MOLONY MILLAR
Consulting Civil and Structural Engineers

# ENGINEERING REPORT

# FOR

# SUBSTITUTE CONSENT APPLICATION

# AT MOUNT USHER VIEW,

# ASHFORD, CO. WICKLOW

| PROJECT NUMBER: 930-244A | | | Document Ref: Engineering Report | | | |
|---|---|---|---|---|---|---|
| **Revision** | **Description & Rationale** | **Originated** | **Date** | **Checked** | **Date** | **Date** |
| - | Progress | RG | 10.11.2021 | AM | 10.11.2021 | |
| A | Planning | RG | 18.11.2021 | AM | 18.11.2021 | |

*Architect:* Concept Design Partnership

*Client:* Vartry Developments Ltd.

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## APPENDICES

# 1 INTRODUCTION

## 1.1 General Description

Vartry Developments Ltd. seeks substitute consent for development at Mount Usher View, Ashford, Co. Wicklow.

This application is made on foot of a grant of leave to make substitute consent under ref. ABP-309566-21. The application site occurs over a site of approximately 1.19 ha. site for which planning permission was granted and taken up under Reg. Ref. 081704 (extended under Reg. Ref. 14118) for a mixed use residential, retail and office development consisting of 24 no. residential units (20 no. 3 bed terraced houses above either retail or office space and 4 no. 4 bed semi-detached houses) in 5 no. blocks.

Development for which substitute consent is sought consists of the development permitted under Reg. Ref. 081704. Development under Reg. Ref. 081704 was not completed and currently consists of:

- Blocks A & B consisting of 9 no. 2.5 storey terraced houses with retail (total 528 sqm below) are to pad or first floor plate level only;
- Blocks C and D consisting of 11 no. 3 storey terraced houses with ground floor offices are complete;
- and Block E consisting of 2 no. 2.5 storey semi-detached houses is complete to roof level but not weather tight.

Vehicular access to the site is from two points on the northern and southern corners of the site from Mount Alto Road (L1096).

Site services have been installed, or lands cleared for that purpose over an area of approx. 0.93 ha. to facilitate ancillary site development works that will be completed in accordance with Reg. Ref. 081704.

## 1.2 Scope of this Report

This report describes the proposed civil engineering infrastructure for the development and how it connects to the existing infrastructure serving the area. In particular, Foul and Surface Water Drainage and Water supply aspects are considered. This report should be read in conjunction with the following drawings submitted with the Planning Application:

| | |
|---|---|
| 930-244A-C01 | Access & Parking Layout Plan; |
| 930-244A-C02 | Surface Water & Foul Drainage Layout Plan; |
| 930-244A-C03 | Watermain Layout Plan; |
| 930-244A-C04 | Road Long Section, Cross Section & Sight Lines; |
| 930-244A-C04-1 | Road Table Ramp, Pedestrian Crossing & Junction Sight Lines; |
| 930-244A-C04-2 | Proposed Junction Table Layout Plan, Sections & Details; |
| 930-244A-C05 | Surface Water Attenuation Related Details; and |
| 930-244A-C06 | Foul & SW Drain and Sewer Longitudinal Sections; and |
| 930-244A-C10 | Surface Water Outfall Sewer, Layout Plan & Longitudinal Section. |

# 2 ACCESS AND ROADS

## 2.1 General

It is proposed to complete the existing access point (Road 1) to the site from Mount Alto Road. Adequate kerb radii, entry treatment and pedestrian facilities are to be provided at this entrance. The junction is also to include a raised junction table (ramp) and proposed structural strengthening of the existing Armco collision barrier opposite this junction on Mount Alto Road.

## 2.2 Design of Roads / Access

All internal roadways have been designed predominantly following the guidance of 'Design Manual for Urban Roads and Streets' (DMURS).

Refer to drawing No. 930-244A-C01, Access & Parking Layout Plan, shows the layout of the access road and parking serving the development.

Drawing no. 930-244A-C04, Road Longitudinal Section & Typical Cross Sections, 930-244A-C04-1, Junction Sight Lines & Road Details and 930-244A-C04-2, Proposed Junction Table Layout Plan, Sections & Details, show the plans, sections and details of the proposed road completion works.

## 2.3 Roads, Parking and Junction Design

The proposed scheme has been developed in a manner which employs best practice in urban design, having regard to the policy document DMURS.

Basic road geometry includes carriageway widths of 6m with perpendicular parking bays of typical dimensions 5m deep by 2.5m wide.

The proposed curving horizontal alignment calms traffic and self regulates lower vehicle speeds; however, the steep site topography of the southern road presents constraints limiting the adherence to preferred maximum gradients.

In this respect the less aggressive feature of a raised junction table has been used strategically as a supplementary measure to calm traffic and assist pedestrian movements by allowing them to cross at grade.

Buff coloured tactile paving is to be used to define crossing points for visually impaired users. The junction is to be provided with standard dropped kerb and tactile paving uncontrolled pedestrian crossing.

Clear junction sightlines have been demonstrated to provide in excess of the minimum requirement in accordance with DMURS for a road speed limit of 50 km/h of 49m forward visibility (on bus routes) at a setback of 2.4m.

A total of 74 car parking spaces are to be provided.

# 3 SURFACE WATER DRAINAGE SYSTEM

## 3.1 Existing Surface Water Infrastructure

Under the original planning grant reference 08/1704, dedicated surface water (SW) sewers were constructed. Reference is made to Molony Millar drawing number 930-244A-C02, sewers EX.S1A – EX.S9 for clarity.

An existing 225mm diameter combined local authority sewer is located along Mount Alto Road, connecting to a 300/375mm combined sewer on Main Street – see layout of existing drainage infrastructure in Appendix I and Molony and Millar Drawing 930-244A-C02 for further clarity. These existing combined sewers flow northwards.

## 3.2 Proposed Site Surface Water Drainage System

It is proposed to discharge SW run-off from the site (after interception and attenuation – see Section 3.3 below) to a new 300mm diameter SW sewer (approximately 220m total length) on Main Street, discharging to the Vartry River. Refer to Molony and Millar Drawing 930-244A-C10 for further details of this proposed new SW outfall sewer.

Run-off from the site will drain to a surface water attenuation tank. The SW Attenuation tank has been designed to accommodate the 100-year return storm (+ 20% for climate change) for the entire development site.

The SW attenuation tank is formed as a reinforced concrete tank below ground to the north-east of the site. The gravity outfall from the tank will be controlled by a Hydrobrake (max. flow of 12.55 l/s; equivalent green-field site discharge) and will flow to the afore-mentioned proposed 300mm diameter outfall SW sewer.

Refer to Molony and Millar Drawings 930-244A-C02, 930-244A-C05 & 930-244A-C06 and Appendix III and IV for SW pipe design and SW attenuation calculations respectively.

## 3.3 Compliance with the Principles of Sustainable Urban Drainage Systems

Currently, the site is a brownfield site with partially completed structures. Subsoil is rock and unsuitable for infiltration. No formal SW structures exist on the site.

Final discharge from the site will be limited to the current greenfield discharge rate. In order to both reduce and attenuate the flow; the proposed development will be designed in accordance with the principles of Sustainable Urban Drainage Systems (SUDS) as embodied in the recommendations of the Greater Dublin Strategic Drainage Study (GDSDS). The GDSDS addresses the issue of sustainability by requiring designs to comply with a set of drainage criteria which aim to minimize the impact of urbanization by replicating the run-off

characteristics of a greenfield site. The criteria provide a consistent approach to addressing both rate and volume of run-off as well as ensuring the environment is protected from pollution that is washed off roads and buildings.

The requirements of SUDS are typically addressed by provision of the following:

- Interception storage;
- Treatment storage (not required if interception storage is provided);
- Attenuation storage;
- Long term storage (not required if growth factors are not applied to $Q_{bar}$ when designing attenuation storage).

In the case of the subject site, interception storage will be provided, and a 20% climate change factor will be applied to the allowable discharge for the 100-year event. This means that both treatment storage and long-term storage are not required.

### 3.3.1 Interception Storage

Interception storage is catered for as follows:

- Rainwater Butts to the rear rainwater downpipes on all residential units providing a capture, store and remove function.

Various other options were considered to be unviable; The nature of the site (rock, with no infiltration capacity) does not allow for the inclusion of any conventional soil infiltration devices and the proposed pitched roofs don't allow for green roofs.

The proposed landscaping will also provide further limited interception storage.

It is considered that although the options for interception storage are limited, the proposals set forward will improve the current status quo substantially.

### 3.3.2 Attenuation Storage

Attenuation storage will be provided by a RC tank located below ground level, to the north-west of the site.

Equivalent Greenfield runoff for the site ($Q_{bar}$) has been calculated as 12.55 l/s. Refer to appendix IV, HR Wallingford Greenfield runoff estimation for sites.

Because long term storage is not provided, the limiting value is used for the 100-year storm without growth factors being applied. The attenuation has been designed to accommodate the 100-year return storm (+ 20% for climate change) for the entire development. The Calculations in Appendix III show that for a 100-year return storm (+ 20% for climate change), a minimum volume of 382 $m^3$ is required when applying a constant maximum discharge of 12.55 l/s.

A tank of 400 $m^3$ has been proposed with a maximum depth of water in the tank = 1.125 m approximately.

A Klargester petrol by-pass interceptor is proposed to deal with any fuel related pollutants emanating from all access roads and parking bays.

# 4 FOUL DRAINAGE SYSTEM

## 4.1 Existing Foul Sewer Infrastructure

Under the original planning grant reference 08/1704, dedicated foul sewers were constructed. Reference is made to Molony Millar drawing number 930-244A-C02, sewers EX.F1A – EX.C6 for clarity.

An existing 225mm diameter combined sewer is located along Mount Alto Road, connecting to a 300/375mm combined sewer on Main Street – see layout of existing drainage infrastructure in Appendix I and Molony and Millar Drawing 930-244A-C02 for further clarity. These existing combined sewers flow northwards.

It can be noted that a (previous) pre-connection application (for water and wastewater) for this site was approved, on 7th November 2018, as part of planning application ref.08/1704, for 24 residential units and 9 retail units.

A copy of this can be found in Appendix I, for information.

## 4.2 Proposed Foul Sewer/Drain System

Existing incomplete foul sewers and manholes EX.C1 to EX.C6 are to be cleared of rubble, high pressure cleaned and rehabilitated.

All private connections (Block C & D) are to be saddled into the existing Mount Alto Road/Main Street combined sewer.

All private connections are 100mm diameter foul drains at 1:60.

The fully occupied proposed foul effluent estimate is calculated as follows:

Residential:

Number of new Units = 11

@ 150 l/person/day & average occupancy ratio of 2.7 persons/dwelling *

Q = 4,455 l/day or 0.052 l/s DWF

$Q_{peak}$ = 6DWF = 0.309 l/s

* Reference: Irish Water, Code of Practice for Wastewater Supply

Refer to '930-244A Foul Sewer Design' for the Hydraulic Design of the gravity sewers.

# 5. WATER SUPPLY

## 5.1 Existing Watermain Infrastructure

An existing 125mm diameter PE watermain is located on Mount Alto Road connecting to an existing 125mm diameter PE watermain located on Main Street. – see the existing watermain infrastructure records contained in Appendix I and Molony and Millar drawing 930-244A-C03 for further clarity.

It can be noted that a (previous) pre-connection application (for water and wastewater) for this site was approved, on 7th November 2018, as part of planning application ref.08/1704, for 24 residential units and 9 retail units.

A copy of this can be found in Appendix I, for information.

## 5.2 Proposed Watermain and Service Connection

Two existing hydrants are located on Mount Alto and Main Streets, ensuring that no part of any building is further than 46m from a hydrant. The hydrants are to be located no closer than 6m from any building.

All service connections are to be 25mm and fitted with an Irish Water compliant service box.

It is proposed that at a post planning detailed design stage a comprehensive Mechanical and Electrical (M&E) building design would be submitted, as may be required, by the applicant for the buildings for approval by Wicklow County Council. Included in this detailed M&E building design would be the following:

• Full internal piping layout including all ancillaries;

• Boosting requirements and details;

• 24-hour water storage; and

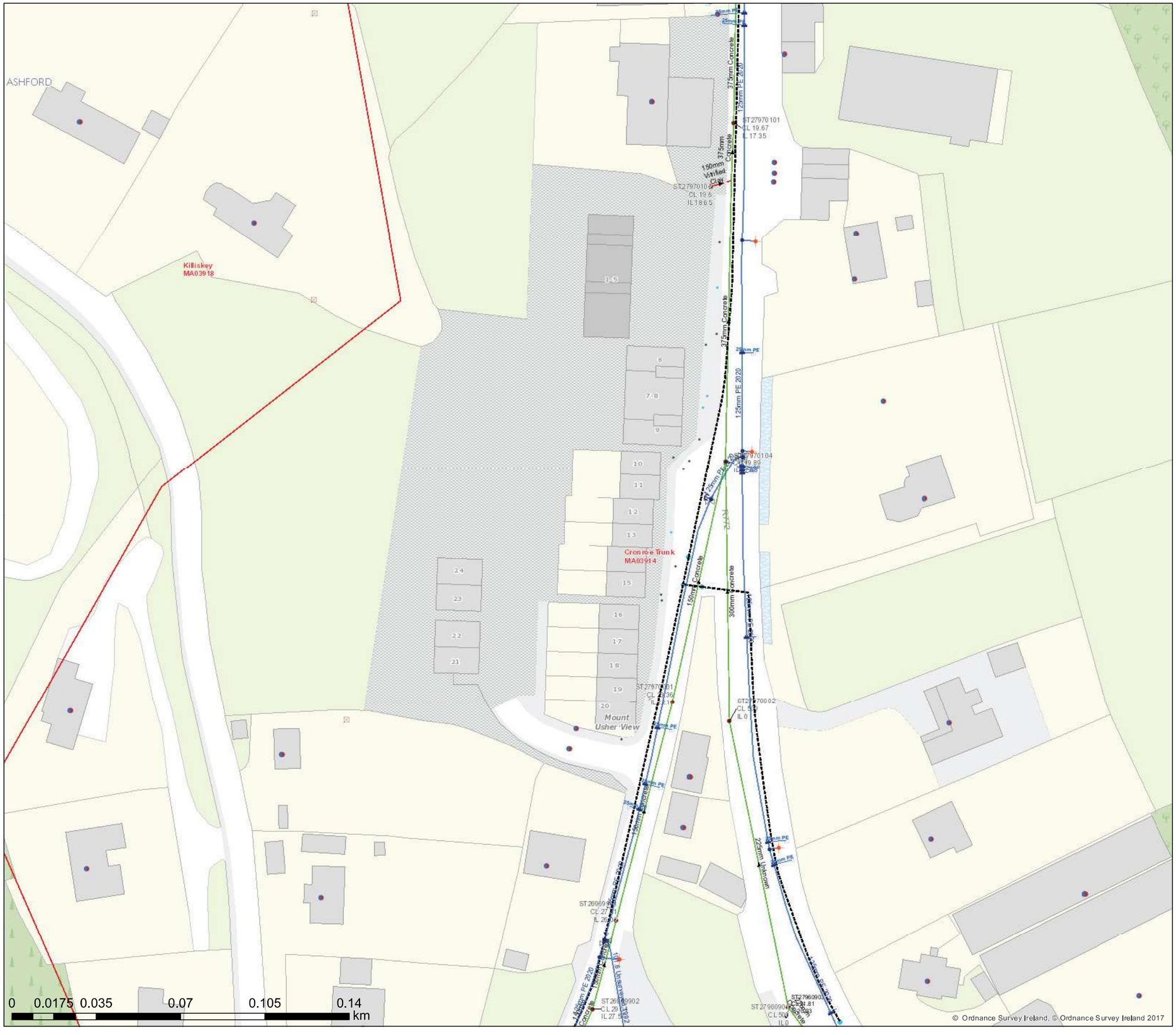
• Other requirements specific to the proposed development.

The water demand for the entire development is 4.5 $m^3$ (4,455 l/day) equivalent to the calculated total foul effluent discharge in Section 4.2 above.

# APPENDIX I

# RECORDS OF EXISTING SERVICES

# Irish Water Web Map




UISCE ÉIREANN : IRISH WATER

Print Date: 17/05/2021

Printed by:Irish Water



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

**Reservoir**
- Potable
- Raw Water

**Water Distribution Mains**
- Irish Water
- Private

**Trunk Water Mains**
- Irish Water
- Private

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

**Water Fittings**
- Cap
- Reducer
- Tap
- Other Fittings

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

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

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

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

**Discharge Type**
- Outfall
- Overflow
- Soakaway
- Standard Outlet
- Other; Unknown

**Cleanout Type**
- Rodding Eye
- Flushing Structure
- Other; Unknown

**Sewer Inlets**
- Catchpit
- Gully
- Standard
- Other; Unknown

**Sewer Fittings**
- Vent/Col
- Other; Unknown

**Storm Water Network**

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

**Inlet Type**
- Gully
- Standard
- Other; Unknown

**Storm Manholes**
- Standard
- Backdrop
- Cascade
- Catchpit
- Bifurcation
- Hatchbox
- Lamphole
- Hydrobrake
- Other; Unknown
- Storm Culverts
- Storm Clean Outs
- Stormwater Chambers

**Discharge Type**
- Oufall
- Overflow
- Soakaway
- Other; Unknown

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

**ESB Networks**

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

**ESB MVLV Lines**
- MV Overhead Three Phase
- MV Overhead Single Phase
- LV Overhead Three Phase
- LV Overhead Single Phase
- MVLV Underground
- Abandoned

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

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

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

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Molony & Millar Ltd c/o Ciaran Allidine
Molony & Millar Ltd,
Riverbank House,
Ballyboden Road,
Rathfarnam, Dublin 14

07 November 2018

Dear Sir/Madam,

**Re: Customer Reference No 2214246641 pre-connection enquiry - Subject to contract | Contract denied**
**Connection for 24 no. domestic units and 9 retails units at Mount Alto Road, Ashford, Co. Wicklow**

Irish Water has reviewed your pre-connection enquiry in relation to water and wastewater connections at Mount Alto Road, Ashford, Co.Wicklow. Based upon the details you have provided with your pre-connection enquiry and on the capacity currently available as assessed by Irish Water, we wish to advise you that, subject to a valid connection agreement being put in place, your proposed connection to the Irish Water network can be facilitated.

You are advised that this correspondence does not constitute an offer in whole or in part to provide a connection to any Irish Water infrastructure and is provided subject to a connection agreement being signed at a later date.

A connection agreement can be applied for by completing the connection application form available 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.

If you have any further questions, please contact us on **1850 278 278** or **+353 1 707 2828, 8.00am-4.30pm, Mon-Fri** or email **newconnections@water.ie**. For further information, visit **www.water.ie/connections**

Yours sincerely,

**Maria O'Dwyer**
**Connections and Developer Services**

# APPENDIX II

# FOUL SEWER DESIGN CALCULATIONS

0.75 to 3 m/s — Self cleansing velocity when flowing half full:
0.6 for <420 Discharge Units (Intermittent Flow) — Pipe Roughness Co-efficient ($K_s$):
1.5 for >420 Discharge Units (Constant Flow)

References:
Code of Practice for Wastewater Infrastructure, Irish Water, 2017
Recommendations for Site Development Works, D.O.E. Nov. 1998
BS8301:1985, Table 4, 7.4.4.1
BS8301:1985, Table 4, 7.4.4.1

| Pipe Run | Pipe Gradient | Pipe Diameter | Discharge Units for segment | Accumulative Discharge units | Actual Peak | | Full Bore | | Proportional flow | Discharge Velocity | Proportional Depth |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | Flow Q | Velocity v | Flow $Q_p$ | Velocity $v_p$ | $Q/Q_p$ | | |
| | 1 in | mm | units | units | l/s | m/s | l/s | m/s | OK? | OK? | OK? |
| | | | | | | | | | | | |
| EX.F1A-EX.F1 | 45 | 225 | 0 | 0 | | | | | | | |
| EX.F1-EX.F2 | 50 | 225 | 0 | 0 | | | | | | | |
| EX.F2-EX.F3 | 22 | 225 | 0 | 0 | | | | | | | |
| EX.F3-EX.F4 | 22 | 225 | 0 | 0 | | | | | | | |
| EX.F4-EX.C1 | 22 | 225 | 0 | 0 | | | | | | | |
| EX.C1-EX.C2 | 22 | 225 | 70 | 70 | 3.551 | 1.285 | 111.274 | 2.799 | YES | YES | YES |
| EX.C2-EX.C3 | 24 | 225 | 84 | 154 | 4.300 | 1.329 | 107.415 | 2.702 | YES | YES | YES |
| EX.C3-EX.C4 | 84 | 225 | 0 | 154 | 4.300 | 0.848 | 56.698 | 1.426 | YES | YES | YES |
| EX.C4-EX.C5 | 84 | 225 | 0 | 154 | 4.300 | 0.848 | 56.698 | 1.426 | YES | YES | YES |
| EX.C5-EX.C6 | 84 | 225 | 0 | 154 | 4.300 | 0.848 | 56.698 | 1.426 | YES | YES | YES |
| C1-EX.C6 | 84 | 225 | 0 | 154 | 4.300 | 0.848 | 56.698 | 1.426 | YES | YES | YES |
| | | | | | | | | | | | |

14 Units allowed per residential unit

# APPENDIX III

## SURFACE WATER SEWER DESIGN CALCULATIONS

| | | | |
|---|---|---|---|
| **Rainfall Intensity (i) roof =** | **75** | **mm/hr** | ***RSDW, DOE, 1998, 3.4*** |
| **Rainfall Intensity (i) paved =** | **50** | **mm/hr** | ***RSDW, DOE, 1998, 3.4*** |
| **Storm Return Period =** | **5** | **years** | ***RSDW, DOE, 1998, Table 3.1*** |
| **Self cleansing Velocity =** | **0.8-3** | **m/s** | ***RSDW, DOE, 1998, 3.4*** |
| **Roof Vol. run-off coeffiecient (Cv) =** | | **0.9** | |
| **Paved Vol. run-off coeffiecient (Cv) =** | | **0.8** | |
| **Pipe Roughness $K_s$ =** | **0.6** | **mm** | ***BS8301:1985, 7.4.4.1 Hydraulic Roughness*** |

**Design calculations:** **Q =** **$A_P$ x i x Cr x Cv x 2.78**

**Routing coefficient (Cr) =** **1.0**

**Qmax =** **15.6 l/s**

**Total Roof Area =** **831.0** **$m^2$**

**Total Paved Area =** **0.0** **$m^2$**

| Pipe No. | Impermeable Area ($A_p$) | | Gradient | Diameter | Actual Rate of Flow | Accumulative Rate of Flow | Discharge Velocity | Capacity Full bore flow | Full Bore Velocity | Proportional flow | Discharge Velocity | Proportional Depth |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Roof ($A_{p1}$) | Paved ($A_{p2}$) | | | Q | $Q_t$ | v | $Q_p$ | $v_p$ | $Q/Q_p$ | | |
| P | $m^2$ | $m^2$ | 1 in | mm | l/s | l/s | m/s | l/s | m/s | OK? | OK? | OK? |
| | | | | | | | | | | | | |
| EX.S1A-EX.S1 | 0 | 0 | 49.6 | 225 | | | | | | | | |
| EX.S1-EX.S2 | 0 | 0 | 22.0 | 225 | | | | | | | | |
| EX.S2-EX.S3 | 0 | 0 | 22.0 | 225 | | | | | | | | |
| EX.S3-EX.S4 | 0 | 0 | 8.6 | 300 | | | | | | | | |
| EX.S4-EX.S5 | 0 | 0 | 31.2 | 300 | | | | | | | | |
| EX.S5-EX.S6 | 395 | 0 | 31.0 | 300 | 7.4 | 7.4 | 1.36 | 200.093 | 2.831 | YES | YES | YES |
| EX.S6-EX.S7 | 436 | 0 | 31.0 | 300 | 8.2 | 15.6 | 1.70 | 200.093 | 2.831 | YES | YES | YES |
| EX.S7-EX.S8 | 0 | 0 | 105.0 | 300 | 0.0 | 15.6 | 1.10 | 108.252 | 1.531 | YES | YES | YES |
| EX.S8-EX.S9 | 0 | 0 | 100.0 | 300 | 0.0 | 15.6 | 1.12 | 110.950 | 1.570 | YES | YES | YES |
| EX.S9-S6 | 0 | 0 | 100.0 | 300 | 0.0 | 15.6 | 1.12 | 110.950 | 1.570 | YES | YES | YES |
| S6- SW ATT | 0 | 0 | 100.0 | 300 | 0.0 | 15.6 | 1.12 | 110.950 | 1.570 | YES | YES | YES |
| | | | | | | | | | | | | |
| SW ATT-S5 | 0 | 0 | 200.0 | 300 | 12.6 | 12.6 | 0.82 | 78.161 | 1.106 | YES | YES | YES |
| S5-S4 | 0 | 0 | 200.0 | 300 | 0.0 | 12.6 | 0.82 | 78.161 | 1.106 | YES | YES | YES |
| | | | | | | | | | | | | |

# APPENDIX IV

# SURFACE WATER ATTENUATION CALCULATIONS

**Storm Water Attenuation Calculations**

Total Site Area = 11933 $m^2$

Areas contributing to SW Run-off:

| Description | Finish | Area ($m^2$) | Percentage run-off (%) | Equivalent run-off area ($m^2$) |
|---|---|---|---|---|
| Roofs(A-E) incl. | tiles/slate | 2655 | 90 | 2389.5 |
| Access roads & parking bays | macadam/concrete | 2451 | 80 | 1960.8 |
| Rem. Landscaped | landscaped | 6827 | 35 | 2389.5 |
| Equivalent impermeable area: | | | | **6739.8** |

Permissible outflow = **12.55 l/s**

**30 year storm**

Permissible Volume (l)= Actual Achievable Outflow (l/s) x time (s)

Actual Volume (l)= (Impermeable Area x depth of rainfall)

Storage capacity (l)= Actual - Permissible Volumes

| Duration | Rainfall | Permissible | Actual | Store |
|---|---|---|---|---|
| min | mm | l | l | l |
| 15 | 18.8 | 11295.00 | 126707.30 | 115412.30 |
| 30 | 24.5 | 22590.00 | 165123.88 | 142533.88 |
| 60 | 31.9 | 45180.00 | 214998.03 | 169818.03 |
| 120 | 41.5 | 90360.00 | 279699.63 | 189339.63 |
| 240 | 54.1 | 180720.00 | 364620.48 | 183900.48 |
| 360 | 63.1 | 271080.00 | 425278.23 | 154198.23 |
| 720 | 82.3 | 542160.00 | 554681.43 | 12521.42 |
| 1440 | 107.3 | 1084320.00 | 723175.18 | -361144.83 |
| 2880 | 122.8 | 2168640.00 | 827641.30 | -1340998.70 |

Site specific rainfall, Met Eireann

From table above, required storage volume is 189.34 $m^3$
However since there is no practical area on site to store the excess / overflow from the 1:30 year storm (GDSDS), the tank will be sized to cater for the 1:100 year storm.

**100 year storm**

Permissible Volume (l)= Actual Achievable Outflow (l/s) x time (s)

Actual Volume (l)= (Equivalent Impermeable Area x depth of rainfall)

Storage capacity (l)= Actual - Permissible Volumes

| Duration | Rainfall | Permissible | Actual | Store |
|---|---|---|---|---|
| min | mm | l | l | l |
| 15 | 26.3 | 11295.00 | 177255.43 | 165960.43 |
| 30 | 34.1 | 22590.00 | 229825.48 | 207235.48 |
| 60 | 44.1 | 45180.00 | 297222.98 | 252042.98 |
| 120 | 57.2 | 90360.00 | 385513.70 | 295153.70 |
| 240 | 74 | 180720.00 | 498741.50 | 318021.50 |
| 360 | 86.2 | 271080.00 | 580966.45 | 309886.45 |
| 720 | 111.7 | 542160.00 | 752830.08 | 210670.08 |
| 1440 | 144.9 | 1084320.00 | 976589.78 | -107730.23 |
| 2880 | 162 | 2168640.00 | 1091839.50 | -1076800.50 |

Site specific rainfall, Met Eireann

From table above, required storage volume is 318.02 $m^3$
Allow 20% for climate change, volume required = 381.63 $m^3$

Hydrobrake discharge = 12.55 l/s

# Greenfield runoff rate estimation for sites

www.uksuds.com | Greenfield runoff tool

| | |
|---|---|
| Calculated by: | Alan Manthe |
| Site name: | Mount Alto Road |
| Site location: | Ashford |

This is an estimation of the greenfield runoff rates that are used to meet normal best practice criteria in line with Environment Agency guidance "Rainfall runoff management for developments", SC030219 (2013) , the SuDS Manual C753 (Ciria, 2015) and the non-statutory standards for SuDS (Defra, 2015). This information on greenfield runoff rates may be the basis for setting consents for the drainage of surface water runoff from sites.

**Site Details**

| | |
|---|---|
| Latitude: | 53.00947° N |
| Longitude: | 6.10886° W |
| Reference: | 1163827602 |
| Date: | Aug 03 2021 10:26 |

**Runoff estimation approach** IH124

## Site characteristics

Total site area (ha): 1.1933

## Methodology

| | |
|---|---|
| $Q_{BAR}$ estimation method: | Calculate from SPR and SAAR |
| SPR estimation method: | Calculate from SOIL type |

## Soil characteristics

| | Default | Edited |
|---|---|---|
| SOIL type: | 2 | 5 |
| HOST class: | N/A | N/A |
| SPR/SPRHOST: | 0.3 | 0.53 |

## Hydrological characteristics

| | Default | Edited |
|---|---|---|
| SAAR (mm): | 1090 | 1090 |
| Hydrological region: | 12 | 12 |
| Growth curve factor 1 year: | 0.85 | 0.85 |
| Growth curve factor 30 years: | 2.13 | 2.13 |
| Growth curve factor 100 years: | 2.61 | 2.61 |
| Growth curve factor 200 years: | 2.86 | 2.86 |

## Notes

### (1) Is $Q_{BAR}$ < 2.0 l/s/ha?

When $Q_{BAR}$ is < 2.0 l/s/ha then limiting discharge rates are set at 2.0 l/s/ha.

### (2) Are flow rates < 5.0 l/s?

Where flow rates are less than 5.0 l/s consent for discharge is usually set at 5.0 l/s if blockage from vegetation and other materials is possible. Lower consent flow rates may be set where the blockage risk is addressed by using appropriate drainage elements.

### (3) Is SPR/SPRHOST ≤ 0.3?

Where groundwater levels are low enough the use of soakaways to avoid discharge offsite would normally be preferred for disposal of surface water runoff.

## Greenfield runoff rates

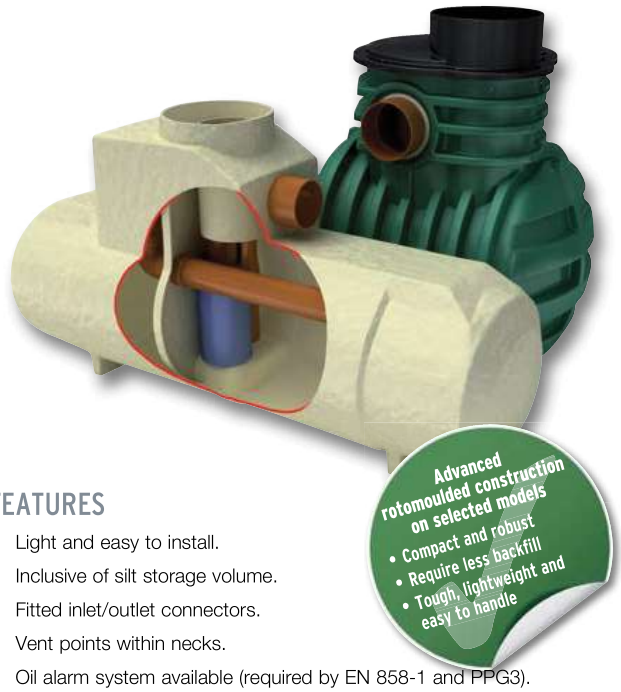
| | Default | Edited |
|---|---|---|
| $Q_{BAR}$ (l/s): | 3.65 | 12.55 |
| 1 in 1 year (l/s): | 3.1 | 10.67 |
| 1 in 30 years (l/s): | 7.78 | 26.74 |
| 1 in 100 year (l/s): | 9.53 | 32.76 |
| 1 in 200 years (l/s): | 10.44 | 35.9 |

Met Eireann
Return Period Rainfall Depths for sliding Durations
Irish Grid: Easting: 326969, Northing: 197089,

| | Interval | | Years | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| DURATION | 6months, | 1year, | 2, | 3, | 4, | 5, | 10, | 20, | 30, | 50, | 75, | 100, | 150, | 200, | 250, | 500, |
| 5 mins | 2.8, | 4.0, | 4.6, | 5.5, | 6.2, | 6.7, | 8.4, | 10.2, | 11.5, | 13.3, | 14.8, | 16.1, | 18.0, | 19.4, | 20.7, | N/A , |
| 10 mins | 3.9, | 5.5, | 6.4, | 7.7, | 8.6, | 9.3, | 11.6, | 14.3, | 16.0, | 18.5, | 20.7, | 22.4, | 25.0, | 27.1, | 28.8, | N/A , |
| 15 mins | 4.6, | 6.5, | 7.5, | 9.1, | 10.1, | 11.0, | 13.7, | 16.8, | 18.8, | 21.7, | 24.3, | 26.3, | 29.4, | 31.9, | 33.9, | N/A , |
| 30 mins | 6.1, | 8.6, | 9.9, | 12.0, | 13.3, | 14.4, | 17.9, | 21.9, | 24.5, | 28.2, | 31.5, | 34.1, | 38.0, | 41.1, | 43.7, | N/A , |
| 1 hours | 8.1, | 11.3, | 13.1, | 15.7, | 17.5, | 18.9, | 23.4, | 28.5, | 31.9, | 36.6, | 40.9, | 44.1, | 49.2, | 53.1, | 56.3, | N/A , |
| 2 hours | 10.7, | 15.0, | 17.3, | 20.7, | 23.0, | 24.8, | 30.6, | 37.2, | 41.5, | 47.6, | 53.0, | 57.2, | 63.6, | 68.5, | 72.6, | N/A , |
| 3 hours | 12.7, | 17.7, | 20.4, | 24.3, | 27.0, | 29.1, | 35.9, | 43.5, | 48.5, | 55.5, | 61.7, | 66.5, | 73.9, | 79.6, | 84.3, | N/A , |
| 4 hours | 14.3, | 19.9, | 22.9, | 27.3, | 30.3, | 32.6, | 40.1, | 48.6, | 54.1, | 61.9, | 68.7, | 74.0, | 82.2, | 88.5, | 93.7, | N/A , |
| 6 hours | 16.9, | 23.5, | 26.9, | 32.1, | 35.6, | 38.2, | 47.0, | 56.7, | 63.1, | 72.1, | 80.1, | 86.2, | 95.6, | 102.8, | 108.8, | N/A , |
| 9 hours | 20.0, | 27.6, | 31.7, | 37.7, | 41.7, | 44.9, | 55.0, | 66.3, | 73.7, | 84.1, | 93.2, | 100.3, | 111.1, | 119.5, | 126.4, | N/A , |
| 12 hours | 22.6, | 31.1, | 35.6, | 42.3, | 46.8, | 50.3, | 61.5, | 74.1, | 82.3, | 93.8, | 103.9, | 111.7, | 123.7, | 132.9, | 140.5, | N/A , |
| 18 hours | 26.7, | 36.6, | 41.9, | 49.7, | 54.9, | 59.0, | 72.0, | 86.6, | 96.1, | 109.4, | 121.0, | 130.0, | 143.8, | 154.5, | 163.2, | N/A , |
| 24 hours | 30.1, | 41.2, | 47.1, | 55.8, | 61.6, | 66.1, | 80.6, | 96.7, | 107.3, | 122.0, | 134.9, | 144.9, | 160.1, | 171.9, | 181.5, | 215.2, |
| 2 days | 37.9, | 50.7, | 57.4, | 67.1, | 73.5, | 78.5, | 94.3, | 111.6, | 122.8, | 138.2, | 151.7, | 162.0, | 177.7, | 189.7, | 199.6, | 233.5, |
| 3 days | 44.5, | 58.7, | 66.0, | 76.6, | 83.5, | 88.9, | 105.8, | 124.2, | 136.0, | 152.3, | 166.4, | 177.1, | 193.4, | 205.8, | 216.0, | 250.8, |
| 4 days | 50.4, | 65.8, | 73.6, | 85.0, | 92.4, | 98.1, | 116.0, | 135.5, | 147.9, | 164.8, | 179.5, | 190.7, | 207.5, | 220.4, | 230.8, | 266.6, |
| 6 days | 60.9, | 78.4, | 87.2, | 99.9, | 108.2, | 114.4, | 134.2, | 155.4, | 168.8, | 187.1, | 202.9, | 214.8, | 232.7, | 246.3, | 257.4, | 295.0, |
| 8 days | 70.4, | 89.7, | 99.4, | 113.2, | 122.2, | 129.0, | 150.3, | 173.0, | 187.4, | 206.9, | 223.6, | 236.2, | 255.1, | 269.4, | 281.0, | 320.3, |
| 10 days | 79.2, | 100.2, | 110.6, | 125.5, | 135.2, | 142.5, | 165.2, | 189.3, | 204.4, | 225.0, | 242.5, | 255.8, | 275.6, | 290.5, | 302.6, | 343.5, |
| 12 days | 87.6, | 110.1, | 121.3, | 137.1, | 147.4, | 155.1, | 179.1, | 204.5, | 220.4, | 241.9, | 260.2, | 274.0, | 294.7, | 310.2, | 322.8, | 365.1, |
| 16 days | 103.4, | 128.7, | 141.2, | 158.8, | 170.1, | 178.6, | 204.9, | 232.6, | 249.9, | 273.2, | 292.9, | 307.8, | 329.9, | 346.5, | 359.9, | 404.9, |
| 20 days | 118.4, | 146.1, | 159.8, | 178.9, | 191.2, | 200.4, | 228.9, | 258.6, | 277.2, | 302.0, | 323.1, | 338.8, | 362.2, | 379.8, | 394.0, | 441.5, |
| 25 days | 136.2, | 166.8, | 181.8, | 202.8, | 216.1, | 226.2, | 257.0, | 289.1, | 309.0, | 335.6, | 358.1, | 375.0, | 399.9, | 418.6, | 433.6, | 483.8, |

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

# Bypass NSB RANGE




## APPLICATION

Bypass separators are used when it is considered an acceptable risk not to provide full treatment, for very high flows, and are used, for example, where the risk of a large spillage and heavy rainfall occurring at the same time is small, e.g.

- Surface car parks.
- Roadways.
- Lightly contaminated commercial areas.

## PERFORMANCE

Klargester were one of the first UK manufacturers to have separators tested to EN 858-1. Klargester have now added the NSB bypass range to their portfolio of certified and tested models. The NSB number denotes the maximum flow at which the separator treats liquids. The British Standards Institute (BSI) tested the required range of Kingspan Klargester Bypass separators and certified their performance in relation to their flow and process performance assessing the effluent qualities to the requirements of EN 858-1. Klargester bypass separator designs follow the parameters determined during the testing of the required range of bypass separators.

Each bypass separator design includes the necessary volume requirements for:

- Oil separation capacity.
- Oil storage volume.
- Silt storage capacity.
- Coalescer.

The unit is designed to treat 10% of peak flow. The calculated drainage areas served by each separator are indicated according to the formula given by PPG3 NSB = 0.0018A(m2). Flows generated by higher rainfall rates will pass through part of the separator and bypass the main separation chamber.

Class I separators are designed to achieve a concentration of 5mg/litre of oil under standard test conditions.

## FEATURES

- Light and easy to install.
- Inclusive of silt storage volume.
- Fitted inlet/outlet connectors.
- Vent points within necks.
- Oil alarm system available (required by EN 858-1 and PPG3).
- Extension access shafts for deep inverts.
- Maintenance from ground level.
- GRP or rotomoulded construction (subject to model).

To specify a nominal size bypass separator, the following information is needed:-

- The calculated flow rate for the drainage area served. Our designs are based on the assumption that any interconnecting pipework fitted elsewhere on site does not impede flow into or out of the separator and that the flow is not pumped.
- The drain invert inlet depth.
- Pipework type, size and orientation.

### SIZES AND SPECIFICATIONS

| UNIT NOMINAL SIZE | FLOW (l/s) | PEAK FLOW RATE (l/s) | DRAINAGE AREA (m²) | STORAGE CAPACITY (litres) SILT | OIL | UNIT LENGTH (mm) | UNIT DIA. (mm) | ACCESS SHAFT DIA. (mm) | BASE TO INLET INVERT (mm) | BASE TO OUTLET INVERT | STANDARD FALL ACROSS (mm) | MIN. INLET INVERT (mm) | STANDARD PIPEWORK DIA. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| NSBP003 | 3 | 30 | 1670 | 300 | 45 | 1700 | 1350 | 600 | 1420 | 1320 | 100 | 500 | 160 |
| NSBP004 | 4.5 | 45 | 2500 | 450 | 60 | 1700 | 1350 | 600 | 1420 | 1320 | 100 | 500 | 160 |
| NSBP006 | 6 | 60 | 3335 | 600 | 90 | 1700 | 1350 | 600 | 1420 | 1320 | 100 | 500 | 160 |
| NSBE010 | 10 | 100 | 5560 | 1000 | 150 | 2069 | 1220 | 750 | 1450 | 1350 | 100 | 700 | 315 |
| NSBE015 | 15 | 150 | 8335 | 1500 | 225 | 2947 | 1220 | 750 | 1450 | 1350 | 100 | 700 | 315 |
| NSBE020 | 20 | 200 | 11111 | 2000 | 300 | 3893 | 1220 | 750 | 1450 | 1350 | 100 | 700 | 375 |
| NSBE025 | 25 | 250 | 13890 | 2500 | 375 | 3575 | 1420 | 750 | 1680 | 1580 | 100 | 700 | 375 |
| NSBE030 | 30 | 300 | 16670 | 3000 | 450 | 4265 | 1420 | 750 | 1680 | 1580 | 100 | 700 | 450 |
| NSBE040 | 40 | 400 | 22222 | 4000 | 600 | 3230 | 1920 | 600 | 2185 | 2035 | 150 | 1000 | 500 |
| NSBE050 | 50 | 500 | 27778 | 5000 | 750 | 3960 | 1920 | 600 | 2185 | 2035 | 150 | 1000 | 600 |
| NSBE075 | 75 | 750 | 41667 | 7500 | 1125 | 5841 | 1920 | 600 | 2235 | 2035 | 200 | 950 | 675 |
| NSBE100 | 100 | 1000 | 55556 | 10000 | 1500 | 7661 | 1920 | 600 | 2235 | 2035 | 200 | 950 | 750 |
| NSBE125 | 125 | 1250 | 69444 | 12500 | 1875 | 9548 | 1920 | 600 | 2235 | 2035 | 200 | 950 | 750 |

Rotomoulded chamber construction  GRP chamber construction  * Some units have more than one access shaft – diameter of largest shown.