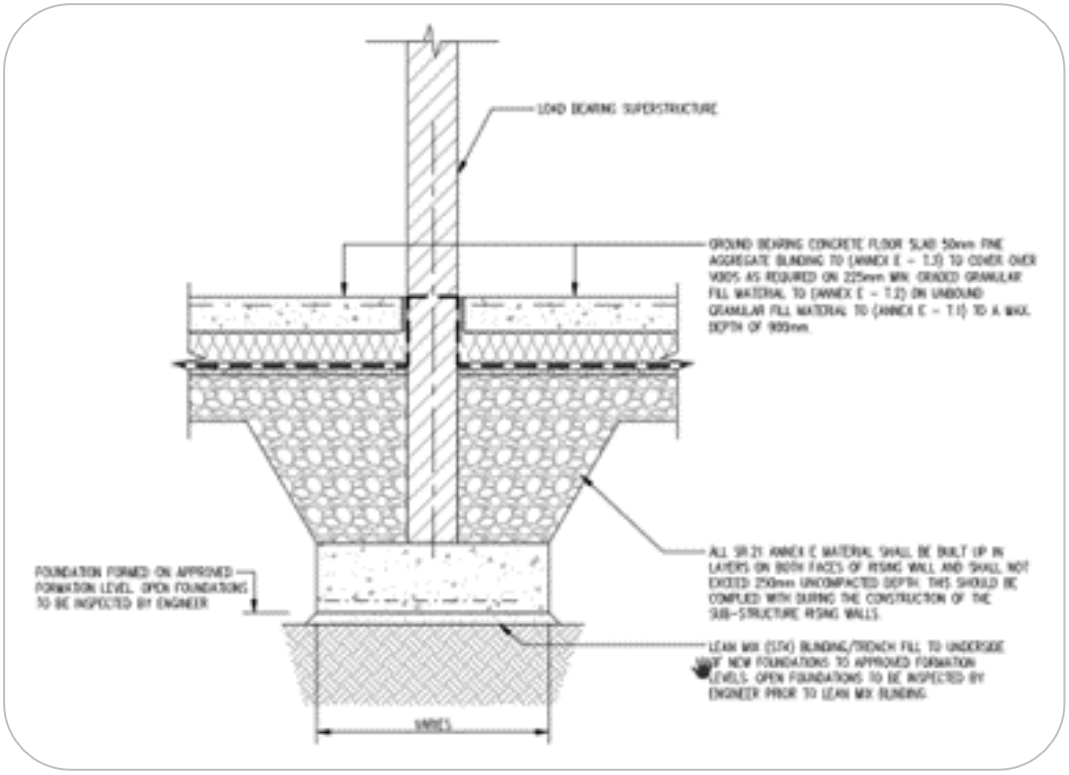


Figure 3 – Typical foundation design: ground bearing slab

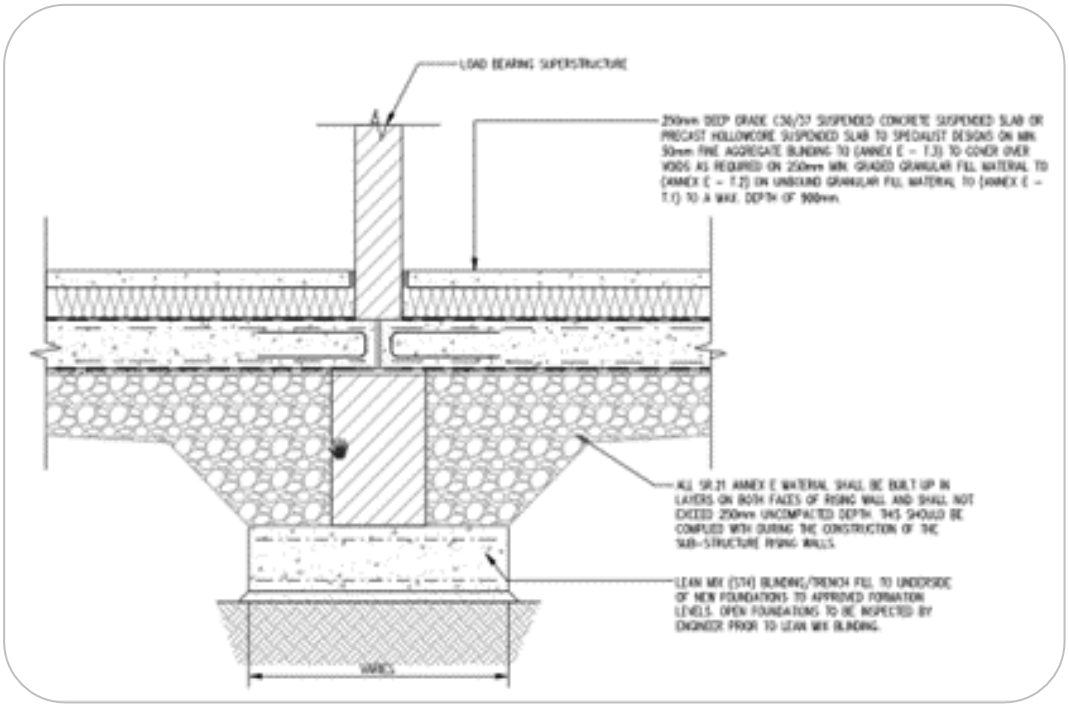


Figure 4 – Typical foundation design: suspended slab

We would note that the dimensions outlined above are typical of what will be required and is based on a minimum allowable bearing pressure of 125 KPA but is subject to change once receipt of the Ground Investigation Report and information becomes available and a full assessment and design appraisal is completed to validate the substructure foundation design.

The construction methodology and sequence of works for the traditional foundations would be as follows:

- Excavate down to required formation levels for foundations (Engineer to inspect all foundation formation levels for BC(A)R design certifier ancillary sign off).
- Place lean mix trench to reach foundation level and compact in layers (if required and ensure water table is not compromised).
- Construct strip and pad foundations.
- Construct masonry rising walls.
- Place and compact granular fill material to underside of ground and or suspended slab
- Construct ground bearing and or suspended floor slab.

Note: Engineer to inspect all items above for BC(A)R design certifier ancillary sign off.

6.2 Foundations for Duplex Typology (Blocks E, F, G) and Duplex/Creche/Apartment Typology (Blocks C & D)

It is expected that the structure of the 3-storey duplex units (including the creche/apartment/duplex combined units to Block D and Duplex/Apartment combined unit to Block C) will be supported on traditional strip and pad foundations but will be subject to a full assessment and design appraisal (including a review of the water table levels) following

receipt of the Ground Investigation Report. The proposed foundations will compromise of strip and pad foundations on mass concrete (lean mix trench fill) where required extending to the stiffer ground formations layers where necessary.

The same floor slab construction approach will be implemented as per the house typologies that is a typical ground bearing slab where achievable and or suspended slab (where the depth of fill below the slab level to approved formation level exceeds 900mm of SR.21 Annex E acceptable fill). Please refer to Detail A and Detail B above for typical foundation layout for the proposed units to Block C, D, E, F and G.

The foundations to the typical 3-storey duplex units for both ground bearing and suspended slab types will vary between 1200mm to 2250mm in width. The depth of these strip foundations will be 400mm in depth. Localised reinforced concrete pads will be constructed where superstructure transfer elements are required to these respective blocks.

We would note that the dimensions outlined above are typical of what will be required and is based on a minimum allowable bearing pressure of 125 KPA but is subject to change once receipt of the Ground Investigation Report and information becomes available and a full assessment and design appraisal is completed to validate the substructure foundation design of the respective duplex units.

6.3 Foundations for Typical Apartments Typology (Blocks A & B)

It is expected that the structure of the apartments to block A and B will be supported on a precast driven pile, reinforced concrete pile caps and precast ground beam system to specialist design to resist the vertical and horizontal loads from the structure above. This will be subject to a full assessment and design appraisal following receipt of the Site Investigation Report. This assessment will also determine whether driven piles would be

acceptable and if there are any vibration concerns with adjacent structures, continuous flight auger piles (CFA) will be developed into the design should vibration concerns become an issue.

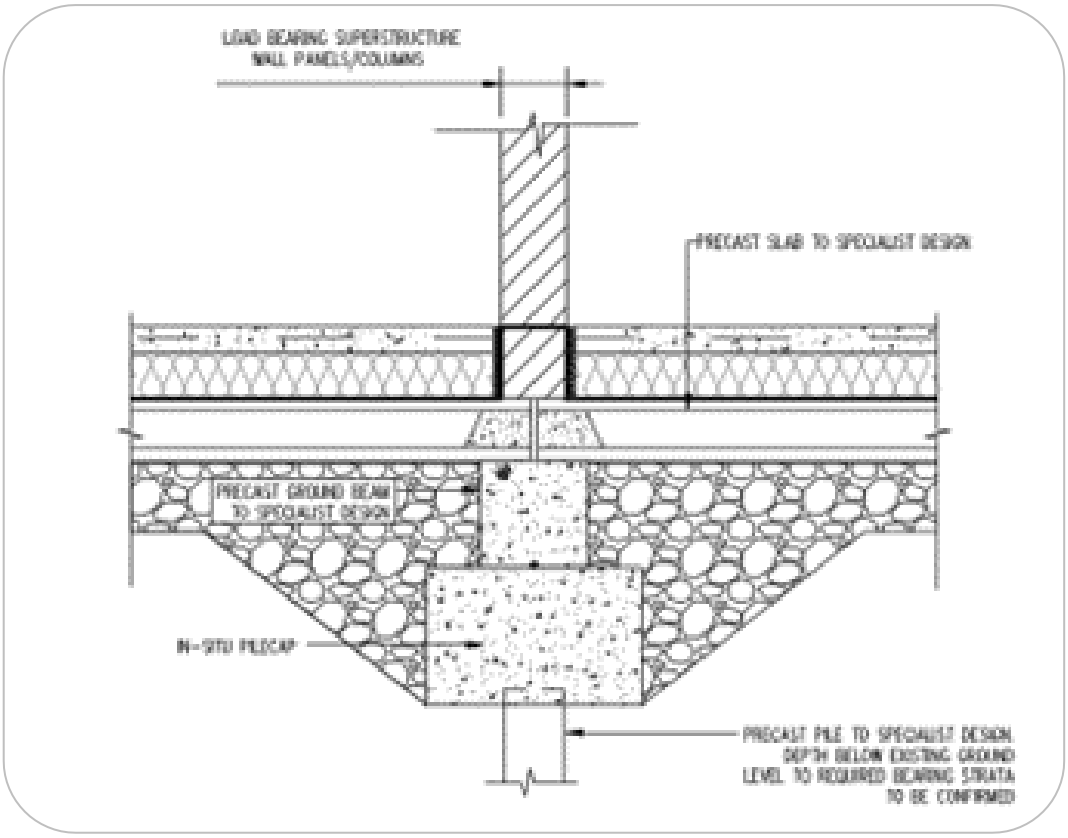


Figure 5 – Typical pile arrangement

Pile caps will be reinforced concrete cast in-situ elements designed to spread the building loads into the piles. The pile caps are typically 800mm deep for 250mm and 300mm square precast driven piles.

Typical pilecap dimensions: 800x800x800 deep.

Typical precast ground beam dimensions: 600x500 deep spanning between pilecaps. (width of ground beam will be governed by cavity width for apartments).

The floor slabs to both block A and B apartment units will be a 250mm suspended precast slab to specialist design with all service penetrations through slab to be coordinated. Refer to Figure 5 showing typical pile arrangements to block A and B apartments.

Note: the dimensions noted above are typical of what will be required but may be subject to change when detailed Ground Investigation Report and information becomes available as site conditions will vary.

The construction methodology and sequence of works for the driven piles to specialist design would be as follows:

- Excavate down to required formation levels
- Install piling mat
- Install piles
- Construct in-situ pilecaps.
- Install precast ground beams
- Static and Dynamic tests to be completed to piles as agreed with Engineer
- Construct masonry/concrete rising elements over ground beams
- Install suspended slabs to specialist design

Note: Engineer to inspect all items above for BA(A)R design certifier ancillary sign off. Specialist design certificates to be issued for specialist design elements.

7.0 RESPONSE TO BOARDS OPINION

As part of the Stage Two planning process the Board issues out their opinion and comments from the local authority on the submission. The relevant points which are attributable to the water & drainage aspects are noted here for clarity. Other aspects are addressed in the relevant reports submitted with this application.

Section 1.0 of Water Services submission RE: Irish Water

Items noted the requirement for engagement with Irish Water pertaining to the requirement to obtain a confirmation of Feasibility & a Statement of Design Acceptance from Irish Water.

The applicant has engaged with Irish water and the required approvals are appended to this report.

Section 2.0 of Water Services submission RE: surface water & flood risk

Where applicable culverted ditches should be de-culverted in line with Council policy. And any required Section 50 applications must be bought through the OPW.

This has been noted and incorporated in the application where applicable.

A more enhanced Suds approach is to be followed including an onsite assessment of the soil conditions and to establish a groundwater flow regime for the subject lands. If feasible attenuation should not be provide in underground tanks and an increased climate change factor should be added to the proposed storage volumes.

Testing was carried out on site and an ongoing groundwater flow monitoring regime has been instigated. The initial results of same are included with this submission. The soil infiltration rates established indicate very poor potential to allow surface water to be retained and disposed of

on site. As such the proposed drainage network ahs incorporated suitable suds features into the design but also has indicated a number of under ground tanks are required to retain the volume of storm water which will be generated during the critical 1-in-100 year storm, increased by 30% as per the Water Departments recommendations.

A detailed Site Specific Flood Risk Assessment for the site should be submitted addressing the potential flooding mechanisms and taking into account potential climate change factors.

With this application a Site Specific Flood risk assessment has been included addressing the Councils requirements, it has been prepared and lodged under a separate cover with this application. All appropriate flood mitigation and adoption requirements will be prepared and a 'Safety file' prepared following detailed design of the scheme if required.

Appendix A

Irish Water Confirmation of Feasibility

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

Robert Fitzmaurice

19-22 Dame Street
Dublin 2
Co. Dublin
D02E267

27 July 2022

Our Ref: CDS22004615 Pre-Connection Enquiry
Site Located Off The R148 & R158, Abutting Junction 8 on The M4, Kilcock, Kildare

Dear Applicant/Agent,

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

Irish Water has reviewed the pre-connection enquiry in relation to a Water & Wastewater connection for a Housing Development of 190 unit(s) at Site Located Off The R148 & R158, Abutting Junction 8 on The M4, Kilcock, Kildare, (the **Development)**.

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

- **Water Connection** - Feasible Subject to upgrades

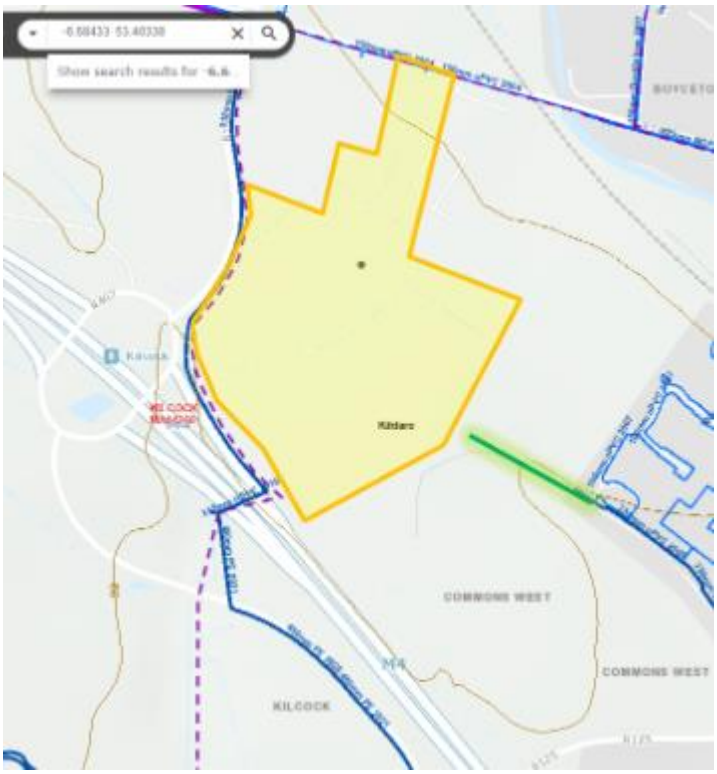
  The connection of the site development (yellow section in figure) will require 240m of new 150mm ID pipe [minimum diameter] (green line) main) to the existing 355mm uPVC main.

  The required connection may reduce depending on other developments in the area between the 355mm uPVC main and the site. The requirements will be confirmed as part of the connection application stage.

  These extension works are not currently on Irish Water investment plan therefore, the applicant will be required to fund these local network upgrades.

Stiúrthóirí / Directors: Cathal Marley (Chairman), Niall Gleeson, Eamon Gallen, Yvonne Harris, Brendan Murphy, Dawn O'Driscoll, Maria O'Dwyer
Oifig Chláraithe / Registered Office: Teach Colvill, 24-26 Sráid Thalbóid, Baile Átha Cliath 1, D01 NP86 / Colvill House, 24-26 Talbot Street, Dublin 1 D01 NP86
Is cuideachta ghníomhaíochta ainmnithe atá faoi theorainn scaireanna é Uisce Éireann / Irish Water is a designated activity company, limited by shares.
Uimhir Chláraithe in Éirinn / Registered in Ireland No.: 530363

The fee will be calculated at a connection application stage.



- **Wastewater Connection**

  - Feasible Subject to upgrades

  The completion of the Kilcock LIHAF project will be required before the connection can be facilitated. The project is on the Irish Water investment plan, scheduled for completion Q1 2026, subject to change.

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?

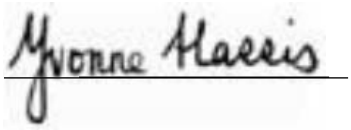
- **Section A -** What is important to know?

- **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
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.

CS CONSULTING
GROUP

Appendix B

Attenuation Calculations

Project: Proposed Development At Kicock
Project No.: S037
Calculation: Attenuation 100-year - Total Site (Catchments A and B)
Calcs By: DF
Checked By: RFM
Date: 5/5/22

CS CONSULTING GROUP
DUBLIN - LONDON - LIMERICK

Site Location:	Dublin		
Design Storm Return Period:	100 years		
Climate Change Factor:	30 %		
Soil Type:	2		
Total Site Area:	8.791 ha		
Hardstand Area:	5.356 ha	.....@	90% Impervious
Softstand Area:	3.435 ha	.....@	0% Impervious
Effective Impermeable Area:	4.820 ha		

Allowable Outflow	**Calculate**	
IH124: QBAR = 0.00108 x $AREA^{0.89}$ x $SAAR^{1.17}$ x $SOIL^{2.17}$		
AREA:	0.0879 km^2	
SAAR:	843 mm	
SOIL:	0.3	
QBAR/ha	2.27 l/s/ha	
Allowable Outflow	**19.9 l/s**	Smallest Allowable Discharge Rate (2l/s/Ha)

Storage required =	**3861 m^3**	

Duration (min)	Rainfall 100-Year (mm)	Rainfall 100-Year with CCF (mm)	Intensity (mm/hr)	Discharge (Q = 2.71iA) (l/s)	Proposed Runoff (m^3)	Contiguous Land Runoff (m^3)	Total Runoff (m^3)	Allowable Outflow (m^3)	Storage Required (m^3)
5	13.8	18.0	215.7	2818	846	0	846	6	840
10	19.2	25.0	149.8	1956	1174	0	1174	12	1162
15	22.6	29.4	117.5	1535	1382	0	1382	18	1364
30	27.9	36.3	72.5	948	1706	0	1706	36	1670
60	34.5	44.9	44.9	586	2109	0	2109	72	2038
120	42.7	55.5	27.8	363	2611	0	2611	143	2467
180	48.3	62.8	20.9	273	2953	0	2953	215	2738
240	52.7	68.5	17.1	224	3222	0	3222	287	2935
360	59.7	77.6	12.9	169	3650	0	3650	430	3220
540	67.6	87.9	9.8	128	4133	0	4133	645	3488
720	73.8	95.9	8.0	104	4512	0	4512	860	3652
1080	83.6	108.7	6.0	79	5111	0	5111	1290	3821
1440	91.3	118.7	4.9	65	5582	0	5582	1721	3861
2880	100.3	130.4	2.7	35	6132	0	6132	3441	2691
4320	108.9	141.6	2.0	26	6658	0	6658	5162	1496
5760	116.8	151.8	1.6	21	7141	0	7141	6882	259
8640	131.2	170.6	1.2	15	8021	0	8021	10323	-2302
11520	144.3	187.6	1.0	13	8822	0	8822	13764	-4942
14400	156.3	203.2	0.8	11	9556	0	9556	17205	-7650
17280	167.7	218.0	0.8	10	10253	0	10253	20646	-10394
23040	188.9	245.6	0.6	8	11549	0	11549	27528	-15980
28800	208.6	271.2	0.6	7	12753	0	12753	34410	-21657
36000	231.8	301.3	0.5	7	14171	0	14171	43013	-28842

Project: Proposed Development At Kicock
Project No.: S037
Calculation: Attenuation 100-year - Catchment A
Calcs By: DF
Checked By: RFM
Date: 11/5/22

CS CONSULTING GROUP
DUBLIN - LONDON - LIMERICK

Site Location:	Dublin		
Design Storm Return Period:	100 years		
Climate Change Factor:	30 %		
Soil Type:	2		
Total Site Area:	4.993 ha		
Hardstand Area:	2.822 ha	.....@	90% Impervious
Softstand Area:	2.171 ha	.....@	0% Impervious
Effective Impermeable Area:	2.540 ha		

Allowable Outflow	**Calculate**	
IH124: QBAR = 0.00108 x $AREA^{0.89}$ x $SAAR^{1.17}$ x $SOIL^{2.17}$		
AREA:	0.0499 km^2	
SAAR:	843 mm	
SOIL:	0.3	
QBAR/ha	2.27 l/s/ha	
Allowable Outflow	**11.3 l/s**	Smallest Allowable Discharge Rate (2l/s/Ha)

Storage required =	**1964 m^3**	

Duration (min)	Rainfall 100-Year (mm)	Rainfall 100-Year with CCF (mm)	Intensity (mm/hr)	Discharge (Q = 2.71iA) (l/s)	Proposed Runoff (m^3)	Contiguous Land Runoff (m^3)	Total Runoff (m^3)	Allowable Outflow (m^3)	Storage Required (m^3)
5	13.8	18.0	215.7	1485	445	0	445	3	442
10	19.2	25.0	149.8	1031	618	0	618	7	612
15	22.6	29.4	117.5	809	728	0	728	10	718
30	27.9	36.3	72.5	499	899	0	899	20	878
60	34.5	44.9	44.9	309	1111	0	1111	41	1071
120	42.7	55.5	27.8	191	1375	0	1375	81	1294
180	48.3	62.8	20.9	144	1556	0	1556	122	1434
240	52.7	68.5	17.1	118	1698	0	1698	163	1535
360	59.7	77.6	12.9	89	1923	0	1923	244	1679
540	67.6	87.9	9.8	67	2178	0	2178	366	1811
720	73.8	95.9	8.0	55	2377	0	2377	489	1889
1080	83.6	108.7	6.0	42	2693	0	2693	733	1960
1440	91.3	118.7	4.9	34	2941	0	2941	977	1964
2880	100.3	130.4	2.7	19	3231	0	3231	1954	1276
4320	108.9	141.6	2.0	14	3508	0	3508	2932	576
5760	116.8	151.8	1.6	11	3762	0	3762	3909	-146
8640	131.2	170.6	1.2	8	4226	0	4226	5863	-1637
11520	144.3	187.6	1.0	7	4648	0	4648	7818	-3169
14400	156.3	203.2	0.8	6	5035	0	5035	9772	-4737
17280	167.7	218.0	0.8	5	5402	0	5402	11726	-6324
23040	188.9	245.6	0.6	4	6085	0	6085	15635	-9550
28800	208.6	271.2	0.6	4	6719	0	6719	19544	-12825
36000	231.8	301.3	0.5	3	7467	0	7467	24430	-16963

Project: Proposed Development At Kilcock
Project No.: S037
Calculation: Attenuation 100-year - Catchment Area A - Tank 1
Calcs By: DF
Checked By: RFM
Date: 20/4/22

CS CONSULTING GROUP
DUBLIN - LONDON - LIMERICK

Site Location:	Dublin		
Design Storm Return Period:	100	years	
Climate Change Factor:	30	%	
Soil Type:	2		
Total Site Area:	1.387	ha	
Hardstand Area:	0.722	ha	.....@ 90% Impervious
Softstand Area:	0.665	ha	.....@ 0% Impervious
Effective Impermeable Area:	0.650	ha	

Allowable Outflow	**Calculate**		
IH124: QBAR = 0.00108 x $AREA^{0.89}$ x $SAAR^{1.17}$ x $SOIL^{2.17}$			
AREA:	0.0139	km^2	
SAAR:	843	mm	
SOIL:	0.3		
QBAR/ha	2.27	l/s/ha	
Allowable Outflow	**2.8**	**l/s**	Smallest Allowable Discharge Rate (2l/s/Ha)

Storage required =	**511**	**m^3**	

Duration (min)	Rainfall 100-Year (mm)	Rainfall 100-Year with CCF (mm)	Intensity (mm/hr)	Discharge (Q = 2.71iA) (l/s)	Proposed Runoff (m^3)	Contiguous Land Runoff (m^3)	Total Runoff (m^3)	Allowable Outflow (m^3)	Storage Required (m^3)
5	13.8	18.0	215.7	380	114	0	114	1	113
10	19.2	25.0	149.8	264	158	0	158	2	157
15	22.6	29.4	117.5	207	186	0	186	3	184
30	27.9	36.3	72.5	128	230	0	230	5	225
60	34.5	44.9	44.9	79	284	0	284	10	274
120	42.7	55.5	27.8	49	352	0	352	20	332
180	48.3	62.8	20.9	37	398	0	398	30	368
240	52.7	68.5	17.1	30	434	0	434	40	394
360	59.7	77.6	12.9	23	492	0	492	60	432
540	67.6	87.9	9.8	17	557	0	557	91	466
720	73.8	95.9	8.0	14	608	0	608	121	487
1080	83.6	108.7	6.0	11	689	0	689	181	508
1440	91.3	118.7	4.9	9	752	0	752	242	511
2880	100.3	130.4	2.7	5	827	0	827	484	343
4320	108.9	141.6	2.0	3	897	0	897	726	172
5760	116.8	151.8	1.6	3	963	0	963	968	-5
8640	131.2	170.6	1.2	2	1081	0	1081	1452	-370
11520	144.3	187.6	1.0	2	1189	0	1189	1935	-746
14400	156.3	203.2	0.8	1	1288	0	1288	2419	-1131
17280	167.7	218.0	0.8	1	1382	0	1382	2903	-1521
23040	188.9	245.6	0.6	1	1557	0	1557	3871	-2314
28800	208.6	271.2	0.6	1	1719	0	1719	4838	-3119
36000	231.8	301.3	0.5	1	1910	0	1910	6048	-4138

Project: Proposed Development At Kilcock
Project No.: S037
Calculation: Attenuation 100-year - Catchment A - Tank 2
Calcs By: DF
Checked By: RFM
Date: 19/4/22

CS CONSULTING GROUP
DUBLIN - LONDON - LIMERICK

Site Location:	Dublin		
Design Storm Return Period:	100 years		
Climate Change Factor:	30 %		
Soil Type:	2		
Total Site Area:	2.353 ha		
Hardstand Area:	1.439 ha	.....@	90% Impervious
Softstand Area:	0.914 ha	.....@	0% Impervious
Effective Impermeable Area:	1.295 ha		

Allowable Outflow	**Calculate**	
IH124: QBAR = 0.00108 x $AREA^{0.89}$ x $SAAR^{1.17}$ x $SOIL^{2.17}$		
AREA:	0.0235 km^2	
SAAR:	843 mm	
SOIL:	0.3	
QBAR/ha	2.27 l/s/ha	
Allowable Outflow	**5.3 l/s**	Smallest Allowable Discharge Rate (2l/s/Ha)

Storage required =	**1039 m^3**	

Duration (min)	Rainfall 100-Year (mm)	Rainfall 100-Year with CCF (mm)	Intensity (mm/hr)	Discharge (Q = 2.71iA) (l/s)	Proposed Runoff (m^3)	Contiguous Land Runoff (m^3)	Total Runoff (m^3)	Allowable Outflow (m^3)	Storage Required (m^3)
5	13.8	18.0	215.7	757	227	0	227	2	226
10	19.2	25.0	149.8	526	315	0	315	3	312
15	22.6	29.4	117.5	412	371	0	371	5	366
30	27.9	36.3	72.5	255	458	0	458	10	449
60	34.5	44.9	44.9	157	567	0	567	19	547
120	42.7	55.5	27.8	97	701	0	701	38	663
180	48.3	62.8	20.9	73	793	0	793	58	736
240	52.7	68.5	17.1	60	866	0	866	77	789
360	59.7	77.6	12.9	45	981	0	981	115	865
540	67.6	87.9	9.8	34	1110	0	1110	173	938
720	73.8	95.9	8.0	28	1212	0	1212	230	982
1080	83.6	108.7	6.0	21	1373	0	1373	345	1028
1440	91.3	118.7	4.9	17	1500	0	1500	461	1039
2880	100.3	130.4	2.7	10	1647	0	1647	921	726
4320	108.9	141.6	2.0	7	1789	0	1789	1382	407
5760	116.8	151.8	1.6	6	1918	0	1918	1842	76
8640	131.2	170.6	1.2	4	2155	0	2155	2763	-608
11520	144.3	187.6	1.0	3	2370	0	2370	3684	-1314
14400	156.3	203.2	0.8	3	2567	0	2567	4605	-2038
17280	167.7	218.0	0.8	3	2755	0	2755	5526	-2772
23040	188.9	245.6	0.6	2	3103	0	3103	7368	-4265
28800	208.6	271.2	0.6	2	3426	0	3426	9210	-5784
36000	231.8	301.3	0.5	2	3807	0	3807	11513	-7705

Project: Proposed Development At Kicock
Project No.: S037
Calculation: Attenuation 100-year - Catchment A - Tank 3
Calcs By: DF
Checked By: RFM
Date: 20/4/22

CS CONSULTING GROUP
DUBLIN - LONDON - LIMERICK

Site Location:	Dublin		
Design Storm Return Period:	100 years		
Climate Change Factor:	30 %		
Soil Type:	2		
Total Site Area:	1.253 ha		
Hardstand Area:	0.661 ha	.....@	90% Impervious
Softstand Area:	0.592 ha	.....@	0% Impervious
Effective Impermeable Area:	0.595 ha		

Allowable Outflow	**Calculate**	
IH124: QBAR = 0.00108 x $AREA^{0.89}$ x $SAAR^{1.17}$ x $SOIL^{2.17}$		
AREA:	0.0125 km^2	
SAAR:	843 mm	
SOIL:	0.3	
QBAR/ha	2.27 l/s/ha	
Allowable Outflow	**11.3 l/s**	Smallest Allowable Discharge Rate (2l/s/Ha)

Storage required =	**242 m^3**	

Duration (min)	Rainfall 100-Year (mm)	Rainfall 100-Year with CCF (mm)	Intensity (mm/hr)	Discharge (Q = 2.71iA) (l/s)	Proposed Runoff (m^3)	Contiguous Land Runoff (m^3)	Total Runoff (m^3)	Allowable Outflow (m^3)	Storage Required (m^3)
5	13.8	18.0	215.7	348	104	0	104	3	101
10	19.2	25.0	149.8	241	145	0	145	7	138
15	22.6	29.4	117.5	189	171	0	171	10	160
30	27.9	36.3	72.5	117	211	0	211	20	190
60	34.5	44.9	44.9	72	260	0	260	41	220
120	42.7	55.5	27.8	45	322	0	322	81	241
180	48.3	62.8	20.9	34	364	0	364	122	242
240	52.7	68.5	17.1	28	398	0	398	163	235
360	59.7	77.6	12.9	21	450	0	450	244	206
540	67.6	87.9	9.8	16	510	0	510	366	144
720	73.8	95.9	8.0	13	557	0	557	488	69
1080	83.6	108.7	6.0	10	631	0	631	732	-101
1440	91.3	118.7	4.9	8	689	0	689	976	-287
2880	100.3	130.4	2.7	4	757	0	757	1953	-1196
4320	108.9	141.6	2.0	3	822	0	822	2929	-2107
5760	116.8	151.8	1.6	3	881	0	881	3905	-3024
8640	131.2	170.6	1.2	2	990	0	990	5858	-4868
11520	144.3	187.6	1.0	2	1089	0	1089	7811	-6722
14400	156.3	203.2	0.8	1	1179	0	1179	9763	-8584
17280	167.7	218.0	0.8	1	1265	0	1265	11716	-10451
23040	188.9	245.6	0.6	1	1425	0	1425	15621	-14196
28800	208.6	271.2	0.6	1	1574	0	1574	19526	-17953
36000	231.8	301.3	0.5	1	1749	0	1749	24408	-22659

Project: Proposed Development At Kicock
Project No.: S037
Calculation: Attenuation 100-year - Catchment B
Calcs By: DF
Checked By: RFM
Date: 11/5/22

CS CONSULTING GROUP
DUBLIN - LONDON - LIMERICK

Site Location:	Dublin		
Design Storm Return Period:	100 years		
Climate Change Factor:	30 %		
Soil Type:	2		
Total Site Area:	3.798 ha		
Hardstand Area:	2.534 ha	.....@	90% Impervious
Softstand Area:	1.264 ha	.....@	0% Impervious
Effective Impermeable Area:	2.281 ha		

Allowable Outflow	**Calculate**	
IH124: QBAR = 0.00108 x $AREA^{0.89}$ x $SAAR^{1.17}$ x $SOIL^{2.17}$		
AREA:	0.0380 km^2	
SAAR:	843 mm	
SOIL:	0.3	
QBAR/ha	2.27 l/s/ha	
Allowable Outflow	**8.6 l/s**	Smallest Allowable Discharge Rate (2l/s/Ha)

Storage required =	**1897 m^3**	

Duration (min)	Rainfall 100-Year (mm)	Rainfall 100-Year with CCF (mm)	Intensity (mm/hr)	Discharge (Q = 2.71iA) (l/s)	Proposed Runoff (m^3)	Contiguous Land Runoff (m^3)	Total Runoff (m^3)	Allowable Outflow (m^3)	Storage Required (m^3)
5	13.8	18.0	215.7	1333	400	0	400	3	397
10	19.2	25.0	149.8	926	555	0	555	5	550
15	22.6	29.4	117.5	726	654	0	654	8	646
30	27.9	36.3	72.5	448	807	0	807	15	792
60	34.5	44.9	44.9	277	998	0	998	31	967
120	42.7	55.5	27.8	172	1235	0	1235	62	1173
180	48.3	62.8	20.9	129	1397	0	1397	93	1304
240	52.7	68.5	17.1	106	1524	0	1524	124	1400
360	59.7	77.6	12.9	80	1727	0	1727	186	1541
540	67.6	87.9	9.8	60	1955	0	1955	279	1677
720	73.8	95.9	8.0	49	2135	0	2135	372	1763
1080	83.6	108.7	6.0	37	2418	0	2418	557	1861
1440	91.3	118.7	4.9	31	2641	0	2641	743	1897
2880	100.3	130.4	2.7	17	2901	0	2901	1487	1414
4320	108.9	141.6	2.0	12	3150	0	3150	2230	920
5760	116.8	151.8	1.6	10	3378	0	3378	2973	405
8640	131.2	170.6	1.2	7	3795	0	3795	4460	-665
11520	144.3	187.6	1.0	6	4174	0	4174	5947	-1773
14400	156.3	203.2	0.8	5	4521	0	4521	7433	-2912
17280	167.7	218.0	0.8	5	4851	0	4851	8920	-4069
23040	188.9	245.6	0.6	4	5464	0	5464	11893	-6429
28800	208.6	271.2	0.6	3	6034	0	6034	14866	-8833
36000	231.8	301.3	0.5	3	6705	0	6705	18583	-11878

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Appendix C

WinDES Surface Water Network Design/Simulation Calculations

STORM SEWER DESIGN by the Modified Rational Method

Design Criteria for Storm

Pipe Sizes STANDARD Manhole Sizes STANDARD

FSR Rainfall Model - Scotland and Ireland

Return Period (years)	2	PIMP (%)	90
M5-60 (mm)	15.300	Add Flow / Climate Change (%)	0
Ratio R	0.280	Minimum Backdrop Height (m)	0.000
Maximum Rainfall (mm/hr)	50	Maximum Backdrop Height (m)	0.000
Maximum Time of Concentration (mins)	30	Min Design Depth for Optimisation (m)	0.000
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 Inverts

Network Design Table for Storm

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
S1.000	18.797	0.177	106.2	0.120	5.00	0.0	0.600	o	225	Pipe/Conduit	
S1.001	45.954	0.894	51.4	0.120	0.00	0.0	0.600	o	225	Pipe/Conduit	
S1.002	65.968	0.273	241.6	0.206	0.00	0.0	0.600	o	375	Pipe/Conduit	
S1.003	9.798	0.100	98.3	0.000	0.00	0.0	0.600	o	375	Pipe/Conduit	
S2.000	38.489	0.641	60.0	0.157	5.00	0.0	0.600	o	225	Pipe/Conduit	
S1.004	10.042	0.053	189.6	0.047	0.00	0.0	0.600	o	375	Pipe/Conduit	
S3.000	51.665	0.519	99.5	0.184	5.00	0.0	0.600	o	225	Pipe/Conduit	
S1.005	19.900	0.060	329.2	0.000	0.00	0.0	0.600	o	375	Pipe/Conduit	
S1.006	36.117	0.105	344.8	0.000	0.00	0.0	0.600	o	375	Pipe/Conduit	
S1.007	11.887	0.041	289.9	0.000	0.00	0.0	0.600	o	225	Pipe/Conduit	
S4.000	65.477	0.632	103.6	0.306	5.00	0.0	0.600	o	300	Pipe/Conduit	
S4.001	22.953	0.679	33.8	0.085	0.00	0.0	0.600	o	300	Pipe/Conduit	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
S1.000	45.59	5.25	80.342	0.120	0.0	0.0	0.0	1.27	50.4	14.8
S1.001	44.27	5.67	80.165	0.240	0.0	0.0	0.0	1.83	72.7	28.8
S1.002	41.59	6.61	79.271	0.446	0.0	0.0	0.0	1.16	128.2	50.2
S1.003	41.36	6.70	78.998	0.446	0.0	0.0	0.0	1.83	201.9	50.2
S2.000	45.16	5.38	79.860	0.157	0.0	0.0	0.0	1.69	67.2	19.2
S1.004	41.03	6.83	78.898	0.649	0.0	0.0	0.0	1.31	144.9	72.2
S3.000	44.29	5.66	79.575	0.184	0.0	0.0	0.0	1.31	52.1	22.1
S1.005	40.21	7.16	78.845	0.833	0.0	0.0	0.0	0.99	109.7	90.8
S1.006	38.79	7.78	78.785	0.833	0.0	0.0	0.0	0.97	107.1	90.8
S1.007	45.55	5.26	78.680	0.000	2.8	0.0	0.0	0.76	30.3	2.8
S4.000	44.14	5.71	80.552	0.306	0.0	0.0	0.0	1.54	109.2	36.6
S4.001	43.72	5.85	79.920	0.391	0.0	0.0	0.0	2.71	191.8	46.3

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Network Design Table for Storm

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
S1.008	22.365	0.065	346.2	0.066	0.00	0.0	0.600	o	300	Pipe/Conduit	
S1.009	25.049	0.051	495.8	0.069	0.00	0.0	0.600	o	375	Pipe/Conduit	
S5.000	25.759	0.308	83.6	0.068	5.00	0.0	0.600	o	225	Pipe/Conduit	
S5.001	32.555	1.085	30.0	0.114	0.00	0.0	0.600	o	225	Pipe/Conduit	
S1.010	49.083	0.129	380.5	0.178	0.00	0.0	0.600	o	375	Pipe/Conduit	
S1.011	33.221	0.380	87.5	0.097	0.00	0.0	0.600	o	375	Pipe/Conduit	
S6.000	27.069	0.273	99.2	0.077	5.00	0.0	0.600	o	225	Pipe/Conduit	
S1.012	32.828	0.066	499.0	0.071	0.00	0.0	0.600	o	450	Pipe/Conduit	
S1.013	25.309	0.056	450.0	0.000	0.00	0.0	0.600	o	450	Pipe/Conduit	
S7.000	22.261	0.221	100.7	0.029	5.00	0.0	0.600	o	300	Pipe/Conduit	
S7.001	69.421	0.399	173.8	0.201	0.00	0.0	0.600	o	300	Pipe/Conduit	
S7.002	23.326	0.150	155.1	0.095	0.00	0.0	0.600	o	300	Pipe/Conduit	
S7.003	45.336	0.332	136.5	0.050	0.00	0.0	0.600	o	300	Pipe/Conduit	
S7.004	31.246	0.934	33.5	0.068	0.00	0.0	0.600	o	300	Pipe/Conduit	
S7.005	26.556	0.266	100.0	0.000	0.00	0.0	0.600	o	300	Pipe/Conduit	
S1.014	40.823	0.359	113.7	0.000	0.00	0.0	0.600	o	525	Pipe/Conduit	
S1.015	12.257	0.211	58.1	0.000	0.00	0.0	0.600	o	225	Pipe/Conduit	
S8.000	10.529	0.263	40.0	0.188	5.00	0.0	0.600	o	225	Pipe/Conduit	
S8.001	44.991	0.792	56.8	0.000	0.00	0.0	0.600	o	225	Pipe/Conduit	
S1.016	6.634	0.155	42.7	0.000	0.00	0.0	0.600	o	225	Pipe/Conduit	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
S1.008	42.45	6.29	78.639	0.457	2.8	0.0	0.0	0.84	59.3	55.3
S1.009	41.09	6.81	78.575	0.525	2.8	0.0	0.0	0.81	89.1	61.3
S5.000	45.42	5.30	80.702	0.068	0.0	0.0	0.0	1.43	56.9	8.4
S5.001	44.70	5.53	80.394	0.182	0.0	0.0	0.0	2.40	95.3	22.1
S1.010	38.98	7.70	78.524	0.886	2.8	0.0	0.0	0.92	101.9	96.3
S1.011	38.36	7.98	78.395	0.983	2.8	0.0	0.0	1.94	214.0	104.9
S6.000	45.28	5.34	78.050	0.077	0.0	0.0	0.0	1.31	52.2	9.4
S1.012	37.12	8.59	77.777	1.131	2.8	0.0	0.0	0.90	143.7	116.5
S1.013	36.27	9.03	77.711	1.131	2.8	0.0	0.0	0.95	151.4	116.5
S7.000	45.63	5.24	81.328	0.029	0.0	0.0	0.0	1.57	110.7	3.5
S7.001	42.68	6.21	81.107	0.229	0.0	0.0	0.0	1.19	84.1	26.5
S7.002	41.84	6.52	80.708	0.325	0.0	0.0	0.0	1.26	89.1	36.8
S7.003	40.41	7.08	80.557	0.375	0.0	0.0	0.0	1.34	95.0	41.0
S7.004	39.95	7.27	80.225	0.443	0.0	0.0	0.0	2.73	192.8	47.9
S7.005	39.30	7.55	79.292	0.443	0.0	0.0	0.0	1.57	111.1	47.9
S1.014	35.68	9.35	76.500	1.574	2.8	0.0	0.0	2.10	454.6	154.9
S1.015	46.02	5.12	76.141	0.000	5.3	0.0	0.0	1.72	68.4	5.3
S8.000	46.14	5.08	78.000	0.188	0.0	0.0	0.0	2.07	82.5	23.5
S8.001	44.73	5.52	77.737	0.188	0.0	0.0	0.0	1.74	69.1	23.5
S1.016	44.56	5.57	75.930	0.188	5.3	0.0	0.0	2.01	79.8	28.0

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Network Design Table for Storm

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
S9.000	57.296	0.332	172.6	0.238	5.00	0.0	0.600	o	300	Pipe/Conduit	
S1.017	13.317	0.453	29.4	0.069	0.00	0.0	0.600	o	300	Pipe/Conduit	
S1.018	52.988	0.453	117.0	0.000	0.00	0.0	0.600	o	300	Pipe/Conduit	
S1.019	13.113	0.119	110.2	0.000	0.00	0.0	0.600	o	300	Pipe/Conduit	
S10.000	38.110	0.254	150.0	0.145	5.00	0.0	0.600	o	225	Pipe/Conduit	
S10.001	7.133	0.048	150.0	0.000	0.00	0.0	0.600	o	225	Pipe/Conduit	
S1.020	46.893	0.093	506.6	0.000	0.00	0.0	0.600	o	375	Pipe/Conduit	
S1.021	10.546	0.106	99.5	0.000	0.00	0.0	0.600	o	225	Pipe/Conduit	
S11.000	12.288	0.268	45.9	0.030	5.00	0.0	0.600	o	225	Pipe/Conduit	
S12.000	32.005	0.472	67.8	0.049	5.00	0.0	0.600	o	225	Pipe/Conduit	
S11.001	9.162	0.181	50.6	0.000	0.00	0.0	0.600	o	225	Pipe/Conduit	
S11.002	53.666	0.706	76.0	0.060	0.00	0.0	0.600	o	225	Pipe/Conduit	
S13.000	34.876	0.350	99.6	0.103	5.00	0.0	0.600	o	300	Pipe/Conduit	
S13.001	55.769	0.287	194.2	0.106	0.00	0.0	0.600	o	300	Pipe/Conduit	
S11.003	13.376	0.075	178.0	0.035	0.00	0.0	0.600	o	300	Pipe/Conduit	
S11.004	18.002	0.101	179.1	0.083	0.00	0.0	0.600	o	300	Pipe/Conduit	
S11.005	17.544	0.101	174.6	0.000	0.00	0.0	0.600	o	300	Pipe/Conduit	
S11.006	36.652	0.134	273.5	0.071	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)
S9.000	43.86	5.80	75.513	0.238	0.0	0.0	0.0	1.19	84.4	28.3
S1.017	43.64	5.88	75.181	0.496	5.3	0.0	0.0	2.91	205.6	63.9
S1.018	41.93	6.48	74.200	0.496	5.3	0.0	0.0	1.45	102.7	63.9
S1.019	41.55	6.63	73.747	0.496	5.3	0.0	0.0	1.50	105.8	63.9
S10.000	44.48	5.60	73.900	0.145	0.0	0.0	0.0	1.07	42.3	17.5
S10.001	44.14	5.71	73.646	0.145	0.0	0.0	0.0	1.07	42.4	17.5
S1.020	39.17	7.61	73.598	0.641	5.3	0.0	0.0	0.80	88.2	73.3
S1.021	45.97	5.13	73.506	0.000	11.3	0.0	0.0	1.31	52.1	11.3
S11.000	46.06	5.11	80.800	0.030	0.0	0.0	0.0	1.94	77.0	3.7
S12.000	45.31	5.34	81.213	0.049	0.0	0.0	0.0	1.59	63.2	6.0
S11.001	45.04	5.42	80.532	0.078	0.0	0.0	0.0	1.84	73.3	9.5
S11.002	43.23	6.01	80.351	0.139	0.0	0.0	0.0	1.50	59.7	16.2
S13.000	45.20	5.37	80.282	0.103	0.0	0.0	0.0	1.58	111.3	12.7
S13.001	42.72	6.20	79.932	0.210	0.0	0.0	0.0	1.12	79.5	24.2
S11.003	42.20	6.39	79.645	0.383	0.0	0.0	0.0	1.18	83.1	43.8
S11.004	41.52	6.64	79.570	0.466	0.0	0.0	0.0	1.17	82.8	52.4
S11.005	40.89	6.89	79.469	0.466	0.0	0.0	0.0	1.19	83.9	52.4
S11.006	39.54	7.45	79.369	0.537	0.0	0.0	0.0	1.09	120.5	57.5

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Network Design Table for Storm

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
S14.000	55.959	0.334	167.5	0.217	5.00	0.0	0.600	o	375	Pipe/Conduit	
S15.000	15.534	0.159	97.7	0.039	5.00	0.0	0.600	o	300	Pipe/Conduit	
S14.001	60.971	0.432	141.0	0.133	0.00	0.0	0.600	o	375	Pipe/Conduit	
S14.002	47.150	0.199	237.2	0.192	0.00	0.0	0.600	o	375	Pipe/Conduit	
S11.007	24.483	0.510	48.0	0.062	0.00	0.0	0.600	o	375	Pipe/Conduit	
S11.008	46.196	1.124	41.1	0.057	0.00	0.0	0.600	o	375	Pipe/Conduit	
S11.009	9.884	0.234	42.2	0.025	0.00	0.0	0.600	o	375	Pipe/Conduit	
S16.000	29.697	0.286	103.8	0.054	5.00	0.0	0.600	o	300	Pipe/Conduit	
S17.000	37.742	0.403	93.7	0.048	5.00	0.0	0.600	o	225	Pipe/Conduit	
S16.001	28.603	0.170	167.9	0.123	0.00	0.0	0.600	o	300	Pipe/Conduit	
S16.002	27.810	0.168	165.6	0.079	0.00	0.0	0.600	o	300	Pipe/Conduit	
S16.003	21.471	0.629	34.1	0.141	0.00	0.0	0.600	o	300	Pipe/Conduit	
S16.004	47.129	1.156	40.8	0.103	0.00	0.0	0.600	o	300	Pipe/Conduit	
S18.000	33.734	0.334	101.0	0.072	5.00	0.0	0.600	o	300	Pipe/Conduit	
S16.005	26.677	0.311	85.8	0.104	0.00	0.0	0.600	o	375	Pipe/Conduit	
S11.010	10.026	0.020	500.0	0.000	0.00	0.0	0.600	o	525	Pipe/Conduit	
S11.011	53.293	0.213	250.0	0.000	0.00	0.0	0.600	o	525	Pipe/Conduit	
S11.012	13.945	0.056	249.0	0.000	0.00	0.0	0.600	o	225	Pipe/Conduit	
S11.013	17.792	0.036	490.6	0.000	0.00	0.0	0.600	o	225	Pipe/Conduit	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
S14.000	44.26	5.67	80.200	0.217	0.0	0.0	0.0	1.40	154.3	26.0
S15.000	45.87	5.16	80.350	0.039	0.0	0.0	0.0	1.59	112.4	4.9
S14.001	42.33	6.33	79.866	0.390	0.0	0.0	0.0	1.52	168.3	44.7
S14.002	40.60	7.00	79.434	0.582	0.0	0.0	0.0	1.17	129.5	63.9
S11.007	39.19	7.60	79.235	1.180	0.0	0.0	0.0	2.62	289.4	125.3
S11.008	38.59	7.88	78.725	1.238	0.0	0.0	0.0	2.83	312.9	129.3
S11.009	38.46	7.93	77.601	1.263	0.0	0.0	0.0	2.79	308.7	131.5
S16.000	45.35	5.32	80.603	0.054	0.0	0.0	0.0	1.54	109.0	6.6
S17.000	44.89	5.47	80.720	0.048	0.0	0.0	0.0	1.35	53.7	5.8
S16.001	43.68	5.86	80.317	0.224	0.0	0.0	0.0	1.21	85.6	26.5
S16.002	42.60	6.24	80.147	0.303	0.0	0.0	0.0	1.22	86.2	35.0
S16.003	42.23	6.37	79.979	0.444	0.0	0.0	0.0	2.70	190.8	50.8
S16.004	41.39	6.69	78.150	0.548	0.0	0.0	0.0	2.47	174.6	61.4
S18.000	45.23	5.36	77.550	0.072	0.0	0.0	0.0	1.56	110.6	8.9
S16.005	40.81	6.92	76.994	0.725	0.0	0.0	0.0	1.96	216.2	80.1
S11.010	38.10	8.10	76.683	1.987	0.0	0.0	0.0	0.99	215.4	205.1
S11.011	36.84	8.73	76.663	1.987	0.0	0.0	0.0	1.41	305.7	205.1
S11.012	45.48	5.28	76.325	0.000	8.6	0.0	0.0	0.82	32.8	8.6
S11.013	43.89	5.79	76.269	0.000	8.6	0.0	0.0	0.58	23.2	8.6

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Manhole Schedules for Storm

MH Name	MH CL (m)	MH Depth (m)	MH Connection	MH Diam.,L*W (mm)	Pipe Out PN	Pipe Out Invert Level (m)	Pipe Out Diameter (mm)	Pipes In PN	Pipes In Invert Level (m)	Pipes In Diameter (mm)	Backdrop (mm)
S1	81.692	1.350	Open Manhole	1200	S1.000	80.342	225				
S2	81.925	1.760	Open Manhole	1200	S1.001	80.165	225	S1.000	80.165	225	
S3	80.771	1.500	Open Manhole	1350	S1.002	79.271	375	S1.001	79.271	225	
S4	81.325	2.327	Open Manhole	1350	S1.003	78.998	375	S1.002	78.998	375	
S5	81.210	1.350	Open Manhole	1200	S2.000	79.860	225				
S6	81.153	2.255	Open Manhole	1350	S1.004	78.898	375	S1.003	78.898	375	
								S2.000	79.219	225	171
S7	81.000	1.425	Open Manhole	1200	S3.000	79.575	225				
S8	81.200	2.355	Open Manhole	1350	S1.005	78.845	375	S1.004	78.845	375	
								S3.000	79.056	225	61
S9	81.370	2.585	Open Manhole	1350	S1.006	78.785	375	S1.005	78.785	375	
S10	81.300	2.620	Open Manhole	1350	S1.007	78.680	225	S1.006	78.680	375	
S11	81.977	1.425	Open Manhole	1200	S4.000	80.552	300				
S12	81.345	1.425	Open Manhole	1200	S4.001	79.920	300	S4.000	79.920	300	
S13	81.138	2.499	Open Manhole	1200	S1.008	78.639	300	S1.007	78.639	225	
								S4.001	79.241	300	602
S14	81.229	2.654	Open Manhole	1350	S1.009	78.575	375	S1.008	78.575	300	
S15	82.052	1.350	Open Manhole	1200	S5.000	80.702	225				
S16	81.744	1.350	Open Manhole	1200	S5.001	80.394	225	S5.000	80.394	225	
S17	81.435	2.911	Open Manhole	1350	S1.010	78.524	375	S1.009	78.524	375	
								S5.001	79.309	225	635
S18	80.870	2.475	Open Manhole	1350	S1.011	78.395	375	S1.010	78.395	375	
S19	79.400	1.350	Open Manhole	1200	S6.000	78.050	225				
S20	79.800	2.023	Open Manhole	1350	S1.012	77.777	450	S1.011	78.015	375	163
								S6.000	77.777	225	
S21	80.500	2.789	Open Manhole	1350	S1.013	77.711	450	S1.012	77.711	450	
S22	82.678	1.350	Open Manhole	1200	S7.000	81.328	300				
S23	82.956	1.849	Open Manhole	1200	S7.001	81.107	300	S7.000	81.107	300	
S24	82.403	1.695	Open Manhole	1200	S7.002	80.708	300	S7.001	80.708	300	
S25	82.150	1.593	Open Manhole	1200	S7.003	80.557	300	S7.002	80.557	300	
S26	82.040	1.815	Open Manhole	1200	S7.004	80.225	300	S7.003	80.225	300	
S27	81.300	2.008	Open Manhole	1200	S7.005	79.292	300	S7.004	79.292	300	
S28	81.000	4.500	Open Manhole	1500	S1.014	76.500	525	S1.013	77.655	450	1080
								S7.005	79.026	300	2301
S29	78.300	2.159	Open Manhole	1500	S1.015	76.141	225	S1.014	76.141	525	
S30	80.250	2.250	Open Manhole	1200	S8.000	78.000	225				
S31	79.794	2.057	Open Manhole	1200	S8.001	77.737	225	S8.000	77.737	225	
S32	77.930	2.000	Open Manhole	1200	S1.016	75.930	225	S1.015	75.930	225	
								S8.001	76.945	225	1015
S33	77.000	1.487	Open Manhole	1200	S9.000	75.513	300				
S34	77.450	2.269	Open Manhole	1200	S1.017	75.181	300	S1.016	75.775	225	519
								S9.000	75.181	300	
S35	76.956	2.756	Open Manhole	1200	S1.018	74.200	300	S1.017	74.729	300	528
S36	75.600	1.853	Open Manhole	1200	S1.019	73.747	300	S1.018	73.747	300	
S37	75.110	1.210	Open Manhole	1200	S10.000	73.900	225				
S38	75.705	2.059	Open Manhole	1200	S10.001	73.646	225	S10.000	73.646	225	
S39	75.700	2.102	Open Manhole	1350	S1.020	73.598	375	S1.019	73.628	300	

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Manhole Schedules for Storm

MH Name	MH CL (m)	MH Depth (m)	MH Connection	MH Diam.,L*W (mm)	Pipe Out PN	Pipe Out Invert Level (m)	Pipe Out Diameter (mm)	Pipes In PN	Pipes In Invert Level (m)	Pipes In Diameter (mm)	Backdrop (mm)
								S10.001	73.598	225	
S40	75.300	1.794	Open Manhole	1350	S1.021	73.506	225	S1.020	73.506	375	
SOutfall 1	75.000	1.600	Open Manhole	1200		OUTFALL		S1.021	73.400	225	
S41	82.200	1.400	Open Manhole	1200	S11.000	80.800	225				
S42	82.563	1.350	Open Manhole	1200	S12.000	81.213	225				
S43	82.149	1.617	Open Manhole	1200	S11.001	80.532	225	S11.000	80.532	225	
								S12.000	80.741	225	209
S44	81.935	1.584	Open Manhole	1200	S11.002	80.351	225	S11.001	80.351	225	
S45	81.632	1.350	Open Manhole	1200	S13.000	80.282	300				
S46	82.000	2.068	Open Manhole	1200	S13.001	79.932	300	S13.000	79.932	300	
S47	81.706	2.061	Open Manhole	1200	S11.003	79.645	300	S11.002	79.645	225	
								S13.001	79.645	300	
S48	81.540	1.970	Open Manhole	1200	S11.004	79.570	300	S11.003	79.570	300	
S49	81.280	1.811	Open Manhole	1200	S11.005	79.469	300	S11.004	79.469	300	
S50	81.109	1.740	Open Manhole	1350	S11.006	79.369	375	S11.005	79.369	300	
S51	81.625	1.425	Open Manhole	1350	S14.000	80.200	375				
S52	81.700	1.350	Open Manhole	1200	S15.000	80.350	300				
S53	82.036	2.170	Open Manhole	1350	S14.001	79.866	375	S14.000	79.866	375	
								S15.000	80.191	300	250
S54	82.050	2.616	Open Manhole	1350	S14.002	79.434	375	S14.001	79.434	375	
S55	81.330	2.095	Open Manhole	1350	S11.007	79.235	375	S11.006	79.235	375	
								S14.002	79.235	375	
S56	80.300	1.575	Open Manhole	1350	S11.008	78.725	375	S11.007	78.725	375	
S57	78.635	1.034	Open Manhole	1350	S11.009	77.601	375	S11.008	77.601	375	
S58	81.953	1.350	Open Manhole	1200	S16.000	80.603	300				
S59	82.070	1.350	Open Manhole	1200	S17.000	80.720	225				
S60	82.550	2.233	Open Manhole	1200	S16.001	80.317	300	S16.000	80.317	300	
								S17.000	80.317	225	
S61	82.100	1.953	Open Manhole	1200	S16.002	80.147	300	S16.001	80.147	300	
S62	81.700	1.721	Open Manhole	1200	S16.003	79.979	300	S16.002	79.979	300	
S63	80.850	2.700	Open Manhole	1200	S16.004	78.150	300	S16.003	79.350	300	1200
S64	78.900	1.350	Open Manhole	1200	S18.000	77.550	300				
S65	78.862	1.868	Open Manhole	1350	S16.005	76.994	375	S16.004	76.994	300	
								S18.000	77.216	300	147
S66	78.630	1.947	Open Manhole	1500	S11.010	76.683	525	S11.009	77.367	375	534
								S16.005	76.683	375	
S67	78.700	2.037	Open Manhole	1500	S11.011	76.663	525	S11.010	76.663	525	
S68	78.050	1.725	Open Manhole	1500	S11.012	76.325	225	S11.011	76.450	525	425
S69	77.900	1.631	Open Manhole	1200	S11.013	76.269	225	S11.012	76.269	225	
SOutfall 2	78.090	1.857	Open Manhole	1200		OUTFALL		S11.013	76.233	225	

MH Name	Manhole Easting (m)	Manhole Northing (m)	Intersection Easting (m)	Intersection Northing (m)	Manhole Access	Layout (North)
S1	687463.223	739968.151	687463.223	739968.151	Required	

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Manhole Schedules for Storm

MH Name	Manhole Easting (m)	Manhole Northing (m)	Intersection Easting (m)	Intersection Northing (m)	Manhole Access	Layout (North)
S2	687454.388	739984.743	687454.388	739984.743	Required	
S3	687485.832	740018.255	687485.832	740018.255	Required	
S4	687530.765	740066.553	687530.765	740066.553	Required	
S5	687564.710	740055.358	687564.710	740055.358	Required	
S6	687532.366	740076.219	687532.366	740076.219	Required	
S7	687480.597	740109.799	687480.597	740109.799	Required	
S8	687523.997	740081.770	687523.997	740081.770	Required	
S9	687513.033	740065.163	687513.033	740065.163	Required	
S10	687481.692	740083.113	687481.692	740083.113	Required	
S11	687450.865	740002.432	687450.865	740002.432	Required	
S12	687470.756	740064.815	687470.756	740064.815	Required	
S13	687470.755	740087.767	687470.755	740087.767	Required	
S14	687464.007	740109.090	687464.007	740109.090	Required	
S15	687398.259	740159.243	687398.259	740159.243	Required	
S16	687419.929	740145.317	687419.929	740145.317	Required	
S17	687447.394	740127.838	687447.394	740127.838	Required	
S18	687473.831	740169.192	687473.831	740169.192	Required	
S19	687512.841	740188.035	687512.841	740188.035	Required	
S20	687488.165	740199.162	687488.165	740199.162	Required	

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Manhole Schedules for Storm

MH Name	Manhole Easting (m)	Manhole Northing (m)	Intersection Easting (m)	Intersection Northing (m)	Manhole Access	Layout (North)
S21	687460.592	740216.978	687460.592	740216.978	Required	
S22	687306.221	740240.423	687306.221	740240.423	Required	
S23	687327.326	740233.339	687327.326	740233.339	Required	
S24	687371.217	740179.554	687371.217	740179.554	Required	
S25	687389.963	740165.673	687389.963	740165.673	Required	
S26	687414.973	740203.487	687414.973	740203.487	Required	
S27	687429.671	740231.061	687429.671	740231.061	Required	
S28	687454.113	740241.444	687454.113	740241.444	Required	
S29	687479.867	740273.119	687479.867	740273.119	Required	
S30	687466.417	740227.247	687466.417	740227.247	Required	
S31	687473.361	740235.162	687473.361	740235.162	Required	
S32	687491.720	740276.237	687491.720	740276.237	Required	
S33	687549.359	740257.177	687549.359	740257.177	Required	
S34	687496.947	740280.323	687496.947	740280.323	Required	
S35	687503.646	740291.832	687503.646	740291.832	Required	
S36	687523.407	740340.998	687523.407	740340.998	Required	
S37	687568.896	740323.204	687568.896	740323.204	Required	
S38	687533.610	740337.600	687533.610	740337.600	Required	
S39	687536.102	740344.284	687536.102	740344.284	Required	

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Manhole Schedules for Storm

MH Name	Manhole Easting (m)	Manhole Northing (m)	Intersection Easting (m)	Intersection Northing (m)	Manhole Access	Layout (North)
S40	687580.804	740330.119	687580.804	740330.119	Required	
SOutfall 1	687585.759	740339.428			No Entry	
S41	687350.671	740160.271	687350.671	740160.271	Required	
S42	687322.494	740174.187	687322.494	740174.187	Required	
S43	687343.659	740150.180	687343.659	740150.180	Required	
S44	687338.488	740142.617	687338.488	740142.617	Required	
S45	687407.564	740135.341	687407.564	740135.341	Required	
S46	687387.685	740106.685	687387.685	740106.685	Required	
S47	687334.768	740089.080	687334.768	740089.080	Required	
S48	687322.407	740083.968	687322.407	740083.968	Required	
S49	687320.966	740066.023	687320.966	740066.023	Required	
S50	687312.293	740050.773	687312.293	740050.773	Required	
S51	687409.223	740102.499	687409.223	740102.499	Required	
S52	687442.130	740050.128	687442.130	740050.128	Required	
S53	687426.617	740049.313	687426.617	740049.313	Required	
S54	687368.760	740030.076	687368.760	740030.076	Required	
S55	687323.772	740015.965	687323.772	740015.965	Required	
S56	687300.613	740008.022	687300.613	740008.022	Required	
S57	687276.464	739968.640	687276.464	739968.640	Required	

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Manhole Schedules for Storm

MH Name	Manhole Easting (m)	Manhole Northing (m)	Intersection Easting (m)	Intersection Northing (m)	Manhole Access	Layout (North)
S58	687418.596	739943.103	687418.596	739943.103	Required	
S59	687442.368	739984.867	687442.368	739984.867	Required	
S60	687407.420	739970.617	687407.420	739970.617	Required	
S61	687380.282	739961.580	687380.282	739961.580	Required	
S62	687353.913	739952.746	687353.913	739952.746	Required	
S63	687332.701	739949.420	687332.701	739949.420	Required	
S64	687298.772	739901.980	687298.772	739901.980	Required	
S65	687288.165	739934.003	687288.165	739934.003	Required	
S66	687279.618	739959.273	687279.618	739959.273	Required	
S67	687270.099	739956.126	687270.099	739956.126	Required	
S68	687269.545	739902.835	687269.545	739902.835	Required	
S69	687255.620	739902.096	687255.620	739902.096	Required	
SOutfall 2	687255.879	739884.305			No Entry	

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PIPELINE SCHEDULES for Storm

Upstream Manhole

PN	Hyd Sect	Diam (mm)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
S1.000	o	225	S1	81.692	80.342	1.125	Open Manhole	1200
S1.001	o	225	S2	81.925	80.165	1.535	Open Manhole	1200
S1.002	o	375	S3	80.771	79.271	1.125	Open Manhole	1350
S1.003	o	375	S4	81.325	78.998	1.952	Open Manhole	1350
S2.000	o	225	S5	81.210	79.860	1.125	Open Manhole	1200
S1.004	o	375	S6	81.153	78.898	1.880	Open Manhole	1350
S3.000	o	225	S7	81.000	79.575	1.200	Open Manhole	1200
S1.005	o	375	S8	81.200	78.845	1.980	Open Manhole	1350
S1.006	o	375	S9	81.370	78.785	2.210	Open Manhole	1350
S1.007	o	225	S10	81.300	78.680	2.395	Open Manhole	1350
S4.000	o	300	S11	81.977	80.552	1.125	Open Manhole	1200
S4.001	o	300	S12	81.345	79.920	1.125	Open Manhole	1200
S1.008	o	300	S13	81.138	78.639	2.199	Open Manhole	1200
S1.009	o	375	S14	81.229	78.575	2.279	Open Manhole	1350
S5.000	o	225	S15	82.052	80.702	1.125	Open Manhole	1200
S5.001	o	225	S16	81.744	80.394	1.125	Open Manhole	1200
S1.010	o	375	S17	81.435	78.524	2.536	Open Manhole	1350
S1.011	o	375	S18	80.870	78.395	2.100	Open Manhole	1350

Downstream Manhole

PN	Length (m)	Slope (1:X)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
S1.000	18.797	106.2	S2	81.925	80.165	1.535	Open Manhole	1200
S1.001	45.954	51.4	S3	80.771	79.271	1.275	Open Manhole	1350
S1.002	65.968	241.6	S4	81.325	78.998	1.952	Open Manhole	1350
S1.003	9.798	98.3	S6	81.153	78.898	1.880	Open Manhole	1350
S2.000	38.489	60.0	S6	81.153	79.219	1.709	Open Manhole	1350
S1.004	10.042	189.6	S8	81.200	78.845	1.980	Open Manhole	1350
S3.000	51.665	99.5	S8	81.200	79.056	1.919	Open Manhole	1350
S1.005	19.900	329.2	S9	81.370	78.785	2.210	Open Manhole	1350
S1.006	36.117	344.8	S10	81.300	78.680	2.245	Open Manhole	1350
S1.007	11.887	289.9	S13	81.138	78.639	2.274	Open Manhole	1200
S4.000	65.477	103.6	S12	81.345	79.920	1.125	Open Manhole	1200
S4.001	22.953	33.8	S13	81.138	79.241	1.597	Open Manhole	1200
S1.008	22.365	346.2	S14	81.229	78.575	2.354	Open Manhole	1350
S1.009	25.049	495.8	S17	81.435	78.524	2.536	Open Manhole	1350
S5.000	25.759	83.6	S16	81.744	80.394	1.125	Open Manhole	1200
S5.001	32.555	30.0	S17	81.435	79.309	1.901	Open Manhole	1350
S1.010	49.083	380.5	S18	80.870	78.395	2.100	Open Manhole	1350
S1.011	33.221	87.5	S20	79.800	78.015	1.410	Open Manhole	1350

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PIPELINE SCHEDULES for Storm

Upstream Manhole

PN	Hyd Sect	Diam (mm)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
S6.000	o	225	S19	79.400	78.050	1.125	Open Manhole	1200
S1.012	o	450	S20	79.800	77.777	1.573	Open Manhole	1350
S1.013	o	450	S21	80.500	77.711	2.339	Open Manhole	1350
S7.000	o	300	S22	82.678	81.328	1.050	Open Manhole	1200
S7.001	o	300	S23	82.956	81.107	1.549	Open Manhole	1200
S7.002	o	300	S24	82.403	80.708	1.395	Open Manhole	1200
S7.003	o	300	S25	82.150	80.557	1.293	Open Manhole	1200
S7.004	o	300	S26	82.040	80.225	1.515	Open Manhole	1200
S7.005	o	300	S27	81.300	79.292	1.708	Open Manhole	1200
S1.014	o	525	S28	81.000	76.500	3.975	Open Manhole	1500
S1.015	o	225	S29	78.300	76.141	1.934	Open Manhole	1500
S8.000	o	225	S30	80.250	78.000	2.025	Open Manhole	1200
S8.001	o	225	S31	79.794	77.737	1.832	Open Manhole	1200
S1.016	o	225	S32	77.930	75.930	1.775	Open Manhole	1200
S9.000	o	300	S33	77.000	75.513	1.187	Open Manhole	1200
S1.017	o	300	S34	77.450	75.181	1.969	Open Manhole	1200
S1.018	o	300	S35	76.956	74.200	2.456	Open Manhole	1200
S1.019	o	300	S36	75.600	73.747	1.553	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)
S6.000	27.069	99.2	S20	79.800	77.777	1.798	Open Manhole	1350
S1.012	32.828	499.0	S21	80.500	77.711	2.339	Open Manhole	1350
S1.013	25.309	450.0	S28	81.000	77.655	2.895	Open Manhole	1500
S7.000	22.261	100.7	S23	82.956	81.107	1.549	Open Manhole	1200
S7.001	69.421	173.8	S24	82.403	80.708	1.395	Open Manhole	1200
S7.002	23.326	155.1	S25	82.150	80.557	1.293	Open Manhole	1200
S7.003	45.336	136.5	S26	82.040	80.225	1.515	Open Manhole	1200
S7.004	31.246	33.5	S27	81.300	79.292	1.708	Open Manhole	1200
S7.005	26.556	100.0	S28	81.000	79.026	1.674	Open Manhole	1500
S1.014	40.823	113.7	S29	78.300	76.141	1.634	Open Manhole	1500
S1.015	12.257	58.1	S32	77.930	75.930	1.775	Open Manhole	1200
S8.000	10.529	40.0	S31	79.794	77.737	1.832	Open Manhole	1200
S8.001	44.991	56.8	S32	77.930	76.945	0.760	Open Manhole	1200
S1.016	6.634	42.7	S34	77.450	75.775	1.450	Open Manhole	1200
S9.000	57.296	172.6	S34	77.450	75.181	1.969	Open Manhole	1200
S1.017	13.317	29.4	S35	76.956	74.729	1.927	Open Manhole	1200
S1.018	52.988	117.0	S36	75.600	73.747	1.553	Open Manhole	1200
S1.019	13.113	110.2	S39	75.700	73.628	1.772	Open Manhole	1350

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PIPELINE SCHEDULES for Storm

Upstream Manhole

PN	Hyd Sect	Diam (mm)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
S10.000	o	225	S37	75.110	73.900	0.985	Open Manhole	1200
S10.001	o	225	S38	75.705	73.646	1.834	Open Manhole	1200
S1.020	o	375	S39	75.700	73.598	1.727	Open Manhole	1350
S1.021	o	225	S40	75.300	73.506	1.569	Open Manhole	1350
S11.000	o	225	S41	82.200	80.800	1.175	Open Manhole	1200
S12.000	o	225	S42	82.563	81.213	1.125	Open Manhole	1200
S11.001	o	225	S43	82.149	80.532	1.392	Open Manhole	1200
S11.002	o	225	S44	81.935	80.351	1.359	Open Manhole	1200
S13.000	o	300	S45	81.632	80.282	1.050	Open Manhole	1200
S13.001	o	300	S46	82.000	79.932	1.768	Open Manhole	1200
S11.003	o	300	S47	81.706	79.645	1.761	Open Manhole	1200
S11.004	o	300	S48	81.540	79.570	1.670	Open Manhole	1200
S11.005	o	300	S49	81.280	79.469	1.511	Open Manhole	1200
S11.006	o	375	S50	81.109	79.369	1.365	Open Manhole	1350
S14.000	o	375	S51	81.625	80.200	1.050	Open Manhole	1350
S15.000	o	300	S52	81.700	80.350	1.050	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)
S10.000	38.110	150.0	S38	75.705	73.646	1.834	Open Manhole	1200
S10.001	7.133	150.0	S39	75.700	73.598	1.877	Open Manhole	1350
S1.020	46.893	506.6	S40	75.300	73.506	1.419	Open Manhole	1350
S1.021	10.546	99.5	SOutfall 1	75.000	73.400	1.375	Open Manhole	1200
S11.000	12.288	45.9	S43	82.149	80.532	1.392	Open Manhole	1200
S12.000	32.005	67.8	S43	82.149	80.741	1.183	Open Manhole	1200
S11.001	9.162	50.6	S44	81.935	80.351	1.359	Open Manhole	1200
S11.002	53.666	76.0	S47	81.706	79.645	1.836	Open Manhole	1200
S13.000	34.876	99.6	S46	82.000	79.932	1.768	Open Manhole	1200
S13.001	55.769	194.2	S47	81.706	79.645	1.761	Open Manhole	1200
S11.003	13.376	178.0	S48	81.540	79.570	1.670	Open Manhole	1200
S11.004	18.002	179.1	S49	81.280	79.469	1.511	Open Manhole	1200
S11.005	17.544	174.6	S50	81.109	79.369	1.440	Open Manhole	1350
S11.006	36.652	273.5	S55	81.330	79.235	1.720	Open Manhole	1350
S14.000	55.959	167.5	S53	82.036	79.866	1.795	Open Manhole	1350
S15.000	15.534	97.7	S53	82.036	80.191	1.545	Open Manhole	1350

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PIPELINE SCHEDULES for Storm

Upstream Manhole

PN	Hyd Sect	Diam (mm)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
S14.001	o	375	S53	82.036	79.866	1.795	Open Manhole	1350
S14.002	o	375	S54	82.050	79.434	2.241	Open Manhole	1350
S11.007	o	375	S55	81.330	79.235	1.720	Open Manhole	1350
S11.008	o	375	S56	80.300	78.725	1.200	Open Manhole	1350
S11.009	o	375	S57	78.635	77.601	0.659	Open Manhole	1350
S16.000	o	300	S58	81.953	80.603	1.050	Open Manhole	1200
S17.000	o	225	S59	82.070	80.720	1.125	Open Manhole	1200
S16.001	o	300	S60	82.550	80.317	1.933	Open Manhole	1200
S16.002	o	300	S61	82.100	80.147	1.653	Open Manhole	1200
S16.003	o	300	S62	81.700	79.979	1.421	Open Manhole	1200
S16.004	o	300	S63	80.850	78.150	2.400	Open Manhole	1200
S18.000	o	300	S64	78.900	77.550	1.050	Open Manhole	1200
S16.005	o	375	S65	78.862	76.994	1.493	Open Manhole	1350
S11.010	o	525	S66	78.630	76.683	1.422	Open Manhole	1500
S11.011	o	525	S67	78.700	76.663	1.512	Open Manhole	1500
S11.012	o	225	S68	78.050	76.325	1.500	Open Manhole	1500
S11.013	o	225	S69	77.900	76.269	1.406	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)
S14.001	60.971	141.0	S54	82.050	79.434	2.241	Open Manhole	1350
S14.002	47.150	237.2	S55	81.330	79.235	1.720	Open Manhole	1350
S11.007	24.483	48.0	S56	80.300	78.725	1.200	Open Manhole	1350
S11.008	46.196	41.1	S57	78.635	77.601	0.659	Open Manhole	1350
S11.009	9.884	42.2	S66	78.630	77.367	0.888	Open Manhole	1500
S16.000	29.697	103.8	S60	82.550	80.317	1.933	Open Manhole	1200
S17.000	37.742	93.7	S60	82.550	80.317	2.008	Open Manhole	1200
S16.001	28.603	167.9	S61	82.100	80.147	1.653	Open Manhole	1200
S16.002	27.810	165.6	S62	81.700	79.979	1.421	Open Manhole	1200
S16.003	21.471	34.1	S63	80.850	79.350	1.200	Open Manhole	1200
S16.004	47.129	40.8	S65	78.862	76.994	1.568	Open Manhole	1350
S18.000	33.734	101.0	S65	78.862	77.216	1.346	Open Manhole	1350
S16.005	26.677	85.8	S66	78.630	76.683	1.572	Open Manhole	1500
S11.010	10.026	500.0	S67	78.700	76.663	1.512	Open Manhole	1500
S11.011	53.293	250.0	S68	78.050	76.450	1.075	Open Manhole	1500
S11.012	13.945	249.0	S69	77.900	76.269	1.406	Open Manhole	1200
S11.013	17.792	490.6	SOutfall 2	78.090	76.233	1.632	Open Manhole	1200

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Area Summary for Storm

Pipe Number	PIMP Type	PIMP Name	PIMP (%)	Gross Area (ha)	Imp. Area (ha)	Pipe Total (ha)
1.000	User	-	100	0.040	0.040	0.040
	User	-	100	0.080	0.080	0.120
1.001	User	-	100	0.120	0.120	0.120
1.002	User	-	100	0.206	0.206	0.206
1.003	-	-	90	0.000	0.000	0.000
2.000	User	-	100	0.157	0.157	0.157
1.004	User	-	100	0.047	0.047	0.047
3.000	User	-	100	0.184	0.184	0.184
1.005	-	-	90	0.000	0.000	0.000
1.006	-	-	90	0.000	0.000	0.000
1.007	-	-	90	0.000	0.000	0.000
4.000	User	-	100	0.306	0.306	0.306
4.001	User	-	100	0.085	0.085	0.085
1.008	User	-	100	0.066	0.066	0.066
1.009	User	-	100	0.069	0.069	0.069
5.000	User	-	100	0.068	0.068	0.068
5.001	User	-	100	0.114	0.114	0.114
1.010	User	-	100	0.178	0.178	0.178
1.011	User	-	100	0.097	0.097	0.097
6.000	User	-	100	0.077	0.077	0.077
1.012	User	-	100	0.071	0.071	0.071
1.013	-	-	90	0.000	0.000	0.000
7.000	User	-	100	0.029	0.029	0.029
7.001	User	-	100	0.201	0.201	0.201
7.002	User	-	100	0.095	0.095	0.095
7.003	User	-	100	0.050	0.050	0.050
7.004	User	-	100	0.068	0.068	0.068
7.005	-	-	90	0.000	0.000	0.000
1.014	-	-	90	0.000	0.000	0.000
1.015	-	-	90	0.000	0.000	0.000
8.000	User	-	100	0.188	0.188	0.188
8.001	-	-	90	0.000	0.000	0.000
1.016	-	-	90	0.000	0.000	0.000
9.000	User	-	100	0.238	0.238	0.238
1.017	User	-	100	0.069	0.069	0.069
1.018	-	-	90	0.000	0.000	0.000
1.019	-	-	90	0.000	0.000	0.000
10.000	User	-	100	0.145	0.145	0.145
10.001	-	-	90	0.000	0.000	0.000
1.020	-	-	90	0.000	0.000	0.000
1.021	-	-	90	0.000	0.000	0.000
11.000	User	-	100	0.030	0.030	0.030
12.000	User	-	100	0.049	0.049	0.049
11.001	-	-	90	0.000	0.000	0.000
11.002	User	-	100	0.060	0.060	0.060
13.000	User	-	100	0.103	0.103	0.103
13.001	User	-	100	0.106	0.106	0.106
11.003	-	-	90	0.039	0.035	0.035
11.004	User	-	100	0.040	0.040	0.040
	User	-	100	0.043	0.043	0.083
11.005	-	-	90	0.000	0.000	0.000
11.006	User	-	100	0.071	0.071	0.071
14.000	User	-	100	0.217	0.217	0.217
15.000	User	-	100	0.039	0.039	0.039
14.001	User	-	100	0.133	0.133	0.133
14.002	User	-	100	0.192	0.192	0.192
11.007	User	-	100	0.062	0.062	0.062
11.008	User	-	100	0.057	0.057	0.057
11.009	User	-	100	0.025	0.025	0.025
16.000	User	-	100	0.054	0.054	0.054
17.000	User	-	100	0.048	0.048	0.048
16.001	User	-	100	0.123	0.123	0.123

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Area Summary for Storm

Pipe Number	PIMP Type	PIMP Name	PIMP (%)	Gross Area (ha)	Imp. Area (ha)	Pipe Total (ha)
16.002	User	-	100	0.079	0.079	0.079
16.003	User	-	100	0.141	0.141	0.141
16.004	User	-	100	0.103	0.103	0.103
18.000	User	-	100	0.072	0.072	0.072
16.005	User	-	100	0.066	0.066	0.066
	User	-	100	0.038	0.038	0.104
11.010	-	-	90	0.000	0.000	0.000
11.011	-	-	90	0.000	0.000	0.000
11.012	-	-	90	0.000	0.000	0.000
11.013	-	-	90	0.000	0.000	0.000
				Total	Total	Total
				5.039	5.035	5.035

Free Flowing Outfall Details for Storm

Outfall Pipe Number	Outfall Name	C. Level (m)	I. Level (m)	Min I. Level (m)	D,L (mm)	W (mm)
S1.021	SOutfall 1	75.000	73.400	73.394	1200	0

Free Flowing Outfall Details for Storm

Outfall Pipe Number	Outfall Name	C. Level (m)	I. Level (m)	Min I. Level (m)	D,L (mm)	W (mm)
S11.013	SOutfall 2	78.090	76.233	76.000	1200	0

Simulation Criteria for Storm

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

Number of Input Hydrographs 0	Number of Offline Controls 0	Number of Time/Area Diagrams 0
Number of Online Controls 4	Number of Storage Structures 4	Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model	FSR	Profile Type	Winter
Return Period (years)	100	Cv (Summer)	0.750
Region	Scotland and Ireland	Cv (Winter)	0.840
M5-60 (mm)	15.300	Storm Duration (mins)	2880
Ratio R	0.280		

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Online Controls for Storm

Hydro-Brake® Manhole: S10, DS/PN: S1.007, Volume (m³): 7.6

Design Head (m) 1.800 Hydro-Brake® Type Md4 Invert Level (m) 78.680
Design Flow (l/s) 2.8 Diameter (mm) 51

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	1.2	0.800	1.8	2.000	2.9	4.000	4.1	7.000	5.4
0.200	1.0	1.000	2.0	2.200	3.0	4.500	4.3	7.500	5.6
0.300	1.1	1.200	2.2	2.400	3.1	5.000	4.5	8.000	5.7
0.400	1.3	1.400	2.4	2.600	3.3	5.500	4.8	8.500	5.9
0.500	1.4	1.600	2.6	3.000	3.5	6.000	5.0	9.000	6.1
0.600	1.6	1.800	2.7	3.500	3.8	6.500	5.2	9.500	6.2

Hydro-Brake® Manhole: S29, DS/PN: S1.015, Volume (m³): 12.3

Design Head (m) 1.800 Hydro-Brake® Type Md4 Invert Level (m) 76.141
Design Flow (l/s) 5.3 Diameter (mm) 71

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	2.1	0.800	3.5	2.000	5.6	4.000	7.9	7.000	10.4
0.200	2.4	1.000	3.9	2.200	5.8	4.500	8.3	7.500	10.8
0.300	2.2	1.200	4.3	2.400	6.1	5.000	8.8	8.000	11.1
0.400	2.5	1.400	4.6	2.600	6.3	5.500	9.2	8.500	11.5
0.500	2.8	1.600	5.0	3.000	6.8	6.000	9.6	9.000	11.8
0.600	3.0	1.800	5.3	3.500	7.3	6.500	10.0	9.500	12.1

Hydro-Brake® Manhole: S40, DS/PN: S1.021, Volume (m³): 7.6

Design Head (m) 1.200 Hydro-Brake® Type Md4 Invert Level (m) 73.506
Design Flow (l/s) 11.3 Diameter (mm) 115

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	3.3	0.800	9.2	2.000	14.6	4.000	20.6	7.000	27.3
0.200	8.5	1.000	10.3	2.200	15.3	4.500	21.9	7.500	28.2
0.300	8.4	1.200	11.3	2.400	16.0	5.000	23.0	8.000	29.1
0.400	7.4	1.400	12.2	2.600	16.6	5.500	24.2	8.500	30.0
0.500	7.5	1.600	13.0	3.000	17.9	6.000	25.2	9.000	30.9
0.600	8.0	1.800	13.8	3.500	19.3	6.500	26.3	9.500	31.8

Hydro-Brake® Manhole: S68, DS/PN: S11.012, Volume (m³): 14.3

Design Head (m) 1.500 Hydro-Brake® Type Md4 Invert Level (m) 76.325
Design Flow (l/s) 8.6 Diameter (mm) 94

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	2.8	0.800	6.2	2.000	9.7	4.000	13.8	7.000	18.2
0.200	5.4	1.000	6.9	2.200	10.2	4.500	14.6	7.500	18.9
0.300	4.6	1.200	7.5	2.400	10.7	5.000	15.4	8.000	19.5
0.400	4.5	1.400	8.1	2.600	11.1	5.500	16.1	8.500	20.1
0.500	4.9	1.600	8.7	3.000	11.9	6.000	16.9	9.000	20.7
0.600	5.3	1.800	9.2	3.500	12.9	6.500	17.6	9.500	21.2

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Storage Structures for Storm

Tank or Pond Manhole: S10, DS/PN: S1.007

Invert Level (m) 78.680

Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	360.0	1.450	360.0

Tank or Pond Manhole: S29, DS/PN: S1.015

Invert Level (m) 76.141

Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	715.0	1.450	715.0

Tank or Pond Manhole: S40, DS/PN: S1.021

Invert Level (m) 73.506

Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	181.0	1.150	181.0

Tank or Pond Manhole: S68, DS/PN: S11.012

Invert Level (m) 76.325

Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	857.0	1.450	857.0

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

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 4 Number of Storage Structures 4 Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model FSR M5-60 (mm) 15.300 Cv (Summer) 0.750
Region Scotland and Ireland Ratio R 0.280 Cv (Winter) 0.840

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

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

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)	Flooded Volume (m³)
S1.000	S1	15 Winter	100	+30%	30/15 Summer				81.395	0.828	0.000
S1.001	S2	15 Winter	100	+30%	30/15 Summer				81.276	0.886	0.000
S1.002	S3	15 Winter	100	+30%	30/15 Summer				80.490	0.844	0.000
S1.003	S4	2880 Winter	100	+30%	30/15 Summer				80.277	0.904	0.000
S2.000	S5	15 Winter	100	+30%	100/15 Summer				80.467	0.382	0.000
S1.004	S6	2880 Winter	100	+30%	1/2160 Winter				80.276	1.003	0.000
S3.000	S7	15 Winter	100	+30%	30/15 Summer				80.558	0.758	0.000
S1.005	S8	2880 Winter	100	+30%	1/960 Winter				80.275	1.055	0.000
S1.006	S9	2880 Winter	100	+30%	1/480 Winter				80.273	1.114	0.000
S1.007	S10	2880 Winter	100	+30%	1/60 Summer				80.272	1.366	0.000
S4.000	S11	15 Winter	100	+30%	100/15 Summer				81.470	0.618	0.000
S4.001	S12	15 Winter	100	+30%	30/15 Winter				81.023	0.803	0.000
S1.008	S13	15 Winter	100	+30%	1/15 Summer				80.768	1.829	0.000
S1.009	S14	15 Winter	100	+30%	30/15 Summer				80.420	1.470	0.000
S5.000	S15	15 Winter	100	+30%					80.816	-0.111	0.000
S5.001	S16	15 Winter	100	+30%	100/15 Winter				80.694	0.075	0.000
S1.010	S17	15 Winter	100	+30%	30/15 Summer				80.252	1.353	0.000
S1.011	S18	15 Winter	100	+30%	30/15 Summer				79.472	0.702	0.000
S6.000	S19	15 Winter	100	+30%	30/15 Summer				78.854	0.579	0.000
S1.012	S20	15 Winter	100	+30%	30/15 Summer				78.787	0.560	0.000
S1.013	S21	15 Winter	100	+30%	30/15 Summer				78.401	0.240	0.000
S7.000	S22	15 Winter	100	+30%	100/15 Winter				81.657	0.029	0.000
S7.001	S23	15 Winter	100	+30%	100/15 Summer				81.650	0.243	0.000
S7.002	S24	15 Winter	100	+30%	30/15 Summer				81.305	0.297	0.000
S7.003	S25	15 Winter	100	+30%	30/15 Summer				81.056	0.198	0.000
S7.004	S26	15 Winter	100	+30%					80.421	-0.104	0.000
S7.005	S27	15 Winter	100	+30%	30/15 Summer				79.769	0.177	0.000
S1.014	S28	2880 Winter	100	+30%	30/360 Winter				78.012	0.987	0.000
S1.015	S29	2880 Winter	100	+30%	1/60 Winter				78.010	1.644	0.000
S8.000	S30	15 Winter	100	+30%	100/15 Summer				78.298	0.073	0.000
S8.001	S31	15 Winter	100	+30%	100/15 Summer				78.042	0.080	0.000
S1.016	S32	15 Winter	100	+30%	30/15 Winter				76.294	0.139	0.000
S9.000	S33	15 Winter	100	+30%	100/15 Summer				76.274	0.461	0.000
S1.017	S34	15 Winter	100	+30%	30/15 Winter				76.078	0.597	0.000

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

PN	US/MH Name	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
S1.000	S1	0.76			34.6	FLOOD RISK	
S1.001	S2	0.93			64.5	SURCHARGED	
S1.002	S3	1.00			120.4	FLOOD RISK	
S1.003	S4	0.05			6.7	SURCHARGED	
S2.000	S5	0.82			52.5	SURCHARGED	
S1.004	S6	0.09			9.8	SURCHARGED	
S3.000	S7	1.09			54.3	SURCHARGED	
S1.005	S8	0.13			12.4	SURCHARGED	
S1.006	S9	0.13			12.3	SURCHARGED	
S1.007	S10	0.10			2.5	SURCHARGED	
S4.000	S11	0.96			100.5	SURCHARGED	
S4.001	S12	0.66			112.0	SURCHARGED	
S1.008	S13	2.40			125.7	SURCHARGED	
S1.009	S14	1.81			139.5	SURCHARGED	
S5.000	S15	0.50			26.4	OK	
S5.001	S16	0.78			69.7	SURCHARGED	
S1.010	S17	2.47			232.6	SURCHARGED	
S1.011	S18	1.36			260.6	SURCHARGED	
S6.000	S19	0.49			23.7	SURCHARGED	
S1.012	S20	2.40			299.4	SURCHARGED	
S1.013	S21	2.36			300.5	SURCHARGED	
S7.000	S22	0.11			10.7	SURCHARGED	
S7.001	S23	0.96			77.1	SURCHARGED	
S7.002	S24	1.28			100.7	SURCHARGED	
S7.003	S25	1.27			113.1	SURCHARGED	
S7.004	S26	0.74			130.7	OK	
S7.005	S27	1.31			130.6	SURCHARGED	
S1.014	S28	0.07			26.3	SURCHARGED	
S1.015	S29	0.09			5.4	FLOOD RISK	
S8.000	S30	1.01			70.2	SURCHARGED	
S8.001	S31	1.05			69.3	SURCHARGED	
S1.016	S32	1.23			68.4	SURCHARGED	
S9.000	S33	1.03			82.4	SURCHARGED	
S1.017	S34	0.88			147.8	SURCHARGED	

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

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)	Flooded Volume (m³)
S1.018	S35	15 Winter	100	+30%	30/15 Summer				75.772	1.272	0.000
S1.019	S36	600 Winter	100	+30%	30/15 Summer				74.857	0.810	0.000
S10.000	S37	600 Winter	100	+30%	30/15 Summer				74.855	0.730	0.000
S10.001	S38	600 Winter	100	+30%	1/15 Summer				74.850	0.979	0.000
S1.020	S39	600 Winter	100	+30%	30/15 Summer				74.848	0.875	0.000
S1.021	S40	600 Winter	100	+30%	1/30 Winter				74.839	1.108	0.000
S11.000	S41	15 Winter	100	+30%	100/15 Winter				81.118	0.093	0.000
S12.000	S42	15 Winter	100	+30%					81.301	-0.137	0.000
S11.001	S43	15 Winter	100	+30%	100/15 Summer				81.110	0.353	0.000
S11.002	S44	15 Winter	100	+30%	100/15 Summer				81.095	0.519	0.000
S13.000	S45	15 Winter	100	+30%	100/15 Summer				81.082	0.500	0.000
S13.001	S46	15 Winter	100	+30%	30/15 Summer				81.027	0.795	0.000
S11.003	S47	15 Winter	100	+30%	30/15 Summer				80.886	0.941	0.000
S11.004	S48	15 Winter	100	+30%	30/15 Summer				80.765	0.895	0.000
S11.005	S49	15 Winter	100	+30%	30/15 Summer				80.539	0.770	0.000
S11.006	S50	15 Winter	100	+30%	30/15 Summer				80.340	0.596	0.000
S14.000	S51	15 Winter	100	+30%	100/15 Winter				80.685	0.110	0.000
S15.000	S52	15 Winter	100	+30%					80.599	-0.051	0.000
S14.001	S53	15 Winter	100	+30%	100/15 Summer				80.581	0.340	0.000
S14.002	S54	15 Winter	100	+30%	30/15 Summer				80.408	0.600	0.000
S11.007	S55	15 Winter	100	+30%	30/15 Summer				80.259	0.649	0.000
S11.008	S56	15 Winter	100	+30%	30/15 Winter				79.642	0.542	0.000
S11.009	S57	15 Winter	100	+30%	30/15 Summer				78.582	0.606	0.000
S16.000	S58	15 Winter	100	+30%					80.782	-0.121	0.000
S17.000	S59	15 Winter	100	+30%					80.815	-0.130	0.000
S16.001	S60	15 Winter	100	+30%	100/15 Summer				80.757	0.140	0.000
S16.002	S61	15 Winter	100	+30%	30/15 Summer				80.581	0.135	0.000
S16.003	S62	15 Winter	100	+30%					80.206	-0.072	0.000
S16.004	S63	15 Winter	100	+30%	30/15 Summer				79.717	1.267	0.000
S18.000	S64	15 Winter	100	+30%	30/15 Summer				78.442	0.592	0.000
S16.005	S65	15 Winter	100	+30%	30/15 Summer				78.424	1.055	0.000
S11.010	S66	15 Winter	100	+30%	1/15 Winter				78.045	0.837	0.000
S11.011	S67	2160 Winter	100	+30%	30/15 Summer				77.791	0.603	0.000
S11.012	S68	2160 Winter	100	+30%	1/60 Winter				77.788	1.238	0.000
S11.013	S69	2160 Winter	100	+30%					76.374	-0.120	0.000

PN	US/MH Name	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
S1.018	S35	1.51			146.4	SURCHARGED	
S1.019	S36	0.30			25.9	SURCHARGED	
S10.000	S37	0.16			6.4	FLOOD RISK	
S10.001	S38	0.20			6.2	SURCHARGED	
S1.020	S39	0.39			31.9	SURCHARGED	
S1.021	S40	0.27			11.9	SURCHARGED	
S11.000	S41	0.18			11.7	SURCHARGED	
S12.000	S42	0.32			18.9	OK	
S11.001	S43	0.43			26.0	SURCHARGED	
S11.002	S44	0.75			43.0	SURCHARGED	
S13.000	S45	0.34			35.0	SURCHARGED	
S13.001	S46	0.74			55.9	SURCHARGED	
S11.003	S47	1.40			95.8	SURCHARGED	
S11.004	S48	1.65			117.5	SURCHARGED	
S11.005	S49	1.55			111.5	SURCHARGED	
S11.006	S50	1.14			124.2	SURCHARGED	
S14.000	S51	0.57			81.6	SURCHARGED	
S15.000	S52	0.16			15.3	OK	
S14.001	S53	0.72			112.9	SURCHARGED	

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

PN	US/MH Name	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
S14.002	S54	1.43			170.9	SURCHARGED	
S11.007	S55	1.13			281.3	SURCHARGED	
S11.008	S56	0.99			284.7	SURCHARGED	
S11.009	S57	1.51			286.5	FLOOD RISK	
S16.000	S58	0.19			19.2	OK	
S17.000	S59	0.36			18.4	OK	
S16.001	S60	1.02			79.1	SURCHARGED	
S16.002	S61	1.34			104.3	SURCHARGED	
S16.003	S62	0.91			151.8	OK	
S16.004	S63	1.08			176.5	SURCHARGED	
S18.000	S64	0.21			21.3	SURCHARGED	
S16.005	S65	1.17			220.9	SURCHARGED	
S11.010	S66	4.42			488.2	SURCHARGED	
S11.011	S67	0.14			37.5	SURCHARGED	
S11.012	S68	0.29			8.2	FLOOD RISK	
S11.013	S69	0.45			8.2	OK	

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Appendix D

Windes Foul Sewer Network Design Calculations

FOUL SEWERAGE DESIGN

Design Criteria for Foul - Main

Pipe Sizes STANDARD Manhole Sizes STANDARD

Industrial Flow (l/s/ha)	0.00	Add Flow / Climate Change (%)	0
Industrial Peak Flow Factor	0.00	Minimum Backdrop Height (m)	0.000
Flow Per Person (l/per/day)	150.00	Maximum Backdrop Height (m)	0.000
Persons per House	4.50	Min Design Depth for Optimisation (m)	0.000
Domestic (l/s/ha)	0.00	Min Vel for Auto Design only (m/s)	0.75
Domestic Peak Flow Factor	6.00	Min Slope for Optimisation (1:X)	500

Designed with Level Inverts

Network Design Table for Foul - Main

PN	Length (m)	Fall (m)	Slope (1:X)	Area (ha)	Houses	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
F1.000	26.548	0.664	40.0	0.000	4	0.0	1.500	o	150	Pipe/Conduit	
F1.001	59.825	1.496	40.0	0.000	12	0.0	1.500	o	150	Pipe/Conduit	
F1.002	21.815	0.436	50.0	0.000	6	0.0	1.500	o	150	Pipe/Conduit	
F1.003	43.626	0.873	50.0	0.000	3	0.0	1.500	o	225	Pipe/Conduit	
F2.000	33.180	0.553	60.0	0.000	4	0.0	1.500	o	150	Pipe/Conduit	
F1.004	36.955	0.185	200.0	0.000	4	0.0	1.500	o	225	Pipe/Conduit	
F1.005	44.388	0.222	199.9	0.000	2	0.0	1.500	o	225	Pipe/Conduit	
F1.006	22.531	0.113	200.0	0.000	3	0.0	1.500	o	225	Pipe/Conduit	
F3.000	47.566	0.793	60.0	0.000	20	0.0	1.500	o	225	Pipe/Conduit	
F3.001	72.208	1.203	60.0	0.000	12	0.0	1.500	o	225	Pipe/Conduit	
F3.002	6.442	0.107	60.2	0.000	0	0.0	1.500	o	225	Pipe/Conduit	
F1.007	36.635	0.183	200.0	0.000	4	0.0	1.500	o	225	Pipe/Conduit	
F1.008	20.363	0.102	200.0	0.000	1	0.0	1.500	o	225	Pipe/Conduit	
F1.009	17.580	0.088	200.0	0.000	1	0.0	1.500	o	225	Pipe/Conduit	
F1.010	18.056	0.090	200.0	0.000	0	0.0	1.500	o	225	Pipe/Conduit	

Network Results Table

PN	US/IL (m)	Σ Area (ha)	Σ Base Flow (l/s)	Σ Hse	Add Flow (l/s)	P.Dep (mm)	P.Vel (m/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
F1.000	80.820	0.000	0.0	4	0.0	10	0.39	1.39	24.5	0.2
F1.001	80.156	0.000	0.0	16	0.0	18	0.61	1.39	24.5	0.8
F1.002	78.660	0.000	0.0	22	0.0	22	0.62	1.24	21.9	1.0
F1.003	78.224	0.000	0.0	25	0.0	21	0.61	1.63	64.6	1.2
F2.000	77.953	0.000	0.0	4	0.0	11	0.34	1.13	20.0	0.2
F1.004	77.352	0.000	0.0	33	0.0	34	0.41	0.81	32.2	1.5
F1.005	77.167	0.000	0.0	35	0.0	35	0.42	0.81	32.2	1.6
F1.006	76.945	0.000	0.0	38	0.0	36	0.43	0.81	32.2	1.8
F3.000	81.464	0.000	0.0	20	0.0	20	0.54	1.48	59.0	0.9
F3.001	80.671	0.000	0.0	32	0.0	25	0.62	1.48	59.0	1.5
F3.002	78.471	0.000	0.0	32	0.0	25	0.62	1.48	58.9	1.5
F1.007	76.832	0.000	0.0	74	0.0	50	0.53	0.81	32.2	3.5
F1.008	76.649	0.000	0.0	75	0.0	50	0.53	0.81	32.2	3.5
F1.009	76.547	0.000	0.0	76	0.0	51	0.53	0.81	32.2	3.6
F1.010	76.459	0.000	0.0	76	0.0	51	0.53	0.81	32.2	3.6

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Network Design Table for Foul - Main

PN	Length (m)	Fall (m)	Slope (1:X)	Area (ha)	Houses	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
F4.000	25.628	0.427	60.0	0.000	6	0.0	1.500	o	150	Pipe/Conduit	
F4.001	6.351	0.106	59.9	0.000	0	0.0	1.500	o	150	Pipe/Conduit	
F1.011	47.219	0.236	200.0	0.000	0	0.0	1.500	o	225	Pipe/Conduit	
F1.012	47.361	0.237	200.0	0.000	0	0.0	1.500	o	225	Pipe/Conduit	
F5.000	41.666	0.694	60.0	0.000	12	0.0	1.500	o	150	Pipe/Conduit	
F5.001	14.468	0.241	60.0	0.000	0	0.0	1.500	o	150	Pipe/Conduit	
F5.002	39.453	0.658	60.0	0.000	0	0.0	1.500	o	150	Pipe/Conduit	
F6.000	23.873	0.398	60.0	0.000	2	0.0	1.500	o	150	Pipe/Conduit	
F5.003	48.026	0.800	60.0	0.000	23	0.0	1.500	o	150	Pipe/Conduit	
F5.004	13.503	0.225	60.0	0.000	0	0.0	1.500	o	150	Pipe/Conduit	
F1.013	46.253	0.231	200.0	0.000	32	0.0	1.500	o	225	Pipe/Conduit	
F1.014	27.368	0.137	200.0	0.000	0	0.0	1.500	o	225	Pipe/Conduit	
F1.015	32.206	0.161	200.0	0.000	0	0.0	1.500	o	225	Pipe/Conduit	
F1.016	16.485	0.082	200.0	0.000	0	0.0	1.500	o	225	Pipe/Conduit	
F1.017	40.210	0.201	200.0	0.000	0	0.0	1.500	o	225	Pipe/Conduit	
F1.018	53.939	0.270	200.0	0.000	0	0.0	1.500	o	225	Pipe/Conduit	
F1.019	11.403	0.057	200.0	0.000	0	0.0	1.500	o	225	Pipe/Conduit	
F7.000	26.067	0.434	60.0	0.000	7	0.0	1.500	o	150	Pipe/Conduit	
F7.001	68.778	1.146	60.0	0.000	12	0.0	1.500	o	150	Pipe/Conduit	
F7.002	7.524	0.125	60.0	0.000	0	0.0	1.500	o	150	Pipe/Conduit	

Network Results Table

PN	US/IL (m)	Σ Area (ha)	Σ Base Flow (l/s)	Σ Hse Add Flow (l/s)	P.Dep (mm)	P.Vel (m/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
F4.000	80.600	0.000	0.0	6	0.0	13	0.39	1.13	20.0	0.3
F4.001	78.173	0.000	0.0	6	0.0	13	0.39	1.13	20.0	0.3
F1.011	76.369	0.000	0.0	82	0.0	53	0.54	0.81	32.2	3.8
F1.012	76.133	0.000	0.0	82	0.0	53	0.54	0.81	32.2	3.8
F5.000	80.500	0.000	0.0	12	0.0	18	0.49	1.13	20.0	0.6
F5.001	79.806	0.000	0.0	12	0.0	18	0.49	1.13	20.0	0.6
F5.002	79.564	0.000	0.0	12	0.0	18	0.49	1.13	20.0	0.6
F6.000	80.188	0.000	0.0	2	0.0	8	0.27	1.13	20.0	0.1
F5.003	78.907	0.000	0.0	37	0.0	30	0.69	1.13	20.0	1.7
F5.004	78.106	0.000	0.0	37	0.0	30	0.69	1.13	20.0	1.7
F1.013	75.896	0.000	0.0	151	0.0	72	0.65	0.81	32.2	7.1
F1.014	75.665	0.000	0.0	151	0.0	72	0.65	0.81	32.2	7.1
F1.015	75.528	0.000	0.0	151	0.0	72	0.65	0.81	32.2	7.1
F1.016	75.367	0.000	0.0	151	0.0	72	0.65	0.81	32.2	7.1
F1.017	75.284	0.000	0.0	151	0.0	72	0.65	0.81	32.2	7.1
F1.018	75.083	0.000	0.0	151	0.0	72	0.65	0.81	32.2	7.1
F1.019	74.814	0.000	0.0	151	0.0	72	0.65	0.81	32.2	7.1
F7.000	79.954	0.000	0.0	7	0.0	14	0.41	1.13	20.0	0.3
F7.001	79.520	0.000	0.0	19	0.0	22	0.56	1.13	20.0	0.9
F7.002	78.373	0.000	0.0	19	0.0	22	0.56	1.13	20.0	0.9

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Network Design Table for Foul - Main

PN	Length (m)	Fall (m)	Slope (1:X)	Area (ha)	Houses	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
F8.000	37.930	0.190	200.0	0.000	7	0.0	1.500	o	300	Pipe/Conduit	
F7.003	66.042	0.330	200.0	0.000	12	0.0	1.500	o	300	Pipe/Conduit	
F7.004	21.761	0.109	200.0	0.000	0	0.0	1.500	o	300	Pipe/Conduit	
F9.000	13.915	0.232	60.0	0.000	4	0.0	1.500	o	150	Pipe/Conduit	
F9.001	21.847	0.364	60.0	0.000	4	0.0	1.500	o	150	Pipe/Conduit	
F9.002	21.441	0.357	60.1	0.000	24	0.0	1.500	o	225	Pipe/Conduit	
F7.005	18.166	0.091	199.6	0.000	4	0.0	1.500	o	225	Pipe/Conduit	
F7.006	19.846	0.099	200.0	0.000	13	0.0	1.500	o	225	Pipe/Conduit	
F7.007	33.942	0.170	200.0	0.000	0	0.0	1.500	o	225	Pipe/Conduit	
F7.008	32.719	0.164	200.0	0.000	6	0.0	1.500	o	225	Pipe/Conduit	
F10.000	30.358	0.759	40.0	0.000	3	0.0	1.500	o	150	Pipe/Conduit	
F7.009	27.553	0.138	200.0	0.000	3	0.0	1.500	o	225	Pipe/Conduit	
F7.010	5.848	0.029	200.0	0.000	0	0.0	1.500	o	225	Pipe/Conduit	
F11.000	29.749	0.496	60.0	0.000	6	0.0	1.500	o	150	Pipe/Conduit	
F11.001	28.642	0.477	60.0	0.000	0	0.0	1.500	o	150	Pipe/Conduit	
F11.002	9.145	0.152	60.0	0.000	0	0.0	1.500	o	150	Pipe/Conduit	
F11.003	17.984	0.300	60.0	0.000	2	0.0	1.500	o	150	Pipe/Conduit	
F11.004	8.440	0.141	59.9	0.000	1	0.0	1.500	o	150	Pipe/Conduit	
F7.011	13.714	0.069	200.0	0.000	1	0.0	1.500	o	225	Pipe/Conduit	
F7.012	46.219	0.231	200.0	0.000	6	0.0	1.500	o	225	Pipe/Conduit	
F7.013	9.731	0.049	200.0	0.000	0	0.0	1.500	o	225	Pipe/Conduit	

Network Results Table

PN	US/IL (m)	Σ Area (ha)	Σ Base Flow (l/s)	Σ Hse	Add Flow (l/s)	P.Dep (mm)	P.Vel (m/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
F8.000	76.270	0.000	0.0	7	0.0	15	0.24	0.98	69.2	0.3
F7.003	76.080	0.000	0.0	38	0.0	33	0.42	0.98	69.2	1.8
F7.004	75.750	0.000	0.0	38	0.0	33	0.42	0.98	69.2	1.8
F9.000	80.100	0.000	0.0	4	0.0	11	0.34	1.13	20.0	0.2
F9.001	79.868	0.000	0.0	8	0.0	15	0.43	1.13	20.0	0.4
F9.002	77.504	0.000	0.0	32	0.0	25	0.62	1.48	59.0	1.5
F7.005	75.641	0.000	0.0	74	0.0	50	0.53	0.81	32.2	3.5
F7.006	75.550	0.000	0.0	87	0.0	54	0.55	0.81	32.2	4.1
F7.007	75.451	0.000	0.0	87	0.0	54	0.55	0.81	32.2	4.1
F7.008	75.281	0.000	0.0	93	0.0	56	0.56	0.81	32.2	4.4
F10.000	78.300	0.000	0.0	3	0.0	9	0.36	1.39	24.5	0.1
F7.009	75.118	0.000	0.0	99	0.0	58	0.58	0.81	32.2	4.6
F7.010	74.980	0.000	0.0	99	0.0	58	0.58	0.81	32.2	4.6
F11.000	81.250	0.000	0.0	6	0.0	13	0.39	1.13	20.0	0.3
F11.001	80.754	0.000	0.0	6	0.0	13	0.39	1.13	20.0	0.3
F11.002	80.277	0.000	0.0	6	0.0	13	0.39	1.13	20.0	0.3
F11.003	80.124	0.000	0.0	8	0.0	15	0.43	1.13	20.0	0.4
F11.004	77.425	0.000	0.0	9	0.0	15	0.44	1.13	20.0	0.4
F7.011	74.951	0.000	0.0	109	0.0	61	0.59	0.81	32.2	5.1
F7.012	74.882	0.000	0.0	115	0.0	62	0.60	0.81	32.2	5.4
F7.013	74.651	0.000	0.0	115	0.0	62	0.60	0.81	32.2	5.4

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Network Design Table for Foul - Main

PN	Length (m)	Fall (m)	Slope (1:X)	Area (ha)	Houses	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
F12.000	48.448	0.807	60.0	0.000	9	0.0	1.500	o	150	Pipe/Conduit	
F7.014	63.303	1.055	60.0	0.000	0	0.0	1.500	o	225	Pipe/Conduit	
F13.000	49.400	0.751	65.8	0.000	6	0.0	1.500	o	150	Pipe/Conduit	
F7.015	13.533	0.068	200.0	0.000	0	0.0	1.500	o	225	Pipe/Conduit	
F7.016	67.302	0.337	200.0	0.000	0	0.0	1.500	o	225	Pipe/Conduit	
F7.017	53.111	0.266	200.0	0.000	0	0.0	1.500	o	225	Pipe/Conduit	
F7.018	44.133	0.221	200.0	0.000	0	0.0	1.500	o	225	Pipe/Conduit	
F7.019	33.289	0.166	200.0	0.000	0	0.0	1.500	o	225	Pipe/Conduit	
F7.020	18.960	0.095	200.0	0.000	0	0.0	1.500	o	225	Pipe/Conduit	
F1.020	2.968	0.015	200.0	0.000	0	0.0	1.500	o	225	Pipe/Conduit	

Network Results Table

PN	US/IL (m)	Σ Area (ha)	Σ Base Flow (l/s)	Σ Hse	Add Flow (l/s)	P.Dep (mm)	P.Vel (m/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
F12.000	75.590	0.000	0.0	9	0.0	15	0.44	1.13	20.0	0.4
F7.014	74.602	0.000	0.0	124	0.0	48	0.94	1.48	59.0	5.8
F13.000	74.169	0.000	0.0	6	0.0	13	0.38	1.08	19.1	0.3
F7.015	73.418	0.000	0.0	130	0.0	66	0.62	0.81	32.2	6.1
F7.016	73.351	0.000	0.0	130	0.0	66	0.62	0.81	32.2	6.1
F7.017	73.014	0.000	0.0	130	0.0	66	0.62	0.81	32.2	6.1
F7.018	72.749	0.000	0.0	130	0.0	66	0.62	0.81	32.2	6.1
F7.019	72.528	0.000	0.0	130	0.0	66	0.62	0.81	32.2	6.1
F7.020	72.361	0.000	0.0	130	0.0	66	0.62	0.81	32.2	6.1
F1.020	72.267	0.000	0.0	281	0.0	100	0.77	0.81	32.2	13.2

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Manhole Schedules for Foul - Main

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)
F1	82.245	1.425	Open Manhole	1050	F1.000	80.820	150				
F2	82.335	2.179	Open Manhole	1200	F1.001	80.156	150	F1.000	80.156	150	
F3	81.600	2.940	Open Manhole	1200	F1.002	78.660	150	F1.001	78.660	150	
F4	80.720	2.496	Open Manhole	1200	F1.003	78.224	225	F1.002	78.224	150	
F5	78.853	0.900	Open Manhole	1050	F2.000	77.953	150				
F6	78.870	1.518	Open Manhole	1050	F1.004	77.352	225	F1.003	77.352	225	
								F2.000	77.400	150	
F7	78.645	1.478	Open Manhole	1050	F1.005	77.167	225	F1.004	77.167	225	
F8	80.237	3.292	Open Manhole	1200	F1.006	76.945	225	F1.005	76.945	225	
F9	82.714	1.250	Open Manhole	1050	F3.000	81.464	225				
F10	82.392	1.721	Open Manhole	1050	F3.001	80.671	225	F3.000	80.671	225	
F11	81.862	3.391	Open Manhole	1200	F3.002	78.471	225	F3.001	79.468	225	997
F11	81.331	4.499	Open Manhole	1200	F1.007	76.832	225	F1.006	76.832	225	
								F3.002	78.364	225	1532
F12	81.115	4.466	Open Manhole	1200	F1.008	76.649	225	F1.007	76.649	225	
F13	81.600	5.053	Open Manhole	1200	F1.009	76.547	225	F1.008	76.547	225	
F14	81.560	5.101	Open Manhole	1200	F1.010	76.459	225	F1.009	76.459	225	
F15	81.950	1.350	Open Manhole	1050	F4.000	80.600	150				
F16	81.680	3.507	Open Manhole	1200	F4.001	78.173	150	F4.000	80.173	150	2000
F17	81.600	5.231	Open Manhole	1200	F1.011	76.369	225	F1.010	76.369	225	
								F4.001	78.067	150	1623
F18	81.994	5.861	Open Manhole	1200	F1.012	76.133	225	F1.011	76.133	225	
F19	81.850	1.350	Open Manhole	1050	F5.000	80.500	150				
F20	81.840	2.034	Open Manhole	1200	F5.001	79.806	150	F5.000	79.806	150	
F21	81.900	2.336	Open Manhole	1200	F5.002	79.564	150	F5.001	79.564	150	
F22	81.538	1.350	Open Manhole	1050	F6.000	80.188	150				
F23	81.800	2.893	Open Manhole	1200	F5.003	78.907	150	F5.002	78.907	150	
								F6.000	79.790	150	883
F24	82.280	4.174	Open Manhole	1200	F5.004	78.106	150	F5.003	78.106	150	
F25	82.400	6.504	Open Manhole	1200	F1.013	75.896	225	F1.012	75.896	225	
								F5.004	77.881	150	1910
F26	82.910	7.245	Open Manhole	1200	F1.014	75.665	225	F1.013	75.665	225	
F27	82.845	7.317	Open Manhole	1200	F1.015	75.528	225	F1.014	75.528	225	
F28	83.300	7.933	Open Manhole	1200	F1.016	75.367	225	F1.015	75.367	225	
F29	83.300	8.016	Open Manhole	1200	F1.017	75.284	225	F1.016	75.284	225	
F30	82.340	7.257	Open Manhole	1200	F1.018	75.083	225	F1.017	75.083	225	
F31	80.700	5.886	Open Manhole	1200	F1.019	74.814	225	F1.018	74.814	225	
F32	81.304	1.350	Open Manhole	1050	F7.000	79.954	150				
F33	80.790	1.270	Open Manhole	1050	F7.001	79.520	150	F7.000	79.520	150	
F34	81.342	2.969	Open Manhole	1200	F7.002	78.373	150	F7.001	78.373	150	
F35	81.220	4.950	Open Manhole	1200	F8.000	76.270	300				
F36	81.124	5.044	Open Manhole	1200	F7.003	76.080	300	F7.002	78.248	150	2018
								F8.000	76.080	300	
F37	81.000	5.250	Open Manhole	1200	F7.004	75.750	300	F7.003	75.750	300	
F38	81.450	1.350	Open Manhole	1050	F9.000	80.100	150				
F39	81.291	1.423	Open Manhole	1050	F9.001	79.868	150	F9.000	79.868	150	

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Manhole Schedules for Foul - Main

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)
F40	81.100	3.596	Open Manhole	1200	F9.002	77.504	225	F9.001	79.504	150	1925
F41	81.240	5.599	Open Manhole	1200	F7.005	75.641	225	F7.004	75.641	300	
								F9.002	77.147	225	1506
F42	81.435	5.885	Open Manhole	1200	F7.006	75.550	225	F7.005	75.550	225	
F43	81.250	5.799	Open Manhole	1200	F7.007	75.451	225	F7.006	75.451	225	
F44	81.051	5.770	Open Manhole	1200	F7.008	75.281	225	F7.007	75.281	225	
F45	79.650	1.350	Open Manhole	1050	F10.000	78.300	150				
F46	80.020	4.902	Open Manhole	1200	F7.009	75.118	225	F7.008	75.118	225	
								F10.000	77.541	150	2348
F47	80.550	5.570	Open Manhole	1200	F7.010	74.980	225	F7.009	74.980	225	
F48	82.600	1.350	Open Manhole	1050	F11.000	81.250	150				
F49	82.430	1.676	Open Manhole	1200	F11.001	80.754	150	F11.000	80.754	150	
F50	81.700	1.423	Open Manhole	1050	F11.002	80.277	150	F11.001	80.277	150	
F51	81.400	1.276	Open Manhole	1050	F11.003	80.124	150	F11.002	80.124	150	
F52	80.900	3.475	Open Manhole	1200	F11.004	77.425	150	F11.003	79.825	150	2400
F53	80.600	5.649	Open Manhole	1200	F7.011	74.951	225	F7.010	74.951	225	
								F11.004	77.284	150	2258
F54	79.950	5.068	Open Manhole	1200	F7.012	74.882	225	F7.011	74.882	225	
F55	77.600	2.949	Open Manhole	1200	F7.013	74.651	225	F7.012	74.651	225	
F56	76.940	1.350	Open Manhole	1050	F12.000	75.590	150				
F57	77.300	2.698	Open Manhole	1200	F7.014	74.602	225	F7.013	74.602	225	
								F12.000	74.783	150	105
F58	75.067	0.898	Open Manhole	1050	F13.000	74.169	150				
F59	75.726	2.308	Open Manhole	1200	F7.015	73.418	225	F7.014	73.547	225	129
								F13.000	73.418	150	
F60	75.400	2.049	Open Manhole	1200	F7.016	73.351	225	F7.015	73.351	225	
F61	76.710	3.696	Open Manhole	1200	F7.017	73.014	225	F7.016	73.014	225	
F62	78.150	5.401	Open Manhole	1200	F7.018	72.749	225	F7.017	72.749	225	
F63	79.480	6.952	Open Manhole	1200	F7.019	72.528	225	F7.018	72.528	225	
F64	80.500	8.139	Open Manhole	1200	F7.020	72.361	225	F7.019	72.361	225	
FFP1	80.250	7.983	Open Manhole	1200	F1.020	72.267	225	F1.019	74.757	225	2490
								F7.020	72.267	225	
F	80.250	7.998	Open Manhole	0		OUTFALL		F1.020	72.252	225	

MH Name	Manhole Easting (m)	Manhole Northing (m)	Intersection Easting (m)	Intersection Northing (m)	Manhole Access	Layout (North)
F1	687420.029	739945.081	687420.029	739945.081	Required	
F2	687409.765	739969.565	687409.765	739969.565	Required	
F3	687352.981	739950.731	687352.981	739950.731	Required	

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Manhole Schedules for Foul - Main

MH Name	Manhole Easting (m)	Manhole Northing (m)	Intersection Easting (m)	Intersection Northing (m)	Manhole Access	Layout (North)
F4	687331.511	739946.870	687331.511	739946.870	Required	
F5	687300.763	739901.489	687300.763	739901.489	Required	
F6	687290.171	739932.933	687290.171	739932.933	Required	
F7	687278.400	739967.964	687278.400	739967.964	Required	
F8	687301.395	740005.932	687301.395	740005.932	Required	
F9	687412.415	739992.852	687412.415	739992.852	Required	
F10	687397.367	740037.976	687397.367	740037.976	Required	
F11	687328.843	740015.206	687328.843	740015.206	Required	
F11	687322.720	740013.204	687322.720	740013.204	Required	
F12	687311.137	740047.960	687311.137	740047.960	Required	
F13	687323.268	740064.316	687323.268	740064.316	Required	
F14	687324.521	740081.851	687324.521	740081.851	Required	
F15	687365.149	740097.275	687365.149	740097.275	Required	
F16	687340.825	740089.204	687340.825	740089.204	Required	
F17	687337.372	740094.535	687337.372	740094.535	Required	
F18	687340.875	740141.624	687340.875	740141.624	Required	
F19	687419.796	740064.405	687419.796	740064.405	Required	
F20	687406.566	740103.915	687406.566	740103.915	Required	
F21	687394.447	740111.817	687394.447	740111.817	Required	

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Manhole Schedules for Foul - Main

MH Name	Manhole Easting (m)	Manhole Northing (m)	Intersection Easting (m)	Intersection Northing (m)	Manhole Access	Layout (North)
F22	687436.234	740132.213	687436.234	740132.213	Required	
F23	687415.991	740144.868	687415.991	740144.868	Required	
F24	687375.955	740171.394	687375.955	740171.394	Required	
F25	687366.762	740181.284	687366.762	740181.284	Required	
F26	687337.826	740217.368	687337.826	740217.368	Required	
F27	687319.524	740237.716	687319.524	740237.716	Required	
F28	687298.666	740262.254	687298.666	740262.254	Required	
F29	687306.284	740276.873	687306.284	740276.873	Required	
F30	687313.459	740316.438	687313.459	740316.438	Required	
F31	687328.515	740368.233	687328.515	740368.233	Required	
F32	687468.445	739996.529	687468.445	739996.529	Required	
F33	687486.146	740015.663	687486.146	740015.663	Required	
F34	687532.899	740066.107	687532.899	740066.107	Required	
F35	687565.157	740052.905	687565.157	740052.905	Required	
F36	687533.381	740073.615	687533.381	740073.615	Required	
F37	687477.947	740109.514	687477.947	740109.514	Required	
F38	687466.938	740059.033	687466.938	740059.033	Required	
F39	687468.896	740072.810	687468.896	740072.810	Required	
F40	687466.866	740094.562	687466.866	740094.562	Required	

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Manhole Schedules for Foul - Main

MH Name	Manhole Easting (m)	Manhole Northing (m)	Intersection Easting (m)	Intersection Northing (m)	Manhole Access	Layout (North)
F41	687456.526	740113.345	687456.526	740113.345	Required	
F42	687444.487	740126.948	687444.487	740126.948	Required	
F43	687455.290	740143.597	687455.290	740143.597	Required	
F44	687473.650	740172.144	687473.650	740172.144	Required	
F45	687514.772	740189.016	687514.772	740189.016	Required	
F46	687487.278	740201.890	687487.278	740201.890	Required	
F47	687464.176	740216.905	687464.176	740216.905	Required	
F48	687401.645	740179.353	687401.645	740179.353	Required	
F49	687417.865	740204.292	687417.865	740204.292	Required	
F50	687431.373	740229.549	687431.373	740229.549	Required	
F51	687440.080	740232.344	687440.080	740232.344	Required	
F52	687455.775	740223.564	687455.775	740223.564	Required	
F53	687464.176	740222.753	687464.176	740222.753	Required	
F54	687473.837	740232.487	687473.837	740232.487	Required	
F55	687493.393	740274.365	687493.393	740274.365	Required	
F56	687545.105	740261.032	687545.105	740261.032	Required	
F57	687500.812	740280.662	687500.812	740280.662	Required	
F58	687570.662	740321.210	687570.662	740321.210	Required	
F59	687524.689	740339.290	687524.689	740339.290	Required	

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Manhole Schedules for Foul - Main

MH Name	Manhole Easting (m)	Manhole Northing (m)	Intersection Easting (m)	Intersection Northing (m)	Manhole Access	Layout (North)
F60	687526.846	740352.650	687526.846	740352.650	Required	
F61	687461.993	740370.641	687461.993	740370.641	Required	
F62	687410.657	740384.257	687410.657	740384.257	Required	
F63	687367.634	740394.096	687367.634	740394.096	Required	
F64	687358.255	740362.156	687358.255	740362.156	Required	
FFP1	687339.612	740365.606	687339.612	740365.606	Required	
F	687338.851	740362.737			No Entry	



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PIPELINE SCHEDULES for Foul - Main

Upstream Manhole

PN	Hyd Sect	Diam (mm)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
F1.000	o	150	F1	82.245	80.820	1.275	Open Manhole	1050
F1.001	o	150	F2	82.335	80.156	2.029	Open Manhole	1200
F1.002	o	150	F3	81.600	78.660	2.790	Open Manhole	1200
F1.003	o	225	F4	80.720	78.224	2.271	Open Manhole	1200
F2.000	o	150	F5	78.853	77.953	0.750	Open Manhole	1050
F1.004	o	225	F6	78.870	77.352	1.293	Open Manhole	1050
F1.005	o	225	F7	78.645	77.167	1.253	Open Manhole	1050
F1.006	o	225	F8	80.237	76.945	3.067	Open Manhole	1200
F3.000	o	225	F9	82.714	81.464	1.025	Open Manhole	1050
F3.001	o	225	F10	82.392	80.671	1.496	Open Manhole	1050
F3.002	o	225	F11	81.862	78.471	3.166	Open Manhole	1200
F1.007	o	225	F11	81.331	76.832	4.274	Open Manhole	1200
F1.008	o	225	F12	81.115	76.649	4.241	Open Manhole	1200
F1.009	o	225	F13	81.600	76.547	4.828	Open Manhole	1200
F1.010	o	225	F14	81.560	76.459	4.876	Open Manhole	1200
F4.000	o	150	F15	81.950	80.600	1.200	Open Manhole	1050
F4.001	o	150	F16	81.680	78.173	3.357	Open Manhole	1200
F1.011	o	225	F17	81.600	76.369	5.006	Open Manhole	1200
F1.012	o	225	F18	81.994	76.133	5.636	Open Manhole	1200

Downstream Manhole

PN	Length (m)	Slope (1:X)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
F1.000	26.548	40.0	F2	82.335	80.156	2.029	Open Manhole	1200
F1.001	59.825	40.0	F3	81.600	78.660	2.790	Open Manhole	1200
F1.002	21.815	50.0	F4	80.720	78.224	2.346	Open Manhole	1200
F1.003	43.626	50.0	F6	78.870	77.352	1.293	Open Manhole	1050
F2.000	33.180	60.0	F6	78.870	77.400	1.320	Open Manhole	1050
F1.004	36.955	200.0	F7	78.645	77.167	1.253	Open Manhole	1050
F1.005	44.388	199.9	F8	80.237	76.945	3.067	Open Manhole	1200
F1.006	22.531	200.0	F11	81.331	76.832	4.274	Open Manhole	1200
F3.000	47.566	60.0	F10	82.392	80.671	1.496	Open Manhole	1050
F3.001	72.208	60.0	F11	81.862	79.468	2.169	Open Manhole	1200
F3.002	6.442	60.2	F11	81.331	78.364	2.742	Open Manhole	1200
F1.007	36.635	200.0	F12	81.115	76.649	4.241	Open Manhole	1200
F1.008	20.363	200.0	F13	81.600	76.547	4.828	Open Manhole	1200
F1.009	17.580	200.0	F14	81.560	76.459	4.876	Open Manhole	1200
F1.010	18.056	200.0	F17	81.600	76.369	5.006	Open Manhole	1200
F4.000	25.628	60.0	F16	81.680	80.173	1.357	Open Manhole	1200
F4.001	6.351	59.9	F17	81.600	78.067	3.383	Open Manhole	1200
F1.011	47.219	200.0	F18	81.994	76.133	5.636	Open Manhole	1200
F1.012	47.361	200.0	F25	82.400	75.896	6.279	Open Manhole	1200

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PIPELINE SCHEDULES for Foul - Main

Upstream Manhole

PN	Hyd Sect	Diam (mm)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
F5.000	o	150	F19	81.850	80.500	1.200	Open Manhole	1050
F5.001	o	150	F20	81.840	79.806	1.884	Open Manhole	1200
F5.002	o	150	F21	81.900	79.564	2.186	Open Manhole	1200
F6.000	o	150	F22	81.538	80.188	1.200	Open Manhole	1050
F5.003	o	150	F23	81.800	78.907	2.743	Open Manhole	1200
F5.004	o	150	F24	82.280	78.106	4.024	Open Manhole	1200
F1.013	o	225	F25	82.400	75.896	6.279	Open Manhole	1200
F1.014	o	225	F26	82.910	75.665	7.020	Open Manhole	1200
F1.015	o	225	F27	82.845	75.528	7.092	Open Manhole	1200
F1.016	o	225	F28	83.300	75.367	7.708	Open Manhole	1200
F1.017	o	225	F29	83.300	75.284	7.791	Open Manhole	1200
F1.018	o	225	F30	82.340	75.083	7.032	Open Manhole	1200
F1.019	o	225	F31	80.700	74.814	5.661	Open Manhole	1200
F7.000	o	150	F32	81.304	79.954	1.200	Open Manhole	1050
F7.001	o	150	F33	80.790	79.520	1.120	Open Manhole	1050
F7.002	o	150	F34	81.342	78.373	2.819	Open Manhole	1200
F8.000	o	300	F35	81.220	76.270	4.650	Open Manhole	1200
F7.003	o	300	F36	81.124	76.080	4.744	Open Manhole	1200
F7.004	o	300	F37	81.000	75.750	4.950	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)
F5.000	41.666	60.0	F20	81.840	79.806	1.884	Open Manhole	1200
F5.001	14.468	60.0	F21	81.900	79.564	2.186	Open Manhole	1200
F5.002	39.453	60.0	F23	81.800	78.907	2.743	Open Manhole	1200
F6.000	23.873	60.0	F23	81.800	79.790	1.860	Open Manhole	1200
F5.003	48.026	60.0	F24	82.280	78.106	4.024	Open Manhole	1200
F5.004	13.503	60.0	F25	82.400	77.881	4.369	Open Manhole	1200
F1.013	46.253	200.0	F26	82.910	75.665	7.020	Open Manhole	1200
F1.014	27.368	200.0	F27	82.845	75.528	7.092	Open Manhole	1200
F1.015	32.206	200.0	F28	83.300	75.367	7.708	Open Manhole	1200
F1.016	16.485	200.0	F29	83.300	75.284	7.791	Open Manhole	1200
F1.017	40.210	200.0	F30	82.340	75.083	7.032	Open Manhole	1200
F1.018	53.939	200.0	F31	80.700	74.814	5.661	Open Manhole	1200
F1.019	11.403	200.0	FFP1	80.250	74.757	5.268	Open Manhole	1200
F7.000	26.067	60.0	F33	80.790	79.520	1.120	Open Manhole	1050
F7.001	68.778	60.0	F34	81.342	78.373	2.819	Open Manhole	1200
F7.002	7.524	60.0	F36	81.124	78.248	2.726	Open Manhole	1200
F8.000	37.930	200.0	F36	81.124	76.080	4.744	Open Manhole	1200
F7.003	66.042	200.0	F37	81.000	75.750	4.950	Open Manhole	1200
F7.004	21.761	200.0	F41	81.240	75.641	5.299	Open Manhole	1200

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PIPELINE SCHEDULES for Foul - Main

Upstream Manhole

PN	Hyd Sect	Diam (mm)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
F9.000	o	150	F38	81.450	80.100	1.200	Open Manhole	1050
F9.001	o	150	F39	81.291	79.868	1.273	Open Manhole	1050
F9.002	o	225	F40	81.100	77.504	3.371	Open Manhole	1200
F7.005	o	225	F41	81.240	75.641	5.374	Open Manhole	1200
F7.006	o	225	F42	81.435	75.550	5.660	Open Manhole	1200
F7.007	o	225	F43	81.250	75.451	5.574	Open Manhole	1200
F7.008	o	225	F44	81.051	75.281	5.545	Open Manhole	1200
F10.000	o	150	F45	79.650	78.300	1.200	Open Manhole	1050
F7.009	o	225	F46	80.020	75.118	4.677	Open Manhole	1200
F7.010	o	225	F47	80.550	74.980	5.345	Open Manhole	1200
F11.000	o	150	F48	82.600	81.250	1.200	Open Manhole	1050
F11.001	o	150	F49	82.430	80.754	1.526	Open Manhole	1200
F11.002	o	150	F50	81.700	80.277	1.273	Open Manhole	1050
F11.003	o	150	F51	81.400	80.124	1.126	Open Manhole	1050
F11.004	o	150	F52	80.900	77.425	3.325	Open Manhole	1200
F7.011	o	225	F53	80.600	74.951	5.424	Open Manhole	1200
F7.012	o	225	F54	79.950	74.882	4.843	Open Manhole	1200
F7.013	o	225	F55	77.600	74.651	2.724	Open Manhole	1200
F12.000	o	150	F56	76.940	75.590	1.200	Open Manhole	1050

Downstream Manhole

PN	Length (m)	Slope (1:X)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
F9.000	13.915	60.0	F39	81.291	79.868	1.273	Open Manhole	1050
F9.001	21.847	60.0	F40	81.100	79.504	1.446	Open Manhole	1200
F9.002	21.441	60.1	F41	81.240	77.147	3.868	Open Manhole	1200
F7.005	18.166	199.6	F42	81.435	75.550	5.660	Open Manhole	1200
F7.006	19.846	200.0	F43	81.250	75.451	5.574	Open Manhole	1200
F7.007	33.942	200.0	F44	81.051	75.281	5.545	Open Manhole	1200
F7.008	32.719	200.0	F46	80.020	75.118	4.677	Open Manhole	1200
F10.000	30.358	40.0	F46	80.020	77.541	2.329	Open Manhole	1200
F7.009	27.553	200.0	F47	80.550	74.980	5.345	Open Manhole	1200
F7.010	5.848	200.0	F53	80.600	74.951	5.424	Open Manhole	1200
F11.000	29.749	60.0	F49	82.430	80.754	1.526	Open Manhole	1200
F11.001	28.642	60.0	F50	81.700	80.277	1.273	Open Manhole	1050
F11.002	9.145	60.0	F51	81.400	80.124	1.126	Open Manhole	1050
F11.003	17.984	60.0	F52	80.900	79.825	0.925	Open Manhole	1200
F11.004	8.440	59.9	F53	80.600	77.284	3.166	Open Manhole	1200
F7.011	13.714	200.0	F54	79.950	74.882	4.843	Open Manhole	1200
F7.012	46.219	200.0	F55	77.600	74.651	2.724	Open Manhole	1200
F7.013	9.731	200.0	F57	77.300	74.602	2.473	Open Manhole	1200
F12.000	48.448	60.0	F57	77.300	74.783	2.367	Open Manhole	1200

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PIPELINE SCHEDULES for Foul - Main

Upstream Manhole

PN	Hyd Sect	Diam (mm)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
F7.014	o	225	F57	77.300	74.602	2.473	Open Manhole	1200
F13.000	o	150	F58	75.067	74.169	0.748	Open Manhole	1050
F7.015	o	225	F59	75.726	73.418	2.083	Open Manhole	1200
F7.016	o	225	F60	75.400	73.351	1.824	Open Manhole	1200
F7.017	o	225	F61	76.710	73.014	3.471	Open Manhole	1200
F7.018	o	225	F62	78.150	72.749	5.176	Open Manhole	1200
F7.019	o	225	F63	79.480	72.528	6.727	Open Manhole	1200
F7.020	o	225	F64	80.500	72.361	7.914	Open Manhole	1200
F1.020	o	225	FFP1	80.250	72.267	7.758	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)
F7.014	63.303	60.0	F59	75.726	73.547	1.954	Open Manhole	1200
F13.000	49.400	65.8	F59	75.726	73.418	2.158	Open Manhole	1200
F7.015	13.533	200.0	F60	75.400	73.351	1.824	Open Manhole	1200
F7.016	67.302	200.0	F61	76.710	73.014	3.471	Open Manhole	1200
F7.017	53.111	200.0	F62	78.150	72.749	5.176	Open Manhole	1200
F7.018	44.133	200.0	F63	79.480	72.528	6.727	Open Manhole	1200
F7.019	33.289	200.0	F64	80.500	72.361	7.914	Open Manhole	1200
F7.020	18.960	200.0	FFP1	80.250	72.267	7.758	Open Manhole	1200
F1.020	2.968	200.0	F	80.250	72.252	7.773	Open Manhole	0

Free Flowing Outfall Details for Foul - Main

Outfall Pipe Number	Outfall Name	C. Level (m)	I. Level (m)	Min I. Level (m)	D,L (mm)	W (mm)
F1.020	F	80.250	72.252	72.500	0	0

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CS CONSULTING
GROUP

Appendix E

Irish Water Statement of Design Acceptance

Robert Fitzmaurice
19-22 Dame Street
Dublin 2
Co. Dublin D02E267

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

5 September 2022

Re: Design Submission for Site Located Off The R148 & R158, Abutting Junction 8 on The M4, Kilcock, Kildare (the "Development")
(the "Design Submission") / Connection Reference No: CDS22004615

Dear Robert Fitzmaurice,

Many thanks for your recent Design Submission.

We have reviewed your proposal for the connection(s) at the Development. Based on the information provided, which included the documents outlined in Appendix A to this letter, Irish Water has no objection to your proposals.

This letter does not constitute an offer, in whole or in part, to provide a connection to any Irish Water infrastructure. Before you can connect to our network you must sign a connection agreement with Irish Water. This can be applied for by completing the connection application form at www.water.ie/connections. Irish Water's current charges for water and wastewater connections are set out in the Water Charges Plan as approved by the Commission for Regulation of Utilities (CRU)(https://www.cru.ie/document_group/irish-waters-water-charges-plan-2018/).

You the Customer (including any designers/contractors or other related parties appointed by you) is entirely responsible for the design and construction of all water and/or wastewater infrastructure within the Development which is necessary to facilitate connection(s) from the boundary of the Development to Irish Water's network(s) (the "**Self-Lay Works**"), as reflected in your Design Submission. Acceptance of the Design Submission by Irish Water does not, in any way, render Irish Water liable for any elements of the design and/or construction of the Self-Lay Works.

If you have any further questions, please contact your Irish Water representative:
Name: Dario Alvarez
Email: dalvarez@water.ie

Yours sincerely,

Yvonne Harris

Yvonne Harris
Head of Customer Operations

Appendix A

Document Title & Revision

- [S037-CSC-XX-XX-DR-C-0107 – Watermain layout]
- [S037-CSC-XX-XX-DR-C-0105 to 0106 – Foul Sewer layout]
- [S037-CSC-XX-XX-DR-C-0128 to 0130 – Foul Long sections]

Standard Details/Code of Practice Exemption: N/A

For further information, visit ***www.water.ie/connections***

Notwithstanding any matters listed above, the Customer (including any appointed designers/contractors, etc.) is entirely responsible for the design and construction of the Self-Lay Works. Acceptance of the Design Submission by Irish Water will not, in any way, render Irish Water liable for any elements of the design and/or construction of the Self-Lay Works.

Stiúrthóirí / Directors: Cathal Marley (Chairman), Niall Gleeson, Eamon Gallen, Yvonne Harris, Brendan Murphy, Dawn O'Driscoll, Maria O'Dwyer
Oifig Chláraithe / Registered Office: Teach Colvill, 24-26 Sráid Thalbóid, Baile Átha Cliath 1, D01 NP86 / Colvill House, 24-26 Talbot Street, Dublin 1 D01 NP86
Is cuideachta ghníomhaíochta ainmnithe atá faoi theorainn scaireanna é Uisce Éireann / Irish Water is a designated activity company, limited by shares.
Uimhir Chláraithe in Éirinn / Registered in Ireland No.: 530363

NEW 180Ø WATERMAIN CONNECTION TO THE EXISTING PUBLIC MAIN IN AGREEMENT WITH IRISH WATER.

NEW BULK METER TO BE CONSTRUCTED TO IRISH WATER STANDARD DETAIL STD-W-26

R148

OFF-LINE HYDRANT TO CALIBRATE METER TO BE CONSTRUCTED TO IRISH WATER STANDARD DETAIL STD-W-17

PROPOSED OFF-LINE SCOUR VALVE AND SCOUR CHAMBER TO BE LOCATED AT LOW POINTS WITH CONNECTION TO THE SURFACE WATER SYSTEM TO BE AGREED WITH THE LOCAL AUTHORITY. SCOUR VALVE AND SCOUR CHAMBER (WITH NON RETURN VALVE) TO BE AS PER CLAUSE 3.16.4 AND 3.21 OF THE IRISH WATER CODE OF PRACTICE TO BE CONSTRUCTED TO IRISH WATER STANDARD DETAIL STD-W-30B.

PROPOSED OFF-LINE SCOUR VALVE AND SCOUR CHAMBER TO BE LOCATED AT LOW POINTS WITH CONNECTION TO THE SURFACE WATER SYSTEM TO BE AGREED WITH THE LOCAL AUTHORITY. SCOUR VALVE AND SCOUR CHAMBER (WITH NON RETURN VALVE) TO BE AS PER CLAUSE 3.16.4 AND 3.21 OF THE IRISH WATER CODE OF PRACTICE TO BE CONSTRUCTED TO IRISH WATER STANDARD DETAIL STD-W-30B.

NEW ON-LINE HYDRANT TO BE CONSTRUCTED TO IRISH WATER STANDARD DETAIL STD-W-18

R158

Former St. Patrick's Church - Protected Structure

Cemetery

Burial Ground

THIS AREA ENCLOSED WITHIN RED LINE (BURIAL GROUND AND FORMER PROTECTED STRUCTURE GROUNDS) DOES NOT FORM PART OF THIS APPLICATION

Boycetown Court

ON-LINE HYDRANT TO IRISH WATER STANDARD DETAIL STD-W-18 WITH NO HOUSE LOCATED MORE THAN 46M FROM EACH HYDRANT IN ACCORDANCE WITH IRISH WATER CLAUSE 3.5.25 FOR WATER INFRASTRUCTURE.

PROPOSED AIR VALVE AS PER IRISH WATER CLAUSE 3.16.6 AND TO STANDARD DETAIL STD-W-22 TO BE LOCATED AT ALL HIGH POINTS.

NEW BULK METER TO BE CONSTRUCTED TO IRISH WATER STANDARD DETAIL STD-W-26A AND IN ACCORDANCE WITH SECTION 3.15.4 OF THE IRISH WATER CODE OF PRACTICE. EACH UNIT WILL BE METERED INTERNALLY WITH MANIFOLD CHAMBERS. SEE NOTE 5. CONNECTION OFF MAIN TO THE APARTMENT BLOCK TO BE 63mmØ ID

> MINIMUM SEPERATION DISTANCE FROM WATERMAIN TO HOUSE AS PER IRISH WATER CLAUSE 3.5.9 FOR WATER INFRASTRUCTURE

BLOCK A
152 TO 183 UNIT

BLOCK B
184 TO 206 UNIT

BLOCK C
207 TO 230 UNIT

BLOCK D
231 TO 240 UNIT

BLOCK E
241 TO 249 UNIT

BLOCK F
249 TO 260 UNIT

BLOCK G
261 TO 272 UNIT

ESB

Bins

Bikes

NEW BULK METER TO BE CONSTRUCTED TO IRISH WATER STANDARD DETAIL STD-W-26A AND IN ACCORDANCE WITH SECTION 3.15.4 OF THE IRISH WATER CODE OF PRACTICE. EACH UNIT WILL BE METERED INTERNALLY WITH MANIFOLD CHAMBERS. SEE NOTE 5. CONNECTION OFF MAIN TO THE APARTMENT BLOCK TO BE 63mmØ ID

PROPOSED ON-LINE AIR VALVE TO BE LOCATED AT HIGH POINTS. TO BE CONSTRUCTED TO IRISH WATER STANDARD DETAIL STD-W-22.

PROPOSED OFF-LINE SCOUR VALVE AND SCOUR CHAMBER TO BE LOCATED AT LOW POINTS WITH CONNECTION TO THE SURFACE WATER SYSTEM TO BE AGREED WITH THE LOCAL AUTHORITY. SCOUR VALVE AND SCOUR CHAMBER (WITH NON RETURN VALVE) TO BE AS PER CLAUSE 3.16.4 AND 3.21 OF THE IRISH WATER CODE OF PRACTICE TO BE CONSTRUCTED TO IRISH WATER STANDARD DETAIL STD-W-30B.

> MINIMUM SEPERATION DISTANCE FROM WATERMAIN TO HOUSE AS PER IRISH WATER CLAUSE 3.5.9 FOR WATER INFRASTRUCTURE

SERVICE PIPES FOR HOUSE NOS 13,14 AND 15 TO BE 32MM AS PER IRISH WATER CLAUSE 3.7.1 FOR WATER INFRASTRUCTURE

OFF-LINE HYDRANT LOCATED ON FOOTPATH TO IRISH WATER STANDARD DETAIL STD-W-17

PROPOSED OFF-LINE SCOUR VALVE AND SCOUR CHAMBER TO BE LOCATED AT LOW POINTS WITH CONNECTION TO THE SURFACE WATER SYSTEM TO BE AGREED WITH THE LOCAL AUTHORITY. SCOUR VALVE AND SCOUR CHAMBER (WITH NON RETURN VALVE) TO BE AS PER CLAUSE 3.16.4 AND 3.21 OF THE IRISH WATER CODE OF PRACTICE TO BE CONSTRUCTED TO IRISH WATER STANDARD DETAIL STD-W-30B.

PROPOSED AIR VALVE AS PER IRISH WATER CLAUSE 3.16.6 AND TO STANDARD DETAIL STD-W-22 TO BE LOCATED AT ALL HIGH POINTS.

COMMERCIAL PREMISES (CRECHE) SHALL HAVE A BULK METER TO DETAIL STD-W-26 AND IN ACCORDANCE WITH SECTION 3.15.3 OF THE IRISH WATER CODE OF PRACTICE. CONNECTION OFF THE MAIN TO BE 32mmØ ID.

PROPOSED OFF-LINE SCOUR VALVE AND SCOUR CHAMBER TO BE LOCATED AT LOW POINTS WITH CONNECTION TO THE SURFACE WATER SYSTEM TO BE AGREED WITH THE LOCAL AUTHORITY. SCOUR VALVE AND SCOUR CHAMBER (WITH NON RETURN VALVE) TO BE AS PER CLAUSE 3.16.4 AND 3.21 OF THE IRISH WATER CODE OF PRACTICE TO BE CONSTRUCTED TO IRISH WATER STANDARD DETAIL STD-W-30B.

OFF-LINE HYDRANT TO IRISH WATER STANDARD DETAIL STD-W-17 WITH NO HOUSE LOCATED MORE THAN 46M FROM EACH HYDRANT IN ACCORDANCE WITH IRISH WATER CLAUSE 3.5.25 FOR WATER INFRASTRUCTURE.

NEW BULK METER TO BE CONSTRUCTED TO IRISH WATER STANDARD DETAIL STD-W-26

NEW 180Ø WATERMAIN CONNECTION TO THE EXISTING PUBLIC MAIN IN AGREEMENT WITH IRISH WATER.

PROPOSED AIR VALVE AS PER IRISH WATER CLAUSE 3.16.6 TO STANDARD DETAIL STD-W-22 TO BE LOCATED AT HIGH POINTS

> MINIMUM SEPERATION DISTANCE FROM WATERMAIN TO HOUSE AS PER IRISH WATER CLAUSE 3.5.9 FOR WATER INFRASTRUCTURE

110MM LOOP WITH MINIMUM 4 HOUSES CONNECTED AS PER IRISH WATER CLAUSE 3.15.14 FOR WATER INFRASTRUCTURE

PROPOSED OFF-LINE SCOUR VALVE AND SCOUR CHAMBER TO BE LOCATED AT LOW POINTS WITH CONNECTION TO THE SURFACE WATER SYSTEM TO BE AGREED WITH THE LOCAL AUTHORITY. SCOUR VALVE AND SCOUR CHAMBER (WITH NON RETURN VALVE) TO BE AS PER CLAUSE 3.16.4 AND 3.21 OF THE IRISH WATER CODE OF PRACTICE TO BE CONSTRUCTED TO IRISH WATER STANDARD DETAIL STD-W-30B.

PROPOSED OFF-LINE SCOUR VALVE AND SCOUR CHAMBER TO BE LOCATED AT LOW POINTS WITH CONNECTION TO THE SURFACE WATER SYSTEM TO BE AGREED WITH THE LOCAL AUTHORITY. SCOUR VALVE AND SCOUR CHAMBER (WITH NON RETURN VALVE) TO BE AS PER CLAUSE 3.16.4 AND 3.21 OF THE IRISH WATER CODE OF PRACTICE TO BE CONSTRUCTED TO IRISH WATER STANDARD DETAIL STD-W-30B.

UNDER CONSTRUCTION
ADJOINING APPROVED SHD APPLICATION (Ref.:ABP-306826-20)

LEGEND:

- EXISTING WATERMAIN
- PROPOSED WATERMAIN
- PROPOSED SLUICE VALVE (S.V.)
- PROPOSED AIR VALVE (A.V.)
- PROPOSED SCOUR VALVE (Sc.V.)
- PROPOSED HYDRANT (H.)
- BOUNDARY BOX (BB)
- THRUST BLOCK (TB)
- PROPOSED BULK METER (Me)

NOTE:

1. ALL PIPE WORK, VALVES, CHAMBERS, NETWORK ARRANGEMENTS AND ALL ASSOCIATED WATERMAIN WORKS TO COMPLY WITH THE IRISH WATER INFRASTRUCTURE STANDARD DETAILS.
2. ALL NEW WATERMAIN MATERIAL SHALL BE IN ACCORDANCE WITH SECTION 3.9 OF THE IRISH WATER CODE OF PRACTICE. MDPE PIPES SHALL BE OF A TYPE PE-80 AND HAVE AN SDR-11 RATING. THEY SHALL CONFORM TO IS EN 12201: PART 1, PART 2 AND PART 3.
3. THE PROPOSED 150mm WATERMAINS WILL BE LOCATED A MINIMUM OF 300mm FROM THE WASTEWATER INFRASTRUCTURE IN ACCORDANCE WITH SECTION 3.5.18 OF THE IRISH WATER WASTEWATER CODE OF PRACTICE AND TYPICAL SERVICE LAYOUT DISTANCES (HORIZONTAL AND VERTICAL) SHALL BE AS PER IRISH WATER STANDARD DETAIL STD-W-11.
4. AIR PRESSURE TESTS TO ALL WORKS TO BE TAKEN IN CHARGE TO IRISH WATER CODE OF PRACTICE SECTION 4.10.
5. MANIFOLD CHAMBERS WILL BE USED TO PROVIDE A COMMUNAL BOX FOR THE APARTMENT BLOCK AND THAT EACH DWELLING UNIT WILL HAVE IT'S OWN SUPPLY PIPE AND METER AND STOP VALVE. ALL METERS IN THE MANIFOLD SHALL BE TAGGED TO INDICATE WHICH PROPERTY IS SUPPLIED AND ANY UNUSED OUTLETS WILL BE BLANKED OFF IN ACCORDANCE WITH SECTION 3.15.3 OF THE IRISH WATER WASTEWATER CODE OF PRACTICE.
6. BULK METERS SHALL COMPLY WITH SECTION 3.15.4 OF THE IRISH WATERS CODE OF PRACTICE FOR WATER INFRASTRUCTURE.
7. EACH HOUSE SHALL HAVE AN INDIVIDUAL CONNECTION WITH BOUNDARY BOX AS PER SECTION 3.15.2 OF THE IRISH WATERS CODE OF PRACTICE FOR WATER INFRASTRUCTURE. IN SOME CASES THE HOUSE SERVICE CONNECTION IS GREATER THAN 15m IN LENGTH. A SERVICE CONNECTION OF 32mmØ TO BE USED IN LOCATIONS WHERE THE SERVICE CONNECTION IS GREATER THAN 15m IN LENGTH, FOLLOWING APPROVAL FROM IRISH WATER.
8. THE PROPOSED WATERMAINS WILL BE LOCATED A MINIMUM OF 300mm FROM THE WASTEWATER INFRASTRUCTURE IN ACCORDANCE WITH SECTION 3.5.18 OF THE IRISH WATER WASTEWATER CODE OF PRACTICE.
9. WATERMAIN T-JUNCTIONS SHALL BE AT 90 DEGREE ANGLES AS PER IRISH WATER DETAIL STD-W-07.
10. THRUST BLOCKS TO BE PROVIDED AT DEAD ENDS, BENDS, TEE JUNCTIONS, VALVE CHAMBERS (AS PER DETAILS) OR ANY ABRUPT CHANGE IN VERTICAL OR HORIZONTAL DIRECTION AND AT ANY LOCATION WHERE WATER PRESSURE IS LIKELY TO DISTORT THE PIPE LINE INSTALLATION OR CAUSE DISPROPORTIONATE MOVEMENT. THRUST BLOCKS TO BE IN ACCORDANCE WITH SECTION 4.9 OF THE IRISH WATER CODE OF PRACTICE AND IRISH WATER STANDARD DETAIL STD-W-28.
11. ANY NEW PLANTING OF TREES, SHRUBS ETC. TO BE IN STRICT ACCORDANCE WITH THE IRISH WATER STANDARD DETAIL STD-W-12A. ANY PROPOSED WATERMAIN LOCATED IN PROXIMITY TO EXISTING TREES SHALL BE IN ACCORDANCE WITH STANDARD IRISH WATER DETAIL STD-W-12.
12. SCOUR VALVE TO BE LOCATED AT SITE LOW POINT. THE SCOUR CHAMBER IS TO BE PROVIDED WITH A NON-RETURN VALVE TO PREVENT BACK FLOW TO THE WATER SUPPLY NETWORK AND AGREED WITH THE LOCAL AUTHORITY. SCOUR VALVE AND CHAMBER TO COMPLY WITH SECTION 3.16.4 AND 3.21 OF THE IRISH WATER CODE OF PRACTICE.
13. NOTE: THE FIRE SAFETY CERTIFICATE HAS NOT BEEN COMPLETED YET, BUT AS PART OF THIS DEVELOPMENT, IT IS CONFIRMED THAT HYDRANTS SHALL NOT BE LOCATED ANY MORE THAN 46m FROM ANY PART OF THE DEVELOPMENT UNITS.
14. INDICATOR AND MARKER POSTS TO BE PROVIDED AT ALL CHAMBERS AS PER SECTION 3.23 OF THE IRISH WATER CODE OF PRACTICE FOR WATER
15. ALL HYDRANTS TO BE IN COMPLIANCE WITH SECTION 3.5.25 OF THE IRISH WATER CODE OF PRACTICE FOR WATER
16. APPROPRIATE MEASURES ADHERING TO SECTION 3.26 OF THE IRISH WATER CODE OF PRACTICE FOR WATER WILL BE PROVIDED TO WATER INFRASTRUCTURE IN CLOSE PROXIMITY TO PLANTING TO PREVENT ANY DAMAGE TO INFRASTRUCTURE VIA ROOT INGRESS OR NEGATIVE IMPACTS TO PLANTING SUCH AS DAMAGE OF TREE ROOTS. THIS WILL BE ACHIEVED BY MEANS OF POLYETHYLENE PIPES WITH WELDED JOINTS AND ROOT PROTECTION BARRIERS.

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P1	07/05/2021	UPDATED DETAILS FOR ISIRH WATER	DF	OS
P2	15.07.2022	ISSUED FOR PLANNING	JS	OS
P3	05.08.2022	LAYOUT REVISED - ISSUED TO IRISH WATER	DD	RFM
P4	30.08.2022	REVISED TO ADDRESS COMMENTS FROM IRISH WATER	DD	RFM
P5	05.09.2022	REVISED TO ADDRESS COMMENTS FROM IRISH WATER	DD	RFM

Architect	Paul Byrne Architects
Project	Kilcock West SHD 2 Boycetown, Kilcock, Co. Kildare.
Title	Proposed Watermain Layout
Dwg. No.	S037-CSC-XX-XX-DR-C-0107

Date	Drn by	Chkd by	Aprvd by	Scale	Revision
FEB 2021	AB	OS	OS	1:500 @ A0	P5

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Environment I.S. EN ISO 14001:2004
Energy I.S. EN ISO 50001:2011
Health & Safety OHSAS 18001:2007

3.5.21 and section 3.14.2 of the Irish Water Code Of Practice. Pipe to be in accordance with IS EN 12201 and polyethylene fittings including fusion joints and electrofusion joints shall be comply with the provisions of IS EN 12201 part 3

R148

R158

Proposed Kilcock Pumping Station will be delivered by IW

Former St. Patrick's Church - Protected Structure

Cemetery

Burial Ground

PROPOSED HYDROBRAKE MANHOLE TO RESTRICT PEAK FLOW TO 8.3 L/S FOR SUB-CATCHMENT AREA B FOR RETURN PERIODS UP TO AND INCLUDING THE 1 IN 100 YEAR PLUS 20% FOR CLIMATE CHANGE.

PROPOSED STORM ATTENUATION FACILITY#2 STORMTECH MC4500 O.S.A. TO PROVIDE 1035M³ FOR THE CRITICAL 1 IN 100 YEAR RETURN PERIOD PLUS 20% FOR CLIMATE CHANGE. 1050M³ STORAGE PROVIDED.

THIS AREA ENCLOSED WITHIN RED LINE (BURIAL GROUND AND FORMER PROTECTED STRUCTURE GROUNDS) DOES NOT FORM PART OF THIS APPLICATION

PROPOSED SURFACE WATER OUTFALL MANHOLE TO BE CONSTRUCTED TO KCC DRAINAGE DIVISION'S REQUIREMENTS. MANHOLE TO BE FITTED WITH AN INTERCEPTOR TRAP AND FRESH AIR INLET.NEW SURFACE WATER CONNECTION TO THE EXISTING SURFACE WATER SEWER, TO BE AGREED WITH KCC DRAINAGE DIVISION.

PROPOSED HYDROBRAKE MANHOLE TO RESTRICT PEAK FLOW TO 11.5 L/S FOR A CATCHMENT OF 3.25HA DISCHARGING AT QBAR RATE FOR RETURN PERIODS UP TO AND INCLUDING THE 1 IN 100 YEAR PLUS 20% FOR CLIMATE CHANGE.

PROPOSED STORM ATTENUATION FACILITY #3 STORMTECH MC3500 O.S.A. AND UPSTREAM PIPES TO PROVIDE 208M³ FOR THE CRITICAL 1 IN 100 YEAR RETURN PERIOD PLUS 20% FOR CLIMATE CHANGE. 212M³ STORAGE PROVIDED IN TANK.

PROPOSED HYDROBRAKE MANHOLE TO RESTRICT PEAK FLOW TO 2.8 L/S FOR SUB-CATCHMENT AREA A FOR RETURN PERIODS UP TO AND INCLUDING THE 1 IN 100 YEAR PLUS 20% FOR CLIMATE CHANGE.

PROPOSED STORM ATTENUATION FACILITY #1 STORMTECH MC4500 O.S.A. TO PROVIDE 521M³ FOR THE CRITICAL 1 IN 100 YEAR RETURN PERIOD PLUS 20% FOR CLIMATE CHANGE. 538M³ STORAGE PROVIDED.

PROPOSED STORM ATTENUATION FACILITY #4 STORMTECH MC4500 O.S.A.AND UPSTREAM PIPES TO PROVIDE 1242M³ FOR THE CRITICAL 1 IN 100 YEAR RETURN PERIOD PLUS 20% FOR CLIMATE CHANGE. 1270M³ STORAGE PROVIDED IN TANK.

PROPOSED HYDROBRAKE MANHOLE TO RESTRICT PEAK FLOW TO 7.3 L/S FOR A CATCHMENT OF 3.24HA DISCHARGING AT QBAR RATE FOR RETURN PERIODS UP TO AND INCLUDING THE 1 IN 100 YEAR PLUS 20% FOR CLIMATE CHANGE.

S69
CL: 77.900
IL: 76.175
PROPOSED SURFACE WATER OUTFALL MANHOLE TO BE CONSTRUCTED TO KCC DRAINAGE DIVISION'S REQUIREMENTS. MANHOLE TO BE FITTED WITH AN INTERCEPTOR TRAP AND FRESH AIR INLET.

EX.SMH2
CL: 78.09
IL: 74.89 (TBC)
NEW CONNECTION TO EXISTING 1200Ø SURFACE WATER SEWER. NEW SURFACE WATER CONNECTION TO THE EXISTING SURFACE WATER SEWER, TO BE AGREED WITH KCC DRAINAGE DIVISION.

Blind manhole for future connection. see section 1.23 of the irish water code of practice for wastewater

Boycetown Court

UNDER CONSTRUCTION
ADJOINING APPROVED SHD APPLICATION (Ref.:ABP-306826-20)

DRAINAGE NOTES

1. All levels are to malin head ordnance datum
2. All works in confined spaces shall be carried out in strict accordance with the provisions on "Safe Work" "In Confined Spaces" Code of Practice for working in confined spaces, published by the Health & Safety Authority.
3. All site development works shall be carried out in strict accordance with the construction drawings.
4. All drainage works shall be carried out in strict accordance with the requirements of the Local Authority, TII Publications Series 500, The Greater Dublin Regional Code of Practice for Drainage Works and the Irish Water Code of Practice and Standard Details.
5. This drawing should be read in conjunction with all other contract documentation, including drawings and specifications.
6. The Contractor is solely responsible for locating, protecting and maintaining all existing services within the site boundary and in the areas affected by the works. the Engineer has provided information on known services but gives no guarantee that this information provided by the third parties, is correct or that these are the only services on the site.
7. Suitable short lengths of pipe or rocker pipes shall be installed to provide a flexible joint within 1000mm of the outer face of the manhole on all sewers and branches.
8. Where rock is met in trenches it shall be excavated and trimmed to 300mm below the underside of pipeline.
9. Granular material 5mm – 20mm nominal size graded aggregate (to comply with table 1 of B5) to be used for bedding, haunching and surround to pipes where specified.
10. Concrete mix C16/20 to be used for bedding, haunching and surround where specified.
11. Where rigid pipes with flexible joints are used with concrete beds for drains and watermains, vertical movement joints shall be provided in the beds at max intervals of 5.0m and aligned with face of pipe socket. joints to be minimum 12m wide and filled with flexcell or similar approved material.
12. Surface water and foul drains shall be surrounded by 150 thickness of C16/20 concrete if cover to pipe is less than:
    - 1.2m in roads and driveways
    - 0.9m in open spaces and paths not near carriageways.
13. Foul manholes located in grassed areas to be surrounded by a concrete plinth 200mm all round and 100mm deep formed with C20/25 20mm concrete
14. All pipe runs shall be laid in straight lines both vertically and horizontally to the specified gradients between manholes. no deviations or bends shall be permitted.
15. Refer to "The Greater Dublin Regional Code of Practice for Drainage Works" for details of surface water manhole standards and Irish Water Code of Practice and Standard Details for details of foul manhole standards..
16. The Contractor shall carry out a CCTV survey report of the completed storm & foul network to the satisfaction of the local authority and report to be issued on practical completion.
17. The Local Authority must be notified at least 10 working days in advance of commencement of works.
18. Prior to commencement of construction outfall levels for the foul and surface water manholes shall be verified on site.
19. Proposed foul sewers will be either concrete, thermostatic structured walled pipes or unplasticised pvc in accordance with section 3.13 of the Irish Water Wastewater Code of Practice. proposed storm drains to be in accordance with the requirements of Kildare Co. Co.
20. Typical service layout distances (horizontal and vertical) as per Irish Water Detail STD-WW-05
21. The external face of proposed manhole chambers in public roads will be a minimum of 0.5m from the proposed public road kerb line in accordance with Section 1.23 of the Irish Water Wastewater Code of Practice
22. Inspection chambers to each house/unit to be in accordance with Irish Water Detail STD-WW-02 and STD-WW-03.
23. Appropriate measures adhering to Section 3.21 of the Irish Water Wastewater Code of Practice will be provided to drainage infrastructure in close proximity to planting to prevent any damage to infrastructure via root ingress or negative impacts to planting such as damage of tree roots. Fusion joints to polyethylene pipes and root protection barriers shall be provided at locations where root ingress is expected.

PIPE MATERIALS

100mmØ – 225mmØ to be uPVC SN8 to IS EN 1401 'UD'
300mmØ – 600mmØ to be concrete to IS EN 1916

PROPOSED FOUL SEWER LAYOUT.

SCALE= 1:500

LEGEND:

- EXISTING FOUL SEWER — EX. FMH
- PROPOSED FOUL SEWER — FMH1
- PROPOSED FOUL SEWER BY IRISH WATER
- PROPOSED IRISH WATER FOUL RISING MAIN
- PROPOSED INSPECTION CHAMBER — IC
- PROPOSED STORM SEWERS — SWMH1
- PROPOSED ROAD GULLY — gt
- INDICATES FOUL MANHOLES LOCATED IN GRASSED/PLANTED AREAS TO BE SURROUNDED BY A CONCRETE PLINTH, 200mm ALL ROUND AND 100mm DEEP FORMED WITH C20/25 CONCRETE, 20mm AGGREGATE SIZE, BEDDED IN CLAUSE 804 MATERIAL. — FMH1
- INDICATES CONCRETE SURROUND C16/C20

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P1	14.05.2021	UPDATED DETAILS FOR IRISH WATER	DF	OS
P2	15.07.2022	ISSUED FOR PLANNING	JS	OS
P3	05.08.2022	LAYOUT REVISED - ISSUED TO IRISH WATER	DD	RFM
P4	30.08.2022	REVISED TO ADDRESS COMMENTS FROM IRISH WATER	DD	RFM
P5	05.09.2022	REVISED TO ADDRESS COMMENTS FROM IRISH WATER	DD	RFM

Architect	Paul Byrne Architects
Project	Kilcock West SHD 2 Boycetown, Kilcock, Co. Kildare.
Title	Proposed Foul Sewer Layout Sheet 1 of 2
Dwg. No.	S037-CSC-XX-XX-DR-C-0105

Date	Drn by	Chkd by	Aprvd by	Scale	Revision
FEB 2021	DF	OS	OS	1:500 @ A0	P5

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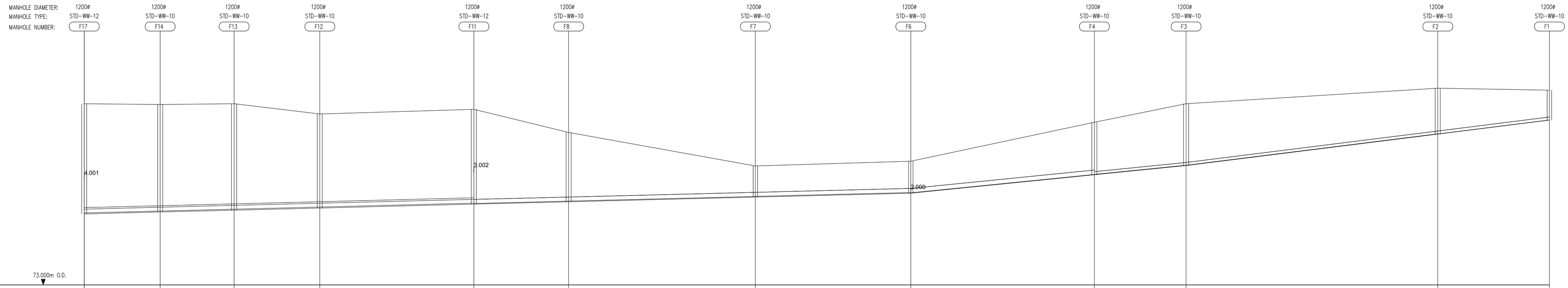
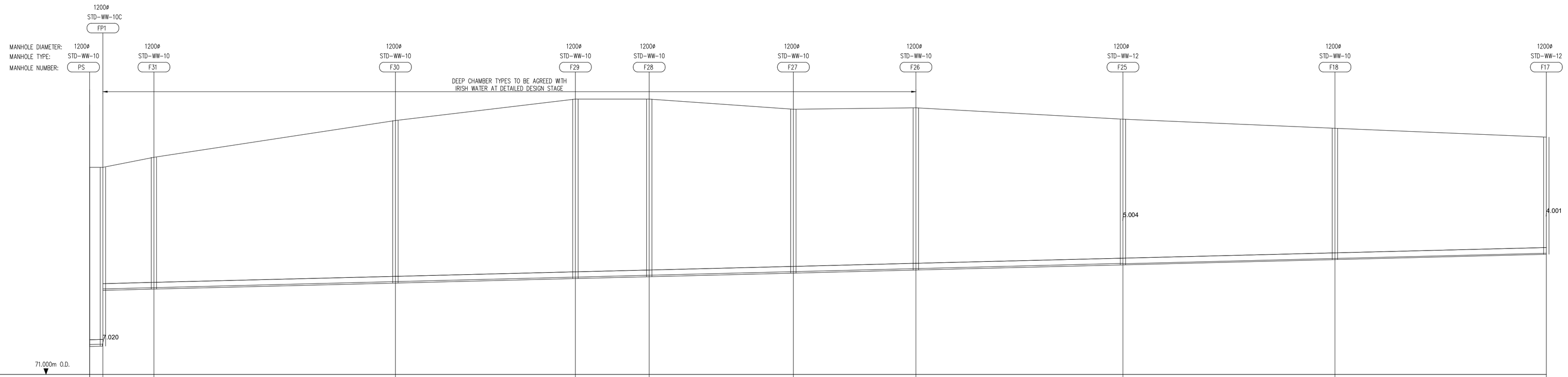


PN	F1.010	F1.009	F1.008	F1.007	F1.006	F1.005	F1.004	F1.003	F1.002	F1.001	F1.000	
DIA (mm)	225	225	225	225	225	225	225	225	150	150	150	
SLOPE (1:X)	200.0	200.0	200.0	200.0	200.0	200.0	200.0	50.0	50.0	40.0	40.0	
COVER LEVEL (m)	81.600	81.560	81.600	81.115	81.331	80.237	78.645	78.870	80.720	81.600	82.335	82.245
INVERT LEVEL (m)	76.369	76.459 76.459	76.547 76.547	76.648 76.648	76.832 76.832	76.945 76.945	77.167 77.167	77.352 77.352	78.224 78.224	78.660 78.660	80.156 80.196	80.820
LENGTH (m)		18.056	17.580	20.363	36.635	22.531	44.388	36.955	43.626	21.815	59.825	26.548

FOUL WATER LONGSECTIONS FROM F1 TO F17

HORIZONTAL SCALE 1:500
VERTICAL SCALE 1:100



PN	F1.019	F1.018	F1.017	F1.016	F1.015	F1.014	F1.013	F1.012	F1.011	
DIA (mm)	225	225	225	225	225	225	225	225	225	
SLOPE (1:X)	200.0	200.0	200.0	200.0	200.0	200.0	200.0	200.0	200.0	
COVER LEVEL (m)	80.250	80.250	80.700	82.340	83.300	83.300	82.845	82.910	82.400	81.994	81.600	
INVERT LEVEL (m)	77.262 77.262	74.767 74.767	74.814 74.814	75.084 75.084	75.285 75.285	75.367 75.367	75.528 75.528	75.665 75.665	75.896 75.896	76.133 76.133	76.369	
LENGTH (m)	11.403	53.939	40.210	16.485	32.206	27.368	46.253	47.361	47.219			

FOUL WATER LONGSECTIONS FROM F17 TO PUMP STATION

HORIZONTAL SCALE 1:500
VERTICAL SCALE 1:100

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P5	05.09.2022	REVISED TO ADDRESS COMMENTS FROM IRISH WATER	DD	RFM

Architect	Paul Byrne Architects
Project	KilcockWest SHD 2 Boycetown, Kilcock, Co. Kildare.
Title	Foul Sewer Longsections (Sheet 1 of 4)
Dwg. No.	S037-CSC-XX-XX-DR-C-0128
Date / Drn by / Chkd by / Aprvd by / Scale / Revision	FEB 2021 / DF / OS / OS / AS SHOWN @ A1 / P5

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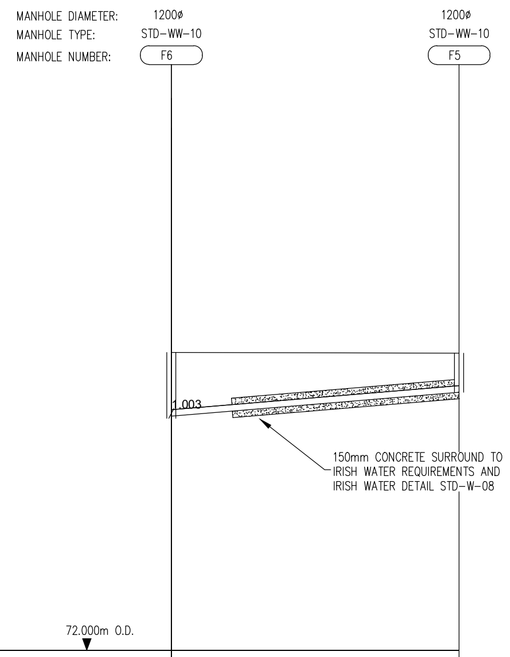
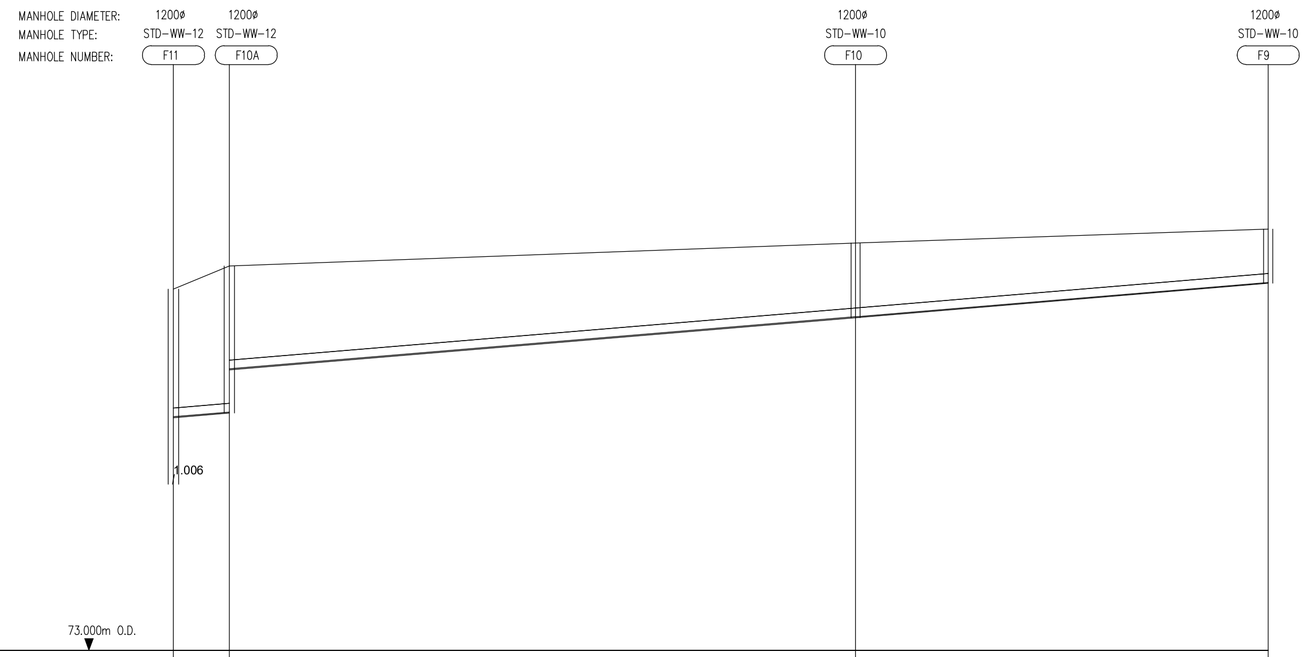


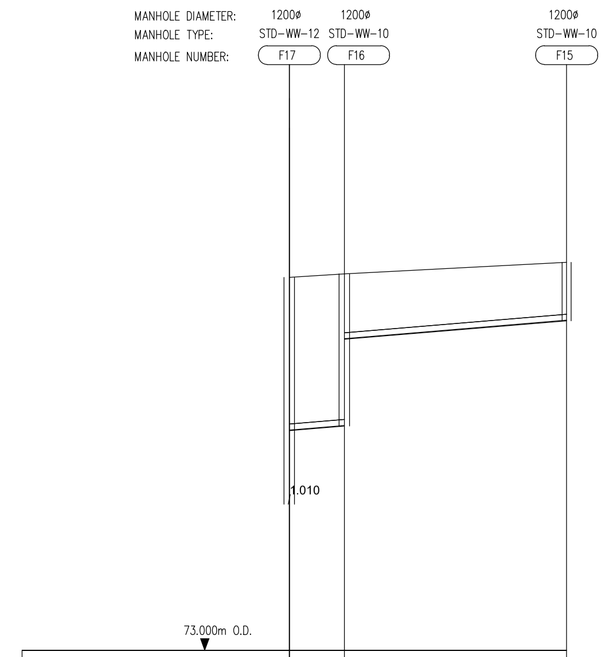
PN	F2.000		
DIA (mm)	150		
SLOPE (1:X)	60.0		
COVER LEVEL (m)	78.870		78.853
INVERT LEVEL (m)	77.400		77.953
LENGTH (m)	33.180		

FOUL WATER LONGSECTIONS FROM F5 TO F6
HORIZONTAL SCALE 1:500
VERTICAL SCALE 1:100



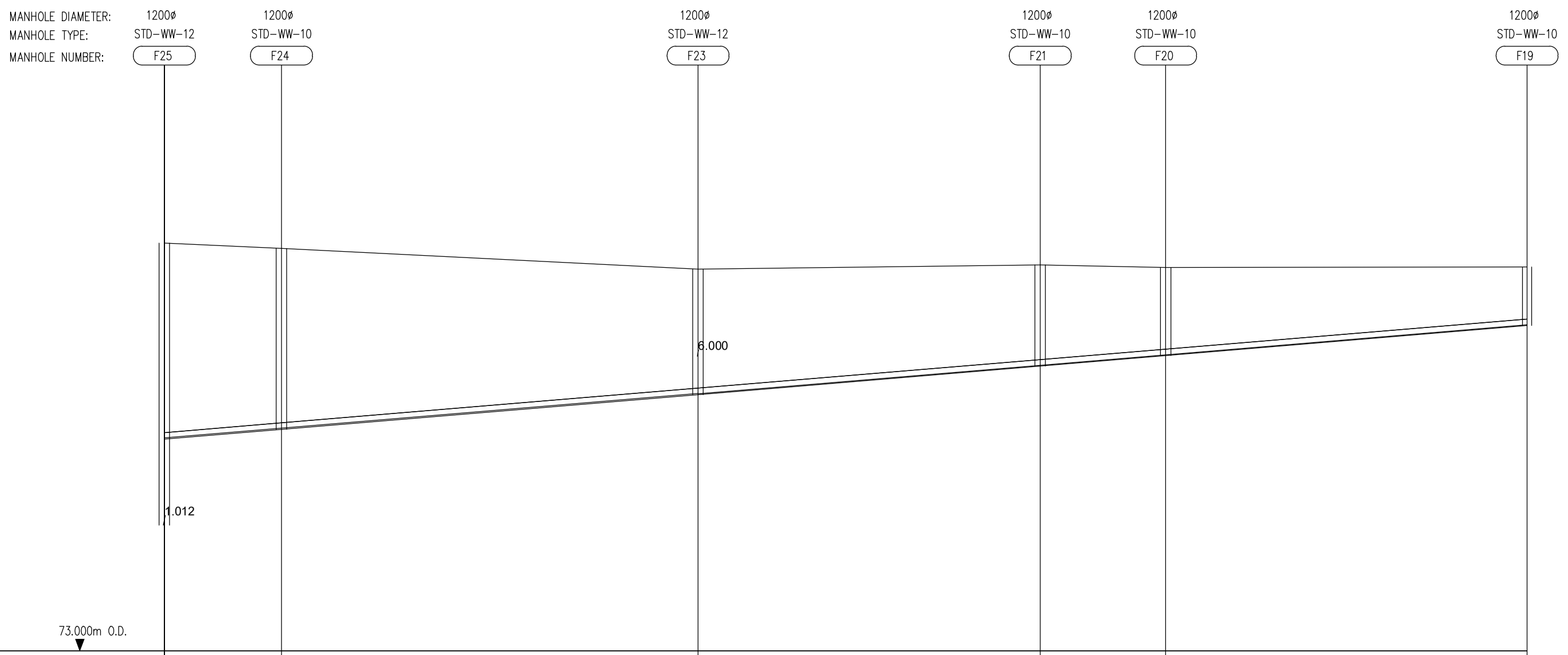
PN	F3.002	F3.001		F3.000
DIA (mm)	225	225		225
SLOPE (1:X)	60.2	60.0		60.0
COVER LEVEL (m)	81.331	81.862	82.392	82.714
INVERT LEVEL (m)	78.394	78.471 / 79.468	80.671 / 80.617	81.464
LENGTH (m)	6.442	72.208		47.566

FOUL WATER LONGSECTIONS FROM F9 TO F11
HORIZONTAL SCALE 1:500
VERTICAL SCALE 1:100



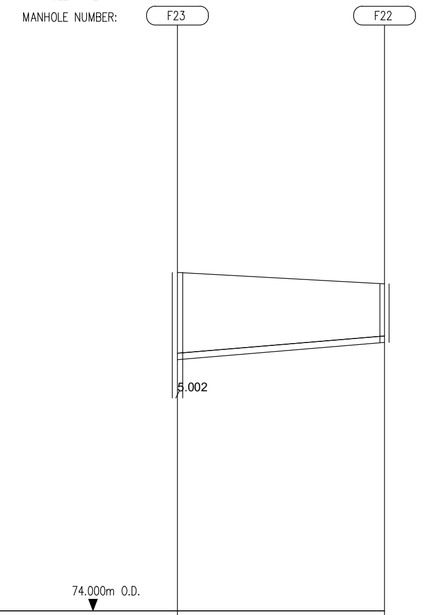
PN	F4.001	F4.000	
DIA (mm)	150	150	
SLOPE (1:X)	59.9	60.0	
COVER LEVEL (m)	81.600	81.680	81.950
INVERT LEVEL (m)	78.067	78.173 / 80.173	80.600
LENGTH (m)	6.351	25.628	

FOUL WATER LONGSECTIONS FROM F15 TO F17
HORIZONTAL SCALE 1:500
VERTICAL SCALE 1:100



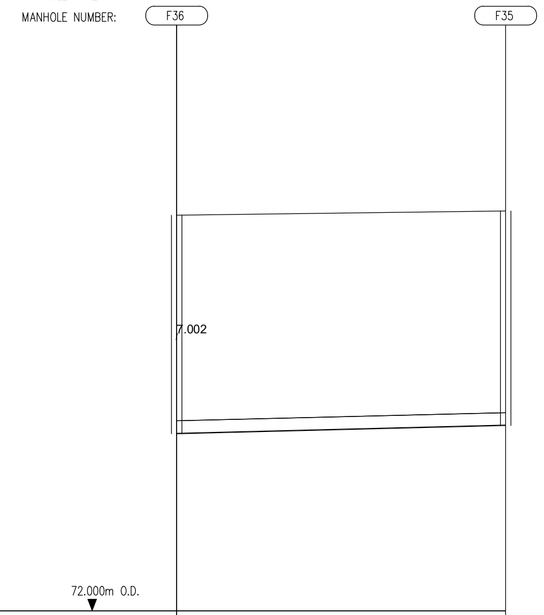
PN	F5.004	F5.003	F5.002	F5.001	F5.000
DIA (mm)	150	150	150	150	150
SLOPE (1:X)	60.0	60.0	60.0	60.0	60.0
COVER LEVEL (m)	82.400	82.280	81.800	81.900	81.840	81.850
INVERT LEVEL (m)	77.881	78.106 / 78.106	78.907 / 78.907	79.564 / 79.564	79.806 / 79.806	80.500
LENGTH (m)	13.503	48.026	39.453	14.468	41.666	

FOUL WATER LONGSECTIONS FROM F19 TO F25
HORIZONTAL SCALE 1:500
VERTICAL SCALE 1:100



PN	F6.000	
DIA (mm)	150	
SLOPE (1:X)	60.0	
COVER LEVEL (m)	81.800	81.538
INVERT LEVEL (m)	79.790	80.188
LENGTH (m)	23.873	

FOUL WATER LONGSECTIONS FROM F22 TO F23
HORIZONTAL SCALE 1:500
VERTICAL SCALE 1:100



PN	F8.000	
DIA (mm)	225	
SLOPE (1:X)	200.0	
COVER LEVEL (m)	81.174	81.220
INVERT LEVEL (m)	76.080	76.270
LENGTH (m)	37.930	

FOUL WATER LONGSECTIONS FROM F35 TO F36
HORIZONTAL SCALE 1:500
VERTICAL SCALE 1:100

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Rev. No.	Date	REVISION NOTE	Dm. By	Chkd. By
P1	07.05.2021	UPDATED DETAILS FOR ISISH WATER	DF	OS
P2	15.07.2022	ISSUED FOR PLANNING	PB	JS
P3	05.08.2022	LAYOUT REVISED - ISSUED TO IRISH WATER	DD	RFM
P4	30.08.2022	REVISED TO ADDRESS COMMENTS FROM IRISH WATER	DD	RFM
P5	05.09.2022	REVISED TO ADDRESS COMMENTS FROM IRISH WATER	DD	RFM

Architect	Paul Byrne Architects
Project	KilcockWest SHD 2 Boycetown, Kilcock, Co. Kildare.
Title	Foul Sewer Longsections (Sheet 2 of 4)
Dwg. No.	S037-CSC-XX-XX-DR-C-0129

Date	Drn by	Chkd by	Aprvd by	Scale	Revision
FEB 2021	DF	OS	OS	AS SHOWN @ A1	P5

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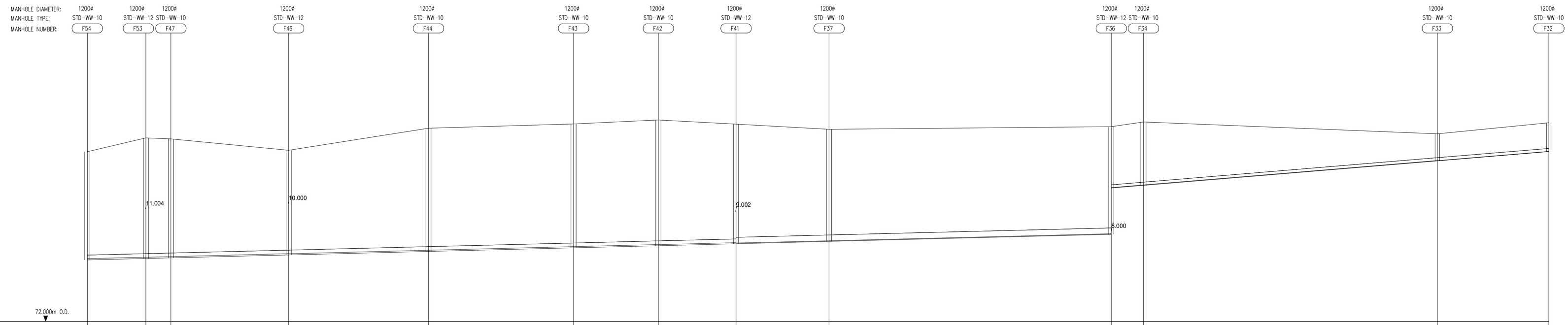
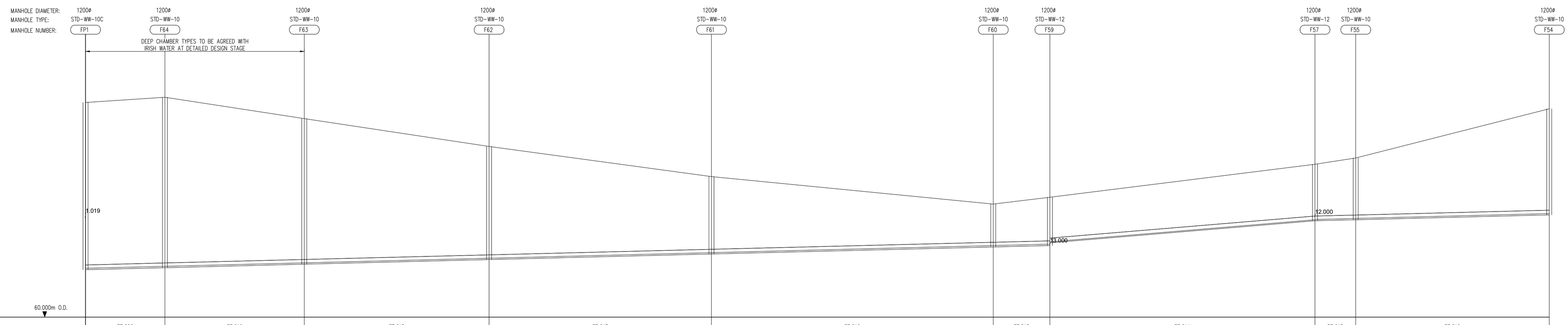


PN	F7.011	F7.010	F7.009	F7.008	F7.007	F7.006	F7.005	F7.004	F7.003	F7.002	F7.001	F7.000	
DIA (mm)	225	225	225	225	225	225	225	300	300	150	150	150	
SLOPE (1:X)	200.0	200.0	200.0	200.0	200.0	200.0	199.6	200.0	200.0	60.0	60.0	60.0	
COVER LEVEL (m)	79.950	80.600	80.550	80.000	81.051	81.250	81.435	81.240	81.000	81.124	81.342	80.790	81.304
INVERT LEVEL (m)	74.882	74.951 74.950	74.980 74.980	75.118 75.118	75.281 75.268	75.451 75.451	75.550 75.550	75.641 75.641	75.750 75.750	76.080 76.048	78.373 78.373	79.520 79.520	79.954
LENGTH (m)	13.714	5.848	27.553	32.719	33.942	19.846	18.166	21.761	66.042	7.524	68.778	26.067	

FOUL WATER LONGSECTIONS FROM F32 TO F54
HORIZONTAL SCALE 1:500
VERTICAL SCALE 1:100



PN	F7.020	F7.019	F7.018	F7.017	F7.016	F7.015	F7.014	F7.013	F7.012
DIA (mm)	225	225	225	225	225	225	225	225	225
SLOPE (1:X)	200.0	200.0	200.0	200.0	200.0	200.0	60.0	200.0	200.0
COVER LEVEL (m)	80.250	80.500	79.480	78.150	76.710	75.400	75.726	77.300	77.600	79.950
INVERT LEVEL (m)	77.267	77.361 77.361	77.528 77.528	77.749 77.749	78.014 78.014	78.351 78.351	78.418 78.501	79.602 79.602	79.651 79.651	79.882
LENGTH (m)	18.960	33.289	44.133	53.111	67.302	13.533	63.303	9.731	46.219	

FOUL WATER LONGSECTIONS FROM F54 TO FP1
HORIZONTAL SCALE 1:500
VERTICAL SCALE 1:100

S037

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P1	07.05.2021	UPDATED DETAILS FOR IRISH WATER	DF	OS
P2	15.07.2022	ISSUED FOR PLANNING	JS	OS
P3	05.08.2022	LAYOUT REVISED - ISSUED TO IRISH WATER	DD	RFM
P4	30.08.2022	REVISED TO ADDRESS COMMENTS FROM IRISH WATER	DD	RFM
P5	05.09.2022	REVISED TO ADDRESS COMMENTS FROM IRISH WATER	DD	RFM

Architect	Paul Byrne Architects
Project	KilcockWest SHD 2 Boycetown, Kilcock, Co. Kildare.
Title	Foul Sewer Longsections (Sheet 3 of 4)
Dwg. No.	S037-CSC-XX-XX-DR-C-0130

Date	Drn by	Chkd by	Aprvd by	Scale	Revision
FEB 2021	DF	OS	OS	AS SHOWN @ A1	P5

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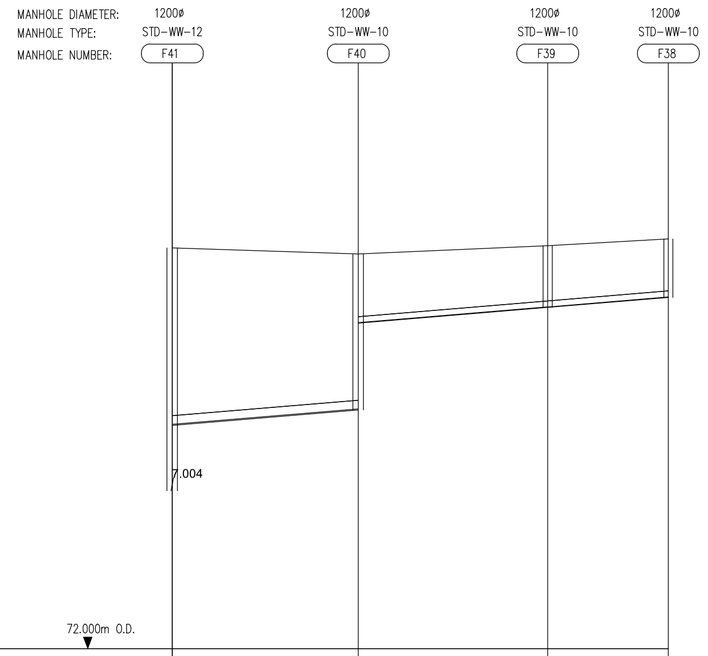
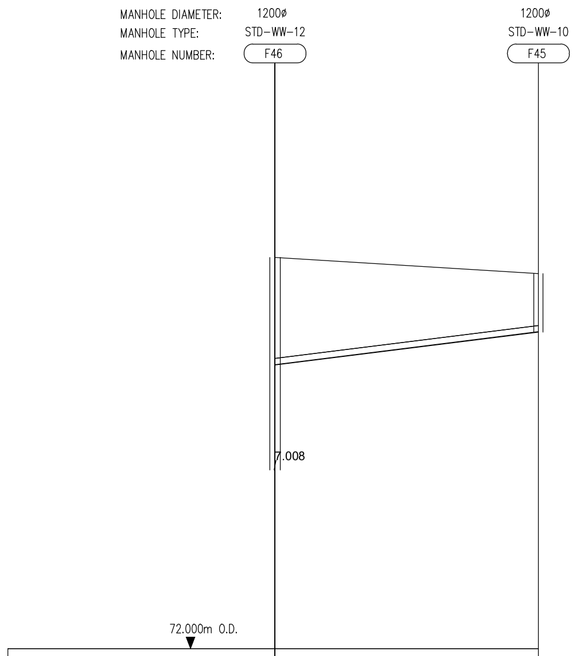


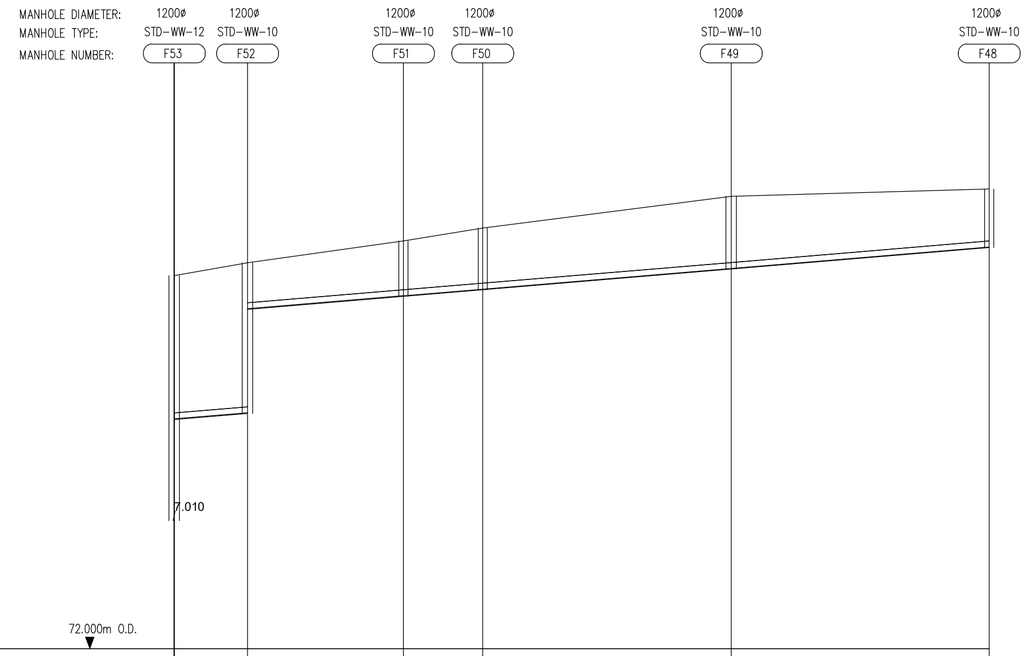
PN		F9.002	F9.001	F9.000
DIA (mm)		225	150	150
SLOPE (1:X)		60.1	60.0	60.0
COVER LEVEL (m)	81.240	81.100	81.291	81.450
INVERT LEVEL (m)	77.147	77.504 79.304	79.868 79.868	80.100 81.450
LENGTH (m)		21.441	21.847	13.915

FOUL WATER LONGSECTIONS FROM F38 TO F41
HORIZONTAL SCALE 1:500
VERTICAL SCALE 1:100



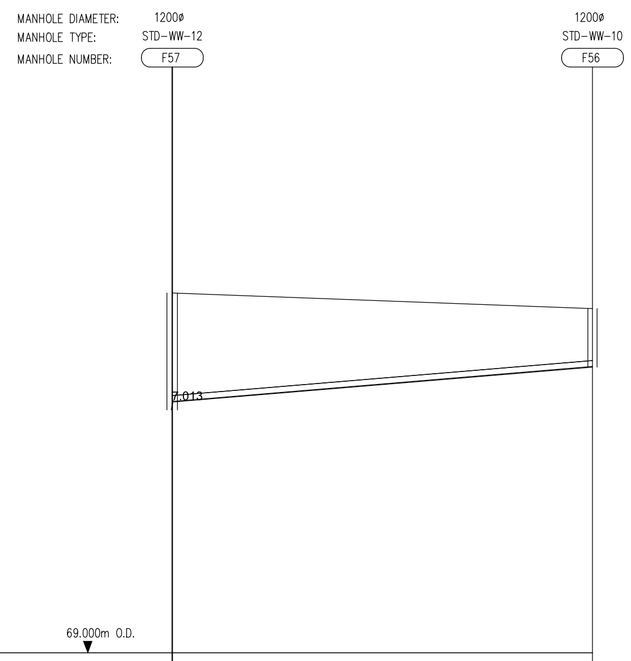
PN		F10.000	
DIA (mm)		150	
SLOPE (1:X)		40.0	
COVER LEVEL (m)	80.020		79.650
INVERT LEVEL (m)	77.541		78.300
LENGTH (m)		30.358	

FOUL WATER LONGSECTIONS FROM F45 TO F46
HORIZONTAL SCALE 1:500
VERTICAL SCALE 1:100



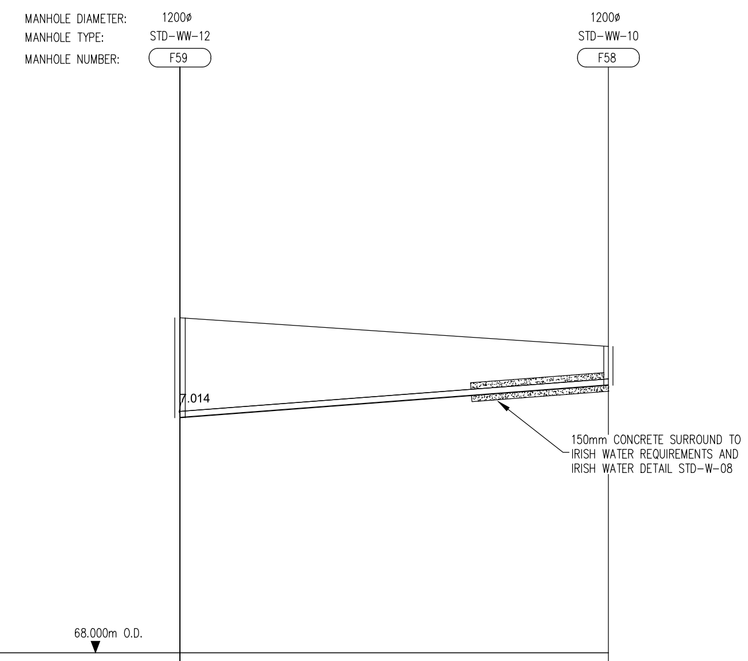
PN		F11.004	F11.003	F11.002	F11.001	F11.000
DIA (mm)		150	150	150	150	150
SLOPE (1:X)		59.9	60.0	60.0	60.0	60.0
COVER LEVEL (m)	80.600	80.900		81.400	81.700	82.430 82.600
INVERT LEVEL (m)	77.284	77.425 79.825		80.124 80.124	80.277 80.277	80.754 80.754 81.250
LENGTH (m)		8.440	17.984	9.145	28.642	29.749

FOUL WATER LONGSECTIONS FROM F48 TO F53
HORIZONTAL SCALE 1:500
VERTICAL SCALE 1:100



PN		F12.000	
DIA (mm)		150	
SLOPE (1:X)		60.0	
COVER LEVEL (m)	77.300		76.940
INVERT LEVEL (m)	74.783		75.590
LENGTH (m)		48.448	

FOUL WATER LONGSECTIONS FROM F56 TO F57
HORIZONTAL SCALE 1:500
VERTICAL SCALE 1:100



PN		F13.000	
DIA (mm)		150	
SLOPE (1:X)		65.8	
COVER LEVEL (m)	75.726		75.067
INVERT LEVEL (m)	73.418		74.169
LENGTH (m)		49.400	

FOUL WATER LONGSECTIONS FROM F58 TO F59
HORIZONTAL SCALE 1:500
VERTICAL SCALE 1:100

S037

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P3	05.08.2022	LAYOUT REVISED - ISSUED TO IRISH WATER	DD	RFM
P4	05.09.022	REVISED TO ADDRESS COMMENTS FROM IRISH WATER	DD	RFM

Architect	Paul Byrne Architects
Project	KilcockWest SHD 2 Boycetown, Kilcock, Co. Kildare.
Title	Foul Sewer Longsections (Sheet 4 of 4)
Dwg. No.	S037-CSC-XX-XX-DR-C-0131

Date	Drn by	Chkd by	Aprvd by	Scale	Revision
FEB 2021	DF	OS	OS	AS SHOWN @ A1	P4

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