Head Office
The Mall
Maryborough Woods
Douglas
Cork, T12 K8YT
(021) 477 4940
www.wdg.ie
reception@wdg.ie

Dublin Office
Level 1, The Chase
Carmanhall Road
Sandyford
Dublin, D18 Y3X2
(01) 524 0191
www.wdg.ie
reception@wdg.ie

Project: Proposed Development at Ceann Scribe, Clontead More, Coachford, Co. Cork.

Project No: 23028

Document Title: Civil Engineering Report

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Author: Ian Reilly MEng MIEI

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Contents

1.0 Introduction

Walsh design group (WDG) were appointed by Cork County Council to produce a Civil Engineering Report as part of a planning application for the proposed residential development of 26 dwellings at Ceann Scribe, Clontead More, Coachford, Co. Cork.

This report is particularly concerned with the following Engineering services:

- Road design,
- Wastewater Drainage,
- Surface Water Drainage & Drainage Impact Assessment,
- Water Supply.

This report should be read in conjunction with the following accompanying drawings and documents submitted with the planning application:

- 23028-XX-XX-XX-XX-DR-WDG-CE-001 Site Layout – Roads & Levels,
- 23028-XX-XX-XX-XX-DR-WDG-CE-002 Site Layout - Drainage,
- 23028-XX-XX-XX-XX-DR-WDG-CE-003 Site Layout – Water Supply,
- 23028-XX-XX-XX-XX-DR-WDG-CE-004 Site Layout – Proposed SuDS Features,
- 23028-XX-XX-XX-XX-DR-WDG-CE-500 Surface Water Drainage Typical Details,
- 23028-XX-XX-XX-XX-DR-WDG-CE-501 Irish Water Standard Details – Wastewater,
- 23028-XX-XX-XX-XX-DR-WDG-CE-502 Irish Water Standard Details – Water Supply (Sheet 1 of 2),
- 23028-XX-XX-XX-XX-DR-WDG-CE-503 Irish Water Standard Details – Water Supply (Sheet 2 of 2),
- 23028-XX-XX-XX-XX-DR-WDG-CE-504 Construction Details,
- 23028-XX-XX-XX-XX-RP-WDG-CE-002 Planning Stage CEMP,
- 23028-XX-XX-XX-XX-RP-WDG-CE-003 Flood Risk Assessment.

1.1. Site Description

This site proposed for development is a greenfield site and is located just north of the centre of Coachford village, County Cork, see Figure 1 for the site location. The site area within the application redline boundary is 1.01ha. The ITM grid coordinates at the approximate centre of the site are E545810, N573516.

Figure 1: Google Earth Satellite Photo of Coachford

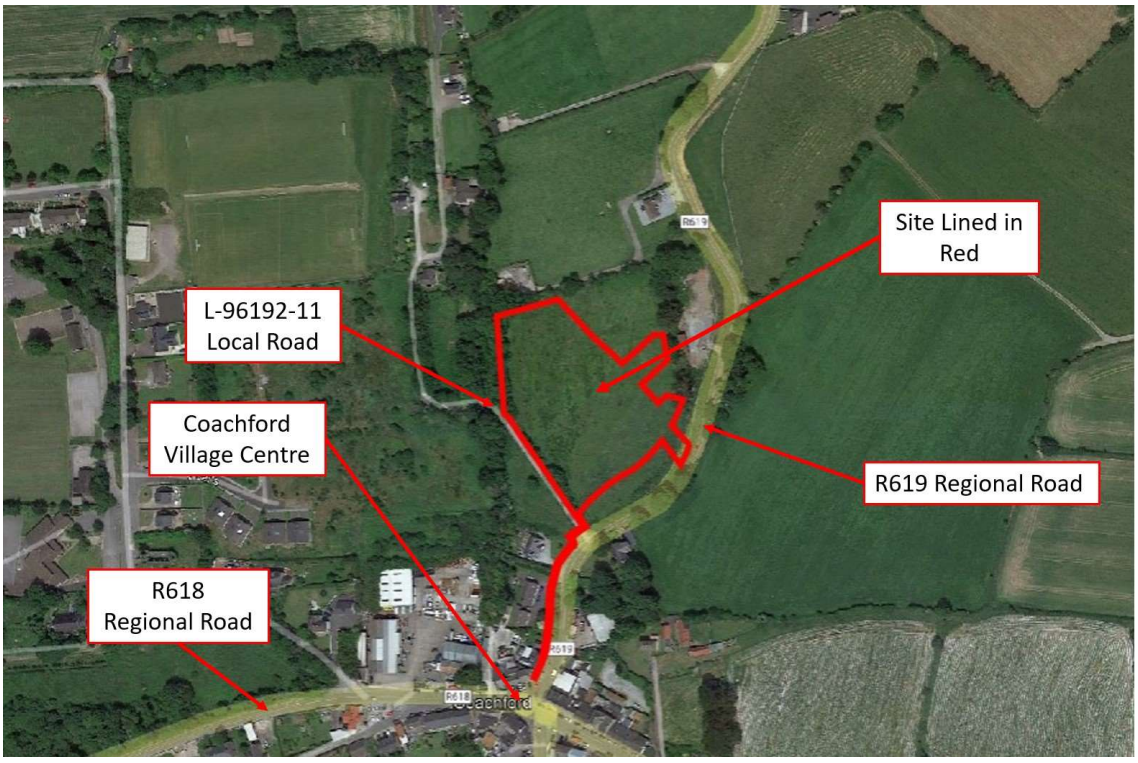


Figure 2: Google Earth Satellite Photo of the proposed development site.

The land is mostly grass covered at this time as is evident from the satellite photo of the site shown in Figure 2. The ground on the site rises from its lowest point of 70.2m OD near the junction of the R619 and the L-96192-11 in the southernmost corner to a high point of 77.2m OD near the northeast corner.

The eastern boundary of the site is formed by the R619 regional road, the southwestern boundary is formed by the L-96192-11 local road. The north and northwest boundaries are shared with a private driveway and a tree covered private plot respectively.

1.2. Proposed Development

The proposed development would consist of 26 dwelling units including 10 No. 1 Bed Apartments, 10 No. 2 Bed 2 Storey Townhouses and 6 No. 3 Bed 2 Storey Semi Detached Houses. A new vehicular access to the site is proposed off the R619 regional road. The proposed development will also include new roads, drainage, water supply, landscaping, boundary treatments, public lighting, electrical and telecommunications infrastructure and all other site development works entailed in a residential development.

Architectural, Engineering and Landscaping drawings are included in the planning documentation; an outline of the development is shown in the Architect's site layout in Figure 3.

Figure 3: Architect's Site Layout

2.0 Road Design

The layout of the proposed new roads and how they connect with the R619 regional road is shown on WDG drawing no. 23028-XX-XX-XX-XX-DR-WDG-CE-001.

2.1. Design Guidelines

The proposed roads within the estate have been designed in substantial compliance with the following:

- Design Manual for Urban Roads and Streets (DMURS) - Dept. of Environment and Dept. of Transport Tourism and Sport-2019,
- Recommendations for Site Development Works for housing areas – DOE 1998,

2.2. Road Hierarchy

There are no *Link* roads or 'through roads' proposed in the development. The proposed roads would be considered local roads in the DMURS hierarchy shown in Table 1. Local roads are described as roads that provide access within communities and to *Arterial* and *Link* roads. The local roads in the development will connect with the R619 which is considered a link road that will connect the development with Coachford Village and and eventually with the arterial N22 national road to the south at Farnanes. The R618 runs in an east/west direction through Coachford and connects it to Carrigadrohid in the west and Dripsey to the east.

DMURS Description	Roads Act/NRA DMRB	Traffic Management Guidelines	National Cycle Manual
Arterial	National	Primary Distributor Roads	Distributor
Link	Regional (see note 1)	District Distributor Local Collector (see Notes 1 and 2)	Local Collector
Local	Local	Access	Access

Notes

Note 1: Larger Regional/District Distributors may fall into the category of *Arterial* where they are the main links between major centres (i.e. towns) or have an orbital function.

Note 2: Local Distributors may fall into the category of *Local* street where they are relatively short in length and simply link a neighbourhood to the broader street network.

Table 1: DMURS Table 3.1 - Terminology used in DMURS compared with other publications.

It is proposed to use a road width of 6.0m throughout the development as most parking spaces/driveways are perpendicular to the carriageway. All roads shall be served by at least one footpath with a minimum width of 2.0m and all estate roads shall have a sign posted speed limit of 30km/h.

2.3. Entrance Sightlines

WDG drawing no. 23028-XX-XX-XX-XX-DR-WDG-CE-001 includes sightlines drawn at the proposed development's entrance from the R619. The sightlines illustrate that a driver leaving the development has a clear view to the near side road edge to the north and south of at least 49m once the ditch has been removed.

The R619 has a sign posted speed limit of 50km/h in this area. The safe stopping distance (SSD) on a bus route with a 50km/h speed limit is 49m according to Table 4.2 of DMURS (2019), see Figure 4.

SSD STANDARDS

Design Speed (km/h)	SSD Standard (metres)
10	7
20	14
30	23
40	33
50	45
60	59

Forward Visibility

Design Speed (km/h)	SSD Standard (metres)
10	8
20	15
30	24
40	36
50	49
60	65

Forward Visibility on Bus Routes

Figure 4: DMURS (2019); Table 4.2, Reduced SSD standards for application within cities towns and villages

Section 4.4.2 of DMURS (2019) states that a maximum setback or 'X' distance of 2.4m should be used for priority junctions in urban areas as longer setback distances allow higher vehicle speeds through junctions and may encourage more than one vehicle on the minor arm to go for the same gap in traffic on the major arm when it is not ideal that they do so. The shorter setback distances protect pedestrians and other vulnerable road users.

The visibility splay shall be kept clear of any vegetation or obstacle that could block a driver's view of oncoming vehicles or cyclists. Any boundary walls constructed within visibility splays shall be restricted to less than 800mm in height. Similarly, any planting within a visibility splay shall be of a species that will not grow to more than 800mm in height.

Nothing shall be planted or sown within a visibility splay without prior written permission from the Local Authority.

2.4. Shared surfaces and Surface Materials

DMURS encourages the use of raised and shared surfaces which promote integration between pedestrians, cyclists, and drivers. This has been shown to be effective where pedestrian activities are high and vehicle movements are mainly due to lower-level access requirements and circulatory purposes.

DMURS recommends that, where design speeds of 30km/h are desired, periodic changes in the colour and/or texture of the street surfaces should be employed. In this development,

shared surfaces are introduced through raised tables and the use of material changes in the street surface treatments.

Shared surfaces in the form of raised homezone areas will be finished in bituminous surfacing with beige coloured chippings to differentiate these features from the normal street surfaces finished in standard black bituminous surfacing, see WDG drawing no. 23028-XX-XX-XX-XX-DR-WDG-CE-504 for construction details.

The proposed locations and extent of these features are shown on WDG drawing no. 23028-XX-XX-XX-XX-DR-WDG-CE-001.

2.5. Traffic Calming

It is proposed to limit the vehicle speeds within the development to 30km/h using standard signage and traffic calming measures as recommended by DMURS and the Traffic Management Guidelines (DoELG 2003) to help improve driver behaviour and reduce vehicle speeds.

The more visible traffic calming measures proposed are raised homezones and a raised junction with the proposed locations shown in WDG drawing No. 23028-XX-XX-XX-XX-DR-WDG-CE-001. These are positioned to reduce the lengths of straight and level roads that would allow a build-up of vehicle speed while also providing designated non-signalised, crossing points for pedestrians.

Ramps to raised sections of roadway shall be constructed in accordance with Diagram 6.34 of The Traffic Management Guidelines. The street level is raised 75mm and finished using bituminous surfacing with beige coloured chippings with 1:15 ramps at each side painted with white triangles (M112) to warn drivers of the elevation change (see Figure 5).

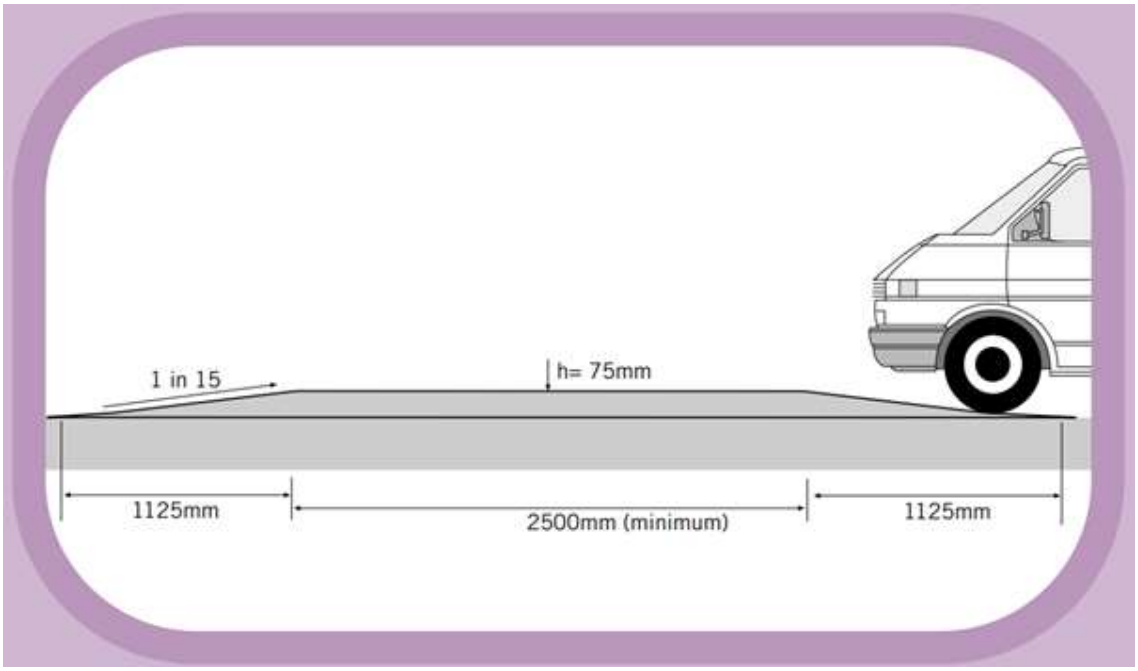


Figure 5: Traffic Management Guidelines, Diagram 6.34 - Raised Tables

2.6. Street Gradients

In accordance with DMURS guidelines, roads have been limited as far as possible, to gradients of 5% or less. As the access road to the development meets the R619 it will have a maximum gradient of 2% for 7.0m in accordance with section 2.7 of the *Recommendations for Site Development Works for housing areas – DOE 1998.*

All proposed roads shall have a cross fall of 2.5%. Vertical alignment has been carefully considered to minimise the amount of cut and fill on site.

2.7. Pedestrian Crossings

Pedestrian crossings will be placed at 2 points of the development where there are natural crossing points with footpaths on both sides, see WDG drawing no. 23028-XX-XX-XX-XX-DR-WDG-CE-001. The proposed pedestrian crossings are uncontrolled crossing points. Each crossing point shall be constructed using dished kerbs in accordance with Diagram 13.1 of the Traffic Management Guidelines 2013, see Figure 6.

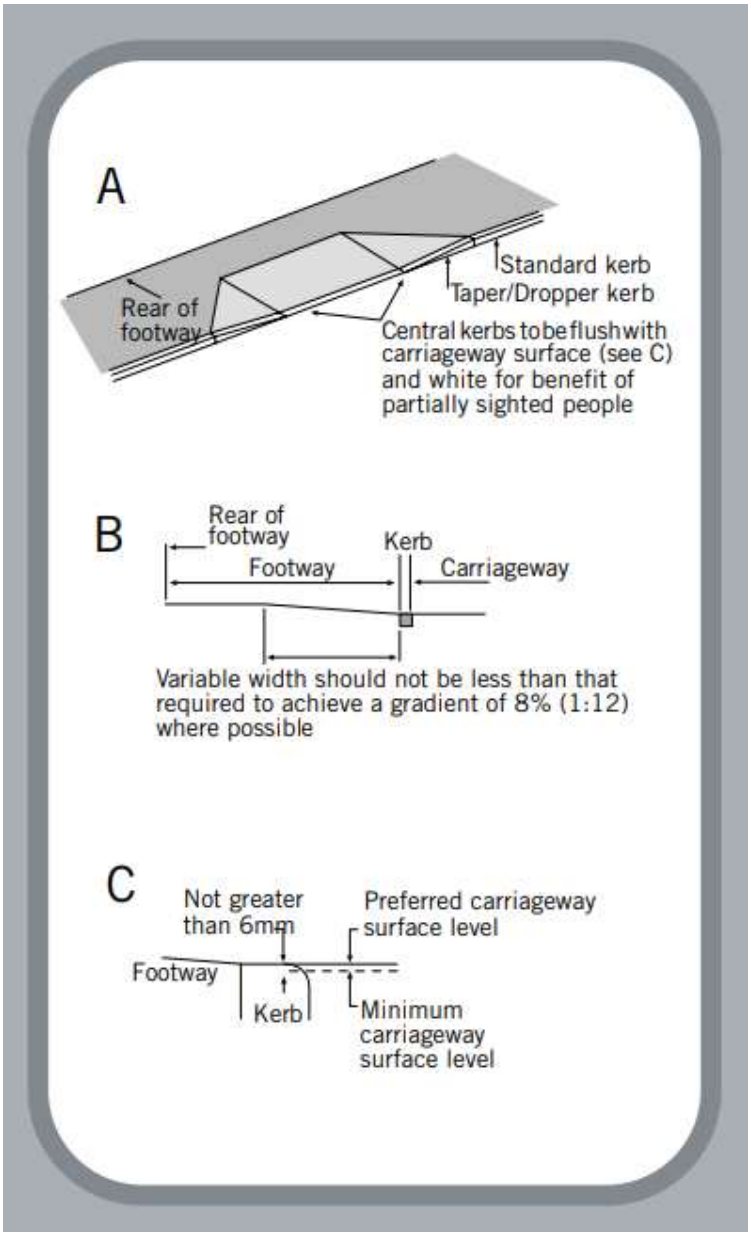


Figure 6: Diagram 13.1 Dished Crossing - Traffic Management Guidelines; DOT, 2013

Buff coloured tactile paving in accordance with Table 13.1 of the Traffic Management Guidelines shall be set in the footpath at each crossing point. Paving slabs measure 400mm x 400mm and shall be laid in a pattern of 3 wide by 2 deep (1200mm wide x 800mm deep) at each crossing point, as illustrated on drawing no. 23028-XX-XX-XX-XX-DR-WDG-CE-001.

2.8. Pavement Construction

Street pavement and footpath construction shall be carried out in accordance with the recognised standard; 'Recommendations for Site Development Works for Housing Areas; DoELG 1998'. Roads will be finished in bituminous surfacing and footpaths will be constructed in concrete. See WDG construction details drawing no. 23028-XX-XX-XX-XX-DR-WDG-CE-504 for road, footpath, and kerb details.

Road construction assumes a minimum design CBR for the existing ground. The appointed main contractor will be obliged to carry out testing to establish the actual CBR prior to final road design and commencement of road construction.

2.9. Private Driveways & Paving

Each private dwelling plot with car parking included shall have driveway slopes in compliance with Technical Guidance Document M of the Building Regulations. Footpaths across all driveway entrances will be dished and incorporate dropped kerbs. All parking bays shall be constructed with permeable paving. The permeable paving will allow for some of the surface water to soak into the subsoil and ground water rather than leaving the site via the sewer network which is preferable in terms of SuDS.

2.10. Site Cut and Fill

Prior to any construction works on site the topsoil (approx. 200mm deep) will be stripped from the surface in all areas apart from the large green areas. This topsoil will be stockpiled, according to best practice, on site to be reused in private gardens and landscaped areas.

Stockpiles are to be located, formed and maintained according to best practice. Vegetation and any waste materials are to be removed from storage areas prior to stockpiling. Soils shall be stockpiled in the driest condition possible. Soil will be banked with a maximum side slope of 1 in 2 and grass seeded with a grass/clover mix to minimise soil erosion and help reduce infestation by nuisance weeds. Stockpiles are to be fenced off and have their contents identified using clear signage. No vehicles shall be allowed to pass over stockpiles.

Fill imported onto the site to be placed under buildings shall comply with Technical Guidance Document D of the Building Regulations and NSAI Standard Recommendation 21 (S.R.21). Fill imported for use under roadways shall comply with the Tii Specification for Roadworks Series 600 documents.

3.0 Surface Water Drainage

The proposed storm sewer collection system consists of a 100mm diameter pipe collection network around each house in accordance with TGD part H discharging to 225mm diameter uPVC sewer or larger in the public areas of the development. The surface water network layout is shown in drawing no. 23028-XX-XX-XX-XX-DR-WDG-CE-002 and the typical details for the surface water infrastructure are shown on drawing no. 23028-XX-XX-XX-XX-DR-WDG-CE-500.

The surface water sewers have been designed using the Causeway Flow design software and the Wallingford procedure for the design and analysis of urban drainage. The surface water system for the development is a single network falling generally from north to south, exiting the site in its southern corner and continuing under the R619 to its junction with the R618 in Coachford Village. It is intended to discharge the stormwater to an existing culvert on the southern side of the R618 at the junction.

3.1. Surface Water Design and Simulation Criteria

The storm network's design criteria included:

- maximum rainfall of 50 mm/hr,
- maximum time of concentration of 30 minutes,
- minimum cover of 1.2m to pipes under roads,
- M5-60 of 15.9mm (Met Eireann),
- SPR of 0.47.

IGSL Ltd. were contracted by Cork County Council to carry out a site investigation on the site. The soil was noted as being gravelly CLAY in the trial pit logs and the soil infiltration rates recorded after BRE Digest 365 testing were relatively poor. To classify this soil, Table 5/1 of the NRA, DMRB, Volume 4, Section 2, Part 1 – NRA HD 106/15, was used. The soil would be considered Class S4 with a corresponding SPR of 0.47.

The storm networks were tested by simulating both summer and winter storms with durations of between 15 minutes and 24 hours and return periods of 1, 30 and 100 years with the following criteria:

- Summer volumetric runoff coefficient of 0.75,
- Winter volumetric runoff coefficient of 0.84,
- Areal runoff factor of 1.0,
- Additional flow for climate change of 20%.

The surface water sewer networks have been modelled and each individual pipe run has been designed such that no flooding will occur to individual elements during any storm up to and including 24-hour 100-year return period, summer, and winter storms. In all storm simulations an additional flow of 20% was added to account for future climate change.

(See detailed design in Appendix A to this document).

3.1.1. Allowable Discharge

In accordance with the recommendations of sustainable urban drainage systems (SuDS) the allowable stormwater discharge from the surface water network was calculated by means of the QBAR equation for small rural catchments (< 25 km^2) as indicated in the institute of Hydrology, UK Report No. 124. QBAR is calculated using the following formula:
$QBAR = (0.00108\ [AREA]^{0.89}\ [SAAR]^{1.17}\ [SOIL]^{2.17})$

Where,

QBAR (m^3/sec)	=	Annual peak flow
AREA (km^2)	=	Catchment area
SAAR (mm)	=	Standard annual average rainfall
SOIL	=	Index with values between 0.15 and 0.50

The variables for the sewer network are as follows:

AREA The catchment area of the estate that will have its runoff attenuated is 1.045ha = 0.01045km^2,

SAAR The standard average rainfall for the site for the period from 1941 to 1970 was obtained from the UKSUDS website and is approximately 1263 mm/year,

SOIL This index was obtained using the Table 5/1 of the DMRB, see Section 3.1 above. Soil Type S4 with a Standard Percentage Runoff (SPR) of 0.47.

For developments smaller than 50ha, the allowable discharge is linearly interpolated from the QBAR value obtained for a 50ha site. Inputting the above data into the QBAR equation, QBAR Actual is calculated as follows:

QBAR	=	$(0.00108\ [0.5]^{0.89}\ [1263]^{1.17}\ [0.47]^{2.17})$
	=	0.482 m3/sec
	=	482 l/sec

By linear interpolation => Adjusted QBAR = 10.06 l/sec.

3.1.2. Network Design

This single network is designed to fall generally from north to south and exit the development in the southernmost corner at the junction between the R619 and the L-96192-11. To reduce the forward flow from the developed site to a maximum of the QBAR greenfield runoff rate of 10.06 l/s a hydrobrake shall be constructed in a manhole prior to the sewer exiting the site. Choking the flow to this rate will result in the requirement for temporary attenuation storage. A certain amount of attenuation storage shall be provided in the roadside swales, but the primary storage element shall be a shallow detention basin in the lower, southwest area of the site. These features are described in more detail in the drainage impact assessment below.

It is intended to continue the new surface water network southwards under the R619 to Coachford Village where it is proposed to discharge the stormwater to an existing culvert on the southern side of the R618 at the junction.

Coachford Infiltration Rates				
	(m/min)			m/hr
	Stage 1	Stage 2	Average	Average
SK01	0.00041	0.00021	0.00031	0.0186
SK02	0.00061	0.00051	0.00056	0.0336
SK03	0.0005	0.0003	0.0004	0.024
SK04	0.00045	0.00033	0.00039	0.0234
SK05	0.00041	0.00041	0.00041	0.0246
SK06	0.0005	0.00042	0.00046	0.0276

Table 2: Summary of IGSL Ltd. Soil Infiltration Rates

The soil infiltration rates shown in Table 2 were recorded by IGSL Ltd. after carrying out 6 no. BRE Digest 365 tests across the site. The IGSL report is included with this application. The infiltration rates are relatively poor at around 20-25mm per hour but a certain amount of infiltration will occur in all SuDS measures constructed to intercept, filter and attenuate the surface water runoff.

To incorporate underdrained roadside swales into the design, the new estate's roads are designed to have a single crossfall towards the verge containing the swale.

In accordance with the Wallingford Procedure, using only impermeable areas in the modified rational method, a Cv (Volumetric Runoff Coefficient) of 0.75 was used for summer events and 0.84 for winter. For the purpose of calculating the volume and rate of flow in the network, the maximum hardstanding area contributing to each pipe run was measured. The hardstanding consists of all roofs, driveways, parking spaces, roads, footpaths and other paved sections within the contributing area. Permeable paving is proposed in areas of the development, however, as the infiltration rates are relatively poor it is assumed that the permeable paving will serve in an interception and attenuation capacity only. As a result, the runoff will be slowed down and filtered but full runoff to the sewer is assumed from permeable paving.

The proposed surface water network has been tested with the Causeway Flow software, simulating rainfall events up to and including the 24-hour, 100 year storm with a 20% addition allowed for climate change. Modelling shows that no flooding occurs in any rainfall event tested.

3.1.3. Road Gullies

Gullies are only used in the homezone areas of the site as shown on WDG drawing no. 23028-XX-XX-XX-XX-DR-WDG-CE-002. It is not practical to use roadside swales in this area so the sewers are located under the estate road and the runoff from the surrounding hardstanding areas is collected by a number of gullies.

All gullies will be precast concrete complying with the requirements of BS 5911: Part 230. The outlet from the gullies will be 150mm diameter pipe set a minimum of 375mm off the floor of the chamber. This allows for debris and silt that falls through the grating to settle below the invert of the outlet pipe. The silt in gullies must be regularly cleaned out as part of the silt management and maintenance schedule in the operational phase of the housing development.

The class of gully grating required will be D400 as per the manhole covers. Gully gratings in roads will be set with the direction of the openings at right angles to the direction of traffic.

3.2. Drainage Impact Assessment

SuDS measures are proposed for the development in both public and private areas in accordance with the guidance from the County Development Plan 2022 Advice Note 1 on Surface Water management and the CIRIA SuDS Manual C753.

The Measures proposed will decrease the impact of the development on the receiving environment and also provide amenity and biodiversity in many cases. Regular maintenance of the SuDS measures will be required to ensure that they are effective throughout their design life. The following paragraphs describe the following SuDS features proposed: a detention basin, permeable paving, underdrained roadside swales, bio-retention tree pits, bio-retention raingardens and water butts.

3.2.1. Detention Basin

The primary means of attenuating runoff prior to its infiltration into the soil shall be the proposed detention basin. The basin is designed to have a depth of 0.3m, side slopes with a gradient of 4 horizontal to one vertical, a base area of approximately 300m^2 and a surface area, when full, of 378m^2. This will provide temporary attenuation storage of approximately 100m^3. The infiltration rate of 0.0276m/hr was recorded by IGSL at the adjacent test location SK06 during soakaway testing in accordance with BRE Digest 365. An infiltration rate of 0.02m/hr was considered in calculating the size of the basin such that no flooding would occur in the drainage network in any event up to and including the 24-hour 100-year storm.

It is worth noting that the basin is designed to be dry most of the time and will only hold water temporarily, during heavy rainfall events. With its shallow depth and relatively gentle side slopes it is basically a shallow depression in the green area that fills with water quite rarely and for a short period. At all other times it will be dry and can function as green open space containing planting and/or furniture that is compatible with getting wet occasionally. See examples in Figure 7.

Figure 7: Examples of detention basins by Peterborough City Council in the UK (CIRIA SuDS Manual C753)

Grassed slopes of 1:3 or less can be mowed with ride-on lawn mowers for ease of maintenance. The 1:4 side slopes are also important in terms of safety as the change of water depth is gradual rather than sudden should someone enter the basin. See WDG drawings no. 23028-XX-XX-XX-XX-DR-WDG-CE-002 and 504 for the proposed layout and details.

3.2.2. Underdrained Roadside Swales

Traditionally storm sewers were constructed under roadways for the most part. It is proposed here to move the storm sewer into road verges as far as possible. It is proposed to construct linear swales parallel with the roads and to have dropped kerbs at the adjacent road edges to allow runoff to fall evenly into the swale. Where swales are in place the road will be constructed with a single 1:40 crossfall to allow the full surface width to drain towards that side of the road. Under the swale the sewer pipe will be perforated and the trench that the pipe is laid in will be filled with suitable filter material. Runoff from the road surface will be gathered in the shallow swale, drain down through the fill material and enter the sewer pipe having been slowed down and filtered in the process, see Figure 8.

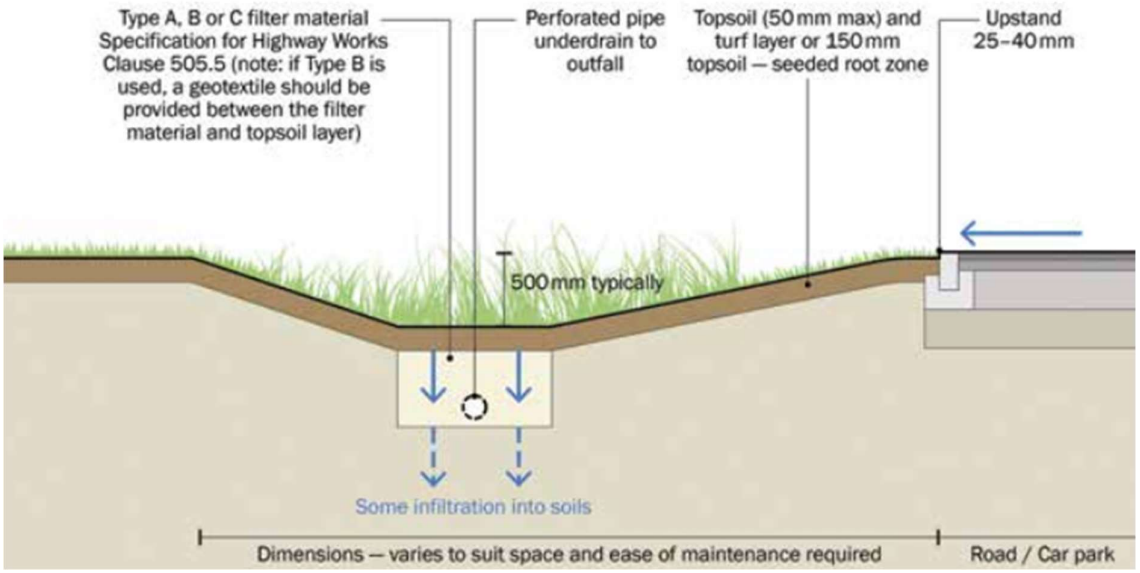


Figure 8: Underdrained Roadside Swale (CIRIA C753 SuDS Manual)

Swales shall be constructed in accordance with the guidance in the CIRIA SuDS Manual Chapter 16 and the detail on the accompanying drawing no. 23028-XX-XX-XX-XX-DR-WDG-CE-504. The dimensions of the swale can be variable to suit the available space but the depth will be a maximum of 500mm and the side slopes will be at a maximum gradient of 1:3. The swales shall be set with grass and/or wildflowers which can be mown normally due to the shallow side slopes, see example in Figure 9. The longitudinal gradient of the swale should be maintained at 1:100 or less in order to slow flows and allow full interception.

Figure 9: Example of roadside swale from the CIRIA SuDS Manual (C753)

CIRIA C753 (The SuDS Manual) Table 24.6 notes that filter swales can be considered to provide Interception when draining the runoff from impermeable surfaces, i.e. it can be assumed that there will be zero runoff from the first 5 mm rainfall for 80% of events during the summer and 50% in winter. The stone filled trenches also provide temporary attenuation storage as there is up to 30% voids in the filter material.

3.2.3. Permeable Paving

Permeable paving is proposed for all car parking spaces in the development. The permeable paving will allow surface water to soak into the subsoil and ground water rather than leaving the site via the sewer network which is preferable in terms of SuDS. See the accompanying WDG drawing no. 23028-XX-XX-XX-XX-DR-WDG-CE-504 for the construction details of the permeable paving, see example in Figure 10.

CIRIA C753 (The SuDS Manual) notes that studies have shown that runoff typically does not occur from permeable pavements for rainfall events of up to 5 minutes in length. The paving's substrate intercepts and stores the runoff before some of it percolates into the surrounding soil and any overflow is piped to the sewer network. The substrate shall be a minimum of 300mm deep and formed with washed, coarse, graded aggregate with 30% voids for water storage.

Figure 10: Example of permeable paving.

3.2.4. Roadside Bioretention Tree Pits

Bioretention tree pits, constructed in accordance with CIRIA SuDS Manual Chapter 19 and the detail provided in drawing no. 23028-XX-XX-XX-XX-DR-WDG-CE-504, are proposed in roadside green areas of the site where a proportion of the surface water from the hard road and footpath surfaces can be channelled towards the tree base for temporary storage and percolation to ground water. The tree pits can be placed in isolated green planters where gaps in the kerbing or kerb drains allow surface water to fall to the base of the trees as per the examples in Figure 11 or tree pits can be arranged to fill an available green space. In all cases, an overflow pipe will carry any overflow back to the sewer in heavier rainfall events. This prevents the tree's roots from being inundated for long periods, causing damage or disease.

Figure 11: Examples of tree pits in isolated green planters from the CIRIA SuDS Manual

Whilst the grass along the top of the roadside verges will most likely be mowed the local area around the base of each tree pit is to be set with a variety of planting including native wildflower grass seed mixes to promote urban biodiversity - providing habitat and food for native insects, invertebrates, and birds. This planting scheme will not be mowed regularly but

occasionally cleaned and weeded. The bioretention tree pits offer runoff interception, filtration and water storage as well as offering further benefits such as evapotranspiration, cooling of runoff in the shade and the promotion of biodiversity.

CIRIA C753 (The SuDS Manual) Table 24.6 notes that, regarding interception design of tree root system (bio retention areas), pavements drained by tree root systems can be considered to provide Interception, i.e. it can be assumed that there will be zero runoff from the first 5 mm rainfall for 80% of events during the summer and 50% in winter.

See the accompanying WDG drawing no. 23028-XX-XX-XX-XX-DR-WDG-CE-002 for the proposed locations of the tree pits.

3.2.5. Bio-retention Rain Garden Planters

It is proposed that dwelling roofs can discharge to rain garden planters in back yards where they will provide treatment to roof runoff through evapotranspiration within the filter media of the rain garden structure. The planters will consist of small, raised gardens enclosed in robust treated timber boxes with high permeability soil and a perforated surface water drain is to be provided at a low level to drain any excess surface water to the drainage network, see diagram in Figure 12.

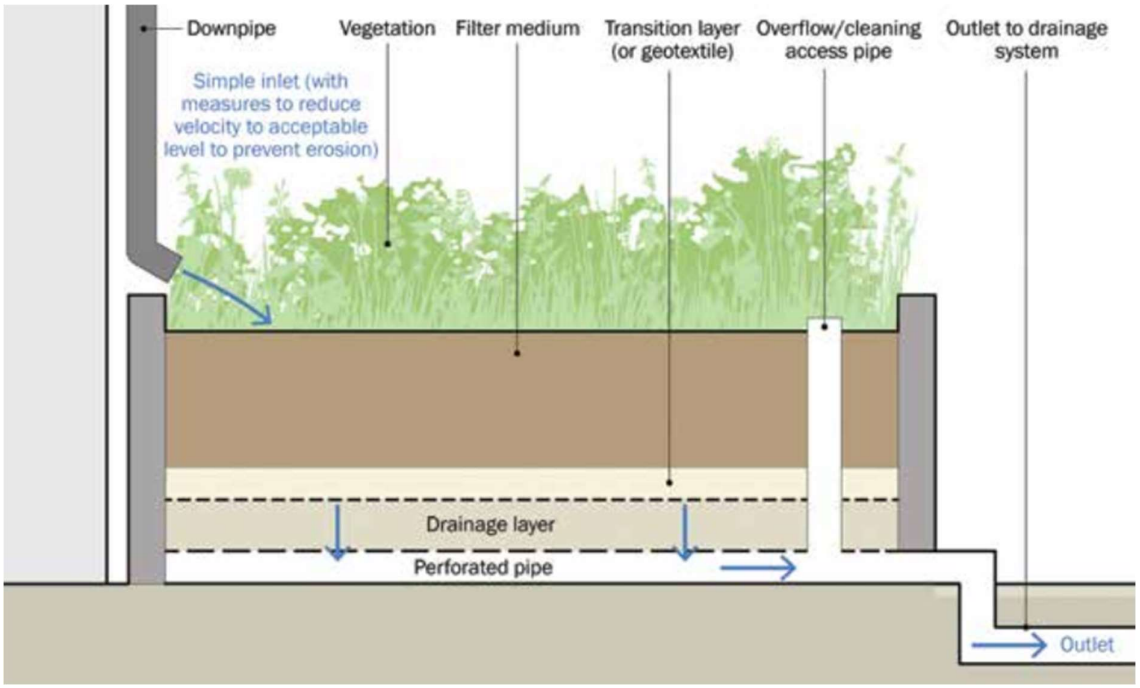


Figure 12: Section through a simple rain garden with outlet pipe (CIRIA C753)

CIRIA C753 (The SuDS Manual) Table 24.6 notes that regarding interception design of rain gardens (bio retention areas), pavements drained by rain gardens can be considered to provide Interception, i.e. it can be assumed that there will be zero runoff from the first 5 mm rainfall for 80% of events during the summer and 50% in winter.

3.2.6. Water Butts

It is proposed to install a 300-litre water butt to the rear of each dwelling that has a rear garden. The water butt shall be designed to collect water from the downpipes with a bypass system so that they do not overtop and flood the yard/garden. The overflows shall be connected back to the raingarden soakaways in this development. A tap on the water butt will allow the water to be used for gardening or car washing etc. and reduce demand on the local authority water supply whilst also slightly reducing the roof runoff entering the surface water sewer. See the accompanying WDG drawing no. 23028-XX-XX-XX-XX-DR-WDG-CE-002 for an example of a water butt.

4.0 Wastewater Drainage

The layout of the proposed wastewater drainage network for the development is shown on WDG drawing no. 23028-XX-XX-XX-XX-DR-WDG-CE-002 and the typical details for the wastewater infrastructure are shown on drawing no. 23028-XX-XX-XX-XX-DR-WDG-CE-501. 1 conventional piped, gravity sewer network is proposed. The network will generally fall from the north to the south where it will connect to existing Irish Water infrastructure near the junction of the R619 and the L-96192-11 just south of the site.

All sewers within the curtilage of individual houses are to be installed in accordance with TGD Part H (2010) and will consist of 100 mm diameter uPVC Sewers from individual houses laid to falls of min 1:60 to connect to a 150mm and 225mm uPVC sewer to be laid under the estate road. Inspection chambers will be constructed within 1m of the boundary of each private property in accordance with Irish Water Standard Details.

All wastewater sewers in the public realm have been designed in compliance with Irish Water's Code of Practice for Wastewater Infrastructure – A Design and Construction Guide for Developers (Revision 2) July 2020. All construction details within the public realm will be in accordance with Irish Water, Wastewater Infrastructure Standard Details (Revision 4), July 2020.

A pre-connection enquiry was submitted to Irish Water to assess the feasibility of providing a connection to the site and Irish Water subsequently issued a confirmation of feasibility for the development (see Appendix C). A wastewater connection for the site is feasible without infrastructure upgrade by Irish Water.

4.1. Wastewater Design Criteria

For the purposes of clarity, the wastewater sewer system has been designed using the following parameters, as required in Irish Water document IW-CDS-5030-03 Section 3.6:

- Flow per person: 150 L/day
- Average persons per household: 2.7 persons
- Unit consumption allowance (infiltration) 10%
- Minimum velocity for pipe running full: 0.75 m/sec
- Peak flow: 6 DWF

The population equivalent (PE) for the development is: 26 dwellings x 2.7 = 70.

The detailed hydraulic design parameters and calculations for the wastewater network are included in Appendix B to this document.

5.0 Water Supply

It is proposed that a connection to the existing Irish Water infrastructure will be made in the R619 just outside the development entrance. The water main layout is shown on WDG drawing no. 23028-XX-XX-XX-XX-DR-WDG-CE-003 and the water main typical details are shown on drawings 23028-XX-XX-XX-XX-DR-WDG-CE-502 and 23028-XX-XX-XX-XX-DR-WDG-CE-503.

A pre-connection enquiry was submitted to Irish Water to assess the feasibility of providing a connection to the site. Irish Water issued a confirmation of feasibility for the development confirming that a connection is feasible without infrastructure upgrades by Irish Water (see Appendix C).

Private properties will each have a separate service connection, fitted with an Irish Water approved boundary box immediately outside the boundary. Fire hydrants are placed so that no domestic property within the development is more than 46m from a hydrant. All potable water infrastructure will be constructed in accordance with the following Irish Water documents:

- IW-CDS-5020-03 Code of Practice for Water Infrastructure – Connections and Developer Services, July 2020 (Revision 2),
- IW-CDS-5020-01 Water Infrastructure Standard Details - Connections and Developer Services, July 2020 (Revision 4).

5.1. Water Demand

The mains water demand for the development is calculated, according to Irish Water criteria, using the following parameters:

- 150 litres/person/day,
- 2.7 persons per housing unit,
- Domestic ADPW = 1.25,
- 26 Housing Units.

6.0 Utilities

6.1. Electricity

Overhead power lines cross the development site and an NW1 form was submitted to the ESB requesting a rerouting of this infrastructure around the site to allow development.

Any works on site shall be carried out in accordance with the following ESB document:

- Safe Construction with Electricity.

6.2. Gas

Gas Networks Ireland was contacted regarding the gas supply services in the vicinity of the proposed development site. GNI responded with a map to show that there are no gas mains in the vicinity, see Appendix D.

Appendix A

Surface Water Design

- Surface Water Sewer Network Design (see drawing 23028-XX-XX-XX-XX-DR-WDG-CE-002)

Design Settings

Rainfall Methodology	FSR	Maximum Time of Concentration (mins)	30.00
Return Period (years)	5	Maximum Rainfall (mm/hr)	50.0
Additional Flow (%)	0	Minimum Velocity (m/s)	1.00
FSR Region	Scotland and Ireland	Connection Type	Level Soffits
M5-60 (mm)	15.900	Minimum Backdrop Height (m)	1.000
Ratio-R	0.200	Preferred Cover Depth (m)	1.000
CV	0.750	Include Intermediate Ground	✓
Time of Entry (mins)	5.00	Enforce best practice design rules	✓

Nodes

Name	Area (ha)	T of E (mins)	Cover Level (m)	Diameter (mm)	Easting (m)	Northing (m)	Depth (m)
S1	0.036	5.00	75.700	1200	545783.689	573574.936	1.225
S2			75.700	1200	545801.661	573555.760	1.380
S3	0.032	5.00	75.700	1200	545812.119	573565.550	1.465
S4	0.083	5.00	75.700	1200	545826.388	573555.326	1.569
S5			75.350	1200	545862.918	573515.806	1.536
S6	0.020	5.00	75.000	1200	545869.463	573489.016	1.225
S7	0.055	5.00	75.114	1200	545857.409	573501.985	1.444
S8			73.546	1200	545837.223	573483.488	1.746
S9	0.042	5.00	75.582	1200	545791.662	573558.554	1.225
S10	0.012	5.00	75.404	1200	545786.542	573553.808	1.225
S11	0.074	5.00	75.059	1200	545796.266	573543.080	1.225
S12			74.000	1200	545772.209	573520.480	1.225
S13	0.009	5.00	74.100	1200	545784.419	573506.006	1.437
S14	0.009	5.00	73.000	1200	545802.728	573484.369	1.225
S15			72.131	1500	545821.495	573466.160	1.831
S16			71.003	1200	545809.574	573454.818	2.603
S17			68.587	1200	545813.518	573435.772	1.225

Links

Name	US Node	DS Node	Length (m)	ks (mm) / n	US IL (m)	DS IL (m)	Fall (m)	Slope (1:X)	Dia (mm)	T of C (mins)	Rain (mm/hr)
1.000	S1	S2	26.282	0.600	74.475	74.320	0.155	169.6	225	5.44	49.1
1.001	S2	S3	14.325	0.600	74.320	74.235	0.085	168.5	225	5.68	48.4
1.002	S3	S4	17.554	0.600	74.235	74.131	0.104	168.8	225	5.97	47.6
1.003	S4	S5	53.817	0.600	74.131	73.814	0.317	169.8	225	6.86	45.3
1.004	S5	S7	14.878	0.600	73.814	73.670	0.144	103.3	225	7.06	44.8
2.000	S6	S7	17.705	0.600	73.775	73.670	0.105	168.6	225	5.29	49.5
1.005	S7	S8	27.379	0.600	73.670	72.300	1.370	20.0	225	7.21	44.5

Name	Vel (m/s)	Cap (l/s)	Flow (l/s)	US Depth (m)	DS Depth (m)	Σ Area (ha)	Σ Add Inflow (l/s)	Pro Depth (mm)	Pro Velocity (m/s)
1.000	1.001	39.8	4.8	1.000	1.155	0.036	0.0	52	0.678
1.001	1.004	39.9	4.7	1.155	1.240	0.036	0.0	52	0.680
1.002	1.003	39.9	8.8	1.240	1.344	0.068	0.0	72	0.809
1.003	1.000	39.8	18.5	1.344	1.311	0.151	0.0	108	0.982
1.004	1.286	51.1	18.3	1.311	1.219	0.151	0.0	93	1.180
2.000	1.004	39.9	2.7	1.000	1.219	0.020	0.0	39	0.572
1.005	2.940	116.9	27.2	1.219	1.021	0.226	0.0	73	2.404

Links

Name	US Node	DS Node	Length (m)	ks (mm) / n	US IL (m)	DS IL (m)	Fall (m)	Slope (1:X)	Dia (mm)	T of C (mins)	Rain (mm/hr)
1.006	S8	S15	23.402	0.600	71.800	70.900	0.900	26.0	225	7.36	44.1
3.000	S9	S10	6.981	0.600	74.357	74.179	0.178	39.2	225	5.06	50.0
3.001	S10	S11	14.479	0.600	74.179	73.834	0.345	42.0	225	5.17	49.9
3.002	S11	S12	33.007	0.600	73.834	72.775	1.059	31.2	225	5.41	49.2
3.003	S12	S13	18.936	0.600	72.775	72.663	0.112	169.1	225	5.72	48.3
3.004	S13	S14	28.344	0.600	72.663	71.775	0.888	31.9	225	5.93	47.7
3.005	S14	S15	26.149	0.600	71.775	70.900	0.875	29.9	225	6.11	47.2
1.007	S15	S16	16.455	0.600	70.300	69.778	0.522	31.5	225	7.48	43.9
1.008	S16	S17	19.450	0.600	68.400	67.362	1.038	18.7	225	7.59	43.6

Name	Vel (m/s)	Cap (l/s)	Flow (l/s)	US Depth (m)	DS Depth (m)	Σ Area (ha)	Σ Add Inflow (l/s)	Pro Depth (mm)	Pro Velocity (m/s)
1.006	2.576	102.4	27.0	1.521	1.006	0.226	0.0	79	2.183
3.000	2.095	83.3	5.7	1.000	1.000	0.042	0.0	40	1.215
3.001	2.025	80.5	7.3	1.000	1.000	0.054	0.0	45	1.264
3.002	2.351	93.5	17.1	1.000	1.000	0.128	0.0	65	1.796
3.003	1.002	39.9	16.7	1.000	1.212	0.128	0.0	102	0.959
3.004	2.324	92.4	17.7	1.212	1.000	0.137	0.0	66	1.801
3.005	2.402	95.5	18.7	1.000	1.006	0.146	0.0	67	1.875
1.007	2.338	93.0	44.2	1.606	1.000	0.372	0.0	109	2.311
1.008	3.036	120.7	44.0	2.378	1.000	0.372	0.0	94	2.801

Pipeline Schedule

Link	Length (m)	Slope (1:X)	Dia (mm)	Link Type	US CL (m)	US IL (m)	US Depth (m)	DS CL (m)	DS IL (m)	DS Depth (m)
1.000	26.282	169.6	225	Circular	75.700	74.475	1.000	75.700	74.320	1.155
1.001	14.325	168.5	225	Circular	75.700	74.320	1.155	75.700	74.235	1.240
1.002	17.554	168.8	225	Circular	75.700	74.235	1.240	75.700	74.131	1.344
1.003	53.817	169.8	225	Circular	75.700	74.131	1.344	75.350	73.814	1.311
1.004	14.878	103.3	225	Circular	75.350	73.814	1.311	75.114	73.670	1.219
2.000	17.705	168.6	225	Circular	75.000	73.775	1.000	75.114	73.670	1.219
1.005	27.379	20.0	225	Circular	75.114	73.670	1.219	73.546	72.300	1.021
1.006	23.402	26.0	225	Circular	73.546	71.800	1.521	72.131	70.900	1.006
3.000	6.981	39.2	225	Circular	75.582	74.357	1.000	75.404	74.179	1.000
3.001	14.479	42.0	225	Circular	75.404	74.179	1.000	75.059	73.834	1.000
3.002	33.007	31.2	225	Circular	75.059	73.834	1.000	74.000	72.775	1.000

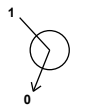
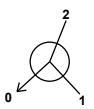
Link	US Node	Dia (mm)	Node Type	MH Type	DS Node	Dia (mm)	Node Type	MH Type
1.000	S1	1200	Manhole	Adoptable	S2	1200	Manhole	Adoptable
1.001	S2	1200	Manhole	Adoptable	S3	1200	Manhole	Adoptable
1.002	S3	1200	Manhole	Adoptable	S4	1200	Manhole	Adoptable
1.003	S4	1200	Manhole	Adoptable	S5	1200	Manhole	Adoptable
1.004	S5	1200	Manhole	Adoptable	S7	1200	Manhole	Adoptable
2.000	S6	1200	Manhole	Adoptable	S7	1200	Manhole	Adoptable
1.005	S7	1200	Manhole	Adoptable	S8	1200	Manhole	Adoptable
1.006	S8	1200	Manhole	Adoptable	S15	1500	Manhole	Adoptable
3.000	S9	1200	Manhole	Adoptable	S10	1200	Manhole	Adoptable
3.001	S10	1200	Manhole	Adoptable	S11	1200	Manhole	Adoptable
3.002	S11	1200	Manhole	Adoptable	S12	1200	Manhole	Adoptable

Pipeline Schedule

Link	Length (m)	Slope (1:X)	Dia (mm)	Link Type	US CL (m)	US IL (m)	US Depth (m)	DS CL (m)	DS IL (m)	DS Depth (m)
3.003	18.936	169.1	225	Circular	74.000	72.775	1.000	74.100	72.663	1.212
3.004	28.344	31.9	225	Circular	74.100	72.663	1.212	73.000	71.775	1.000
3.005	26.149	29.9	225	Circular	73.000	71.775	1.000	72.131	70.900	1.006
1.007	16.455	31.5	225	Circular	72.131	70.300	1.606	71.003	69.778	1.000
1.008	19.450	18.7	225	Circular	71.003	68.400	2.378	68.587	67.362	1.000

Link	US Node	Dia (mm)	Node Type	MH Type	DS Node	Dia (mm)	Node Type	MH Type
3.003	S12	1200	Manhole	Adoptable	S13	1200	Manhole	Adoptable
3.004	S13	1200	Manhole	Adoptable	S14	1200	Manhole	Adoptable
3.005	S14	1200	Manhole	Adoptable	S15	1500	Manhole	Adoptable
1.007	S15	1500	Manhole	Adoptable	S16	1200	Manhole	Adoptable
1.008	S16	1200	Manhole	Adoptable	S17	1200	Manhole	Adoptable

Manhole Schedule

Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Connections	Link	IL (m)	Dia (mm)
S1	545783.689	573574.936	75.700	1.225	1200		0 1.000	74.475	225
S2	545801.661	573555.760	75.700	1.380	1200		1 1.000 0 1.001	74.320 74.320	225 225
S3	545812.119	573565.550	75.700	1.465	1200		1 1.001 0 1.002	74.235 74.235	225 225
S4	545826.388	573555.326	75.700	1.569	1200		1 1.002 0 1.003	74.131 74.131	225 225
S5	545862.918	573515.806	75.350	1.536	1200		1 1.003 0 1.004	73.814 73.814	225 225
S6	545869.463	573489.016	75.000	1.225	1200		0 2.000	73.775	225
S7	545857.409	573501.985	75.114	1.444	1200		1 2.000 2 1.004 0 1.005	73.670 73.670 73.670	225 225 225
S8	545837.223	573483.488	73.546	1.746	1200		1 1.005 0 1.006	72.300 71.800	225 225

Manhole Schedule

Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Connections	Link	IL (m)	Dia (mm)
S9	545791.662	573558.554	75.582	1.225	1200		0 3.000	74.357	225
S10	545786.542	573553.808	75.404	1.225	1200		1 3.000 0 3.001	74.179 74.179	225 225
S11	545796.266	573543.080	75.059	1.225	1200		1 3.001 0 3.002	73.834 73.834	225 225
S12	545772.209	573520.480	74.000	1.225	1200		1 3.002 0 3.003	72.775 72.775	225 225
S13	545784.419	573506.006	74.100	1.437	1200		1 3.003 0 3.004	72.663 72.663	225 225
S14	545802.728	573484.369	73.000	1.225	1200		1 3.004 0 3.005	71.775 71.775	225 225
S15	545821.495	573466.160	72.131	1.831	1500		1 3.005 2 1.006 0 1.007	70.900 70.900 70.300	225 225 225
S16	545809.574	573454.818	71.003	2.603	1200		1 1.007 0 1.008	69.778 68.400	225 225
S17	545813.518	573435.772	68.587	1.225	1200		1 1.008	67.362	225

Simulation Settings

Rainfall Methodology	FSR	Analysis Speed	Normal
FSR Region	Scotland and Ireland	Skip Steady State	x
M5-60 (mm)	15.900	Drain Down Time (mins)	500
Ratio-R	0.200	Additional Storage (m³/ha)	2.0
Summer CV	0.750	Check Discharge Rate(s)	x
Winter CV	0.840	Check Discharge Volume	x

Storm Durations

15	30	60	120	180	240	360	480	600	720	960	1440

Return Period (years)	Climate Change (CC %)	Additional Area (A %)	Additional Flow (Q %)
1	20	0	0
30	20	0	0
100	20	0	0

Node S15 Online Hydro-Brake® Control

Flap Valve	x	Objective	(HE) Minimise upstream storage
Replaces Downstream Link	✓	Sump Available	✓
Invert Level (m)	70.300	Product Number	CTL-SHE-0136-1010-1700-1010
Design Depth (m)	1.700	Min Outlet Diameter (m)	0.150
Design Flow (l/s)	10.1	Min Node Diameter (mm)	1500

Node S3 Link Surround Storage Structure

Base Inf Coefficient (m/hr)	0.02000	Porosity	0.30	Link	1.001
Side Inf Coefficient (m/hr)	0.02000	Invert Level (m)	74.235	Surround Shape	(Trench)
Safety Factor	2.0	Time to half empty (mins)	2	Diameter (mm)	1000

Node S4 Link Surround Storage Structure

Base Inf Coefficient (m/hr)	0.02000	Porosity	0.30	Link	1.002
Side Inf Coefficient (m/hr)	0.02000	Invert Level (m)	74.131	Surround Shape	(Trench)
Safety Factor	2.0	Time to half empty (mins)	3	Diameter (mm)	1000

Node S5 Link Surround Storage Structure

Base Inf Coefficient (m/hr)	0.02000	Porosity	0.30	Link	1.003
Side Inf Coefficient (m/hr)	0.02000	Invert Level (m)	73.814	Surround Shape	(Trench)
Safety Factor	2.0	Time to half empty (mins)	0	Diameter (mm)	1000

Node S7 Link Surround Storage Structure

Base Inf Coefficient (m/hr)	0.02000	Porosity	0.30	Link	2.000
Side Inf Coefficient (m/hr)	0.02000	Invert Level (m)	73.670	Surround Shape	(Trench)
Safety Factor	2.0	Time to half empty (mins)	0	Diameter (mm)	1000

Node S8 Link Surround Storage Structure

Base Inf Coefficient (m/hr)	0.02000	Porosity	0.30	Link	1.005
Side Inf Coefficient (m/hr)	0.02000	Invert Level (m)	72.300	Surround Shape	(Trench)
Safety Factor	2.0	Time to half empty (mins)	0	Diameter (mm)	1000

Node S13 Link Surround Storage Structure

Base Inf Coefficient (m/hr)	0.02000	Porosity	0.30	Link	3.003
Side Inf Coefficient (m/hr)	0.02000	Invert Level (m)	72.663	Surround Shape	(Trench)
Safety Factor	2.0	Time to half empty (mins)	0	Diameter (mm)	1000

Node S14 Link Surround Storage Structure

Base Inf Coefficient (m/hr)	0.02000	Porosity	0.30	Link	3.004
Side Inf Coefficient (m/hr)	0.02000	Invert Level (m)	71.775	Surround Shape	(Trench)
Safety Factor	2.0	Time to half empty (mins)	0	Diameter (mm)	1000

Node S15 Link Surround Storage Structure

Base Inf Coefficient (m/hr)	0.02000	Porosity	0.30	Link	3.005
Side Inf Coefficient (m/hr)	0.02000	Invert Level (m)	70.900	Surround Shape	(Trench)
Safety Factor	2.0	Time to half empty (mins)	180	Diameter (mm)	1000

Node S15 Link Surround Storage Structure

Base Inf Coefficient (m/hr)	0.02000	Porosity	0.30	Link	1.006
Side Inf Coefficient (m/hr)	0.02000	Invert Level (m)	70.900	Surround Shape	(Trench)
Safety Factor	2.0	Time to half empty (mins)	180	Diameter (mm)	1000

Node S15 Depth/Area Storage Structure

Base Inf Coefficient (m/hr)	0.02000	Safety Factor	2.0	Invert Level (m)	71.500
Side Inf Coefficient (m/hr)	0.02000	Porosity	1.00	Time to half empty (mins)	84

Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)
0.000	300.0	300.0	0.300	378.2	378.2	0.301	0.0	378.2

Results for 1 year +20% CC Critical Storm Duration. Lowest mass balance: 96.37%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute winter	S1	10	74.525	0.050	4.3	0.0599	0.0000	OK
15 minute winter	S2	11	74.369	0.049	4.2	0.0552	0.0000	OK
15 minute winter	S3	11	74.302	0.067	7.8	0.1737	0.0000	OK
15 minute winter	S4	11	74.236	0.105	17.1	0.3601	0.0000	OK
15 minute winter	S5	12	73.908	0.094	16.8	0.2921	0.0000	OK
15 minute winter	S6	10	73.812	0.037	2.4	0.0427	0.0000	OK
15 minute winter	S7	12	73.741	0.071	24.1	0.1932	0.0000	OK
15 minute winter	S8	12	71.874	0.074	23.9	0.0833	0.0000	OK
15 minute winter	S9	10	74.395	0.038	5.0	0.0461	0.0000	OK
15 minute winter	S10	10	74.221	0.042	6.4	0.0489	0.0000	OK
15 minute winter	S11	10	73.895	0.061	15.1	0.0758	0.0000	OK
15 minute winter	S12	11	72.874	0.099	14.9	0.1123	0.0000	OK
15 minute winter	S13	11	72.727	0.064	15.9	0.1636	0.0000	OK
15 minute winter	S14	11	71.839	0.064	16.9	0.0896	0.0000	OK
60 minute winter	S15	48	71.529	1.229	27.8	14.3526	0.0000	SURCHARGED

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute winter	S1	1.000	S2	4.2	0.659	0.105	0.1674	
15 minute winter	S2	1.001	S3	4.2	0.521	0.105	0.1155	
15 minute winter	S3	1.002	S4	7.7	0.557	0.194	0.2451	
15 minute winter	S3	Infiltration		0.0				
15 minute winter	S4	1.003	S5	16.8	1.009	0.422	0.8963	
15 minute winter	S4	Infiltration		0.1				
15 minute winter	S5	1.004	S7	16.5	1.258	0.323	0.1957	
15 minute winter	S5	Infiltration		0.1				
15 minute winter	S6	2.000	S7	2.3	0.356	0.058	0.1303	
15 minute winter	S7	1.005	S8	23.9	2.281	0.204	0.2867	
15 minute winter	S7	Infiltration		0.0				
15 minute winter	S8	1.006	S15	23.9	1.626	0.234	0.5974	
15 minute winter	S8	Infiltration		0.0				
15 minute winter	S9	3.000	S10	5.0	1.027	0.060	0.0338	
15 minute winter	S10	3.001	S11	6.3	0.922	0.078	0.0997	
15 minute winter	S11	3.002	S12	14.9	1.190	0.159	0.4177	
15 minute winter	S12	3.003	S13	14.9	1.140	0.373	0.2485	
15 minute winter	S13	3.004	S14	15.9	1.711	0.172	0.2634	
15 minute winter	S13	Infiltration		0.0				
15 minute winter	S14	3.005	S15	16.8	1.455	0.176	0.6405	
15 minute winter	S14	Infiltration		0.0				
60 minute winter	S15	Hydro-Brake®	S16	10.1				
60 minute winter	S15	Infiltration		0.1				
60 minute winter	S15	Infiltration		0.1				
60 minute winter	S15	Infiltration		0.5				

Results for 1 year +20% CC Critical Storm Duration. Lowest mass balance: 96.37%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	S16	9	68.445	0.045	10.1	0.0508	0.0000	OK
180 minute winter	S17	80	67.406	0.044	10.1	0.0000	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute summer	S16	1.008	S17	10.1	1.825	0.084	0.1074	18.3

Results for 30 year +20% CC Critical Storm Duration. Lowest mass balance: 96.37%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute winter	S1	10	74.551	0.076	9.4	0.0902	0.0000	OK
15 minute winter	S2	11	74.394	0.074	9.3	0.0835	0.0000	OK
15 minute winter	S3	11	74.339	0.104	17.4	0.3457	0.0000	OK
15 minute winter	S4	11	74.310	0.179	38.1	0.7696	0.0000	OK
15 minute winter	S5	12	73.966	0.152	37.1	0.6468	0.0000	OK
15 minute winter	S6	10	73.829	0.054	5.2	0.0630	0.0000	OK
15 minute winter	S7	11	73.782	0.112	54.0	0.3963	0.0000	OK
15 minute winter	S8	12	71.940	0.140	53.0	0.1585	0.0000	OK
15 minute winter	S9	10	74.416	0.059	11.0	0.0704	0.0000	OK
15 minute winter	S10	10	74.242	0.063	14.0	0.0727	0.0000	OK
15 minute winter	S11	10	73.926	0.092	33.3	0.1151	0.0000	OK
15 minute winter	S12	10	72.933	0.158	33.1	0.1790	0.0000	OK
15 minute winter	S13	11	72.763	0.100	34.9	0.3229	0.0000	OK
15 minute winter	S14	11	71.873	0.098	37.4	0.1501	0.0000	OK
180 minute winter	S15	136	71.661	1.361	32.9	58.7306	0.0000	SURCHARGED

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute winter	S1	1.000	S2	9.3	0.806	0.233	0.3024	
15 minute winter	S2	1.001	S3	9.3	0.637	0.232	0.2100	
15 minute winter	S3	1.002	S4	17.1	0.653	0.428	0.4551	
15 minute winter	S3	Infiltration		0.0				
15 minute winter	S4	1.003	S5	37.1	1.199	0.933	1.6631	
15 minute winter	S4	Infiltration		0.1				
15 minute winter	S5	1.004	S7	36.6	1.525	0.715	0.3570	
15 minute winter	S5	Infiltration		0.1				
15 minute winter	S6	2.000	S7	5.1	0.423	0.128	0.2374	
15 minute winter	S7	1.005	S8	53.0	2.800	0.454	0.5198	
15 minute winter	S7	Infiltration		0.1				
15 minute winter	S8	1.006	S15	53.2	1.607	0.519	0.7695	
15 minute winter	S8	Infiltration		0.0				
15 minute winter	S9	3.000	S10	10.9	1.264	0.131	0.0605	
15 minute winter	S10	3.001	S11	14.0	1.152	0.173	0.1763	
15 minute winter	S11	3.002	S12	33.1	1.459	0.354	0.7443	
15 minute winter	S12	3.003	S13	32.7	1.391	0.821	0.4432	
15 minute winter	S13	3.004	S14	35.2	2.103	0.381	0.4748	
15 minute winter	S13	Infiltration		0.1				
15 minute winter	S14	3.005	S15	37.2	1.452	0.390	0.7363	
15 minute winter	S14	Infiltration		0.0				
180 minute winter	S15	Hydro-Brake®	S16	10.1				
180 minute winter	S15	Infiltration		0.1				
180 minute winter	S15	Infiltration		0.1				
180 minute winter	S15	Infiltration		0.9				

Results for 30 year +20% CC Critical Storm Duration. Lowest mass balance: 96.37%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
60 minute summer	S16	21	68.445	0.045	10.1	0.0508	0.0000	OK
60 minute summer	S17	21	67.406	0.044	10.1	0.0000	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
60 minute summer	S16	1.008	S17	10.1	1.826	0.084	0.1075	74.3

Results for 100 year +20% CC Critical Storm Duration. Lowest mass balance: 96.37%

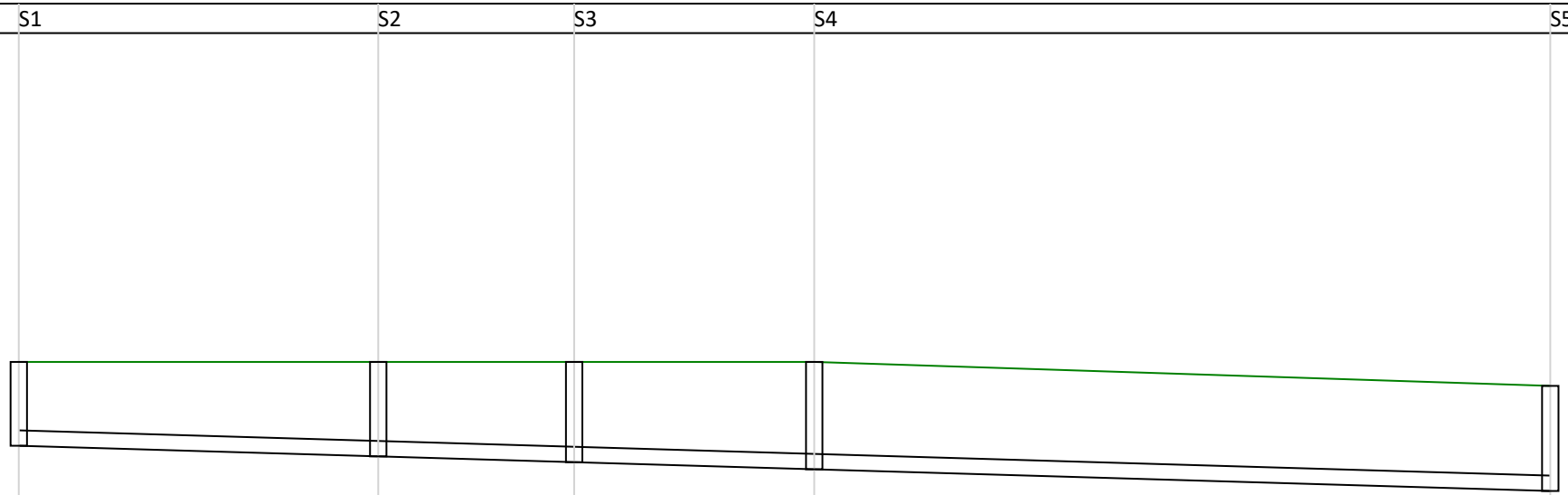
Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute winter	S1	10	74.562	0.087	12.2	0.1040	0.0000	OK
15 minute winter	S2	10	74.405	0.085	12.0	0.0959	0.0000	OK
15 minute winter	S3	12	74.398	0.163	22.7	0.6153	0.0000	OK
15 minute winter	S4	12	74.374	0.243	47.6	1.1332	0.0000	SURCHARGED
15 minute winter	S5	12	73.985	0.171	43.5	0.7980	0.0000	OK
15 minute winter	S6	10	73.837	0.062	6.8	0.0721	0.0000	OK
15 minute winter	S7	11	73.797	0.127	65.5	0.4819	0.0000	OK
30 minute summer	S8	19	71.972	0.172	64.5	0.1948	0.0000	OK
15 minute winter	S9	10	74.425	0.068	14.2	0.0812	0.0000	OK
15 minute winter	S10	10	74.252	0.073	18.2	0.0835	0.0000	OK
15 minute winter	S11	10	73.940	0.106	43.2	0.1331	0.0000	OK
15 minute winter	S12	11	72.967	0.192	42.8	0.2169	0.0000	OK
15 minute winter	S13	11	72.776	0.113	45.2	0.3973	0.0000	OK
15 minute winter	S14	11	71.908	0.133	48.6	0.2215	0.0000	OK
180 minute winter	S15	140	71.743	1.443	42.0	88.8049	0.0000	SURCHARGED

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute winter	S1	1.000	S2	12.0	0.861	0.302	0.3668	
15 minute winter	S2	1.001	S3	11.9	0.648	0.299	0.3156	
15 minute winter	S3	1.002	S4	20.3	0.648	0.509	0.6190	
15 minute winter	S3	Infiltration		0.0				
15 minute winter	S4	1.003	S5	43.5	1.218	1.093	1.9422	
15 minute winter	S4	Infiltration		0.1				
15 minute winter	S5	1.004	S7	43.1	1.611	0.842	0.4098	
15 minute winter	S5	Infiltration		0.1				
15 minute winter	S6	2.000	S7	6.7	0.452	0.168	0.2810	
15 minute winter	S7	1.005	S8	65.2	2.932	0.558	0.6087	
15 minute winter	S7	Infiltration		0.1				
30 minute summer	S8	1.006	S15	64.4	1.668	0.629	0.8470	
30 minute summer	S8	Infiltration		0.0				
15 minute winter	S9	3.000	S10	14.1	1.341	0.170	0.0736	
15 minute winter	S10	3.001	S11	18.1	1.231	0.225	0.2135	
15 minute winter	S11	3.002	S12	42.8	1.538	0.458	0.8986	
15 minute winter	S12	3.003	S13	42.3	1.477	1.062	0.5309	
15 minute winter	S13	3.004	S14	45.7	2.133	0.495	0.6297	
15 minute winter	S13	Infiltration		0.1				
15 minute winter	S14	3.005	S15	48.1	1.589	0.503	0.8394	
15 minute winter	S14	Infiltration		0.0				
180 minute winter	S15	Hydro-Brake®	S16	10.0				
180 minute winter	S15	Infiltration		0.1				
180 minute winter	S15	Infiltration		0.1				
180 minute winter	S15	Infiltration		1.0				

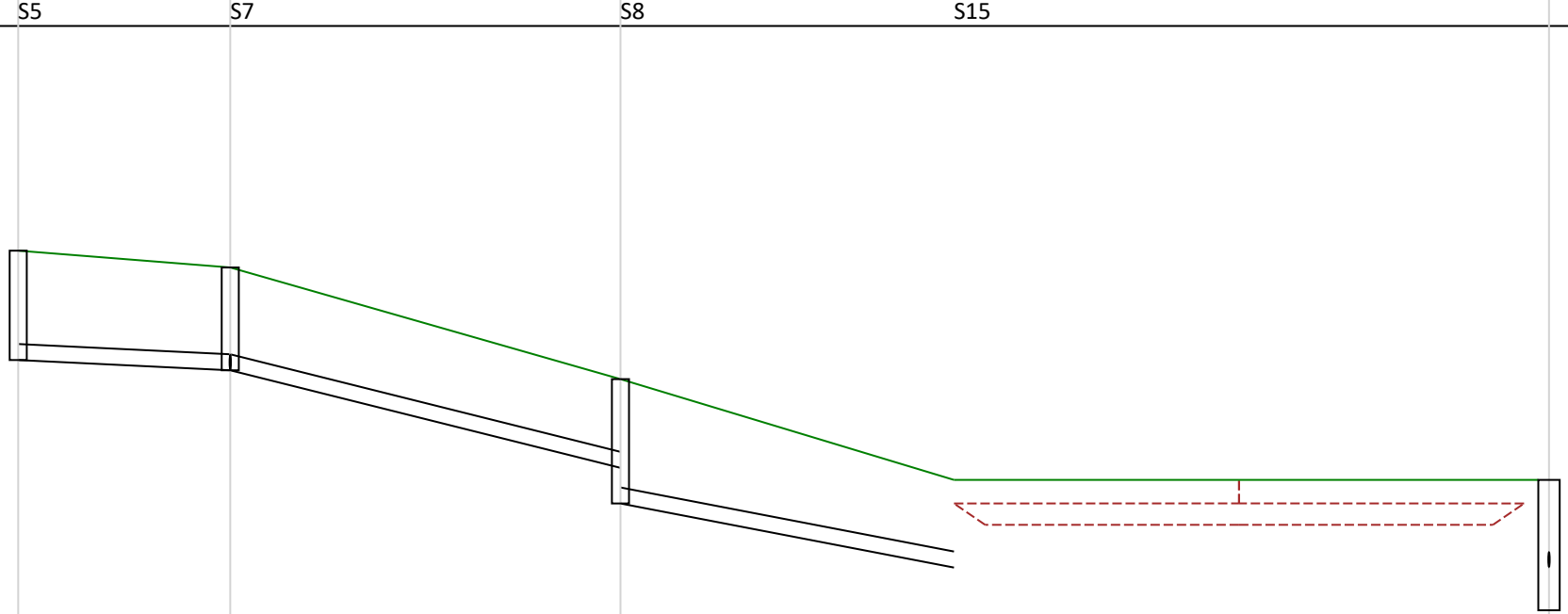
Results for 100 year +20% CC Critical Storm Duration. Lowest mass balance: 96.37%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
30 minute winter	S16	8	68.445	0.045	10.1	0.0508	0.0000	OK
60 minute summer	S17	15	67.406	0.044	10.1	0.0000	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
30 minute winter	S16	1.008	S17	10.1	1.826	0.084	0.1075	77.6



Link Name	1.000	1.001	1.002	1.003
Section Type	225mm	225mm	225mm	225mm
Slope (1:X)	169.6	168.5	168.8	169.8
Cover Level (m)	75.700	75.700	75.700	75.700 / 75.350
Invert Level (m)	74.475 / 74.320	74.320 / 74.235	74.235 / 74.131	74.131 / 73.814
Length (m)	26.282	14.325	17.554	53.817

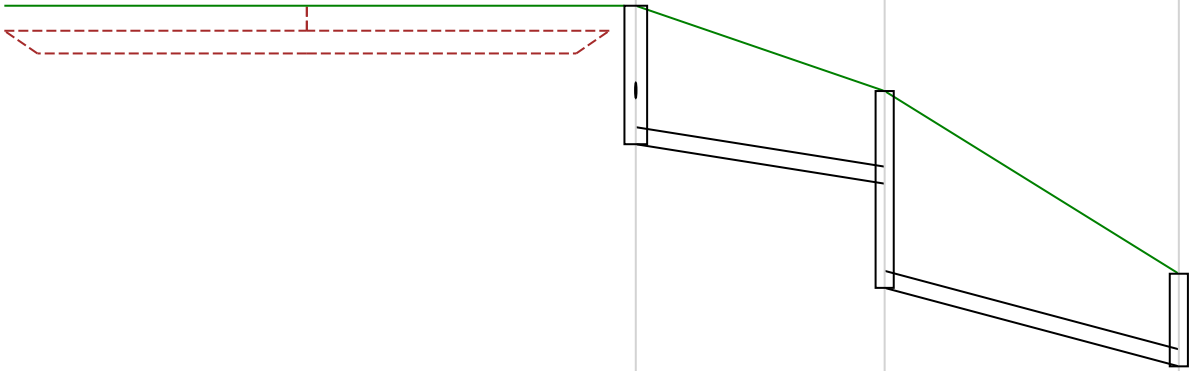


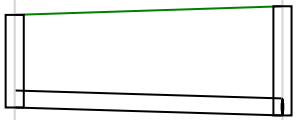
A4 drawing

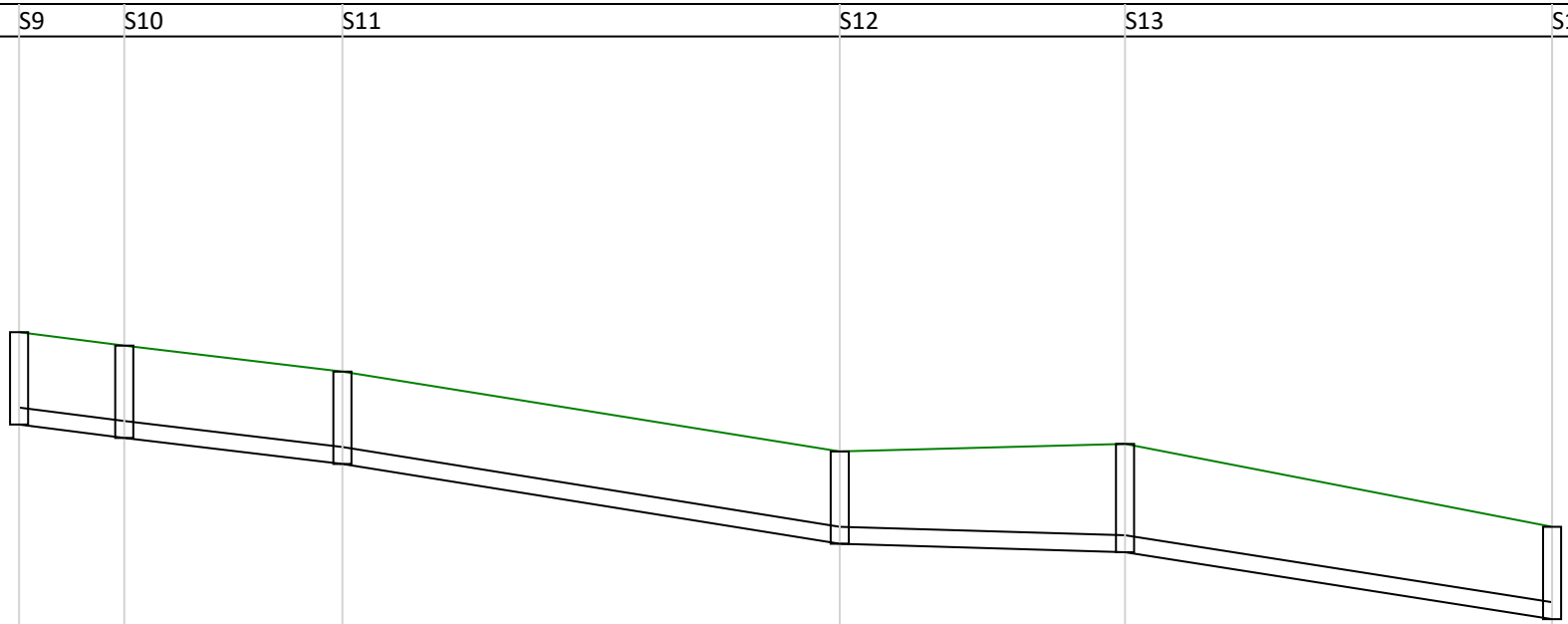
Hor Scale 500
Ver Scale 100

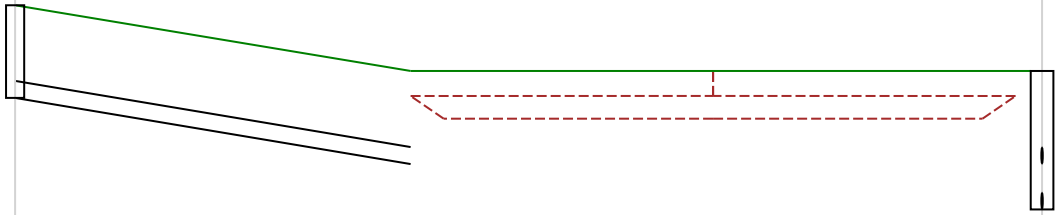
Datum (m) 67.000

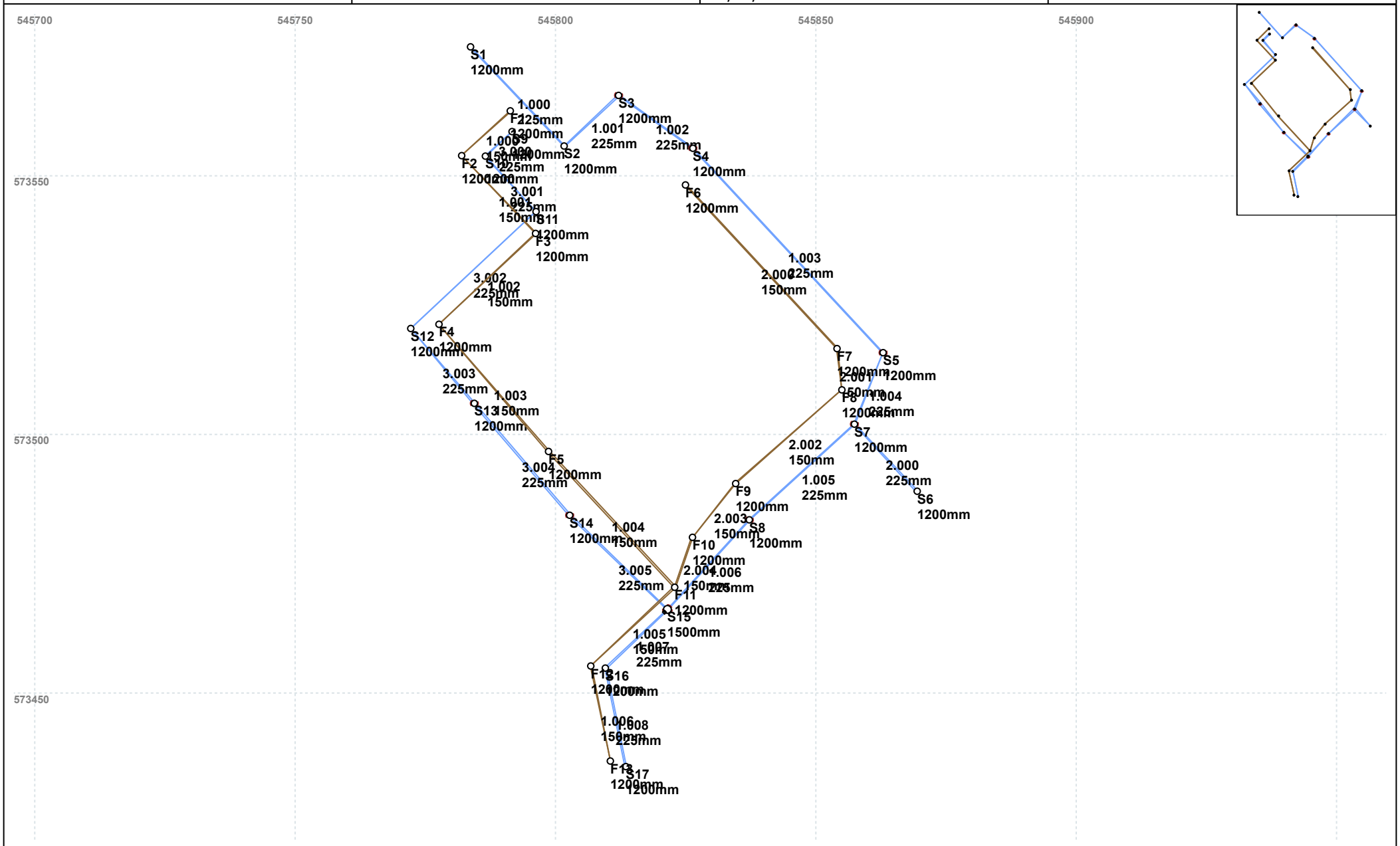
Node Name	S5	S7	S8	S15
Link Name	1.004	1.005	1.006	
Section Type	225mm	225mm	225mm	
Slope (1:X)	103.3	20.0	26.0	
Cover Level (m)	75.350	75.114	73.546	72.131
Invert Level (m)	73.814	73.670 / 73.670	72.300 / 71.800	70.900
Length (m)	14.878	27.379	23.402	

Node Name		S15	S16	S17
A4 drawing Hor Scale 500 Ver Scale 100 Datum (m) 64.000				
Link Name		1.007	1.008	
Section Type		225mm	225mm	
Slope (1:X)		31.5	18.7	
Cover Level (m)		72.131	71.003	68.587
Invert Level (m)		70.300	69.778 / 68.400	67.362
Length (m)		16.455	19.450	

Node Name	S6	S7
A4 drawing Hor Scale 500 Ver Scale 100 Datum (m) 69.000		
Link Name	2.000	
Section Type	225mm	
Slope (1:X)	168.6	
Cover Level (m)	75.000	75.114
Invert Level (m)	73.775	73.670
Length (m)	17.705	

Node Name	S9	S10	S11	S12	S13	S14
A4 drawing Hor Scale 500 Ver Scale 100 Datum (m) 68.000						
Link Name	3.000	3.001	3.002	3.003	3.004	
Section Type	225mm	225mm	225mm	225mm	225mm	
Slope (1:X)	39.2	42.0	31.2	169.1	31.9	
Cover Level (m)	75.582	75.404	75.059	74.000	74.100	73.000
Invert Level (m)	74.357 / 74.179	74.179	73.834	73.834 / 72.775	72.775 / 72.663	72.663 / 71.775
Length (m)	6.981	14.479	33.007	18.936	28.344	

Node Name	S14	S15
A4 drawing Hor Scale 500 Ver Scale 100 Datum (m) 66.000		
Link Name	3.005	
Section Type	225mm	
Slope (1:X)	29.9	
Cover Level (m)	73.000	72.131
Invert Level (m)	71.775	70.900
Length (m)	26.149	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Appendix B

Wastewater Design

- Wastewater Sewer Network Design. (see drawing 23028-XX-XX-XX-XX-DR-WDG-CE-002)

Design Settings

Frequency of use (kDU)	0.50	Minimum Velocity (m/s)	0.75
Flow per dwelling per day (l/day)	2430	Connection Type	Level Soffits
Domestic Flow (l/s/ha)	0.0	Minimum Backdrop Height (m)	1.000
Industrial Flow (l/s/ha)	0.0	Preferred Cover Depth (m)	1.200
Additional Flow (%)	10	Include Intermediate Ground	✓

Nodes

Name	Dwellings	Cover Level (m)	Manhole Type	Easting (m)	Northing (m)	Depth (m)
F1	9	75.659	Adoptable	545791.322	573562.562	1.350
F2		75.409	Adoptable	545781.987	573553.902	1.350
F3	5	75.020	Adoptable	545796.181	573538.862	1.350
F4		74.200	Adoptable	545777.628	573521.291	1.350
F5	2	73.487	Adoptable	545798.667	573496.705	1.350
F6	5	75.680	Adoptable	545824.967	573548.237	1.350
F7		75.329	Adoptable	545854.065	573516.593	1.716
F8	3	75.185	Adoptable	545855.004	573508.611	1.706
F9		73.717	Adoptable	545834.606	573490.498	1.350
F10		72.975	Adoptable	545826.312	573480.102	1.350
F11		72.398	Adoptable	545822.895	573470.444	1.698
F12		70.885	Adoptable	545806.780	573455.222	2.385
F13		68.493	Adoptable	545810.536	573436.848	1.033

Links

Name	US Node	DS Node	Length (m)	ks (mm) / n	US IL (m)	DS IL (m)	Fall (m)	Slope (1:X)	Dia (mm)
1.000	F1	F2	12.732	1.500	74.309	74.059	0.250	50.9	150
1.001	F2	F3	20.680	1.500	74.059	73.670	0.389	53.2	150
1.002	F3	F4	25.553	1.500	73.670	72.850	0.820	31.2	150
1.003	F4	F5	32.359	1.500	72.850	72.137	0.713	45.4	150
1.004	F5	F11	35.730	1.500	72.137	70.700	1.437	24.9	150
2.000	F6	F7	42.990	1.500	74.330	73.613	0.717	60.0	150
2.001	F7	F8	8.037	1.500	73.613	73.479	0.134	60.0	150
2.002	F8	F9	27.279	1.500	73.479	72.367	1.112	24.5	150
2.003	F9	F10	13.299	1.500	72.367	71.625	0.742	17.9	150
2.004	F10	F11	10.244	1.500	71.625	71.215	0.410	25.0	150
1.005	F11	F12	22.168	1.500	70.700	69.550	1.150	19.3	225

Name	Pro Vel @ 1/3 Q (m/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)	US Depth (m)	DS Depth (m)	Σ Area (ha)	Σ Dwellings (ha)	Σ Units (ha)	Σ Add Inflow (ha)	Pro Depth (mm)	Pro Velocity (m/s)
1.000	0.282	1.229	21.7	0.3	1.200	1.200	0.000	9	0.0	0.0	12	0.405
1.001	0.276	1.203	21.3	0.3	1.200	1.200	0.000	9	0.0	0.0	13	0.410
1.002	0.383	1.573	27.8	0.4	1.200	1.200	0.000	14	0.0	0.0	13	0.554
1.003	0.350	1.302	23.0	0.4	1.200	1.200	0.000	14	0.0	0.0	14	0.486
1.004	0.429	1.761	31.1	0.5	1.200	1.548	0.000	16	0.0	0.0	13	0.621
2.000	0.227	1.132	20.0	0.2	1.200	1.566	0.000	5	0.0	0.0	10	0.319
2.001	0.227	1.132	20.0	0.2	1.566	1.556	0.000	5	0.0	0.0	10	0.318
2.002	0.357	1.773	31.3	0.2	1.556	1.200	0.000	8	0.0	0.0	10	0.501
2.003	0.388	2.076	36.7	0.2	1.200	1.200	0.000	8	0.0	0.0	9	0.561
2.004	0.354	1.757	31.0	0.2	1.200	1.033	0.000	8	0.0	0.0	10	0.496
1.005	0.512	2.621	104.2	0.7	1.473	1.110	0.000	24	0.0	0.0	14	0.730

Links

Name	US Node	DS Node	Length (m)	ks (mm) / n	US IL (m)	DS IL (m)	Fall (m)	Slope (1:X)	Dia (mm)
1.006	F12	F13	18.754	1.500	68.500	67.460	1.040	18.0	225

Name	Pro Vel @ 1/3 Q (m/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)	US Depth (m)	DS Depth (m)	Σ Area (ha)	Σ Dwellings (ha)	Σ Units (ha)	Σ Add Inflow (ha)	Pro Depth (mm)	Pro Velocity (m/s)
1.006	0.529	2.710	107.7	0.7	2.160	0.808	0.000	24	0.0	0.0	14	0.755

Pipeline Schedule

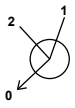
Link	Length (m)	Slope (1:X)	Dia (mm)	Link Type	US CL (m)	US IL (m)	US Depth (m)	DS CL (m)	DS IL (m)	DS Depth (m)
1.000	12.732	50.9	150	Circular Foul	75.659	74.309	1.200	75.409	74.059	1.200
1.001	20.680	53.2	150	Circular Foul	75.409	74.059	1.200	75.020	73.670	1.200
1.002	25.553	31.2	150	Circular Foul	75.020	73.670	1.200	74.200	72.850	1.200
1.003	32.359	45.4	150	Circular Foul	74.200	72.850	1.200	73.487	72.137	1.200
1.004	35.730	24.9	150	Circular Foul	73.487	72.137	1.200	72.398	70.700	1.548
2.000	42.990	60.0	150	Circular Foul	75.680	74.330	1.200	75.329	73.613	1.566
2.001	8.037	60.0	150	Circular Foul	75.329	73.613	1.566	75.185	73.479	1.556
2.002	27.279	24.5	150	Circular Foul	75.185	73.479	1.556	73.717	72.367	1.200
2.003	13.299	17.9	150	Circular Foul	73.717	72.367	1.200	72.975	71.625	1.200
2.004	10.244	25.0	150	Circular Foul	72.975	71.625	1.200	72.398	71.215	1.033
1.005	22.168	19.3	225	Circular Foul	72.398	70.700	1.473	70.885	69.550	1.110
1.006	18.754	18.0	225	Circular Foul	70.885	68.500	2.160	68.493	67.460	0.808

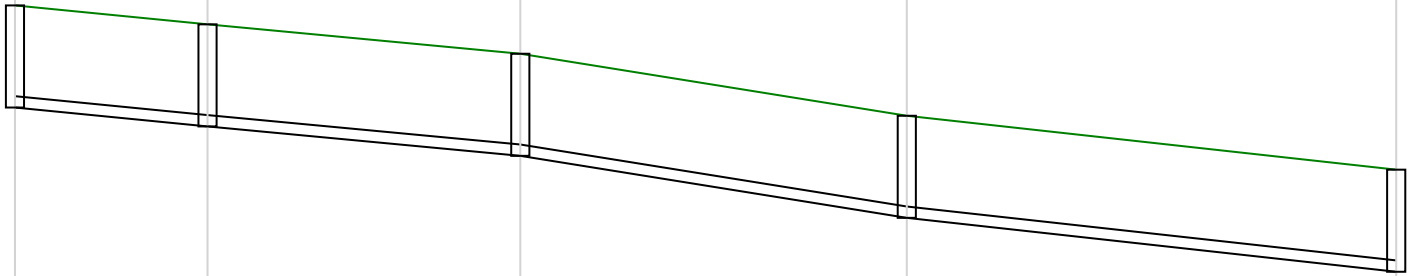
Link	US Node	Dia (mm)	Node Type	MH Type	DS Node	Dia (mm)	Node Type	MH Type
1.000	F1	1200	Manhole	Adoptable	F2	1200	Manhole	Adoptable
1.001	F2	1200	Manhole	Adoptable	F3	1200	Manhole	Adoptable
1.002	F3	1200	Manhole	Adoptable	F4	1200	Manhole	Adoptable
1.003	F4	1200	Manhole	Adoptable	F5	1200	Manhole	Adoptable
1.004	F5	1200	Manhole	Adoptable	F11	1200	Manhole	Adoptable
2.000	F6	1200	Manhole	Adoptable	F7	1200	Manhole	Adoptable
2.001	F7	1200	Manhole	Adoptable	F8	1200	Manhole	Adoptable
2.002	F8	1200	Manhole	Adoptable	F9	1200	Manhole	Adoptable
2.003	F9	1200	Manhole	Adoptable	F10	1200	Manhole	Adoptable
2.004	F10	1200	Manhole	Adoptable	F11	1200	Manhole	Adoptable
1.005	F11	1200	Manhole	Adoptable	F12	1200	Manhole	Adoptable
1.006	F12	1200	Manhole	Adoptable	F13	1200	Manhole	Adoptable

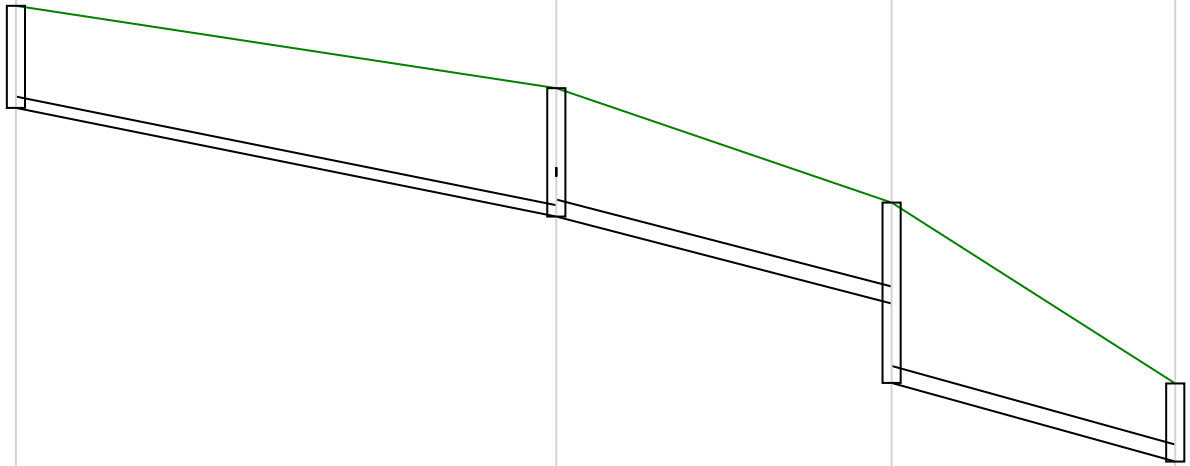
Manhole Schedule

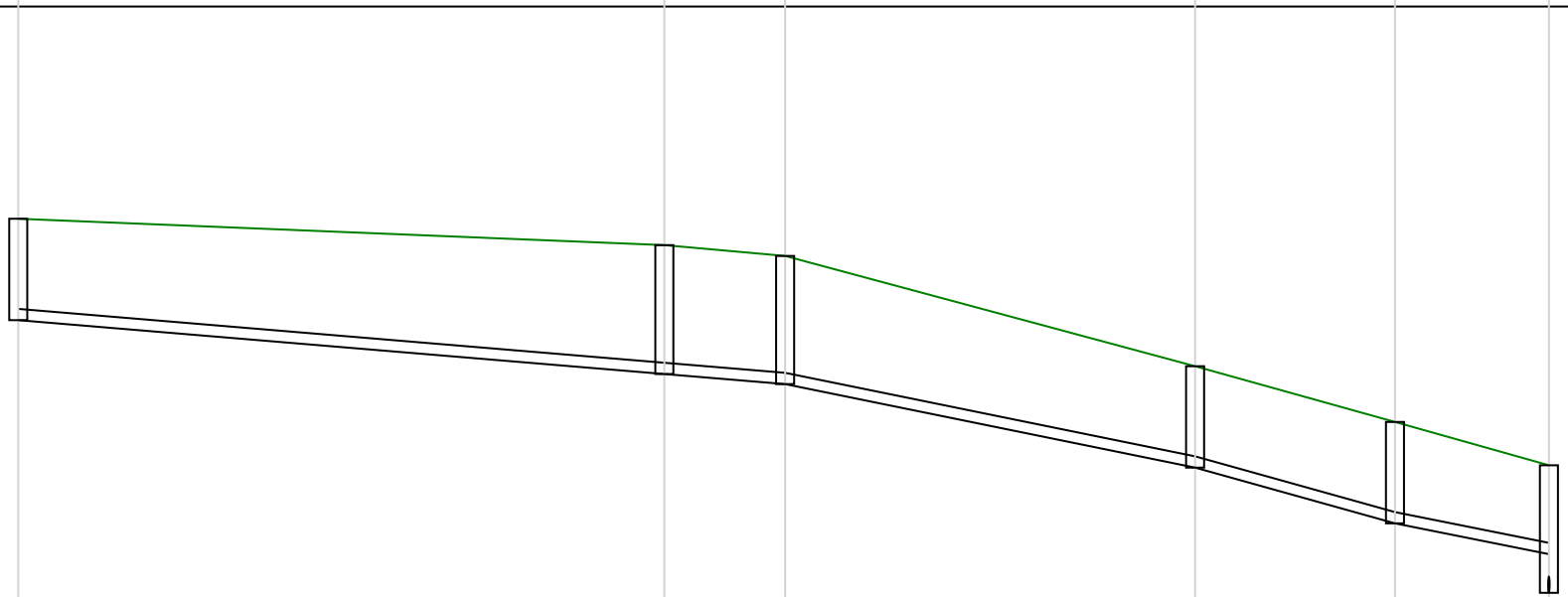
Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Connections	Link	IL (m)	Dia (mm)
F1	545791.322	573562.562	75.659	1.350	1200	 0	1.000	74.309	150
F2	545781.987	573553.902	75.409	1.350	1200	1  0	1.000 1.001	74.059 74.059	150 150

Manhole Schedule

Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Connections	Link	IL (m)	Dia (mm)
F3	545796.181	573538.862	75.020	1.350	1200	 1	1.001	73.670	150
						0	1.002	73.670	150
F4	545777.628	573521.291	74.200	1.350	1200	 1	1.002	72.850	150
						0	1.003	72.850	150
F5	545798.667	573496.705	73.487	1.350	1200	 1	1.003	72.137	150
						0	1.004	72.137	150
F6	545824.967	573548.237	75.680	1.350	1200				
						0	2.000	74.330	150
F7	545854.065	573516.593	75.329	1.716	1200	 1	2.000	73.613	150
						0	2.001	73.613	150
F8	545855.004	573508.611	75.185	1.706	1200	 1	2.001	73.479	150
						0	2.002	73.479	150
F9	545834.606	573490.498	73.717	1.350	1200	 1	2.002	72.367	150
						0	2.003	72.367	150
F10	545826.312	573480.102	72.975	1.350	1200	 1	2.003	71.625	150
						0	2.004	71.625	150
F11	545822.895	573470.444	72.398	1.698	1200	 1	2.004	71.215	150
						2	1.004	70.700	150
						0	1.005	70.700	225
F12	545806.780	573455.222	70.885	2.385	1200	 1	1.005	69.550	225
						0	1.006	68.500	225
F13	545810.536	573436.848	68.493	1.033	1200	 1	1.006	67.460	225

Node Name	F1	F2	F3	F4	F5
A4 drawing Hor Scale 500 Ver Scale 100 Datum (m) 68.000					
Link Name	1.000	1.001	1.002	1.003	
Section Type	150mm	150mm	150mm	150mm	
Slope (1:X)	50.9	53.2	31.2	45.4	
Cover Level (m)	75.659	75.409	75.020	74.200	73.487
Invert Level (m)	74.309	74.059 / 74.059	73.670 / 73.670	72.850 / 72.850	72.137
Length (m)	12.732	20.680	25.553	32.359	

Node Name	F5	F11	F12	F13
A4 drawing Hor Scale 500 Ver Scale 100 Datum (m) 65.000				
Link Name	1.004	1.005	1.006	
Section Type	150mm	225mm	225mm	
Slope (1:X)	24.9	19.3	18.0	
Cover Level (m)	73.487	72.398	70.885	68.493
Invert Level (m)	72.137	70.700 / 70.700	69.550 / 68.500	67.460
Length (m)	35.730	22.168	18.754	

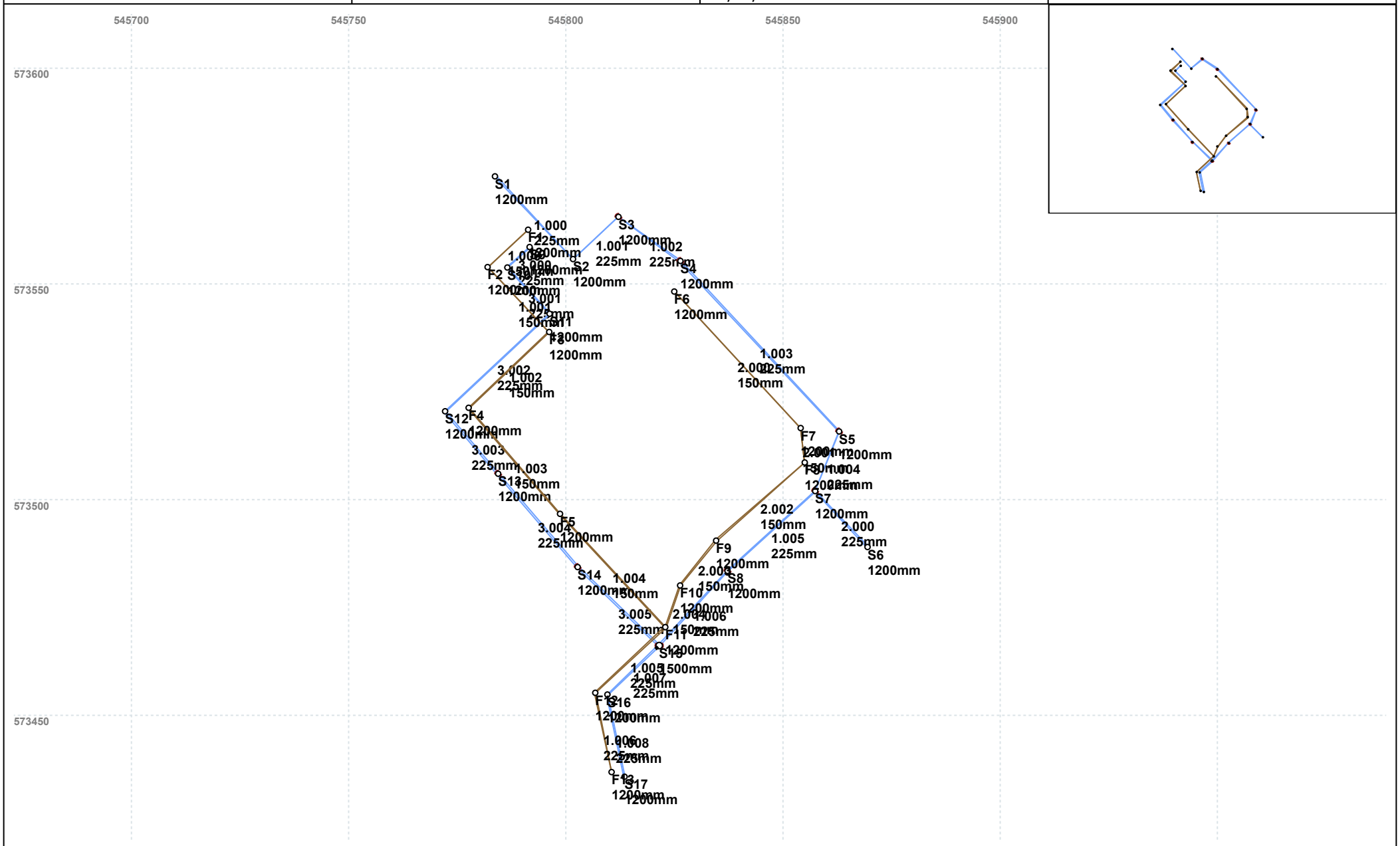


A4 drawing

Hor Scale 500
Ver Scale 100

Datum (m) 67.000

Node Name	F6		F7		F8		F9		F10		F11
Link Name	2.000		2.001		2.002		2.003		2.004		
Section Type	150mm		150mm		150mm		150mm		150mm		
Slope (1:X)	60.0		60.0		24.5		17.9		25.0		
Cover Level (m)	75.680		75.329		75.185		73.717		72.975		72.398
Invert Level (m)	74.330	73.613	73.613	73.479	73.479	72.367	72.367	71.625	71.625	71.215	
Length (m)	42.990		8.037		27.279		13.299		10.244		



Appendix C

Irish Water Documents

Irish Water Documents:

- Confirmation of feasibility Letter.

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

Ciaran Galvin

Cork County Council
The Courthouse
Skibbereen
Co. Cork
P81 DX52

7 June 2023

Our Ref: CDS23003794 Pre-Connection Enquiry
Clontead Beg, Coachford, Co. Cork

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 26 unit(s) at Clontead Beg, Coachford, Co. Cork **(the Development)**.

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

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

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

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

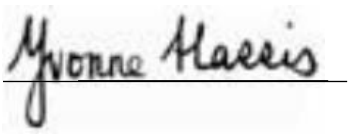
Where can you find more information?

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

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)

Appendix D

Utilities

- ESB Map
- Gas Networks Ireland Map

ESB Networks

TITLE: 20240207-008_A3

COLOUR CODE:

- BLACK - 38KV & HIGHER VOLTAGE OVERHEAD LINES
- GREEN - MV(10KV/20KV) OVERHEAD LINES
- BLUE - LV (400V/230V) OVERHEAD LINES
- CYAN - 38KV & HIGHER VOLTAGE UNDERGROUND CABLE ROUTES
- RED - MV/LV (10KV/20KV/400V/230V) UNDERGROUND CABLE ROUTES

DATE: 07-Feb-2024

** SCALE: 1:2000

** SCALE WHEN PRINTED ON AN A3 PAGE
XY COORDINATES DISPLAYED IN IRISH GRID COORDINATE SYSTEM

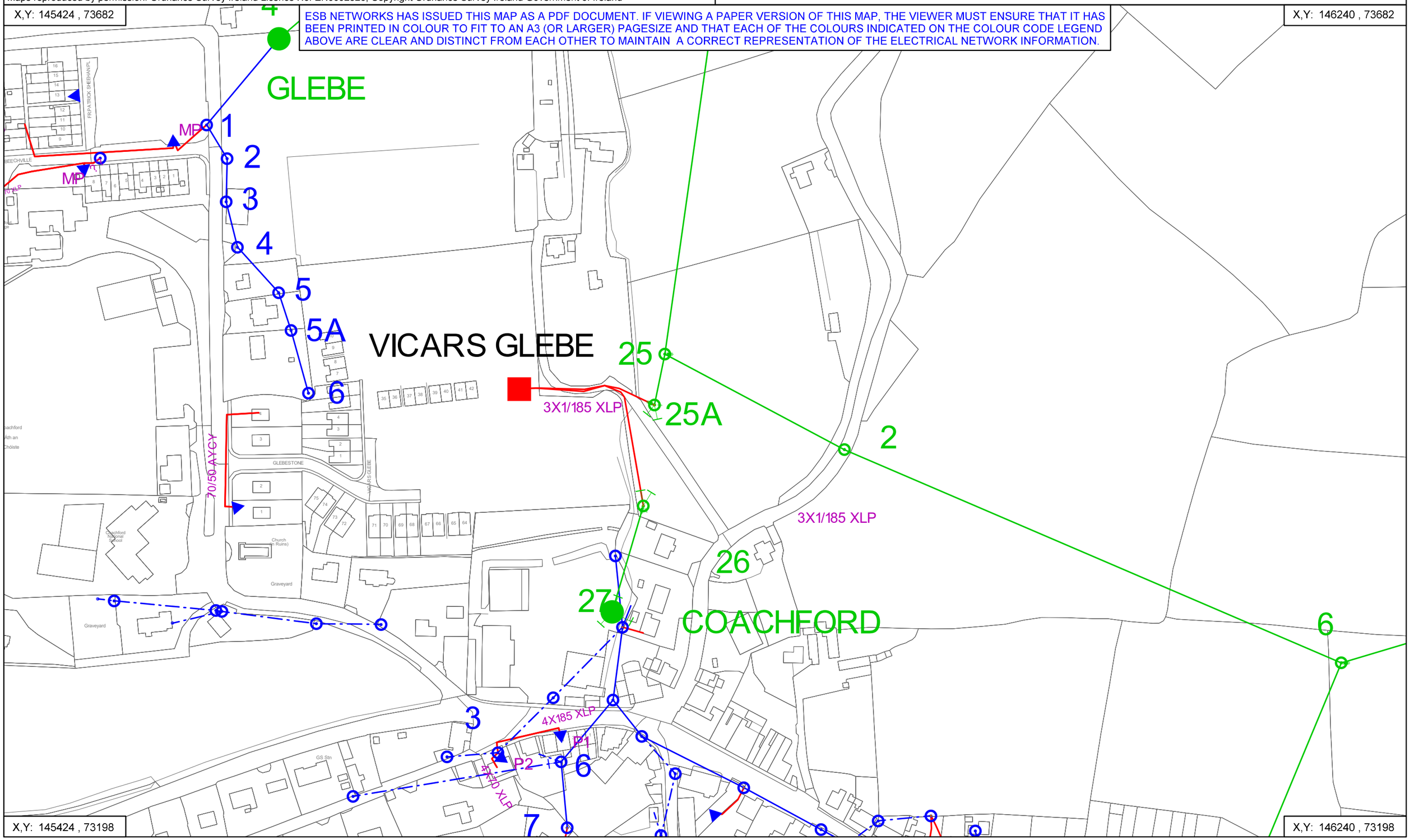
WARNING

THIS MAP INDICATES THE APPROXIMATE LOCATION OF ESB TRANSMISSION (400KV, 220KV, 110KV, 38KV) AND DISTRIBUTION (20KV, 10KV, 230V/400V) UNDERGROUND CABLES AND OVERHEAD LINES IN THE GENERAL AREA OF THE PROPOSED WORKS. ESB NETWORKS TAKES NO RESPONSIBILITY FOR THE ACCURACY OR COMPLETENESS OF THE MAP. IT IS THE USER'S RESPONSIBILITY TO INDEPENDENTLY VERIFY THE INFORMATION AND THE LOCATION OF UNDERGROUND CABLES AND OVERHEAD LINES. LOW VOLTAGE (230V/400V) SERVICE CABLES (E.G. HOUSE SERVICES, FACTORY/SHOP SERVICES, PUBLIC LIGHTING LAMP SERVICES, ETC) ARE NOT INCLUDED BUT THEIR PRESENCE SHOULD BE ANTICIPATED. THE DEPTHS OF UNDERGROUND CABLES MUST NEVER BE ASSUMED. ADDITIONAL MORE DETAILED INFORMATION IS AVAILABLE FOR HIGH VOLTAGE TRANSMISSION UNDERGROUND CABLES (38KV, 110KV, 220KV, 400KV) FROM THE LOCAL ESB NETWORKS TRANSMISSION REPRESENTATIVE - SEE ATTACHED LIST FOR CONTACT DETAILS OR CALL 1800 372 757. NO WORK SHOULD BE CARRIED OUT IN THE VICINITY OF 38KV OR HIGHER VOLTAGE UNDERGROUND CABLES WITHOUT PRIOR CONSULTATION WITH ESB NETWORKS. BEFORE ANY MECHANICAL EXCAVATION IS UNDERTAKEN, THE ACTUAL LOCATION OF ALL UNDERGROUND ELECTRICITY CABLES MUST BE ESTABLISHED AND VERIFIED ON THE SITE USING: (A) UP-TO-DATE MAP RECORDS; (B) CABLE LOCATER EQUIPMENT OPERATED IN BOTH POWER AND RADIO MODES; (C) CAREFUL HAND DIGGING OF TRIAL HOLES USING 'SAFE DIGGING PRACTICE'. REFER ALSO TO 'HSA CODE OF PRACTICE FOR AVOIDING DANGER FROM UNDERGROUND SERVICES'. ESB TAKES NO RESPONSIBILITY FOR AND SHALL BEAR NO LIABILITY, HOWSOEVER ARISING, IN RELATION TO ANY DAMAGE, INJURY/DEATH OR LOSS OF SUPPLY AS A RESULT OF DAMAGE OR INTERFERENCE WITH ITS NETWORKS.

ESB NETWORKS HAS ISSUED THIS MAP AS A PDF DOCUMENT. IF VIEWING A PAPER VERSION OF THIS MAP, THE VIEWER MUST ENSURE THAT IT HAS BEEN PRINTED IN COLOUR TO FIT TO AN A3 (OR LARGER) PAGESIZE AND THAT EACH OF THE COLOURS INDICATED ON THE COLOUR CODE LEGEND ABOVE ARE CLEAR AND DISTINCT FROM EACH OTHER TO MAINTAIN A CORRECT REPRESENTATION OF THE ELECTRICAL NETWORK INFORMATION.

X,Y: 145424 , 73682

X,Y: 146240 , 73682



X,Y: 145424 , 73198

X,Y: 146240 , 73198

Important Safety Notice: Damage to gas pipelines can result in serious injury or death. Gas network information is provided as a general guide. The exact location and depth of medium or low pressure distribution gas pipes must be verified on site by carrying out necessary investigations, including, for example, hand digging trial holes along the route of the pipe. Service pipes are not generally shown but their presence should always be anticipated.

High pressure transmission pipelines are shown in red. If a transmission pipeline is identified within 10m of any intended excavations then work must not proceed before GNI has been consulted. The true location and depth of a transmission pipeline must be verified on site by a representative of GNI. Contact can be made through 1800 427 747.

All work in the vicinity of the gas network must be completed in accordance with the current edition of the Health and Safety Authority publication, 'Code of Practice For Avoiding Danger From Underground Services' which is available from the Health and Safety Authority (0818 289 389) or can be downloaded at www.hsa.ie.

- Aurora Telecom Duct
- Aurora Telecom Sub Duct
- Aurora Telecom Inserted Gas Pipe

Aurora TELECOM

Aurora Telecom Queries - 01-8926166 (Office Hours)
Aurora_Network_Queries@gasnetworks.ie
Aurora Telecom Emergency Only 1800 427399 / 01 2030120

- Transmission Pipe (High Pressure)
- Transmission Pipe (Construction Issue)
- Distribution Pipe (Medium Pressure)
- Distribution Pipe (Low Pressure)
- Service Pipe (Medium Pressure)
- Service Pipe (Low Pressure)
- Strategic Pipe (Medium Pressure)
- Strategic Pipe (Low Pressure)
- Inserted
- Abandoned Pipe

C=?	Cover (depth in metres)		Pressure Monitor
CP	CP Test Point		Protection (Slabbing)
	End Cap		Protection (Sleeve)
	Hot Tap		Reducer
	Installation		Service Terminator
	Valve		Tee
	Mains Verification**		Transition

** Please contact GNI on 1800-427747 for specific information

DIAL BEFORE YOU DIG 1800 42 77 47
In Emergency call 1800 20 50 50 Gas Networks Ireland

Gas Networks Ireland

GAS NETWORK INFORMATION

Description: Coachford

Location: 545832,573474

Plot Date: 31/01/2024 12:53	Scale: 2500 @ A3
Plotted By: 3948	Ref ID: *3948_31012024125302*